

ESG in Business:

How Environmental, Social and Governance Practices are Changing the Purpose of Business©

Larry Berglund SCMP MBA FSCMA
Principal
Presentations Plus Training & Consulting Inc.

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This publication is for my many supply chain colleagues, business associates, students, and other rule breakers that know we can make a difference.

*In each and every day, there is a purpose that we live;
And the secret that we share, is never take more than we give.*

Isn't It Strange ©2024.

Berglund, Larry. Rugg, Nick. Cuperus, Wil.

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December 2025 Prologue

After 3+ years of researching, editing, updating, and publishing this book on my website, this will be the last edition which I personally contribute to. At the end of 2025, I am retiring from my consulting practice and facilitating workshops and courses.

What started as a few pages for a course I was developing, led to this deep dive into the world of environmental, social, and governance practices, which I chronicled in *ESG in Business*. The geopolitical landscape has changed greatly over this relatively short period of time. The international order of business was upended, as we knew it, by a 2025 US ideological shift in foreign and industrial policies, which remains to be seen as being sustainable – economically, socially, and legally.

The vessel of exchange between countries and companies is adapting to an unknown outcome. Each month there are wide swings in policies brought about by monetary and fiscal concerns and technology developments, from a variety of actors. Competition and economic survival are stressed in all sectors. There is a need for government intervention in many cases to support businesses and industries during this time of chaos. The rule of law has been suspended too often to seek advantages through coercive changes to established trade rules and practices.

I have used supply chain strategies as the lens to track the ESG journey. For every challenge there is the proverbial opportunity. Leading companies are rethinking their sourcing and sales strategies.

Governmental institutions are rethinking their purpose, be they foreign or domestic. The global acknowledgement to reduce dependence on fossil fuels led to interesting investments in EVs and other technology advances, which have not proven to be successful, due to the affordability problems. Still, moving towards more responsible and sustainable forms of energy will remain the goal. In spite of indifferences in some circles, emissions and the use of toxic materials can and should be reduced. The business model for doing so requires better timelines based on science.

Having taught many courses over the decades, I always found frustration with outdated teaching materials, as did the students. The reason I wrote *ESG in Business*, was to eliminate this problem. Anyone who downloads a copy of this book, should know it is the latest research on the subject, at all times. Leading organizations which use the book as core reference material, benefit from this position, as do their audience.

To this end, I am pleased to announce that NECI The Procurement School, Inc., (Procurement School) based out of Victoria, B.C., will continue to ensure the *ESG in Business* content stays relevant. This is no easy task and is commendable to see this commitment to share the supply chain strategies affecting public and private sector organizations. Procurement School has been a long-time, credible source of supply chain practices. While focused on the public sector, they have a cadre of professionals with private and public sector legal and procurement experience.

As of January 2026, *ESG in Business*, will be the copyright property of The Procurement School. Anyone wanting a copy must acquire it through The Procurement School. <https://theprocurmentschool.com/>

Thank you to all the colleagues, organizations, and readers who have enjoyed *ESG in Business* to date. I'm pleased the publication will continue in a robust format to enable business people to make decisions within their sphere of influence, for the good of all.

Larry

Foreword

As soon as a book is written, it is out of date. The subject of environmental, social and governance (ESG) practices is constantly in flux. Technology is exploding; disruptive materials and designs are quickly being implemented; social values are being strategized and evolving as practices evolve; science and engineering are making a difference; geopolitical strategies are self-serving rather than serving the greater good, thriving in an era of sound bites; competing ideologies are adding to increased protectionism in trade wars; global warming was being accepted as a reality based on research and the visible damages appearing in the forms of fires, floods, and levels of toxins in the water, air and the earth which impacts everyone. Global warming has doubters which use their dogma to trump scientific evidence. Stakeholders are much more aware of the purpose of business; the means to achieve their ends must meet stakeholder expectations.

My research methodology is a daily scan of multiple sources of data, media stories, academic papers, and business publications to glean the nuanced thoughts and assess the potential outcomes. I draw from a variety of books and newsletters on ESG and cross-reference the ideas for trends. I seek input from colleagues, business owners, and local and international business associations, as to what they see happening and try to connect the dots. I publish the edits and updates on a monthly basis. I provide a synopsis of the monthly research updates and edits at the beginning of each publication for ongoing readers to locate new information.

When I listen to CEOs and other business leaders, there is a level of frustration from outdated government regulations and practices preventing new products from going on the market. There is a need for due diligence on the part of regulators, but there is also a need for expediency, as we see temperatures rising and increased levels of particulates compounding our global problems. Extending existing standards to protect markets or products, limits the investment opportunities and support for new ideas which support sustainability.

We are seeing that EVs have not met stakeholder expectations in the area of affordability. After 20-years EVs, remain a high-priced consumer option, requiring massive government subsidies across the supply chains and interventions in public policies. Public policies on electrification of transportation need revisions.

I have tried to compile emerging information from a variety of sectors into this single reference document. I refrain from inserting too many subjective opinions or ideas which are not scalable. I strive to mitigate bias, whether mine or others, however, it is not entirely possible. The fact that I am writing on ESG as a purpose for business to affect a positive change, is a bias in itself. Guilty as charged. My personal and professional philosophies and values are expressed in the materials, while I have endeavoured to be objective. This is my legacy project and my give back, to help others make better informed decisions.

I have spent the past two decades on ESG-related strategies and 45-years in supply chain management - arguably too long in the latter; however, I continue to find supply chain discussions a useful conduit to exchange ideas and introduce tomorrow's solutions.

I hope you find this material to be an insightful and a professional compilation of ESG ideas to apply within your sphere of influence. That is the intention. I would like to hear about ESG in *your* business.

Larry Berglund

Summary of updates and edits in this edition

Each month I explore a wide variety of ESG subjects which relate to business practices. While my objective is to share positive results under the heading of ESG and to note where negative or damaging practices have an impact. These can be either social, environmental, or economic. Ultimately, all decisions can be quantified in terms of their monetary impact. Whether specific impacts will be generational or shorter in intensity, is almost impossible to determine at the time.

As we witness changes in business governance, which are concurrently juxtaposed by geopolitical events, we get a better sense of where trends are emerging, retreating, or being accepted as a best practice. The intent is to guide our attention and help us adapt to the market signals.

- Bamboo ceiling
- Canada trading with BRICS countries
- Copyright to *ESG in Business*
- Emission targets being revised
- EV sales getting unplugged
- Haisla \$6B LNG project on hold
- India's new labour laws
- Interprovincial trade barrier removals stuck
- Maritime Association for Clean Seas
- PHEV drivers only using electric option for 30% of the time
- The Procurement School

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Executive summary

If you are in a business involving goods and services, or a consumer, you are aware of supply chains. Major global events have been impacting supply chains for years: the shift from a fossil fuel energy supply to renewable energy, by most countries; the digitalization of information; the electrification of transportation; the need for decarbonization in all sectors to reduce emissions; eliminating plastics and waste; the circular economy; diseases affecting humans and wild life; global warming; emerging market arenas; and environmental, social, and governance (ESG) policies.

Global events continue to expose the lack of resilience in sourcing strategies. The circular economy is a decade old and gaining traction to affect how we view resources and design. ESG is showing us that we can prosper with dignity and respect. Developing supply chains with responsible materials and labour practices is possible. Addressing environmental concerns in a sustainable business model requires challenging the status quo. These changes necessitate national and international interventions by business, thought leaders, and governments.

ESG blueprints and road maps have been written and are being updated to reflect to evolving ideas and targets. We need more companies and governmental agencies to adopt the best and leading solutions to ensure a planet which is going to sustain our collective ecosystems. The solutions are not secrets. The United Nation's Sustainable Development Goals are readily available; the International Labour Organization conventions are market-tested; the 2007 United Nations Declaration on the Rights of Indigenous Peoples reflects the acknowledgement in social obligations; the ISO 14001 for environmental and 26000 social value standards are well known; leading brand managers and manufacturing companies are sharing their processes and technologies; industrial associations are advocates for better methodologies; investors and stakeholder voices are being heard; the principles of the circular economy are working; innovative logistics are driving down costs and improving services; disruptive technologies are shaking the status quo; and the expectations of consumers and customers demand affordability and availability.

Supply chain managers have been part of the transactional process in all sectors. As Artificial Intelligence and the Internet of Things expands exponentially, the role of supply chains needs to adapt to be relevant as well. There will always be a cost of goods to consider but it will be a much broader view with the total cost of ownership internalized as much as possible. See **Addendum V** for a TCO Worksheet.

This publication looks at the many touch points in supply chains in multiple sectors and discusses how ESG in changing the purpose of business. It looks at potential winners and losers in the markets and the shift in power by early adopters. The metrics for success in business must include objective financial and non-financial reports.

Whether your organization has embraced ESG or is considering the adoption of many of the practices, the content is to support a continuum for ESG to flourish.

And ESG is not without its detractors. Counterpoints are important part of the discussions and debates.

What got us here won't get us to where we want to be going. We are leaving behind much of the traditional industrial strategies and forging new partnerships to achieve what is possible and necessary. This will result in massive investments to move to renewable energy sources. The risks are steep, as are the rewards to those who do so successfully.

ESG is a global shift affecting generations of peoples and facing the multiplicity of problems which can be attributed to anthropogenic actions. There is a burning necessity to correct our direction and get it right, in the time remaining. The clock is ticking.

The Purpose of business

Business decisions have been influenced by the theory of the *Invisible Hand*. The Invisible Hand is an economic term coined by Scottish economist Adam Smith over two hundred years ago. The basic premise is that people will do business with each other in a free market that best determines the price of goods and services. An unfettered free market does not want any government intervention. This concept upheld the idea that when everyone works for their own self-interest, we will collectively be better off.

We can now see the shortcomings of the Invisible Hand, which originated in a time with slave labour, a privileged few controlling commerce, working conditions were harsh, child labour was acceptable, and with an absence of environmental responsibility. Natural resources were seen as being infinite but also worth fighting wars over. The Invisible Hand directed the expansion of the Industrial Revolution.

Fast forward to the 21st Century. Many of the shortcomings of the Invisible Hand have been eradicated in the marketplace – but not all. We acknowledge that government intervention is necessary to enforce responsible business practices. We complement the Invisible Hand with a term this author refers to as the *Indivisible Hand* of government. The Indivisible Hand guides and, out of necessity, monitors the Invisible Hand to stimulate social and economic interests being realized in a sustainable manner.

Any model which is primarily profit-based from a Supply side needs to be effectively balanced by the Demand side. Supply chain practices, built on the Invisible Hand values, were aimed at attaining the lowest cost. This theory seemed to make sense until we looked deeper into the supply chain and found that the lowest cost came at the expense of social values, environmental degradation, and the erosion of long-term economic development.

Until recently, business management training was primarily based on Smith's theory that as long as a product was legally sold, the market would set the price and should not concern itself with the public welfare – that was the job of government. Public sector procurement also followed the Smith theory, where the lowest cost from a tendering process must deliver the best value. Procurement decisions were largely one-dimensional – with economic interests being the first choice.

However, in the 1980s, quality management started to drive value, which in turn affected costs. Investing in quality management practices was primarily a means to ensure economic benefits would accrue. Environmental interests followed quality management rather reluctantly – until we could connect environmental benefits with sustaining profits. Social procurement practices didn't hit the procurement radar until the early 2000s.

Procurement, which is a transactional tool of the Demand side, needed to redefine the value proposition to go beyond the lowest cost and be based on values representing a larger stakeholder base. Procurement in private and public sectors began realizing that the lowest cost was not a sustainable model. The Indivisible Hand, through legislation and by supporting international standards, has been transformative in affecting how we think of value. We need a three-dimensional model with *economic* and *environmental* interests meeting the *expectations* of stakeholders.

Government procurement in Canada is being reformed to reflect the trade barriers imposed in 2025 by the US government. The purpose of government procurement is to operationalize strategies; set expectation for suppliers to meet; act apolitically to ensure value for money; and support accountability. This will initiate a shift away from lowest cost to a balanced model which favours Canadian jobs, materials, and security.

ESG is growing in business practices as externality costs increase. Externalities include GHG emissions,

climate change, health and safety practices, inclusivity, equity, or continued use of toxic chemicals. The social license of a business is granted by its employees, stakeholders, regulators, customers, and the community at large. Companies which adapt a sense of purpose mitigate the risks of externalities through their policies and seek to build their social capital. Externality costs are borne by society – not directly in a company's operations.

We could surmise that business created the problems we are trying to resolve today but that is too simple. We could also say that business will get us out of the problems we are in today. Again, not entirely true. There will be a constant push and pull by business as ESG issues surface, receive attention, and morph into newer challenges. It's how we as a people have progressed globally. Commerce created wealth and it can support sustainability and inclusivity. It will be an asynchronous movement between developed economies and emerging economies. Where the developed economies have benefited from a technical advantage, the emerging economies have the opportunities to access and accelerate these benefits.

The 2024 COP29 Summit, raised the point that the richer economies may need to raise US\$ 1 trillion, within a decade, to aid the more vulnerable countries in combatting climate change. If this doesn't occur at some level of financing or loans, the people are practically sentenced to try and eke out a living within a declining environment. Economic losses and social stress will compound. This will lead to those being affected trying to try and migrate to more favourable countries that may not want this type of immigration. All adding to the geo/political tensions. Compounding the environmental concerns with global warming, was the termination of all US scientific authors and contributors in 2025, by the US administration, on the National Climate Assessment report. These studies had been in effect since 1990. <https://www.reuters.com/sustainability/cop/trump-administration-dismisses-all-authors-key-climate-report-email-says-2025-04-28/>

It has been a decade since Harvard's Joseph Henrich coined the term, *WEIRD*. Western, Educated, Industrialized, Rich, and Democratic. This term captures the attributes of western business. If you are reading this, you are likely WEIRD. Being WEIRD is not good or bad. It's part of our evolutionary path. ESG is a stepping stone along the path. Within the WEIRD world is the conflict with First Nations' perspectives and other Indigenous peoples, which are slowly being addressed.

As individuals, a *sense of purpose* triggers an intrinsic force in us to achieve what we want in life. It shouldn't be for only for our self interests, as that is not sustainable. In business, a sense of purpose creates a value proposition that can inspire, not only the leaders of that organization, but its staff to realize the mutual benefits of their collective efforts and be relevant to and appreciated by their customers. The shift in the purpose of business has gone from making profits, at any cost, to making profits with a sense of responsibility for all stakeholders, protecting environmental interests, and building social capital. Economic outcomes are but one measure of a business.

Shareholder Primacy vs Purpose-Centric Models

Competing interests are good for discussions. By presenting business models which argue different perspectives on the purpose of business, we develop a deeper understanding of the role of business in society as a contributor to economic benefits and social values. Economist Milton Friedman, captured and influenced the American view in his quote, "*social responsibility of business is to increase its profits.*" That is the basis of the shareholder primacy theory. Companies are expected to put shareholder interests above any other interests. Even at the expense of communities or social norms. Shareholder primacy focuses on short-term results and lesser attention to business ethics. If a business only focuses on making profits for its shareholders, the model is seldom sustainable for future growth. Truly, privately-owned companies can certainly do as they see fit and may only want to serve as a vehicle for their family interests.

There is an important role for not-for-profit (NFP) business operations. Many NFPs are purpose- or mission-based organizations, which operate to serve the greater good. Purpose-centric theory is based on the intentions of a business to intentionally and strategically go beyond the profit motivation and to commit to creating positive outcomes through social and environmental impacts. If it sees profits, along with social and environmental values, as a meaningful reason for being in business, it is more likely to be sustainable. One of the main reasons is the ability to attract and retain talented staff.

Successful NFPs are under the leadership of entrepreneurs who fill a void in the market. The management and employees of NFPs enjoy many of the benefits of for-profit companies. The main difference is that surplus revenues or “profits” from NFP operations are required to be reinvested into the communities, which is their *purpose*.

When the leadership has a purpose-centred philosophy this is reflected in its values and business practices. Purpose-centric companies need to ensure their fiscal responsibilities are not lost to their social commitments. Long-term profitability is still a mandate for being sustainable. See the section *social enterprises* for more insights.

In the public sector, where there is not a profit motive, stakeholders want efficient service delivery, in a transparent manner with integrity and accountability. Governments, as the major players on the demand side, need to set the standards to which the private sector will comply. The role of government procurement is to have *measurable outcomes* rather than a focus on *transactional* performances, based on job descriptions.

Embracing the circular economy

VUCA, the acronym coined in 1985, captures the market conditions of today. Volatile, uncertain, complex, and ambiguity. Sustainability through the circular economy will not be a linear process but convoluted with many unintended consequences and unexpected breakthroughs along the way. We are facing a polycrises of events from wars to geopolitical instability.

At the end of 2024, the average global temperature continued to rise. CO₂ emissions were at a record high of 420 parts per million which is up ~12% from 2004, and 51% higher than pre-industrial levels. Methane is 165% higher than a couple centuries ago. Scientists insist that this is not sustainable. In spite of all the global commitments to reduce the emission levels, collectively, we are failing in the implementation of the strategies to reverse the global warming. The Paris 2015 targets are not being realized. We have annualized Climate Conferences (COP) where world leaders talk about solutions. It would seem that after the event, the talk has been just that. Pledges cannot be platitudes. The US dramatically announced its withdrawal from the Paris accord in January 2025. In 2025, the EU will soften its GHG reduction goals for 2030-2040, as they are not achievable and are not affordable, under current market conditions. <https://www.reuters.com/sustainability/climate-energy/eu-delay-2040-climate-target-proposal-beyond-q1-commission-2025-03-21/>

We need to double down on the commitments to save our planet. One of the global strategies for businesses and governments to follow is framed in the principles found in the circular economy.

The Ellen MacArthur Foundation has been accelerating the transition to a circular economy since its inception in 2010. The circular economy is based on the (3) principles:

1. Eliminating waste and pollution;
2. Circulating products and materials; and the
3. Regeneration of nature.

This is in stark contrast to the conventional linear model which is based on consumption of materials and resources rather than their conservation.

To remain competitive on a cost basis, leading companies recognize that with changes in legislation, consumer demand, technology and environmental standards, they must be looking ahead to remain financially viable. Our economy and quality of life have been based on unfettered consumption. Now we are focusing on the conservation of resources. The transportation sector functions in a global market with international agreements and extended supply chains, originally intended to supply goods at the lowest cost.

Circularity in supply chains is providing solutions to decades of myopic strategies where resources were seen as being infinite. A sustainable economy means we practice *economic decoupling* on a mass scale. Ergo, economic growth without a corresponding increase in consumption in energy and resources, nor in environmental stress. Greenhouse gases are killing profits and the planet. The circular economy is one of the means towards sustainability and is not a solution in itself. It is a framework to build from.

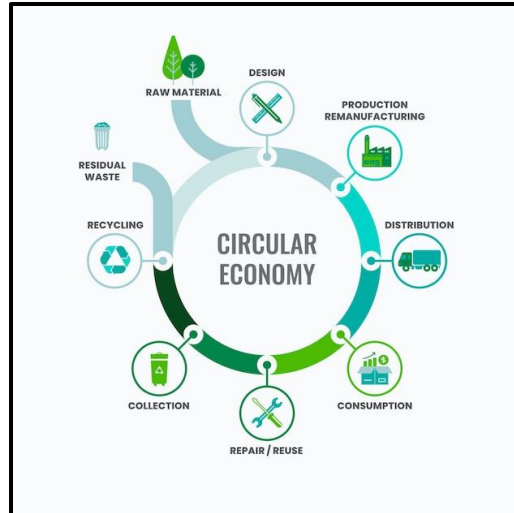
The widely referenced 7R Model, which forms the basis for design of products in the circular economy, includes:

1. Recycle
2. Repair
3. Reuse
4. Repurpose
5. Refurbish
6. Reduce
7. Rethink

We respectfully add a number 8, *Responsibility*. **Addendum IV** provides a self-assessment on alignment of an organization's products and values with the 7R Model.

Authors Velenturf and Purnell describe a sustainable circular *society*. This is one which maintains environmental quality and economic prosperity for current and future generations. Their value framework considers (3) components:

- A. Social and individual well-being: Create conditions that offer equity in realizing quality of life that at least meets human rights standards for all;
- B. Environmental quality: Using resources within planetary boundaries, enhancing natural capital within and across generations;
- C. Economic Prosperity: Collective organization of fair access to resources within and across generations to enable social and individual well-being and enhance environmental quality.



Circular economy in action

A great example of the circular economy, which has been used in Vietnam for hundreds of years, is the making of bricks. Rice, being their essential food item, is a very valuable resource in so many ways. Rice fields are flooded from the Mekong River and after a couple years, the silt needs to be removed in order to plant the next crops. The farmers dredge the silt from their fields and sell it to the local brick maker via river barges. The local brick maker needs fuel to keep the brick ovens heated. The brick maker also buys rice husks for fuel. The brick maker hires local villagers and makes a batch of bricks in a mold from the silt; the bricks are dried in the sun for several days and then thousands of the *raw* bricks are hand loaded into a brick oven and *baked* for a few days and left to cool; then they unload the brick oven and sell the bricks to local builders. A zero waste, circular model. Affordable and practical. If there is a down side to this, the burning of the rice husks, does release smoke, while the left-over ash is sold back to the farmers for fertilizer.



ISO 59000

The ISO 59000 series, circular economy standards are aimed at small, medium enterprises (SMEs) wanting to adopt circular economy practices. These new standards introduced in June 2024, are intended to simplify the means towards circular economy values and support more businesses taking on this strategy. The ISO 59000 standards give SMEs an opportunity to differentiate themselves in a

crowded market.

The standards help SMEs to respond to governmental tenders and larger corporate opportunities requiring commitments to circular economy values. The easier it is for SMEs to adapt, the market capacity for suppliers with circular economy resources will increase to meet growing demands.

1. Sustainability Metrics Framework: ISO 59020 provides a clear set of metrics to track and report circularity actions. This helps businesses identify areas for improvement and demonstrate their commitment to stakeholders.
2. Enhanced Resource Management: By defining best practices for resource efficiency, the ISO 59000 series guide businesses in optimizing their resource use, reducing waste, and lowering operational costs.
3. Unified Terminology: Harmonized terms and definitions reduce confusion and ensure that all stakeholders, from suppliers to customers, are on the same page regarding sustainability efforts.
4. Pathway to Circularity: ISO 59010 provides detailed guidance about how businesses should prepare their entry into the circular economy and execute it.
5. Framework for Accountability: With these standards in place, businesses can hold consultants and service providers accountable for delivering tangible results in their circular economy initiatives.

ISO standards are useful when looking at integrating the UN Sustainable Development Goals (SDGs) into business practices. As an example, *ISO 26000* Social Responsibility and *ISO 37101* Sustainable Development in Communities, align with the UN SDG Goal 1 – *No Poverty*. Together the ISO standards provide guidance on ensuring fair labour practices and fair working conditions are initiated; and job opportunities are created along with improvement in living conditions. <https://www.iso.org/sdg/SDG01.html>

UN Sustainable Development Goals

Supporting the shift to more responsible business practices are the United Nation's Sustainable Development Goals. These (17) goals act as a touchstone for actions to resolve global issues which impact us directly or indirectly. We are either contributing to these problems or are recipients of the actions taken by others for which we have little control. But we can take actions within our sphere of responsibility. Solutions require global cooperation focused on these outcomes which were developed in 2015 with 2030 as a major timeline for alignment. The UN SDGs are:

1. No poverty
2. Zero hunger
3. Good health and well-being
4. Quality education
5. Gender equality
6. Clean water and sanitation
7. Affordable and clean energy
8. Decent work and economic growth
9. Industry, innovation and infrastructure
10. Reduced inequalities
11. Sustainable cities and communities
12. Responsible consumption and production

13. Climate action
14. Life below water
15. Life on land
16. Peace, justice and strong institutions
17. Partnerships for the Goals

The (17) UNSDGs can be viewed as a priority from numbers 1 through 17. These priorities relate to Marlowe's hierarchy of needs theory. Individuals and communities can't be worried about climate action plans while they are faced with poverty, which means a lack of nutrition to sustain life, which impedes good health and well-being, and so on. We have to break the chronic cycles of depravity among the poorest and emerging nations in order for us to be truly sustainable. Business is one of the means by which we can deploy our resources to achieve the greater good, within our sphere of influence.

Addendum III provides a checklist for an organization to see how their practices align with the UN SDG goals. <https://sdgs.un.org/goals>

Water security

Let's consider the topic of water. A universal need to sustain life is access to clean drinking water. For decades, the abundance of water in most of the Western world, did not generate a lot of interest or concern in those regions where drinking water was in a crisis. As global warming and weather patterns are impacting the globe, water is now getting the strategic attention it should have all along.

Droughts are appearing where there had not been previous problems. This has led to the deforestation and crop losses from catastrophic fires; loss of land use and biodiversity; a lack of water for irrigation to produce food; mass starvations of people requiring relocation to sustainable locations; increased tensions between rich and poor countries; reduced levels of water preventing the shipping of goods to markets. These situations will have long-term effects which cannot be accurately predicted but will undoubtedly lead to economic, environmental, and social stress.

In late 2024, after a 2-year study, the Global Commission on the Economic of Water (GCEW), sounded the alarm on water security. A major source of freshwater is rain. As our average global temperature rises, so do the incidents of excessive atmospheric rivers. The evaporation of water in soil and plants leads to the increased water vapour in the atmosphere.

Included in their message is the chronic problem of mismanagement in water supplies, be they Western or emerging economies. From a business perspective, water problems could cut economic growth by 8% in the next couple of decades. Food production could lose 23% of capacity. The reflection on our water crisis reiterates the purpose of business in a global society. There is so much good which can be generated through business transactions. Yes, people can take advantages of loopholes and exploit certain areas, but these are not sustainable strategies. Our collective good is based on mutual trust and respect which requires that businesses comply with international standards and meet the expectations of all stakeholders. Our ecosystems know no boundaries.

Cambodia, with aid from China, is planning a canal across Cambodia to divert water from the Mekong River to the Gulf of Thailand. The intent of the Funan Techo Canal is to increase transportation and irrigation in Cambodia. This has potential disruption to the rice fields in Vietnam and other agricultural

issues in the SE Asia region. Keeping the *butterfly effect* in mind, this could become a major disruption to the balance of biodiversity in the region with unintended consequences.

<https://www.reuters.com/sustainability/climate-energy/cambodia-canals-impact-mekong-questioned-after-china-signs-deal-2025-04-23/>

The GCEW provided 7 steps to addressing the water crisis, which I have paraphrased:

1. Manage the global water cycle for our common good.
2. Adopt outcomes which assess the key roles of water on sustaining life.
3. Set market prices for water.
4. Phase out subsidies in agriculture which supports excessive water consumption.
5. Enable investments in low- and middle-income countries to support their economic development and our common good.
6. Act now on opportunities – don't wait.
7. Develop multilateral governance of water for our common good.

<https://turningthetide.watercommission.org/>

Plastics and Packaging

If you believe that recycling plastic waste is good for the planet, you might as well believe in unicorns, the tooth fairy, and Santa. Recycling plastic has been an illusion which arguably, led to increased use of plastics and the inability to recycle the massive volumes or contain their dispersion in the ecosystem. Plastic packaging is now a target for 2025 to be 100% reusable, recyclable or compostable according to the US Plastics Pact. In addition, the average recycled content or responsibly sourced bio-based content in plastic packaging will be 30%.

Plant-based materials such as polylactic acid (PLA) and polyethylene furanoate (PEF) are showing promise as alternatives to PVC. Plant-based beer bottles came on the market in 2020 but it remains to be seen if these will become scalable solutions for many other food and beverage items.

Japan developed a biodegradable plastic which dissolves quickly in salt water in 2025. The material is supposedly as strong as PVC yet breaks down in salt water with the remaining components being eliminated through naturally occurring bacteria. If there is a presence of salt on land, this too will dissolve the plastic material. This new biodegradable material is not toxic, inflammable and does not emit CO₂. <https://www.reuters.com/sustainability/climate-energy/scientists-japan-develop-plastic-that-dissolves-seawater-within-hours-2025-06-04/>

After failed talks in late 2024 by the UN Intergovernmental Negotiating Committee, it would seem that the fight between fossil fuel-based economies trump the desire to reduce the global use of plastics. Plastic production is expected to triple by 2050. In early 2025, under a presidential executive order, it was decided that plastic straws should replace paper straws in all US federal government facilities and that a strategy to ban paper straws must be developed within 45-days. <https://www.whitehouse.gov/fact-sheets/2025/02/fact-sheet-president-donald-j-trump-ends-the-procurement-and-forced-use-of-paper-straws/>

Amazon, to its credit, has embarked on a strategy to eliminate as much packaging as possible. Amazon's Ships in Product Packaging program (SIPP) looks at how to ship products in the original packaging rather than repacking for further handling. Not all products can be shipped without further packaging – towels vs glassware, for example; however, Amazon is only shipping ~13% of orders in original packaging and want to see how much further they can reduce unnecessary packaging materials. In 2024, Amazon eliminated plastic filler *pillows* in shipping packages and replaced these with 100% recycled paper. This small step took 15 billion plastic pillows out of Amazon's packaging requirements per year.

A good example of the SIPP program is the conversion from larger, plastic bottles of Tide detergent, with

the handle on the side, to a bag-in-a-box design. This resulted in less plastic and a lighter weight product. Amazon worked with Procter & Gamble which agreed to redesign a rather iconic bottle into a more responsible form of packaging. Amazon ships the detergent in its new bag-in-a-box format without further packaging or handling requirements. Similar to wine being sold in boxes instead of glass bottles. <https://www.amazon-packaging.com/reinventing-an-american-icon>



According to the American Forest & Paper Association, recycling of paper and cardboard continues to be supported. The annual recycling of paper has moved from 47.6M tons in 2002 to 49.1M tons in 2022; while the rate of recycling has moved from 48.2% to 67.9% over this period. Cardboard recycling has moved from 23.2M tons to 34.0M tons; while the rate of cardboard recycling has gone from 69.9% to 93.6%. Paper and cardboard are renewable materials yet recycling avoids consuming more raw natural resources.

The OECD has a detailed report on the management of plastic waste on a global basis. The OECD classifies waste as being mismanaged and uncollected; landfilled; incinerated; or recycled. Summarily the OECD report that 9% of plastic waste is recycled with 22% being mismanaged. Bans and environmental fees in over 100 countries are ineffective in dealing with the crisis.

The 38 member countries of the OECD generate ~50% of the plastic waste. Canada is a founding member of the OECD. 82% of Canada's plastic waste had been treated by burying it in landfill sites. Only 6% has been recycled!

Key findings from *Global Plastics Outlook*:

- Plastic consumption has quadrupled over the past 30 years, driven by growth in emerging markets. Global plastics production doubled from 2000 to 2019 to reach 460 million tonnes. Plastics account for 3.4% of global greenhouse gas emissions.
- Global plastic waste generation more than doubled from 2000 to 2019 to 353 million tonnes. Nearly two-thirds of plastic waste comes from plastics with lifetimes of under five years, with 40% coming from packaging, 12% from consumer goods and 11% from clothing and textiles.
- Only 9% of plastic waste is recycled (15% is collected for recycling but 40% of that is disposed of as residues). Another 19% is incinerated, 50% ends up in landfill and 22% evades waste management systems and goes into uncontrolled dumpsites, is burned in open pits or ends up in terrestrial or aquatic environments, especially in poorer countries.
- In 2019, 6.1 million tonnes (Mt) of plastic waste leaked into aquatic environments and 1.7 Mt flowed into oceans. There is now an estimated 30 Mt of plastic waste in seas and oceans, and a further 109 Mt has accumulated in rivers. The build-up of plastics in rivers implies that leakage into the ocean will continue for decades to come, even if mismanaged plastic waste could be significantly reduced.

- Considering global value chains and trade in plastics, aligning design approaches and the regulation of chemicals will be key to improving the circularity of plastics. An international approach to waste management should lead to all available sources of financing, including development aid, being mobilized to help low and middle-income countries meet estimated costs of EUR 25 billion a year to improve waste management infrastructure.

Source: [OECD Global Plastics Outlook Database](#)

The use of plastics in packaging is complex and controversial. The shift towards mono plastics is seen as an acceptable transition from the multi-layer packaging materials. Mono is easier to recycle, requires less energy to produce, it can be repurposed, and requires less resources to manufacture. Mono packaging materials align with the circular economy values.

A significant Canadian government policy was announced in December 2022, to ban the manufacturing and import of many types of single use plastics. The food service and packaging industry's lack of concern due to perceived price imbalances, invited government intervention which creates the "even playing field" for all sellers of packaging products. Now there will be renewed investment into optional packaging products for the food sector and retailing in general for compliance. This will likely incur some price adjustments in order to address the importance of protecting our biodiversity and ecosystems. This strategy again, aligns with the circular economy values. Stopping the problem at the source through the responsible design of products and the use of biodegradable materials.

In the UK they have been using lasers to "tattoo" fruits and avocados to replace plastic labels. Retailer Tesco is working with its fruit supplier Westphalia on this technology. Marks & Spencer trialed laser IDs on a range of fruits in 2017. Consumers may have a final say in this experimental technology.

Although many community stakeholders feel that the ban on plastics was long overdue there is another side to this argument. A group of plastic manufacturers successfully challenged this through a judicial review which led to dismissing the regulation banning single use plastics through the Canadian Environmental Protection Act (CEPA). The industry organization is the Responsible Plastic Use Coalition. In 2021, they challenged the term "toxic" under the CEPA and the late 2023 ruling means the ban can only apply to plastics which are determined to be *toxic*. Toxic is defined as being "immediate or long-term harmful effect on the environment or its biological diversity."

In July 2024 the province of BC introduced a \$2.00 fee for retailers to charge customers for a new reusable bag and \$.25 for a paper bag. Retailers must charge the fee as part of government program to reduce single use plastics. The "new reusable bag" might be made of plastics – not sure if this really makes sense. At the same time, there will no longer be *oxo-degradable* plastics allowed, as they have not been proven to be fully compostable. These products contain additives which leave microplastics. Hard to compost plastics will be eliminated wherever possible. Other plastic packaging to be banned are Styrofoam food containers and cling wrap, in 2028. There will be some exceptions on smaller products and extended time for businesses to adapt to new regulations. <https://bc.ctvnews.ca/fees-for-paper-and-reusable-bags-mandatory-in-b-c-starting-monday-1.6963017>

The Province of Ontario refuses to enact legislation requiring non-alcoholic containers be subject to a deposit-return system as most other Canadian provinces have had in effect for decades. Ontario has a deposit-return system for used alcoholic containers but prefers to have the non-alcoholic containers going to incineration or landfill sites for disposal. The grocery and big box companies (Loblaws and Costco) do not support a deposit-return system while the beverage industry does support a deposit-return system. Ontario sees the blue box collection system as a means of addressing the problem as part of an extended producer responsibility (EPR) program. The *theory* behind the EPR program is that beverage companies will provide more responsible containers. <https://www.cbc.ca/news/canada/toronto/ontario->

Some progress was made in late 2023 with the EU agreeing to ban the export of plastic waste to poor countries and non-OECD countries. “The EU will finally assume responsibility for its plastic waste by banning its export to non-OECD countries,” said Pernille Weiss, a Danish member of the European parliament with the centre-right EPP group, who was in charge of the proposal. “Once again, we follow our vision that waste is a resource when it is properly managed, but should not in any case be causing harm to the environment or human health.”

In mid-2024, Nigeria announced a ban on single use plastics and Styrofoam to take effect in 2025. The US Agency for International Development’s studies found that Nigeria generates 2.5 M tonnes of plastic per year with 70%+ going into rivers, seas, and landfill sites. The city of Lagos has to try and deal with 50-60 million water bags discarded in its streets per year, according to the UN Environment Programme. Changing consumer behaviours will be one of the biggest challenges.

Studies in China and Japan have found airborne plastics in cloud formations. The spread of the nano particulates occurs through rain and snow fall. The troposphere can transport the plastics thousands of kms from their origin. <https://link.springer.com/article/10.1007/s10311-023-01626-x#Sec1>



TPX Image March 15, 2024. Tonnes of plastics and trash on fishing village beach in Indonesia.

Easter Island (Rapa Nui), due to its location in the Pacific Ocean and the currents which impact its shores, receives 50 times more waste plastics than the coast of Chile. The microplastics contaminate the food chain. Ironically most of the plastic waste is coming from Chile itself.

<https://www.reuters.com/business/environment/easter-island-battles-global-vortex-plastic-waste-2024-10-16/>

Packaging products in easily recyclable materials such as steel, tin, aluminium and other types of metal is more sustainable than plastics. Metals can be recycled and repurposed many times and retain their tensile strength and other properties - as long as they are being collected properly for recycling. Repurposing aluminium for other packaging uses reduces energy consumption by over 90%, as opposed processing bauxite ore into original aluminium materials.

In late 2025, McKinsey reported the latest findings for the packaging sector. They identified (5) criterion for sustainable materials used in packaging.

1. Affordability
2. Performance

3. Meets regulatory requirements
4. Supply resilience
5. Emergence of alternative materials

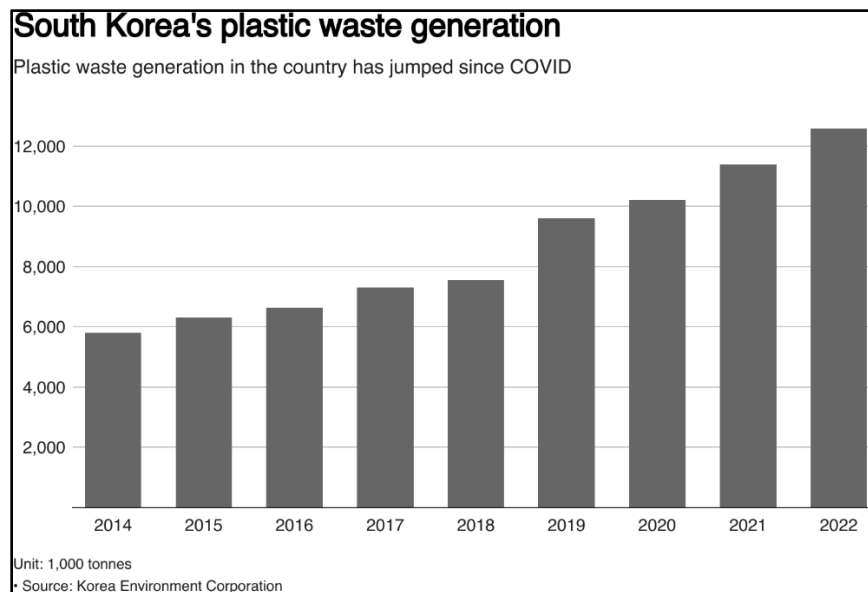
It is not surprising that affordability can be a barrier to introducing responsible packaging. As the business environment is affected by increased trade tensions, financial stability is a corporate mandate.

https://www.mckinsey.com/industries/packaging-and-paper/our-insights/sustainable-packaging-2025-top-barriers-for-packaging-purchasers?stcr=32EFB188B6E24DFA9A413E563E4ECB98&cid=mgp_opr-eml-alt-gem_pp-mgp-glb--&hlkid=3e19406735ca481e87c4e0a9ddbb0449&hctky=13835713&hdpid=46498919-703e-44fa-95dd-6214b6f4be6c

Plastic recycling

Globally, it is estimated that we produce 350 M tonnes of plastics per year. Of that, 1 M tonnes of plastic pollute the oceans. One of the best countries at managing waste plastics is South Korea. The bi-monthly MIT Technology Review magazine has rated South Korea as "one of the world's best recycling economies", and the only Asian country out of the top 10 on its Green Future Index in 2022.

NGOs such as Green Peace dispute these claims, and at best, South Korea can recycle ~30-70% of the waste plastics, which compares to 5-6% for the USA. Methods of measuring, the recycling methods, and the use of the statistical information make any records suspect. Suffice to say, it's impossible to recycle the volume of plastics being generated each year. The following graph shows how the problem is growing within one of the *better performing* countries. Plastic volumes increased 30+% since 2019 in SK. A bankrupt SK recycling site contains 19,000 tonnes of ground plastic waste with no treatment or disposal plans to date. According to Reuters, most plastic waste gets incinerated or dumped into landfills, as there is no means to recycle. <https://www.reuters.com/business/environment/south-koreas-mountain-plastic-waste-shows-limits-recycling-2024-11-22/>

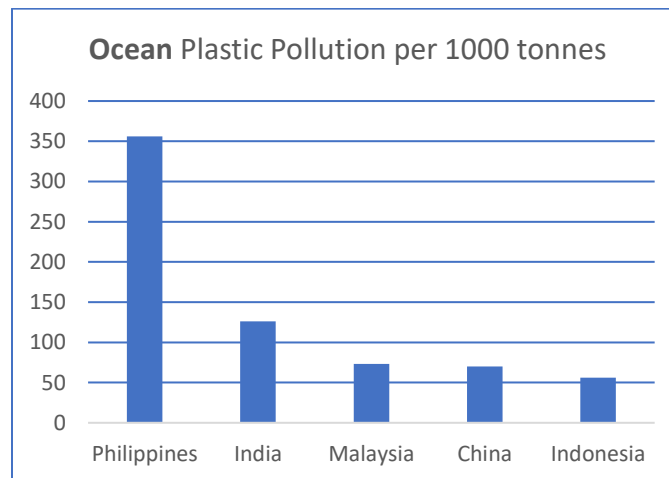
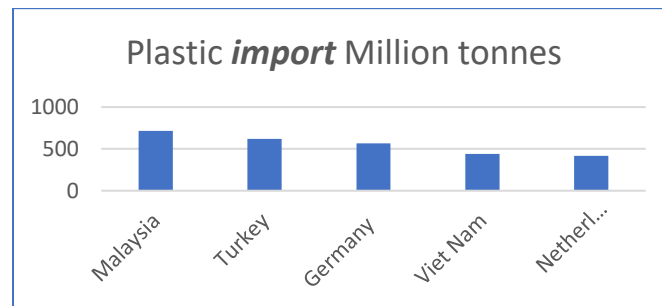
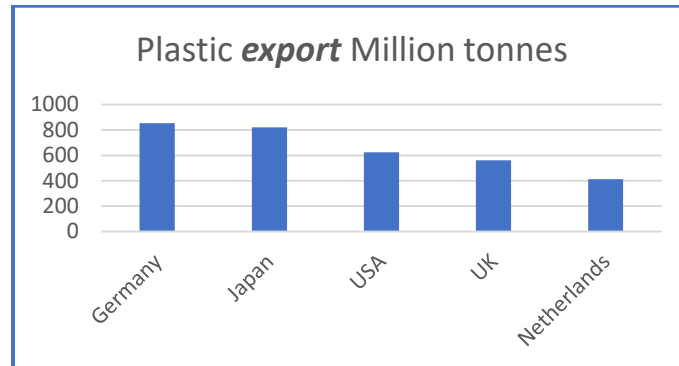


Until 2017, China was the largest importer of plastic waste. China banned imports that year which resulted in a 95% drop in volume. <https://www.weforum.org/stories/2023/03/charted-the-flow-of-global-plastic-waste/>

Vietnam, is the 4th largest importer of plastics for its recycling sector. The country imported 420,000

tonnes of waste plastics with reports showing that only ~30% of the plastic is being sorted. The sorting makes up part of a *cottage* industry employing people in small towns and villages. Most of the plastic ends up in landfill sites.

The top 5 export and import countries in 2021 of plastic waste, according to the World Economic Forum were:



Nestlé is eliminating the use of plastics in its *Quality Street* brand chocolate containers and is switching to paper. This follows their earlier strategy of replacing the individual chocolate wrappers made from plastic to paper. Customers were initially upset by the loss of the traditional packaging feel and appearances. For late 2024, Nestlé will test market the reception of customers with the paper

containers in the UK before making final decisions. When global brands make this type of change successfully, others are bound to follow. https://www.theguardian.com/business/2024/oct/09/nestle-tests-paper-container-for-quality-street-plastic-tub-christmas?CMP=Share_iOSApp_Other

Toymaker Lego, a family-owned business, is switching away from oil-based plastics to materials made from renewable and recycled content by 2032, for their bricks. While acknowledging this will increase costs substantially, they have committed to reduce their environmental impact. Hasbro and Mattel have also committed to reducing oil-based materials in their brands. A step in the right direction with good transparency by a global brand.

Lego's US billion \$ Vietnam factory will be run on clean energy in 2026. Lego will buy direct power purchase agreements to provide energy from solar and wind power. The plant will use 12,000+ solar panels and will replace plastic bags with paper bags. Its Lego distribution centre in Vietnam will be used to service Australia and other Asian customers. <https://www.ctvnews.ca/business/article/lego-opens-a-factory-in-vietnam-it-says-will-make-toys-without-adding-emissions-to-the-atmosphere/>

Paper bottles

Bottles made from paper have been on the market for a few years. In Denmark, The Carlsberg Group, was one of the first in 2019 with bottles made from paper and wood fibre. Some bottle uses the PEF polymer film as a liner to contain liquids. Coca Cola launched paper beverage bottles in Europe using PEF liners with limited acceptance. A few other beverage companies followed suit. In 2025, Coca Cola scaled back its commitments to using recycled content from a 50% reduction in 2030 to ~35% only. Coca Cola remains one of the largest polluters of plastic globally. <https://www.ctvnews.ca/climate-and-environment/coca-cola-is-dramatically-scaling-back-its-plastic-promises-1.7133010>

Consumers play a big role in the acceptance of paper over glass containers. Paper bottles are fully biodegradable. If it's possible to stop the usage of PVC-based plastic bags from consumers, it may require an industry and governmental edict to increase the conversion to renewable paper containers. In 2025, California banned the use of plastic bags, as an example of government intervention. After a successful law suit, four companies, Revolution Sustainable Solutions, Metro Poly, PreZero US Packaging, and Advance Polybag agreed to pay US\$1.8M in settlement for claiming their bags were recyclable. The new regulations will come into effect January 2026. <https://abc7.com/post/california-lawsuit-says-makers-plastic-bags-lied-products-being-recyclable/18033642/>

Paper bottles are becoming widely available through increased production and retailers and producers turning to a more responsible product. Paper bottles are light weight not only replacing plastics but glass bottles. Paper is from a renewable resource. Used paper products are recyclable and compostable. Paper bottles weigh 80% less than glass. When we think of shipping a pallet of paper bottles to be filled vs a pallet of glass bottles, it is literally tonnes less, saving on shipping and handling costs.

During the 2025 market chaos, paper bottles and cans could provide an option to the escalating aluminium prices. Paper containers could offset costs and provide a more resilient material option. Large consumers of cans and bottles in the food and beverage industry have some alternatives to consider.

Pulpex is a pioneer in the production of paper bottles and works with all sectors on their innovative materials. Brand managers are collaborating with Pulpex to design and replace plastics in all types of containers to reduce waste through renewable, recyclable, which are PET-free. <https://www.pulpex.com/mission>

- Canadian-based Kinsbrae Group out of Ontario is making its KB© paper bottles out of 100% recycled paperboard. Kinsbrae uses a Frugalpac machine to make the bottles. <https://www.kinsbraegroup.com/products>

- US-based Paper Water Bottle® Company, makes paper bottles which are 98% landfill biodegradable. <https://paperwaterbottle.com/>
- US-based RyPax makes stock paper bottles which are 100% recyclable and biodegradable. <https://www.rypax.com/rypax-paper-bottle/>
- The paper bottling company, Paboco®, out of Denmark is making paper bottles for Absolut Vodka, to be sold initially in the UK through Tesco. <https://www.paboco.com/>
- British-based Frugalpac™ is making paper bottles for wine, spirits, and olive oils. <https://frugalpac.com/>

Plastic vs paper bags

Paper bags are always seen as an acceptable replacement over plastic for consumers when leaving grocery and retail outlets with their purchases. Paper is a renewable material, can displace carbon-based plastics, and paper can be recycled. An obvious choice. Politicians see paper bags as a reasonable option to replace plastic bags, because paper is recyclable. Or is it? Environment Canada's estimate is that only 55% of all waste paper is recycled into new products.

In 2023, the Ontario LCB stopped providing single-use paper bags from their customer services and encouraged people to bring reusable tote bags (probably plastic) or use small cardboard boxes instead. The program supported the planting of trees to have a positive environmental impact. In 2024, the Ontario LCBO is returning to single-use paper bags for customer services. Loblaw's switched from reusables to paper bags again. Environmentalists push back on paper bags because it requires hot water, heat, and energy to convert into a format to be able to recycle them. The tradeoff is that paper is a lesser evil than plastic, which is a common theme in many circular economy strategies. It's no wonder confusion reigns in the market as to which choice is best. Still – no plastics is a step in the right direction.

<https://www.cbc.ca/news/business/paper-bags-ban-walmart-1.7358649>

Ocean cleanup

In 2025, I met members of the *Ocean Legacy* team. With all of the plastic and discarded goods littering the oceans, Ocean Legacy out of Vancouver, is providing an all-hands-on-deck solution. Not only do they operate ships which scavenge and salvage waste products on the open ocean and shorelines, they collect the materials for responsible recycling. They have removed 1.5M tonnes of marine waste, a wide variety of plastic materials and brought them to Vancouver to be converted into new products. Ocean Legacy relied on the Federal Ghost Gear funding, which was eliminated in 2025.

Ghost gear consists of the abandoned, lost or discarded fishing gear which is considered one of the leading causes of death to marine life. The UN Nations Environment Programme estimates that 640,000 tons of ghost gear remains in the ocean each year. <https://www.cbc.ca/news/canada/plastic-fishing-gear-waste-recycling-1.7637690>

A decade has passed since the 2011 tsunami ravaged Japan and the debris continues to circulate in the Pacific Ocean. The 2021 floods down the Fraser River washed tonnes of household debris and other detritus into the coastal waters of BC. Ocean Legacy provide the valuable cleanup services, which are

arguably, economically *unsustainable* in the short-term but are environmentally necessary, in the long-term. There is a need for producers to recognize that recycled marine plastics should be one of the first sources of raw material, rather than virgin plastic, to contribute to mitigating the impact on oceans and sea life.

Ocean Legacy produces various products from the plastic marine waste, through their Legacy Plastic™ brand. This consists of recovered fishing ropes, buoys, floats, nets, oyster traps, and tonnes of other man-made waste materials which have been washed out to sea. The three sources of plastic materials are:

1. Used marine gear from fishing and aquaculture operations along the Pacific Coast recovered at source or through Ocean Legacy depots.
2. Shoreline plastic recovered from cleanup operations undertaken by Ocean Legacy's expeditions along with other partner organizations and volunteers which conduct cleanups on the vast stretch of coves and shorelines.
3. Ocean plastics recovered from ocean recovery expeditions as far as 2500 Kms out to sea.

Ocean Legacy can displace virgin plastic materials for many manufacturers and use the recovered marine plastics for raw materials to make *plastic lumber* and other repurposed items for commercial and industrial needs.

Ocean Legacy has a scalable solution but needs more customers to sustain their operations and help to cleanup our oceans through the value chain. We owe a debt of gratitude to Ocean Legacy, the many volunteers, and other organizations which are cleaning up our collective mess.

<https://oceanlegacy.ca/about/>

In late 2025, the Maritime Association for Clean Seas (MACS) was formed by several shipping companies to provide measurable reductions in plastics and operational waste. <https://www.supplypro.ca/maritime-association-for-clean-seas-to-tackle-ocean-plastic/>

MACS will target:

- Sustainable procurement and material use;
- Vessel waste measurement and reduction;
- And improved portside waste reception.

Packaging and circular economy

While not without controversy, the use of expanded polystyrene (EPS) is part of the circular economy. Colleague Farshad Alian, at Cryopak, which specializes in cold-chain packaging, is a supply professional directly involved in their circular economy strategy. Through Cryopak's partnership with Quebec-based NexKemia, an EPS manufacturer, the EPS is used in shipments to customers and returned to be reused within a closed-loop system. The EPS raw materials contain 30% recycled resins to reduce environmental impacts; conserve natural resources, while lowering emissions and volumes of waste. <https://www.cryopak.com/> <https://nexkemia.com/>

Energy sources

The International Energy Agency (IEA) has provided a synopsis of energy sources to generate electricity over the past 50 years, in the Table below. Summarily, coal and renewable have remained about the same; nuclear increased 5-fold; natural gas increased by 24%; and oil dropped by 90% between 1971

and 2019. The IEA predicted that there will be an oil surplus of 1 million bpd in 2025. This is largely due to a slower Chinese economy. <https://www.reuters.com/business/energy/iea-sees-2025-oil-market-supply-surplus-2024-11-14/>

As we embrace AI, cryptocurrencies, and expand data centres, it is expected that electricity demands from these three drivers could increase from 460 TW to 1000 TW by the end of 2026. Renewable energy is growing as a percentage of the global electricity supply but increased demands of EVs and the electrification of industry will require substantially more clean energy.

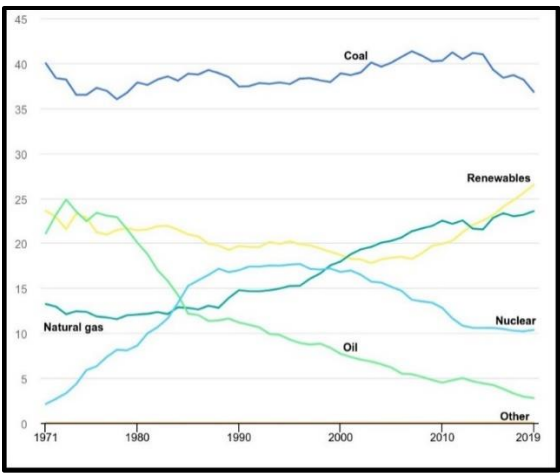
Data centre demand for electricity has created the unintended consequence of requiring more fossil-fuels to power their operations. One of the largest in the US is located in North Virginia, operated by Utility Dominion, which is building its own 1000 MW gas plant. They cut their renewable demands by ~15% in its energy mix. Other data centre operators such as Entergy and NiSource are also investing in natural gas energy supplies. Ireland estimates that 20% of its electricity demand is for data centre operations. Ireland’s only coal station will continue supplying energy burning oil rather than coal until 2029 to meet electrical demands. <https://www.reuters.com/technology/artificial-intelligence/how-ai-cloud-computing-may-delay-transition-clean-energy-2024-11-21/>

Coal and natural gas consumption will remain quite high during the transition away from fossil fuels. There are a lot of unknown factors with AI usage, with its relatively short history. One early observation is the vast amounts of electricity which are required to use the technology.

We assume that digitalization is a more responsible form of running businesses but this transition requires more electricity than the grids can currently supply. While politicians and environmentalists may want to shutter fossil-fuel generators, it does not appear feasible within the next 5-10 years to do so. Data centres which are the means to connect businesses and consumers through networks, are energy vampires. Energy requires a source – preferably renewable and clean but we can’t afford *not* to run data centres if they still require fossil fuels. Compromises need to be made along the way.

Table: World electricity generation mix by fuel, 1971-2019

IEA. Licence: CC BY 4.0

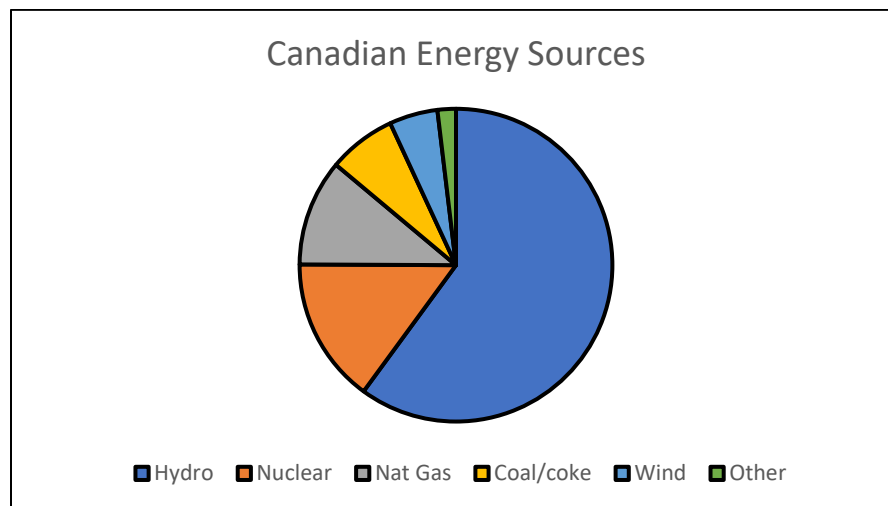


<https://www.iea.org/reports/electricity-2024/executive-summary>

Electric and autonomous vehicles will complement the electrification of the mass transit systems in rural communities. One critical part of the electrification is the source of energy to charge batteries. If energy comes from a fossil fuel base (coal, oil) instead of a hydro (water), the net/net emission reductions could be very low. Producing new batteries requires that mining operations be accelerated which contributes

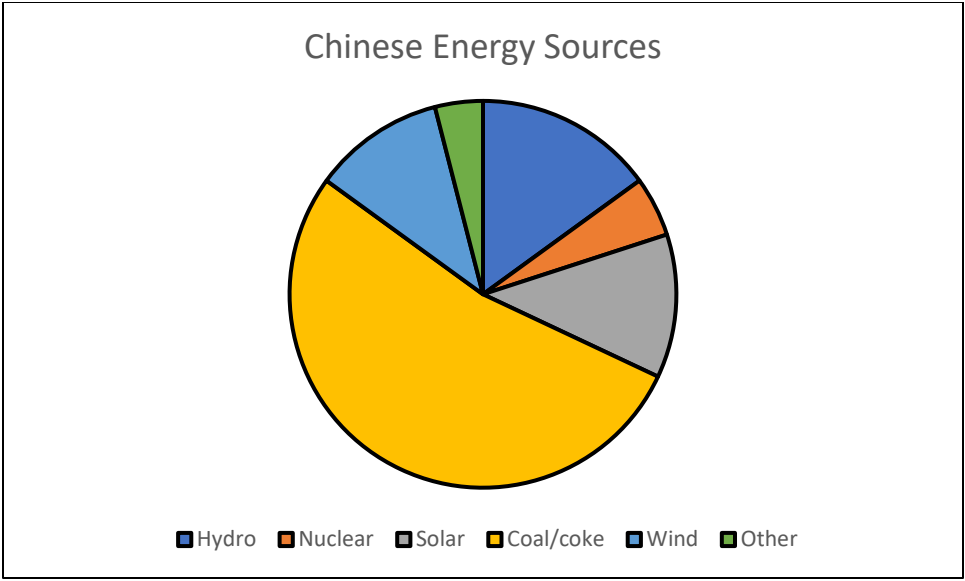
to increased emissions; accessing minerals invites environmental damages; displacing villages to access minerals has social costs. While the WEIRD world may reduce tailpipe emissions from ICE vehicles, there is an offset with increased *externality* costs. Externality costs are those which are borne by the communities and can't be directly charged to a producer or manufacturer in their industrial activities. Indirect externality costs can include decreased living standards, pollution, quality of health, or cultural impacts.

In Canada, ~66% of the energy supply is from renewable sources, primarily hydroelectric. The balance is from fossil fuels at 18% and nuclear at 15%. Clean energy accounts for 65% of the energy; the balance being fossil-based. Nuclear is not labelled as being clean due to the need for uranium mining and consumption. <https://energyrates.ca/the-main-electricity-sources-in-canada-by-province/>



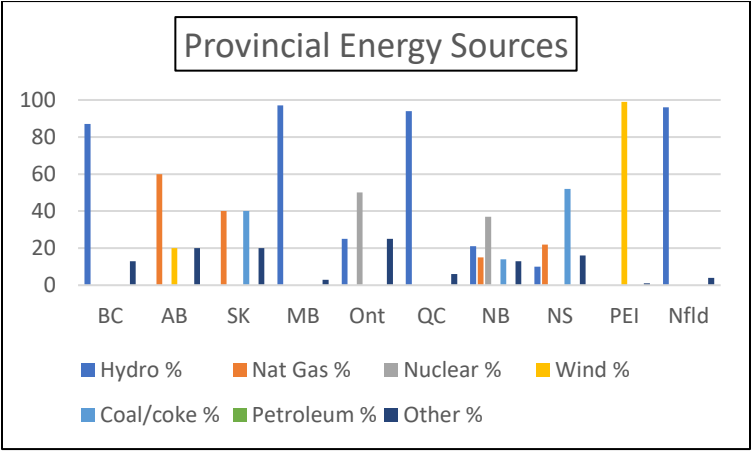
The prime energy source for various provinces however, varies widely. BC hydroelectric is 87%; Manitoba hydro is 97%; Ontario is 25% hydro, 50% nuclear and 10% natural gas; Quebec hydro is 94%; Newfoundland hydro is 96%. While Alberta uses 60% natural gas, 20% wind power, and only 5% hydro; Saskatchewan uses 40% natural gas and 40% coal/coke; New Brunswick 22% hydro/wave, 37% nuclear, and natural gas 15%. Prince Edward Island uses 99% wind power.

By comparison, China continues to transition to cleaner, renewable energies away from coal. This is a huge achievement on the part of China as it continues to invest and lead in developing renewable energies with supporting technologies.



Crown Corporation Hydro-Quebec is changing how it brings larger wind projects to market. Prior to 2024, private companies would need to respond to tenders for smaller wind farm operations and Hydro-Quebec would buy the power, if they were successful. Now, Hydro-Quebec will be the main contractor and shareholder for all 1000+MW projects in collaboration with Indigenous groups and municipalities. They expect to erect hundreds of wind turbines to achieve the 10,000MW capacity. For comparison, a wind farm east of Quebec City has 164 wind turbines to generate 364 MW of power. Private companies will still be invited to build wind farms on smaller scale operations, as they have been. The smaller wind turbine projects typically generate 350MW of power.

EVs need consistent clean power sources. EVs are a good fit for BC, QC, MB, PEI, and Nfld. Not so good for AB and SK with their fossil fuel energy base. The largest populations are in BC and QC.



There needs to be a balance between the economic interests of a few players and the larger interests of a healthy society. Transportation modes all contribute to the GHG emissions through some form of energy consumption either in manufacturing or operations. The consequential pollution impacts our air, water, and land resources as well as our health and well-being. Looking for ways to reduce the anthropogenic impact is in our collective interests.

The Global Logistics Emissions Council (GLEC) produced a 2019 Framework which indicates that emissions are tracking to greatly exceed current levels unless actions are taken to correct the trend.

Their comparison from 2015 to 2050 is as follows:

Logistical Emissions Source	2015 %	2050 %
Inland waterways	2	2
Rail	3	2
Air	6	6
Sea	27	34
Road	62	55

In the bellwether state of California, there is pushback on the social side of autonomous vehicles. In February 2023, the VP of the International Brotherhood of Teamsters, which represents 500,000 commercial truck drivers, wants a national transportation policy which addresses potential job losses. California has legislation governing self-driving cars and delivery vehicles under 4536 Kgs. Now they are looking at rules which allow autonomous semitrucks up to 36,287 Kgs to operate on the roads.

According to Sylvain Rouche in a 2021 Supply Professional article, 80 per cent of global merchandise trade, by volume, moves via maritime transit and account for 3% of CO₂ emissions. Sea levels rising threaten 14% of the world's largest ports. Moving away from oil-based energy will require increased investment in technology and fuel option strategies.

Environmental, social, and governance policies are being deployed by progressive and purposeful organizations. ESG while not a panacea is seen as an effective means of transitioning from a fossil fuel-based economy to one based on more renewable based energy supplies and significantly reduced resource consumption. ESG and the circular economy are not opposing strategies – they are complementary strategies. This enables sustainable economic growth by decoupling production from the environmental impacts and social stress caused on a global basis as we acknowledge that resources are finite and we only have one planet. Net zero strategies are an example of economic decoupling.

In July 2023, the European Parliament passed a hotly contested law to restore degraded natural ecosystems, salvaging environmental measures. The intention is to mandate 5% of land and sea restoration targets for 2030 to address biodiversity loss and to reduce the use of chemical pesticides by 50%. Restored ecosystems are able to absorb more GHG emissions.

The financial risk for investors of new technology must also be considered. While the circular economy is delivering scalable solutions to minimize environmental impacts in many products, not all investments in technical options are successful. Governments will need to incentivize industry and investors through more innovative funding and loan mechanisms. <https://ellenmacarthurfoundation.org/>

Emissions

In spite of all of the attention to combatting emissions, by the end of 2024 global emissions had still increased. The total was 41.6 billion tonnes, up from 40.6 billion tonnes in 2023 - primarily from burning coal, oil, and gas. The latter three accounted for 37.4 billion tonnes, up by less than 1% over the past year. In 2025 the US wants to increase the use of coal for energy.

Emissions are a common denominator in every business as they have inevitable external impact costs. Sustainable solutions don't necessarily translate into higher costs. They do contribute to environmental initiatives, which is the long-term desired outcome. We don't sacrifice safety over cost – why would we try to save money at the expense of other sustainable practices?

We are aware that many causes of our problems have reasonable solutions which we have agreed to

undertake. i.e., the depletion of the ozone layer was attributed to aerosol propellants such as chlorofluorocarbon (CFC). As an industry, the producers of the aerosol products agreed in cooperation with the Canadian government, to phase out the use of CFCs 40+ years ago. During this phase out period, they then turned to the use of hydrofluorocarbon (HFC) as the propellant of choice. HFCs are not as harmful environmentally as CFCs but contribute to the GHG emissions causing global warming and have not resolved the ozone depletion. The industry again agreed to *phase* out HFCs which are common in HVAC systems. 40-50 years to phase out harmful emissions is a proxy for ignoring the problem in the first place.

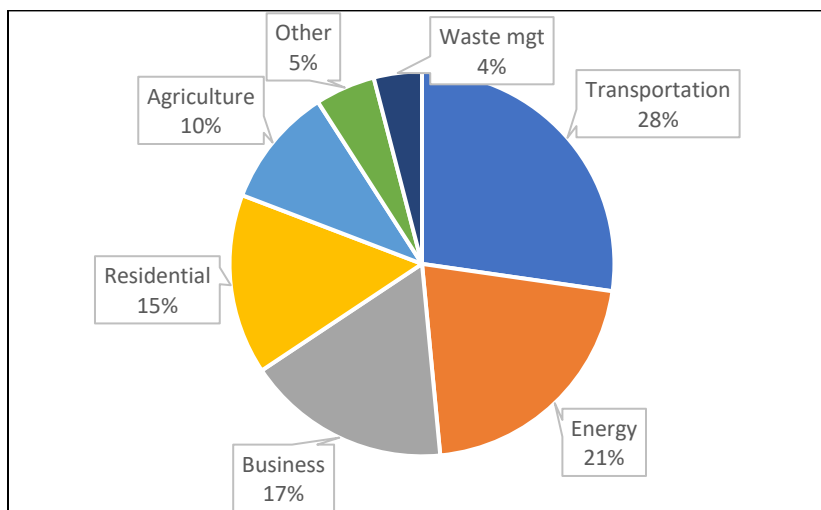
The (6) main GHGs, as identified under the 1997 Kyoto Protocol, are:

1. Carbon dioxide (CO₂)
2. Methane (CH₄)
3. Hydrofluorocarbons (HFCs)
4. Nitrous oxide (N₂O)
5. Perfluorocarbons (PFCs)
6. Sulphur hexafluoride (SF₆)

Nitrogen Trifluoride (NF₃), which used chemical in photovoltaic panels, LED screens and many other electronics is now considered a major contributor to harmful GHG emissions. NF₃ was not originally recognized in the Kyoto Protocol.

Measuring organizational GHGs can be a complex task requiring external expertise. There are a variety of sources which provide estimates as to the main drivers of GHGs. In Table 1, using the UK's Business, Energy, and Industrial Strategy data, the main emitters by sector are:

Table 1: UK BEIS GHG Source of Emissions by sector



In Table 2, the information from Our World in Data, provides the following summary by sector for GHGs:

Table 2: Our World in Data GHG Sources of Emissions by sector

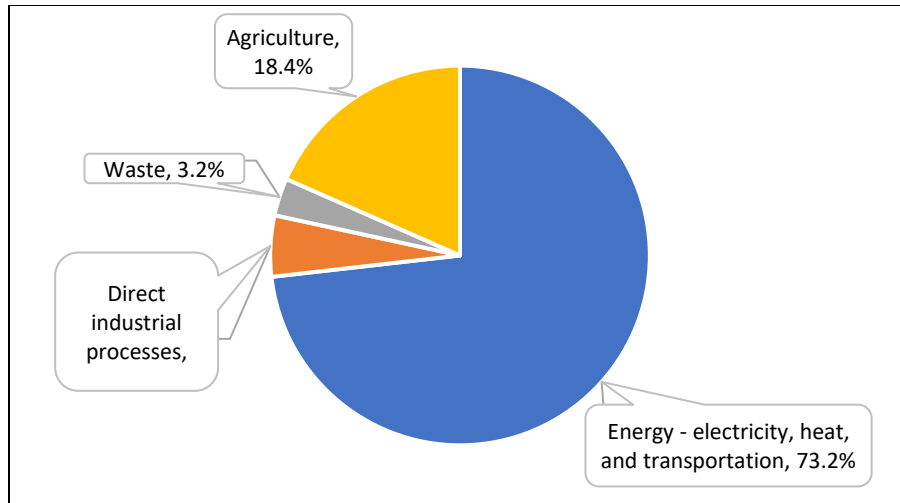
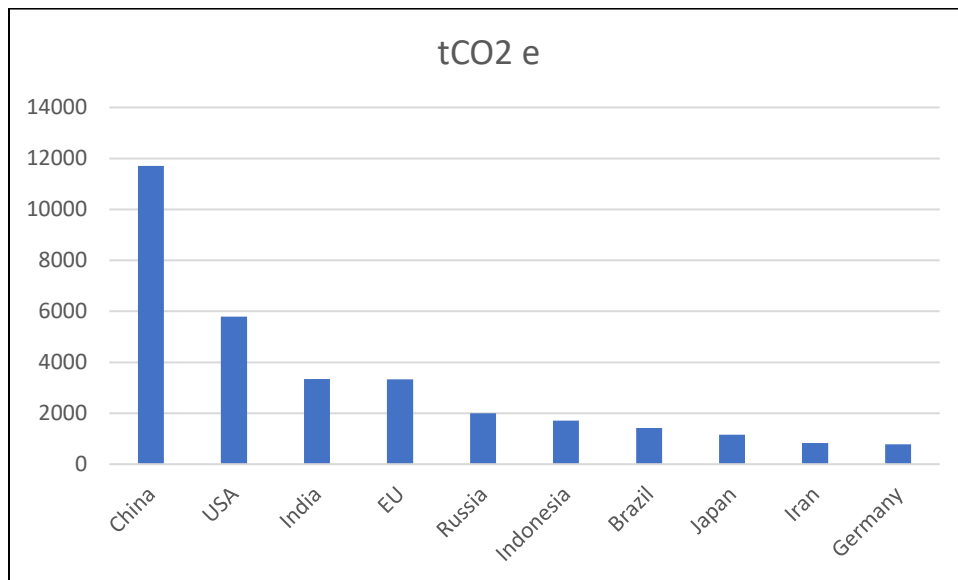


Table 3, 2018 data from US Climate Watch, provides the following summary of the top 10 tCO_{2e} by country:

Table 3: Climate Watch GHGs by country



In a 2023, UNEP Emissions Gap Report, the top 5 emitters of GHGs in 2021 account for 60% of GHGs. The Group of 20 (Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Republic of Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, the United Kingdom, the United States, and the European Union) account for 76% of global GHGs.

More countries and companies have committed to reach net zero emissions. Targets are set for ~90% of global emissions to be reduced with 2030 seeing 50% lower global GHGs than in 2019. Nitrous oxide which are extremely harmful continue to increase according to a late 2024 report by the Global Nitrous Oxide Assessment. It is doubtful if commitments can be made to achieve the target reductions per the Paris Agreement. <https://www.reuters.com/business/environment/world-will-miss-paris-climate-target-nitrous-oxide-rises-report-says-2024-10-31/>

Table 4, 2021 data from US Environmental Protection Agency, provides the following summary of the 6.34 M metric tonnes of emissions generated annually in the USA. A cursory comparison of GHG emission sources between Canada and the USA shows them to be the same, by percentage, although the US volumes are far greater due to its larger industrial and manufacturing base. Canada would rank ~11th in global emissions, below Germany.

Table 4: US Anthropogenic Caused Emissions

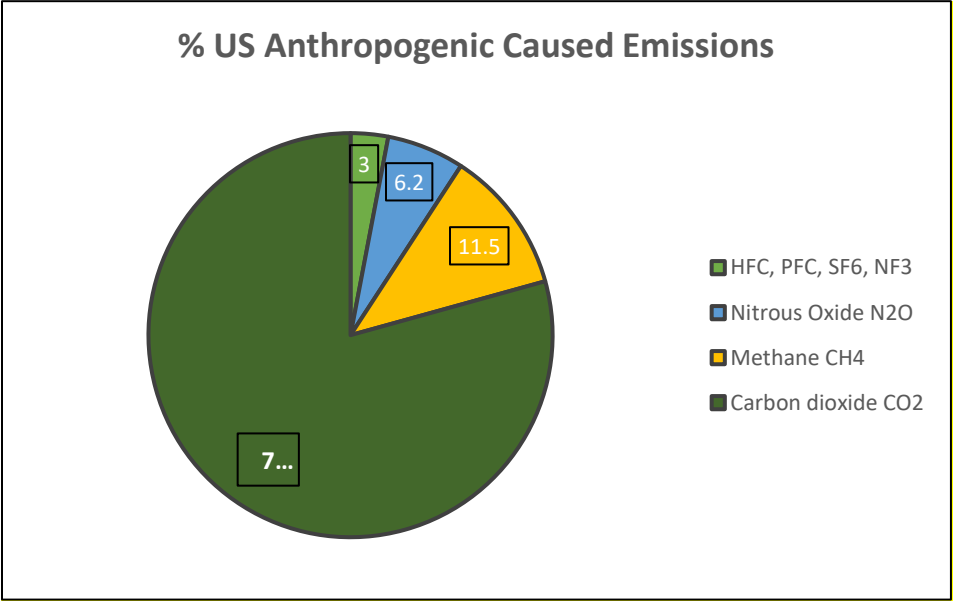


Table 5, 2023 data from Environment and Climate Change Canada, provides the following summary of the 670 Mt CO₂ Eq emissions generated annually in Canada.

Table 5: Canadian Anthropogenic Caused Emissions

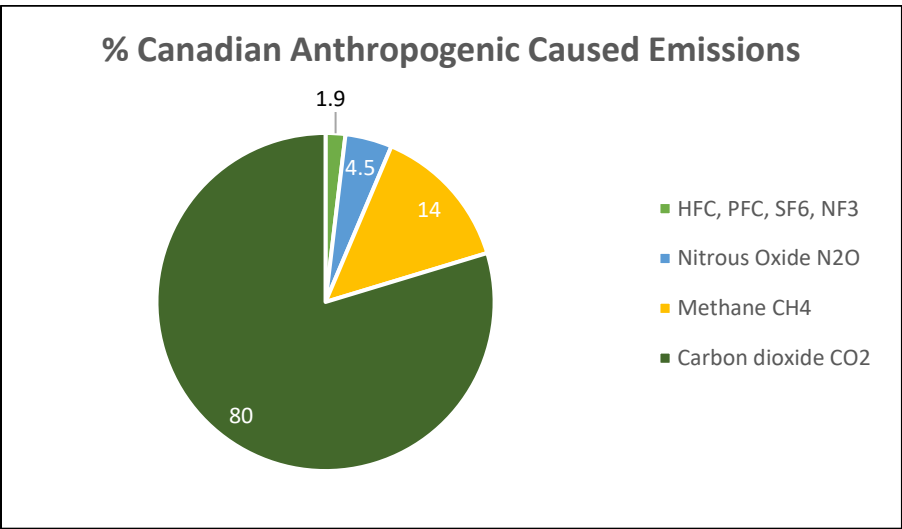


Table 6 indicates the primary sources of GHGs by the major emitters, from the Food and Agriculture Organization of UN

Table 6: 2019 data FAO

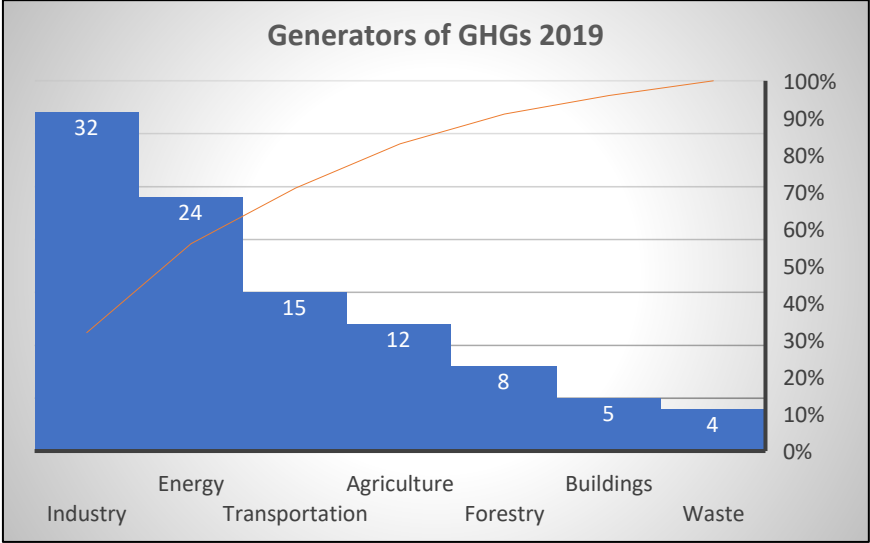


Table 7 indicates the primary sources of GHGs in the EU by sector. EU GHGs were reduced by 5% from 2022 to 2023.

Table 7: 2024 data from Eurostat GHG by sector

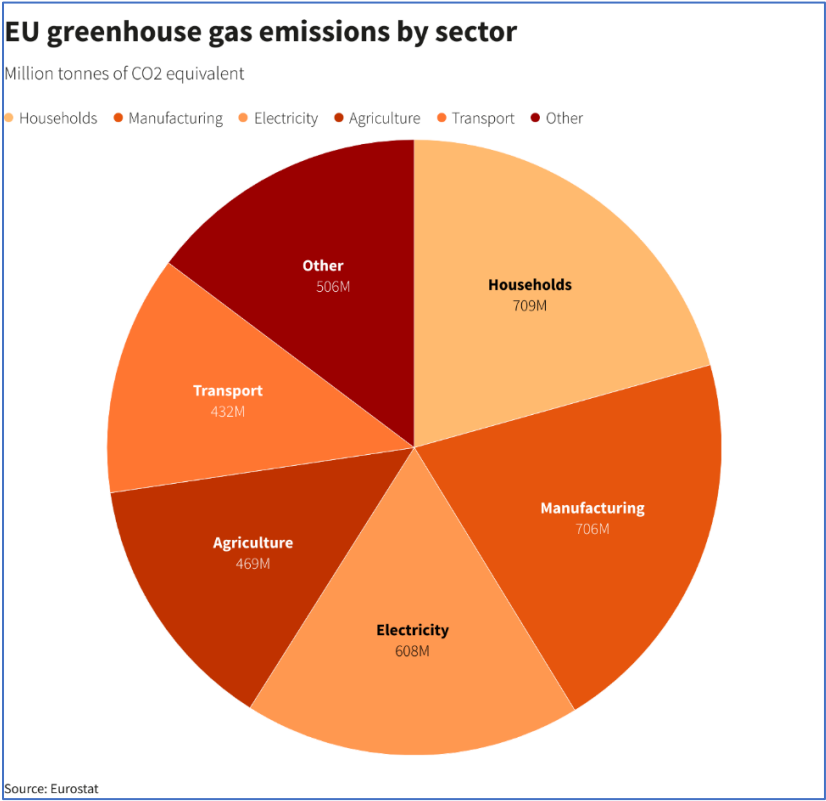
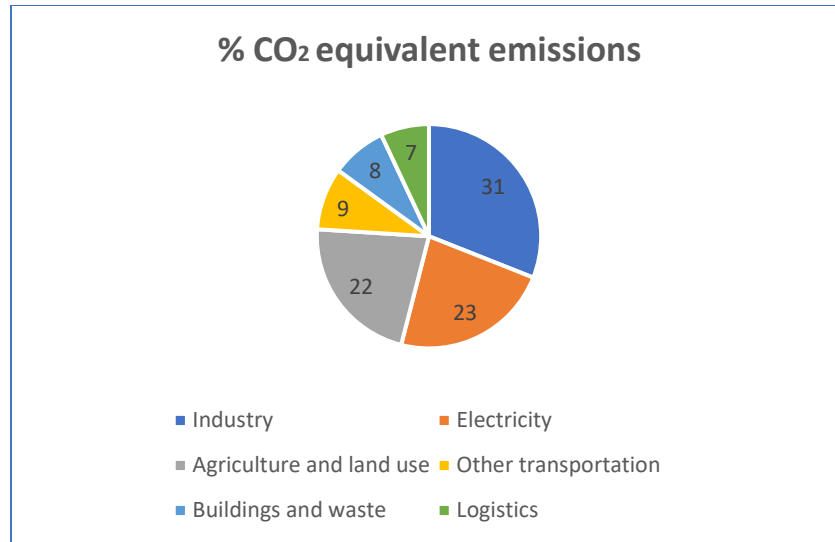


Table 8: CO2 equivalent emissions by sector

Source: McKinsey & Company Decarbonizing Logistics June 2024



Key findings on GHGs from the **2023 Global Carbon Budget** include:

- Regional trends vary dramatically. Emissions in 2023 are projected to increase in India (8.2%) and China (4.0%), and decline in the EU (-7.4%), the USA (-3.0%) and the rest of the world (-0.4%).
- Global emissions from coal (1.1%), oil (1.5%) and gas (0.5%) are all projected to increase.
- Atmospheric CO₂ levels are projected to average 419.3 parts per million in 2023, 51% above pre-industrial levels.
- About half of all CO₂ emitted continues to be absorbed by land and ocean “sinks”, with the rest remaining in the atmosphere where it causes climate change.
- Global CO₂ emissions from fires in 2023 have been larger than the average (based on satellite records since 2003) due to an extreme wildfire season in Canada, where emissions were *six to eight times higher than average*.
- Current levels of technology-based Carbon Dioxide Removal (i.e. excluding nature-based means such as reforestation) amount to about 0.01 million tonnes CO₂, more than a million times smaller than current fossil CO₂ emissions. <https://globalcarbonbudget.org/fossil-co2-emissions-at-record-high-in-2023/>

The Global Carbon Budget report, produced by an international team of more than 120 scientists, provides an annual, peer-reviewed update, building on established methodologies in a fully transparent manner. The 2023 edition (the 18th annual report) will be published in the journal Earth System Science Data.

Stakeholder interests are growing in the private sector. The challenge is to leverage transference in favour of more sustainable solutions resides in governments ensuring ESG practices are included in the criteria evaluations with an appropriate level of weighting. As the need for increased efficiencies in logistics and distribution ramps up with new technologies, the balance to ensure ESG is concurrently being addressed is a challenge. Social costs are being incurred as technology replaces workers. Where earlier disruptive technologies created openings at new entry level points for workers, we are seeing robotics becoming the new entry level point where machines only need apply.

Resilience in supply chains

Business risks are something to avoid. In supply chains, risk is never completely removed. The number of

touch points or links in a supply chain add to the potential risks, should one of these connections fail. As supply chains tighten, there is an increased level of interdependency on each link. As referenced earlier, car manufacturers are curtailing or delaying production because of the chip shortages on a global basis. Geo/political events add to the level of uncertainty which increases the challenges and risks but also invites opportunities. Resilience has been a void in the supply chain.

The prophetic Stanford University professor Hau Lee proclaimed in 2004 that cost effective and lean supply chains will not provide sufficient competitive advantages, which seems counterintuitive. Lee opined those successful operations require agility, adaptability and alignment-the essence of resilience. His Triple A theory was put to the test and found many takers at the time.

His message on resilience was lost as more companies sought more business from fewer suppliers to get the lowest cost. Single sourcing from the lowest cost producer became the mantra. Asian suppliers benefited from the outsourcing of products which increased the level of logistical challenges. A series of events caused a pause in the pursuit of the lowest cost. The 2020+ pandemic exposed the weakness of single sourcing as it was not resilient. The US imposed tariffs in early 2025, exposed the shortcomings of relying on a trading partner which can't be trusted. The trade war which was initiated by the US, while CUSMA was still in effect, damaged trade relations until the US shows signs of contrition on this matter. Their unilateral behaviour created distrust, but again, the lack of resilient sources cannot be understated. Complacency is rooted in a lack of long-term economic investment in diverse supply chains. The late Jack Welch, was renowned for his constant attention to reinventing business opportunities and continuous improvement across GE's many business operations. Learn from the best. <https://www.gsb.stanford.edu/insights/jack-welch-create-candor-workplace>

The trend of single sourcing from the lowest cost producer led to many shortages of supplies and materials during the 2020-22+ pandemic epoch. We have to consider options which lead to a more *resilient* supply chain. While pandemics are rare, we have faced other issues from SARS to financial market turmoil to labour shortages in many sectors. It is probable we will face other market conditions which are beyond the control of an individual company or government to control. Leading organizations prepare and profit through the execution of effective planning across their operations to service their customers. The nascent circular economy strategy is becoming the conduit for success.

The demand side (customers and consumers) can look to some of the large retail manufacturers (suppliers) and how they pivoted with omnichannels to distribute products and develop multiple sources. Undoubtedly, resilience will be supported through onshoring and supported through the many technologies being used. Resilience requires a combination of high-level technical investments for real time access to supply chains as well as flexible manufacturing. Distribution channels, from a resilience and risk perspective, must be assessed for efficiencies and economic advantages. Those business partners which work out the new channels with the complexity of more robust technical solutions will gain market share, at the expense of their competitors. Resilience may beat lowest cost. An empty shelf of low-cost goods isn't as beneficial as a shelf full of actual products.

Resilient supply chains are using end-to-end visibility to be proactive in supply chain risk management. This requires the buyers, suppliers (and their suppliers), logistics, customers and consumers to be connected in real time. By being able to foresee where the cause of disruptions will probably occur, alternative solutions can be developed. Resilience correlates to diversity of supply. If you have all your eggs in one basket, the interdependency of the partners moves from a strength to a weakness. As Julia Formosa, CEO and Founder of Mystar Consulting recommends in her 2025 article, *Supply Chain Risk Management Global Tariff Edition*, "create a flexible strategic objective process that incorporates risks

and adapt to volatility” to support supply chain resiliency.

From a non-technical perspective, breaking down managerial silos and having integrated teams from design, finance, operations, suppliers, and strategic sourcing greatly helps to build resilient supply chains. Increased accuracy of forecasting by teams reduces the costs of uncertainty. The VUCA era thrives on disconnected teams.

Evidence of a move towards near shoring was seen with Mexico becoming an advantage for importing direct to the US. Redwood Logistics invested heavily in the shipping of automotive, appliances, aerospace, pharmaceuticals, HVAC, FMCG, food and beverage products into the US. One of the largest 3PLs, BlueGrace Logistics, established a Mexican office in 2023, to respond to this renewed interest in near shoring of supplies to reduce lead times and support supplier diversity. Ocean freight costs and lengthy delays out of Asia, favour a Mexican shipping points. BlueGrace has its proprietary software, BlueShip®, to connect 10,000 customers with 250,000 carriers in the US. The US government is shifting its international trade policies and tariffs to wean itself off over reliance on China.

In 2024, Mexico began developing the port of Guaymas to handle more vehicle shipments. Ford has been trucking vehicles, destined for Chile, 2000 kms from Hermosillo to the port of Lazaro Cardenas. Shipping via ocean from Guaymas could reduce handling costs by 30%. The 2025 US tariffs remain to be seen as to how these could upset the Mexican-USA trade relations.

US clothing brand, DXL, as a further example, is sourcing from Mexico and Nicaragua. This was a strategic move away from China, Vietnam, Bangladesh, Cambodia, and India to reduce supply chain risks. DXL’s CEO, Kanter, cites the shipping advantages of 7 days from Mexico vs 45 days from Asia. This reduces inventory carrying costs and allows for flexible ordering cycles from design to production. To sustain this growth Mexico will need to invest in its infrastructure, security, and energy capacity.

Taiwan-based EV transmission supplier, Hota, is building a plant in New Mexico in part, due to the US government financial and employment incentives. Hota produces 20 million transmission gears annually. The Hota plant will be located near one of the largest US-Mexico ports of entry at Santa Teresa, New Mexico. This enables Hota to service US and Mexican customers including Tesla.

Consolidation of suppliers to attain more competitive pricing can be undone by one supplier’s inability to deliver on time. Having a contingency plan for business disruption will encourage near shoring of suppliers with technology being a key enabler. The United Nations uses the acronym, *ALAN*. As local as possible, as international as necessary.

Ryder System handles ~250,000 shipments per year between the US and Mexico. Due to the increase in near shoring strategies. Ryder continues to invest in warehousing and logistical operations to support the market growth with Mexico.

The consolidation of the Canadian Pacific and Kansas City (CPKC) railways was formed to provide competitive alternatives to truck freight between the US, Canada, and Mexico, as they saw near shoring a growth segment under CUSMA. Intermodal traffic increases as the efficiencies contribute to revenues for rail carriers.

ESG in supply chains

The focus for supply chain management is in each of the (3) areas of ESG. Each is equally important, although the priorities of each are subject to competitive responses in the market and changing expectations of stakeholders. Corporate governance, generating profits, needs to be balanced with each of the ESG objectives for a sustainable business model.

Supply chain leadership must find the means to ensure competitiveness in product and service delivery with resilient sourcing partnerships. Juxtaposed on the profit and / or cost management objectives, are the ESG expectations which defines values. The values align with the corporate statements and commitments and need to be reflected in the business practices across the supply chain. Supply chain performance in the (3) ESG areas cannot be seen as exceeding corporate expectations, commitments or objectives.

Corporate leadership is ultimately responsible to its stakeholders and shareholders for the overall conduct of the organization.

ESG Framework

Environmental	Social	Governance
Reduce waste	Fair/living wages	Policy
Decarbonization	Diversity, equity, inclusivity, and accessibility	Ethics and conduct
Emissions strategy	Employee well-being	Compliance
Responsible practices	Community benefits	Reporting
Climate change strategy	Respect labour laws	Leadership
Renewable energy	Fair trade product support	Stakeholder values

ESG requires that sourcing decisions be passed through a filter for their values, prior to determinations being taken. This exercise invites input from various stakeholders to ensure commitments align with organizational strategies. Governance practice leads to consistency and continuous improvements to demonstrate responsible actions.

Behind the ESG messaging, is the acknowledgement that the desired outcome is social justice for all. Social justice has not been adopted as a truly global value but is a value expressed and aspired to in the WEIRD economy. Social justice seeks to ensure a distribution of social benefits, not just in law but in spirit and voluntary actions. It's a melding of rights and responsibilities. For supply chain decisions it requires a scrutiny of how the material extraction, labour content, production and process methods support the well-being of all stakeholders. Even where social justice may not be recognized under various ideological/political regimes, this does not allow buyers a license to exploit these jurisdictions in terms of social and environmental values for economic advantages.

Factored into the resilient strategies is the need to ensure ESG policies and practices are effective. ESG practices are driven in the supply sector by the largest player on the demand side, public procurement. If the weighting on environmental and social values continues to be overshadowed by pricing, the supply side will not move the needle. Whether they are a small municipality or the Department of National Defence, if governments don't demand a higher commitment to achieving GHG reductions, waste free water supplies, or resource conservation, the supply side won't invest in more sustainable solutions.

Common references for sustainable practices in supply chains are the basic ILO conventions. These include:

- Freedom of association
- Right to collective bargaining
- Elimination of force and compulsory labour
- Abolition of child labour
- Elimination of discrimination

Many leading organizations use these ILO conventions as a framework for policy development. As an example, the global company, Unilever takes the ILO conventions and emboldens them in their Responsible Sourcing Program Principles. With 60,000 suppliers and 150,000 employees, its governance practices are commendable. Under a decade of leadership from CEO Paulus Polman, Unilever set a standard in advancing ESG which few other organizations have realized. Their sourcing principles are stated as:

1. Business is conducted lawfully and with integrity
2. Work is conducted on the basis of freely agreed and documented terms of employment
3. All workers are treated equally and with respect and dignity
4. Work is conducted on a voluntary basis
5. All workers are of an appropriate age
6. All workers are paid fair wages.
7. Working hours for all workers are reasonable
8. All workers are free to exercise their rights to form and/or join trade unions or to refrain from doing so and bargain collectively
9. Workers' health and safety are protected at work
10. Workers have access to fair procedures and remedies
11. Land rights of communities, including indigenous peoples, will be protected and promoted
12. Business is conducted in a manner which embraces sustainability and reduces environmental impact

The status quo in organizations and within procurement teams can be self-limiting. What worked for us last week, is likely what we are going to continue with next week, until it doesn't work. If everyone is buying it and the government approves its use, it must be OK. With reference to the CFCs, HFCs, silica dust, hydrochloric / muriatic acid issues, the status quo is slow to change. The common default is we can't afford to change. At one time we couldn't afford to remove the lead from gasoline; we couldn't afford a health care system; and we couldn't afford to remove trans fats from food products. It turns out, we couldn't afford not to.

A rather innocuous appearing governmental procurement tool is the procurement card (P-card). The P-card was intended to reduce the administrative costs for buying low value goods. Enter Amazon. Based

on conversations with procurement professionals in the public sector, they are seeing staff and managers searching the Amazon site for *deals*. Their only measure of value is their budget. If it costs less to buy an item from Amazon, they are doing a good job. Their time isn't included in the search. Shipping may be. Duties may be. It's what gets charged to their P-card that matters.

Which causes us to reflect on local sourcing opportunities and trade agreements. In discussions with procurement colleagues in the Lower Mainland of BC, conservatively there could be \$300M per year in spending through P-card programs within the public sector. We can't have local preference for suppliers under the trade agreements but when we think of the P-card flexibility, there are options. Referring to the Lower Mainland values, if only 10% of the P-card buying was redirected at *local* suppliers, it could redistribute \$30M to locally owned and operated businesses. It doesn't negate trade agreement obligations. To an SME sector, \$30M is a meaningful amount of money. Public sector organizations may need to look at their P-card guidelines and ensure that *local* sourcing is the first option and foreign-online is not. Multiply the example dollars by the rest of the Canadian market and it becomes a significant dollar value. It does require a conscious change in spending practices. P-cards may bypass local suppliers and small-medium businesses which, ironically in part, pay the taxes which pay the government staff. Using the circular economy vernacular, time to rethink the use of P-cards.

The **S** in ESG invites a discussion on how the circular economy might impact jobs in general and social benefits. The transition will likely boost employment where there are more physical labour activities such as those related to extending product life involving repairing, remanufacturing, and repurposing products for other uses. A 2020 OECD publication, *Labour Market Consequences of a Transition to a Circular Economy: A Review Paper-Environmental Working Paper #165*, indicates that the circular economy could add 2% more workers which will help to offset job losses where increased production efficiency and technology is displacing workers.

The opposite of job creation is job destruction where labour is not required through a variety of actions such as banning products which are discontinued or not seen as being as responsible (aerosols); job substitution occurs where one labour activity is directly replaced by another (landfills to recycling). The transition to the circular economy would involve all types of job activities but the aggregated value appears to be slightly positive for labour roles.

Agricultural waste traditionally has been burned. There was no purpose for the tonnes of waste left behind after crops were harvested. It was a cheap disposal method which compounded the GHG problem. Vancouver-based Social Print Paper's founder and managing partner, Minto Roy, created a better solution to the residue waste from sugar cane – turn it into paper. The product is Sugar Sheets which serve the same function as pulp-based paper. Trees are valuable carbon sinks. The opportunity to repurpose agricultural waste instead of cutting trees, which are more important as a construction material, makes economic and social sense. Social Print Paper creates jobs and reduces the environmental stress. If we have to use paper, we now have alternatives to mitigate deforestation. Social Print is a good example of a company which sees ESG as a scalable opportunity and continues to attract customers for its Sugar Sheets. Repurposing waste into an advantage which mitigates environmental degradation and increases employment. <https://socialprint.com/>

ESG readiness and its continuum

There is no substitution for homework. Engaging with key stakeholders such as interest groups, NGOs, Indigenous Peoples, community groups, social entrepreneurs, elected officials, government ministries, key suppliers, and other vested parties is part of the research. A literature review could be conducted and a synopsis of the pros and cons developed. Talking with leading organizations which have navigated

the route successfully bear listening to.

An overview of a senior management reflection on ESG status has been included with a detailed questionnaire in **Addendum I**. Whether an organization has adopted ESG or is considering ESG, the questionnaire shares pragmatic ideas and ensuring success with ESG. Competing interests such as cost management, staffing, policies, sales and marketing, governance, and efficiency to impact social and economic development are taken into account.

The outcome of preparatory work is to draft the compelling narrative and business plan to move forward or to promote continuous improvement on the ESG journey. Boards of Directors will need buy-in and legal counsel is advisable.

Shareholders and stakeholders may have different views on ESG priorities. The common denominator is that all organizations understand that ESG strategies support existing business objectives and does not mean that profits are being sacrificed. Without profits, there is no further purpose for a business. Profits are critical to our economic development while ensuring environmental interests, social well-being, improved community benefits, and effective governance practices are how we sustain the profits.

Implementing ESG within an organization

1. Create the business imperative narrative and embed ESG in policies and practices. Work with 3rd party experts in the various aspects of ESG where your internal resources may be lacking. Define what the organization wants to do such as Net Zero emissions for 2030. Assign roles and responsibilities for senior executives and the management team. Have a communication plan go out to all stakeholders. Ensure strategic operational and financial plans will be viewed through the ESG lens prior to actions being taken.
<https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/net-zero-emissions-2050/challenge.html>
2. Measure the current environmental footprint for a baseline to set targets. Develop a risk mitigation plan which aligns with the corporate governance and Net Zero targets. Set the KPIs and incentives which reward responsible behaviour across the organization.
3. Address where training of staff will be required and draft policies which support a Net Zero initiative. Set a timetable for how Net Zero strategies will impact jobs and processes. Get the buy-in from staff and look for the quick wins to encourage the replication of success.
4. Build relationships with governmental agencies, NGOs, industry competitors and partners to build the capacity for continued sustainability initiatives. Do what you can within your sphere of influence to positively impact your stakeholders.
5. Report out in an objective and transparent manner on all ESG metrics. This includes progress to date and gaps for continuous improvement as part of the governance commitment. Work with 3rd party experts to provide insights as to where more can be done. Look for international, industry, or bona fide standards of compliance to achieve and become a recognized leader.

Drawing from the Ellen MacArthur Foundation's *Building a circular supply chain* recommendations to transition to a circular supply chain, the following actions can be taken:

1. Develop a reporting structure which motivates the decision-making to support circular supply chain values.
2. Optimize network designs which prioritize the retention of values embedded in products and materials.
3. Engage with and reward like-minded suppliers which adopt circular economy practices.
4. Use technology to facilitate flows of information, materials and products, in a closed-loop

model.

5. Revise performance assessments which support commitments by decision-makers to shift in favour of circular economy principles.
6. Design products and develop business models to focus on an efficient and effective flow of materials throughout their life cycle.
7. Customers should know how they play a role which supports the sales of responsible products and services, past the point of initial sale.
8. Invest where there is a connection to support circular economy benefits.
9. Ensure supply chain policies are revised to reflect the circular economy values in decision criteria.

An example of a large organization taking on a strategic Net Zero plan was unveiled by Walmart. This type of an approach applies to large and small initiatives where organizations are implementing ESG. Their approach recognizes that ESG requires a full supply chain effort and support when beginning the implementation to adapt practices and make a difference.

Walmart launched its Project Gigaton in 2017. An aggressive program requiring Walmart's suppliers and stakeholders to reduce 1B metrics tons (gigaton) of GHG emissions by 2030. They created a compelling vision and acknowledged their leadership role to drive change across the supply chain. This strategy includes providing suppliers with access to renewable energy with Schneider Electric and a supplier financing program with HSBC to enable early payment of invoices and lending advantages. The partnerships with its suppliers are tied to a supplier's ability to actually reduce their GHGs in operations using science-based targets (SBTi) and their CDC scores.

Walmart's Project Gigaton is based on six pillars which its supplier partners can commit to where possible:

1. Energy – use renewable energy sources with little or no carbon emissions
2. Nature – reduce emissions at the farm level and mitigate deforestation practices
3. Waste – reduce all types of materials going to landfills
4. Product use and design – increase use of sustainable materials and recycled content
5. Packaging – to source sustainably and adopt circular economy production processes
6. Transportation – to reduce emissions and total miles of trucking

These commitments align with the circular economy principles and use disclosure as a key reporting mechanism to encourage continuous improvements.

By early 2024, Walmart's Project Gigaton had met the target of 1 billion tonnes of reduced emissions – 6-years earlier than expected. With a project involving 5000 suppliers, this is a great example of what can be achieved with the right mindset. Walmart leveraged their buying power to affect change and continues to operate within a very competitive retail market.

Amazon reduced its 2023 emissions by 3%. In 2019, Amazon set a target to match 100% of its electricity supply with renewable power by 2030. It has already met that target by 2024 – 6-years ahead of schedule. As the world's largest corporation to buy renewable electricity, Amazon's total emissions from its supply chain, 3rd party logistics, and purchased electricity were 68 million tonnes of CO₂e in 2023.

<https://www.reuters.com/business/environment/amazons-total-emissions-fell-2023-it-meets-renewable-power-goal-2024-07-10/>

West Fraser Timber announced in April 2023, that SBTi has validated its scope 1, 2, and 3 emission reductions. West Fraser is committed to achieve near-term GHG reductions across all of its operations in the USA, Canada, the UK, and Europe. West Fraser operates 60 facilities to produce lumber, engineered wood, pulp, newsprint, wood chips and uses renewable energy.

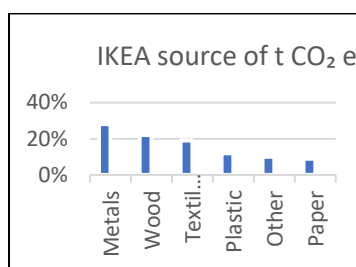
<https://www.westfraser.com/sustainability/sustainability-report>

Global CPG company, Post Holdings, has committed to reducing its Scope 1, 2 and 3 GHGs by 30% by 2030. The Scope 3 emissions largely come from the supply of ingredients and packaging materials.

<https://www.postholdings.com/post-holdings-sets-scope-3-ghg-emissions-reduction-target/>

Global retailer IKEA, in its Climate Report FY22, is aggressively reducing its carbon footprint by increasing the sourcing of renewable materials. IKEA reported a 12% reduction on its CO₂ emissions climate footprint from base year 2016 with a 15% reduction in total by 2030. Commitments include bio-based glues for wood-based products; 100% recycled content in key materials; cellulose-based textile fibres; and 100% renewable energy at our material suppliers, such as board factories and paper mills. IKEA uses the circular economy as its road map for designing problems out of its supply chain. The complexity for IKEA is to implement changes while operating 400+ stores in 49 countries with 9000+ products being produced from 40 factories with 1000 suppliers. IKEA's CEO, Torbjörn Lööf, reported in 2017 that it affects only 30% of emissions in its supply chain. Reducing Scope 3 emissions is an issue with their climate footprint. Finding alternative materials is a constant balancing act between availability, affordability, and quality.

IKEA's carbon footprint based on types of materials, which could model other similar home furnishing retailers, charts as follows:



<https://about.ikea.com/en/sustainability>

Canadian company ESG implementation example

Cloverdale Paint wanted a change in direction. They wanted to bring ESG into their products and business practices. The transition was relatively easy to navigate. Cloverdale Paint is a 90-year-old, family-owned company, based in BC.

Their procurement group had the expertise on board and had completed a strategic supplier review, revised their procurement procedures for resiliency in the market, and adopted environmental standards for their product lines. The intent was to minimize their environmental impact yet retain product quality. Having a commitment to environmental standards, the E in ESG, is referred to as having a focus on *singularity* of purpose. An environmental policy is certainly a noble objective but leading organizations look for *comprehensive* policies which include social (S) and governance (G) values. Sustainability requires a holistic approach.

The next step for Cloverdale Paint was to go fully into an ESG strategy across the company. The senior leadership group developed their mission and value statements which they shared through their corporate and customer messaging. Successful implementation of policies requires these be rolled out to ensure customer and stakeholder interests were respected. This is a change in decision-making. Without the subsequent business actions representing the values, policies are merely platitudes.

The procurement group and quality control went into high gear. Major suppliers were advised in the shift towards best value and not just attention to prices. This required several actions be undertaken concurrently.

A supplier code of conduct was drafted; ongoing 3rd party audits are conducted to validate supplier compliance with on-site inspections through QIMA; a review of packaging materials led to changes in material specifications being made; social and environmental commitments became part of their contract terms and conditions; paying living wages became a contracting norm; Scope 1, 2 and 3 GHG reduction targets are set in place; verifiable carbon credits have been purchased with energy and emission audits on a regular basis.

To provide accountability Cloverdale Paint engaged with EcoVadis to set benchmarks in the (4) key areas of environmental, labour and human rights, ethics, and sustainable procurement practices. This led to the aggregated overall score which moved from 40, to 43, to 55 as part of their continuous improvement plan with ESG. Cloverdale Paint still supports philanthropical causes as part of its social commitments. These are voluntary but speak volumes about the ownership commitment to the communities it serves. The purpose of business goes beyond the balance sheet.

A large part of this transition to ESG-based criteria can be credited to their Director of Procurement, Ross Nordin and their Corporate Regulatory Compliance Manager, Paul Ly. These sea changes by organizations are led by champions who take on the challenges and achieve outcomes which impact all of its stakeholders. Being competitive on pricing is not lost during this strategic shift.

There are saving which accrue from efficiencies being gained through strategic partnerships with key suppliers. All organizations need a return commitment from their supplier base to change their business model. This also has a ripple effect for suppliers. If they can assist Cloverdale Paint in their mission, they can also benefit from this outcome. Competing on values is good for all of the players in a market, as it introduces a new level of differentiation for customers. Early adopters win market share.

The Cloverdale Paint ESG journey had been 3-years in the making, to the end of 2024. They are a lean organization yet the change management steps had to be taken for successful implementation. Adapting internal business practices and having suppliers address a new value proposition takes a degree of patience. There can be missteps and doubt about the change in direction in the early days. Ongoing training is a common commitment with early adopters. Leadership requires an ability to monitor progress and respond to unforeseen events during the transition.

Lessons learned:

The messaging from the C-Suite to external and internal stakeholders is critical

Ensure the organizational supply chain policies and practices reflect best practices in order to take on ESG

Metrics must be developed for reporting out

Training is essential to adapt a new value proposition

Change management practices are as important as the ESG priorities

Changing behaviours after decades of focus on price and quality requires patience and constant reiteration of ESG values

Brining in external expertise complements the managerial talent and the ability to assimilate ESG practices

Market competition will dictate the speed and ability to respond to emerging issues

Policy is a means, not an end.

Supply chain policies

The G in ESG is addressed through a procurement policy as the framework. The policy represents the gravitas of the governance practices as to how an organization's strategies will be applied in decision-making. Policies which embrace ESG temper the traditional models which were price-based. ESG policies are value-based. Policies should be written as a comprehensive document as opposed to drafting an ESG component to add on to an existing procurement policy.

Effective policies are more *descriptive* than *prescriptive*. This implies that rather than having a policy refer to a specific outcome or identify with equity seeking groups, the policy is broad enough to ensure various ESG values can be attained. A policy is more effective where there are not targeted, time-limited constraints on annual deliverables, requiring a policy to be continuously amended, as new leadership is in place.

As an example, an organization, in a *prescriptive* policy, states they want to target youth-at-risk, between 19-28 years of age, for increased employment opportunities. In a *descriptive* policy, this objective could be addressed as ensuring people facing barriers to employment will have increased employment opportunities with our organization. The prescriptive model often falls victim to time, as

objectives change or other equity seeking groups want their issues to take precedence. Policies should be reviewed at least within a 5-year period after being implemented. Stakeholder values and expectations are fluid and evolving.

An organizational policy should be inclusive of and convey:

- ESG values and objectives
- Community and cultural commitments
- Business ethics and professionalism
- Administrative and executive responsibilities
- Spending authorities
- Exceptions, exclusions or exemptions as per trade agreements
- Supplier performance and codes of conduct
- Definitions for internal and external stakeholders
- Fairness, integrity, accountability, and transparency
- Compliance with all legislative and / or Board requirements

Staff conduct and supplier code of conduct are codified within a policy. An adjunct within an ESG supply chain policy is to state the job title of the person responsible for the policy. This implies within that person's job *description*, ESG responsibilities are a part of their accountability for performance. Without an ESG reference or some acknowledgement of sustainability within a job description, it does not support a mandated commitment. The executive responsibility and reporting are denoted in the policy. The policy must align with corporate values and strategic objectives. Policies are a means of messaging to all stakeholders on an organization's values and expectations. Policies must be ratified by senior executives for effective governance.

Policies can be aspirational and inspirational and should align with organizational mission and value statements. The importance of policies is to set clear expectations around sourcing options. To support a procurement policy there should be a complementary policy guide. A guide provides details on how to interpret the policy with procedural instructions. Procedures are affected by leading practices or technical advancements, whereas, policies are more strategic. Procedures are relatively easy to amend, while policies are not. All the more reason to ensure policies are relevant to all stakeholders.

Staff codes of conduct need to reflect the organizational values. These values can include customer service; respect for DEI; employee well-being; business ethics; conflicts of interest; gifts and gratuities; protection of assets and intellectual properties; insider trading; financial reporting; and records retention; entrepreneurship; accountability for one's actions; teamwork; safety; waiver process where applicable; and organizational objectives. Non-compliance by staff with a code of conduct should result in defined consequences. Without the latter we invite bending the rules to fit the situation and undermine the organizational reputation and ESG commitments.

ESG Essential Clauses

Colleague Nishant Riva, Product Manager, Lean Procurement, in Aberdeen Scotland, recommends the following clauses be used in agreements to advance sustainability and reinforce ESG commitments. As with all clauses, there needs to be vigilance to ensure compliance and accountability. 3rd party standards are useful for parties to recognize and use as a framework for assessing effectiveness.

<https://www.procurescape.com/procurement-your-strategic-partner-nishant-ravi/>

1.Environmental

Define the environmental standards and targets that third parties should meet. These include emissions

reduction, waste reduction, and Biodiversity conservation.

2.Labour and Human Rights

Require 3rd parties to adhere to fair labour practices, ensure safe working conditions, and comply with international human rights standards.

3.Ethical Sourcing

Specify that suppliers must source materials and products ethically, avoiding conflict minerals and ensuring responsible sourcing practices.

4.Transparency and Reporting

Require regular reporting on sustainability metrics, like carbon emissions, water usage, and social impact, to ensure transparency in the supply chain.

5.Supply Chain Traceability

Require suppliers to provide full traceability of products and materials to promote accountability.

6.Auditing and Inspection Rights

Specify the right to audit supplier facilities and records to ensure compliance with sustainability standards. Also, outline the process for auditing supplier facilities and records.

7.Renewable Energy and Energy Efficiency

Encourage the use of renewable energy sources and energy efficient practices in 3rd production processes.

8.Sustainable Packaging

Include provisions that promote or mandate ecofriendly packaging materials and practices to minimize waste and foster sustainable practices.

9.Sustainable Product Development

Encourage or mandate investments in sustainable product innovation. This fosters sustainable practices in supply chains.

10.Intellectual Property Rights

Address any intellectual property issues related to sustainable technologies or processes developed during the contract.

11.Local Community Engagement

Mandate 3rd parties, especially suppliers to engage with and contribute positively to the well-being of local communities where they operate.

12.Sustainable Transportation

Include provisions that promote eco-friendly transportation methods in upstream and downstream activities.

13.Anti-corruption provisions

Include strict anticorruption clauses to guide 3rd business conduct. This fosters effective governance.

14.Sustainable Finance

Mandate that any funds allocated or provided must be exclusively used for sustainable objectives and

projects, aligning with predefined ESG criteria and goals, and require transparent reporting on the allocation and utilization of these funds. This is especially important for banks and other financial institutions.

15. Renewal and Review

Specify how the contract will be renewed or revised to adapt to evolving sustainability goals and regulations.

16. Force Majeure and Sustainability

Clarify how force majeure events may impact sustainability commitments and responsibilities.

17. Continuous Improvement Requirements

Encourage and specify that suppliers continually improve their sustainability practices and technologies.

18. Insurance

Incorporate insurance provisions into ESG contracts to mitigate ESG-related risks effectively, covering areas such as environmental liabilities, cybersecurity, product liability, etc. Also, ensure insurance coverage is regularly reviewed and updated.

19. Limitation of Liability

Determine and state explicitly, the extent of each party's liability for sustainability-related incidents.

20. Conflict Resolution Mechanisms

Establish procedures for resolving disputes related to sustainability breaches, such as mediation or arbitration.

21. Termination for Noncompliance

Specify the consequences of sustained non-compliance with sustainability standards, which may include contract termination.

Business ethics

Trust is the engine of business. Deontological theory expects us to “do good.” The intent is captured in the phrase the Golden Rule, treat others as you would like others to treat you. We trust each other to act in ways which achieve the greatest amount of good because people benefit from the most good. Trust is the currency of a business professional.

ESG integrates deontological theory and stakeholder theory. Stakeholder theory requires that the interests of investors, employees, communities, and legal requirements be respected when making business decisions. Studies have shown that companies which perform well against their competitors often have a strong sense of commitment to values and ethics. As stated in *Good Company*, typically the best performing companies outperform the overall stock market. Over several years, companies within the same industry which adopted many of the trust-building attributes outperformed their competition. Corporations which put their staff and customers ahead of their shareholders are meeting shareholder expectations.

In his book *Level Three Leadership*, Professor James G. Clawson talks about an individual's VABEs. Our personal values, assumptions, beliefs and expectations which become a part of our view of what we think of as the way the world should be. These are well-defined by the time we enter the work place. Real world experiences can cause us to revise our VABEs in order to be more effective along our career

path or when leading others. Personal conduct should be congruent with organizational values for long-term relationships.

The culture of an organization is its persona. Their persona is reflected in its corporate actions and is affected by the beliefs, values, vision, practices, behaviours, and messaging. The leadership is expected to ensure the culture is adaptive to meet the expectations of shareholders and stakeholders. The leadership's audio must sync with its video – what you heard should be what you see. What was acceptable in terms of social interactions between people even 10+ years ago was significantly and rightly challenged by the Me-Too movement.

Codes of conduct are a guide at best. They set acceptable parameters within which decisions and behaviours should be made by individuals. The Supply Chain Canada's professional code reinforces the behaviour and conduct which a supply chain professional should exhibit in practice. The Code serves as guidance for its members and reflects on the profession as a whole. While it may not prevent acts of indiscretion, it provides an appropriate level of response where the behaviour or conduct of an individual may detract from the integrity of the profession.

Critical materials

In 2025, the US is applying tariffs on all kinds of goods and materials. China has banned the export of various critical materials which US companies need. The suppliers therefore bought large quantities shipped from Thailand and Mexico, neither of which have any mining operations for gallium and antimony, for example. US laws do not prevent the sourcing of Chinese-mined gallium or antimony, as long as the exporter has a license. However, US buyers, knowingly circumvent the trade ban from China and continue to source directly from Chinese-owned logistic companies, in spite of laws prohibiting the practice. It seems only illegal or unethical if you are caught. <https://www.reuters.com/business/autos-transportation/how-us-buyers-critical-minerals-bypass-chinas-export-ban-2025-07-09/>

Supplier Codes of Conduct

Supplier codes of conduct are the external messaging by an organization on its values and the partnerships it seeks to form. Supplier codes of conduct support the core values of the contracting organization and should be reflected in its 3rd party relationships. Supplier codes of conduct are voluntary; however, if they are included in a contract, this grants the code legitimacy, meaning they are enforceable or could lead to termination if performance is not compliant with the code. Supplier codes of conduct can include: business ethics; environmental standards; labour laws and practices; employee well-being and safety; discrimination; harassment; violence; and conflicts of interest. The ILO labour conventions provide a good framework to draft supplier codes of conduct.

An example by a leading organization, with a supplier code of conduct, shared in a transparent format, is from Unilever. Unilever operate in global markets with a wide variety of products. Their supplier code of conduct is framed as a Responsible Sourcing Program using a principles-based commitment, as follows:

1. Business is conducted lawfully and with integrity
2. Work is conducted on the basis of freely agreed and documented terms of employment
3. All workers are treated equally and with respect and dignity
4. Work is conducted on a voluntary basis
5. All workers are of an appropriate age
6. All workers are paid fair wages
7. Working hours for all workers are reasonable
8. All workers are free to exercise their rights to form and/or join trade unions or to refrain from doing so and bargain collectively

9. Workers' health and safety are protected at work
10. Workers have access to fair procedures and remedies
11. Land rights of communities, including Indigenous peoples, will be protected and promoted
12. Business is conducted in a manner which embraces sustainability and reduces environmental impact

The right to collective bargaining is acknowledged in most western economies. It is a commonly referenced expectation in supplier codes of conduct. An interesting development in Quebec in early 2025, exposed how there can be strategic initiatives taken to counter collective bargaining. Amazon chose to close all of its facilities in this province immediately following the successful unionization at its Laval operation. If Amazon only closed Laval they could be found guilty of breaching the Quebec labour laws. In 2004, when a Wal-Mart facility was unionized, W-M shut down that one facility only. W-M was found guilty of unilaterally changing working conditions, instead of bargaining, by only closing its one facility. Amazon knew the potential outcome if they only closed one facility which was being unionized, therefore, shut down all the operations in Quebec and contract with 3rd party companies. It will be interesting to see if there are subsequent actions by the union or Amazon or whether customers care who delivers their orders. In July 2025, the Amazon fulfilment centre in Delta BC was certified as a union. Amazon's operation in Staten Island, NY was certified in 2022 but has yet to reach a contract.

<https://www.cbc.ca/news/canada/british-columbia/delta-amazon-facility-unionized-1.7583281>

In late 2025, the country of India introduced new labour codes for Wages, Industrial Relations, Social Security, and Occupational Safety, Health and Working Conditions. This is the first significant reform to changing workplace conditions since 1947. Most of the laws have been in place in Western markets for decades. It will be interesting to see how these laws impact businesses and workers over the next few years, as compliance and enforcement can be challenging.

<https://economictimes.indiatimes.com/news/economy/policy/four-labour-codes-come-into-force-who-benefits-what-changes-and-what-workers-must-know/articleshow/125484448.cms?from=mdr>

Supplier performance

Measuring supplier performance is the only way to know if you are receiving value for money. Having a critical set of KPIs which the parties have agreed to is fundamental to risk management. Failure to achieve KPIs invites risk for all parties. KPIs are much different from supplier selection criteria. Performance is your actual experiential knowledge as to how they are performing in the market. Their ability to adapt and be resilient in the face of market conditions and meet the terms and conditions of the contract. Mitigation includes relationship building, information sharing, diversification, and ESG practices.

Supplier *performance* evaluations can include an assessment of compliance with a code of conduct but are more focused on the qualitative and quantitative aspects of the materials and service expectations within a contract. The important link to supplier codes of conduct, is where codes of conduct form part of a contract, this gives a voluntary code, *legitimacy*. A supplier must agree to maintain the conditions of the supplier code of conduct with a customer or an infraction or non-compliance could be considered as a breach of contract. ESG would be an explicit commitment within a contract and tied to performance.

Addendum VI provides a list of *definitions* which can be used when drafting policies and when issuing solicitation documents which support ESG strategies.

Ethics applied in practice

In 2025, Tesla has been charged with speeding up odometers to avoid warranty claims. A proposed class action law suit alleges that Tesla odometers are set to generate 15% higher readings than actual driving distances. <https://www.reuters.com/business/autos-transportation/tesla-speeds-up-odometers-avoid-warranty-repairs-us-lawsuit-claims-2025-04-17/>

In 2015, Volkswagen disclosed that it had used software to intentionally cheat on emissions testing, involving 11M vehicles. VW settled the US civil and criminal actions by paying US\$20B+. Quite a message to the automotive market to address its ethical conduct. Yet, in late 2023, Cummins Inc. agreed to pay US\$1.675B for installing devices to cheat on emissions testing under the US Clean Air Act. Stellantis and Nissan used Cummins engines in their vehicles, recalled thousands of vehicles to update its emission software. Cummins also supplied PACCAR and Daimler trucks. In August 2022, Stellantis paid US\$300M in a similar emissions scandal. In 2024, Stellantis paid US\$190.7M in penalties for failing to meet US fuel economy requirements in 2019-2020.

In 2025, Stellantis, VW, and other EU car makers pled guilty to fixing rates on recycled content in their vehicles and paid ~Cdn \$ 700M in fines. <https://www.reuters.com/sustainability/boards-policy-regulation/eu-issues-458-million-euro-fine-car-manufacturers-over-vehicle-recycling-cartel-2025-04-01/>

Daihatsu, the Toyota-owned car manufacturer, admitted to tampering with collision results in vehicles it exported. Toyota admitted to falsifying emission tests for 30-years. Toyota Motor Corp., was guilty of cheating on engine emission testing used in several other brands of vehicles. This type of unethical behaviour will likely persist in the “catch-us-if-you-can” regulator and fraudster cases. It would seem that car buyers are oblivious to this type of corruption and are apathetic to the cause. As long as it’s legal to buy, buyers vote with their wallets.

In June 2024 as a follow up to the Toyota/Daihatsu incident, Toyota, Mazda, and Honda also admitted to falsifying test results in various vehicles over a number of years. In July 2024, GM agreed to pay US\$ 145M in penalties for allowing excess emissions between 2012-2018 on ~6 million vehicles. Another 15 minutes of bad news and then move on. <https://www.reuters.com/business/autos-transportation/gm-pay-1458-million-penalty-after-us-finds-excess-emissions-59-million-vehicles-2024-07-03/>

Again, in 2024 Toyota had another mea culpa moment when it admitted additional cheating on emissions for newer model Camrys and RAV4 vehicles. In late 2024, Toyota has been charged with cheating on emissions from forklifts sold in the US. And yet again, in 2025, Toyota pled guilty and paid US\$1.6B for emission fraud for its subsidiary Hino Motors. Another 15 minutes of *bad news*.

Boeing, the legendary airline manufacturer, admitted to one criminal charge of conspiracy to defraud the US government in July 2024. To avoid going to court over the fatal 2018 and 2019 737 Max airline crashes, Boeing pled guilty of hiding design flaws during safety certifications and will pay a fine of US\$487M and requires that Boeing be monitored for oversight by an independent party. Boeing has lost US\$23B since 2020 while under its CEO Calhoun, who earned US\$32.8 M for 2023.

Boeing’s recent poor performance can be traced to its corporate culture. In a Forbes article, the (3) factors negatively impacting Boeing are: *organizational processes for addressing the propensity to succumb to psychological pitfalls, handling make-or-buy decisions about producing in house or outsourcing instead, and shared norms and values that reside within a company’s boundaries*. Corporate culture affects corporate conduct. <https://www.forbes.com/sites/hershshrefrin/2024/01/28/boeings-weak-corporate-culture-underlies-difficulties-with-737-max-9/>

In 2013, Canadian diamond mining company Rio Tinto, received approval from the Australian government to exploit a sacred Aboriginal site in the Juukan Gorge. Archeological evidence indicated that the cave has had human occupation for 46,000 years. Based on outdated Heritage laws from 1972,

Rio Tinto proceeded to dynamite the site to expand their iron ore mine in 2020. At the time, Rio Tinto chief executive Salisbury stated that he had “taken into accountability that there clearly was a misunderstanding about the future of the Juukan Gorge.” He said Rio Tinto would *overhaul* its heritage process and take a *leadership position* on the reform to the Aboriginal Heritage Act, which had been underway since 2018. This catastrophe to the loss of cultural and historical links speaks to the serious gap in ethical conduct and responsibility of business leaders. While Rio Tinto may eventually make a monetary settlement to the Puutu Kunti Kurrama and Pinikura peoples for this egregious act, it’s another lesson which shows how economic interests can outweigh the environmental and social values of disenfranchised citizens. Rio Tinto gets *15 minutes of bad news* and we move on. The site is destroyed forever.

In a February 2022 mea culpa statement, Rio Tinto published the findings and recommendations on its corporate behaviour conducted by Elizabeth Broderick, the former Australian Sex Discrimination Commissioner. The *Report into Workplace Culture at Rio Tinto*, was a scathing review of Rio Tinto’s workplace culture which identified disturbing findings of bullying, sexual harassment, racism and other forms of discrimination throughout the company. The study surveyed 10,000 people which had been victims of this workplace violence. Rio Tinto’s senior management group found the report unsettling and an embarrassment to their stakeholders. Rio Tinto has launched assertive actions to correct these deplorable practices. The Juukan Gorge incident could be viewed as an extension of a “win-at-any-cost” ethos at Rio Tinto. <https://www.riotinto.com/-/media/Content/Documents/Sustainability/People/RT-Everyday-respect-report.pdf>

In April 2024, Rio Tinto’s Chairman Barton, told shareholders at its annual meeting that, amongst other objectives, it included striving for “impeccable ESG credentials.” A little irony in that statement. In late 2024, Rio Tinto found that it still has an unacceptable rate of sexual harassment at its work sites. Rio Tinto and BHP were charged with using NDAs to prevent women who have been *allegedly* sexually assaulted from making any claims or speaking about this. A law suit was filed in December 2024 against each company for their use of NDAs. Both companies stated they no longer use NDAs.

<https://www.reuters.com/markets/commodities/bhp-rio-pressured-women-sign-ndas-after-sexual-harassment-complaints-lawyer-says-2024-12-12/>

Professor Leigh L. Thompson emphasizes that the presence of a formal ethics and compliance program in no way guarantees effective ethics management. Employees must believe that formal policies actually guide behaviour – they are not just platitudes in a manual. Interpersonal ethics is the way in which we treat others. Bullying behaviour or cheating directly harms others. People may feel uncomfortable speaking up during a meeting. Intimidation or the abuse of power are examples of unethical interpersonal behaviours.

David Montero, the author of *Kickback: Exposing the Global Corporate Bribery Network*, has a quote on bribery simply being the cost of doing business. “[Bribes] are like steroids – everyone’s doing it. And if you don’t do it, you fall behind.” Montero’s research quite clearly shows that bribery has become the hidden standard of doing global business. He referenced the case of Rolls-Royce. Rolls-Royce revenues increased exponentially between 1987 and 2016. Initially this was seen as the Rolls-Royce know how to marry technology and leading management practices. As it turned out, Rolls-Royce was found guilty of a global bribery scheme. Using a system of shell companies, they bribed foreign officials in Russia, China, India and in other countries before getting caught. Rolls-Royce settled lawsuits in the UK and USA by paying US \$800 Million in fines. But who really remembers? It’s just the cost of doing business and then promising to never do it (get caught) again.

In 2025, the US government, under an Executive Order, stopped the Foreign Corrupt Practices Act of 1977 (FCPA) until August, with a possible extension to February 2026. The rationale was to allow US companies to access critical materials, using whatever means necessary – presumably including, bribing

foreign officials. <https://gfmag.com/economics-policy-regulation/us-halts-enforcement-of-foreign-bribery-law/>

In 2007 Harvard professor Max Bazerman's research led to an acknowledgement that *once the ethical line has been crossed, an institutionalization of corruption can occur in which unethical acts become a part of daily activities and people often have a vested interest in remaining quiet*. Unequivocally the research showed that incremental steps of unethical behaviour largely went unnoticed. This may cause individuals to escalate these activities, unintentionally with no malice to defraud, until it must be dealt with. A former Imperial Tobacco employee admitted to a decade-long scheme to ship tax-free cigarettes into the US where they would be smuggled back into Canada for sale.

Jonathan Gratch, professor of computer science, University of Southern California, sees the rise of digital assistants adding to ethical concerns. His research is showing that people tend to be less ethical when interacting with virtual assistants. This can be attributed to less emotional bonds, less empathy, with diminishing social checks. Fairness and politeness are the usual norms with face-to-face contact – absent with *machines*. GAI bears much further research and governance oversight. <https://cams.mit.edu/wp-content/uploads/2023-05-15-WSJ-How-AI-Will-Change-the-Workplace.pdf>

In 2013 SNC Lavalin paid a significant price for its unethical conduct. The World Bank barred SNC and 100 of its subsidiaries from bidding on any of the Bank's development projects for the next ten-years! An unintended outcome of SNC bribing public officials in Cambodia. The RCMP was already probing the SNC activities in Libya, Algeria and Bangladesh. SNC knew about its ethical choices but chose to not make the right decisions at the right time. In 2018, the Canadian government introduced the use of deferred prosecution agreements. This waived the sanctions against SNC Lavalin.

SNC Lavalin seems to regard illegal bidding practices as one of its standards of how business is done. Between 2003-2012 SNC settled bid rigging charges in Quebec with a payment of \$1.2M. Again, between 2002-2011, SNC was party to bid rigging with 6 other engineering companies in Quebec and paid a portion of the \$12M settlement. In 2024, a former VP at SNC Lavalin executive, Normand Morin, was sentenced to prison for bribing officials to get a bridge repair contract in Quebec. SNC Lavalin is now called AtkinsRealis. Companies can also review the ISO Anti Bribery Management System for further guidance: ISO 37001:2016

To its embarrassment in 2024, the Canadian government found it had paid ~\$5M to three IT staffing companies in an over billing scheme by Dalian Enterprise, Coradix Technology, and GC Strategies. These companies have been "suspended from federal work" until further notice. As a result, the government has formed the Office of Supplier Integrity and Compliance to address supplier misconduct.

Global snack company Mondelez, continues to make cookies in Russia to support its investment, while Russia continues to attack the Ukraine. Mondelez operates three factories in Russia and despite calls for boycotts, they continue to operate and want a supply chain which is "*self-sufficient, stand alone.*" Mondelez continues to make its distinctive-shaped Toblerone chocolate in Switzerland and Slovakia and exports into Russia. Good business or good ethics? The infamous 15-minutes of bad news. <https://www.reuters.com/business/retail-consumer/toblerone-still-sold-russia-even-mondelez-nixed-imports-2024-06-28/>

Unilever was able to sever its business operations in Russia in late 2024. It's estimated that Unilever wrote down Cdn \$ 700 M in the sale of its assets. Danone wrote off ~Cdn \$ 1.5 B earlier in 2024 from its Russian business operations. The total write-down from exiting Russia has been estimated at ~ Cdn \$ 140 B for foreign companies. <https://www.reuters.com/markets/deals/unilever-completes-sale-russian-business-2024-10-10/>

Responsible leaders set the ethical expectations of staff and communicate through ethical messaging and conduct. In the case of Timberland, CEO Jeff Swartz was made aware of the sourcing of hides for leather from the Amazon rainforest in 2009. Swartz worked with Green Peace to release a policy requiring its suppliers to not purchase cattle which were raised in newly deforested areas of the

Amazon. This policy had a significant effect on leather, beef, and other products in Brazil. Any cost implications were completely secondary to doing the right thing to ensure brand protection and customer loyalty.

Illegal mining, forestry, fishing, or any other illegal business practices, requires a partner – the buyer of illegal goods, implicit in the transactions. Nobody will participate in illegal actions if there is no customer to buy the *stolen* goods. Without the means to verify or validate the *provenance* of goods or labour, illegal practices will continue. The take seems worth the risk. Eventually the illegal goods get lost in the upstream and downstream supply chain activities and there is very little which can be done to trace the origins. The buyers know when they are buying from a less than a legitimate supplier; but also know there is a low risk of the buyer being caught. A lot of attention is directed at the illegal activities by the smaller players, often eking out a living, while lesser on the final beneficiaries in the transaction, who can be the bigger players in a market. People behave in the way they are rewarded. Ethics matter.

The beef industry in Brazil is linked to ~25% of the global annual tropical deforestation and ~10% of GHG emissions. There are strict legal limits on the clearing the Amazon forest for pastures but it continues illegally. China imports ~1M tonnes of beef from Brazil annually. <https://www.reuters.com/sustainability/land-use-biodiversity/china-brazil-try-out-beef-traceability-plan-2024-07-10/>

Gum arabic.

One of the key ingredients in Coca Cola, Pepsi, and hundreds of other global consumer brands, is *gum arabic*. This product comes from the acacia tree. Gum arabic is valued at US\$3000-5000 tonne and has sales of ~\$250M per year. The prime source for the gum has been the Sudan – which is mired in military conflicts, civil war, and corruption. No traders will state where they buy the gum from. The global brands which buy the gum must engage in nefarious business practices to buy this commodity. Lacking any governmental controls, the gum is smuggled out of the Sudan to meet the demand of buyers. Companies such as Nexira SAS in France and Ingredion in the US are large buyers of gum arabic.

<https://www.reuters.com/world/africa/how-key-ingredient-coca-cola-mms-is-smuggled-war-torn-sudan-2025-03-04/>

The DRC

I hesitate to single out the Democratic Republic of Congo (DRC). However, the DRC epitomizes what needs to be corrected in global business ethics and policy governance. The DRC's citizens have survived decades of political corruption and instability, along with humanitarian crises at the worst level. Yet the DRC is a *supplier to the world* for many critical resources.

The electronics industry has its Electronics Industry Citizenship Coalition Code of Conduct. Many of the larger electronic brands are signatories to the code. While the intent of the EICC code is good, it has not prevented the questionable practices of sourcing raw materials such as coltan from the DRC. We could surmise that cost pressures necessitate securing the materials first and applying the code second. The Organization for Economic Co-Operation and Development (OECD) has condemned the artisanal mining practices being conducted in the DRC. The Canadian government participates on various OECD committees. In 2008 the OECD Guidelines for Multinational Enterprises states, "*observance of the Guidelines by enterprises is voluntary and not legally enforceable.*" It asks that MNCs meet the softer expectations of society while promoting commercial interests. Money versus morals. The sanctions for noncompliance of a code should serve as a deterrence to act more responsibly.

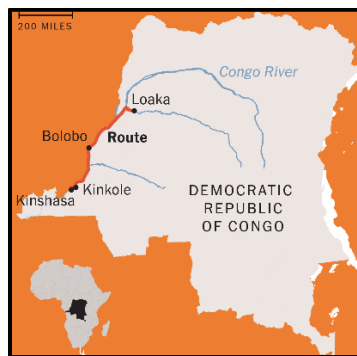
Again, in late 2024, Apple's supply chain suppliers were accused of using materials from the DRC. While

Apple disputes the claims, the lack of vigilance as to the provenance of materials continues to be a problem. With all the mining, legal and illegal in the DRC, suppliers and companies which control the brands, are willing to *look the other way* in order to buy critical materials as the demand is there.

<https://www.reuters.com/world/africa/congo-lawyers-say-apples-supply-chain-statement-must-be-verified-2024-12-18/>

One of the critical metals for EVs is cobalt. It is estimated that the DRC contains 50% of the global supply of cobalt. Cobalt extraction in the DRC is fraught with human rights issues. ~15% of the cobalt extraction is provided by artisanal groups. Artisanal miners are individuals who earn less than \$10.00 per day and use their hands with no other equipment, health or safety protection in this dangerous work. Artisanal operations often use child labour. Amnesty International has been monitoring the DRC and little has changed to provide rights to cobalt mining workers even in larger mining operations. Amnesty reported that the Tesla mining supplier, Glencore, has not adequately addressed the concerns of its workers for safety and health, since it signed a contract in 2020. While Glencore does not buy from artisanal miners, conditions remain deplorable in most DRC operations. The DRC is one of the richest countries in the world in terms of precious and critical materials. The DRC is an example of the *resource curse*. The resource curse being one where a country is rich in natural resources and minerals but its government fails to be able to improve its society due to ideology, ineptness, corruption, or failing to plan for its future through diverse investments.

Adding to the illegal practices in the DRC are clear cut logging in critical forest areas. Not only a threat to wild life but literally changing the ecosystem out of the devastation which results. There are meagre returns for the workers to cut and float the log rafts down river to willing buyers. The exploitation of people and natural resources, based on fraud and graft, continues largely unabated. The 1st UN SDG is to resolve *poverty*. You can't blame the workers for trying to eke out a living. The unscrupulous buyers support the illegal activities and bear more responsibility for their self-interests in unsustainable harvesting of natural resources. <https://www.nytimes.com/interactive/2022/06/14/climate/congo-rainforest-logging.html>



There is a possibility that Afghanistan will supply critical minerals to China. This would be another example of the *resource curse* in a country. Afghanistan has iron ore, lithium, and copper deposits. It lacks the skills, resources, infrastructure, and inability to join commercial trading systems due to its isolation from most markets because of the Taliban's repressive regime. China could become the major investor in Afghan's mineral resources to feed China's battery industry. From a supply chain perspective, without the ability to verify the provenance of materials, it means that EV makers and other industries could be providing the finances to support the Taliban. This geo/political complexity could lead to increased tensions. <https://www.reuters.com/world/asia-pacific/china-offer-taliban-tariff-free-trade-inches-closer-isolated-resource-rich-2024-10-25/>

Adding to the complexity of accessing critical minerals is the play by China's CMOC Group to increase cobalt production at its DRC Kisanfu mine. Kisanfu, which has Chinese battery company CATL as an investor, almost doubled its cobalt production in 2023, flooding the cobalt market. This has led to cobalt prices dropping from US\$ 40 per pound to US\$23 per pound over the past 2-years.

Zambia and the DRC are vying for the positions as major players in a global fight for critical minerals, such as cobalt and copper and using their leverage to gain infrastructure improvements. This adds to the geo/political strategies and tension between China and other EV, clean energy, and military equipment companies. Economic interests are gaining more favour than social interests in these two developing countries. The US-led Minerals Security Partnership formed with other Western countries, wants to reduce the dependency on critical metals being supplied by China and Russia. The DRC and Zambia are pawns in the game. <https://www.reuters.com/markets/commodities/west-challenges-chinas-critical-minerals-hold-africa-2024-02-16/>

While the DRC has been a disgrace from a human rights and environmental view, the country is seen as a "must do business location" by the WEIRD world. In spite of the situation in the DRC, the US government and other allies, insist that business must continue with the DRC mining companies, as it essential for critical materials. The materials which will allow for an energy transition to address climate change issues. Private companies are reluctant to continue to invest in places like the DRC, Zambia and other politically challenging countries due to the risk of investment and backlash from stakeholders. Instead, the US proposal suggest that international governmental agencies could be the proxy for accessing the materials in exchange for improving the quality of life of their citizens.

<https://www.reuters.com/sustainability/us-must-support-critical-mineral-projects-risky-nations-white-house-adviser-says-2024-05-06/>

ESG reporting metrics

A June 2024 report from CFO magazine reiterates the importance for CFOs to go beyond just the financial reports, which is their traditional role and this role will not diminish in importance. However, expectations are changing for CFO leaders. The following excerpt captures the new focus for the CFOs.

Non-financial reporting <https://the-cfo.io/2024/05/22/why-cfos-shouldnt-focus-on-just-finances-in-2024/>

First, ESG (environmental, social and governance) reporting is a major focus area for companies. We're reminded of the global ambition to achieve a 45% reduction in emissions by 2030 and reach net zero by 2050. Not to mention our responsibility to build businesses fit for the future and socially responsible. The significance of this means that governments, regulators and stakeholders everywhere are cranking up the pressure on businesses to show compliance and purpose. For business leaders, into financial reports in 2025. So, where do businesses start? Well, despite ESG reporting having very little to do with finances, leaders should look to their CFOs. This is because their skill sets are widely applicable to this form of non-financial reporting, with Deloitte, for instance, putting it down to the four faces of CFOs: catalyst, strategist, steward and operator. Whether setting KPIs, implementing an ambitious strategy or stamping out miscommunication and a lack of transparency (e.g. greenwashing), CFOs are a perfect fit for this type of role.

Governance reporting frameworks use different matrix for different purposes. Originally intended for financial investors, audiences, and an accounting narrative on the materiality of outcomes. The 2019 NYU Stern Center for Sustainable Business provided a synopsis on the use matrices. Reporting should consistently follow a framework which meets the corporate governance needs. Reporting metrics include:

The 2017 **Accounting for Sustainability** (A4S) launched by the Canadian Chapter of A4S which works with the Chief Financial Officers to integrate economic, environmental and social factors into business decisions. This is aimed at implementing social and human capital accounting.

CDP (formerly climate disclosure project) focuses on key environmental data. CDP, as a not-for-profit, runs the disclosure system for investors, corporations, cities, states, and regions to manage their

environmental impact. There is a CDP Supply Chain membership program. <https://www.cdp.net/en/supply-chain>

CDP-Water Security – At the request of investors, purchasers and city stakeholders, CDP-Water reports out on managing the risks associated with climate change, water security and deforestation.

<https://www.cdp.net/en/>

Canadian Sustainability Standards Board (**CSSB**) released its CSDS 1, *General Requirements for Disclosure of Sustainability-related Financial Information*, and CSDS 2, *Climate-related Disclosures*, Canada's inaugural sustainability disclosure standards, in 2025. https://www.frascanada.ca/en/cssb/news-listings/csd1_csd2_launch

Corporate Sustainability Reporting Directive (CSRD) covers the 2024 ESG reporting rules out of the EU. The CSRD rules require large companies and listed companies to publish reports on their social and environmental risks and their impact on society. https://finance.ec.europa.eu/capital-markets-union-and-financial-markets/company-reporting-and-auditing/company-reporting/corporate-sustainability-reporting_en

EcoVadis has been providing corporate non-financial ratings since 2007 to public and private sector organizations using industry peer comparisons. Their mission is to support sustainable, ethical and responsible organizations. <https://ecovadis.com/>

Global Reporting Initiative (GRI) is aimed at environmental, economic, and social impacts. The International Integrated Reporting Council (IIRC) targets the ability of an organization to generate value largely for European international stakeholders, with lesser attention on IIRC in the USA. <https://www.globalreporting.org/>

Higg Materials Sustainability Index (Higg MSI) enables companies in the clothing, textile, and footwear sector to assess and monitor their impact through a comprehensive screening of environmental and social practices. <https://cascale.org/tools-programs/higg-index-tools/product-tools/>

International Standard on Assurance Engagement (ISAE) guidelines for an organization's ethical behaviour, quality management, and performance of an ISAE 3000 engagement. https://www.ifac.org/flysystem/azure-private/publications/files/B005%202013%20IAASB%20Handbook%20ISAE%203000_0.pdf

International Sustainability Standards Board (ISSB) are sustainability disclosures focused on the needs of investors and the financial markets. <https://www.ifrs.org/groups/international-sustainability-standards-board/>

Partnership for Carbon Accounting Financials (PCAF) are for the financial industry to align with the Paris Climate Agreement. PCAF's methodology uses the SBTi model. <https://carbonaccountingfinancials.com/>

The **Sustainability Accounting Standards Board (SASB)** is based on US materiality definitions from security laws aimed at sustainability factors which could affect performance and operations. <https://sasb.org/>

The **Task Force on Climate-related Financial Disclosures (TCFD)** reports disclosures from governance, strategy, risk management, metrics and targets for investors. <https://www.fsb-tcfid.org/>

The **UN Global Compact (UNGC)** looks for companies to make commitments to its sustainability principles related to human rights, labour, environment and anti-corruption on an annual basis. <https://unglobalcompact.org/>

Social Accountability International developed an international standard, **SA 8000**, which helps organizations to use socially acceptable business practices and can be applied to any company, of any size. For over 20-years, their certifications examine forced and child labour, freedom of association and collective bargaining, discrimination, workplace discipline, hours of work, pay rates, and management systems. <https://sa-intl.org/programs/sa8000/>

The **EU Taxonomy** is a European classification system which establishes a list of environmentally

sustainable economic activities. The intent is to provide investors, companies, and policy makers with how to interpret sustainable economic activities. The Taxonomy Regulation has six environmental objectives:

1. Climate change mitigation
2. Climate change adaptation
3. The sustainable use and protection of water and marine objectives
4. The transition to a circular economy
5. Pollution prevention and control
6. The protection and restoration of biodiversity and ecosystems

https://finance.ec.europa.eu/sustainable-finance/tools-and-standards/eu-taxonomy-sustainable-activities_en

However, in 2025 it is expected that the “green reporting rules” will be relaxed and less onerous on requirements. EU countries are asking that the reporting be “simplified” to reduce the burden on businesses. This comes as the US demands that there be less regulations required. By late 2025 Siemens and TotalEnergies were asking that the EU abolish its corporate sustainability commitments in order to make EU companies more competitive. <https://www.reuters.com/sustainability/boards-policy-regulation/totalenergies-siemens-urge-eu-abolish-climate-law-letter-shows-2025-10-09/>

ESG ratings are not without its detractors. Criticisms include the lack of standardization, opaque methods of calculations, inherent biases, trade-offs on values, claim validation, and a lack of objectivity. Ratings are an *opinion*; *impact* is a science-based and economic calculation, to paraphrase Pavan Sukhdev.

Greenhushing is appearing in more markets. Greenhushing refers to a company reducing its GHGs or investing in solar energy but opts to *not* make this information available to the public, for fear of being accused of making false claims or resistance from specific investors.

There are many rating agencies which provide ESG scores to the investment community. From a supply chain perspective this is important. If a company says it is committed to ESG practices, the rating agencies provide additional scrutiny to validate corporate claims. A 2023 report by the SustainAbility Institute referred to some of the most widely recognized ESG rating firms. In the ranking for quality and usefulness, the top (5) firms included: CDP; S&P Global ESG; Sustain analytics; MSCI; and ISS-ESG.

Many companies subscribe to the **B Corp** criteria model. B Corp has thousands of small, medium businesses which voluntarily commit to meet B Corp certification. Formed in 2006, B Corp is a not-for-profit organization with a philosophy to encourage businesses to address ESG issues. B Corp has optional assessment tools, standards, and baseline requirements. The latter are defined as being for a parent company with \$5B+ in annual revenues including Patagonia. Canadian-based B Corp companies include BDC, Cheekbone Beauty, Coast Capital Savings, Fairware, Salt Spring Coffee, and hundreds of other responsible businesses which continue to demonstrate their commitment to ESG.

<https://www.bcorporation.net/en-us/>

GIST Impact Reporting

One organization which provides a unique means to measure the performance by companies on the ESG continuum is *GIST Impact*. Founded by its CEO Pavan Sukhdev in 2008, GIST focuses on detailed data analysis from (4) areas of capital:

1. **Natural Capital** - *an economic metaphor for the value that nature delivers to the economy.*
2. **Human Capital** - *the economic value of a worker's experience and skills.*
3. **Social Capital** - *a set of shared values or resources that allows individuals to work together in a group to effectively achieve a common purpose.*

4. **Produced Capital** - *physical assets generated by applying human productive activities to natural capital and capable of providing a flow of goods or services*

GIST Impact

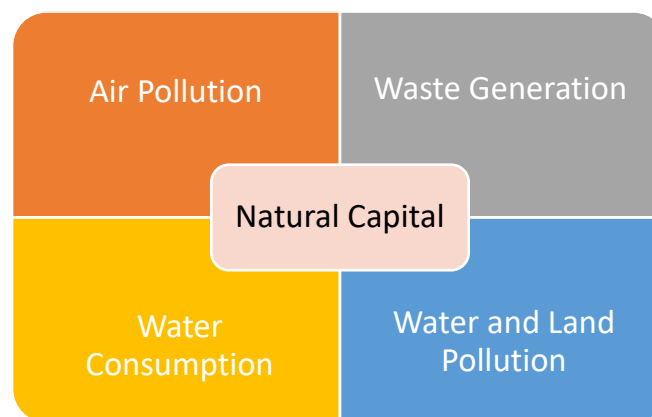
ESG metrics rate companies on a variety of factors including how ambitious their targets are, how often they talk about sustainability, or how their greenhouse gas emissions compare to their competitors.

Impact metrics quantify companies' real footprints on the environment and society, both positive and negative, planned and unplanned.

Impact starts where ESG metrics stop. For example, where ESG assesses a company's water use, impact measurement translates this into the resulting change in availability of clean water and values the impact, such as the costs of more infectious diseases and malnutrition.

<https://gistimpact.com/>

Drivers of Impact on Natural Capital¹



From the GIST article, as an example, illegal gold mining in Brazil, creates water and land pollution, leading to the depletion of freshwater (outcome), which in turn can result in economic losses and reduced life expectancy from infectious diseases and starvation (impact), measurable in *monetary* terms. A much broader assessment of the generational impact than most ESG models would consider.

The GIST Impact model closely examines the net-net pricing model in great detail. Too often business can rationalize its decisions on short-term, out-of-pocket costs. The immediate benefits may accrue to a handful of shareholders and stakeholders. There are always the inherent externality costs to be considered. However, the externality costs are mired in complexity and the ability to measure with accuracy. This results in the larger set of stakeholders absorbing the unintended externality costs.

GIST Impact shares research and analytics with the independent WifOR Institute to promote objective measurement of business practices on the (4) areas of capital. <https://www.wifor.com/en/about-wifor/>

A discussion on the role of ESG metrics is provided by Pavan Sukhdev.

<https://www.youtube.com/watch?v=hdwtKVeTl2g>

The Canadian Federal government mandated the reporting on emissions involving federally regulated banks and insurance companies to comply with the TCFD framework disclosure guidelines. Further will

¹ Adapted from GIST Impact report: Measuring natural capital impacts. Cape Capital Nature Positive Report. <https://capecapital.com/asset-management/npe-report/>

be a requirement for ESG considerations and climate-related risks for federally regulated pension plans. New legislation requires all federal contracts over \$25M can only be awarded where the companies agree to publish their annual GHG emissions and their mitigation plans. These requirements are part of the federal 2030 Emissions Reduction Plan.

ESG Reporting Example A - Axereal

European based and global malting company Axereal, weaves the UN SDG into their company's core values, operations, and reports out through their annual sustainability report. Boortmalt tell their outcomes in a story board fashion with extra visibility into their company based on SBTi and the GRI standards. They operate on 5 continents, with 27 processing plants, with a 3M tonne production capacity. Boortmalt operate in Canada and are part of the larger Axereal Group of companies and are a great example of how to include ESG practices within a profitable business.

Boortmalt build their values around (4) core objectives to achieve sustainability:

1. Health and safety
2. Sustainable farming
3. Energy and emissions and
4. Water conservation

Boortmalt have (5) support objectives:

1. Community engagement
2. Equality, inclusivity and diversity
3. Business ethics and Code of Conduct
4. Waste reduction and
5. Traceability & transparency

<https://www.boortmalt.com/sustainability-report-2023>

ESG Reporting Example B - Carlsberg

The Carlsberg Group has a very comprehensive approach to Net Zero across their entire supply chain by 2040. They have targeted (5) key areas of their business:

1. Agriculture and Processing. Ensuring that their raw materials are being grown using regenerative agricultural practices leading to soils being able to capture and store carbon neutrally.
2. Packaging. Materials are to be fully aligned with the circular economy principles and their production is decarbonized. As referenced earlier in the book, Carlsberg introduced paper beverage bottles.
3. Cooling. Cooling systems run on renewable electricity to optimize efficiencies. Any additional renewable electricity comes from on-site renewable sources of power or is procured through Power Purchase Agreements.
4. Brewing. Converting boilers from using natural gas to using renewable thermal fuels or electrification.
5. Transportation and Distribution. Short haul vehicles should be electrified while long haul vehicles should be running on renewable fuels. <https://www.carlsberggroup.com/>

ESG Reporting Example C - Asahi

The Japan-headquartered, century old, Asahi group of companies published a most comprehensive, integrated and detailed sustainability report in June 2023. Their report addresses: philosophical and cultural perspectives, policies, performance, and as well as their governance, risk management, strategies, and metrics and targets. Asahi went so far as to name their Board of Directors and indicate

each person's set of skills in a matrix, which they are expected to exhibit, along with the defined skills required for a Board member.

The key issues covered in their report are:

- Sustainability management
- Human capital
- Environment
- Communities
- Responsible drinking
- Health
- Human rights

Asahi reports out using the GRI and ISSB standards.

It's worth noting that within the Asahi sustainability report they have identified their Board of Directors Skill Matrix and defined the skill expectations of Board members in a matrix.

Part of their commitment is to affect the current industry average of ~4 litres of water per litre of beer. Asahi typically consume 2.82 litres of water per litre of beer but have attained 2.55 litres at their most water-efficient brewery located in the Czech Republic. By 2030, Asahi breweries:

- will be carbon neutral
- all the packaging will be from recyclable materials and be fully recyclable
- ingredients coming from sustainable source
- all electricity will be from renewable sources

https://www.asahigroup-holdings.com/sustainability/pdf/sustainabilityreport_en.pdf

ESG Reporting Example D – ATCO Group

The ATCO group of companies, which began as a trailer rental company, operate in a global market in utilities, energy, structures, and logistics. This Canadian company provides a very comprehensive sustainability report on an annual basis. ATCO have several solar and renewable energy projects where they partnered with First Nations on successful installations.

Their 2025 details commitments on:

- Corporate governance
- Business ethics
- Responsible supply chain practices
- Health and safety
- Energy transition
- Indigenous relations
- DEI
- ESG data sets
- Reporting out following IFRS, ISSB, GRI, SASB, and TCFD standards

<https://www.atco.com/en-ca/about-us/projects/barlow-solar.html>

Net Zero Implementation

A very ambitious and comprehensive example of a Net Zero strategy is evidenced by Standard Chartered (SC). Their detailed quantitative methodology follows SBTi standards to decarbonize their business

interests by 2050.

Using data from finance, emissions, and operations they analyze their client investments and loans, to determine the *share of total annual GHG emissions of a borrower or investee that is allocated to the corresponding loan or investment (PCAF, 2022) is known as the Attribution Factor.*

SB's Net Zero approach has (5) steps:

1. Determine a suitable method to apply for data analysis
2. Conduct assessment and set baselines
3. Use a scenario to set net targets
4. Communicate the targets to specific stakeholders
5. Continuous monitoring and reporting

The SB Net Zero strategy was developed with milestones for 2021 through to 2050. Scope 1 and 2 emissions are set to be achieved by the end of 2025. SB engaged with Ernst &Young to independently validate their SBTi results. SB has applied their analysis to (13) market sectors and their respective value chains. These sectors include: Agriculture, Aluminium, Automotive, Aviation, Cement, Commercial Real Estate, Oil and Gas, Power, Residential Mortgages, Shipping, Steel, Thermal Coal, and Facilitated Emissions. From the *Standard Chartered Net Zero Methodological White Paper Second Edition 2024*, you can look at their detailed methodology through the following link:

<https://av.sc.com/corp-en/content/docs/SC-net-zero-whitepaper.pdf>

Artificial Intelligence and Sustainability Reporting

In 2025, GIST, a leading business providing analytics and research, published its insightful report: *Deeper Than Disclosure: The New ESG Frontier with AI*. This report looks at the ESG reporting on compliance and managing the growing complexity, using the various standards in effect.

Their (3) key findings recap the need to integrate diverse and fragmented data sources beyond the surface level information; validate datasets; and a *human-in-the-loop* to ensure credible findings to align with stakeholder expectations. The GIST study exposes the difficulty in benchmarking ESG results between organizations, often based on self-reported data. The implication is that many ESG reports may under report controversial issues, such as the presence of child labour or environmental stress.

The GIST method is not echoing current information available; it reveals what we can't see – inconsistencies and interpretations by organizations which can skew their reporting. AI can distil scientific evidence and compare to reporting standards, looking for gaps. The application of AI to examine ESG reporting is not about speed and efficiency, it's about identifying the meaning behind the data being shared and disclosing stealth material impacts. The report reiterates the need for human intervention to provide oversight on ethics, which can be a weakness in AI results.

<https://www.gistimpact.com/deeper-than-disclosure-the-new-esg-frontier-with-ai/>

KPIs for supply chain management

There is limited consensus by supply chain professionals as to which KPIs are the best to assess progress with ESG strategies. This makes sense when we think about the variety of organizational structures and corporate goals.

Supply chain KPIs should be tailored to the organizational strategies, policy statements, and be reflected in its practices. The reason for measuring and reporting is to add to the level of accountability. Take

commitments to the next level of performance.

Some of the more common KPIs applied by supply chain managers in private and / or public sectors include:

A. Environmental

1. GHG emissions
2. Freshwater consumption
3. Resource circularity
4. Waste management
5. Energy consumption
6. Renewable energy sources

B. Social

1. Supplier/employee inclusivity, diversity, equity and accessibility
2. Supplier/employee health and safety
3. Employee training
4. Employee pay equality
5. Employee turnover rate
6. Employee code of ethics
7. Supplier code of conduct

For each metric, depending on the type of organization or industry sector, there are many variations for each of the metrics. Metrics are not a one-size-fits-all. Formulas and definitions for each metric will need to be expanded in relative detail as various stakeholders look for different values when interpreting reports.

C. Governance

Governance metrics can often be assessed answering in a simple yes or no when referring to supply chain management actions. The responses lead to discussions on where the gaps are and how these gaps can be closed.

Questions to apply to an assessment of governance metrics:

1. Is there a supply chain policy for DEI?
2. Is there a supply chain policy requiring supplier codes of conduct?
3. Are supply chain KPIs reported out on a regular basis?
4. Is there a social procurement strategy in place?
5. Is there an annual comprehensive report on the overall sustainability of a supplier?

Examples of more detailed metrics:

GHG emissions:

- Scope 1, 2 and 3 emissions by tCO₂e for each category
- tCO₂e for corporate travel
- tCO₂e for staff commuting
- value of carbon offsets purchased each year

Fresh water:

- volume of freshwater consumed on a year-over-year basis

- % of water recycled
- % of water saved post implementation of initiatives.

Resource circularity:

- % of renewable materials
- % of recycled content
- % of certified sustainable material
- % of compostable packaging

Waste management:

- Tonnes of waste by type
- Tonnes reduced post implementation of initiatives
- Tonnes of PVC taken out of packaging
- Tonnes of recyclable content of packing for inbound and outbound shipments

Energy consumption:

- # of KWh/year
- # of KWh/saved per year after implementing new systems
- # of hours provided through renewable energy sources

Social:

- # of contracts with social value outcomes
- # of hours of employment for people facing systemic barriers to employment
- # of contracts with SEs
- # of contracts with SMEs
- # of contracts with Indigenous suppliers
- # of suppliers with codes of conduct
- # of non-compliance issues by suppliers
- Annual spend with SMEs, SEs, or Indigenous suppliers

Universities and colleges across Canada and the USA have an opportunity to participate in the STARS sustainability reporting. STARS is the acronym for the Sustainability Tracking, Assessment & Rating System. It is a voluntary self-reporting framework designed to share best practices in higher education facilities on their ability to initiate more sustainable practices across these large organizations.

<https://stars.aashe.org/about-stars/why-participate/>

Supply chain management relies on independent 3rd party standards for criteria in decision-making. This allows for more objective assessments of proposals as the criteria allow for comparisons to be made on equal values or commitments.

The International Standards Organization (ISO) has many standards which support ESG initiatives. Some are *guides* only while others are *compliance-based*. These include:

- ISO 14000 environmental management
- ISO 14024 labelling
- ISO 14046 water footprint
- ISO 14055 combat land degradation and desertification
- ISO 15270 recovery and recycling of plastic waste
- ISO 20762 electric vehicle power
- ISO 22000 food safety management

ISO 26000 social responsibility
ISO 50000 energy management systems
ISO 59000 circular economy standards
ISO 71000 chemical protection

In late 2025, ISO and GHG Protocol agreed to co-develop new GHG emissions measurement and reporting standards. <https://www.iso.org/news/2025/09/iso-and-ghgp-partnership>

International trade

International trade has been the main stay of the WEIRD markets. Cost efficiency, market growth, social justice, and product innovation, enable businesses to function in the global marketplace. By providing access to diverse resources and managing risks effectively, global supply chains contribute to economic development in all markets. International standards reflect governance values and concerns for quality, environmental interests, and sustainability practices. Within the macroeconomic markets, we have trading blocs and agreements with preferential treatment using reduced tariffs and terms for select country partners. We have competing trade blocs based on ideologies between established and emerging economies, as well as capitalist-theory markets and government-controlled markets.

International trade in the modern era, began with the General Agreement on Tariffs and Trade (GATT) in 1947, which was replaced by World Trade Organization (WTO) in 1995.

Protectionism

Protectionism is simply politically motivated economic tools to protect domestic companies from foreign imported goods. All countries have some form of protectionism while trying to comply with international trade rules. Protectionism can include tariffs, quotas, % of domestic materials or labour, or subsidies. Protectionism is a slippery slope. Protecting industries that are not investing in better technologies or designs, is as risky as allowing unrestricted importation of goods.

While the government collects the tariffs in the form of revenues, the costs are ultimately borne by the consumers. A foreign-made washing machine just incurs a higher price to a consumer. The theory is that the domestic washing machine producer appears more competitive. The domestic producer may be less efficient than the foreign-made competitor but the consumer has little knowledge and pays more to get a washing machine. There is a sense that the consumer and the government are protecting their domestic production, which is slightly true. But this adds to inflation. The industry being protected must also contribute a large part to the GDP. Smaller industries and companies, like a glove manufacturer, are not worth increasing tariffs to protect a small part of the domestic economy. Protectionism is as much about emotions as it is about economics.

For decades US steel producers simply relied in increasing tariffs to protect their owners in the market. Foreign steel producers, using better manufacturing processes, were able to be much more competitive than US producers. US automakers were a classic example. Japanese automakers ate their lunch in the 1970s, until they were *invited* to produce cars within the USA and completely changed the US market hegemony. Canada followed suit.

BRICS

The BRICS core countries include Brazil, Russia, India, China, and South Africa. There are other countries applying for membership or have considered joining BRICS for economic and ideological reasons. In late 2025, Canada is wanting to expand trade with India. This will be an interesting negotiation as India deals directly with Russia for oil, for example. The current US administration will watch these negotiations closely and decide if Canada and India's trade agreement may conflict with US interests.

In 2025, the US wants to ensure the continuation of the US dollar as the primary currency for international transactions and debt payments involving emerging economies. This is being threatened by the BRICS bloc of countries, who want to use their local currencies and *de-dollarize* the markets. As the US arbitrarily imposes tariffs on imports, it will likely try to penalize BRICS member countries which bypass the use of the US dollar in their trading. China's long-term strategy to connect many countries through its Belt and Road Initiative (BRI) will affect international relations with the US and the various BRIC members. China is investing US ~\$ 1Trillion to achieve their land and sea network.

<https://www.chathamhouse.org/2021/09/what-chinas-belt-and-road-initiative-bri>

An adjunct to protectionism is *dumping*. The WTO define dumping as a situation of international price discrimination, where the price of a product when sold in the importing country is less than the price of that product in the market of the exporting country. Easy to define, yet is a very complex economic formulation when trying to compare the *normal value*, the price in the exporting country and the *export price* in the importing country.

Dumping is tied to the concept of *overcapacity*. This complex intervention through government financial policies contributes to the tension in trade wars. An example of the impact of overcapacity is seen where China's slowing domestic demand led to increased exports by Chinese companies, some of which are government controlled. Sectors such as cement, EVs, iron, lithium-ion batteries, semiconductor chips, solar panels, and steel are seeing China's dominance in supply through their production, quality, and lower costs. The latter, arguably, from government subsidies. The US and EU try to combat this threat through tariffs, which are not completely effective. Since 2019, China has exported new cars, with zero-mileage, as new cars, which is a form of dumping. Excess capacity shipped overseas to inflate sales and support continued production. <https://www.brookings.edu/articles/how-the-us-should-address-chinese-overcapacity-and-its-impact-on-international-trade/>

Isolationism

The antithesis to *free trade* is isolationism. Isolationism, from an economic perspective, is about a country wanting to be self-sufficient in its resource access and production. This requires a withdrawal from international trade agreements and leads to increasing tariffs on imported goods. The example in 2025 is the US administration's position that it does not need Canada's oil, gas, vehicles, or lumber. The US administration doesn't need goods from Canada, the EU, or Mexico and it doesn't want anything from China – the 3rd largest exporter into the US. The US pleads for *free* markets and yet cries foul and tries to sell its isolationist theories. Great countries in history have not found economic or political sustainability through isolationism. The resulting chaos created by the arbitrary US tariffs, adds to the geo/political tensions in the Middle East, the Ukraine, and much of the *free* world. Supply chain resiliency is being pushed to unprecedented limits.

While the US has criticized China's state-owned industries, the US government is now directly investing in private US corporations. The US government has taken a 10% equity position in Intel; its DOD has taken an equity position in military and technology supplier MP Materials to control costs (*partially owned by China*); US Department of Energy took a 5% equity stake in both Vancouver-based Lithium

Americas and Trilogy Metals Inc.; trying to ban trans-shipments from South East Asia to avoid US tariffs; directing pharmaceutical companies to reduce drug costs in the US and to increase their prices in other countries as an offset. This is a far cry from a *free market* stance. <https://www.cbc.ca/news/business/us-government-lithium-americas-1.7647981>

Investor-State Dispute Settlement (ISDS)

ISDS is a process which allows corporations to take legal actions against foreign countries for changes in policies which impact profits. ISDS cases continue to be filed across the globe and are an active business. A case in point was the 2010 case claim by Philip Morris, a MNC tobacco company, sued the country of Uruguay for introducing a policy which banned smoking in public spaces and generally discouraged smoking. Philip Morris' head office is in Lausanne, Switzerland. The US\$25M case was filed as Philip Morris said this anti-smoking legislation would reduce their profits as a result. In 2016, the International Centre for Settlement of Invest Disputes (ICSID) found in favour of the country of Uruguay. The ICSID ruled that Philip Morris must compensate Uruguay US\$ 7M for its court costs.

A subsidiary of Bermudan South American Silver bought mining rights in Bolivia which was inhabited by Indigenous communities. In 2010, the mining company was charged with pollution of sacred areas and threatening Indigenous leaders. The Bolivian government revoked their rights. Under the ISDS ruling, Bolivia had to pay the mining company ~\$20M.

Most of the litigation of ISDS cases are funded through 3rd party companies. The litigation finance industry is estimated at ~\$Cdn 20M per year. Critics argue that 3rd party companies are driving frivolous cases. US-based Odyssey Marine Exploration won a ~Cdn\$40M from Mexico when it was denied a permit to mine a seabed due to environmental concerns.

<https://www.theguardian.com/environment/2025/mar/05/revealed-how-wall-street-is-making-millions-betting-against-green-laws-isds-aoe?>

Trade Agreements

Trade agreements are a sword and a shield. They enable the international exchange of goods and services, as well as commerce within a country. Trade agreements have reduced tariffs on imported goods for partners which want to increase trade; and higher tariffs and duties for trading partners that are not as welcome.

I would argue that there is no such thing as *free trade*. Free trade is a term bandied about in democracies and in marketing schemes, which implies open and fair market access for all countries. All trade is *managed* trade which is in a constant state of flux between partners, allies, ideologies, and other international and domestic interests. Free trade literally does not exist. The plethora of terms and conditions, hidden fees, fine print, ambiguous phrases, permits, licenses, and bills of lading, requires due diligence on the part of exporters, importers, and customers.

Democracies like the term *free*, which is almost the ultimate oxymoron. We refer to freeways, free markets, free parking, free shipping, free returns, free subscriptions, free maintenance, free installation, gluten free, sugar free, salt free, nut free, free elections, free speech, free trade zones, tax free, BOGO (buy one, get one free), a free lunch, the free world, free ride, get out of jail free, free rein, scot free, duty free, emission free, free health care, free range, free samples, free service, free trial period, free style, and it's a free country, to name a few. The US which touts its economic free market capitalism is actually a form of *mixed* capitalism – the US government does intervene and control several industries, such as banking, agriculture, and energy. Canada is based on social capitalism, which balances social and economic equity. *Free* is an overused marketing catch phrase to free people from their money.

Interprovincial trade

The Federal government began removing the interprovincial trade *barriers* across Canada in 2025. The reason being, their removal will add billions to Canada's economy. Using Stats Canada's numbers from 2021, \$453 B or 38% of trade is done within Canada; and \$743 B or 62% is done internationally. Economist Trevor Tombe, from the University of Calgary, estimates that removal could save the *average* Canadian family \$6000 per year. With a national population of 40 million people, there are ~10 million *average* families. Removing the trade barriers would equate to \$60 B per year in savings.

<https://www.fraserinstitute.org/studies/achieving-four-day-work-week-part-2-essays>

Any inefficiencies which result in cost increases are passed along the supply chain to the consumer or customer in the price of the goods they buy. The reduction in interprovincial trade barriers is a very strategic shift in federal governmental policies which should affect pricing on all goods and services. It now remains to be seen how these reductions will translate into lower prices and increased economic benefits. Establishing a price index on key goods and services helps to measure the incremental changes pre- and post-barrier periods. If costs are reduced as a result of more efficiencies to move goods and labour across Canada, there needs to be seen, a reduction in costs to consumers and businesses.

Ontario made commitments with several provinces but more work needs to be done across Canada. By late June 2025, the Provinces removing further barriers remained a work-in-progress. Alberta as an example, removed some interprovincial barriers but added a hefty fee on BC wines being sold in Alberta. One step forward, one step backward. <https://www.cbc.ca/news/canada/calgary/bakx-bc-wine-alberta-aglc-fee-tax-1.7596265>

By December 2025, Canadian interprovincial trade barriers still *do not* include beef and alcohol. Hopefully these can be removed in 2026 to increase trade and reduce costs to consumers and business.

<https://www.cbc.ca/news/canada/british-columbia/bc-electric-vehicle-rebates-sales-mandates-9.6984032>

There is growing interest to begin *interties* which could connect Atlantic energy producers to consumers and utilities in western Canada and into US markets. Interties facilitate the generation of energy from different locations and allow access to multi-regional transmission networks. Leveraging existing clean and fossil-fuel energy generation provides a stable energy supply. <https://www.cbc.ca/news/politics/major-projects-carney-fast-track-1.7552126>

Large companies are looking at options to relocate their headquarters into the US. There are corporate tax advantages for doing so – therefore, Canadian corporate taxes need incentives to remain competitive and retain corporate offices. Locating to the US enables participation in the lucrative US government contracts from hauling freight to banking. If Provinces want to promote buying of Canadian wines to Canadians, as an example, there should be financial incentives for consumers to do so.

The Globe & Mail reported transportation leader, TFI, is considering redomiciliation of its headquarters from Montreal to the US. The Mullen Group are mulling over domiciling their operations into the US. Barrick Gold is considering moving to the US. Canada needs to be able to attract capital investment in Canada. The uncertainty around tariffs causes investors to put their plans on hold.

<https://www.mining.com/barrick-weighs-us-relocation-says-ceo-mark-bristow/>

Trade agreement exemptions, exclusions, and exceptions

With respect to ESG and supply chain management, there are mandatory obligations when running competitive bids. However, there are clauses within all agreements which accommodate the desire for *government* entities to negotiate directly with equity deserving groups, such as social enterprises or Indigenous suppliers. This means that competitive bidding processes may be waived.

These clauses include:

- **New West Partnership Trade Agreement (NWPTA)**
Part V (2)

Exceptions

2. Procurements:

(a) from philanthropic institutions, prison labour or persons with disabilities

Part V

EXCEPTIONS

ALL PARTIES

A. GENERAL EXCEPTIONS

1. Measures adopted or maintained related to:

(a) Aboriginal peoples;

Indigenous suppliers will increase to meet an expanding demand for their goods and services. The NWPTA and the adjunct Truth and Reconciliation Commission, supports this strategy. As with other suppliers in various markets, care should also be taken to develop these supplier assets and ensure competition is fair and transparent.

If there are sufficient Indigenous suppliers in a market, issuing a competitive bid could realize the best value; however, a lack of sufficient Indigenous suppliers could mean taking a negotiated process, as allowed by the NWPTA. Building the capacity of Indigenous suppliers should be part of the engagement strategy. http://www.newwestpartnershiptrade.ca/pdf/NewWest_Partnership_Trade_Agreement_2016.pdf

- **Comprehensive European Trade Agreement (CETA)**

Exceptions

Article 19.3.2 (d) relating to goods or services of persons with disabilities, of philanthropic institutions or of prison labour

<https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/ceta-aecg/index.aspx?lang=eng>

- **Canadian Free Trade Agreement (CFTA)**

CFTA 504s. 11 (v)

Non-Application

This Chapter does not apply to...

(i) procurement of goods and services...

(v) from philanthropic institutions, non-profit organizations, prison labour or natural persons with disabilities

Procurement exceptions specific to NFLD, PEI, NB and NS are referenced within the CFTA. Regional economic development or benefits may be *derogated* for NFLD, PEI, NB and NS as outlined with the CFTA. Derogation applies where the total value is estimated at \$1 million, or less; and is used to support small firms or employment opportunities in non-urban areas; it is noted that derogation cannot exceed ten times in total per calendar year.

<https://www.canada.ca/en/intergovernmental-affairs/services/internal-trade/canadian-free-trade-agreement.html>

- **Canada USA Mexico agreement (CUSMA)**

Section D – General Provisions

Article 1018: Exceptions

(d) relating to goods or services of handicapped persons, of philanthropic institutions or of prison labour. <https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/cusma-aceum/index.aspx?lang=eng>

- **Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP)**

Article III — Security and General Exceptions (GATT)

1. Nothing in this Agreement shall be construed to prevent any Party from taking any action or not disclosing any information that it considers necessary for the protection of its essential security interests relating to the procurement of arms, ammunition or war materials, or to procurement indispensable for national security or for national defence purposes.
2. Subject to the requirement that such measures are not applied in a manner that would constitute a means of arbitrary or unjustifiable discrimination between Parties where the same conditions prevail or a disguised restriction on international trade, nothing in this Agreement shall be construed to prevent any Party from imposing or enforcing measures:
 - a. necessary to protect public morals, order or safety;
 - b. necessary to protect human, animal or plant life or health;
 - c. necessary to protect intellectual property; or
 - d. relating to goods or services of persons with disabilities, philanthropic institutions or prison labour.

<https://www.international.gc.ca/trade-commerce/trade-agreements-accords-commerciaux/agr-acc/cptpp-ptpgp/index.aspx?lang=eng>

- **Association of Southeast Asia Nations (ASEAN)** <https://www.international.gc.ca/world-monde/international-relations-relations-internationales/asean/index.aspx?lang=eng>

Protect Ontario by Unleashing our Economy Act, 2025 (Bill 5)

In a well-intentioned response to the US trade wars, the Ontario government passed legislation which allows Ontario to waive many environmental conditions and social rights, in order to expedite economic development. The intent of the Act is to accelerate permitting for resource extraction, ease energy use requirements, exert greater control over cultural artifacts, and create *special economic zones*. The special economic zones could be exempt from the existing approval processes and safeguards, if the province deems them to be in its best interests.

One of the highlighted targets for the Bill will be the mining exploration in Ontario's Ring of Fire. This will only advance if the Indigenous nations approve in advance. With a new Federal government in charge, the approval of the Act, needs to be factored into long-term Canadian interests. There can be unintended consequences for reactive responses instead of a nationally coordinated economic strategy. Indigenous views are opposed to any legislation which goes against their enshrined rights, Treaty obligations or sovereignty. The Act has merit; the methodology for its implementation process is now the emphasis. <https://www.cbc.ca/news/canada/toronto/ontario-bill-5-doug-ford-future-1.7553800>

It should be noted that in 2025, in response to the tariffs being imposed on Canadian exports into the USA, several municipalities and provinces, have suspended their sourcing strategies to exclude US companies from bidding on government projects. While this contravenes legislated requirements, it remains to be seen as to how long these practices will remain in place. Government infrastructure projects are worth billions of investments annually, and are an important component of all trade agreements.

ASEAN Agreement

For several decades Canada has been negotiating with the ASEAN member countries to establish a new free trade agreement. Negotiations are expected to be finalized by the end of 2025. The ASEAN-Canada Free Trade Agreement will include Brunei, Cambodia, Indonesia, Laos, Malaysia, Myanmar, Philippines, Singapore, Thailand, Timor-Leste, and Vietnam into a partnership with Canada. It should be anticipated that the ASEAN agreement would be consistent with other trade agreement allowing for exceptions, exemptions, and exclusions where *goods or services of handicapped persons, of philanthropic*

institutions or of prison labour are involved. This supports social procurement strategies.

de minimis rules

A 100-year loop hole on imports into the US has been the *de minimis* rule. Until recently, many Asian exporters with shipments valued at less than US \$800, were exempt of duties under the *de minimis* ruling. Barring this exemption is so that smaller shipments avoid duties and may be an unfair competitive advantage to domestic American companies. As the Chinese companies Shein, Temu and others account for over 600,000 packages *per day* into the US, this loop hole was restricted through a 54% tariff being imposed on Chinese made goods in May 2025.

The closing of the *de minimis* rule affects Canadian businesses, which ship orders into the US effective September 2025. Many small businesses in Canada, only have lower value orders to ship to US customers. These orders fall within the *de minimis* ban and will be subject to additional tariffs, making them far less competitive.

This could lead to additional administration costs for packaging identification to manage the types of goods and track the provenance of origin. But it will slow the shipments down to a crawl, if they require inspection in the US. For Canadian consumers bringing items back into Canada from a trip, this could result in the return to filling out a paper declaration and being subject to tariffs. Hundreds of small Canadian businesses will have serious losses of 20-50% of their volumes as a result of the US changing the *de minimis* exemptions. <https://www.nbcnews.com/business/business-news/retail-panic-end-de-minimis-exemption-means-brands-globe-rcna227990>

DHL terminated deliveries from *business-to-consumer* on values over US\$800, as a result of the change in the *de minimis* rulings in 2025, related to the US tariff tactics. Business-to-business shipments may not be affected but could result in delays. DHL weighs the cost of providing the services for the fees being charged and likely determined that the lower value shipments and administration work is becoming too costly. If DHL makes this type of decision, so too would other transport companies. https://www.cnn.com/2025/04/20/business/dhl-global-shipments-us-suspension-intl-hnk?cid=ios_app

Shein and Temu have exploited a similar import rule in the EU by shipping direct to customers. Current EU tariffs only apply on online imported goods valued at over 150 Euros. EU lawmakers are looking at closing this loophole. Both Shein and Temu expressed that their sales success is based more on their supply chain efficiencies and operational proficiencies.

In 2025, Mexico addressed its own *de minimis* problems by adding a 19% single rate tax on all courier shipments into Mexico, other than those from the US, Canada, and a few other countries with trade agreements with Mexico. Essentially, Mexico has targeted low-cost shipments from China for increased tariffs. <https://research.hktdc.com/en/article/MTg5OTE3NjkzMA>

Transparency International

One organization which sheds some light on international trade and the propensity of 100s of countries to respect contract terms and avoid corruption, is Transparency International (TI). TI is a non-profit NGO which advocates to stop corruption. For decades TI has reported as to how countries rank in terms of their concern for corruption and justice. The UN SDG expresses the need that corruption detracts from the value of trade for a country. Justice should be evidenced in effective, accountable and inclusive institutions at all levels of government and business. The rule of law contributes to economic and social development. Corruption only benefits certain individuals involved in committing illegal acts. Codifying a supplier code of conduct serves to protect human rights as a supply chain best practice.

TI's annual ranking of countries public sectors, provides some insights on the level of due diligence which may be required when exporting or importing products. Transparency International's Corruption

Perceptions Index ranks 180 countries in its 2023 Index and allows viewers to click on any country to check their Index ranking. Canada used to rank in the top 10 of the least corruptive countries and in 2023 ranked 12th. <https://www.transparency.org/en/cpi/2023>

Truth and Reconciliation

An adjunct to Canadian trade agreements is the Truth and Reconciliation Commission (TRC) work on addressing historical injustices and harm to its Indigenous people. This came into effect in June 2015. The Commission was led by Indigenous judge, Justice Murray Sinclair/Mazina Giizhik - *the one who speaks of pictures in the sky*.

Indigenous Truth and Reconciliation is about respectful relationships. The precursor to this was the 2007 United Nations Declaration on the Rights of Indigenous Peoples (UNDRIP). Corporations have a global presence and the UNDRIP impacts their strategies and cultures. Business ethics are a work-in-progress. For supply chains, sourcing of materials and labour and needs to be part of their procurement policy and practices. As Chief Cadmus Delorme, of the Cowessess First Nation in Saskatchewan says, “Indigenous people don’t want pity, they want parity.”

The inherent weakness in the Truth and Reconciliation strategy is that it is by and large a voluntary commitment outside of federally regulated contracts and some Provincial initiatives. Truth and Reconciliation is a statutory federal holiday with a few Provinces following its observation. The TRC is formally recognized by BC, MB, NB, NWT, Nunavut, PEI, and Yukon. *Orange Shirt Day* is September 30 and is officially the National Day for Truth and Reconciliation.

A summary of the UNDRIP declaration adopted by the United Nations member countries, is as follows:

The Declaration is the most comprehensive instrument detailing the rights of indigenous peoples in international law and policy, containing minimum standards for the recognition, protection and promotion of these rights. It establishes a universal framework of minimum standards for the survival, dignity, wellbeing and rights of the world's indigenous peoples.

The Declaration addresses both individual and collective rights; cultural rights and identity; rights to education, health, employment, language, and others. It outlaws discrimination against indigenous peoples and promotes their full and effective participation in all matters that concern them. It also ensures their right to remain distinct and to pursue their own priorities in economic, social and cultural development. The Declaration explicitly encourages harmonious and cooperative relations between States and indigenous peoples.

For business leaders, in Canada, the Truth and Reconciliation Commission has 94 Calls to Action. For supply chain management, there are several key areas which need immediate attention. The ones which directly affect supply chain decisions are Calls to Action #22, #23, #57, and #92. Some of these are directed at the public sector and others directly at the corporate sector. <https://www.rcaanc-cirnac.gc.ca/eng/1524494530110/1557511412801>

Calls to Action #22:

We call upon those who can effect change within the Canadian health-care system to recognize the value of Aboriginal healing practices and use them in the treatment of Aboriginal patients in collaboration with Aboriginal healers and Elders where requested by Aboriginal patients.

Calls to Action #23:

1. *Increase the number of Aboriginal professionals working in the health-care field.*
2. *Ensure the retention of Aboriginal health-care providers in Aboriginal communities.*

3. *Provide cultural competency training for all healthcare professionals.*

Calls to Action #22 and #23 were demonstrated through the strategy of a shared services buying group, Mohawk Medbuy Corporation, entering in to a long-term supply contract with Indigenous supplier, MSS. The Mohawk Medbuy group representing dozens of Canadian hospitals and health care services, negotiated an agreement with MSS to supply health care supplies across Canada.

<https://www.newswire.ca/news-releases/primed-recognizes-their-role-in-reconciliation-amp-partners-with-medical-surgical-amp-safety-supplies-ltd-mss-and-mohawk-medbuy-corporation-mmc-to-support-an-indigenous-value-based-supply-chain-822470569.html>

For public sector leadership, the Calls to Action #57 is important.

Professional Development and Training for Public Servants

We call upon federal, provincial, territorial, and municipal governments to provide education to public servants on the history of Aboriginal peoples, including the history and legacy of residential schools, the United Nations Declaration on the Rights of Indigenous Peoples, Treaties and Aboriginal rights, Indigenous law, and Aboriginal–Crown relations. This will require skills based training in intercultural competency, conflict resolution, human rights, and anti-racism.

Calls to Action #92

Business and Reconciliation

We call upon the corporate sector in Canada to adopt the United Nations Declaration on the Rights of Indigenous Peoples as a reconciliation framework and to apply its principles, norms, and standards to corporate policy and core operational activities involving Indigenous peoples and their lands and resources. This would include, but not be limited to, the following:

i. Commit to meaningful consultation, building respectful relationships, and obtaining the free, prior, and informed consent of Indigenous peoples before proceeding with economic development projects.

ii. Ensure that Aboriginal peoples have equitable access to jobs, training, and education opportunities in the corporate sector, and that Aboriginal communities gain long-term sustainable benefits from economic development projects.

iii. Provide education for management and staff on the history of Aboriginal peoples, including the history and legacy of residential schools, the United Nations Declaration on the Rights of Indigenous Peoples, Treaties and Aboriginal rights, Indigenous law, and Aboriginal–Crown relations. This will require skills based training in intercultural competency, conflict resolution, human rights, and anti-racism.

<https://www.rcaanc-cirnac.gc.ca/eng/1524506030545/1557513309443>

Chief Cadmus Delorme talks about truth as the first step towards reconciliation. There is an Indigenous world view which conflicts with the WEIRD world view. Until Indigenous people are fully recognized as rights holders, it's difficult to address reconciliation terms. The fact that the TRC is quite passive in the private sector, due to it not being a legislated act, detracts from the interest and progress on engagement.

Aboriginal business certification

There could be a requirement to ensure that an Aboriginal business is certified. The Canadian Council for Indigenous Business uses the following criteria in their certification program:

1. *Certified Aboriginal Business Membership*
2. *51% or more Aboriginal ownership and control*
3. *Proof of Aboriginal heritage of owner(s), acceptable documents include:*

- *Indian Status Card, or valid identification provided by the following:*
- *Métis National Council Governing Membership*
- *Inuit Beneficiary Card*
- *Congress of Aboriginal Peoples (CAP) Affiliate Membership*
- *Northwest Territories Land Claim Settlement Beneficiaries*
- *Confirmed Alberta Métis Settlement Members*
- *Northwest Territory Métis Nation Membership*
- *Membership in a historic Métis community recognized as independent and rights-bearing by a provincial or Canadian federal government.*

4. Applicants must also provide:

- *Proof of ownership and control documents listed (based on the Ownership Structure Type) on our online application form.*

The need to verify Aboriginal business certification was reiterated in a 2025 random audit which found 68% of Indigenous companies which received Federal contracts, lacked or had incomplete documentation. Globe and Mail reporter, Bill Curry, filed the article, *Indigenous Procurement Program lacks 'robust' checks on fraud* in October 2025. With the 2021 Federal commitment to ensure 5% of its contracts are targeted to Indigenous businesses, the audit exposed the verification process is in need of better governance. The Indigenous Business Directory lists Indigenous-owned or controlled companies. <https://services.sac-isc.gc.ca/REA-IBD/?lang=eng> The value of the contracts to Indigenous businesses was reported to be \$1.6B in 2022-2023. The audit recommendations, which are being implemented are:

- Standard process for Indigenous business verification
- Improved training
- Increased audits and fraud detection
- Integrate feedback from Indigenous stakeholders

In July 2024, the University of Saskatchewan signed a Memorandum of Understanding with the Inuit Tapiriit Kanatami national group representing 70,000 Inuit people. The MOU recognizes that it is the right of the Inuit to decide who is Inuit.

International Indigenous Rights

The Province of Alberta failed to complete the cleanup of abandoned oil and gas wells and returned \$137M to the Federal government program. The intent was to address the environmental and social issues related to decades old oil and gas exploration. The Provinces of BC and Saskatchewan had done so, under a similar agreement and time frame. This leaves ~100 First Nations sites with incomplete remediation of wells, limiting the available land for housing and other Indigenous purposes. It could be a situation where provincial and federal political ideologies are in conflict and the cleanup program is further delayed as a result. <https://www.cbc.ca/news/canada/calgary/alberta-orphan-wells-inactive-decommission-1.7324701>

As of 2025, Alberta had 79,000 abandoned oil and gas wells scattered across the province. Since 2022, it managed to provide cleanup and remediation services to ~4000 sites. The industry and government spent ~\$1B on closing orphaned wells. This loosely translates to a cost of \$250,000 per well and extrapolates to ~19B as a projected cost to treat the remaining sites. Most of these costs would be considered as externality costs. <https://www.reuters.com/business/energy/canadian-oil-province-alberta-cleans-up-5-inactive-wells-2023-2024-12-05/>

Australia's government lacks consistency in applying rules which impact Aboriginal rights and those of mining companies. In late 2024, Rio Tinto is suing the government on "procedural fairness grounds" after it did not renew the miner's exploration lease on uranium rich land. The current regulations appear

to be unfair to all parties and are mired in bureaucracy. <https://www.reuters.com/world/asia-pacific/australian-mine-fight-reignites-aboriginal-heritage-tensions-2024-10-01/>

In October 2023, Australians rejected to advance the status of its Aboriginal peoples by voting against this in a referendum. Setting the politics aside, this will be a set back for the reconciliation initiatives with their Aboriginal people, which comprise ~3.5% of the population. The rejection ends the opportunity to have an advisory role for the Aboriginal and Torres Strait Islanders on government policies and influence their self-determination. Imagine the knowledge the Aboriginals could share on the environment, with their collective experience as being the stewards of a continent for 60,000 years. The referendum is dismissive of UNDRIP intentions to recognize their unique culture and entrench further the discrimination, poor health and education, and economic inequities. It is probable that this movement towards Aboriginal recognition will take another political movement, as it out of sync with the social values held by many of Australia's global trading partners. Fundamental rights should be enshrined in a country's constitution for all of its citizens. Aboriginals can be referred to as *Traditional Owners*.

In 2025, the Yindjibarndi Ngurra Aboriginal Corporation (YNAC), in Australia, filed a law suit against the Solomon mining hub. The suit claims the mining damaged its land and people. Its ~ Cdn\$1.5B claim includes compensation for cultural damage and for financial impacts. The mine is operated by Fortescue, which agrees that YNAC should receive some compensation. <https://www.reuters.com/sustainability/land-use-biodiversity/aboriginal-group-seeks-11-bln-western-australia-iron-ore-claim-2025-02-19/>

Contrast this outcome with the progress in Canada with its commitments to Truth and Reconciliation. In October 2023, Canada had a First Nation's politician elected as premier of a province. In New Zealand, the Māori have been gaining recognition of their rights and have a Māori as their Minister of Foreign Affairs. There is growing favouritism to rename the country Aotearoa, reflecting its Māori heritage. Renaming public places and spaces with original First Nation names is part of the recognition of Indigenous values, as witnessed in Canada. Again, in October 2023, New Zealand elected a new Prime Minister and the recognition and expanding of the rights of the Māori will be watched by many.

By 2024, New Zealand's Prime Minister, Luxon has reversed a 2018 policy to increase oil and gas exploration. The rationale was to improve the NZ economy by expanding exports. Agriculture accounts for 80% of NZ's exports but only 5% of its economy. Farmers felt that NZ's environmental policies were making their exports too costly in the market. New Zealand will review renewable energies offshore and onshore in 2025. In mid-2024 NZ Airlines said it could drop its commitments to buying SAF, as it is too costly. <https://www.reuters.com/world/asia-pacific/new-zealand-scraps-clean-green-policies-boost-economy-2024-08-04/>

In 2025, global energy company Santos, out of Australia, was granted permission to begin its Narrabri gas project in New South Wales. The controversial decision favoured economic interests over those of the Gomeroi people. The National Native Title Tribunal's ruling came after a decade of protests. <https://www.msn.com/en-us/money/markets/santos-wins-native-tribunal-approval-for-a-3-6b-narrabri-gas-project/ar-AA1F8hPR?ocid=finance-verthp-feeds>

In 2024, the ongoing pursuit of the Indigenous rights of the Sámi people in Finland continues. The Sámi have had traditional territories within the national borders of Finland, Norway, Sweden and Russia for hundreds of years. Similar to the rights granted to the Nunavummiut people in Northern Canada for self-governance, the Sámi have argued this to Norway's Supreme Court. The complex ruling on the rights of the Sámi came down in May 2024. The ruling does not recognize their collective property rights. The court's majority means that the land under dispute will remain with the private company, Finnmark Estate, as it has since 2006. Finnmark was given control from the state forestry. <https://www.cbc.ca/news/world/norway-indigenous-land-ruling-1.7220504>

In January 2024, the Nunavummiut people of the Nunavut Territory in Northern Canada, were given the

official responsibility to govern themselves as well as control all of the administration, resources, including mining, public lands, and rights to waters. This devolution agreement was 25-years in the making and marks an historic day for the Indigenous people to self-govern their destiny. This is similar to the successful agreements signed with the Yukon Territory in 2003 and the Northwest Territories in 2014.

In 2024, Brazil started a reforestation program to address the loss of biodiversity in the Amazon rainforest. Led by Indigenous chiefs, Raoni Metuktire of the Kayapó and Almir of the Suruí people. As stated in a Reuters report, the aim is to encourage dozens of villages in the Amazon and elsewhere to plant one million trees a year. The purpose is to recover degraded forest lands destroyed by illegal loggers and gold miners, land-grabbing invaders who cleared trees to make way for cattle pastures, and forest fires. Suruí Chief Almir said the program will start with 10 Indigenous territories, including the Xingu National Park, Brazil's first reservation that has been besieged by commercial farming, and the largest one, the Yanomami reservation bordering with Venezuela that has the most degraded lands due to mining.

Again, in Brazil in 2024, the government is planning a 1000 km railway through the Amazon. This will directly impact the Indigenous people of the Mundurucu, Kayapó, and Xingu regional tribes. Farmers and grain traders want cheaper transportation for soy and other products from the Amazon to the coast for exporting. Another example of *death by a thousand cuts*. The railway is seen as a lesser evil than a paved highway which enables more illegal logging and mining in the area.

While Brazil's constitution recognizes that Indigenous lands cannot be used for mining or commercial agriculture, the government has not done a good job of protecting these rights. Illegal gold mining practices continues in spite of some minor disruptions from police. In 2024, Greenpeace observed dozens of illegal mining operations, with deforestation being rampant along with disease and violence on the Sararé people's reserve. These actions only occur if there are buyers for the illegal gold. This reiterates the need for being able to trace the provenance of materials. A breakthrough in tracing the provenance of gold uses radio-isotope scanning and fluorescence spectroscopy. This technique, long used by archeologists, proved to determine where gold has been mined. The practice led to the estimate of 40% of Brazil's gold is from illegal mining. <https://www.reuters.com/world/americas/new-technology-aids-brazils-crackdown-illicit-amazon-gold-trade-2024-12-14/>

In late 2024, the Brazilian government stated that they have stopped most of the illegal mining operations, which led to an environmental and humanitarian crisis. The Yanomami were observed returning to traditional hunting and planting of crops. Fish stocks were still down due to the contamination of waterways with chemicals. Long-term effects are uncertain on this important source of food supply. <https://www.reuters.com/world/americas/brazil-says-it-has-nearly-cleared-gold-miners-amazon-yanomami-reservation-2024-09-14/>

The Peruvian Mascho Piro Indigenous people have been seen near logging operations in the remote Amazon forest. They are usually searching for food while trying to remain reclusive. A certified FSC logging company has built roads across the Mascho Piro land to harvest cedar and mahogany trees. The FENAMAD NGO tries to promote Indigenous rights and well-being across the Madre de Dios region of Peru.

In June 2024, a fight between the Indigenous Awyu tribe in Indonesia and palm oil companies is waiting for a court decision on the land rights. The deforestation practices are at the heart of the arguments. Palm oil has been banned from the US and EU where the palm oil has been categorized as having a *high indirect land-use change rate*. The Awyu see the land being considered for clearing for more palm production as part of their cultural heritage. The court ruling is expected before the end of 2024.

The lack of an ability to have the provenance of product sourcing contributes to illegal activities. In Brazil, farmers are illegally growing soybeans on Indigenous reservations and selling into the market. The buyers know that they are participating in illegal sourcing but odds are they won't get caught or face big fines if they are. This has led to allegations of corruption within the Indigenous leadership to curry favour with international companies. <https://www.reuters.com/markets/commodities/soy-grown-illegally-brazils-tribal-lands-finds-its-way-global-markets-2024-09-05/>

Nestle and Procter & Gamble are investigating illegal supplies of palm oil in Indonesia in late 2024. The Rainforest Action Network claims that deforestation has occurred in a wildlife reserve in the Aceh province of Indonesia. Large brand companies use local intermediaries for the harvest of fruits and palm oils.

Native American, San Carlos Apaches are awaiting a decision to allow a massive copper mine to be approved in 2025. The site has cultural significance to the Apache, who have conflicting interests on its operation, and the site has been mired in political tug-of-wars for a decade. Rio Tinto and BHP want to operate the mine which could supply ~25% of the US demand for copper and reduce dependency on imports. The operation would bring vital employment and revenues to a depressed economic region.

Along with reconciliation of human rights with Indigenous peoples, comes the ability for them to participate in their economic development. Governmental policies, from the demand side, support increased commitments towards equity of working opportunities for Indigenous peoples and this is reflecting in the hiring and contracting with the private sector companies, on the supply side. These shifts can take years to come into normalized business relationships and practices and require political governance to ensure commitments are continued.

In April 2025, the US Administration supported a land swap for Rio Tinto and BHP and the affected Apache tribes, to move ahead with this massive copper mine. It takes ~60 days before an environmental report can be tabled to outline further concerns on the potential land swap. The San Carlos Apaches dissension within their tribe members about losing their religious site to an underground mine and potential economic benefits. The US Administration a vital source of material within the USA.
<https://www.reuters.com/sustainability/boards-policy-regulation/trump-approve-land-swap-rio-tinto-copper-mine-opposed-by->

Environmental racism

In June 2024, Canada passed into act the *National Strategy Respecting Environmental Racism and Environmental Justice Act*. The purpose of the Act is to acknowledge that *a disproportionate number of people who live in environmentally hazardous areas are members of an Indigenous, racialized or other marginalized community; establishing environmentally hazardous sites, including landfills and polluting industries, in areas inhabited primarily by members of those communities could be considered a form of racial discrimination*. Further requirements will include the assessment and prevention of such egregious actions. There will be few immediate results but it is expected that a national strategy framework be tabled within a couple of years to Parliament.

There have been too many examples of various levels of government failing to correct long-standing problems, leading to the legislation. The years of inaction have been well-documented, including a 2020 UN report which was summarized as *"a pattern in Canada where marginalized groups, and Indigenous peoples in particular, find themselves on the wrong side of a toxic divide, subject to conditions that would not be acceptable elsewhere in Canada."* Cases of environmental hazards serious health impacts on Black and Indigenous communities in Nova Scotia, going unresolved.

The decades long fight by the Asubpeeschoseewagong Netum Anishinabek First Nation, known as Grassy Narrows, in Ontario is one of the most glaring examples of environmental racism, and the

disproportionate impacts on racialized communities. This First Nation has experienced mercury poisoning from a local pulp and paper mill. This is in contrast to the 2000 situation in the town of Walkerton, Ontario where 7 people died and hundreds became ill from contaminated water. There was an immediate investigation and compensation was offered within a year of the event. The lack of consent associated with the Trans Mountain pipeline project is another cited example of environmental racism. <https://www.parl.ca/DocumentViewer/en/44-1/bill/C-226/third-reading>

ESG requires that policies and business practices have strong governance and support at the most senior levels of the company, including its board, and in governmental entities. Allowing indiscretions in ethical conduct undermines the integrity of the organization and its brand credibility. While any actions taken by a corporation may be within their legal rights at the time, it does not meet the ethical expectations of stakeholders on their conduct. In the case of Rio Tinto, we can see that the Australian government was also culpable in this avoidable desecration. By failing to provide governance leadership, as the UNDRIP recommendations declared, the Australian government chose to condone Rio Tinto's actions. The Canadian examples which were cited, reiterate that environmental racism requires effective legislation. While the dumping of ~9 tonnes of mercury into a river by the Reed Paper mill was prior to laws being in place, not taking remedial and corrective actions over 60 years is unacceptable.

Bamboo Ceiling

Studies have shown a distinct bias towards Asian employees and executives in the workplace. The term coined for this is *bamboo ceiling*. Specifically, the bamboo ceiling refers to the individual, cultural, and organizational factors that impede career progression and limit opportunities for workers of Asian origin. This includes stereotypes, biases, discrimination, lack of career advancement opportunities and professional development, and more.

A Canadian study on educators revealed similar biases in the hiring and promotion of Asian employees. We can see a similarity to other prejudices and biases related to BIPOC, Indigenous, and people facing systemic barriers to employment. <https://education.org/wp-content/uploads/2025/02/2024-Reids-Eizadirad-Asian-Educators-Experiencing-the-Bamboo-Ceiling-A-Canadian-Case-Study-of-Systemic-Barriers-in-Hiring-Advancement-and-Promotion.pdf>

Breaking this systemic bias can be addressed by:

- Celebrating diversity
 - Denouncing the model minority stereotype
 - Invest in professional development and cultural training
- <https://directemployers.org/2023/05/24/four-steps-to-break-the-bamboo-ceiling-in-the-workplace/>

Climate justice

Related to Environmental racism is Climate Justice. This has been defined by the UN *as the moral and ethical principle that seeks to address the disproportionate impact of climate change on vulnerable communities and future generations*. Climate change is an evolving anthropogenic outcome primarily attributed to the WEIRD nations in the Northern hemisphere. Their actions have caused the suffering of people of colour and lower incomes around the world. The concept of Climate Justice requires solutions which integrate human rights and development with humanity at the core.

The University of California, Center for Climate Justice has framed climate solutions around 6 pillars:

- Just Transition.
- Social, Racial and Environmental Justice.
- Indigenous Climate Action.
- Community Resilience and Adaptation.

- Natural Climate Solutions.
- Climate Education and Engagement.

Responsible investment

Responsible investment organizations screen for negative and positive factors. Negative screening excludes companies producing tobacco, alcohol, gambling, and weapons as an example; whereas, positive screening supports ESG leadership companies. Investments in projects which have potential social impact and a financial return are favoured which could involve microfinance, affordable housing, healthcare, education, and renewable energy. Socially responsible investing supports organizations which act in the best interests of their environment and society as a whole.

The Principles for Responsible Investment (PRI) were drafted in 2005 when the UN invited the largest global institutional investors, involving 12 countries and intergovernmental organizations, to sign on to a commitment to develop sustainable investment strategies. The PRI has (2) UN-based partners, the UN Environment Programme Finance Incentive and the UN Global Impact groups. The value of the assets managed by the PRI signatories is US\$80 trillion.

The PRI principles to practice ESG factors in investment decisions are:

- We will incorporate ESG issues into investment analysis and decision-making processes.
- We will be active owners and incorporate ESG issues into our ownership policies and practices.
- We will seek appropriate disclosure on ESG issues by the entities in which we invest.
- We will promote acceptance and implementation of the principles within the investment industry.
- We will work together to enhance our effectiveness in implementing the principles.
- We will each report on our activities and progress towards implementing the principles.

The Insurance Institute of Canada supports the principles of the PRI and the subsequent Inevitable Policy Response for governments to address the climate change challenges and rising insurance rates.

An example of a long-term organization which advocates for responsible investment is the US-based non-profit organization, CERES. CERES drives capital investments heavily weighted on electrical energy, oil and gas, transportation, banking, food and steel. Initially aimed at environmental risks, CERES broadened their influence by drafting the GRI standards for reporting corporate sustainability actions. CERES was a founding member of the Climate Action 100+. The latter group of investors manages US\$ 68 trillion by ~170 companies and ~700 members.

The EU Securities and Markets Authority took actions to curb greenwashing of investments. The 2024 rules disallow funds from using the terms green, environmental or impact in their names if they are investing in oil and gas; coal; and the other companies which are engaged in unacceptable pollution practices. Fund managers must change their names or sell the assets. It is estimated that ~50% of funds have some form of breach with the new rules. There are concerns that the rules could restrict access to funds and actually contribute to fewer investments in green bonds as an example. A fifth of the global green bond market is tied to energy and power companies valued at ~US\$ 70B issued in green bonds in 2024. <https://www.reuters.com/sustainability/eu-watchdog-clarify-esg-fund-naming-rules-after-backlash-2024-10-11/>

Green Sovereign Bonds

A green sovereign bond is a debt instrument issued by a national government to fund environmental projects. Green sovereign bonds are for the purpose of raising capital for green initiatives like renewable energy, sustainable infrastructure, and resource conservation. In 2025, China's first \$1.25B Cdn green bond will attract international funds to support domestic and low-carbon development. China's focus is on climate change mitigation, climate adaptation, natural resource conservation, pollution control and biodiversity. Funds could be put toward EV charging systems. China's investments in green bonds have grown from zero in 2015 to \$300B Cdn in 2024.

Borrowing from the International Corporate Governance Network's (ICGN) investor engagement queries, we get a sense of the probity by investors into corporate ESG values. Adapting the ICGN questionnaire provides a model for assessing ESG leadership attributes and the connection to metrics. These questions could be applied to supplier selection processes.

1. What are the top 3 ESG considerations of your company?
2. How have you engaged with key stakeholders to determine these considerations? Who are the key stakeholders? Where is the process documented? How often is the consultation repeated?
3. How many of these ESG considerations are part of the strategy outlook over the next 5-10 years?
4. How does the company's mission get reflected on sustainability in its governance as well as metrics and KPIs?
5. Do you have a long-term incentive plan in place? What is the evaluation process and vesting period?
6. Do executives have a share-ownership requirement? What multiple of their annual salary does this represent?
7. How do you entice responsibility for ownership of ESG in company governance, directors, executives and employees?
8. What makes your disclosure of issues credible and reliable?
9. How are these issues integrated in the compensation packages of executives and others?
10. Do you benchmark your remuneration practices against peers? How do you know which peers to look at for best practices?

These questions relate to the Senior Leadership Reflection; Company Self-Assessment on ESG Commitments; and the Circular Economy Principles Self-Assessment templates in the **Addendums** in this book.

Net Zero push back

In 2025, several asset management companies may have to respond to the US House of Representatives Committee about their role in using environmental protection as part of investment criteria. The US administration wants to bar any financial assessments from including non-financial factors, such as ESG. Asset managers pledged support for zero emissions by 2050 through the Glasgow Financial Alliance and other asset management commitments to reduce GFGs through investment portfolios. The House of Representatives see these actions as a *collusion to cut emissions*. This appears to be an ideological imposition of political values on environmental progress. <https://www.reuters.com/sustainability/sustainable-finance-reporting/us-house-committee-targets-another-investor-climate-group-2024-12-23/>

As we saw with push back on DEI for political ideology differences, this happened to the banking sector as the US government changes policies on advocating for fossil fuel investments. The Net Zero Banking Alliance (NZBA) had key investment banks withdraw from their previous commitments. JPMorgan, Citigroup, Bank of America, Goldman Sachs, and Wells Fargo left the alliance by early 2025. These US-

based banks frame their net zero commitments to a “scaled” approach. Canadian banks pulled out of the NZ, as political pressures in the US do not favour climate and environmental risks being factored into banking investments.

JP Morgan, while scaling back its net zero investment strategies, launched a new EU initiative in 2025 which supports climate action. In May 2025, JP Morgan stated their focus was “helping clients scale energy transition and climate tech businesses around the world.” They earmarked US\$1.0T for these investments. <https://www.reuters.com/sustainability/climate-energy/jp-morgan-creates-new-green-banking-leadership-role-2025-05-08/>

In 2025, RBC scrubbed its data on low-carbon financing and amended its sustainability reporting, as continued pressures on social ideologies permeate the finance sector. <https://www.ctvnews.ca/business/article/rbc-scraps-sustainable-finance-commitment/>

It’s important to note that Canadian banks are required to report their efforts to increase diversity on their boards of directors and senior management positions, effective February 2025. Banks are instructed to share this information as part of their annual shareholder meeting notices. This is in sharp contrast to US banking and federal government regulations. <https://www.msn.com/en-ca/news/canada/canadian-banks-must-reveal-diversity-of-board-top-managers-under-new-rules/ar-AA1z7Ogf>

Deforestation

Forests cover ~30% of the world and more than 80 per cent of all terrestrial species of animals, plants and insects depend on healthy forests. ~1.6B people are sustained by forests for employment, materials, food, fuel, and shelter. Deforestation can lead to irreversible outcomes. Loss of species; malnutrition and starvation; climate change and weather pattern disruptions; natural disasters; and diminished biodiversity. Poverty among Indigenous peoples is directly affected by deforestation practices. It’s estimated that 11% of annual carbon emissions are attributed to loss of forests. The UNEP and REDD+ involves significant research into forest carbon stocks in emerging countries. <https://carboncredits.com/what-does-redd-plus-mean-everything-you-need-to-know/>

Deforestation practices can include: conservation, restoration, agroforestry, responsible sourcing, improved farming methods, or the use of efficient stoves for cooking and heating. The more vulnerable developing countries have defaulted to reducing environmental standards to provide revenues by allowing excessive extraction and harvesting practices, which leave behind damaged ecosystems. Many of these *resource cursed* countries are led by weak governments.

The UN Environment Programme (UNEP) is a global commitment to protect and restore ecosystems, sustainably manage forest resources, combat desertification, mitigate land degradation and prevent further biodiversity loss. This is primarily the focus of the UN SDG 15 *Life on Land*. Programs such as REDD+ are one of the many tactical means in place to support conservation. REDD+ stands for Reducing Emissions from Deforestation and Forest Degradation, and additional forest-related actions which help to mitigate negative climate change impacts.

Biodiversity can be complex and have delayed consequences. In Australia, in the 1930s, farmers introduced Gamba grass and other invasive species from Africa to Northern Australia as a resilient source of cattle feed. Gamba grass is drought and fire resistant. However, when it burns, it has ~10 times the fuel load of other grasses and reaches ~13 metres into the tree canopies. Managing Gamba grass fires is a mixed responsibility between government agencies and private landowners, and is becoming an existential hazard to the environment. A video from GIST recaps the Gamba grass issues. <https://www.gistimpact.com/fighting-invasive-species-in-northern-australia/>

For supply chain sourcing, the provenance of materials is an important part of the decision criteria. By buying/selling forest products which are recognized as meeting 3rd party international standards, is one way to contribute to sustainable economic activities.

Puma, the German sportswear company, joined the *Deforestation-Free Call to Action for Leather*. The raising of cattle is one of the largest contributors to deforestation. Cattle leather is a valuable by-product of the cattle industry. Puma, as part of their sourcing strategy, will ensure, through reporting transparency, that the hides for leather will not be sourced where deforestation practices have been allowed. In turn, this will help to protect wildlife habitat and biodiversity, preserve carbon stocks to mitigate climate change, and protect human rights. An example of consciousness in capitalism. Deforestation occurs from a variety of agricultural-related harvesting operations including: timber, palm oil, cattle, soy, rubber, coffee, and cocoa. <https://textileexchange.org/leather-call-to-action/>

EU coffee importers placed advance orders for coffee to avoid potential problems when the new EU Regulation on Deforestation Free Products (EUDR) comes into effect in late 2024. Coffee stocks in producing countries dropped as bean orders are increasing. In 2025, non-EUDR products were not allowed to be imported into the EU. The EU is the largest coffee market. Deforestation-free means that certain commodities must not have been produced or harvested on land or forests, which were deforested after December 31, 2020. The EUDR extends to cattle, cocoa, coffee, palm oil, rubber, soy, and wood. This EUDR can also be applied to goods such as meats, leather, chocolate, palm nuts, soybean flours, soybeans, glycerol, and many other products related to the core seven commodities. The EU backed off on some palm oil restrictions on imports from Indonesia.

In July 2024, the EU deforestation plans received push back to delay by some countries and sectors. By September, the International Coffee Organization, which represents 90% of the coffee production, wanted to postpone the deforestation deadline. They say they couldn't reach the target date but didn't say how long they want to delay compliance. By September, the EU Cocoa Association added its voice to the coffee growers' position to delay the EUDR legislation.

Making the EU Deforestation policy requires that the provenance of goods be traceable. Ghana, as one of the larger producers of cocoa beans, has done this in anticipation of the EU requirements. They have a system which can track the cocoa pods from the farm to the port of export. Ghana's cocoa producers are typically small farmers who are dependent on the EU market. Cocoa supports 17% of their population.

In early 2025, political pressures forced the EU to soften its stance on deforestation. It labelled (4) countries as being *high risk* of deforestation practices – Belarus, Myanmar, North Korea, and Russia. Other countries are rated as *standard risk* and *low risk*. Each level of risk has compliance procedures applied to the products which are imported into the EU. In September 2025, the EU deforestation was delayed until mid-2026 due to global lobbying in the midst of market uncertainties. Short-term finance beats sustainability, again. <https://www.esgtoday.com/eu-to-delay-implementation-of-supply-chain-deforestation-law-again/>

Consumer companies including Nestle, Mars Wrigley, Ferrero, Tony's Chocolonely, and the Fair Trade Advocacy Office have come out in strong support of the EU deforestation policy. As per the Global Witness NGO, 120 M tonnes of GHGs can be emitted per year as a result of deforestation. This could be another situation where tracing of the provenance of products is required to protect forests from illegal forestry and harvesting practices. In late 2024, Danone stopped sourcing Brazilian soy as a result of the EUDR. Danone was buying 260,000 tonnes of soy for animal feed from Brazil, so that loss is not insignificant.

Market lobbyists won their case about the EUDR in late 2024. The EU deferred the start of the EUDR regulations by one year. The fear of supply shortages and inflation on the commodities being impacted are the main reasons being given. Mondelez, the parent company of Cadbury chocolates, wants the EUDR deferred a further year. <https://www.reuters.com/sustainability/climate-energy/cadbury-parent-mondelez-calls-delay-eu-deforestation-law-2025-07-04/>

In late 2023, Cargill, one of the largest integrated food system companies, made a commitment to improve the trace sourcing of soy, corn, wheat, and cotton in South America. By 2030, Cargill wants to ensure the products they buy are not involving deforestation practices across South America. The commitment extends to the direct and indirect supply chain production of key crops in Brazil, Argentina, and Uruguay and to protect endemic vegetation. Cargill will partner with NGOs and other stakeholders to monitor, report, and verify natural ecosystems and land use.

The position of Cargill and other soy traders such as ADM, Bunge, Cofco, and Louis Dreyfus changed in late 2024 on the buying of soy from Brazil. They want the moratorium on soy, which they committed to, be less constraining. This could allow soy farmers to sell produce from recently deforested areas of the Amazon rain forest. <https://www.reuters.com/markets/commodities/soy-traders-eye-changes-ban-buying-deforested-amazon-guardian-reports-2024-12-04/>

McKinsey & Company identified 5 steps towards prioritizing sustainable business opportunities.

Step 1. Assess the value prospects which make attractive investments;

Step 2. Identify important technology and infrastructure enablers which could be applied to existing assets and practices to give an advantage;

Step 3. Base priorities on climate impact and technological maturity where there are big wins which are attainable;

Step 4. Align with future policies and regulations set by leading countries with publicly declared commitments;

Step 5. Define a strong business case and plan for a 5–10-year window which factors uncertainty into the models.

Non-governmental organizations (NGOs) act as “global monitors” for international corporate behaviours. Where larger corporations evade or disregard ILO labour conventions or environmental standards, NGOs are capable of creating a lot of unwanted attention for CEOs. They do so through social media and through annual general meetings and in all sectors. Their intervention has led to dramatic changes in the fast fashion world. But far more is required on the social and environmental fronts.

A leader in forest preservation, on a global basis, is the not-for-profit Global Citizens organization formed in 2008. They invest in buying up vast tracts of forests that are threatened and have been damaged by resource extraction and harvesting. Their *Stand for Trees* project is aimed at saving 18,000 miles² of forests from preservation investments in Brazil, Cambodia, Colombia, DRC, Indonesia, Kenya, Madagascar, Malawi, Peru, Zambia, and Zimbabwe. This helps to address concurrent socio/enviro/eco/ and economic interests. Global Partners with local conservationists and other NFPs to extend their reach. Global complements the many other corporate programs which invest in reducing deforestation.

<https://www.globalcitizen.org/en/about/who-we-are/>

CEO of BlackRock Inc., Larry Fink, stated “The power of capitalism is driven by mutually beneficial relationships between you and the employees, customers, suppliers, and the communities your company relies on.” BlackRock has well-defined principles on investing based on ESG and climate risk in its BlackRock Investment Stewardship. Their position is that purposeful leadership, with accountability, will drive the changes in the market to achieve the intended outcomes. Blackrock manages US\$ 4.9 Trillion in assets.

In 2025, BlackRock caved in to the US Securities and Exchange Commission rulings which discourage ESG policies and the use of DEI. BlackRock will review the rulings but will likely acquiesce in order to remain competitive. Blackrock is in negotiations to buy the Panama Canal. <https://www.cnn.com/2025/04/01/business/larry->

[fink-letter-blackrock-nightcap?cid=ios_app](https://www.finkletterblackrock.com/nightcap?cid=ios_app)

Global warming funding ethics

There is a concerning dark side to the investment by the WEIRD communities into emerging economies to reduce GHGs, reduce poverty, and improve their standard of living. It has to do with the conditions attached to the loans for projects. The article also invites a debate on the ethics of these loans.

Climate financing is more about the business deal than affecting the outcomes. This is particularly true of the lower income southern hemisphere countries, adding to their financial stress in the form of increased debts. The loans may be fully legitimate in that the parties have agreed to accept the terms and conditions; however, it's akin to an arsonist selling fire extinguishers.

The loans from western countries often are tied to the emerging country requiring it to buy equipment or materials from the lending country, as part of the terms. In other words, the lending country makes money from the interest and increases revenues when its domestic suppliers are involved in the foreign projects.

An excerpt from a 2024 Special report by Reuters, by Irene Casado Sanchez and Jackie Botts.

<https://www.reuters.com/investigates/special-report/climate-change-loans/>

France gave a \$118.6 million non-concessional loan to Ecuador's port city Guayaquil in 2017 to build an aerial tramway. The loan, which France counted as part of its climate finance pledge, shows how the global program can create expensive debt in developing countries in exchange for few environmental gains, while lending nations benefit.

Dubbed the Aerovia, the cabled gondolas were billed as a climate-friendly alternative to the congested bridges connecting industrial Guayaquil to a neighboring city where workers live. Four years after its inauguration, the Aerovia transported roughly 8,300 passengers a day. That was one-fifth of the ridership projected in early planning documents – resulting in lower-than-expected revenue and environmental benefit.

The Aerovia cabled gondola, built in Guayaquil, Ecuador, with a loan from France, carries far fewer passengers than projected. REUTERS/Henry Romero

Debt from the loan has added to Guayaquil's \$124 million budget deficit. Guayaquil expected to pay 5.88% interest, according to early planning documents. France was projected to earn \$76 million in interest over the 20-year repayment period. That interest rate would be unusually high for a climate-related loan, finance analysts said. A 2023 OECD analysis of concessional loans from 12 developed nations and the European Union found they offered an average interest rate of 0.7% in 2020. Guayaquil and France declined to disclose the interest rate of the final loan agreement for the tramway.

"This is a classic example where a bad loan, which has been given to a country in the garb of climate finance, will create further ... financial stress," said Bharadwaj, the climate researcher from the International Institute for Environment and Development.

The loan agreement did not require Guayaquil to hire a French company. Nonetheless, French transportation company Poma won the contract to build the tramway, along with Panamanian company SOFRATESA, founded by a French citizen. The companies also operate the tramway, so the municipality collects no revenue from passenger fares to help repay the loan. Neither company responded to questions from Reuters.

Nearly all of the Aerovia's components – including its cabins, electrical control panels and cables – were manufactured in France and Switzerland and then shipped to Guayaquil, according to a slide presentation prepared by the local government before the tramway's launch.

To Euan Ritchie, senior policy adviser at Development Initiatives, an international policy organization, the project amounted to a "transfer of wealth from Ecuador to France."

Contesting that claim, a spokesperson for the French development agency said that the tramway belongs to the city and that the agency assessed the risk of financial stress before approving the loan. The aerial tramway has already resulted in a "significant greenhouse gas reduction," despite low ridership, said the spokesperson, who provided no estimates. The spokesperson said the agency does not participate in selecting contractors.

Still, France's development agency trumpeted the successes of French companies in landing such contracts. The agency's 2022 annual report said that more than 71% of its projects that year involved "at least one French economic actor," garnering them 2 billion euros in "economic benefits." The spokesperson declined to provide estimates of how French suppliers benefit from climate-related funding. French companies often win bids because they have "in-depth knowledge and local presence" in regions where AFD sends significant aid, the spokesperson said, adding that it "in no way favors any entities based on their nationality."

Debt-for-nature-swaps

These types of financial instruments have been used since the early 1990s. Essentially, a developing country enters into an agreement with another country by issuing a *blue* or *green* bond. A blue bond, as defined by the World Bank, raises capital to finance ocean-based or marine projects to improve

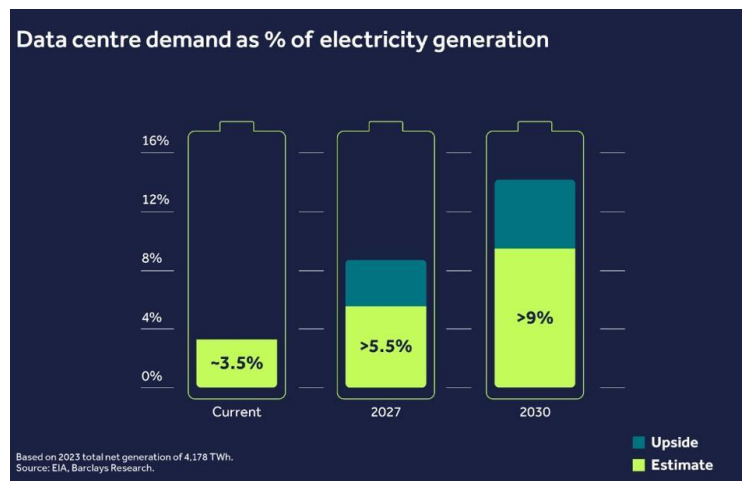
ecosystems with economic and climate benefits. Green bonds are used to direct funding for SDGs or a form of ESG benefits.

In 2023, Ecuador, through Credit Suisse, sold US\$800M in bonds to refinance its debts and use the funding to protect its Galapagos Islands. This debt-for-nature-swap was previously done by the Seychelles, Belize and Barbados. The World Bank and other advocates see these types of financing solutions critical to save the ecosystems in poorer countries. The funds alleviate their debts in order to find funds to protect natural resources such as coral reefs, reduce deforestation of habitats, protect wild life species, and reduce the loss of biodiversity. While debt-for-nature-swaps are not without financial risks, there is a greater risk of expecting lower income nations to find the funds to address ecological issues which affect the rest of the countries. <https://www.reuters.com/sustainability/sustainable-finance-reporting/ecuador-sets-second-debt-for-nature-swap-motion-2024-12-03/>

AI and ESG investments

Increased computing power and data centres are being pressured by the increased use of AI. Microsoft and Alphabet reported emissions are up by ~30 and 13% respectively in 2023. Meta has been offsetting its emissions but says it gets more difficult to cap the GHGs from its value chain with offsets. For ESG investors, this makes it more challenging to balance economic returns with portfolios favouring sustainability.

Quantum computing holds great promise to reduce the amount of energy required to power AI through data centres and reduce GHGs. One ChatGPT search consumes ~10 times the energy of a Google search and emits 4.32 grams of CO₂. Analyst Will Thompson, estimates that initial data centre energy demands for AI were forecast to consume ~3.5% of the US electrical demand but will be ~9% by 2030 – a 300% increase. A massive amount of energy will be required in the few years to meet the electricity demands. This was not foreseen, only 3-years ago.



An article comparing the [energy consumption spanning 20 years](https://www.forbes.com/sites/torconstantino/2024/10/02/is-quantum-computing-an-unlikely-answer-to-ais-looming-energy-crisis/) by the top 500 supercomputers in the world found that a publicly available quantum computer with the same compute power as the top-energy glutton on the list, consumed less than 0.05% of the electricity.

<https://www.forbes.com/sites/torconstantino/2024/10/02/is-quantum-computing-an-unlikely-answer-to-ais-looming-energy-crisis/>

Social impact bonds

Social impact bonds (SIBs) are a financial instrument to affect social outcomes. SIBs have had limited success, based on the reported results from ~2010 to date. SIBs are partnerships between government

agencies and private sector funders to address specific, critical social problems. The government agency selects an issue to be resolved and then finds an organization which commits to take on the challenge. The government avoids an upfront investment, and the service provider is paid out, only if successful, through the issuance of a bond. The value of the bond is based on the estimated costs, if the government were to provide the services through governmental services. This formula could include economic benefits or cost savings which could be delivered. The key part of an SIB is the defined, measurable and evidence-based outcomes to validate the process. Failure to achieve the targeted outcomes may allow the government agency to not pay out the funds.

In Canada, only the province of Saskatchewan undertook the SIB route to address a health issue. The *Sweet Dreams* project was to provide affordable housing to single mothers and their children, who may be at risk of entering foster care. The objective was that by 2019, 22 mothers and their children were to stay together for at least six months, for parents to complete educational requirements and prepare to find employment. Investors would only be reimbursed if 17 or more children did not enter foster care. The outcome was expected to save \$1.5M for Saskatchewan. Government reduces its investments and tax payers receive value for the outcomes, directly and indirectly.

Another SIB project in Saskatchewan, involved the Mosaic Company Foundation and the Mother Teresa Middle School in Regina. The school received a bond of \$1M for a 5-year term to support students facing high-risk due to their socio-economic status. The bond was to pay out the Foundation's investment at a 1.3% interest if 82%+ of the students graduated from Grade 12 on time. If only 75% graduated, then only 75% of the bond would be covered. The business case for the government was to save \$1.7M in health, social and justice costs. The Federal government initiated (2) SIBs to address strokes with the Heart & Stroke Foundation; and to expand college programs in BC, SK, ON, and QC.

Reading between the lines, SIBs have had some success but have not had a lot of uptakes to achieve the social outcomes. While over 11 countries have tried SIBs, from an investor perspective, there is a lot of risk to absorb, and from a governmental perspective, there is limited reporting of successful outcomes.

<https://innovationsask.ca/news/the-sweet-dreams-initiative>

Litigation

Responsible investing looks at the types of projects which are being funded. As we move towards decarbonization and electrification of various sectors, many of the projects invite environmental and social confrontations. Disparities can be rooted in the extraction of resources, impact on drinking water, employment opportunities, violations of human rights and working conditions. The confrontations often lead to law suits which require judicial rulings and settlements.

One independent organization, the **Business & Human Rights Resource Centre (BHRRC)**, plays an important role in the monitoring and tracking of global infractions and illegal practices. Mining operations are a common defendant in these cases. The BHRRC tracks and reports out on the cases on a regular basis. They provide a litigation tracking tool which is easily accessible to advocate for responsible corporate actions. <https://www.business-humanrights.org/en/from-us/just-transition-litigation-tracking-tool/just-transition-litigation-database-methodology/>

Supply chain strategies and technology

1. Demand forecasting. Traditionally one of the weakest links in the supply chain has been providing forecasts internally from planners to production and from buyers to their suppliers. Too many variables to possibly manage concurrently. Inventory levels have masked a lot of the inefficiencies. GAI is effective in modelling data derived from seasonality, trends, economic conditions, target marketing, to assist in

optimizing inventory and resource planning. Customer input enables product design and development for adapting to trends or profitability. This combined with better predictability takes a lot of the guesswork out of the decisions.

2. Resilience. GAI enables more responsive routing of fleet vehicles, load management, dynamic routing in real time and driver resourcing. Data from traffic and weather conditions and fuel costs, as an example, can result in various scenarios being prepared and recommend which options concurrently address operational advantages for customer services, shortened lead times, and reduced costs.

3. Risk management. Supplier risks can involve screening for financial capacity, credit limits, cyber security, operations, ESG compliance, legal and regulatory mandates, geo/political events and performance ratings. Competitor pricing can be tracked and used to set yield pricing rates. GAI technologies, such as blockchain, can monitor and assess these risks more effectively, on a 24/7 basis.

4. Quality management. Early detection of anomalies reduces costs and improves productivity. This can include the parts being sent to the production floor but also logistical delays which allow for plans to mitigate the risks in a timely manner. <https://research.aimultiple.com/generative-ai-supply-chain/>

Supply chain management skills

STEM jobs (Science, Technology, Engineering, Mathematics) will increase in an attempt to transform businesses into circular economy models. As ESG and the circular economy continue to entwine in values and principles, this affects the skill sets required for individuals to be successful in managing more complex supply chain issues. Where the historic focus has been on transactional proficiencies, the future prerequisites will use a different set of attributes. In his 2016 book, *Thank You For Being Late*, author Thomas Friedman, coined the term *Stempathy*. To paraphrase, stempathy is applying the STEM knowledge for the greater human good.

Robotics and AI will continue to displace low skilled and repetitive types of manual labour. These technologies will also impact professional services. Legal counsels are already applying AI, cognitive learning, and machine learning to conduct research and predict legal outcomes. In supply chains, jobs which are directly involved with optimization of materials; products which extend product life cycles; and logistical efficiencies will be in demand.

For supply chain professionals, based on numerous studies, including the *Circular Jobs Initiative*, there is a need to have effective *soft* skills. While soft skills are usually seen as lesser important than analytical skills, in the new economy there is a greater need to be able to adapt and respond quickly to changing dynamics in markets and relationships.

Supply chain leaders should have:

- Sound business acumen
- Ability to collaborate with multiple supply chain partners
- Strategic problem-solving skills
- Negotiation expertise
- Conflict resolution skills
- Team building skills
- Supplier development strategies
- Balanced emotional intelligence
- Systems thinking approach
- A total cost of ownership perspective
- Analytical and creative skills

- Green skills

Green skills

Green skills are aimed at reducing the anthropogenic activities on the environment. Systems thinking is required in a circular economy to see how decisions connect with other direct or indirect outcomes; whereas, analytical skills were desirable in a linear economy to solve specific problems, which may not have considered other unintended consequences. Adapting to a hybrid set of skills which bridge technical and social values will be highly desirable.

As discussed in the *Economic Impact* report in 2023, looking at municipal strategies, *A green edge: Green skills for the future*, these skills encompass leadership, urban design, energy, financial, procurement, waste management, and communications. They surveyed and interview hundreds of public sector executives and business leaders from Berlin, London, New York, Singapore, Sydney, and Tokyo.

The lack of green skills is a wide gap to fill. Cities provide much of the local direction to address ESG initiatives. With the lack of expertise in green skills, this impedes progress with innovation and investment from the private sector. There needs to be a skill set with an understanding of how to deal with the complexities around ESG in public policies and practices.

The *Economic Impact's* insightful report provided a synopsis of the green skills from a public sector perspective. I would posit that these translate into the green skills which private companies should embrace to develop the required mindset for effective strategies involving ESG issues. Adapted from their Green Skills Barometer:

Pillars	Indicators
1. Environmental awareness on external issues which influence the adoption of green skills in business	1.1 External stakeholder impact 1.2 Environmental factors
2. Leadership on preparing the organization for green skills expertise and provides incentives	2.1 Articulate the benefits clearly 2.2 Business readiness for transition 2.3 Requirements to adopt green skills
3. Employee imperative to differentiate green competencies from other skill sets	3.1 Capabilities to adopt green skills across work force 3.2 The critical importance of a green perspective 3.3 Complementary skill types

<https://impact.economist.com/sustainability/project/a-green-edge/briefing-paper/>

Aside from the perfunctory supply chain skills, there is a heightened awareness on how to:

- implement social procurement practices;
- provide increased opportunities for Indigenous peoples;
- navigate trade agreements to engage with social enterprises;
- adapt to environmental strategies through clean energy and renewable energy;
- balance local and global economic development sourcing opportunities;
- utilize digitalized formats such as blockchain;
- operate cradle-to-cradle distribution for resource recovery; and
- align policies with operational responsibility and accountability.

AI bots, such as, ChatGPT could replace procurement staff responsible for drafting competitive bid documents, contract agreements, risk assessments, evaluations, and other types of business documents.

It's only a matter of time, before ChatGPT and its imitators are implemented in more organizations requiring higher volumes of documentation.

With the focus on Net Zero, focusing on the lowest cost of supplies is rather moot. Not that affordability isn't important but will take a back seat to the higher need for reducing emissions. Net Zero is described as being the point where the volume of GHGs being released into the atmosphere is being offset by the volume of GHGs being removed. That is the aim of decarbonization. Lowering the earth's average temperature to below an average of 14°C. The highest temperature was recorded on July 21, 2024 at 17.09°C

Group purchasing organizations

The perfect storm has been forming over the past few years. The lack of qualified purchasing staff to meet the demands of the private and public sectors. Governance requires an adequate staffing resource to effectively manage the organizational spend and align with ESG and other business objectives.

Part of the solution is to work with group purchasing organizations (GPOs). GPOs² can have a tactical and a strategic role to complement staffing resources. Rather than trying to attract and retain competent procurement resources, many organizations are opting to partner with GPOs. This enables the organization to be competitive; meet trade agreement obligations; comply with competitive bid laws; support contract management; form strategic supplier relationships; benefit from a leveraged spend; and have lesser concern with procurement staffing turnover.

Health care service providers have successfully been working with GPOs for decades. IT services, HR, logistics, and commodities are commonly bought through GPOs. There are very few items which an organization buys which are not being purchased by others. GPOs are able to *pool* these requirements and leverage this to the advantage of the pool members, with minimal or no administration fees. Now more governmental and private companies are seeing advantages of GPOs as labour shortages push the levels of expertise required to sustain operations in the market.

With GPOs, the organization can focus on its core competencies and operations while having confidence that its supply side is being managed professionally. The senior leadership of the organization should be familiar with best and leading practices in procurement and contracting, however, the execution can be left in the hands of the GPO experts.

Many smaller public and private sector organizations find engaging with a GPO a good investment in resources. They usually do not have their own procurement staff and rely on managers and other staff to make "the deals" and manage their spend, with the best of intentions. Often the owner or CFO is the person responsible. This will work until it doesn't. Typical savings from having a strategically managed spend are between 5-15% of the value. A smaller company with an annual spend on goods and services of \$10M should realize a return between \$500K to \$1.5M.

There are administrative tasks where procurement-as-a-service could benefit. The procurement world is overwhelmed with paperwork and documentation. Most of it is very critical to the smooth operations of the various departments. Examples would be the maintenance of contracts, updates to insurance certificates, verifying work place insurance coverage, quality certification, conducting trade and work references, and low value repetitive ordering. All these functions consume resources. Consider a company with a supplier base of ~200 suppliers, where the time to maintain records can take 25% to 40% of your staff's time – or it doesn't get done properly, inviting further risk.

Not all GPOs are the same. There are several GPOs in Canada – some focus on the transactional side of

² Thanks to Gerry (Jerry) Ford, QC Solver, for his contribution to our GPO discussions.

buying goods and services on behalf of their clients, while others provide the tactical and strategic input on an ongoing basis. Others provide the transactional support and the back-office services and reporting requirements. Some GPOs may require membership fees and minimum volumes of business on an annual basis. There are various costing models including pay as you go, on demand services or, group purchasing. Developing effective and timely reporting in the form of dashboard synopses keeps the organization’s leadership in the know.

There are risks of outsourcing procurement services to a 3rd party GPO. It may put a ceiling on job growth within that organization which sends a message to staff that job security is not a priority; training may be capped because the services can be bought; recruitment and retention costs more than paying for the services; there is a greater dependency on the 3rd party services. What other services could be outsourced?

For the organization, if working with a GPO is a strategy for internal service delivery, then it may be more difficult to hire for other roles; if the organization wants to bring the services back internally, it shakes the credibility of outsourcing in the first place, which lies with the leadership. Morale suffers and there is the organizational memory of the failed outsourcing. Does outsourcing to a GPO fit with the organization’s value statement or is it a cost cutting exercise?

As with other professional service agreements, managing the relationship with the GPO is a requirement to ensure value for money and responsive services. There are pros and cons to any outsourcing agreement and it needs to be taken for the long-term, strategic benefits.

Fractional Work

An adjunct to contracting for expertise is *fractional* work. This is a growing area for professional service providers to be contracted on a monthly retainer by a client. Independent contractors are able to work for several clients concurrently, under NDAs, which suits their personal life style and utilizes their professional expertise. The client is able to access the skills as and when required and the consultant or fractional contractor has a familiarity with the client needs and market sector. This reduces the learning curve if only hiring for part time expertise.

Fractional differs from part time in that there is an expectation that there will be a continuous need for a foreseeable period of time but not necessarily on a firm daily/weekly/monthly basis. The client has access to the expertise and can reduce their costs. Services can include specialized knowledge on business strategies or for functional advisory roles to coaching and mentoring skills. Fractional work can embed the external advisor on a project team and have that level of commitment without it being a full-time resource. The client and advisor agree on hours of work, hours of commitment, and the hourly rate or retainer fee. Fractional work is not intended to replace full time staff or executives. This gives flexibility to the fractional contractor and reduces the fixed salary and benefits of a full-time employee being paid by the client. Both parties need to weigh the pros and cons in this type of relationship – but it’s working. <https://www.fractionaljobs.io/blog/what-is-fractional-work>

Sustainability leadership skills

Borrowing from the comprehensive Asahi Group Board of Directors skill matrix, we can adapt a set of sustainability skills which is transferable to any organization’s leadership. Asahi categorizes the *expected* set of skills into two groups – decision-making and supervisory skills. Asahi names their respective Board members in this public document.

	Decision-making Skills	Supervisory Skills

Executive	Strategy	Global	Sustainability	Discontinuous growth	Leadership	Finance	Risk & Governance	HR & Culture
Koji	x		x	x	x	x		x
Katsuki	x	x	x	x	x	x		
Tanimura		x	x				x	x
Sakita	x	x		x		x		
Ahmadjian		x	x				x	x
Sasae	x	x			x		x	
Ohashi	x	x		x	x	x		
Matsunaga				x	x		x	x

Drawing from their definitions of sustainability skills and abilities, they are as follows:

Strategy – ability to assess societal changes over the long-term;

Global – ability to make decisions from a global perspective and frame of reference; ability to optimize a blend of local and global;

Sustainability – ability to provide leadership for the creation of social impact through business; and provide managerial direction rooted in the knowledge and insight on ESG;

Discontinuous growth – ability to transform the business structure and earnings model; and encourage innovation and explore new areas of business;

Leadership – ability to assess the performance of business operations and raise related issues; and assess the leadership team’s business capabilities;

Finance – ability to assess the state of management from performance and management indices and raise related issues; and assess the resource allocation and raise related issues;

Risk & governance – ability assess risk control and raise related issues; and assess the state of governance for business execution and raise related issues;

Human resources & culture – ability evaluate a diverse set of human resources and their capabilities; and assess the corporate culture and raise related issues.

Another example using a Canadian Board of Directors, with their skills and experience matrix is provided by the NFI Group. The matrix below echoes the balance of skills with core attributes which NFI seeks in its diverse leadership.

These skills and abilities should resonate with most organizations. The expectations of stakeholders and shareholders are balanced in this set of objective criteria for Board accountability. Senior management would need to successfully execute their responsibilities across a broad spectrum of activities.

NFI is in the highly competitive transportation sector and operates out of Winnipeg, Manitoba. NFI Group evolved out of New Flyer Industries, in 2005. Through mergers and acquisitions, NFI now operates in 9 countries. NFI designed its line of vehicles on common platforms with shared suppliers.

From a supply chain perspective, NFI has incurred serious parts shortages and addressed risk with its major suppliers. The shortages of seats, impacted their 2024 production schedule. According to NFI's financial updates, they expect to generate ~40% of their 2025 manufacturing sales from ZEBs and project a total revenue of \$4B from their overall sales. <https://www.nfigroup.com/>

NFI Board skills and experience matrix											
											
 Gender Diversity	Male	Male	Male	Male	Female	Male	Female	Male	Female	Male	Female
 Director Since	2025	2008	2025	2012	2015	2015	2024	2020	2025	2009	2023
 Independent	•	•	•	•	•	•	•	•	•	•	•
 Senior Leadership and People Resources	•	•	•	•	•	•	•	•	•	•	•
 Public Company Board Service	•	•	•	•	•	•	•	•	•	•	•
 Accounting, Finance and Risk Management	•	•	•	•	•	•	•	•	•	•	•
 Manufacturing and Operations	•	•	•	•	•	•	•	•	•	•	•
 Public and Private Commercial Vehicle Sector	•	•	•	•	•	•	•	•	•	•	•
 Government Relations	•	•	•	•	•	•	•	•	•	•	•
 Sustainability	•	•	•	•	•	•	•	•	•	•	•
 Technology and Innovation	•	•	•	•	•	•	•	•	•	•	•
 Strategic Process	•	•	•	•	•	•	•	•	•	•	•
Committees											
 Audit	•	•	•	•	•	•	•	•	•	•	•
 Human Resources, Compensation and Governance	•	•	•	•	•	•	•	•	•	•	•
 Operations and Technology	•	•	•	•	•	•	•	•	•	•	•

ESG and executive compensation

A 2022 Conference Board Report, suggests that due to increased attention to ESG by multiple stakeholders and concurrent interests in stakeholder capitalism, Boards are linking executive compensation to financial and non-financial outcomes. Incentives are related to ESG performance measures. Boards are also concerned that ESG can meet the expectations of shareholders and a company's performance. <https://www.conference-board.org/us/>

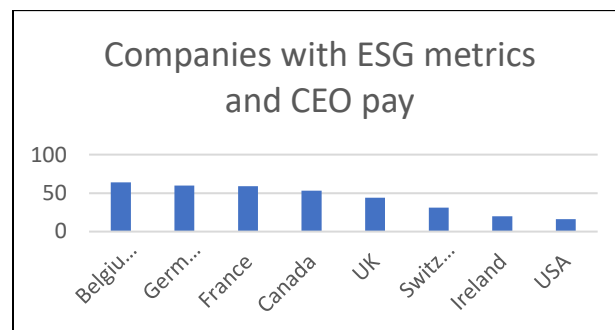
CNN business writer, Moira Ritter reported in July 2021, that the average S&P 500 CEO made ~300 times the average worker's salary, according to the AFL-CIO's annual Executive Paywatch report. This equates to an average US\$15.5 Million. Meanwhile the average production and nonsupervisory worker earned US\$43,512. Stakeholders continue to challenge this disparity which contributes to the apparent have and have-not perspective. A 2020 SHRM report talks about the executive pay difficulties and shareholder protection. Issues such as clawbacks and cause definitions to address nonfinancial performance issues; trying to adjust compensation for performance in volatile markets; and incentives to hit strategic goals such as improved performance under inclusion, diversity, equity, and accessibility (IDEA) objectives.

A 2023 Stanford study of 4400 companies in 21 countries, discusses the types of companies which do relate ESG to CEO pay. The number of companies which link ESG to CEO pay went from ~400 in 2017 to ~1200 in 2020. Their findings show that companies which have a strategy to reduce GHGs achieve these outcomes when CEOs are tied to that metric, which is intuitive. People behave in the way they are rewarded. ESG pay incentives which involve 3rd party measurements also impact CEO performance. The researchers also found that ESG did not have a positive impact on its bottom line or share prices; but did not have a strong correlation to negative results either. In other words, a mixed bag.

The Stanford study found common traits where ESG and CEO pay was more prevalent in countries with more stringent regulations; countries with a greater concern for social outcomes and sustainability. Industries with a larger carbon footprint were more likely to include ESG with CEO compensation; larger companies with independent directors; companies with more diverse boards; institutional investors have a greater propensity to favour companies with ESG incentives for CEOs where DEI and climate change is part of their operational agendas. This could be interpreted as seeing that a company which adopts a holistic view of their responsibilities for economics plus ESG will be better managed. The study supports the notion that the environmental factors such as emissions in Scope 1 and 2 sources are the easiest to assess. The governance factors range quite widely on the metrics and performance issues and are driven by the individual company's objectives.

The following chart from researchers Cohen, Kadach, Ormazabal, and Reichelstein (2023) from the Stanford study, reiterates that US companies have the lowest % linking ESG metrics to CEO pay. Belgium, Germany, France, and Canada are much more committed to these assessments. Big cultural differences, in part, between most of the countries and the USA business and political ideologies.

<https://www.gsb.stanford.edu/insights/does-it-pay-link-executive-compensation-esg-goals>



Other research suggests that companies should have at least 1-2 years of operational experience with ESG targets before using them to assess the executive's ability to deliver on them. It takes time to develop and compile appropriate data and determine the actual impact on ESG goals. Boards are also concerned that the reporting can be justified and demonstrate increased value by introducing ESG values. Some argue that ESG is not about impact but simply a risk management issue.

In a major rebrand, Nokia, the former Finnish phone seller, launched its new business platform in early 2023. CEO Pekka Lundmark, sees Nokia leading in the digital transformation and wants to *develop ESG into a competitive advantage*. Pekka got buy-in from Nokia's leadership team on its investment as a technology leader. The (5) core ESG objectives for Nokia are:

1. Climate and circularity
2. Industrial digitalization
3. Security and privacy
4. Bridging the digital divide
5. Responsible business

<https://www.esgtoday.com/nokia-commits-to-net-zero-value-chain-emissions-by-2040/>

Inclusivity, Diversity, Equity, and Accessibility

IDEA expanded out of the original DEI acronym. Most leading organizations have an HR policy around

IDEA and the procurement policies of these organizations recognize the value in having a diverse supplier base. This adds to healthy competition in the market and creates social values at the same time. The additional value being added to the DEI view is that of accessibility. The new acronym **IDEA** is comprised of inclusivity, diversity, equity, and *accessibility*. The latter means ensuring physical barriers are removed and accommodations for people with access restrictions can be mitigated. Accessibility can be extended to imply digital access to information.

A model for global diversity and inclusion is provided by The Conference Board. The CFB suggests that the competencies be integrated into an organization's business operations. The competencies include:

- Change management
- Diversity, Inclusion and Global Perspective
- Business acumen
- Strategic external relations
- Integrity
- Visionary and strategic leadership
- HR disciplines

Professor Paul Larsen, from the University of Winnipeg, summarizes the motivators of supplier diversity as follows:

- Improves organization's community impact
- Improves organization's social standing
- Broadens the supplier base
- Improves corporate image/brand reputation
- Matches demographics of consumers in target markets
- Creates new business opportunities
- Improves organization's supply chain performance

Diversity in itself, is insufficient to drive values. The culture of the organization will need to demonstrate why diversity is important to its success in the future. Diversity in an organization is most effective where values are aligned across the workplace.

The key to diversity bringing advantages to the organization is to have a common agreement on what value means. If people within an organization do not have a common concept of value, their individual diversity can lead to incongruence or passive engagement. As individuals, they will interpret value as they personally define it. As an example, is spending to be focused on the lowest cost or is it on the best value?

[Accessible Canada Act](#)

In June 2019, The Canadian Federal government passed the Accessible Canada Act, Bill C-81. The purpose is to identify, remove, and prevent accessibility barriers in the following areas:

- Built environments, including buildings and public spaces
- Employment, including job opportunities and employment policies and practices
- Information and communication technologies, including digital content and technologies used to access it
- Procurement of goods and services
- Delivering programs and services
- Transportation, including air, rail, ferry, and bus carriers that operate across a provincial or federal border

The Bill provides principles, which guide how businesses can communicate the goals:

- Inherent dignity
- Equal opportunity
- Barrier-free government
- Autonomy
- Inclusive design
- Meaningful involvement

The Bill applies to organizations under federal jurisdiction such as:

- Parliament, including the Senate, the House of Commons, the Library of Parliament, and the Parliamentary Protective Service
- Government of Canada, including government departments, Crown Corporations, and agencies
- Federally regulated private sector, including organizations in the transportation sectors, broadcasting and telecommunications services, and the banking and financial sectors
- Canadian Forces and the Royal Canadian Mounted Police (RCMP)

There is considerable attention to enforceability and compliance processes within the Act which regulated bodies must adopt in their operations. Most provinces and local governments have similarly aligned accessibility legislation. <https://www.canada.ca/en/employment-social-development/programs/accessible-canada/act-summary.html>

For more than 35-years, the Rick Hansen Foundation has been raising awareness and funding a shift which supports people with disabilities. The Foundation states that more than 6.2M Canadians have some form of disability, and the numbers are growing. People with disabilities still face social and physical barriers that stop them from being a part of their communities. While we've made great strides towards creating an accessible and inclusive world, there's still more work to be done.

<https://www.rickhansen.com/>

Employment Equity Act

In Canada, there is the Employment Equity Act, which applies to the public and private sectors. The purpose of the Act is to eliminate discrimination and bias in hiring and employment practices. The Act enshrines commitments to equity for disenfranchised people and a requirement to accommodate their special needs. The Act supports and expects the values expressed in IDEA to be recognized as follows:

The purpose of this Act is to achieve equality in the workplace so that no person shall be denied employment opportunities or benefits for reasons unrelated to ability and, in the fulfilment of that goal, to correct the conditions of disadvantage in employment experienced by women, Aboriginal peoples, persons with disabilities and members of visible minorities by giving effect to the principle that employment equity means more than treating persons in the same way but also requires special measures and the accommodation of differences.

<https://laws.justice.gc.ca/eng/acts/e-5.401/page-1.html#:~:text=2%20The%20purpose%20of%20this,women%2C%20Aboriginal%20peoples%2C%20persons%20with>

A contentious issue related to the Employment Equity Act is the self-identification of Indigenous heritage. The Deputy Minister of Indigenous Services Canada, Gina Wilson, expressed concerns over “Indigenous identity theft.” This is also referred to as *race-shifting*. Preventing false identity claims is a growing issue with governmental positions. <https://www.cbc.ca/news/indigenous/indigenous-identity-public-service-1.7254555>

The demographics of the workforce in trucking are part of the resilient strategy discussions and the need for diversity. Driver shortages can impact capacity and service levels. Traditionally the trucking sector has been a male-dominated role. As in construction, women have a great opportunity to enter a relatively recent career path. Taking on the role of driving, with less focus on being able to physically

handle cargo, drivers need to be tech savvy and ensure safety at all times. Amplify finds it challenging to attract and find higher quality drivers which meet their expectations when turnover occurs. The driving profession has been under rated as a career option. Amplify are actively trying to hire women for driving positions. The COO references that the average age of drivers in the industry is closer to 50 years of age. While at Amplify, the average age is ~28 years.

The Women's Trucking Federation of Canada (WTFC) was formed in 2015. The WTFC is evidence of the continued growth by women as truckers - be they drivers, mechanics, and executives. In February 2023, the BC Ministry of Social Development and Poverty Reduction announced \$1.6M in funding for a free truck driver training course for women. The 6-month program is open to women who are unemployed with a Class 5 licence through the YWCA's Changing Gears Program.

<https://www.womenstruckingfederationofcanada.net/>

A 2023 report by Dr. Naveed Khan of Centennial and George Brown Colleges, reports 3.5% of commercial drivers are female in Canada whereas there are 8% in the US. Canada has ~320,000 full and part time drivers with 27,000 retiring each year.

In 2023, the Federal government partnered with the non-profit, Trucking HR Canada, with a \$46M funding to recruit, train and subsidize wages for up to 1400 new drivers and 1200 other professionals that are in the trucking sector. This is intended to address the aging population of current truck drivers and is being filled by many immigrant drivers. ~17% of Canada's drivers are South Asian, with ~56% of Vancouver drivers being South Asian. <https://www.supplypro.ca/canadas-trucking-industry-needs-thousands-of-drivers/>

Pushback

The US government banned DEI in the federal government workspace in early 2025 under a presidential executive order. This includes all existing policies and media references to DEI. Further it is expected that the US Attorney General must draft language to deter private sector companies from adopting or continuing DEI programs. <https://www.cbsnews.com/news/trump-orders-end-diversity-programs-dei/>

Conservative groups see DEI as a form of discrimination, where DEI favours *racial and ethnic representation* in a workplace. More US companies revised their DEI policies to reflect concerns from conservative groups. These include JPMorgan Chase, Goldman Sachs, Starbucks, Brown-Forman and Lowes. <https://financialpost.com/pm/business-pmn/goldman-sachs-abandons-ipo-diversity-pledge-with-us-dei-goals-under-fire>

US corporations are experiencing a push back on IDEA values. In July 2024, the John Deere company announced it will no longer sponsor "social or cultural awareness" events, becoming the latest major U.S. company to distance itself from diversity and inclusion measures after being targeted by conservatives. Weeks earlier Tractor Supply took similar actions around hushing IDEA values. Tractor Supply said it would retire diversity, equity and inclusion targets, stop submitting data to the *Human Rights Campaign* and *withdraw carbon emission goals in an effort to ensure its "activities and giving tie directly to" its business*. And further media backlash in August 2024, has required that Harley-Davidson cease its support of DEI actions, including LGBTQ+ and Pride festivals. They said they would not use diversity of their workforce as part of Harley's marketing strategy. Ford Motor has had to revise its DEI policy in wake of the DEI conservative position. Ford CEO Jim Farley said *Ford decided to stop participating early this year in some external culture surveys, including one put together by LGBTQ advocacy group Human Rights Campaign, and various "best places to work" lists*.

Google dropped DEI commitments in early 2025, in part, so they can qualify for US government contracts. Meta and Amazon are following suit. The financially troubled airline manufacturer Boeing, eliminated its DEI department in late 2024, after 5-years. Wal-Mart dropped its DEI commitments in late 2024 as political action groups pushed back. McDonalds is phasing out its DEI commitments and will support some initiatives under *its Global Inclusion Team* program. American Airlines has backed off their

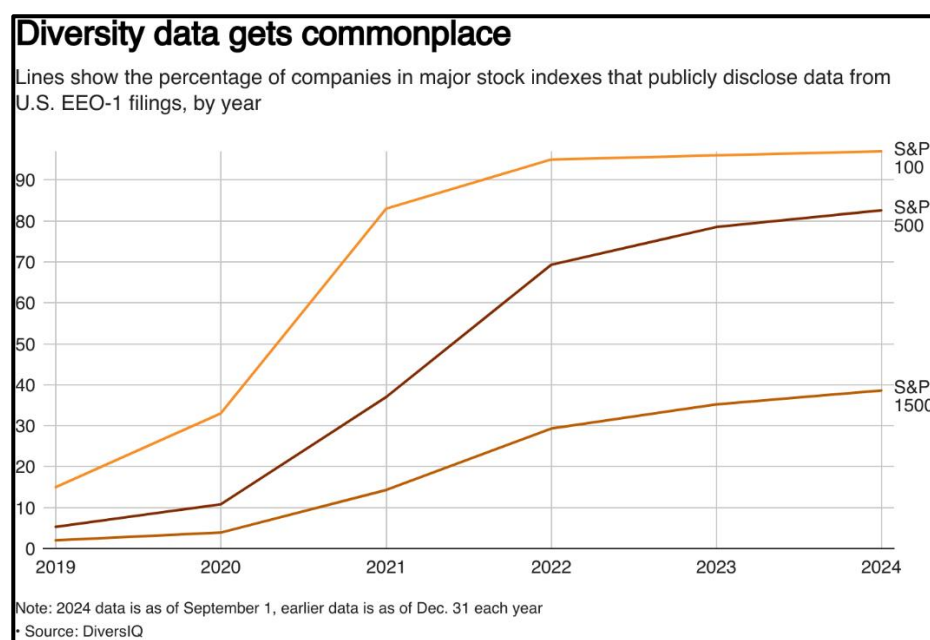
DEI commitments as a result of the ideology pendulum swinging the other way. Molson Coors and Target dropped their DEI commitments in early 2025. Pfizer will have to defend its diversity fellowship program aimed at Black, Latino and Native American leadership in their company. Disney aligned itself with the imposed wishes of the US Administration and dropped DEI in 2025.

<https://www.reuters.com/technology/google-scrapes-diversity-based-hiring-targets-wsi-reports-2025-02-05/>

Push forward

While large brands have been targets of conservative groups, there is increased evidence that many US companies are continuing to report out on DEI based data. It makes business sense to promote a diverse supplier base. Leading organizations are able to generate profits and support the workplace well-being of employees. This includes the benefits which are derived from DEI policies. To have a government in a “free” country tell private corporations that can’t have a DEI policy is not democratic. If these governmental ideologies are imposed on private companies, what will be next?

<https://www.reuters.com/world/us/key-directives-trump-dei-executive-order-government-private-sector-2025-01-22/>



US-Costco’s board of directors, unanimously pushed forward on their DEI strategies in 2025. The board criticized the National Center for Public Policy, as they see the NCPP spreading misinformation on illegal discrimination *against employees who are white, Asian, male, or straight*.

“Among other things, a diverse group of employees helps bring originality and creativity to our merchandise offerings, promoting the “treasure hunt” that our customers value,” Costco said in its proxy statement to investors. “We believe (and member feedback shows) that many of our members like to see themselves reflected in the people in our warehouses with whom they interact.”

https://www.cnn.com/2024/12/27/business/costco-dei?cid=ios_app

In 2025, Apples’ Board supports DEI in spite of attacks by US conservative groups. The Board provides direction to Apple policies and does not want shareholder interest groups to undermine their corporate objectives. https://www.cnn.com/2025/05/02/business/costco-apple-levi-shareholders-dei?cid=ios_app

Procurement practices need to ensure that best value is the organizational view and aligns with country-based values. Without a common understanding of what value is, we invite bias in decision-making. Staff

may choose to not buy products from a company because of a negative headline or internet story – regardless of what may actually have occurred. We lose the potential synergy found in diversity when we haven't clearly defined value. The divergence of opinion on what value means, detracts from the collective actions. Respect for diversity is one of criterion in change management.

Diversity in the supplier base invites transparency by 3rd party audits to ensure value for money. As discussed, NGOs provide monitoring but more intensive audits are often required for detailed inspections. There are many such service providers in the private sector, such as, Bureau Veritas, EcoVadis, INTERTEK, Openview Service, QIMA, SGS, TÜV Rheinland, and UL Solutions. They provide factory inspections for compliance with safety standards, working conditions, use of forced or child labour, quality, use of chemicals, environmental compliance, social impacts, and the use of fund audits.

Business advocates for diversity

A strong Canadian advocacy organization for business diversity is 2SLGBTQI+ Chamber of Commerce (CGLCC). Along with Tourism HR Canada, the collaboration launched the Rainbow Registered Accreditation Program for 2SLGBTQI+ friendly businesses and organizations in Canada – regardless of their industry or size. There over 100,000 2SLGBTQI+-owned businesses in Canada. These businesses generate over \$22 billion in economic activity and employ over 435,000 employees. <https://cglcc.ca/about-us/>

With respect to Indigenous business diversity, generally it's being an organization which is 51% owned, managed, and controlled by Aboriginal persons. Leadership in the Indigenous supplier community is being led, in part, by the Canadian Council for Indigenous Business (CCIB). The CCIB is aware of the under-representation of 60,000 Indigenous enterprises in Canada. Economic reconciliation is a desired goal of the CCIB with corporations and governmental agencies. They act as an intermediary for Aboriginal businesses. Suncor's COO, Mark Little, sees the participation by Aboriginal businesses in its supply chain as a means to build the communities it operates in. The CCIB see the opportunity to manage wealth instead of poverty for the Indigenous people. <https://www.ccab.com/membership/certified-aboriginal-business-cab/>

CCIB has created its Progressive Aboriginal Relations™ (PAR) as a certification program that confirms corporate performance in Aboriginal relations at the bronze, silver or gold level. Certified companies promote their level with a PAR logo signaling to communities that they are good business partners; great places to work, and are committed to prosperity in Aboriginal communities. PAR is the only Corporate Social Responsibility program with an emphasis on Aboriginal Relations. <https://www.ccab.com/programs/progressive-aboriginal-relations-par/>

The First Nations Business Development Association (FNBDA) was formed in 2020. The FNBDA was established as a BC Society and is comprised of the founding Nation owned Development Corporations and led by its Managing Director, Michael Bonshor, CPA of Visions First Nations Financial Service and the Dzawada'enuxw First Nation. Their mandate is to *lift the collective strength and influence of BC First Nations owned Development Corporations, for the benefit of their community*. <https://fnbda.com/about/>

The Canadian Aboriginal and Minority Supply Council (CAMSC) are a strong advocacy group which facilitates expansion of Aboriginal and minority-owned businesses. Since 2004, CAMSC as a not-for-profit organization, certifies and develops diverse suppliers to contract with corporate and government buyers. Concurrently, they help larger organizations connect with the certified suppliers they represent. <http://camsc.ca>

Engaging with Indigenous businesses

The commitments to the Truth and Reconciliation Calls to Action, require *action*. Colleague, Jenny Miles, Manager, Social and Sustainable Procurement with the BC Lottery Corporation, shared the following

recommendations for organizations aiming to work with Indigenous companies:

- **Educating:** Taking a training course on Indigenous procurement in Canada, many webinars and in-person training sessions are available. These sessions are opportunities to learn from leaders and colleagues working in this area.
- **Attending:** Indigenous business events, for example, CCIB and CAMSC host a variety of events throughout the year. Use these opportunities to meet with Indigenous suppliers and learn about their businesses. <https://www.ccab.com/events/>
- **Researching:** what other organizations are doing. Many organizations have publicly available policies in place and/or publish annual reports or share information widely on social media. Find organizations similar to yours and see what they have been doing.
- **Collaborating-internal:** sharing goals and learnings with internal partners helps to identify opportunities to work with Indigenous suppliers, promoting internal engagement and enthusiasm. Support internal business units to connect with Indigenous suppliers. A major challenge in connecting opportunities is that often business units and suppliers don't know where to find each other.

Large organizations in particular can be challenging for a supplier to know who to reach out to and internal stakeholders may not know where to go to find Indigenous suppliers. Find a place on your website that can easily direct suppliers to where RFPs are posted or who the procurement contacts are. When you meet suppliers, share their information with the right contact within your organization.

- **Collaborating-external:** Identify opportunities to work with other organizations on shared goals, learnings and connections. Connecting with local Indigenous business communities, such as Economic Development corporations can facilitate connecting with suppliers in your region. Speaking with procurement peers in similar industries can also contribute to further connections.

In the Tk'emlúps te Secwépemc region of BC, this type of collaboration came together when several local organizations began reaching out to the Sc.wé'íwen Economic Development corporation to discuss Indigenous procurement. The procurement teams from BC Lottery, Thompson Rivers University, the City of Kamloops and Sc.wé'íwen Economic Development, formed a working group which has hosted several events, including a Procurement coaching session for Indigenous Suppliers and an Indigenous vendor showcase. The group expanded to include several other public and private organizations and Métis Nation BC. [Procurement coaching session for Indigenous Suppliers](#)

Indigenous-owned businesses with a purpose

Notable Indigenous companies in Canada, with a purpose, include:

Ashfirewear – firefighting clothing designed for women, made with natural fibres and biodegradable materials, founded by Ashley O'Neil. <https://ashfirewear.com/>

Birch Bark Coffee Company – making clean, fresh water available to communities, founded by

Mark Marsolais. <https://birchbarkcoffeecompany.com/>

Cheekbone Beauty Cosmetics INC – cosmetics company founded by Jenn Harper, to provide scholarships for First Nations youth. <https://www.cheekbonebeauty.com/>

Her Braids – making clean, fresh water available to communities and donations to the David Suzuki Foundation's Blue Dot Movement, founded by Sunshine Tenasco. <https://www.beadeddreams.ca/blogs/news/62537797-her-braids-making-an-impact>

Hinaani Design – clothing sourced from northern and Canadian materials in a sustainable manner and, supports local social causes, founded by Nooks Lindell. <https://www.hinaani.ca/>

Indigenous International Trading Group of Canada (IITGC) – sourcing products and services from Asia with specialty in mining and green energy projects. <https://iitgc.ca/>

Indigenous Marketing Solutions – providing a full spectrum of print and marketing services to organizations, communities, government entities and corporations across Canada, providing ethical and equitable income to support Coast Salish communities. <https://promo.indigenousmarketing.ca/aboutf.htm>

Medical, Surgical and Safety Supplies (MSS) Ltd. – a certified aboriginal, not-for-profit, exclusive distributor of PRIMED gloves to Canadian hospital and health care facilities. <https://www.mssltd.com/>

OneHoop – uniquely qualified consulting firm founded by former Chief of Cowessess First Nation, Cadmus Delorme. Delorme's voice carries a powerful message on government relations and Indigenous values. <https://onehoop.ca/>

Virtual Gurus – provide virtual assistants for businesses consisting of people facing barriers to employment, founded by Bobbie Racette. <https://thevirtualgurus.com/company/about>

Indigenous investors

Indigenous investors putting billions of dollars into dozens of major projects across Canada. Part of the incentive is the promised funding from the Federal and Provincial governments to make it easier for Indigenous groups to finance the projects. This could include guaranteed loans for Indigenous communities to invest in major resource projects. ~40 Canadian energy projects involve Indigenous investments ranging from Cdn \$13 M to \$14.5B. In May 2025, the Federal government announced an increase from \$5B to \$10B for loan guarantees to encourage more Indigenous investment in major projects including mining and pipelines. The government intends to keep the Impact Assessment Act in place.

In late 2025, Bank of Montreal started its BMO Indigenous Bond issue valued at \$200M. This is to create equity participation in infrastructure projects for investors and provide funding security. Indigenous reserves cannot be used as collateral as reserves are legally considered as Crown lands. Investment dealer Cedar Leaf Capital is part of a syndicate with Canada Pension Plan Investment Board, the Province of Alberta, and First Nations Finance Authority. FNFA loan portfolio is value at \$3.4B. <https://newsroom.bmo.com/2025-10-23-BMO-First-North-American-Bank-to-Issue-Labelled-Indigenous-Bond-in-Support-of-Indigenous-Owned-Businesses-and-Indigenous-Communities>

Indigenous investors see these funds as a means to accelerate the approval of projects, and some projects require First Nations equity. Having Federally backed loans, at favourable rates, will be profitable for Indigenous investors, which lack the capital for these larger projects. For the Indigenous investors there is considerable environmental permitting mandates and consultations before project

approvals are granted. In addition, Indigenous chiefs may give the approval but their decision is subject to approval by hereditary chiefs as well. <https://www.reuters.com/business/energy/canadas-indigenous-peoples-eye-big-energy-deals-await-trudeau-loan-promise-2024-04-02/>

Many Indigenous investors are aiming for financial independence and managing their own wealth vs being reliant on government funding.

Indigenous investment opportunities in play, recent or pending include:

- Fisher River Cree Nation invested in the biggest solar farm in Manitoba — a one-megawatt facility that will be hooked up to the province's power grid and will pay off loans and grants within 10 years
- The James Smith Cree Nation entered into a partnership with AECOM and Tesla Energy Institute to bring a hydro-electric power plant to Saskatchewan's east-central region.
- The Tahltan Nation purchased 5% stake in three run-of-river hydro-electric \$124M projects located in its traditional territories, which include the communities of Iskut, Dease Lake and Telegraph Creek.
- The Nisga'a and Tahltan Nations and Arrow Transportation Systems to buy Stewart Bulk Terminals Ltd., which owns and operates the facility in Stewart, B.C., with partial \$5M BC government financial package
- Stonlasec8 Indigenous Alliance Limited Partnership will invest \$715 million for a 12.5 per cent stake in the BC pipeline system with Enbridge in 2025.
- Nisga'a Nation participates in the Ksi Lisims LNG project with the French company, Totalenergies, to produce 12M tons of LNG annually
- \$500M Seven Stars Energy Wind project in Weyburn/Griffin Saskatchewan with Enbridge and the Six Nations Energy Development LP.
- Metlakatla Development Corporation, Prince Rupert logistics facility, ~\$225M.
- 51% ownership in the BC wind power projects which are to be completed by 2031 with (8) equity ownership agreements involving Upper Nicola Band, Lower Nicola Indian Band, Ashcroft Indian Band and Westbank First Nation in the southern Interior; the Lheidli T'enneh First Nation, Stellate'en First Nation, Western Moberly First Nation and the Saulteau First Nation in the north; and the Wei Wai Kum First Nation on Vancouver Island. Construction budget is \$16B.
- 77% ownership of the Nations Royalty Corp mining company by the Nisga'a Nation.
- Piwakanagan First Nation, in Ontario is a 50.1% owner in the Spanish company EDP Renewables wind farm.
- The Greenwood Sustainable Infrastructure solar farm in Saskatchewan will be owned by Ocean Man First Nation valued at \$200 M.
- Nisga'a First Nation and Texas-based Western LNG have partnered to build the Prince Rupert Gas Transmission (PRGT) pipeline which transgresses 21 territories of First Nations, starting in 2024. This will include an LNG port and is expected to take ~4-years and is valued at ~\$10 B.
- Negotkuk First Nation and Tobique First Nation in New Brunswick operates the \$49 M Burchill wind farm investment with projected revenues of \$4M per year for decades.
- National Indigenous Collaborative Housing Inc. (NICHI) formed in 2022 with Federal funding of \$300 M to build housing for people living away from their Indigenous communities.
- Meadow Lake Tribal Council Bioenergy Centre operates the \$100M project converts wood waste from its Indigenous-owned, NorSask Forest Products sawmill into renewable energy.
- Nch'kay West, a partnership that includes the Squamish Nation and Westbank Projects Corporation, are developing the Jericho Lands in Vancouver. As a former First Nation village, the

land will be used to build thousands of affordable housing units, under 99-year strata leaseholds. The property was acquired in 2016 for \$480M.

- Malahat First Nation and Energy Plug Technology building a battery plant on Vancouver Island. Malahat also have investments in their Skywalk project and Film Studios.
- The Trans Mountain oil pipeline, which began operations in May 2024, will be sold by the Federal government and will include First Nations investors as part of the Cdn \$34B deal.
- Alberta Indigenous Opportunities Corporation will take 5.34% equity interest in the NGTL and Foothills pipeline from TC Energy for Cdn \$1B announced in mid-2024.
- Coastal GasLink will sell 10% of the operations to Indigenous communities
- BC Hydro is exploring the sale of 50% of its Cdn \$3B transmission line project with K'uul Power, which is a consortium of First Nations.
- Enbridge sold Cdn \$1.12B stake in Alberta pipelines to a group of Indigenous communities in 2022.
- Clearwater Seafoods is a Cdn \$1B consortium of (7) Mi'kmaq communities from Nova Scotia and Newfoundland.
- Cedar LNG export project in BC is majority owned by Haisla Nation in partnership with Pembina Pipeline, approved in June 2024. Construction is ~\$6B for a 2028 operational start. **This project was shelved in 2025, and the Haisla Nation are trying to acquire the assets in hopes of reviving the project.** <https://thelogic.co/briefing/haisla-nation-to-acquire-assets-of-defunct-lng-project/>
- Salish Elements building a green hydrogen plant in Lillooet at a cost \$110M to be operational in 2026.
- Ontario's Hydro One drafted a model whereby First Nations can acquire 50% of all future large-scale transmission line projects. <https://www.reuters.com/business/energy/indigenous-investment-canadian-energy-projects-2024-04-02/>

In British Columbia, Indigenous-owned businesses can be found at BC Marketplace. Most cities provide a listing of Indigenous-owned businesses. Buying goods or services from these targeted groups, directly impacts their economic and social interests. <https://marketplacebc.ca/indigenous-owned/#marketplace>

Employee well-being

Staff turnover rates and workers leaving the employment ranks contributed to the inflation rate and supply shortages in late 2022. For those who stay in the workplace there was an increased level of stress. In a *Deloitte Insights Magazine* for Summer 2022, worker well-being is based on physical, mental, financial, and social aspects. A pre-pandemic poll by Gallup showed that 31.5% of employees are engaged in their jobs; 51% are not engaged; and 17.5% are actively disengaged. The workplace is not getting better with most complaints about the amount of workload and the extended workday hours being incurred.

This certainly adds to the cost of suppliers as a low employee well-being can be related to lower productivity and higher health care costs. Attracting and retaining good workers is critical. Studies show that the greater the affinity people have with their employer values and their personal values, they will make a greater commitment to the interests of the employer. The workers feel valued and have less turnover.

Employee well-being is part of the ESG holistic. A 2014 study on well-being by Deloitte showed the top 5 triggers for retention include flexible scheduling, telecommuting (now referred to as working remotely), designated office space for wellness, reimbursement for well-being expenses, and healthy snacks. Fast

forward to 2023 and we saw that flexible scheduling and working remotely were necessitated by the pandemic.

The 2014 study concluded “*well-being is becoming a core responsibility of good corporate citizenship and a critical performance strategy to drive employee engagement, organization energy, and productivity.*” One could conjecture, that today there can be a sense of complacency with employee well-being programs and when opportunities arise for them to move on, they jump at it. It may cost an employer an incremental amount for the retention tactics but it can cost far more when they walk out the door.

Google, which its founders Page and Brin went on record in 2004 saying “expect us to add benefits rather than pare them down over time” and instead, dumped thousands of staff in January 2023 through a terse email. Google has been clawing back health benefits and other perks. Google has devolved from being the *new* school to going *old school* corporate-wise. Well-being just met its alter ego, affordability.

UPS combined employee well-being with their ability to attract and retain frontline workers at its Northern California operation. In a statement issued in October 2023, their pilot program for child care options was a scalable success. *In partnership with Patch Child Care Solutions, the UPS Emergency Child Care Initiative was piloted from August 2022 to January 2023 during the evening shift at a UPS facility in Northern California. With goals of reducing work absences because of child care challenges and increasing retention, the initiative was a first-of-its-kind for UPS, which has over 2,000 facilities and more than 500,000 employees worldwide.*

The pilot program offered emergency day care services onsite at the UPS facility, where parents would have the lowest possible barrier to using the new service. 80% percent of eligible employees participated and took advantage of the service more than once, avoiding more than 120 unplanned absences. Employee turnover among the pilot group dropped significantly, from 31% to 4%.

A 2023 report, *EQUITY, DIVERSITY & INCLUSION STRATEGY REPORT, A REVIEW OF LGBTQ+ WORKPLACE TRENDS IN NORTH AMERICA* by the Robert Walters Group, an international recruitment consultancy, addresses the potential for companies to improve their performance. This report summarily indicates that organizations are not attracting and retaining professional staff, largely due to the lack of a DEI transparent workplace. The LGBTQ+ professionals earned significantly lower incomes than other staffers in similar organizations. This was identified in lack of their pay equity, promotional opportunities, lesser benefits, low affinity for values with employers, less professional development and training, and less mentoring. Turnover rates amongst all staff were higher due to the disconnect on values and well-being where organizations were relatively silent on DEI. <https://www.robert-walters.ca/content/dam/robert-walters/country/united-states/files/2023-edi-report/EDI-NA-Gender-Report.pdf>

Well-being in society

Well-being is a complex gauge on our quality of life and standard of living. In Canada, for decades, the Gross Domestic Product (GDP) was the gauge as to whether we were doing good or bad, as a general population. GDP increases through economic activities even those which have been related to disasters or are actual harmful. Floods, fires, train derailments, pollution, health problems, building jails, or hurricanes all add to the GDP, which is purely an economic indicator of annual spending.

The opposite of the GDP, as an indicator of well-being, is the Canadian Index of Wellbeing (CIW). The CIW assesses the impact of volunteer work, a good education system, a sustainable environment, and improved social impact, among other beneficial factors. The GDP and CIW are both affected by health

care. As an example, GDP increases with health care *treatments*; and the CIW increases with illness *prevention*. This validates the view that a strong economy does not mean we are better off. The main research for the CIW is provided by the Faculty of Health, University of Waterloo, in Ontario. Their composite index gives a sense as to whether our overall well-being is improving or not. Summarily, the GDP has far outpaced the CIW. <https://uwaterloo.ca/canadian-index-wellbeing/>

The CIW composite index includes:

1. Community vitality
2. Democratic engagement
3. Education
4. Environment
5. Healthy populations
6. Leisure and culture
7. Living standards
8. Time use

It's important how we balance economic development with the perceived well-being of individuals in our communities. The lower income earners often bear the brunt of slower economic activity with a measurable reduction in their well-being. *The wealthiest top 20 per cent of households controlled more than two-thirds — nearly 68 per cent — of net worth in Canada in the first quarter of 2023, while the least wealthy bottom 40 per cent accounted for 2.7 per cent, according to Statistics Canada, as reported in the Toronto Star, July 2023, Business Reporter, Ghada Alsharif.*

An interesting assessment of well-being is the model used by the country of Bhutan. They have developed and monitor their Gross Happiness Index (GHI). Several Canadian and US cities have adopted the GHI. Bhutan's government uses four factors to rate its GHI, which include:

1. Sustainable and equitable socio-economic development
2. Environmental conservation
3. Preservation and promotion of culture and
4. Good governance.

Economists also refer to the Gini coefficient to rate how *income inequality* affects the individuals in various countries. *Income is defined as household disposable income in a particular year. It consists of earnings, self-employment and capital income and public cash transfers; income taxes and social security contributions paid by households are deducted.*

The problem with increased income disparity between high- and lower-income groups is the pressure on social assistance programs to keep pace. In Canada, the growing gap can be attributed in part to inflation and interest rates which have a greater negative impact on lower income households. Higher income households benefit from higher interest rates and are less affected by inflation on basic services, housing, and food costs. A Statistics Canada report in Q2 2024 showed that the top 20% of the Canadian population holds 66% of the wealth; the bottom 40% hold 2.8% of Canada's wealth.

<https://www.cbc.ca/news/politics/canada-highest-level-income-inequality-recorded-1.7349077>

Taskforce on Inequality and Social related Financial Disclosures (TISFD).

This ambitious project was launched in 2025 to examine the confluence of social well-being and economic prosperity. A global approach is being taken by the TISFD stakeholders to bring these issues to the forefront of business. It is hoped that there will be quantifiable outcomes to report out on where

business and financial institutions can form more responsive strategies to address the consequences of actions on society.

As summarized in a June GIST report *Bridging the Gap: Social and Financial Disclosures in an Era of Growing Inequality*:

1. Well-being: A holistic, outcome-oriented framework that includes health, safety, income, education, and social connection.
2. Human rights: Internationally recognized entitlements that serve as minimum standards for dignity and equity.
3. Human and social capital: The skills, relationships, trust, and institutions that enable people and societies to thrive.

https://www.gstimpact.com/wp-content/uploads/2025/06/Bridging-the-Gap-Social-and-Financial-Disclosures-in-an-Era-of-Growing-Inequality.pdf?utm_medium=email&hsenc=p2ANqtz-8gOc1Vqgu4fAdGqXB6ltm6MqmJBgm8agBEwvGUiegZPGTb94EalO9GBXoxMKLQ6TgGJFg1G7iDNpmp8weZS-88XEBhw&hsmt=111198979&utm_content=111198979&utm_source=hs_email

Pay equity

Pay equity and pay gaps are two distinct metrics. *Equity* is the direct comparison of wage rates for the same work, without considering how these individuals may identify. Pay *gaps* are the average difference between wage rates for different groups of people, without consideration of the specific job.

Author Patrick Lencioni reiterates the need for *healthy* organizations as well as being *smart*. Ensuring the *healthy* organizational values such as good morale and low turnover among employees is as critical as having the *smart* attributes of effective technology, marketing, finance, and strategy. Sustaining a smart and healthy organization is no easy feat based on most corporate records to date, otherwise more companies would have lasting success.

Employee turnover

There are two main types of staff turnover. *Voluntary*, where employees choose to work for another employer for increased personal or professional advantages; or *involuntary* where staff may be laid off due to economic issues, behavioural issues, restructuring or displacement through technology.

Turnover can certainly contribute to loss of profits and service impacts. A 2022 study by the Retail Council of Canada demonstrates the costs related to staffing turnover using a rate of \$13.00 per hour. The following table does not include loss of sales, errors or quality problems, or potential harm to the company image, for one employee.

The report provides good insights on onboarding new hires within an era of DEI practices and use of social media. Their review finds that 92% of companies use social media today for recruiting, while 29% of candidates use social media as their primary tool for job searches. The Retail Council of Canada are strong advocates for the hiring of people with systemic barriers to employment and the duty of employers to accommodate their needs. <https://www.retailcouncil.org/wp-content/uploads/2024/01/RCC-HR-toolkit-6-final.pdf>

Adapted from the Retail Council of Canada HR Tool Kit

Action	Hours	\$ Rate	\$ Cost	\$ Cumulative
Termination				
Administration	0.5	25.00	12.50	
Processing	2	30.00	60.00	

Exit interview	1	30.00	30.00	
				102.50
Hiring				
Advertise	2	30.00	60.00	
Average ad cost			250.00	
Review resumes	4	30.00	120.00	
Interviews	3	30.00	90.00	
Background check	1.5	30.00	45.00	
Job offer	0.5	30.00	15.00	
				580.00
Orientation/train				
Administration	1	25.00	25.00	
Orientation	2	30.00	60.00	
Training	12	13.00	156.00	
				241.00
Lost productivity				
Existing staff	80	13.00	1040.00	
Co-workers backfill	80	13.00	1040.00	
Administration	18	30.00	540.00	
Learning curve	40	13.00	520.00	
				3140.00
Total				4063.50

Using the table above, if a company had 100 employees, with a 10% turnover rate, this is costing the company ~\$40,000 – \$50,000 per year at a minimum to replace 10 employees. Larger organizations in the commercial and industrial sectors could be running average hourly wages of \$40.00 per hour. This would extrapolate to \$67,000 - \$77,000 per year in lost value. Well-being, recruitment and retention strategies have a payback. Skilled trades, technology, or senior executives would be considerably higher in the turnover costs as compared with lower wage or entry level staff.

A September 2023 report from Mercer, a human resource service company, stated the average *voluntary* turnover rate in Canada was ~15%, an increase of 25% over previous surveys. The average involuntary turnover rate was ~4%, down ~25% from earlier periods. The combined voluntary and involuntary turnover rates in Canada were highest in the following sectors:

- Retail and wholesale ~37%
- Health care services, other non-manufacturing, and consumer goods ~18%
- Services ~17%
- Logistics ~17%

The industries with the lowest average turnover rates include chemicals and energy at ~9%. Supply chain and transportation services were ~7%. <https://www.imercer.com/articleinsights/workforce-turnover-trends-canada#:~:text=The%20average%20voluntary%20turnover%20rate,dissatisfied%20with%20their%20current%20employers.>

Another estimate on the cost of turnover from the Workhuman® company, using a larger organization example, shows the annual cost of a 10% turnover rate, as follows:

Annual cost of replacing 10% of employees with a staff of 5000

<https://www.workhuman.com/blog/the-ridiculously-high-cost-of-employee-turnover/>

	Support staff	Mid-Mgt	Senior Mgt
Average salary	\$30K	\$70K	\$150K
Replacement cost @ 75%	\$22.5K	\$52.5K	\$112.5K
Healthy turnover @ 10%	350 staff	100 staff	50 staff
Replacement cost	\$7.8M	\$5.3M	\$5.6M
Total cost of employee turnover		\$18.7M	

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Employee performance

Every organization needs to have employees with a commitment to the organization's success. Government services need this commitment as much as any for profit company. Employee retention strategies are only a part of the engagement plan. Job performance is critical for an individual to success and for the sustainability of the organization.

As an example, in the auto sector, increasing global competition has GM looking at the performance of its managerial teams. With ~53,000 salaried employees in 2024, GM wants to ensure job performance is on track. To this end, GM moved to a 5-point job assessment rating scale.

1. Significantly exceeds expectations
2. Exceeds expectations
3. Achieves expectations
4. Partially meet expectations
5. Does not meet expectations

GM's annual managerial reviews target 5% of managers must be in group 1; 10% must be in group 2; 70% must be in group 3; 10% in group 4; and 5% from group 5. A merit-based bonus model will reward group 1 managers with 150% of a predetermined dollar value; group 2 with 125%; group 3 with 100%; group 4 with 50%; and group 5 with zero. Previously GM used a 3-point model with groups 2, 3 and 4 descriptors and modest discretionary bonuses.

Employee well-being requires a remuneration which is commensurate with the value expectations of the organization. The heavier the weighting on financials the lesser the attention to the non-financials. The link between these two is employee well-being. As we have seen, with the amount of employee disengagement it makes sense to find the right balance. People behave in the way they are rewarded. As senior management need their salary and performance linked to strategic outcomes, managers and staff need similar motivation. Be it sales, quality, innovation or ESG values, employee well-being is fundamental to long-term success.

Remote work vs return-to-work

In mid-2024, more companies are wanting employees to return-to-work (office), as opposed to working from home or working remotely. One of the main arguments which employers refer to is that productivity improves when staff are on site. On site adds to the culture of the organization. Working

remotely is affected by employee lifestyle choices, commuting times, elder or child care needs, the type of work required, and housing costs. Hybrid work seems to find the balance between productivity and lifestyle. Traditional *return to work programs* were intended for workers who were recovering from injuries or extended stays for health or other reasons.

Trying to attract and retain high-performing employees requires that accommodations or compromises be made. Expecting employees to be in an “office” full time, also doesn’t seem necessary. The pandemic exposed this as not being an imperative. In Canada, as per Stats Canada, 19% of workers worked from home in May 2024 which is down from ~25% in May 2021. In 2016, only ~7% of workers did so from home.

Beginning in September 2024, Federal government staff and executives will have to return to the office for work. Staff will be expected to work a minimum of 3-days per week; with executives on-site 4-days per week. Among the rationale given were: *Working together onsite strengthens collaboration within and across teams and increases opportunities for learning and sharing; reflects the benefits that consistent in person interactions offer; more effective collaboration and onboarding of new talent, as well as building a strong culture of performance that is consistent with values and ethics of the public service; help our ability to perform as organizations; build stronger teams and stronger cultures, that leads to better services to Canadians.*

There are also exemptions which could be allowed instead of the return to office work:

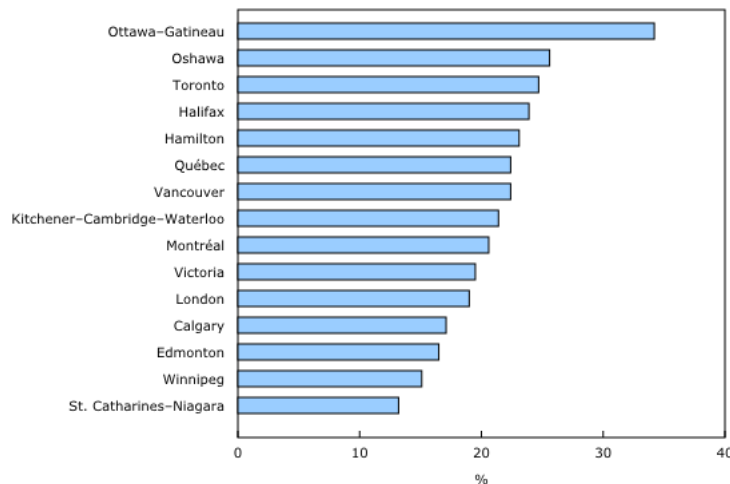
- Employees hired to work remotely prior to March 16, 2020.
- Indigenous public servants whose location is critical to their identity to work from their communities.
- Employees who, with the permission of their ADM, are working remotely 125 km or more from their designated worksite.
- Exceptional exemptions on a case-by-case basis, on a time-limited or longer-term duration (for example, short-term operational requirements, extenuating circumstances).

<https://ottawa.ctvnews.ca/federal-government-s-new-hybrid-work-rules-begin-monday-here-s-what-you-need-to-know-1.7027565>

Amazon expects its corporate staff to return-to-work, 5-days per week effective January 2025. Again, the purpose is to support collaboration and its culture in the workplace.

The well-being of employees is the objective. How that is done is a leadership responsibility. Mandates seldom build morale. <https://www.forbes.com/councils/forbesbusinesscouncil/2023/10/04/companies-want-employees-back-in-the-office-post-pandemic-but-do-employees-want-to-return/>

Percentage of remote workers in largest municipal areas. Source Labour Force May 2024



The AI effect and well-being

As we gain more experience with AI and other digital interactions, we are now seeing some trends emerge in changes in behaviour. AI can trigger mental health issues such as loneliness and depression. In its 7th edition, Stanford University's 2024 AI Index Report summarized the following recommendations for companies complementing employee's work with AI:

- Provide clear expectations for staff when using AI with limits to the amount of use
- Encourage employees to seek support if feeling anxiety or isolation
- Avoid dependency on AI suggestions and recommendations
- Maintain social relationships and interactions with colleagues and friends
- Instill ethical conduct when using AI to protect privacy and autonomy

<https://aiindex.stanford.edu/report/>

AI job impact

The *Paul Bunyan* effect in business is taking place. The story of Paul Bunyan is based upon the giant logger who competes against another smaller person with a power saw to cut logs. Paul can't produce as many logs as the power saw and acknowledges he has lost his place in this market. This is the analogy that artificial intelligence could exceed that of humans. The long-term effects of AI are unfolding with mixed signals. AI is having an asynchronous impact across all industries and sectors.

In their paper, *Artificial intelligence, services globalisation and income inequality* by Giulio Cornelli, Jon Frost and Saurabh Mishra, they looked at the impact on various jobs and investments involving AI. In their definition of AI, it includes machine learning, big data analytics, computer vision, speech processing, languages, reasoning, knowledge, and robotics, without people required for the output. They identified (4) themes in AI:

1. Shift to higher productivity and higher incomes in modern services, without necessarily a change elsewhere. Modern services being research and development; business services; IT, finance.
2. Skill-biased technical changes which favours skilled workers earning higher incomes. This is skill-complementary AI which differs from skills-replacement AI resulting in displacement.
3. Increased market concentration with leading companies accelerating their AI investments to be early winners at the expense of the followers. Increased revenues to the company and its work force.
4. AI displaces traditional skilled labour and entry positions reducing the demand for those skills

resulting in lower incomes or job losses. Those affected would require retraining in order to gain employment. <https://www.bis.org/publ/work1135.pdf>

With apologies to Pete Seeger, *where have all the hours gone?* As commented earlier, entry level positions have been eroded by robotics in many production and service roles. A 2023 McKinsey Global Institute research report, *Generative AI and the future of work in America*, shares their thoughts and insights on labour market conditions and adaptations. With Canada being about 1/10th the size of the US market, we can make some extrapolations for comparison.

<https://www.mckinsey.com/~media/mckinsey/mckinsey%20global%20institute/our%20research/generative%20ai%20and%20the%20future%20of%20work%20in%20america/generative-ai-and-the-future-of-work-in-america-f.pdf>

First is the issue of Generative AI (GAI). Where AI applications such as ChatGPT are focused on text, GAI algorithms can generate images and movies, music, design products, accelerate scientific research, exercise predictive power, and other creations, once limited to humans. GAI may keep people in the loop but it is revolutionizing the future of labour.

The research indicates that 30% of the hours today could be replaced by GAI and other forms of technology by 2030. The good news is that there will be an offsetting increase in job opportunities due to the need for clean and renewable energies; increased infrastructure investment and development require more jobs; increased domestic sourcing for resilient supplies; an aging population requiring health care services. Summarily, these actions will result in 12M job *shifts*.

Where entry level, clerical and administrative support, routine manual production work, and hospitality service jobs will take deeper cuts, offsets will require job training to meet the demands in other jobs. The *shift* from basic skills to more advanced skills for STEM, healthcare, construction, and professional careers will grow. Digitalization in healthcare, banking, insurance, pharmaceuticals, and other sectors will require higher skill sets and new types of jobs. The transportation sector plays an important role in the economy and drivers will continue to be in demand.

GAI and other technologies could see an increase in productivity of ~20% by 2030. This astounding increase would be tempered by the actions to address skill shortages and meet labour demands in the growth industrial sectors. Part of the solution will see increased opportunities for remote work, hiring back retirees, hiring barriered individuals, and employment where post-high school degrees are not necessary but complement work experience. Examples of the latter could be food service workers or manual labourers previously displaced. One of the trends appears to be a lessening of low- and middle-wage jobs as more higher paying, skilled jobs are required.

A mid-2023 report by the OECD shows that member country unemployment rates vary from a high of ~12% in Spain to <3% in the Czech Republic. The OECD report estimates that 27% of jobs will be impacted by GAI. Responses from the manufacturing sector are retraining internal workers 71%; outsourcing services 53%; hiring new workers 48%; and allowing attrition 14%. The OECD highlights three key strategies where governments can adapt to GAI and other technologies.

1. Support low wage workers – wage and collective bargaining policies are effective; energy regulations with temporary and targeted adjustments
2. Ensure workers' rights, health, and well-being within inclusive markets – AI workplace policies are transparent and trustworthy
3. Provide incentives and encourage training of low-skilled and older workers – incentives to retrain and upskill the workforce and prepare them to adapt to new roles

<https://www.oecd.org/employment-outlook/2023/>

ESG governance policies need to take into account this transition and shift across all sectors. Issues such

as hiring, retaining, retraining, and employee well-being are going to be a higher priority as organizations compete for talent and sufficient levels of staffing. Workers will have greater leverage in their workplace conditions and benefits. Collective bargaining agreements may see GAI as a potential threat where the more vulnerable categories of work will be targeted.

Business *with* a purpose

Interest in the environmental issues in general began in the mid-1960s. The attention to the social factors in business began ~20-years ago. The City of Vancouver enacted the first Ethical and Sustainable Procurement Policy in Canada in 2005. This action led to social procurement policies and practices in many sectors which saw the value of 3rd party service providers in the form of social enterprises. Social enterprises are *businesses with a purpose*.

Some of the more well-known examples of social entrepreneurs include:

- Bill Drayton, founder of Ashoka, which supports social entrepreneurs on a global basis;
- Blake Mycoskie, founder of TOMS, donating shoes, eyewear, water and community development programs;
- Dame Anita Roddick founder of The Body Shop, focused on sustainable ingredients and supporting small scale farmers;
- Jeffrey Hollender, founder of Seventh Generation, developed eco-friendly cleaning and hygiene products and donates 10% of profits to social and environmental programs;
- Mohammed Yunus, founder of the Grameen Bank, began micro-credit loans aimed at women to start businesses in villages desperate for services and to develop their financial independence;
- Paul Newman co-founded Newmans Own (1982) with profits donated to multiple social causes.

ESG is reliant on responsible and ethical businesses, be they for-profit or not-for-profit organizations. Their customers buy the brands and services and are loyal and trusting of their operations. Yvon Chouinard, co-founder of Patagonia, is a good example of a for-profit business, which voluntarily contributes to communities. Patagonia donates 1% of its sales to support and address environmental issues.

Businesses with a purpose must also be financially viable. Social entrepreneurs are not dependent on grants or donations to sustain their operations. Charities are dependent on grants and donations. For-profit companies must meet the needs of its shareholders and investors. Social entrepreneurs are not profit motivated but fully understand that in order to do more good, they must also be successful business managers as they operate their social enterprise and often compete with for-profit companies.

Research Gate provides a comparative look at conventional business entrepreneurs and social entrepreneurs. <https://www.researchgate.net/>

	Business Entrepreneurs	Social Entrepreneurs
Goal	Capture a market securely	Fill a market gap; change the world
Objective	Build a business; earn profits	Create sustainable solutions for social change
Profit Motive	Maximize shareholder value; profit as an end	Advance social aims; profit as a means to financial sustainability
Risk	Basic business risk	Basic business risk plus social aspect
Links to social problems	Indirect	Direct
Feedback	Established consumer and market information sources	Need to be creative in obtaining market and responses
Competition	“Win” for one business over others in a market	Exists because no one else adequately solving problem, “win” for society
Growth	Competitive for one company	Collaborative for societal impact
Capital	Benefit from robust financial and managerial services	Contend with unpredictable and fragmented financing

Social procurement

Social procurement can include fair trade products; living wage programs; local economic development; apprenticeships; community enrichment; supplier diversity; business ethics; environmentally responsible products and services; and building social capital. Social procurement is *the shift from making good deals to making deals that do good*. Today more private sector, publicly traded companies and public sector organizations are embracing social purchasing practices.

Social procurement aligns with several of the UNSDG goals of 1. No poverty; 3. Good health and well-being; 8. Decent work and economic growth; and 10. Reduced inequalities.

ISO 26000 Social Responsibility guidelines use (7) core subjects for organizations to address to engage in ESG-based actions. These are:

1. Organizational governance
2. Human rights
3. Labour practices
4. Environment
5. Fair operating practices
6. Consumer issues and
7. Community involvement and development.

Where most ISO standards are *compliance-based*, these are *guidelines* only. ISO 26000 aligns with the UN SDG goals, similar to social procurement above, with the addition of 8. Gender equality; 9. Affordable and clean energy; and 13. Sustainable cities and communities. ISO 26000 sets an expectation of good governance in organizations which adopt the guidelines.

Social enterprises

Social enterprises are operated by business entrepreneurs. Social enterprises do not displace conventional, profit motivated suppliers in a community. Social enterprises complement the supply side

in the market. Their role is to find ways in which people who are systemically barriered have opportunities to be represented in the workplace. Meaningful work is a basic human desire. Where a for-profit company trains and hires for efficiency in service delivery, they can be reluctant to hire individuals who potentially appear to be less efficient. Social enterprises are able to provide the skills and types of work best suited to the needs of a barriered individual. For-profit companies which do work with social enterprises, demonstrate their sense of care and commitment to a community through their business practices.

Social enterprises are a new supplier base for supply chains to work with for goods and services. With labour shortages in all sectors, SEs are filling the gap. In BC, Embers Staffing, also an SE, specializes in skills development and training, which connects workers with companies. Many of these workers were people facing systemic barriers to traditional employment. Founder, Marcia Nozick, began Embers in 2001 with a mission to create economic and employment opportunities for people in Vancouver's Downtown Eastside. Embers employs ~2000 people and paid \$~7.0M+ in wages and benefits.

One of the stronger advocates for the advancement of social procurement is Buy Social Canada CCC Ltd. Its Executive Director, the late David LePage, built a credible program for implementing social procurement into organizations. Buy Social Canada offers training workshops for parties to gain expertise in engagement between social enterprises and buyers. See **Addendum X** for further information on the role of Buy Social Canada.

The BC Social Procurement Initiative was formed in 2019 by Presentations Plus Training & Consulting Inc., Buy Social Canada, Scale Collaborative, and the Vancouver Island Construction Association. BCSPi pioneered the development of training programs on social procurement in the BC public sector for several years. BCSPi was a catalyst for many cities and towns to implement social procurement practices across BC.

For 25-years, the Canadian Association for Supported Employment (CASE) based out of Nova Scotia, provides comprehensive programs for engaging employers with disabled individuals. CASE works with employment service providers, community agencies, and stakeholders working toward full participation in the labour market by offering resources, expertise and support. <https://supportedemployment.ca/>

A growing presence in the social procurement sector is Buy Social USA. Their mandate is to help corporations, government entities, universities, and other institutional buyers, *buy better*. Part of their program for sellers is a verification program using a curated list of social enterprises. <https://www.buysocialusa.org/>

Social enterprises (SEs) are not-for-profit organizations which represent the well-being of individuals which face systemic barriers to employment. Barriers may be attributed to being new immigrants, lack of transit, limited education, elder/child care needs, criminal records, availability for hours of work, Indigenous biases, or other impediments to being interviewed for or holding a job. Another barrier to employment can be in the area of *neurodiversity* – people dealing with ADHD (attention deficit hyperactivity disorder), are on the autism spectrum, or have a disability that affects their ability to focus and keep things in working memory. There is a need to accommodate their needs and they can be productive, independent workers. <https://www.cbc.ca/radio/just-asking/neurodiversity-in-the-workplace-1.7350104>

The Accessibility for Manitobans Act has defined (5) types of barriers:

1. Attitudinal barriers where people think and act based on false assumptions
2. Informational and communication barriers where some the people receive what they need to know but not all
3. Technological barriers occurs where people with disabilities cannot access the site

4. Physical and architectural barriers are where obstacles prevent easy access
5. Systemic barriers are policies, practices or procedures that result in some people receiving unequal access or being excluded.

Would your organization hire an ex-convict? Likely not. However, Purpose Construction out of Winnipeg, does. As a social enterprise, Purpose Construction trains barriered individuals to qualify for construction work, pays them living wage rates, and helps them to return to full time work—often in the private sector. Purpose Construction builds social capital in a community. With a shortage of skilled trades, Purpose Construction can supply a pool of workers to meet the demand in the market without government subsidies. <https://www.purposeconstruction.ca/contact/>

Living wage rates

Living wage rates are based on the local community costs to afford a living. It is based on (2) adults with (2) children; (1) child in FT Day care; (1) child in pre- and after-school care; adults each working 35-40 hours per week; (1) parent taking an education after work hours: groceries; transit pass; and rent.

LW rates exclude: credit cards, loans or debts; retirement savings plan; owning a home; children education savings plans; elder care; and any costs “beyond the minimal required for recreational, entertainment or holidays.” <https://www.livingwage.ca/>

Each community has a LW rate for its specific economic conditions. Many cities have adopted LW rates in Canada since 2011. The City of New Westminster, BC was the first to do so. The City of Vancouver initiated its LW policy in 2017 and abruptly stopped its LW program in January 2023. The top (10) salaried staff at the City of Vancouver earn an average of \$160.00 per hour plus benefits. They decided that contractors working for the city should not be paid a living wage of ~\$25.00 per hour.

Vancouver introduced a *fair wage* policy in 2024 at a rate of \$21.86 per hour. The fair wage hourly rate can include any non-mandatory benefits, employer-paid medical plan premiums and extended health benefits. More cities are introducing fair wage rates.

Typically, all construction jobs pay far more than a LW rate. The fair wage rates are classified by the job position. Cities can publish a fair wage rate schedule for the positions from brick layer to a wall and ceiling installer.

There can be a large gap between the minimum wage rate set in a Province and the living wage rate in different cities within a Province. Living wage rates are calculated by specific locales. Provinces control the minimum wage which must be paid within a Province. When a public sector organization issues a competitive bid, it usually favours the lowest bidder. The private sector owner bidding on a contract must pay at least the minimum wage or a fair wage if a city has adopted one. We know that many companies must pay more than minimum wage rates to attract and retain employees.

There is some irony in running competitive bids in cities and towns, which have adopted LW or fair wage policies in their governance practices. The public sector staff could not afford to live on less than a *living wage rate*. Public officials know that those who they hire under a contract may not earn enough to support themselves in the locale where they are working and providing services. There are dozens of LW cities, towns and universities across Canada. LW programs are not without debate. This draws attention to the growing disparity between low income and higher income earners. The 2024 Federal government minimum wage rate is \$17.30 per hour.

It's easy to assess the difference between LW rates and MW rates. However, this is not a *net-net* cost difference. Individuals at the entry level or lesser skilled employment which move from a MW rate to a LW rate also pay more taxes; spend more locally; are healthier; and redistribute their incomes within their communities. This is referred to as the economic multiplier effect.

The 2023 living wage rates and the minimum wage rates for a sample of cities were as follows:

City	Living wage rate	Minimum wage rate	Difference
Victoria	25.40	15.65	9.75
Edmonton	22.25	15.00	7.25
Regina	17.80	14.00	3.80
Winnipeg	19.21	14.15	4.76
Toronto	25.05	15.50	9.55
Fredericton	24.50	14.75	9.75
Halifax	26.50	15.00	11.50
Charlottetown	19.30	15.00	4.30
St. Johns	24.69	14.50	10.19

In 2011, Vancity credit union, reviewed its contracts with ~1200 contractors across 45 industry sectors. They targeted strategic annual contracts over \$250,000 and contracts which typically involved lower wage earners where contracts had lower annual spend thresholds. The latter included personnel agencies, janitorial services, catering and security services. The financial cost to the bottom line at Vancity was ~1% of its budget to implement its living wage policy. Vancity is one of Canada's largest and longest living wage employers.

It costs ~\$120,000 per year in Canada to incarcerate an individual, with an average age of 30, based on a variety of Federal government statistics and the Office of the Parliamentary Budget Officer. There is a 60% probability of recidivism, within one-year, if they have spent one term in prison. While social programs have difficulty finding adequate funds to deal with early prevention for youth at risk, we always find the \$120K for their treatment. This reiterates that our community resources tend to be focused on the cost of treatments rather than prevention when it comes to social interventions from bullying, racism, addiction, and to housing. Prevention has a payback.

In July 2013, a new type of corporation was introduced by the BC Government. Community Contribution Companies, or CCCs, are hybrid corporations that bridge the gap between for-profit companies and non-profit organizations. Similar to non-profits, CCC's are setup to achieve a social purpose and must adhere to BC government law related to this. However, unlike non-profits, CCC's can attract equity investment for growth and operate the same way as any other business. Non-profits and charities have restrictions as to owning and operating businesses and running social enterprises. The CCC model allows social enterprise businesses a legal structure to operate under.

CCC's must follow a number of BC government rules to ensure the majority of their profits and assets will always be directed toward a social purpose.

One of the early and continuing success stories in the social enterprise sector, is CleanStart Property Services CCC Inc. CleanStart was the idea of its founder Dylan Goggs, who took a new way of looking at how business can contribute to social values and community development. CleanStart began in 2010 with one truck and handful of employees, many of whom faced systemic barriers to employment.

CleanStart takes its role of accommodating people facing employment barriers very responsibly and with a sense of duty. CleanStart pay living wage rates and provide benefits. Where workers have re-entered rehab, CleanStart has held their jobs open for their return to work. When an employee couldn't pay for their child's school supplies, CleanStart arranged for a donation to cover the cost and issued an interest-

free loan. When one employee couldn't make their rent payment, CleanStart provided a pay advance to avoid eviction. CleanStart has become a very successful business and has encouraged and resulted in many other social enterprises to be formed. <https://cleanstartbc.ca/>

In 2023, CleanStart provided 13,000+ supportive employment hours. The estimated social return on investment was \$613,000+. See SROI below.

Another successful social enterprise is Jonnon Designs. Jonnon is a team of Vancouver-based sewers and artists who face barriers to traditional employment, like new immigrants, new parents, people living with or recovering from mental illnesses, or people with physical barriers to full-time work, incorporating their skills and craft into the clothing designs. Many of the Jonnon group work from their homes, on their own schedules, with their preferred work loads. Jonnon Designs is a CCC and is owned by entrepreneur Azadeh Hessami. Azadeh took over the company, formerly known as Common Thread, and the staff, when its original owner retired. One of the key products which Jonnon creates is upcycling street banners into reusable bags. Another theme of the circular economy – repurposing. www.jonnon.ca

Colleague Chris Carter, likes how a local SE operates in the Tri-Cities area of BC. *DisDaBomb*, founded in 2010, by Angela Lusignan is a social enterprise now operated by the Community Ventures Society (CVS). DisDaBomb has a dedicated team which produces, promotes, and sells a wide array of colourful and creative bath bombs. What's different here is that this initiative employs seven individuals living with developmental disabilities. Not only are these individuals able to earn a wage, but this work delivers the pride, satisfaction, and the feeling of purpose delivered from meaningful employment. All funds raised at DisDaBomb are reinvested into the company. They sell ~200 bath bombs per day! This growth has led to an expansion of their team and the growth of influence in their social enterprise.

SEs play a vital role in providing employment opportunities, job training, and ensuring a safe work place for people facing disabilities.

[Social return on investment](#)

There is a social return on investment when disenfranchised people gain meaningful employment, as shown in an empirical study by Ernst & Young with Atira Property Management in 2017. A financial return of \$4 to \$1 is not uncommon. <https://atira.bc.ca/apmi-social-return-on-investment-report/>

The social return on investment, from the E&Y report, summarily found economic and social benefits through:

- Reduced social needs
- Taxes and benefits paid by employees
- Increased local spending
- Reduced shelter costs
- Reduced crime-related costs
- Reduced reliance on social subsidies
- Increased employability
- Increased self-esteem
- Improved health
- Improved quality of life

The cost of treating homeless people is an example of the cost of not intervening effectively with individuals who show early signs of trouble. Treating their problems as adults is not the same as preventive assistance, while they are in their formative years. The average cost of a homeless person in the hospital is ~\$17,000 vs \$8000 for the national average. <https://kitchener.ctvnews.ca/new-study-shows-financial-impact-of-homelessness-on-our-health-care-system-1.6888815>

In the UK, GIST Impact reported a SROI of £10.14 (~\$18.00 Cdn) per £1.00 of investment in tackling economic inequality through a partnership with Microsoft's Digital Edge program. By upgrading the digital skills of disenfranchised individuals, they qualified for entry level jobs with *local* employers. The total return was £78,000 *per graduate* of the Digital Edge program. This example is part of the larger strategy on social development which introduces the *place-based* social value model – resolving unique challenges and delivering benefits to a community or local area. The Digital Edge project aligns with the UN SDG #10 – Reduced inequality.

GIST shared that a recent study on apprenticeship programs in the UK, showed a return of £6.89 for every £1.00 of investment in these programs. GIST Impact reviewed 22 digital apprenticeship programs involving the QA Group. <https://www.qa.com/about/>

When applying a place-specific lens to social value, the unique social, economic, and environmental benefits to a community or local area are assessed. This approach highlights local needs, ensuring interventions positively impact those areas.

Source: *From Policy to Practice* November 2024:

Achieving more through measuring place-based social value

https://gistimpact.com/wp-content/uploads/GIST-Impact-Microsoft_Measuring-Social-Value_Nov-2024.pdf

Through a macroeconomic governance lens, there is a high rate of return when wealthy (WEIRD) countries intervene in poorer countries to prevent or mitigate armed conflicts. The IMF 2025 research shows for every dollar invested in this strategy there is a return of \$26-103. By preventing conflicts there is a reduction in lives being saved and reduced injuries, which is quite evident. When citizens must face forced displacement and migration, the economic results are often catastrophic. Investing can stabilize communities and institutions. The higher risk a country faces results in the level violence.

As we have seen in the EU and the USA, when illegal immigration is driven in part by unstable regional governments, which do not have core education and health services, there is a need to defend and to accept immigrants from a humanitarian perspective. Many of these immigrants still identify with their root countries and often require considerable resources in their adopted country to sustain a living.

An economic policy which could see the WEIRD countries providing billions in resources to support poorer countries, could reduce the cycle of violence and build stronger allies in the higher risk countries. The trade off being, the wealthier countries would also be better off in the long-term, by not having to continuously intervene in foreign countries and also spend resources accepting immigrants who would prefer to have stayed in their home country. The focus on prevention rather than correction.

Further linkages between education and economic growth were revealed in a report by the economist with the World Bank, Amory Gethin. His report, *The Power of Education Policy*, demonstrates that growth in the world's poorest nations was increased by 60-70% with access to better education. This also benefits low-skilled workers as they are still necessary to fulfill agricultural roles in rural communities. Education + innovation leads to skills + technology impacts.

<https://www.imf.org/en/Publications/fandd/issues/2025/03/the-power-of-education-policy-amory-gethin>

There is a relationship between the cost of health care in Canada being aimed at prevention and early intervention to reduce overall costs and improve health outcomes, and the potential benefits of intervention in poor countries to stabilize their economic future and well-being. Investments in emerging economies have shown that the investment has provided benefits over decades of monitoring. Countries

such as Argentina, Brazil, Morocco, South Korea, and Turkey are examples.

The ability to create meaningful employment and developing effective trading markets raises the standards and quality of life in emerging economies and these require less foreign investment over time. The complexities of the causes of conflicts are based on chronic failure to have functioning governments and institutions. These cycles are almost impossible to break without providing initial opportunities for the citizens to live and thrive in safer surroundings. They can't afford to do so within their limited internal resources. It will require international support. <https://www.imf.org/en/Blogs/Articles/2025/03/13/how-sound-economic-policy-can-help-prevent-conflict>

Social procurement, which is a progressive, value-based model for supply chain professionals, was referenced in the books, *Good Planets Are Hard to Buy* and *Plan It for Our Planet*, both by Larry Berglund. Watch an interview from 2021, *Buying Hope*, with an overview of the shift towards social procurement in Canada. <https://www.youtube.com/watch?v=DG-MriOsSso>

Value chain

Supply chains refer to the critical handling points in the production of goods or the delivery of services. The transactional side of the supply chain is when a buyer places an order with a supplier for a component or materials. The buying organization is part of the supply chain as is each of the directly affected *primary* suppliers locally or globally which are involved in this process. The value chain are those *secondary* suppliers, which supply labour and materials to the market. For example, if a company wants to erect a building, there are *primary* suppliers of concrete, lumber, glass, steel, and contracted labour which agree to the terms and conditions to complete the project. These suppliers are part of the supply chain. The value chain would be *secondary* organizations which provide training for workers; companies which provide blue prints; supply catering services for meetings; laundry services for cleaning uniforms; flagging companies for traffic control; or supply corporate schwag for promotions. The value chain benefits from general economic activities and adds to the social and economic development of a community. Social Enterprises and Small Medium Enterprises are important players in the value chain.

Fair trade products

In Canada, Fair trade (FT) certified products are recognized by the federal government. This logo,  is the only one which can be applied to ensure the products are FT compliant. The FT strategy enables farmers and workers to have more control over their farming and production. This leads to an increased income with improved health and education in the families of the farmers. As a leader in the global movement to make trade fair, Fairtrade supports farmers and workers and connects with the consciousness of the customers who buy their products. <https://fairtrade.ca/>

There are literally hundreds of FT certified cities and towns globally. Many private sector organizations have agreed to buy FT products for their staff and understand that FT products are a voluntary way to support responsible sourcing. FT produce includes: bananas, cocoa, coffee, cotton, flowers, fruits, herbs, honey, nuts, oils, quinoa, rice, sugar, tea, veggies, textiles, and wine.

One of the myths about FT certified products is that FT costs more than conventional options. In October 2023, the price of a local, Canadian FT roasted coffee was \$.0308 per gram, in my retail grocery store; while the price of a US brand regular coffee, at the same store, was ~8.5% more at \$.03354 per gram. Buying the local FT coffee contributes more to local employment, reduces the environmental costs associated with shipping, the *economic multiplier effect* is better for local companies, and it addresses the environmental interests outside of Canada where the coffee beans were grown. When I first got involved with FT coffee, 18 years ago, there was a ~20% premium for FT. The market

acceptance of FT has increased the demand and appears to have made FT coffees more competitive.

Costco supports the Equitable Food Initiative (EFI) and FT by paying a premium for products which are labelled with the bona fide symbol.

FT certified products ensure:

- 3rd party audits are conducted on a regular basis
- Direct income for farmers which at prices better than open market prices
- Safe working conditions for workers
- Improved health and education for workers
- Environmentally responsible practices to grow FT products such as coffee and tea

There can be fraudulent cases of FT labeling. Fraud has no limitations on products, sectors, or countries. In 2024, there are a considerable number of fraudulent cases of misuse of FT certified cocoa products being generated out of West Africa. One of the reasons, is that FT cocoa receives a higher premium which has led to illegal use of the FT certificates. Cocoa has been noticeably hit by inflation over the past year. Part of the investigation is being led by FairTrade West Africa by the Director Etienne Tehua. An advantage for FT certification is that it is possible to have objective audits of the certificates to protect legitimate farmers and their customers.

Related to fair trade is the *direct* trade model. Direct trade, using coffees, is where larger roasters approach the coffee farmers directly and negotiate the price and supply. This would remove a 3rd party certification in the process. It could reduce the cost for the buyers and sell more coffee for the farmers. However, the lack of certified products puts risks on the part of the buyers and reverts back to unscrupulous buyers taking advantage of impoverished farmers who could be in a weak negotiation position. The FT products provide the provenance, fairness and transparency in the trade. Similar to FT chocolate where farmers have found that by forming a cooperative to act as their trading agent, they tend to attain higher incomes in the long-term than through direct trade relationships.

Economic multiplier effect and fair trade

The *economic multiplier effect*, using FT coffee as example, means that for every dollar spent locally, the money is redistributed into the local and / or Canadian economy, when buying locally roasted coffee beans. When we buy FT or regular coffee beans from a US-based company, there is less money redistributed locally, as the profits leave Canada, favouring the MNC.

Another example of the economic multiplier effect on office supplies has a similar outcome. A 2013 study, *The Power of Purchasing: The Economic Impacts of Local Procurement*, by Tony Pringle, showed that for every \$1.00 spent with a local office supply company, \$0.45 was reinvested locally. When a \$1.00 was spent with a MNC office supply company, only \$0.15 was reinvested locally. This study, and others, show the fallacy of primarily measuring out-of-pocket costs, rather than a total cost of ownership model, when making sourcing decisions. The long-term effect on the office supply market has shown a decline in local SME office product companies with the larger market share going to MNCs, over very small savings margins, for the past decade – almost irreversible now.

We could posit, that the larger governmental buyers have been supporting MNCs at the expense of Canadian SMEs in several sectors. The lack of consideration of the economic multiplier effect skews the decision-making. This is not to say there should be a bias for local but that best value is more complex than just simple quantifiable comparisons. <https://www.locobc.ca/blogs/the-power-of-purchasing>

Plastic Bank

David Katz took his vision of reducing poverty by linking it with the use of waste plastic as a *currency*. In

emerging and poor economies, trying to break the cycle of chronic poverty is overwhelming. A lack of funds means limited health care, exposure to disease, lack of education, lack of fresh water, lack of employment, an inability to borrow funds or have access to any financial support, and an endless cycle of this generational malaise. A common *resource* in these communities is waste plastic. Turn plastic into a currency. Eliminating poverty is the 1st priority of the UNSDGs.

Katz formed the Plastic Bank[®] where people collect plastic waste and return it for money. Through blockchain and financial technology (fintech) apps, Plastic Bank is a for-profit venture which helps to rebuild communities and addresses the plastic waste problem concurrently. Operating successfully in many countries, this grass roots innovative strategy is enabling people to regain their dignity and financial independence. Since 2013, Plastic Bank continues to operate and reduce poverty.

Katz understood that most plastic waste comes from areas of poverty. His bold idea is empowering people across Indonesia, the Philippines, Brazil, Egypt, Thailand, and Cameroon. This is allowing people to earn an income and have social benefits.

“I think the real gift of that day was the realization that I didn’t need to create Plastic Bank. I needed to become the person who could. It was really a spiritual day of awakening for me. There was a still, quiet voice, unattached to outcome and meaning. It was a space that said: You can become the person who makes a change in the world.” David Katz on the moment he conceived Plastic Bank.

<https://plasticbank.com/about/>

People collect and sort waste plastic. Take it to a depot for weighing and receive money. The depot takes it to a larger collection station, where it is weighed, and payment is made to the depot. The station sends it for recycling into new products. Market driven without government intervention. With government corruption being an underlying issue, the Plastic Bank is providing a really escape out of poverty for many families.

Defining *local* business

Sustainability in supply chains often involves deliberations on buying from *local* businesses or buying Canadian-made goods and services. Defining *local* is very subjective and mired in ambiguity. Initially, the purpose of a local business was to offer unique products or services that weren’t readily available and there was a demand to meet. From a supply chain sourcing perspective, the problem is that local is often affected by loyalties to small business owners with personal ties to the buying entity. There are emotional attachments based on familiarity with local businesses. Consumer buying habits and retail sales are rooted in being identified as a local. For private sector buyers of goods and services, they have a lot of discretion as to which suppliers they buy from. For public sector buyers, there are legal limitations as to where they can place orders subject to trade agreements and bylaws. Trade agreements do *not* allow for local preferences when tendering.

Looking through a Canadian lens

Smaller, established communities want to support *local* or independent businesses but may be doing so based on an address— not usually a hard objective decision. Defining local as being *within the town’s limits* is very arbitrary. Rural areas are less concerned with tough negotiations with their local businesses on goods and services than their urban counterparts.

In smaller locales, supply contracts are intended to support local employment and are often influenced by elected officials. The supply of fleet vehicles or construction equipment may come from a local distributor, but the brand of equipment itself could seldom be referred to as being local. Smaller communities are trying to ensure a local business presence and not default to buying from the lower-cost, big box, multinational corporation. Most online buying for consumers is being facilitated through international MNCs – almost impossible to avoid. Offshore retailers are shipping 1M+ packages per *day* into the US market-duty free.

For businesses buying goods and services, there needs to be a strategy which takes into account SMEs and MNCs. The aforementioned economic multiplier effect should be considered as part of the overall costs. Value for money could be compromised to support local businesses when a bias favours a small owner or contractor. This practice has led to unfair advantages for local suppliers and unethical/illegal procurement practices by elected officials when awarding contracts. www.collingwoodinquiry.ca

To add to the confusion around local is the definitions around what is a city, a village, a town, a hamlet, a resort community, a district, a regional district, a neighbourhood, a rural municipality, an urban municipality, an unincorporated settlement, or a region. Depending upon the # of people or hectares of land involved, the definitions are inconsistent within each province or territory. Juxtapose *local* business into this discussion and it becomes very confusing.

Canada has multiple definitions for businesses. A brief literature search provides the following definitions for various businesses including *local*:

- *A bricks and mortar business where the owners live within a geographic area where they operate a business.*
- *A local business is one which sells products or services to consumers in its own town, city, or geographic area.*
- *At least 50% locally owned.*
- *A local business is a company or store that operates in a specific neighborhood, town, or city, serving the needs of the people who live or work nearby. Local businesses include farmers who sell their farm products, local coffee shops, small clothing stores, and others.*
- *Local service Industry means an industry, the manufacture and product of which is generally consumed within the local area.*
- *Private, worker, community or cooperative ownership, at least 50% locally-owned. This means the owners live in the geographic area where the business is located.*
- *The characteristics of a local business environment can include factors such as the overall economic conditions in the area, the level of competition in the market, the availability of resources and infrastructure, and the demographics and buying habits of consumers.*
- *Regional truck drivers typically operate within a designated region or area, covering routes that span a specific geographic territory. Local truck drivers usually work within a local area or city, making frequent stops for deliveries or pickups within a smaller radius.*
- *Local means existing in or belonging to the area where you live, or to the area that you are talking about.*
- *Localization involves adapting products, services and marketing strategies to meet the needs and preferences of specific local markets.*

- *Small business is generally defined as any business that is independently owned and operated, typically with fewer than 100 employees, and usually with less than \$10 million in annual revenue.*

Canada Revenue Agency: The three criteria to qualify as a small business for Canadian income tax purposes are:

- The business earns less than \$50,000 in passive investment income.
- The business earns less than \$500,000 in active business income during the taxation year.
- The business's taxable capital is less than \$10 million.

Small, medium enterprises (SMEs)

- SME meaning small and medium enterprises or businesses.
- Small businesses in Canada are those with 5 to 99 employees.
- Medium-sized businesses employ between 100 and 499 people.

Social enterprises (SEs): Not for profit organization which provides meaningful work/training to people facing systemic barriers to employment. Primarily community-based organizations.

Independent: Independent companies are when the majority of the business' ownership is private, by employees, the community, or an area cooperative, and is resident to the community in which it's based.

Indigenous: an organization which is 51% owned, managed, and controlled by Aboriginal persons.

Micro-businesses: Micro-businesses employ between 1 and 4 people. The term microenterprise, also known as a microbusiness, refers to a small business that employs few people.

Treasury Board of Canada Secretariat: A business with fewer than 100 employees or between \$30,000 and \$5 million in annual gross revenues

Innovation, Science, and Economic Development Canada: A business with 1–99 paid employees

QuickBooks Canada: A business with at least five paid employees, but fewer than 100 paid employees.

Artisanal business: Products made using traditional methods and tools – usually being hand-crafted as opposed to industrially made, characterized by small batch lots.

Bartering: A barter transaction is an exchange of goods or services, for other goods and services. This type of business is recognized by the CRA and barterers could require applicable taxes to be paid. Bartering is part of the *informal* economy. One organization, BarterPay, has a wide network of members which are very active in the informal economy. <https://www.cbc.ca/radio/costofliving/bartering-economy-trend-1.7260333>

Co-operative (co-op): a type of incorporated business that is owned by a group of members with common needs and/or a common goal.

Employee ownership trust (EOT): An EOT is a form of employee ownership where a trust holds shares of a corporation for the benefit of the corporation's employees. EOTs may be used to facilitate the purchase

of a business by its employees, without requiring the employees to pay directly to acquire the shares. One requirement is that the EOT must reside in Canada – local.

Family-owned business: A company where two or more family members own or control the majority of the business. Family members can include spouses, parents and children, extended family, multiple generations, stockholders, board members, working partners, advisors, and employees. Family-owned businesses can range in size from mom-and-pop shops to Fortune 500 companies.

Franchises: Franchisees benefit from a business model with an established brand presence, generating revenues quickly and with lesser risk of business failure. A franchisee could be a local business entrepreneur who operates branches of an MNC – Tim Hortons, as an example. Hortons is part of a MNC holding company with controlling shares held by Brazil's 3G through Restaurant Brands International. Hortons is part of a group including Popeyes and Burger King. An owner of a Tim Hortons franchise is usually viewed as a being a local business owner. Whereas, a smaller, long-time, family-owned fast-food outlet could arguably consider themselves more local than a Hortons' franchisee that moved into town in the past year. Therein lies the rub- especially in smaller rural towns and communities. The term local requires an inherent bias and can seldom be applied fairly or equitably.

Investment Canada Act: A Canadian business is defined under (3) criteria:

- (a) a place of business in Canada,
- (b) an individual or individuals in Canada who are employed or self-employed in connection with the business, and
- (c) assets in Canada used in carrying on the business; (entreprise canadienne)

Multinational corporation (MNC): A multinational corporation is a company which operates in its home country, as well as in other countries around the world. It maintains a central office located in one country, which coordinates the management of all of its other offices, such as administrative branches or factories.

Its subsidiaries report to the corporation's central headquarters. MNCs are involved on all major infrastructure projects and large retail operations on a global basis. MNCs can be publicly traded, meaning owned by shareholders, or privately held, meaning shares of the company are not offered to the public. MNCs may partner with smaller local businesses and contractors on capital projects, but as a much smaller %. Many oligopolistic market sectors such as foods, pharmaceuticals, airlines, and petrochemicals are heavily influenced by MNCs.

Online business: E-commerce or electronic commerce where a business can buy or sell goods and services online. An online can be an MNC, local business, or any other type of business with a virtual presence. Online business operations are not restricted by any physical aspects and easily function with remote workers from any global location. Online retailing has changed the relationships between buyers and sellers to where local is becoming irrelevant. Price-based decisions with little thought for any social or environmental considerations. When we see the massive volumes of Shein and Temu saturating domestic markets, it is close to impossible to compete with this business model.

Online sales are being referred to as *social commerce*, as this trend continues to grow. Social media such as Instagram and Facebook are facilitating sales through their platforms with social commerce forecast to reach US\$8.0+ Trillion by 2030! <https://www.supplypro.ca/178779-2/>

Sourcing options with local vs MNCs

Many buyers take an *all-or-nothing* approach – buy as much as possible from the lowest cost source, regardless of locale, as long as the seller meets the specifications. Strictly price-based. Other buyers, for resiliency will buy a certain % at the lowest cost and the balance from one or more other suppliers to avoid shortages. When running competitive bids, there is no requirement that the bid is for all of the estimated demand from a buyer's organization. When it moves into public realm, tendering for goods and services must comply with legal obligations owed to all bidders and to the stakeholders which should be free of unfair bias and ensure value for money. The latter is becoming more problematic on major construction projects. <https://www.cbc.ca/news/canada/british-columbia/wastewater-vancouver-b-c-utility-1.7153369>

Smaller, established communities with only a few service providers can be in a conflict of interest when tendering for goods or services. Running a competitive bid with a couple of suppliers is not going to achieve a competitive outcome. If one supplier fails, there is lesser competition, in the long-term. Running a competitive bid without a sufficient number of bidders could invite collusion. Small towns might only be 30 minutes apart, how could officials objectively decide who is more *local*?

It is a common practice for larger buying organizations to award long-term contracts for the majority of their operational needs, wherever possible. Setting aside the need to have flexible or resilient sources, reducing the cost of goods and services is a prime motivator for buying organizations. Where we see this strategy being tempered, is where there is a concern that economic development and social interests are an integral part of an organizations purpose for being in business. Mining and other resource-based companies must have a local supply and labour pool available to sustain operations.

MNCs or other large employers located in smaller communities do provide opportunities to contribute to the local social and economic development. The large employers can ensure they source locally produced goods or services. Maintenance, operating and repair supplies are ideal to source from local distributors, and repair shops to complement supply contracts. These larger buyers can unbundle their requirements to target local SMEs and SEs. Many suppliers are able to support a % of locally made goods as part of a larger supply contract. Municipal entities, as well as school districts, universities and hospitals have the ability to direct a % of their supplies to local companies. Smaller, local suppliers form part of the *value* chain. Buying seasonal food from local producers can include caterers and farmers. By specifying that food items include *fresh* produce, favours local SMEs, SEs, and farmers. This is an easy way to demonstrate a commitment to local suppliers.

Resilient strategies require a strategy which is inclusive of SMEs to complement conventional supply chains. Hospitals and universities buy tonnes of food. Making fresh produce one of the criteria in a contract favours local supply and does not compromise trade agreement obligations. Stating that service response times in a contract must be within an hour will draw more local companies. It is helpful to track the *local* spending and see if incremental shifts are making a difference. Stakeholders like to know where their tax dollars are being allocated.

Office supply companies were one of the first retailers to lose out to the Big Box MNCs. If a large municipality or a group of government entities, want to combine their demand volumes, it will usually preclude any SMEs from having a chance at that contract. The small SMEs cannot compete on price or have the capacity. GPOs often source from an MNC to get their clients the savings they want and MNCs have the depth of inventory to do so. When the local business fails, it's rationalized as part of the unintended consequences of competition in the market.

In several market studies conducted by LOCO BC, they found that \$63 out of every \$100 spent with a local business went back into the local economy; only \$14 out of every \$100 spent with an MNC went back into the local economy. *LOCO is building stronger communities with applied research of the policies and practices of a fair and just economy, contributing to a world where resilient communities are based on shared economic prosperity.* www.locobc.ca **LOCO**

Looking through an international lens

MNC supply chains function much differently from domestic. Initially, there are very few relationships between an MNC and the country which it has recently invested in. The global search to secure lithium sources provides a good example of this. In Canada, the Northern Ontario region termed the *Ring of Fire*, is a relatively new area of mining exploration and development. Supply chains need to be set up which can support the new projects in an efficient manner. It makes a lot of sense to have a local sourcing strategy and local procurement policy to support local businesses in resource extraction and harvesting operations.

MNCs, as prime employers, need to have strong stakeholder support when operating in foreign locales or remote domestic communities. The Ring of Fire has the Australian mining company Wyloo Metals leading the exploration in this environmentally sensitive and Indigenous homeland.

Proximity implies a location close to a major mine, forestry, manufacturing, or processing site. Buying local supports local economic development and builds capacity through revenue generation and employment. Buying from local companies reduces operating costs associated with deliveries, imports, and labour. Training of local labour increases efficiencies and contributes to positive relationships. New suppliers may need to be formed in many instances which is based on socio/economic benefits. MNCs will need to invest in helping local businesses be successful for the benefit of all parties. Payment cycles need to adapt to meet local SME needs, as cash flow in a developing market is much different from a mature market.

MNCs must be respectful of cultural values, human rights, environmental conditions and social practices, without imposing external expectations. Displacing local suppliers or importing the materials and labour will not build stakeholder support. Supply chain decisions are closely affected by the political climate and should not be underestimated. Our record on international investment and business practices in resource sectors has not been stellar. <https://amnesty.ca/human-rights-news/canadian-mining-firm-human-rights-violations-drc/#:~:text=The%20Canadian%20company%20Ivanhoe%20Mines,a%20new%20report%20has%20found.>

A caveat with supporting local businesses, in start up situations, is to not disrupt existing businesses. If a large MNC moves into a remote community and buys up the majority of available materials and supplies, it will drive inflation across that community. Existing SMEs cannot expand fast enough to meet the immediate demand. It can create new businesses and competitors which are dependent on one employer. Many local residents will not enjoy an increase in direct income from a mine or oil company, but they will bear the inflation and instability on basic commodities. There is a sensitive balancing act when supporting local businesses – domestic or foreign.

Prequalification

Prequalification of potential service providers and *unbundling* larger orders with service level agreements can assure a better value proposition. Prequalification supports local contractors and is relatively easy to administer. Prequalification identifies a number of service providers with the capability and the capacity to perform the work, when it is required. Buying a portion of the goods or services for operating budget items from more than one supplier may cost incrementally more than from an MNC but still provides revenues to an SME. The price differences are NOT that big but the loss of a local business or reduced employment can have a bigger impact on a small community. Political optics may outweigh the business side of the deals.

Unbundling

Unbundling larger contracts and having the overall demand met by several smaller businesses can support economic and social development interests. There are concerns with this strategy to be acknowledged as well. If an SME becomes totally dependent upon local customers or reliant on large local organizations buying their goods, this invites a business risk. Any change in the local economy or a downturn in market sectors, will often take down an SME business as they don't have the assets to withstand a significant drop in revenues. A poor performing or inefficient SME adds unnecessary costs to the community. SMEs cannot be complacent and must ensure they remain competitive on pricing, technology, and customer services. SMEs must stay relevant to the needs of the customers and demonstrate good value. A suggestion from colleague Rusty Joerin, is to give a *heads up* to local service providers where a tender may be required to be posted. There is nothing wrong with calling or emailing *local* suppliers to encourage their participation – especially if unbundling is an option to be exercised. See the example below.

In general, buying local is aimed at supporting family-owned farms, local produce, locally made artisanal items, small lots of fabricated goods, or having requisite services provided by local trades, crafts, or apprenticeship programs. Larger components of capital equipment or infrastructure projects are not able to be provided by a local SME. However, SMEs and SEs should be able to participate in the work although they will seldom be the major supplier, contractor, or investor.

Unbundling and economic multiplier effect

Example of Unbundling in Practice and the Economic Multiplier Effect

Scenario: Smaller community needs an estimated \$50,000 per year for office and cleaning supplies.

Tender options:

Option 1. All-or-nothing RFQ from any qualified supplier

Big Box Co quote \$50K less 5% discount = \$47,500 ($50,000 - 2500$)

Local Company quote \$50K plus 5% = \$52,500 ($50,000 + 2500$)

∴ Order from Big Box Co with a total savings of \$2,500 off of estimated \$50,000

Risk:

- Potential economic development loss of Local Co
- Reduced long-term competition

Community economic return using the *economic multiplier effect* @ \$0.15 = $\$47,500 \times .15 = \$7,125$

Option 2. Unbundle RFQ with 60% lowest price and 40% aimed at local businesses

Big Box Co quote (\$30,000 less 5% discount) = \$28,500 (.6 x 50,000) = (30,000 less 5% discount = \$1500)

Local Company quote (\$20,000 + 5%) = \$21,000 (.4 x 50,000) = 20,000 + 5% = \$1000

Total cost = \$28,500 + \$21,000 = \$49,500

Total savings of \$500 from estimated budget of \$50,000

Benefits:

- Support for local economic and development with Local Co
- Long-term competition options remain in place
- Supports community values

Economic multiplier effect from unbundling:

From Big Box Co = \$28,500 x .15 = \$4275

From Local Company = \$21,000 x .45 = \$9450

Community economic return = \$4275 + \$9450 = \$13,725

Difference of \$13,725 – 7,125 = returned to the community of \$6600

Net/Net benefit to the community for unbundling: \$6600 – 2500 = **\$4100**

The economic multiplier effect (EME) example above, is for a relatively small dollars in low profile products. The point is, if we don't consider the EME in transactions, we are only looking at the out-of-pocket cost differences. Those decisions are not taking into consideration other economic and social factors.

If we take the Canadian automotive sector, according to the Unifor union statistics, it directly employs 125,000 people and indirectly supports 462,000 jobs. Autoworkers contribute ~\$6M per day in economic benefits. The EV car subsidies in Canada were to protect the Canadian autoworker jobs rather than buy lower cost, import EVs. The BC Ferry system, which is a Crown Corporation, buys many of the larger ferries offshore *because we can't afford to make them in Canadian shipyards*. Out-of-pocket costs appear to be higher from Canadian shipyards. Arguably, if we consider the EME in the purchase of ferries, we could make the case that *we can't afford not to build them in Canada* because of the economic ripple effect. Canadian shipyards employ ~7200 workers and generate \$2+B in revenues per year. Taxpayer dollars are redistributed across Canada.

Within larger urban centres, we often find with large infrastructure projects such as rapid transit or water treatment plants, offshore contractors are winning the public tenders. It may seem unfair to *local* taxpayers to see their money goes to a foreign contractor but that is the expectation and challenge with all trade agreements. When it moves into public tendering for goods and services, there is a legal obligation owed to the public stakeholders which should be free of bias and compliance with legislated requirements.

Local Canadian consumer brands

The February 2025 financial attack by the US on Canada over the US ill informed opinions on trade deficits and trade agreements brought "local" back into conversations. It is not easy for Canadians to buy local products and produce, for a variety of reasons. Seasonality being one. But the US marketing and

influence on Canadian grocers is hard to ignore. Consumers have the legal right to buy whatever is legally available, that is the rule of law, which we respect. Product positioning in grocery chains is paid by the major brands, which are often US or foreign-owned MNCs. This issue is covered under the Food retailers and producers' section of this book.

I am advocating for conscientious decisions by consumers and businesses. Knowing how the buying of goods and services locally impacts a community is just as important as fiscal responsibility. Enjoy an MNC coffee and remember that the local coffee shop at one time inspired the MNC or their franchisee to invest in an MNC. We can have both but if we forget local businesses to only decide with our dollars, it is the slow race to the bottom. We lose part of our culture and values when we are overwhelmed by the MNC messaging, branding, clothing, sponsorships, advertising, and think that only MNCs can support our social and economic needs.

The table below lists "local, or Canadian and examples of Imports and MNCs for similar consumer and industrial products. Which ones would you describe as *local*? Does it affect your buying decisions? We need to face the fact that an SME serving coffee, tea, and pastries, hiring local cooks and servers cannot compete head-to-head with an MNC on price. The MNC will always enjoy a scale of operations that a local company cannot meet. Locals differentiate on their service delivery, style, and unique characteristics. The benefits of the economic multiplier effect are greater when buying local.

Local/Canadian	Imports/MNC
Auto parts – CAPS, Lordco, Princess	LKQ, NAPA
Barbeques – Broil King, Iron Embers, Napoleon, Valor	AOG, FireMagic, Weber
Beer – Central City, Driftwood, Keiths, Kokanee, Labatts, Molsons, Moosehead, Sleeman	Anheuser-Busch, Budweiser, Corona, Heineken
Food cans – Ideal Can	Crown, Silgan, Sonoco Metal
Cheese - Lactalis, Saputo	Colby, Kraft
Chicken – Mary Brown's Chicken	KFC, Popeyes Louisiana Kitchen, Chick-fil-A
Chocolates – Dionisia, Laura Secord, Purdys, Rogers', Smarties	Hershey, M&M's,
Clothing – Aritzia, Canada Goose, Hartt, Helene Clarkson, Herschel, Lululemon, Manmade, Mondetta, Roots, Sportchek, Tilley	Gap, Walmart, Footlocker
Coffee - Kicking Horse ³ , Salt Spring Island	Folgers, Van Houtte
DIY - Home Hardware	Home Depot
Freight - Amplify, Bison, Freightera, Manitoulin	FedEx, JB Hunt, Schneider, UPS
Furniture - Bermex, Canadel, Casalife, Dorel, Durham, EQ3, Muskoka Chair, Palliser, Stoney Creek	IKEA, Lowes, Wayfair

³ Founded in Invermere, BC but 80% owned by Lavazza, an Italian company, since 2017

Grocers – Empire, Federated Co-op, George Weston	Safeway, Walmart
Honey – Beemade, Billy Bee	Beehall, Bonie Bee, Suzhou, Wasp Queen
Lumber – Canfor, Interfor, Irving, Tolko, West Fraser	Georgia-Pacific, Weyerhaeuser
Office supplies – Mills, Monarch, Monk	Office Depot, Staples
Oil and lubricants – Klondike	Chevron, Esso, Shell
Paint - Cloverdale	Behr, Benjamin Moore, Sherwin Williams
Peanut butter – Aliments, Fatso, Island Nut, Luminare, Meridian Farm Market, Nudemarkt, Nuts to You, Picards, Good N' Natural,	Jif, Kraft, Smuckers
Pizza – Boston Pizza, Gabriel Pizza, Greco Pizza, King of Donair, New Orleans Pizza, Panago, Pizza Delight, Pizza Nova, Pizza Pizza, Tito's	Domino's, Papa John's, Little Caesars
Sandwiches - Mr. Sub	Subway
Snacks - Covered Bridge, Hardbite, Hawkins Cheezies, Mrs. Dunsters, Old Dutch	Cheetos, Doritos, Kraft, Lays, Mondalez, Oreos, Pringles, Ruffles
SS protection - EnviroPaste	Avesta
Soup – Aylmer, Habitant, Primo, Sprague, Unico	Campbells
Tires – Fountain, Kal	NAPA
Whiskey – Canadian Club, Crown Royal, Forty Creek, Wisers	Jack Daniel's, Jim Beam, Four Roses, Wild Turkey

The retailing food sector is complex. Tim Hortons franchisees are controlled by Brazil's Restaurant Brands International, an affiliate of 3G Brands. Canadian bread brands such as Ben's, Bon Matin, Dempster's, Natural Bakery, POM, Stonemill, and Villaggio are controlled by Mexico's Grupo Bimbo.

Grocery retailers are scrambling to provide visible information for consumers as to which products are Canadian or locally made. In 2025, with threats of tariffs by the US, there were innovative apps to identify which products maybe Canadian or locally made, without trying to decipher the labeling rules. *Buy Beaver*, *O SCANada*, and *Maple Scan* are free apps allowing consumers to scan a bar code and get confirmation as to the provenance of a product via their smart phone.

It would be impractical to list all Canadian owned retailers, products, or brands. The point of this discussion is to raise the awareness of options which contribute to a stronger Canadian economy. Buying *local* products is always a great option. Making it easy to identify Canadian owned and manufactured goods supports the option. Buying at local markets is one way to find local artisans and produce companies. These are niche sellers which are an important part of the economy, as they spend their revenues locally.

Canadian manufactured goods may always have some foreign sourced content which is to be expected in a global market. It is the protectionism, isolationism, and oligopolistic markets which we are collectively trying to dissuade.

Canadian wineries have taken market share from imported global brands, including US brands. Import tariffs and taxes skew the value of Canadian made wines from imports. The 2025 US and Canada trade wars created a demand for Canadian wines, far more effective than any marketing campaigns have

done. Many Canadian manufactured products are sold or made in international markets for distribution advantages and tax considerations, as are imported products into Canada. Canada needs good competition in all Canadian sectors.

In late 2025, it was observed, while visiting a Fraser Health hospital in BC, they bought Jif® peanut butter. US-based Jif® "peanut butter" lists ingredients equivalent to peanut flavoured *icing*. A flavoured icing obviously would be cheaper than a whole food. But this isn't just a price problem. It's a specification problem and an opportunity to buy Canadian.

Real peanut butter should be peanuts blended into butter. When specifications simply say "peanut butter," they allow products that technically meet the name but miss the mark on quality, nutrition, and value.

In the USA, FDA standards require peanut butter to contain at least 90% peanuts. The other 10% can include salt, sweeteners, and hydrogenated oils. In Canada, there is no prescribed compositional standard for peanut butter, making clear specifications even more critical.

Commercial brands like Jif® contain: roasted peanuts, sugar, molasses, fully hydrogenated vegetable oils, mono and diglycerides, and salt. A Canadian processor option like Meridian Farm Market, typically contain just peanuts or peanuts with salt. These aren't minor differences - they're completely different products, sold under the same name.

When hospitals or university food services buy from Canadian companies like Meridian instead of multinationals like Jif®, revenues stay in Canada. LOCO BC research on the economic multiplier effect found \$63 out of every \$100 spent locally stays in the community, versus only \$14 from multinationals.

Jif® at \$0.24 per single-serving might not be cheaper when considering total value. The commercial product contains 90% peanuts plus sugars, molasses, and hydrogenated oils, imported from the US. The Canadian option offers 100% peanuts with no fillers, processed in Canada, with economic multiplier benefits.

Instead of just saying "peanut butter," specify ingredient requirements (e.g., "whole foods only"), minimum peanut percentage (e.g., "minimum 95% peanuts"), geographic preferences where trade agreements allow, and nutritional standards (e.g., "no added sugars"). This applies to all procurement - office supplies, furniture, or services. Clear specifications enable true quality comparisons, not just price tags.

This is where procurement professionals earn their keep - catching the details that others might miss. When teams assume all products with the same name are the same, they risk buying lower quality items that don't support their ESG goals or provide best value.

Taking time to write proper specifications ensures you're comparing similar products and getting the best value for your organization and community. Don't let weak specifications undermine your ESG commitments.

From our colleague, Kathrine Caughran, NISCL-CSCL, MBA, Principal/Consultant, Procurement Guide Canada

Decarbonization



Canadian clean energy strategy

The Federal government outlined its strategy to address electricity supply and demand between 2024 – 2050 in the Clean Energy Regulations. This 27-year period coincides with the target date for net zero GHGs. The report expects a 40% increase for electricity over this period. The summary results show a reduction of ~300 Mt of Co2e with an estimated net-net savings of \$28B – or ~\$1B per year on average.

The report provides an economic perspective along with science-based projections to achieve the reduced the average global temperature to meet the Paris commitments. There is a sense of urgency implied in this report after reviewing climate change disasters and infrastructure adaptability if immediate actions are not taken.

Canada's electrical grid must be upgraded to handle the increased demand for electricity. Estimates of \$400B have been made in order to have the electrical grid meet increased use of EVs, heat pumps, population growth, and economic needs. <https://www.cbc.ca/news/science/electrification-grid-ev-heating-1.6935663>

The report does identify the improved metrics in Canada with the transition away from coal-fired energy in the past 20-years where we were at 20% in 2000 and only 6% by 2020. The transition occurred through the adoption of low and non-emitting electricity generation from 73% to 84% over the same period of time.

Electricity generation by 2050 would be derived as follows:

- Emitting technologies 1%
- Nuclear 9%
- Hydro 53%
- Wind, solar, geothermal and wave 46%

The Clean Energy Regulations will shape the energy strategies for decades to come. This will impact consumers and industry through technologies and by implementing government legislation to achieve the desired outcomes. As a relatively small country, it will require considerable adaptations to the cost structures of materials and production, to be able to remain competitive in a global market.

<https://www.canada.ca/en/services/environment/weather/climatechange/climate-plan/clean-electricity-regulation.html>

Decarbonization of industry

Decarbonization will change traditional employment as workers move to cleaner energy employers. The US United Steel Workers Union is preparing for this inevitable transition. As refinery and fossil-fuel based jobs shrink, solar and wind companies are hiring. While many new clean energy employers have tried to be well-paying non-union companies, unionized workers will most likely want to be part of the new economy. The United Steel Workers wants their members involved. The Inflation Reduction Act is the impetus for this change in employment strategies by unions.

The fact that our economy has been dependent on carbon-based energy and products since the Industrial Revolution is one of the larger barriers to reducing emissions. The revenues generated by the *carbon majors* contributes to the enormity of wealth favoured by the nations, corporations, and individuals which rely on this vast revenue stream. Carbon majors today are defined as a group consisting of only 57 fossil fuel and cement producers. In 2022, the fossil fuel revenues were US\$ 4T; the largest cement companies received US\$ 170B in 2023. These revenues will assist in the transition to more responsible energy solutions.

The carbon major group is reportedly responsible for ~80% of the global CO₂ emissions between 2016-2022. The carbon majors include nation-states, state-owned companies and investor-owned companies. The seminal research was done by the Climate Accountability Institute's Richard Heede in 2013. The InfluenceMap organization continues this work. <https://www.reuters.com/sustainability/climate-energy/majority-recent-co2-emissions-linked-just-57-producers-report-says-2024-04-04/>

The 2015 Paris Agreement and the UN Framework Convention on Climate Change led to the target of 1.5°C limit above pre-industrial levels. The target supports the Net Zero campaigns and many businesses are trying to reduce their anthropogenic impacts on global warming. A McKinsey Sustainability report highlighted (10) technologies to mitigate carbon emissions:

1. Renewable energy
2. Batteries and energy storage
3. Circular economy
4. Building technologies
5. Industrial-process innovation
6. Hydrogen
7. Sustainable fuels
8. Nature-based solutions
9. Carbon removal, capture and storage
10. Agriculture and food

A late 2025 McKinsey report, *What's next for climate tech?* highlighted (9) energy technologies to reduce 80% of GHGs if taken to a scalable level. These are quite similar to McKinsey's earlier recommendations but do offer different insights based on market acceptance and challenges.

https://www.mckinsey.com/capabilities/sustainability/our-insights/whats-next-for-climate-tech?stcr=C4E3EAA930BE437FA81B4D96625DE986&cid=mgp_opr-eml-alt-mst-mgp-glb-&hlkid=4c460630cc4e42a3afbe375786fb2848&hctky=13835713&hdpid=01d43505-0284-40a9-a007-2fdbf02ed76b

1. EVs
2. Nuclear
3. Energy storage
4. CCUS

5. Carbon removals
6. Sustainable fuels
7. Circular technologies
8. Hydrogen
9. Electrified heat

Decarbonization is a two-fold strategy. First, significantly reduce the greenhouse gas emissions; and secondly, remove carbon from the biosphere by capturing emissions and increasing storage in agriculture and forests. Decarbonization should have energy security as part of the strategic plans.

We have been reliant on fossil fuels to drive industry and commerce for 1 ½ centuries. This source of cheap, plentiful energy allowed relatively unrestricted use of fossil fuels, replacing steam, until a couple decades ago. Hydro energy was developed shortly after the oil industry began. At one-time, England went all-in on gas lighting while electricity was available. Betting on one source of energy or fuel is risky. In the 1970s, the only threat was oil embargos and financial threats from OPEC. These were mitigated over time and a few geo/political events created economic stress but supply was assured. North America is now quite independent of fossil fuels from foreign nations. The G7 countries and other international organizations, such as the UN, are phasing out fossil fuels for cleaner sources of energy. Ensuring energy security will always be an important part of any country's strategy for economic and social development. Having fossil fuels available could make sense from a military defence position alongside the other forms of renewable energy. For the foreseeable future, other countries we compete with, are continuing to use fossil fuels while exploring cleaner types of energy.

Norway, which relies heavily on clean hydro power for its electricity grid, and has adopted EVs to displace ICE vehicles, continues to increase its export of crude oil to Europe. In December 2023 it produced 1.85 M bpd, which is a record output, and is increasing exploration of natural gas near the Arctic Ocean. Norway supports the 2015 Paris climate agreement and agrees with phasing out fossil fuels but acknowledges the demand for fossil fuel will continue for decades. And it generates considerable revenues to afford the transition to cleaner energies.

This will require rethinking how energy is created, how we maintain production and distribution of goods, and land management practices. The increased warming of the planet is largely attributed to power generation, industry, transport, buildings, and agriculture methods.

In 2024, China is committing to developing a carbon emissions control system. The purpose is to cap its emissions by 2030. While China will remain a global supply leader, as it has been for the past few decades, their strategy will be to *decouple* emission targets from economic growth. They will develop the means to track, monitor and internalize emissions with a focus on power generation, steel, metals, construction materials and petrochemical industries.

Decoupling has been the EU and US strategy which recognizes that economics and environmental issues need to be balanced. The need to reduce the average temperature of the atmosphere is the key to sustainability. The WEIRD world wants to continue to produce goods while reducing the environmental impact. Having China make a similar commitment is critical. Other countries such as India have not been able to reconcile these competing interests. <https://www.reuters.com/world/china/chinas-state-council-issues-plan-create-carbon-control-system-2024-08-02/>

The electrification of society puts tremendous pressure on the demand for electricity. Currently, power generation from fossil fuels is accountable for 30% of the global CO₂. Singapore, which has become a centre for massive data centres, on a small land mass, has been adapting to reduce its electrical demand

through technology. Hyper-scale data centres are electricity vampires and require cooling systems to reduce the waste heat which is generated. Australia's Sustainable Metal Cloud (SMC), has brought their technology to Singapore to resolve the energy problem using liquid immersion. SMC has replaced the inefficient cooling fan systems used in server farms. This reduces physical space, electricity and emissions by 50%. Liquid immersion designs eliminate the need for air-conditioned server operations. SMC partnered with Nvidia to optimize the energy savings and targets Net Zero in installations.

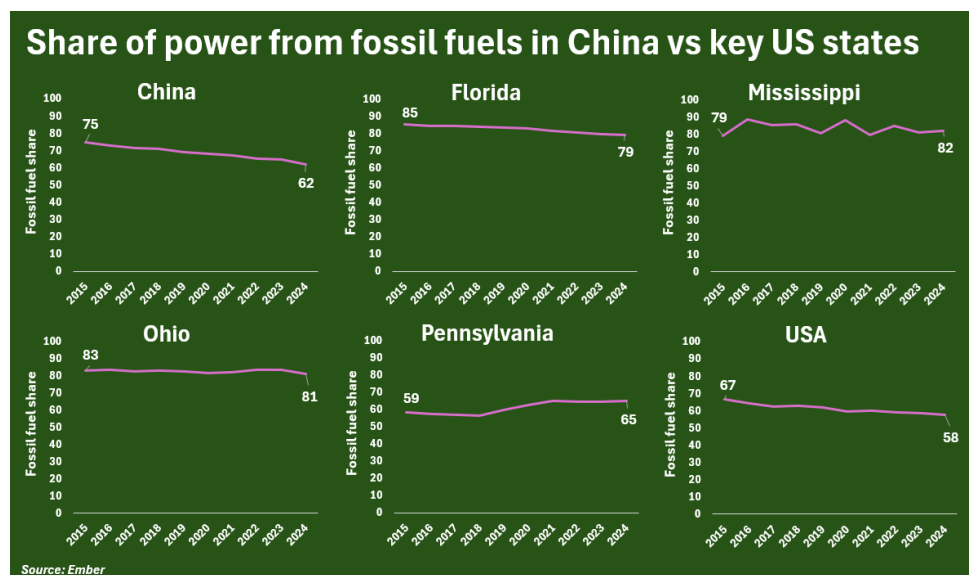
<https://smc.co/>

Coal

The cost to shutter a coal mine as a stranded asset is significant. For example, LEAG, which operates coal mines in the eastern regions of **Germany**, supplies 10% of Germany's electricity by burning lignite coal. As Germany transitions to renewable energy, it has an agreement in principle to pay LEAG ~Cdn \$ 2.6B to cease their coal-fired plants by 2038 and be compensated for their foregone earnings. Of this amount 700M is for social costs and the balance to be used for industrial options such as supplying renewable energy. This is similar to the settlement made with the German company, RWE. They agreed to accelerate their exit from lignite-fired power plants by 2030.

China's power generators are on target to have reduced coal consumption below 60% for the first time. Emissions from coal account for ~40% of global emissions, this is a significant milestone to improve upon. China is expanding use of renewable energy which continues to reduce usage of fossil fuels.

While China burns more coal than the US, due to China's economic scale, China continues to expand its use of renewable energy. The 2025 US administration is averse to the idea of renewable energy and continues to support fossil fuels. China actually emits less CO₂ per unit of electricity than many US states and continues to reduce its dependence on coal-fired energy. China's government-controlled energy system operates from a single grid. In contrast, the US operates (3) main grids using (6) different utilities, powered by many individual utilities using a variety of energy generation fuels. Several of the latter draw on high carbon intensity power generation. <https://www.reuters.com/markets/commodities/chinas-power-grid-clean-up-puts-several-us-systems-shame-maguire-2025-03-07/>



In September 2024, **Denmark's** coal-fired energy operator Orsted, will shutter its last coal-fired plants.

Orsted transitioned to offshore wind in 2017 and sold its gas and oil businesses. This will meet its target of 99% green energy by 2025. Orsted was 85% coal-energy in 2008.

In October 2024, **Great Britain** closed its last coal-fired energy plant. After 140-years, coal ceased to be the source of energy and was phased out completely. Government investments in renewable energy options and nuclear power have displaced coal. A large part of the impetus to move away from coal was to charge for carbon emissions. The cost to phase out coal was conducted through blind auctions where operators submitted a price for them to shut down. The government selected the best value for their interests and budgets. A coal phase out strategy is dependent on clean energy options being available. This worked in the UK but does not work at present in South Africa as an example.

Finland closed its last coal-fired energy plant in April 2025. Wind and solar power have been increasing rapidly since Finland passed legislation to ban coal in 2029.

South Africa's economy is built on its coal mining industry. This industry employs 90,000 workers. As much as 80% of its energy requirements are from burning coal which is the epicentre of its economy. Transitioning to cleaner energy will require billions of dollars. An outcome of COP26 were loans from Britain, Canada, Denmark, France, Germany, Netherlands, Spain, Switzerland, the EU and USA valued at Cdn \$12B to *begin* the transition away from coal. South Africa emits more GHGs than Britain and France. With a country mired in poverty and governmental corruption, the shift to cleaner energy could take decades. <https://www.reuters.com/world/africa/focus-coal-miners-power-grid-south-africa-spends-just-sixth-climate-aid-2024-09-26/>

Algoma began operating its electric arc furnace (EAF) in 2025 in Sault Ste. Marie. With EAF technology, Algoma replaced its 120+ year old blast furnace with EAF. This will potentially reduce emissions by ~75% over conventional blast furnaces. EAF is a green steel solution. While the investment is ~\$1B Cdn, the long-term ability will improve efficiencies to reduce operating costs and emissions. <https://www.northernontariobusiness.com/industry-news/manufacturing/how-algoma-steel-de-risked-its-electric-arc-furnace-project-8395552>

“Green steel” was defined by India in late 2024, with (3) types of low carbon (green) steel. The formula created by India is where less than 1.6 tonnes of CO₂ per tonne of finished steel is green; less than 1.6 tonnes of CO₂ is 5-star rated; and between 2-2.2 tonnes of CO₂ is 3-star rated. Australia's Rio Tinto does not see green steel being an option due to cost. Green steel lacks the economic advantages over conventional steel. Rio Tinto is experimenting with biomass as an energy source for steel. Their Biolron™ uses 1/3 of the electricity that hydrogen-based options consume. <https://www.riotinto.com/en/news/stories/decarbonising-steel-making>

In 2024, Alberta's last coal-fired energy plant went down. The plant was converted to natural gas, reducing emissions by 60% and water consumption by 50%. Alberta transitioned from being reliant on ~80% coal energy in 2001 to zero by 2024. In January 2025, Alberta allowed coal exploration to be renewed in the Rocky Mountains, after banning it a couple years earlier. This allows permits which were on hold or cancelled to be reinstated and could alleviate some of the lawsuits from mining companies over the changes in previous legislation. <https://www.cbc.ca/news/canada/calgary/aer-grassy-mountain-eastern-slopes-brian-jean-1.7436871>

In June 2024, in another example of divestment in thermal coal, UK-based LGIM sold its stake in Glencore. LGIM manages Cdn \$300B in assets and is committed to climate risk management. A concern of LGIM's management was the transparency in reporting alignments with the 2015 Paris Climate Agreement.

A 2024 report from the Institute for Energy Economics and Financial Analysis (IEEFA) estimates that 800+ coal-fired power plants could be decommissioned within 10-years. Most of these older plants are tied to long-term power purchase agreements and government subsidies. Due to renewable energies

becoming more affordable and scalable, it is possible to transition off the coal to cleaner energy solutions. <https://www.reuters.com/business/environment/more-than-800-coal-plants-worldwide-could-be-profitably-decommissioned-research-2024-06-17/>

Scope 1, 2, and 3 emissions

A big part of ESG strategies is measuring the impact on the environment. Emissions have been classified as being scope 1, 2 or 3. Being able to assess the size of the carbon footprint requires the emissions associated with any business operations to be assessed. Certainly, some types of emissions are easier to gather data on than others. Air travel emissions basically use the distance of the flight x the carbon emissions generated as a standard calculation for the aircraft. The data has been captured and tracked numerous times. If the airline uses an e-plan to displace a conventional fuel aircraft, the incremental difference is easy to measure. Or driving a specific vehicle for 25,000 kms per year would generate a predictable emission volume based on a formula. It is a theoretical estimate, not the actual consumption for a specific mode of travel. Whereas, calculating the emissions on a foreign manufactured piece of equipment, involving several suppliers, in multiple countries and various modes of transport, is much more complex. Supply chain mapping of the activities helps to identify where emissions are being generated across the multiple supply chain activities.

Scope 1 emissions are those which are *directly* controlled and generated from an organization-owned asset. Scope 1 emissions can include those from furnaces, boilers, facilities and company vehicles. Actions to consider are: retrofitting HVAC systems; fleet fuel options; heat pump installations; LED lighting options.

Scope 2 emissions are *indirectly* attributed to purchased energy, transportation, waste, business travel, employee commuting, and chemicals incurred by suppliers. Coal-fired vs hydropower GHGs would be vastly different in volumes, as an example. PPAs are used to buy greener energy.

Scope 3 are also indirectly generated by the suppliers to an organization through the supply chain materials being supplied, their transportation, excavation, end-of-life disposal, or use when sold in the market. Scope 2 and 3 indirect emissions are mutually exclusive by classification. Scope 3 emissions should be identified as being upstream or downstream in the supply chain process. Actions to take to reduce upstream emissions require sourcing of low-carbon materials which have large impacts such as metals and batteries; use of recycled or bio-based materials where production processes can be adapted; design products to for ease of recycling; use of alternative binder materials as found in concrete-free cement.

Upstream Scope 3 indirect emissions are: purchased goods and services; capital goods; fuel and energy related activities; transportation and distribution; waste generated from operations; business travel; employee travel; and leased assets. The upstream activities are the inbound actions incurred to acquire the goods and services from all suppliers to produce a product.

Downstream Scope 3 indirect emissions are: transportation and distribution; processing, use of sold products and their end-of-life treatment; leased assets; franchises; and investments. The downstream activities are the outbound actions required to get product to market for the sellers and eventual disposal by customers. Actions to take include converting ICE to EVs or buying EVs; work with customers who are like-minded to pursue DIR processing or expand their recycling capabilities; develop composite products from waste stream. An example from Nestlé, in 2024 they will move 50% of their global shipping needs with Hapag-Lloyd, Maersk, and CMA CGM on ocean freight using lower-carbon fuels. The estimated reduction is 200,000 tCO₂e per year from their Scope 3 emissions.

Measuring emissions

There are a variety of methods to measure the volume of emissions with pros and cons for each. If an organization chooses one of the methods, they should be consistent with that method for measuring the scope. Those activities or sources of emissions can be better benchmarked and incremental changes can be assessed.

It's recommended that there be partnerships between the buying and selling organizations within a supply chain to measure emissions for mutual benefits. With literally hundreds of business actions and activities for generating emissions, it's impossible for one organization to be able to capture the data without cooperation with its business partners.

1. Spend-based method: Also known as environmentally extended input-output analysis, based on spend data.
2. Average data method: Based on the actual volume of goods or services consumed by the buying organization.
3. Hybrid method: Calculations produced with a combination of primary and secondary data
4. Supplier-specific method: This involves using primary data provided by a supplier, detailing and assigning a proportion of this to the buying organization's Scope 3 emissions calculation.

Industries such as mining struggle to measure and manage their Scope 3 emissions. Mining accounts for 4-7% of GHGs globally. The complexity of their operations through extraction, processing and shipping in a global market adds to their inability to gather and report these metrics. Rio Tinto has gone on record as saying they can't meet their 2025 target for GHG reductions through operations. At best, they could buy carbon offsets to reach estimates of emissions. While targets have been set for 2040 and 2050 for Scope 3 reductions in mining, investors like to see the short-, medium-, and long-term plans with the business models for achieving these outcomes.

SBTi estimates that Scope 3 emissions are 11 times greater than Scope 1 emissions. Supply chain professionals are in a position of influence to affect Scope 3 emissions through targeted agreements using SBTi methods. See **Addendum XI**.

Renewable energy

In 2025, renewable energy investments started to cool. When global companies such as BP reduce their investments in renewables and push for increased fossil fuel investments, that's a big market signal. Investors want their returns. Political pressures in the US support fossil fuels and detract from renewables. With mounting financial losses BP's commitment of 40% commitments to renewables by 2030 was reduced to ~<25%. Shell changed its investment strategy to weigh more on fossil fuels in 2025 as well.

In contrast to BP and other fossil-fuel based companies, the Jeff Bezos backed Earth Fund continues to support specific GHG reduction projects. The Fund is earmarking US\$7.5B for developing countries by 2030 for renewable energy options. <https://www.reuters.com/sustainability/cop/bezos-backed-renewables-alliance-targets-75-bln-developing-countries-2025-09-22/>

Co-Chair of the Glasgow Financial Alliance for Net Zero (GFANZ), Mark Carney stated in an interview with McKenzie & Company in December 2022, there will be substantial *stranded assets* in the conversion away from fossil-fuel based companies. Coal plants and other high-emission assets will require bridge financing in some form as a sectoral pathway to wind down these operations to achieve the 1.5°C temperature reduction targets. Many of the coal plants have 30-40 years of remaining

operational time which will need to be incentivized to come to termination earlier than they originally intended. Financial institutions, under the guidance of GFANZ, will play a pivotal role in this economic transition. Phasing out fossil-based industries will require economic viability to ensure energy security. Financing options for energy infrastructures are not market ready.

Renewable energy sources are set to meet nearly 50% of all electricity demand by the end of the decade, but will fall short of triple capacity to reduce carbon emissions, an IEA report showed in October 2024. Solar PV is projected to supply 80% of the growth; wind is forecast to increase by 100% by 2030. The renewable sector is fraught with financial risks from government incentives and uncertainty with the price of equipment supplies from global suppliers. <https://www.reuters.com/business/energy/renewable-energy-fall-short-un-goal-triple-by-2030-iea-says-2024-10-09/>

The major sources of renewable energy are solar, wind, geothermal, hydro, and biomass. These options imply the need for more renewable energy sources at affordable prices. A serious challenge for industry is the production of steel, cement, and chemicals where they require 1600°C+ which fossil fuels can easily achieve, whereas, electrical power cannot. Options include clustering of energy plants at concentrated sites for integration of processes. According to the Columbia Climate School, sustainable biomass can be used for some cement factories and steel plants. Steel is possible through charcoal combustion instead of coal, where charcoal is deemed to be a renewable energy source. In spite of the technical solutions to curb emissions, there is a note of positivity from CEMEX CEO, Fernando Gonzalez, “The transition of a hard-to-abate industry like cement to be a carbon-neutral economy is feasible. And, it is profitable.”

Africa’s renewable energy strategies

Optimistically, the continent of Africa is making shifts away from fossil fuels to renewables. This will be a decades long strategy to provide cleaner energy. In 2024, Africa has the capacity to provide 25% of energy through cleaner generation; it’s end goal is to achieve 50% renewables. Solar, wind, and nuclear energy will be the main providers of clean energy.

The employment opportunities will be substantial to meet the needs of ~1.5 billion people. This will provide a much-needed economic boost. Power sources will be designed regionally where natural resources exist. North Africa has great potential for wind and solar while other regions will use hydro or build nuclear plants.

As a continent rich in raw materials, this will position Africa to become more self-sufficient as a supplier of materials in a global market. The challenges will include policy agreements between nations; qualified labour; infrastructure upgrades; transmission lines; and an ability overcome the corruption which has been prevalent in its emerging economies.

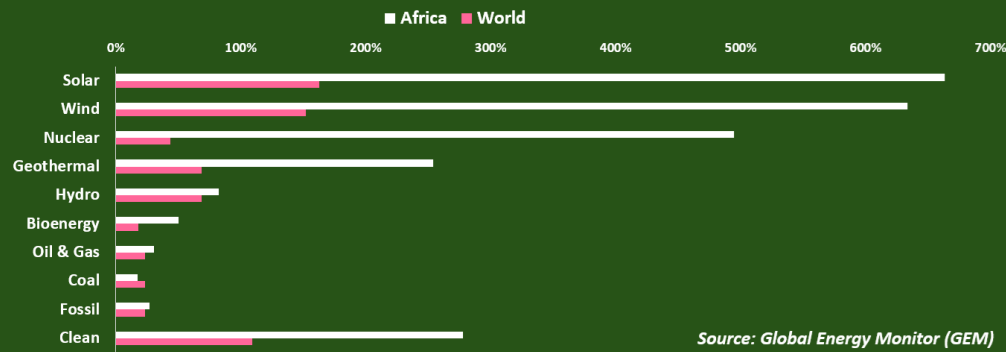
Africa will be able to take advantage of new technologies which have been proven in Western countries to accelerate their programs. There will be a need for billions of dollars by investors and banking to enable the transformation. <https://www.reuters.com/business/energy/africas-road-map-bigger-greener-power-system-maguire-2024-10-15/>

Having cleaner energy will have a dramatic improvement on health care. Where ~130 million people are reliant on burning charcoal and other materials on cook stoves, access to affordable electricity will be life changing. Deforestation can be reduced by providing cleaner, low-cost energy. <https://www.iea.org/reports/africa-energy-outlook-2022/key-findings-over>

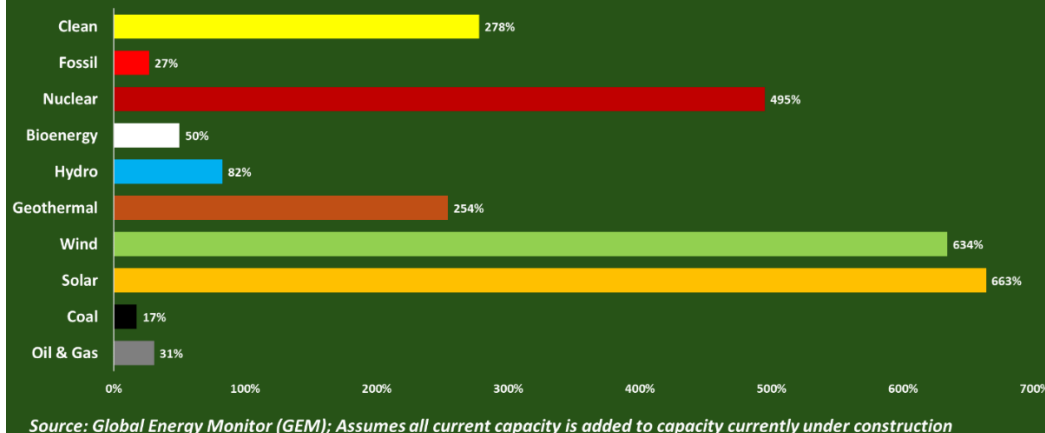
The following tables show the ambitious scale of clean energy development for Africa over the next few decades.

Africa plans to boost clean power generation capacity by far more than the global average

Africa vs World planned capacity changes to current power generation after ongoing construction + pre-construction is finished



Final planned changes to Africa power generation capacity by source



Renewable energy agreements use various forms of *power purchase agreements* (PPA). A PPA involves an independent 3rd party renewable energy provider to sell energy certificates to a corporation. The corporation negotiates a multi-year contract for its power, at specified pricing. The corporation draws its power from the same grid as before. The 3rd party renewable energy producer in turn, sells its energy to the energy grid operator, such as a provincial utility. The 3rd party energy producer can use the sale of energy certificates to assist in the financing of a project. The corporation benefits from receiving GHG reductions credits. The utility operator benefits from receiving additional green energy supply to meet demand and doesn't increase its GHGs. <https://www.ccc.ca/en/insights-for-exporters/power-purchase-agreements-tool-for-canadian-cleantech-exporters/>

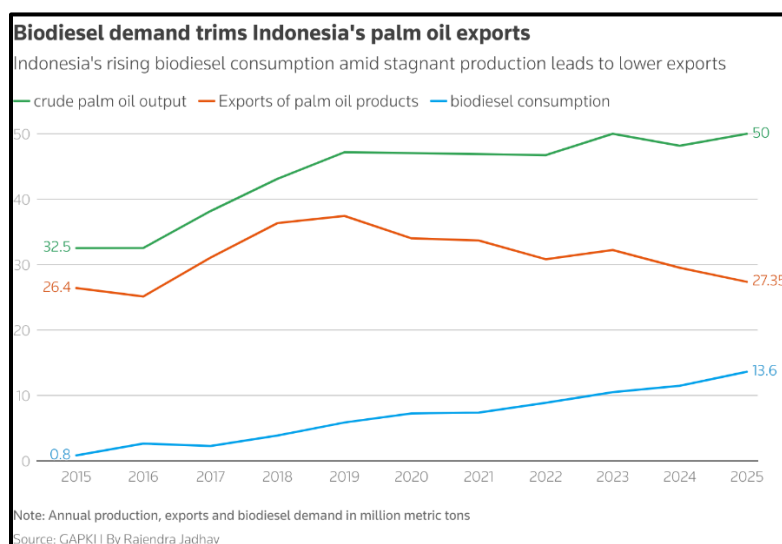
Biomass

Biomass is an alternative, renewable source of energy, used in many global locations in the form of wood pellets. Wood pellets can be used to convert coal-fired energy operations to biomass energy. Burning wood is allowed under the Paris Climate Agreement as long as trees which are cut are replanted. Trees are a natural carbon sink. There are certainly debates over claims that burning wood

releases less CO₂ than coal as an example. Pellets can be made from recycled pallet boards, forestry residues and tree branches, reducing landfill waste. Pellets are relatively easy to store and transport to rural areas with smaller populations and lack of other energy infrastructures for heat and power. There is a demand in the UK, Europe, Japan and South Korea to replace coal with wood pellet energy. Biomass and biofuel sources, in addition to wood, include garbage, foliage, food scraps, and waste cooking oils. Biogas is produced from animal manure and human sewage. The US Energy Information Administration estimates that biomass meets ~5% of the energy demands.

Indonesia mandated an increased use of palm oil for fuel to reduce oil imports for energy in 2025. The 40% palm/diesel mix is a substantial increase from the current 35/65 blend being used in land transportation, trains, industry, and diesel power plants. Indonesia would reduce exports of palm oil to ensure supply. Indonesia converted to the B40 mix in early 2025 and will move to 50% diesel mix in 2026.

Indonesia's exports of palm oil will be reduced by 30% by 2030 as concurrently biodiesel continues to grow in demand. Palm oil remains an environmental and as previously discussed, a social issue.



Germany is also investing heavily into green ammonia starting in 2024. They will buy 259,000 tonnes to cut emissions using green hydrogen fuel to help transition industries such as steel and chemicals, which rely on fossil fuels. Due to Germany having limited renewable energy resources, they will import 50-70% of the green hydrogen they require. Germany auctions the contracts through government tenders to establish pricing and supply.

Germany will be one of the largest users of hydrogen to displace fossil fuels and gas-based hydrogen in the EU. Germany is investing Cdn \$ 28B to convert its industry to cleaner hydrogen fuels. Steel producers such as Thyssenkrupp, Salzgitter and ArcelorMittal are basing their future production on the availability of hydrogen to fuel their German operations and decarbonize their plants.

Vietnam has targeted 50% of its office buildings and homes with solar power by 2030. The government intends to allow factories to buy electricity from renewable power suppliers via direct power purchase agreements. Once approved, the price would be less than ½ of electricity from solar farms. The government's national power operator would buy surplus solar energy to feed into its own grid.

In early 2024, Exxon Mobil and Chevron formally signed off to end of their California oil interests with the state of California, after 100+-years. This includes their offshore production assets. The value of the write down of their combined stranded assets is ~US\$5B. Bellwether California, will ban new ICE vehicles by 2035.

In a November 2023 report, *an affordable, reliable, competitive path to net zero*, McKenzie & Company summarized the concurrent, yet independent strategies for the transition to net zero as follows:

1. Reduce GHGs
2. Ensure companies can remain competitive and benefit during the transition, regardless of country or region
3. Ensure the affordability of energy, materials, and other products when compared to traditional options
4. Ensure that sourcing strategies address security and resilience across the supply chain

In October 2021, the Science Based Targets Initiative (SBTi) issued net zero targets and global temperature reductions to pre-industrial levels of 1.5° C. The SBTi set best practices of introducing transition plans to deal with Scope 1, 2, and 3 emissions, short-term milestones of achievement, Board governance responsibility and executive compensation tied to achieving results. The SBTi was funded by IKEA Foundation, Amazon, Bezos Earth Fund, We Mean Business coalition, Rockefeller Brothers Fund and UPS Foundation. Bezos pulled its Earth Fund out of the agreement after 2-years.

The cost of decarbonization has yet to be faced head on. In late 2023, the Clean Energy Procurement Academy (CEPA) was formed by major players including Apple, Nike, Amazon, Meta, PepsiCo, and REI Co-op. CEPA estimate that 50% of GHGs are attributed to supply chain actions.

“To address the climate crisis, we need to act quickly to expand access to clean energy around the world. Businesses can help drive that change,” said Sarah Chandler, Apple’s Vice President of Environment and Supply Chain Innovation. “As we make progress to ensure every Apple product is carbon neutral by 2030, we will continue to work closely with our global suppliers to support their transition to renewable energy. We’re proud to collaborate with CEBA and others to expand those efforts beyond our supply chain and across industries.”

In a report by McKinsey, the transitioning to net zero emissions could require \$US 3.5 trillion a year! Who will pay for to reduce the Scope 3 emissions the buyers or the sellers? Will consumers be able to absorb the cost in the goods they need? The cost is equal to ~50% of the world’s global corporate profits. <https://www.supplychaindive.com/news/who-will-pay-to-decarbonize-the-supply-chain/690631/>

Carbon sequestration

In 2025 Germany committed ~Cdn \$ 10B to expand CCS technologies to industry. The funding targets chemicals, steel, cement and glass sectors to reduce emissions. <https://www.reuters.com/sustainability/climate-energy/germany-launches-6-bl-ur-industrial-decarbonisation-program-includes-ccs-2025-10-06/>

Researchers estimate that 7-9 billion tonnes of CO₂ need to be removed to achieve the 1.5 degree C threshold. In 2024, there were ~2 billion tonnes being removed. Carbon sequestration involves capturing CO₂, removal and storage from the atmosphere. The two types of sequestration include biological and geological. Biological uses the natural carbon sinks such as reforestation, restoration of mangroves and wetlands, soil and water. Geological relies on the technologies to store CO₂ in underground rock formations. CCUS compresses CO₂ and it is then injected into rock formations for permanent storage. Capturing CO₂ during the production process allows for increased scalable solutions. In addition, is direct air capture and storage (DACS).

The largest CO₂ DACS plant is located in Iceland. It has been operating since 2021 to remove a targeted

36,000 tonnes of carbon per year from the atmosphere. This is a scalable solution with the US and other countries adapting similar technology. Swiss-based Climeworks developed this effective DACS process involving subsurface mineralization of carbon which is meeting ISO 14064-2 standards. The plan is to remove 1 M tonnes per year of CO₂ by 2030 and scale up to 1 B tonnes by 2050. This is still a small portion of the CO₂ volume to make a real impact. The financial challenge is to reduce to the cost per tonne of reduction from ~\$1000 per tonne to \$100 per tonne over this period.

https://www.cnn.com/2024/05/08/climate/direct-air-capture-plant-iceland-climate-intl?cid=ios_app

In late 2024, a US \$8B CCS project was approved which will store CO₂ collected from 57 Midwest ethanol plants and shipped via a pipeline to a North Dakota underground site. The pipeline operator is Summit Carbon Solutions and will involve plants in North and South Dakota, Iowa, Minnesota, and Nebraska. This is a very ambitious project secured with fuel tax credits as the funding trigger.

<https://www.reuters.com/business/energy/north-dakota-approves-summit-carbon-pipeline-permit-2024-11-15/>

The Canadian federal government provides tax credits for companies which invest in equipment to capture CO₂ and for equipment to transport, store and use CO₂. Reducing industrial emissions through carbon capture, utilization and storage technology (CCUS) is a key governmental strategy to address climate change. An example is the 2023 start to the Heidelberg Materials cement plant in Edmonton. The \$1.4B project is designed to capture and store carbon which is the equivalent of 300,000 cars per year. This would be the first carbon neutral facility in North America. The CO₂ would be piped underground and stored near Edmonton. Shell Canada is going ahead with two CCUS projects in Alberta with startup forecast for late 2028. CCUS has proven to be technically challenging.

CCUS is part of the strategy which creates CCUS hubs. The cluster of CCUS hubs is intended to allow the sharing of CO₂ transportation, storage or utilize the same infrastructure. This will reduce the significant barrier costs to expanding CCUS facilities. The number of gigatons required to reduce GHGs will require hundreds of CCUS hubs. Currently there are only a handful of hubs in the world but hundreds more are needed and being planned. A 2021 report, *Is carbon capture too expensive?* by Baylin-Stern and Berghout addresses the issue of the concentration of CO₂ emission streams. High concentration is found in the production of ethanol and ammonia which is ~70% of the emissions and are the lowest cost for a CCUS system. But these only account for 5% of the global emission volumes. Low concentration operations such as power generation, cement and petrochemicals represent 3 times the percentage of global emissions but are the most expensive to bring into a CCUS infrastructure.

In early 2024, Germany said they will allow CCUS with offshore storage for certain industrial sectors in order to realize their net zero 2045 goals. To do so means transporting CO₂ which could assist the cement industry in reducing emissions which are currently banned from land sequestration.

Sweden was approved by the EU Commission to proceed with a Cdn \$ 4B investments into CCUS. This would include biomass projects and other waste used to produce fuel, electricity and heat. The target is to remove 50,000 tonnes of biogenic CO₂ per year to achieve its net zero 2045 objectives.

<https://www.reuters.com/sustainability/european-commission-approves-swedish-carbon-capture-aid-plan-2024-07-02/>

Enfinite, one of the largest CCUS energy storage players in Alberta, is bringing more capacity on line in early 2024. This will bring Enfinite's capacity up to 180MW, per Jason White, executive officer. Industry group, Energy Storage Canada says that there needs to be ~12,000MW of storage to achieve a net-zero electricity grid. In January 2024, the Alberta Electric System Operator (AESO) issued an emergency alert as there was not enough electricity to meet the demand due to extreme cold weather. Emergency services urged Albertans to turn off unnecessary lights, avoid cooking with a stove and delay charging electric vehicles.

The critics of CCUS for steel manufacturing, are convinced that it cannot be commercially viable as it is

too expensive. DRI is replacing the older steel mill blast furnace technology. Fortescue Metals, which is one of the largest global iron ore suppliers, says that CCUS is not a solution for the energy transition.

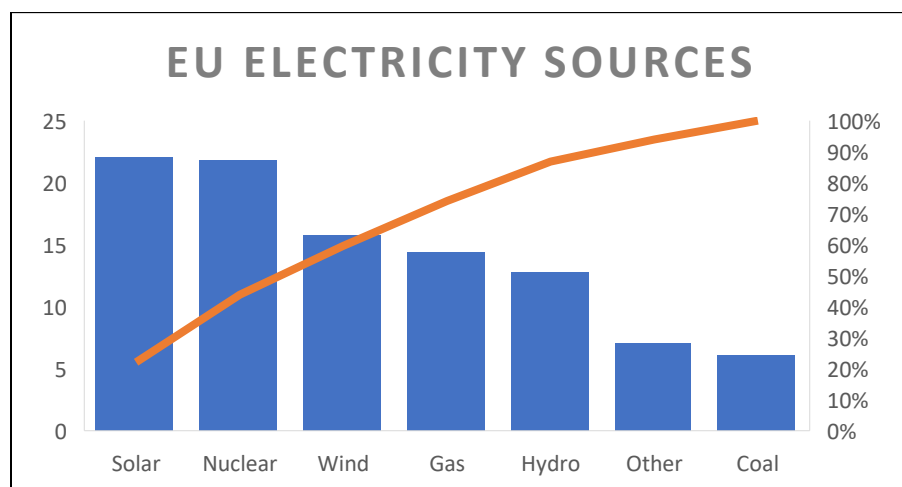
Carbon dioxide removal (CRD) projects are an option to CCUS projects. CRDs are being considered for India to focus on biochar production. The EU is looking at CRD credits in its emissions trading system. The estimated value of the CDR market for 2030 could be \$Cdn 140 B.

GHG reduction options

In October 2022, global giant Apple signaled that it wants its supply chain to be carbon neutral by 2030. Apple chip supplier Taiwan Semiconductor Manufacturing Company, stated they will be using 100% renewable energy, as reported in Supply Chain Dive. When leading brands like Apple make these commitments, it's a game changer with a positive ripple effect across many sectors. The Boston Consulting Group estimates that only 10% of companies were measuring their emissions, up 1% from 2021.

Solar

Electrical energy from solar power became the largest generator in EU by June 2025. The steady transition away from fossil fuels is quite remarkable. <https://ember-energy.org/latest-insights/solar-is-eus-biggest-power-source-for-the-first-time-ever/>



In June 2024 a Chinese-state owned Power Construction Corp of China, connected the world's largest solar plant to their energy grid. This is a 5 GW, 200,000-acre facility in the desert area of the Xinjiang region. The operation will generate 6B KW hours of electricity per year. In late 2024, China's CHN Energy began an offshore floating solar park in the Shandong province. The solar plant will be capable of generating 1.8 billion KWH of power per year, which could service 2.5 million residents.

<https://www.reuters.com/business/energy/chinas-chn-energy-starts-up-massive-offshore-solar-park-2024-11-14/>

Solar energy technology is facing a dilemma in terms of which type of system should be installed. More conventional solar investments are based on PV panels while an emerging technology uses concentrated solar power (CSP). PV is a lower capital cost but lacks the ability to store energy; CSP is a much higher capital cost but can provide power at night. Investors and energy providers are mixed on these competing interests.

Germany is expanding its adoption of solar panels. In early 2024, they eased regulations and increased subsidies for larger rooftop photovoltaic systems. Solar rooftop systems have almost doubled over 2023

with a prediction that over 50% of German companies will be using solar energy by 2030. The Netherlands have ~30% of its homes using rooftop solar panels. Canada draws ~1% of energy from solar. Germany's GHGs dropped 3.4% over 2024 and it's expected that Germany, as one of the few countries, will meet its 2030 targets. <https://www.cbc.ca/news/climate/solar-power-cheap-netherlands-1.7250118>

The business case for residential, rooftop solar panels in Canada is more complex. The payback on solar in Calgary is ~5-years; in Toronto it is ~10 years; in Halifax it is 11 years. The variation depends on the cost of hydro generated electricity. Quebec's low-cost electrical energy means that a payback on rooftop solar panels is ~19 years. Further issues with solar panel installations in residences can occur with home insurance policies. Some companies will only insure if the panels generate a maximum of 10 Kw. The solar panels must be owned by the homeowner and not rented or leased and any energy is for personal use only. Other home insurance policies could prohibit participation in selling excess energy back to the grid. As solar panels become more popular, insurance companies may need to adapt policies to support greener solutions. <https://www.cbc.ca/news/science/rooftop-solar-cost-benefits-1.7303406>

French grocer Carrefour will be installing photovoltaic (PV) panels in its parking lots to supply 20% of its electricity. Carrefour will partner with the GreenYellow renewable energy company to supply and install around 350 sites beginning in 2024.

In June 2024, the US government required that solar panels must meet EPEAT standards to qualify for federal projects. Two companies were EPEAT ready – First Solar, a US company manufacturing in the US and Hanwha Qcells, a S. Korean company manufacturing in China, US, S. Korea, and Malaysia. The EPEAT standard can be applied where there are at least two manufacturers, with at least three products in a category, such as solar panels, to comply with US Federal Acquisition Regulations.

Renewable energy is going to continue to target wind and solar development, which show promising results to date. Challenges for these alternative energy sources are serious. Land availability being one. Germany has only ~9% of its land available which would be considered prime for onshore wind farms. Morocco is leveraging the use of solar energy to displace imported energies. ~20% of Morocco's energy is powered from renewables such as solar and wind turbines. Solar has enabled this emerging economy to irrigate vast areas of its desert country and increasing its agricultural exports at a relatively low cost. India, Egypt, China, UAE, and Mexico operate some of the largest solar farms.

Solar panel supplies are dominated by Chinese manufacturers. The US and India are subsidizing domestic solar panel manufacturers as China supplied 80% of the market in 2023. China invested \$US130B last year in solar technology and capacity. China will be able to supply more than a terawatt of solar capacity in 2024. The US and India combined can product 200 gigawatts of solar capacity or 20% of the Chinese capability. <https://www.reuters.com/world/china/china-will-dominate-solar-supply-chain-years-wood-mackenzie-2023-11-07/>

European solar manufacturers are potentially facing production shutdowns or bankruptcies due to the glut of panels on the market in early 2024. The European Solar Mfg. Council is seeking government funding to protect their financial viability. The ESMC wants emergency measures including buying excess inventories, changes to regulations which favour local solar producers, or add tariffs and quotas to imported panels.

The problem for US solar panel manufacturers is the lead in the US market which has been well established by Chinese manufacturers located in the US. The Chinese companies include Jinko Solar, Trina Solar, JS Solar, Longi, Hounen, Runergy, and Boviet. Chinese plants are located in Texas, Arizona, Ohio, and North Carolina and are welcomed by state officials for job creation. In August 2024, the US began investigating solar panels imported from India, which are suspected of being made in China's Xinjiang region. India accounts for ~11% of the US solar panel market and only began shipping panels to

the US in the past 5-years. <https://www.reuters.com/business/energy/indian-solar-panels-face-us-scrutiny-possible-links-china-forced-labor-2024-08-27/>

According to the China Electricity Council in 2024, grid-connected wind and solar power generation would provide ~40% of the energy, about equal to coal generation by the end of the year. According to the US research group, Global Energy Monitor, China is building ~64% of the new global solar and wind capacity. This is 8 times the US projected capacity. This has resulted in a 10% lower use of coal-fired energy in China as renewables are becoming more available. Coal used to supply 60% of China's overall energy demand and now 44% is from non-fossil fuel sources. <https://www.reuters.com/sustainability/climate-energy/china-coal-generation-share-record-low-may-renewables-hit-new-highs-analysis-2024-07-11/>

Zero-carbon electricity grid

In late 2024, CATL announced it will transition into the *zero-carbon electric grid* market. CATL EV battery sales are over US\$40B per year and increasing by ~15% year-over-year. As a global leader in the EV battery sector, CATL sees the bigger niche of supplying independent energy systems, which could power a city. CATL's founder Robin Zeng, sees its electric grid management systems serving AI data centres with green energy from solar panels and wind turbines. CATL will launch a pilot project in the DRC with the Chinese mining CMOC and with the Chinese province of Hainan to combine energy storage from solar and wind sources. The potential scalability of this innovative technology would have a profound impact on cities around the world. <https://www.reuters.com/business/autos-transportation/chinese-giant-catl-pushes-beyond-batteries-into-power-grids-ev-platforms-2024-11-13/>

Canadian renewable progress

Canada has been fortunate to have access to hydro-generated power for its 60% of its electrical supply. Hydro being one of the greener sources of energy. Globally hydro energy is not as plentiful. According to IEA research, less than 20% of the global generation of energy is from hydro power. As we see weather patterns shifting dramatically with droughts and flooding in disparate locales, any source of energy needs a Plan B. From an earlier discussion on Canada's energy sources, we know that Canada relies on hydro for 60% of its electricity supply.

In the heart of Canada's oil and gas industry, Alberta is making strides in renewable energy. According to Nagwan Al-Guneid, Director of Business Renewables Centre Canada, says there is a surge with private energy developers into wind and solar projects. Southern Alberta and Saskatchewan have a propensity for high winds with an abundance of sunshine. Saskatchewan has a higher investment in solar projects. The increase in renewables is driven in part by the deregulation of the electricity market. Most provinces have control of energy rates.

AGT Foods out of Saskatchewan, is crushing canola seeds and producing zero carbon fuels to replace diesel fuel. The ability to replace diesel with a renewable, clean fuel source should cause pause to replace ICEs in E-trucks. Clean fuels can extend the life of existing resources and are renewable. In Canada, the Clean Fuel Regulations increase incentives for the development and adoption of clean fuels, technologies and processes. The goal of the Clean Fuel Regulations is to significantly reduce pollution by making the fuels we use every day cleaner over time. The Clean Fuel Regulations require liquid fossil fuel (gasoline and diesel) suppliers to gradually reduce the carbon intensity – or the amount of pollution – from the fuels they produce and sell for use in Canada over time, leading to a decrease of approximately 15% (below 2016 levels) in the carbon intensity of gasoline and diesel used in Canada by 2030.

<https://www.canada.ca/en/environment-climate-change/services/managing-pollution/energy-production/fuel-regulations/clean-fuel-regulations/about.html>

In 2020, the Athabasca Chipewyan First Nation partnered with Concord Green Energy to build three solar-power farms in Southern Alberta. The \$145M investment will yield 150 gigawatt hours of clean electricity per year. This is significant as 1 gigawatt = 1B watts or capable of providing energy to

~300,000 homes. The project aligns with the Province of Alberta commitment to reduce dependency on coal-fired electricity generation; reduces need for diesel-powered generators for Chipewyan residences; demonstrates the leveraging opportunities with the UNDRIP for economic development and social well-being; and the commitment to the UN SD goal of clean and affordable energy; and the circular economy principles of energy and resource conservation. Scalable models can be used by BC First Nations-led clean energy projects to support Canada's net-zero targets.

Newfoundland and Labrador, ended a moratorium on wind power in April 2023, and opened bids for wind energy projects a few months later. In 2024 Newfoundland is assessing the feasibility of operating ~300 wind turbines for power generation. <https://www.cbc.ca/news/canada/newfoundland-labrador/weigh2-impact-statement-1.7102133>

Canada's Diavik mine, operated by Rio Tinto in the North Slave Region of the Northwest Territories, completed construction of a solar power plant. The facility is designed using 6000 bi-facial panels which generate power from direct sunlight and light which is reflected off the year-round snow cover. It will be capable of producing 4200 mega-watt hours of electricity per year. The solar energy will displace 1M litres of diesel fuel per year, reduce 2900 tCO₂e and will be completed in early 2024. The renewable solar power will complement Diavik's current wind diesel hybrid generation system. The ~4 M\$ funding is shared between the Government of the NWT and the Federal government's Large Emitters GHG Reducing Investment program.

Vehicle-to-grid technology is being trialed in 2024. The technology allows an energy grid to draw power from a battery when it is plugged in during a peak period and replenish the battery when demand is lower. This would be applicable for larger buses which sit idle for longer periods. In December 2023, BC Hydro along with Powertech Labs, and several other partners, successfully tested an E-bus to the grid through a 60KW charger. This is referred to as a bidirectional charging hub.

EU renewable progress

Germany is on target to achieve a conversion from fossil fuel energy to renewable energy supplying 80% of its power by 2030, which will require 50% more renewables than they are currently using. Germany is relying on wind power for 31.3%; solar for 12.0%; biomass for 8.4%; and other low carbon generation options at 3.4%. They have moved away from nuclear, are abandoning coal generation, and will use existing gas plants as a backup supply. Germany is going to invest in gas-powered generation systems to ensure adequate energy backup until renewable energy is reliable to service the demand. Germany will spend ~\$20B Cdn to subsidize existing gas plants to convert to hydrogen energy by 2035-2040.

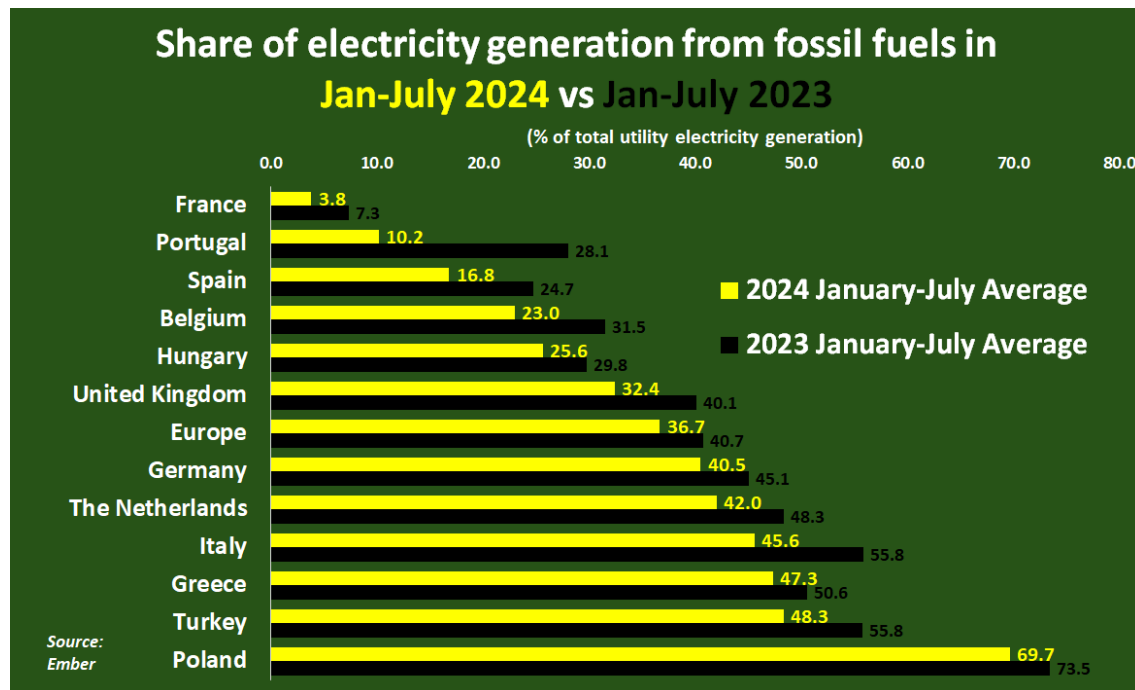
In 2024, Germany agreed to buy green hydrogen and solar power from Morocco for the EU market. Germany lacks the land to utilize solar power and will partner with Morocco to continue to develop its renewable energy production. Green hydrogen is seen as a replacement for fossil fuels in the production of steel and chemicals. Italy and Austria are included in the hydrogen deal. Italy will trial hydrogen at the steel pipe plant operated by Tenaris in northern Italy. The green manufacturing technology will be provided by Tenova. <https://tenova.com/>

Germany's Chancellor Scholz wants to ban natural gas boilers in new residences starting in 2024, which has created a debate. Affordability is a key issue in these debates and a lack of infrastructure to support electricity as a viable option, in the shorter term.

The current EU leader in renewable energy is Portugal, at 61%. Their target is 85% by 2030. In part due to the Russian natural gas supply being curtailed, Portugal has transitioned electrical power to wind at 25%; hydro at 23%; solar at 7%; and biomass at 6%. It's natural gas demand dropped 21% in 2023 from 2022 with most of it being delivered via ship.

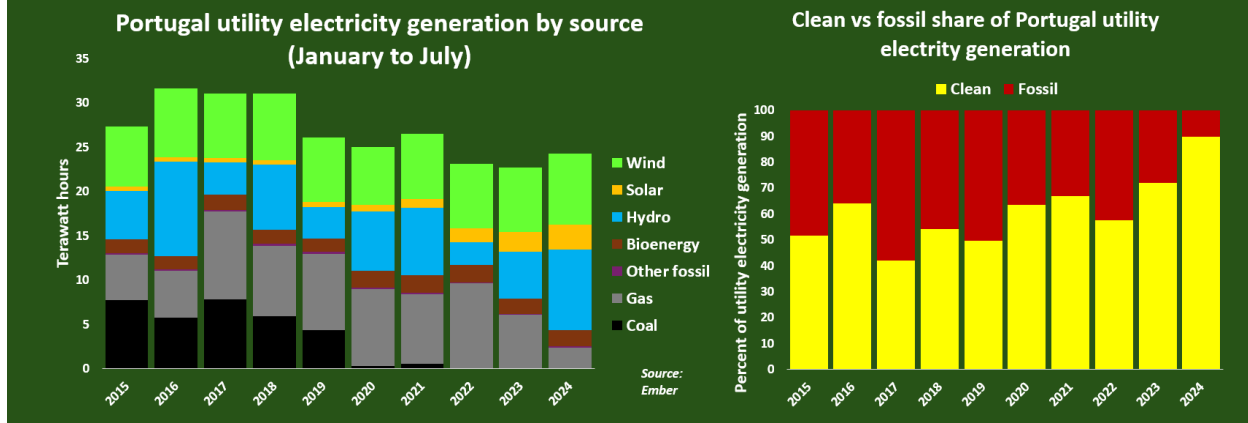
Spain has renewable energy providing 50-60% through wind and solar and has targeted 80% by 2030. Gas is down to ~17% as an energy source. Spain's industrial activity has slowed and is reducing the demand for electricity, in a 2024 Reuter's report. ~80% of Spain's energy is now carbon free. Moeve, Spain's 2nd largest oil company will build an 8B Euro green hydrogen plant expected to generate 2 GW energy by 2030. <https://fuelcellsworld.com/2025/01/29/energy-policy/moeve-set-to-start-europe-s-largest-green-hydrogen-project-in-spain>

The table below shows the year-over-year progress in the EU with their transition away from fossil fuel energy to cleaner energy options. The progress is quite dramatic. Portugal has cut its supply of fossil energy by 50%, exceeding the results of Spain, which also has been very aggressive with their energy strategies.



The following graph provides the greener solutions which Portugal has adopted to achieve their GHG reductions. Wind and hydro power have been a major source of its electricity while coal has been quite negligible over the past 5-years.

Portugal electricity generation by source



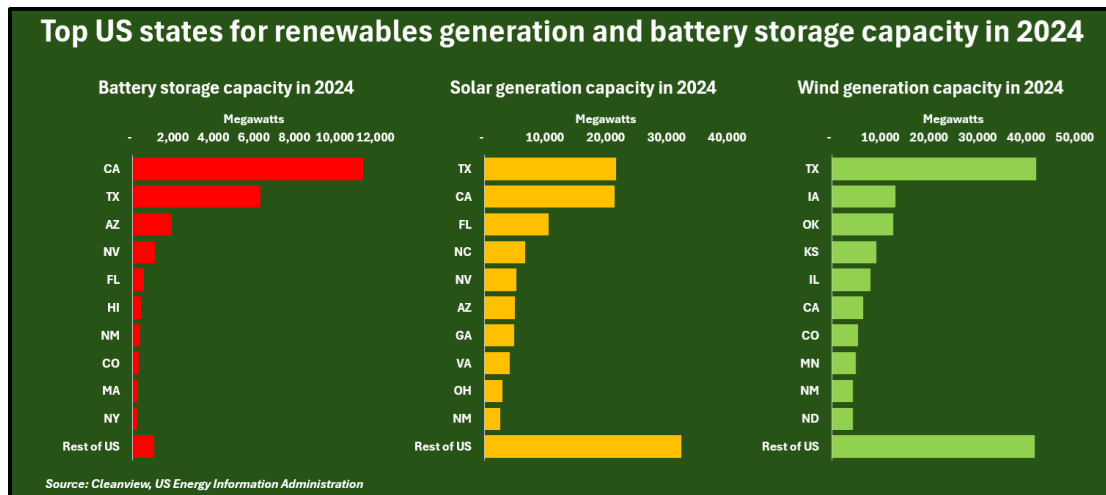
The IEA reiterated the position of China as the global leader in renewables in January 2024. They predict that China will account for 56% of the increases to renewable energy capacity between 2023-2028. This amounts to 2060 GW from China while the rest of the world, combined, will add 1574 GW. As an example, Australian billionaire, Andrew Forrest, in January 2024, announced a project to add 14 GW of clean energy by 2030, which would be 1/3 of Australia's renewable energy target. The IEA forecast a demand of 11,000 GW of renewable energy by 2030 to displace existing fossil fuel energy. Low-income countries in Africa, Asia and Latin America will be hard pressed to find investments to offset their fossil fuel needs. <https://www.reuters.com/sustainability/climate-energy/renewable-energy-growth-must-accelerate-reach-2030-goal-iea-2024-01-11/>

Many issues remain to harness wind power and other renewables to reduce fossil fuel dependencies. One is the technical expertise required to design and build wind and solar plants, operate and maintain them, facing labour shortages. Wind and solar energy compete for the supply of critical raw materials and rare earth metals which drive costs upwards. The International Renewable Energy Agency (IRENA) identified these problems in 2017. Juxtaposing the volatility of prices and governmental financial support compounds the transition options. Wind power in many markets requires a natural gas back up as weather factors affect the energy supply from wind, whereas, gas is more dependable.

Optimistically, solar and wind power, as part of the green energy shift, should continue to reduce in cost as renewables continue to increase as a source of energy. A 2025 IRENA report shows China, India and Brazil as leading countries investing in green energy options. One exception to the advocacy for renewable energy was the lack of support in the USA, notably since 2025. Fossil fuels are highly subsidized many governments, whereas, renewable far less so. <https://www.cbc.ca/news/climate/green-energy-renewables-united-nations-report-1.7591214>

US renewable progress

The state of Texas is the leader in renewable energy and battery capacity within the USA. Texas has been pushing solar, wind, and battery storage since 2019. Along with California, Florida and Colorado they are investing billions in renewables and storage. It's estimated that Texas gets 30% of its electricity from wind and solar, whereas, California gets 40% from these renewables. <https://www.reuters.com/business/energy/texas-tops-us-states-renewable-energy-battery-capacity-maguire-2025-01-09/>



Nature-based options

Ecosystems need to thrive. Over-fishing or farm-fishing leads to serious upsets to the balance in the ecosystem. Consider the problem of *eutrophication*. Eutrophication occurs when excess nutrients, such as fertilizers, are flushed into waterways and harbours. Cambridge University zoologist, David Willer has written extensively on this subject. Left untreated, sea life is killed off by depleting oxygen levels. Thanks to nature's bivalves (oysters, clams, mussels, scallops) they can restore the health of the water and ensure part of the marine ecosystem is sustained. Bivalves continuously draw waste nutrients out of the water as part of their food supply. While western economies view bivalves as more expensive proteins, bivalves will be part of the solution in food security. A major focus is on larger fish and sea products for commercial purposes. Biodiversity in the circular economy is essential and our ability to harvest bivalves can feed us, reduce emissions, and protect the biosphere.

Natural asset management is relatively new to municipal planning but provides scalable solutions for environmental and economic interests. An organization, based out of Victoria, BC, is the Natural Assets Initiative (NAI). NAI provides expertise in helping communities utilize nature's resources to adapt infrastructures to be resilient at a lower cost with reduced risks. Their recommendations result in the effective balancing of nature with engineering-based solutions through science and accounting.

<https://naturalassetsinitiative.ca/>

Poseidon Principles

The Poseidon Principles, drawing on the International Marine Organization (IMO) standards, are used in the marine sector to measure emissions related to shipping financial and insurance portfolios. Standard Charter references the IMO standards, for example. The (4) principles are: Assessment, Accountability, Enforcement, and Transparency. <https://www.poseidonprinciples.org/finance/>

Wind

The Achilles heel for wind is the fickleness of nature. Wind is unpredictable, yet the energy generated is now able to be stored. In a 2023 Reuters report, **Britain** has successfully been harnessing wind power and brought the world's largest wind farm, Hornsea 2, online in August 2022. Wind power generates 26.8% of the country's electrical requirements. This resulted in a 5% reduction in importing electrical energy from France. However, gas-fired plants increased output by 1.8% over 2021-2022 to meet demand.

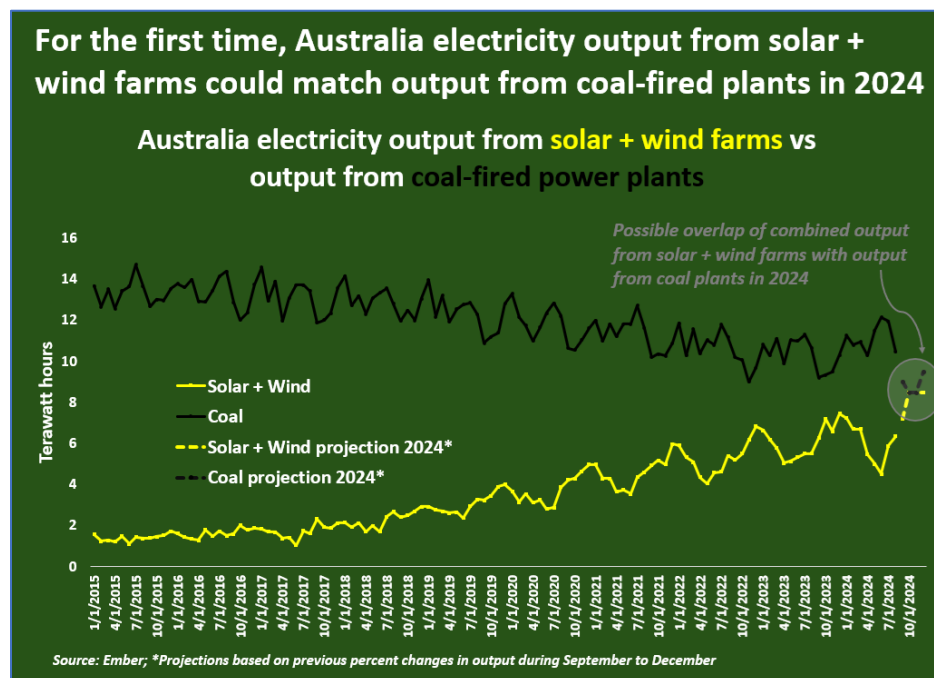
US-based Airloom Energy, redesigned vertical wind turbine towers to horizontal energy systems. Visibly, the Airloom design is not seen on a horizon as a tower farm. Their design is rectangular rather than

circular and requires far less land space. Airloom projects their costs to be more affordable than conventional wind farms. <https://www.airloom.energy/>

Australia's solar and wind energy investments are on target to equal the amount of coal-fired energy in 2024's summer period, for the first time. Renewable energy generation has increased 170% from 2018-2023 while coal decreased by 20%.

Poland cut investments in wind turbines as demand dropped over 2025. In 2025 it was expected that Poland would issue green sovereign bonds to promote renewable energy investments and low-carbon generation projects. <https://www.reuters.com/sustainability/boards-policy-regulation/poland-updates-green-bond-framework-ahead-possible-first-issuance-six-years-2025-06-26/>

Vestas was going to build a turbine factory in Poland but has scrapped this project due to higher costs and US political push back. <https://www.ft.com/content/981c399e-a4a1-4107-9601-0a4740e583e8>



The traditional suppliers of energy such as BP, Shell, and Equinor are trying to hedge their bets on wind against the high yields which continue with oil and gas supplies. In late 2024, BP partnered with **Japan's** power utility JERA to create an offshore wind operation. Their joint venture is valued at Cdn \$ 8.0 B and is targeting 13 GW of power. <https://www.reuters.com/business/energy/bp-jera-form-jv-combining-offshore-wind-operations-2024-12-09/>

Denmark, which was an early adopter of wind energy, has found that the financing of these energy projects is getting more difficult. Denmark uses a tendering process to have bidders invest in wind supply. Orsted, out of Denmark, has been participating in wind generation for a decade but chose to not bid in a 2024 offering citing that inflation, interest rates and distribution bottlenecks added to the increased risks of returns. Denmark did not offer subsidies with their 2024 tender, adding to the risk factors. In early 2025, this resulted in Denmark stopping its offshore wind tendering process and reviewing it for economic values for potential investors. <https://www.reuters.com/business/energy/denmark-halt-offshore-wind-tenders-revamp-subsidy-model-2025-01-31/>

France continues to see investments in renewable energies through TotalEnergies with an estimated ~15% wind power generation. The **UK** estimate is 26% wind; **Germany** with 31%; **Portugal** with 61%; and **Spain** with 23%. **Australia** with 12%; **Canada** with 6%; **USA** with 10%; Sweden with 25%; and **China** with 12%.

The Netherlands, continue to invest in renewable electricity. ~40% of its energy is from renewables, with 60% from wind. Although the wind turbines generate controversy, within its densely populated cities, they are proving to be affordable and acceptable. <https://www.cbc.ca/news/science/windpark-fryslan-1.7537115>

In **British Columbia**, Canada, the province approved 8 wind power projects in late 2024. These are expected to provide 8% more electricity to the power grid by 2031. <https://www.cbc.ca/news/canada/british-columbia/wind-energy-british-columbia-1.7405911>

Carbon offsets

At ~6 million Kms², the Amazon rainforest is often called the “lungs of the earth.” The forest is globally important to reduce GHGs and produces ~20% of our vital oxygen. The Brazilian government is going to help protect this environmentally sensitive region through its ESG bond issue. The plan is to issue ~Cdn \$2B in bonds per year with the proceeds going equally to environmental and social programs. While this sounds appealing to protect the Amazon, Brazil’s government record on managing debt is not great. The issuing of bonds will require substantial oversight. Transparency International historically rates Brazil as one of the more corrupt countries. <https://www.transparency.org/en/cpi/2023/index/bra>

The country of Guyana is considered to be carbon neutral due to its dense forest canopy. It has entered into carbon offset agreements with companies, largely based on protecting its natural habitats. Oil production development will impact Guyana and it has taken steps to balance economic interests with environmental concerns. Guyana has a low population and needs to build its social capital. Guyana has a fragile parliamentary democracy and will hopefully be able to avoid being *resource cursed*. Climate change will occur and will provide a real “laboratory” to measure the effects as it transitions to a petro-economy. Offset agreements are in place with Apple, CNOOC, Exxon, Hess, Meta, Netflix and others. Other carbon neutral countries include: Bhutan, Gabon, Comoros, Madagascar, Niue, and Suriname. <https://www.youtube.com/watch?v=84iOg1XKUkA>

In 2025, the French bank, Credit Agricole, shifted away from precious metal investments and shifting to regulated carbon markets. The EU Emissions Trading System (ETS) is valued at 770 B Euros for carbon dioxide permits. <https://www.reuters.com/markets/europe/credit-agricole-cib-chooses-carbon-trading-over-gold-sources-say-2024-09-16/>

In 2025, mining company Vale, meatpacker Marfig, and bankers Santander, Itau, and Rabobank will start to replant ~2 M trees to restore 2M hectares of the Amazon forests under the Mucununga project. There are an estimated 500,000 carbon credits over 40-years, with each credit worth 1 ton of emissions. <https://www.reuters.com/sustainability/climate-energy/blue-chip-backed-biomas-launches-first-brazil-reforestation-project-2025-04-25/>

In late 2024, the company Amazon and other major companies under the Lowering Emissions by Accelerating Forest Finance (LEAF) coalition, will buy carbon offset credits valued at ~Cdn \$ 200 M to protect the Amazon rainforest.

The organization Carbon Done Right Developments (CDR) has completed a formal 3rd party validation of their rewilding project in Sierra Leone. CDR met the new Verra VM0047 standards for nature-based restorations. Independent validation was done by Earthwood as to the quality, volumes of carbon storage in the newly planted trees, and the legal framework addressing carbon rights and community engagement.

Carbon Done Right completed a 3rd season of planting in Sierra Leone at the end of the 2024 rainy season and was focusing on maintenance and fire management of the 5000 ha area of reforestation. The rewilding project can be expanded to cover 25,000 ha allowing for 10M tonnes of carbon credits at that scale. CDR's CEO is James Tansey, along time advocate for nature-based solutions. <https://www.globenewswire.com/news-release/2025/01/10/3007965/0/en/Carbon-Done-Right-Announces-Closing-of-Second-Tranche-of-Non-Brokered-Private-Placement.html>

In support of the carbon offset markets, SBTi will allow some carbon offsets, announced in early 2024. In a controversial move the SBTi Board said it will allow offsets which are generated through Scope 3 emissions. SBTi maintain that Scope 1 must be reduced and Scope 2 are tied largely to an organization's energy supply. The rationale from SBTi allowing Scope 3 offsets would encourage investments in other GHG reduction projects, freeing up capital to do so. The argument from business is that uncertainty in government policies, emerging technologies, and high costs should allow for Scope 3 emissions to be offset. As a follow up the CEO of SBTi resigned in July 2024 over the controversial change in governance. <https://www.reuters.com/sustainability/companies-get-green-light-use-offsets-supply-chain-emissions-2024-04-10/>

In early 2024, the EU is considering allowing carbon credits for the removal of carbon emissions which currently do not qualify. Carbon removal projects can include planting trees and CCUS facilities. The EU is a proponent of mitigation rather than offsetting emissions. Carbon offsets remain a topic of discussion as being effective in reducing emissions in the supply chain. One concern is that attention on carbon removal may distract from carbon emission reductions currently being generated in production. The estimated global market for CO2 reduction credits is US\$ 100 B per year between 2030 and 2035. By mid-2024 only a comparatively lower investment of US\$32B has been invested in DAC projects and US\$ 11B in nature-based solutions such as tree planting. <https://www.reuters.com/sustainability/climate-energy/global-carbon-removal-market-could-reach-100-billionyr-2030-35-report-says-2024-06-27/>

Amazon began selling carbon credits to customers and suppliers in 2025. The conditions are that they include net-zero targets for Scope 1 as well as others across their supply chain and that they measure and report out on results. <https://www.reuters.com/sustainability/climate-energy/amazon-sell-carbon-credits-suppliers-customers-2025-03-20/>

In mid-2024, Australia moved forward with its carbon credit fund under an A\$3B Emissions Reduction Fund (ERF). The intent is to reduce GHGs by 43% below 2005 levels by 2030 in projects which avoid deforestation, regenerate forests, support carbon sequestration or collect methane from landfill operations. BHP, Rio Tinto, and Qantas have committed A \$53M to establish the carbon credit funds for this accelerated investment. Companies involved in high emitting sectors can buy credits to offset their emissions. <https://www.reuters.com/sustainability/bhp-rio-tinto-qantas-invest-53-mln-australian-carbon-credit-fund-2024-08-12/>

In September 2024, French oil company TotalEnergies, signed a US\$ 100M to preserve US forests to offset its emissions. This will include a reduction in timber harvests in 10 US states. TotalEnergies has targeted US\$ 100M per year to offset 5M tonnes of CO2 annually by 2030. These would be primarily Scope 3 emissions. <https://www.reuters.com/sustainability/totalenergies-invests-100-mln-us-offset-climate-emissions-2024-08-30/>

Cost of Carbon offset credits

Ostrom Climate Solutions Inc. provided a costing of the various methods to mitigate carbon emissions through a market commentary as follows:

Credit type	US price range per tonne Sept 2025	Notes
High quality Nature-based Removal	30 - 60	Steady pricing where corporations continue with strong demand
Improved Forest Management	25 - 45	Strong permanence assurances command a

		premium
High-Quality Mitigation Projects	35 – 60	Increased attention to Asian rice-sector supports price increases
Technology-based Removal	150 - 1000	DAC technologies remain high in cost with lower costs in US and EU in late 2026
Carbon Capture and Storage	200 - 500	US and EU markets showing growth
Biochar credits	100 - 180	Incremental cost increases as methodologies improve

<https://ostromclimate.com/>

Agroforestry

Agroforestry is a set of land management practices used around the world. They encompass the intentional integration of trees or shrubs with other crops or livestock. The five agroforestry systems commonly used in temperate agroforestry include: silvopasture; alley cropping; agricultural riparian buffers, forest farming/food forests; and shelterbelts/vegetative buffers.

<https://www2.gov.bc.ca/gov/content/industry/agriculture-seafood/agricultural-land-and-environment/agroforestry>

Wetlands are an important carbon storage system in addition to supporting many species of insects, wildlife and water fowl. Wetlands refer to a variety of marshes, bogs, peatlands, muskeg, fens, swamps and open water areas. Wetlands filter water and absorb carbon dioxide within an ecosystem. However, when they are damaged through mining or drained for pasture or for warehousing sites, they release tonnes of GHGs. Extracting critical minerals and materials in Canada's north will undoubtedly require damage to wetland areas. It's very difficult to assess the long-term impact to any wetlands which are affected. Once we enter a wetland the footprint remains. <https://www.ducks.ca/stories/iwwr/natural-climate-solutions/>

Assisted migration practices are being used by various jurisdictions to mitigate climate change problems in forests. As temperatures affect the ability of trees to take seed and mature, having people transplant trees from different locales is being seen as a means of ensuring forest cover. While not without controversy, this scientific led practice is a preemptive way to test longer term effects of climate change and assess species survival.

Test case on assisted migration from the Government of Canada site:

In an assisted migration trial in Claremont, Ontario, led by Natural Resources Canada and the Ontario Ministry of Natural Resources, six hardwood species were gathered from four different seed sources and replicated five times. Species and seed sources were selected from locations approximately 500 (Pennsylvania), 900 (Kentucky) and 1,400 (Tennessee) kilometres south of the Claremont planting site, using one local seedzone as a control. Trials such as these and older forest genetics trials are increasingly being used to help address the many questions raised by assisted migration.

Thermal energy

Thermal Energy Storage (TES) technology complements renewable energy sources. TES provides reserve power, energy storage, and increases the efficiencies where heating and cooling are necessary. TES can store heat or cold which can be accessed when required to balance the supply and demand of various forms of energy generation and technologies. Heating and cooling consume ~50% of energy requirements for buildings and in industry. Similarly, long-duration energy storage (LDES) ensures clean

energy is available by capturing the waste or excess energy being produced and having the flexibility to draw from days, weeks, or months later. Solar and wind as energy sources have limitations dependent upon weather and seasonality. TES and LDES smooth the peaks and valleys associated with these forms of renewable energy and support decarbonization.

An example in Toronto of TES involves a massive water storage facility called the *Well*. As part of a district energy system operated by Enwave Energy, the Well provides heating and cooling to 100 buildings. The district heating system takes advantage of wastewater and lakes to use with technology to convert to lower cost energy solutions. <https://www.cbc.ca/news/science/thermal-storage-explainer-1.7163743>

The US Inflation Reduction Act has significantly spurred investments and changed business practices through technology advancements. Battery energy storage systems (BESS) investments are growing significantly. While energy sources can be intermittent, such as solar or wind, BESS offers options to address capacity. There is the potential for BESS to replace backup diesel generators and lead-acid batteries.

Renewable energy is dependent upon batteries to store energy. The emergence of vanadium as an alternative to lithium-ion batteries is on the market. Vancouver based Invinity Energy Systems is making shipping container sized batteries with the capacity to power 15-20 homes. The batteries enable solar and wind turbines to generate the power and store it when the sun goes down or the wind stops to provide reliable energy. The advantage of vanadium batteries is that they can be charged and discharged over 100s or 1000s of cycles; whereas, lithium-ion degrade much faster during the charging cycles. Invinity has production centres in Scotland and Asia.

Hydrogen

IRENA shared some interesting limitations on the use of hydrogen. Hydrogen is not an energy *source*; it is an energy *carrier*. Hydrogen must be manufactured as it does not appear naturally. Pipelines for hydrogen can cost 10-50% more than oil pipelines and currently there are few hydrogen pipelines for transporting the fuel. If hydrogen is produced from fossil-fuels, it adds to the GHGs – although it can be made from renewable electrical energy. The demand for low-carbon hydrogen is not strong. Hydrogen is primarily for road transit in fuel cell EVs (FCEV) and refueling stations. Some municipal fleets operate using hydrogen as they have a limited range of travel and can be fueled from a municipal station.

In contrast, Vietnam is investing in hydrogen production, including green hydrogen, by 2030. They are targeting an output of 10-20 M tons per year by 2050. The 2024 Reuters report states that the hydrogen will replace natural gas and coal-fired energy and be used for transport, fertilizer, steel and cement production.

Latin America is poised to be a big supplier of clean hydrogen. Situated geographically with hydro energy, the region could supply the growing hydrogen market. The political inconsistency in policies and history of corruption need to be addressed. The cost of clean hydrogen runs ~Cdn \$14.00 per Kg while *gray* hydrogen, from fossil fuels, is only ~\$Cdn 1-3 per Kg. The demand side needs to enter into long-term contracts to encourage the Latin investment. Potentially, with infrastructure changes, they could see ~Cdn \$1.50-2.50 per Kg. <https://www.reuters.com/sustainability/climate-energy/latin-america-gears-up-clean-hydrogen-boom-road-is-not-smooth-2024-10-04/>

The EU is trying to establish a hydrogen strategy which favours EU companies over Chinese. China's ability to produce lower cost hydrogen equipment, similar to its EV control, requires governmental intervention to protect EU hydrogen companies. In late 2024, the EU will restrict the maximum content of electrolyzer equipment/parts to 25% Chinese-made on renewable hydrogen projects. The value of the next grant auction is Cdn \$ 2B which will favour EU companies. <https://www.reuters.com/business/autos-transportation/eu-changes-hydrogen-project-auction-rules-limit-chinese-presence-2024-09-27/>

Plug Power Inc. opened its latest liquid hydrogen plant in the USA in April 2025. This Louisiana facility produces 15 tons per day; its Georgia facility produces 15 tons per day; and in Tennessee produces 10 tons per day. <https://www.plugpower.com/blog/hydrogenii-plug-and-olin-celebrate-opening-of-louisiana-liquid-hydrogen-plant/>

In 2023, the Province of BC launched its hydrogen strategy *to advance all aspects of hydrogen projects and facilitate hydrogen's role across British Columbia's energy systems. Priorities include hydrogen production, distribution, storage, end-uses, and export, as well as the setting of policy, regulatory, and other enabling frameworks.* Its Clean Energy and Major Projects Office will be supporting:

- Initial project concepts and investment facilitation for companies
- Regional hydrogen hub development
- Coordination of regulatory, permitting, and environment requirements
- Hydrogen policy and enabling frameworks
- Indigenous participation

In January 2024, BC-based, Teralta began taking byproduct hydrogen from a sodium chlorate plant and refined them for use as hydrogen, clean power for a pulp and paper mill in Prince George. This conversion should reduce the use of natural gas by 25% at the mill. This was one of the first projects approved by the Clean Energy and Major Projects Office.

Prince George, BC is becoming a hydrogen hub with a refueling station for HD duty trucks; a proposed \$5B hydrogen project from Mitsubishi; and a \$2B hydrogen and ammonia plant from Australian company, Fortescue. The province announced \$36B to be invested in expanding the electrical grid by 2034 with clean energy. Currently 70% of the provincial energy demand is being met by conventional fossil fuels such as gasoline, diesel and natural gas. BC-based HTEC is expanding their hydrogen refueling stations across BC, amongst other cleaner energy projects.

In May 2024, the Province of BC announced an expanded hydrogen infrastructure with ~20 hydrogen refueling stations in a highway network. The initial projection is to fuel 300 HD vehicles per day – displacing diesel fuel. The project could add 280 FT jobs in this ~Cdn \$1B investment. The Xaxli'p First Nation will operate a green hydrogen plant on their property in Lillooet. They are hoping to provide fuel for heavy duty trucks, which have converted to hydrogen fuel cells. The hydrogen plant is expected to produce 3500 tonnes per year by 2026.

Hydrogen-powered HD trucks are being reassessed as being more cost effective than EVs. Batteries for e-trucks are too heavy and require too long to recharge. The conversion to hydrogen cells from diesel engines is costly and requires new designs. Volvo and MAN are investing in hydrogen cell HD vehicles. Cummins and other engine manufacturers are redesigning engines for hydrogen. Runner cleaner burning fuel is a priority. The supply of green hydrogen, HD trucks and engines is a signal that EV will have a role but so will hydrogen in this important transportation sector.

The Port of Vancouver trialed a hydrogen-powered container gantry in 2025. This could lead to replacing 25 diesel powered gantries – substantially reducing emissions and supporting the expanded use of hydrogen in BC. <https://www.supplypro.ca/dp-world-pilots-hydrogen-fuel-cell-crane-at-port-of-vancouver/>

CNG

Compressed natural gas (CNG) has had some success in the markets. Several fleet operators use CNG for fuel and claim lower operating costs. The City of Hamilton runs ~130 buses on CNG to reduce emissions and save on operating costs. Ontario's Blue Water Recycling Assoc runs its fleet on Renewable natural gas (RNG) derived from cow manure. Innovative trucking company Hyliion, out of Austin Texas, is a leader in electrified powertrain options for Class 8 semi-trucks. In 2022, Hyliion partnered with Cummins Inc to utilize natural gas and electric engines in the Hypertruck ERX powertrain with onboard power

generation to recharge batteries. CNG has not found favour with the general public commuters due in part to the price difference for a limited choice of CNG vehicles and fueling stations are not plentiful. Honda ceased the manufacturing of its Civic Natural Gas vehicles in 2015 due to low demand and lack of fueling stations.

CNG-powered Class 8, heavy duty hauler trucks, using X15N Cummins engines in Freightliner standard models are operating. The circular economy connection is that the CNG is produced from biomethane. Biomethane is captured from waste such as manure and landfills and processed into natural gas. Methane is 25 times more potent than CO₂ emissions. Chevron distributes the renewable CNG fuel. Walmart continues to integrate alternative fuels into its 10,000-vehicle fleet. The advantage is that CNG already has a distribution network and can be adapted to fuel conventional truck designs

LNG

Liquid natural gas (LNG) burns 40% fewer GHGs than coal when producing electricity. For many Asian countries, buying Canadian LNG could reduce their overall emissions. LNG is big contributor to our employment and the economy. LNG is used in long-haul fleets but not for commuter vehicles due to onboard storage capacity, lack of filling stations, and ultimately insufficient sales. The caveat with LNG is that it emits much higher volumes of methane gases. In July 2023, the International Maritime Organization completed stricter global emission standards. The IMO went so far as to say that while LNG will be allowed for marine shipping fuels in cruise ships and container ships, the long-term use of LNG does not meet new emissions standards. By 2025, the European Union is expected to issue new LNG standards aimed at decarbonizing the maritime sector, according to the IMO. LNG as a long-term alternative energy appears to have a much shorter shelf life for investors. This will also impact the oil and gas sectors.

In June 2024, Prince Rupert, BC moved forward with a Cdn \$1.35B LNG exporting and LPG storage terminal on Ridley Island. This is after a 5-year environmental review process. The port of Prince Rupert is the 3rd busiest in Canada, after Montreal and Vancouver. The project is expected to generate decades-long annual return of ~Cdn \$200 M per year starting in 2026.

LNG is a growing market and Canada lost opportunities to get into market due to various delays over the past decade. The US and other exporters filled this void as Canada played *catch up*. LNG is necessary energy option to assist in the transition away from fossil fuels, as economic interests require a sustainable and affordable transition. The 1st shipment of LNG to Asia was made from Kitimat BC in July 2025. By contrast, the US LNG exports, constructed or proposed by 2030, are ~161.2 MPTA while Canada could export ~30% of this volume. <https://financialpost.com/commodities/energy/oil-gas/canada-first-cargo-lng-sets-sail-buyers-asia>

LNG demand is expected to grow by 50%+ by 2040. Countries such as China and South Asia use LNG for their economic growth. Reuters reports that LNG demand has eased in the EU, Japan, and Australia but China alone, will command much of the supply of LNG for decades.

Canada's LNG project status 2025

Exports, 50.3 million tonnes per annum (MTPA)

Export Licence – 40 years

LNG Canada Phase 1 - Kitimat, B.C.

Status: Operational summer 2025 14 MPTA

LNG Canada Phase 2 - Kitimat, B.C.

Status: Awaiting final investment decision 14 MPTA

Cedar LNG - Kitimat, B.C.

Status: Under construction 3 MPTA

Woodfibre LNG - Squamish, B.C.

Status: Under construction 2.1 MPTA

Ksi Lisims LNG - Gingolx, B.C.

Status: Awaiting regulatory assessment, government approval and final investment decision 12 MPTA

Tilbury LNG Phase 2 - Delta, B.C.

Status: Awaiting regulatory assessment, government approval and final investment decision 2.5 MPTA

Summit Lake PG LNG - Prince George, B.C.

Status: Yet to apply for an export licence 2.7 MPTA

<https://www.cbc.ca/news/canada/calgary/canada-major-lng-player-1.7571405>

In sharp contrast to many western markets reducing their fossil fuels, India is the largest coal-dependent economy and continues to expand its coal sector, which has grown 8%+ in 2023. Shares of mining operation Coal India and power generator NTPC soared 55% and 78% respectively. Reuters sees coal demand dropping in the EU and the US by 20% in the same period. By comparison, shares of Australian coal miner Whitehaven have dropped 22% and South Korean power generator KEPCO, are also in negative territory. In 2023 India added 4 GW of coal-fired energy, which is 4 times the amount since 2019. In July 2024, India's government is pushing its power companies to investment Cdn \$ ~40B to expedite coal-fired power to meet electricity demand for 2030. India's current strategy is to remain dependent on fossil fuels until at least 2040, as the world's #3 importer and consumer of oil. India's commitment to Net-Zero is targeted for 2070. India began receiving oil from Russia in a 2024 long-term agreement. India will take 500,000 bpd, valued at US\$ 13B over a 10-year period. This supply agreement irks the US which is vying for trade agreements with India. India is a BRICs member as well.

<https://www.ctvnews.ca/world/article/india-indicates-it-will-keep-buying-russian-oil-despite-trumps-threats/>

90% of emissions from apartments, houses, offices, shops, schools, and industrial buildings is from natural gas. Natural gas was and is primarily one of the most affordable energies in Canada. The town of Squamish took the step to ban natural gas in new construction. Fortis BC, the major supplier of natural gas has gone on record that it does not want to accelerate the move away from fossil fuels in their massive distribution system. The Metro Vancouver climate board is pushing to move away from natural gas and renewable natural gas much quicker. Renewable natural gas is made from organic farm waste, land fill sites, and water treatment plants, which Fortis provides. The city of Nanaimo announced it will ban natural gas heating in new home construction effective July 1, 2024. This will have a ripple effect with reduced sales of natural gas fireplaces and appliances, affecting many SMEs in this sector. Restaurateurs will need to rethink their cooking options and locations if natural gas is not going to be available.

In July 2024, the City of Vancouver walked back its commitment to ban natural gas in new construction. In a controversial vote, they will allow natural gas for heating and hot water in new construction. The rationale was based on trying to address affordability and expediting building permits. This is an example of the reluctance of investors and builders to jump in too early where policies can be amended according to the leadership at the time.

Canadian federal government policy is to phase out natural gas heating systems and replace with heat pumps in all new construction. GHG reductions require a net-zero emissions over the next 25-years. This will require hydroelectricity to be the energy source of the day unless other renewable energy costs are

more attractive.

In British Columbia, the provincial government has introduced *Step 1 of the BC Energy Code for Part 9 Buildings*. In 2023, this is voluntary, performance-based compliance model applies to new residential buildings. However, municipalities and towns can apply the Code to ensure energy efficiency in new construction exceeds the basic requirements of the BC Building Code. The Code states the energy efficiency which must be achieved and the builder decides how to construct it to meet and exceed these requirements. One of the recommendations is to incorporate at least one temperature-controlled room as reported by Andrea Woo, in the August 18, 2023 Globe and Mail. This room should not exceed 26°. The BC Energy Code *requires that all new buildings be net-zero energy ready by 2032*.

The VP of the Canadian Home Builders' Assoc of BC, Mark Bernhardt, supports the changes to the BC Building Code. As a builder and developer, he says the Code has encouraged designs which reduce the use of energy. The design changes can include extra insulation, larger roof overhangs on south-facing overhangs to provide shade, and exterior roller blinds on east- and west-facing windows. Vivian Loftness, a professor of architecture at the University of Pittsburgh, reiterates that home designs can reduce the indoor temperatures. *Cool roofs* which reflect more sunlight, strategic window placement, rainscreen facades which have a gap in the exterior cladding, high-efficiency heat pumps, transom and windows with exhaust fans, can reduce interior temperatures. These design nuances are most effective up to 30°-40°. Portable air conditioners are a band aid. Central AC adds to energy consumption. New construction will be affected by the changes to the Building Code, so long-term outcomes will take decades to be realized. The changes to the building code are an important signal that design, which is fundamental in the circular economy model, is at the heart of making a difference, within our sphere of influence. http://energystepcode.ca/app/uploads/sites/257/2019/08/BCEnergyStepCode_GuideDigital_v02July2019.pdf

The changes in the building code may be rooted in the success of the Passive House design. Originating in Germany in the late 1980s, passive buildings are ultra-low energy for heating or cooling. Passive designs are used in residential, commercial and in the construction of schools. Passive Buildings Canada characterizes passive houses as being air tight, no heat transferred from inside to outside, balanced ventilation, triple paned windows, super insulated, shaded and land placement considerations.

Related to the passive concept is the Centre for Interactive Research on Sustainability (CIRS) building at the University of British Columbia. Conceived by Professor John Robinson, it opened in 2011. After challenges to the existing building codes were overcome, the CIRS building is net energy positive, utilizes 100% collected rain water, local building materials, reuses reclaimed waste water, designed to optimize natural lighting, and relies on natural air ventilation. The building is certified LEED Platinum.

E-methanol

E-Methanol or green methanol, produced from green hydrogen is another form of renewable energy which is low carbon. Where electrification may not be feasible in some industries such as cement and steel, e-Methanol could meet the technical requirements. Blue hydrogen is produced from natural gas, which is not as clean as green hydrogen, produced from water.

There is increased interest in the use of green-ammonia to compete with green-hydrogen. Ammonia has ~twice as much energy as liquid hydrogen by weight and ~nine times the energy density of lithium-ion batteries. With 90% of global trade linked to marine transport and the commitment by the International Maritime Organization to reduce emissions by 50% by 2050, from 2008 levels, greener energy could be the catalyst. As a first, engine manufacturer Wartsila will supply ammonia fuel for a Norwegian platform supply vessel in 2025.

Maersk is targeting to use 15-20% green fuel such as green methanol by 2030 to displace 5 million

tonnes of diesel fuel in its fleet of vessels. Maersk committed to buying bio-methanol from China's LONGi Green Energy Technology starting in 2026. In 2025, Denmark began its e-methanol operation which will produce 42,000 tonnes per year, which is a scalable solution.

<https://www.reuters.com/sustainability/climate-energy/worlds-first-commercial-scale-e-methanol-plant-opens-denmark-2025-05-13/>

Nuclear

Energy, produced through nuclear *fission*, has been considered as a means of achieving carbon neutrality. Nuclear investments are included in the EU green Taxonomy. In Canada, Bruce Power and Ontario Power Generation (OPG) see nuclear energy as a key contributor to its Net Zero climate change goals. The companies have partnered to evaluate potential opportunities for deploying small modular reactors (SMRs). SMRs are lower in capital and can be used to replace coal-fired plants and provide power to smaller communities.

In 2025, Ontario Power Generation is constructing SMRs near the Darlington nuclear site in Ontario and hopes to have its first SMR online by 2030 at a budget of \$12B Cdn. There are (4) new SMRs budgeted at ~\$21B by the Ontario government. Ontario refurbished its 50-year-old Pickering nuclear station beginning in 2024 and plans to run it for ~30-years to meet electrical demand and meet clean electricity regulations set by the Federal government. The project is estimated to take ~11-years. Nuclear energy meets about 50% of Ontario's demand. <https://www.cbc.ca/news/canada/toronto/small-modular-reactor-nuclear-power-ontario-construction-1.7529338>

Thailand is looking at SMRs to solve its energy problems in the coming decade. Importing LNG to generate electricity has been one option to offset their shrinking LNG reserves but SMRs could be viable. SMRs have a lower capital cost per unit but economic sustainability is still uncertain. In July 2024, France has agreed to use existing SMR designs to reduce the cost of expanding the use of SMRs. <https://www.reuters.com/business/energy/frances-edf-drops-plans-develop-its-own-small-nuclear-reactor-technology-2024-07-01/>

Of significant note in December 2022, was the historical, technological breakthrough to produce clean energy through nuclear *fusion*. This was achieved by scientists at the Lawrence Laboratory's facility in California. In 2025 Helion Energy began the first nuclear fusion site in Washington state. It is expected to provide power for the AI sector and has Microsoft's commitment to buy clean power by 2028 from Helion's site. <https://www.geekwire.com/2025/groundbreaking-fusion-helion-eyes-rural-wash-for-worlds-first-plant-despite-unproven-tech/>

The emotional backlash by protesters against nuclear energy does not seem to be substantiated in scientific evidence. The Chernobyl and Fukushima disasters are the images which add to the skewed information on the benefits of nuclear. Technology in nuclear energy has advanced since the designs of the 1960s, as has our design of vehicles. Over 1 M people die *per year* from car accidents, while deaths from nuclear energy is a fraction of this. Ban cars? I don't think so. The US and Japan agreed in early 2024 to partner and accelerate the development and commercialization of nuclear fusion.

In late 2024, the US government is earmarking Cdn \$1B for small modular reactor technology to be developed as there are low emissions from SMRs to support climate change strategies. Amazon wants to buy nuclear energy from proposed SMRs in northwestern USA. Microsoft and Alphabet are buying into SMR energy generation to meet the demands of crypto and AI data centres and hope to have SMR access by 2030.

A hangover from nuclear energy is the spent reactor fuel. It's estimated that there are 90,000+ tonnes of spent fuel being stored in the US alone, with 2000 tonnes of waste being added every year. Burying is the only viable option at present with most sites facing lengthy legal battles delaying solutions. Canada began final approval of its nuclear waste site storage facility in Northern Ontario through the Nuclear

Waste Management Organization (NWMO) in late 2024. The site selection was 15-years in the making and still requires further regulatory due diligence in order for the \$26B project to move forward.

<https://www.cbc.ca/news/canada/thunder-bay/nuclear-waste-storage-site-chosen-1.7395660>

Geothermal

One renewable energy gap which Canada has not closed relates to geothermal supply. Canada has very few geothermal energy generation installations or projects in place. We are one of the few Pacific Rim countries to not exploit geothermal as a renewable source. Consider that Iceland, 50-years ago was dependent on imported oil for energy and has now transitioned to geothermal energy. Reykjavik is supplied with direct use geothermal energy. Hot water near the surface is piped into buildings for heat and distributed through District heating systems for multiple types of buildings. Geothermal investment has not caught the attention of government or investors, who compete against other energy sources with lower upfront costs. But in the long-term, geothermal could be the cleanest and lowest cost renewable energy source for many parts of Canada.

There is a tremendous potential for the US to expand the use of geothermal energy. Shale drilling techniques, which led to the controversial fracking practices, could be applied to tapping into geothermal sites. Per the IEA, this could provide the much-needed electricity for data centres.

<https://www.reuters.com/business/energy/shale-drilling-techniques-could-lead-geothermal-surge-iea-says-2024-12-13/>

Germany is increasing its geothermal investments starting in 2024. The government wants to expedite geothermal development and is going to support legislation and approvals to fast track this renewable energy source. <https://www.reuters.com/business/energy/germany-expedite-approval-processes-geothermal-plants-2024-06-28/>

Since 2010 Vancouver has been using technology to provide energy from sewage and wastewater systems to 4900+ residential suites and 30+ buildings. In mid-2024, the Toronto Western Hospital will use wastewater to heat and draw lake water to cool the facility. This will reduce energy costs and emissions dramatically. This is a scalable solution being considered by several other cities in Canada.

<https://www.cbc.ca/news/science/what-on-earth-sewage-heat-1.7136741>

One breakthrough for geothermal operation is in Hinton, Alberta. Novus Earth is addressing the need to decarbonize energy through its innovative and pragmatic direct-use geothermal, closed loop design, to provide power to the nearby city of Hinton. With support from several levels of government, Novus Earth is enabling local agriculture, aquaculture, vertical farms, enhanced tourism and recreation as part of their Latitude 53 Project. The geothermal system can service forestry and pulp mill operations in a cleaner energy model and creates jobs in the community. A scalable design which will sustainably drive economic and social benefits while mitigating environmental impacts. <https://novusearth.ca/latitude53project/>

The transition from international oil and gas energy supply to renewables will, in all likelihood, involve the major oil companies. Their balance sheets can afford the investment; they have a history of running complex projects; they have experience with hydrogen fuels; they will maintain the backstop of supply until the various renewables can affordably displace fossil fuels. The gas and oil companies have taken stakes in renewable energy and will be poised to be the suppliers of *new* forms of energy as they exit from their legacy models.

To prove this point, Exxon Mobil Corporation announced in November 2023, it will be a leading producer of lithium for EV batteries by 2030. Beginning in Arkansas, Mobil will start its mining operations using DLE technology for extraction. *“Lithium is essential to the energy transition, and ExxonMobil has a leading role to play in paving the way for electrification,”* said Dan Ammann, president of ExxonMobil Low Carbon Solutions. *“This landmark project applies decades of ExxonMobil expertise to unlock vast supplies of North American lithium with far fewer environmental impacts than traditional mining operations.”*

International Battery Metals (IBAT) is providing portable DLE operations. The IBAT footprint is ~3 acres (1.2 hectares) which is far less than the hundreds of acres required for evaporation ponds or open-pit sites. Chile, with some of the largest reserves of lithium, wants to phase out the use of evaporation ponds and replace it with DLE technology. Lithium, ironically, requires millions of gallons of water to produce enough materials for batteries. This can contribute to more environmental problems which it is hoping to mitigate. A nanotechnology from Calgary-based startup Litus, creates minimal waste and uses minimal water to produce lithium. https://www.thestar.com/business/mars/little-wonder-this-calgary-company-uses-tiny-tech-to-lessen-the-impact-of-lithium-extraction/article_b0fbefca-e56d-11ee-8ee8-9fb77e4e5005.html?utm_medium=social&utm_source=email&utm_campaign=user-share

In a global conversation, the meeting of leaders at the 2023 COP 28 Summit, in Dubai, drafted a commitment addressing the need to move away from fossil fuels. The breakthrough agreement calls for *transitioning away from fossil fuels in energy systems, in a just, orderly and equitable manner, so as to achieve net zero by 2050 in keeping with the science.*

The draft agreement included:

- Tripling renewable energy capacity globally and doubling the global average annual rate of energy efficiency improvements by 2030;
- Rapidly phasing down unabated coal and limitations on permitting new and unabated coal power generation;
- Accelerating zero and low emissions technologies, including, renewables, nuclear, abatement and removal technologies, including such as carbon capture and utilization and storage, and low carbon hydrogen production, so as to enhance efforts towards substitution of unabated fossil fuels in energy systems.
- Reducing both consumption and production of fossil fuels, in a just, orderly and equitable manner so as to achieve net zero by, before, or around 2050 in keeping with the science;
- Accelerating and substantially reducing non-CO2 emissions, including, in particular, methane emissions globally by 2030;
- Accelerating emissions reductions from road transport through a range of pathways, including development of infrastructure and rapid deployment of zero and low emission vehicles;
- Phasing out of inefficient fossil fuel subsidies that encourage wasteful consumption and do not address energy poverty or just transitions, as soon as possible."

While words are not actions, it is important to note that there was a fear factor from fossil-fuel dependent countries and regions that the COP 28 statement might start the phasing out of fossil fuels. Historically, these voluntary commitments to reduce GHGs or to reduce the global temperature, have not been fully honoured. An Associated Press summary of the last 25-years of climate talks, shows that we haven't moved the needle very much in the efforts to reduce the global temperature. The strategies to achieve the targeted GHG reductions are a Rubik's Cube of machinations with over 200 countries trying to protect their self-interests. In 2025, the USA withdrew its UN climate damage funding support.

While the headlines say that coal is being phased out, China expects to increase its demand for coal until ~2030; and India will continue with coal energy until 2040.

The 1997 Kyoto Protocol was finally enacted in 2005 without China or the USA signing on to it. Canada pulled out of Kyoto in 2011. At the 2009 Copenhagen talks, the developed countries agreed to fund emerging economies with \$US 100B by 2020. This did not happen and most of the funds were attached to loans, adding to the debts of poorer countries. The 2015 Paris Accord was seen as the most effective with a non-binding agreement to slash GHGs, without sanctions for failing to do so. In 2021, at the COP

26 Glasgow summit talks, delegates agreed to phase *down* coal, not phase out coal. China and India, which are reliant on coal-fired energy, demanded a softening on the phase out of coal. The COP 2022 talks in Egypt led to more voluntary funding for damages caused in poorer countries due to climate change. Coal emissions continue to rise with India expanding the use of coal. These examples of failed actions contribute to the apathy amongst citizens which are dependent upon leaders taking actions and having accountability. <https://www.cbc.ca/news/science/5-cop-decisions-1.7057734>

The intent of the carbon taxation strategies was to financially force emitters to transition to non-fossil fuel sources of energy; and for consumers, reducing their options on energy use through restrictions on natural gas and other fossil fuels. The price differential between the cost of gasoline and EV operating costs, will make EVs less attractive. **Effective April 1, 2025 the consumer carbon tax was eliminated on gasoline, diesel, and natural gas.**

While the carbon tax was not seen as being ideal, if we agree that global warming is due to fossil fuel emissions, and there are viable technology solutions, then there will be a new form of financial incentives required to support industry and consumers to adapt to the climate change. The industrial carbon tax program will be reviewed subsequent to the 2025 Canadian election.

The US does not see the transition away from fossil fuels as a short-term priority. The EU is going to ensure its carbon emissions strategies ensure their markets are competitive. Canada, will need energy policies that can bridge the transition to cleaner energies and address supplying competitive products in a global market.

To posit more on future carbon taxes at this juncture would exceed this author's erudition of the markets. It would be speculative at best; and misguided at worst. We will follow the clash of competing interests and assess the impact on carbon taxes and emissions.

Carbon taxes

The carbon tax strategy has been criticized in Canada since its inception two decades ago. Canada's 2025 federal election affected revisions to previous carbon tax and emission reduction strategies. This will add to the investment risk which has been made and future plans for investing in green options in all sectors. The EV sector's investment in supply chain strategies could be turned on its head. Governments have propped up the EV sector and will need to revise their policies on these subsidies.

<https://www.ctvnews.ca/politics/liberal-leadership/article/if-he-becomes-prime-minister-mark-carney-will-immediately-remove-the-carbon-tax/>

All forms of carbon pricing models are complex and not without controversy. Canada has a mix of federal/provincial/territory carbon pricing plans in effect. There are several regional carbon pricing models in effect as well. All carbon emission strategies try to balance the need to decarbonize operations in the long-term without crippling the economy in the short-term.

The successful use of the sulfur dioxide (SO₂) cap-and-trade system to reduce acid rain in the 1990s, resulted in 50% less SO₂ emissions with affordable compliance costs and helped to clean up the Great Lakes' region along the Canada/US border. This led to the development of the European Union's Emission Trading System, the world's largest cap-and-trade system. The two key components of Canada's carbon pricing strategy are the federal fuel charge; and a regulatory trading system for industry.

There are (5) carbon pricing models used by various global jurisdictions to deal with the carbon content, primarily from coal, petroleum, and natural gas:

- carbon taxes
- cap-and-trade
- emission reduction credits
- clean energy standards
- fossil fuel subsidies

The two standards for climate policies use either a technology-based standard or a performance-based

standard. *Technology*-based require the use of specified equipment, processes or procedures where policies require particular forms of energy-efficient equipment, combustion methods, or methane gas collection practices. Due to the multiple types of GHGs from various sectors, any one technology would likely not meet the diverse requirements and lead to limited technical options.

Performance-based standards set targeted levels of allowable emissions or emission rates, where regulated companies opt for a technical solution which fits their business financial needs and objectives. Examples could include reduced tCO₂e from production facilities or vehicle fuel efficiency per km. The inherent limitations of technical or performance solutions can be addressed through carbon pricing, most often referred to as carbon taxation.

Methane gas emissions were measured in 2024, using a spectrometer flying over various oil and gas basins. The EPA estimates prior to the new testing technology were ¼ of the 7.5 M tonnes per year. The new technology is far more reliable than making estimates from earlier industry reports.

<https://www.reuters.com/business/energy/drillers-emit-far-more-methane-than-us-estimates-aerial-survey-shows-2024-07-31/>

Canada's decarbonization strategy includes an Output-based pricing system (OBPS) which took effect in Ontario, New Brunswick, Prince Edward Island and Saskatchewan in January 2019. The OBPS falls under the Greenhouse Gas Pollution Pricing Act. The OBPS was intended to get commitments from industrial facilities to reduce their GHGs. Under an OBPS industrial facilities pay on their emissions that *exceed* a target level. Those which emit less can earn carbon credits which they can bank or sell to other companies needing to offset emissions. <https://www.canada.ca/en/environment-climate-change/services/climate-change/pricing-pollution-how-it-will-work/output-based-pricing-system.html>

Carbon taxes were seen as the most efficient means of starting to meet the financial requirements of a decarbonized world. The tax on the volume of carbon emissions requires that producers factor this cost into their final goods. Therefore, everyone pays. Referred to as *internalized* costs as opposed to *externalized* – where society pays for the additional cost of disposal or cleaning up the air, water or land. The carbon tax implies an even playing field. When all producers pay, all their customers pay and there is no advantage or disadvantage, within Canada. But this can make Canadian companies less competitive outside of Canada.

A geopolitical challenge is where countries do not respect ESG goals and allow producers to be exempt from carbon taxes and simply pocket their profits. This *leakage* is not great; however, energy-intensive companies could be attracted to lower cost countries. Where mature markets push carbon taxes too high, they risk having companies relocate to more beneficial tax regimes.

Taxes tend to focus on the carbon content of upstream emitters such as gas and oil producers, coal mining, refineries and fuel importers, or LNG terminals. There are fewer companies to deal with than the downstream market. The latter involves the thousands of companies which burn fossil fuels for energy and driving, as an example. The upstream players pass along the increased costs which adds to the cost of doing business in order to reduce emissions. Tax incentives are provided for investing in emission reducing technologies or CCUS. Tax relief on higher energy costs is provided to lower income earners in the form of tax rebates.

In Canada, the carbon pricing has two sides. The *consumer* and the *industrial* impact. A 2024 report from the Canadian Climate Institute shows that industrial emission reductions have been 3 times more effective than consumer-paid options. While the two strategies should achieve a 50% reduction by 2030, the consumer-paid options only accounts for ~10% with the balance through industrial adoptions. Carbon taxes are paid by the *current* generation for the benefit of the next generation by reducing long-term emissions. The carbon pricing has become more politically charged and based on emotions of affected groups rather than on scientifically based outcomes. The consumer portion of carbon taxes was

reduced to zero, effective April 2025 in Canada.

Cap-and-trade systems basically work by having governments set a cap or maximum volume of emissions across a market sector. Annual permits allow for a specified tCO₂e or other pollutants by each producer. Over time the government reduces the number of permits which incentivizes companies to reduce their emissions more efficiently. Companies which cannot meet the targets must pay a tax or buy credits from other emitters which have met their reduction targets.

The Province of British Columbia introduced one of the first carbon tax systems in Canada, in 2008, using a tax of \$10/tCO₂e. It is aimed at upstream providers and is legislated to be revenue neutral, through tax cuts for individuals and businesses. As of 2023, the carbon tax has increased to \$65/ tCO₂e. There are also provisions for exemptions for specific types of energy and their purpose. For example, greenhouse operators can receive *partial* exemptions for *qualified* crops. Partial exemptions are applied on the use of natural gas and propane for an eligible purpose. Qualified crops include: Vegetables, fruits, bedding plants, ornamental plants, tree seedlings, and landscape plants. Eligible purpose refers to the fuel used to heat an eligible greenhouse in order to grow or produce plants. Quite a system to navigate for a small business owner.

The Province of Alberta implemented a performance model for large emitters, targeting a 12% reduction over 2007 baseline volumes. This encourages all players to reduce emissions regardless of the technology deployed to achieve the outcome. Alberta's model involves tradable credits to develop cleaner energy sources. In late 2023, the Federal government sought further emission reductions from the gas and oil sector which directly affects Alberta and Saskatchewan producers. Both provincial governments felt this was changing the goal posts and object so politically, as their oil and gas sector have committed to CCUS and other emission reductions, which would not impede production increases. In response to the increased emission reductions. Some oil and gas sector companies are dragging their feet on further emission reduction investments, in hopes that a change of federal government will provide tax relief. <https://www.reuters.com/business/energy/some-canadian-oil-firms-await-trudeaus-fate-rather-than-cut-emissions-faster-2023-12-19/>

In 2010, the IEA estimated that eliminating fossil fuel subsidies, resulting in lower consumption, would reduce global tCO₂e by 2 gigatons per year by 2020. The fossil fuel subsidies were estimated to be valued at US\$660B by 2020 without policy reforms.

The 2024+ global demand for oil and gas production indicates a growth in this sector. This will result in an increase in emissions, with little possibility to offset these emissions, as fast as they are being generated. An emissions cap is an option being argued by the influential International Institute for Sustainable Development and is not being welcomed by the industry sector. For 2024, the IEA forecast the supply of oil to increase by 1.5 million bpd to a record 103.5 million bpd from outputs from the US, Brazil, Guyana, and Canada. The IEA reported that energy emissions reached 37.4 billion tonnes in 2023, or an increase of 1.1% in a March 2024 report. This is another signal that we have not been successful in our efforts to achieve targeted reductions as an aggregate value.

Food security

Guidelines for improvement

Food security is defined by the World Bank, drawing from the 1996 World Food Summit, under four main dimensions being met simultaneously:

1. Physical *availability* of food: Food availability addresses the “supply side” of food security and is determined by the level of food production, stock levels and net trade.

2. Economic and physical *access* to food: An adequate supply of food at the national or international level does not in itself guarantee household level food security. Concerns about insufficient food access have resulted in a greater policy focus on incomes, expenditure, markets and prices in achieving food security objectives.
3. Food *utilization*: Utilization is commonly understood as the way the body makes the most of various nutrients in the food. Sufficient energy and nutrient intake by individuals are the result of good care and feeding practices, food preparation, diversity of the diet and intra-household distribution of food. Combined with good biological utilization of food consumed, this determines the nutritional status of individuals.
4. *Stability* of the other three dimensions over time: Even if your food intake is adequate today, you are still considered to be food insecure if you have inadequate access to food on a periodic basis, risking a deterioration of your nutritional status. Adverse weather conditions, political instability, or economic factors (unemployment, rising food prices) may have an impact on your food security status.

The Food Policy for Canada is an aspirational model which aligns with the UNSDGs. The targets are:

- SDG 2 (Zero Hunger), Target 2.1: By 2030, end hunger and ensure access by all people, in particular the poor and people in vulnerable situations, including infants, to safe, nutritious and sufficient food all year round.
- SDG 3 (Good Health and Well-Being), Target 3.4: By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and well-being.
- SDG 12 (Responsible Production and Consumption), Target 12.3: By 2030, halve per capita global food waste at the retail and consumer levels and reduce food losses along production and supply chains, including post-harvest losses.
- SDG 13 (Climate Action), Target 13.3: Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning. <https://agriculture.canada.ca/en/departement/initiatives/food-policy/food-policy-canada>

These are aggressive targets and given the need for increased visits to food banks across Canada, may not be on track to achieve the intended outcomes.

A UN Food Summit recommended the adoption of *nature-positive* food systems. According to the World Economic Forum, nature-positive means a *nature positive approach enriches biodiversity, stores carbon, purifies water and reduces pandemic risk. In short, a nature positive approach enhances the resilience of our planet and our societies.*

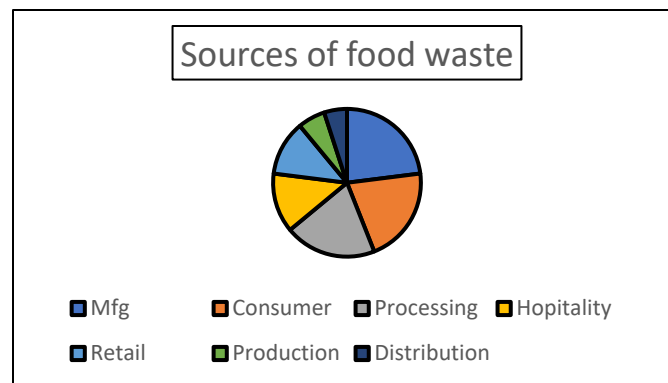
The Ellen MacArthur Foundation challenges the FMCGs and retailers to enact nature-based food products into the mainstream for consumers. Their (5) recommendations are:

1. Create ambitious and well-resourced action plans to make nature-positive product portfolios a reality
2. Create a new collaborative dynamic with farmers
3. Develop iconic products to showcase the potential of circular design for food
4. Contribute to and use common on-farm metrics and definitions
5. Advocate for policies that support a nature-positive food system

Food waste

One of the global paradoxes having enough food produced to feed the world, yet 1 billion people do not have enough food. The inequity in food distribution is a major contributor to this problem. The developed economies have a surplus of foods which leads to waste, while the developing countries go without, for reasons of political and economic difficulties. It's been estimated that 40% of the entire food supply chain is being lost through waste.

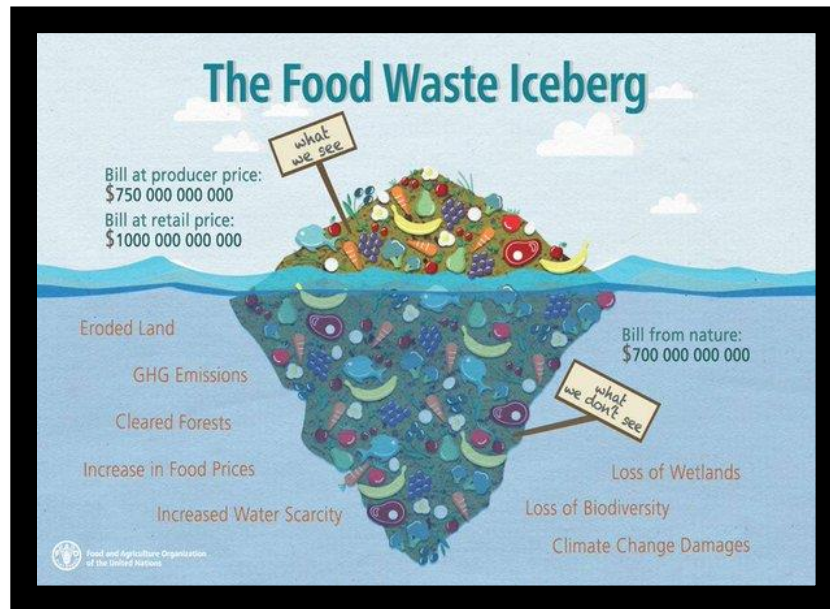
The 2019 report *The Avoidable Crisis of Food Waste*, from Value Chain Management International, found that 66% of occurrences of food waste were from manufacturing, consumers, and processing; the hospitality sector accounted for 13%; and retail, production and distribution made up the balance of 23%.



Consumer behaviours, excess food production methods, and marketing campaigns have combined to create a lot of unnecessary food waste. The colours, sizes, and shapes of food influences our decisions as to what we should buy. Grocery stores set arbitrary standards as to what appears to appeal to consumers and culls perfectly nutritious foods due to their lower cosmetic image. Organic produce is more susceptible to artificial applications of selection criteria and increases costs. Waste which the circular economy sees as a resource, includes not only the products but the consumption of enormous quantities of water and nutrients to produce the goods.

Case in point: As they've done many times, the Heppell farm in BC, organizes and gives away tonnes of fresh produce. On one occasion 15 tonnes of potatoes; 10 tonnes of carrots; 1 tonne of beets; and 2 tonnes of squash to anyone who could use the produce. Heppell asks that donations be made to a local food bank for the produce they donate. Heppell can't sell the perfectly edible produce due to its appearance not meeting the cosmetic standards of larger produce retailers. He estimates that 20% of the local population relies on local food banks. Heppell calls this the Ugly Potato Day! Unsold produce typically ends up as animal feed.

Food and Agriculture Organization of the UN Food Waste Iceberg



Role of consumers in food security

Consumer food trends in developed countries often favour *fast* foods. Fast foods temporarily sate a feeling of being hungry but lack the necessary nutrients of a balanced diet. Processed meats and cheeses are costly yet convenient. Health and nutritional benefits take 2nd place. Obesity is a growing health problem which experts correlate to poor eating habits. The Canadian government's Canadian Risk Factor Atlas reported in a 2015-2018 survey, that ~26% of adults are living with obesity. People have become disconnected to the importance of how foods are grown, processed, shipped and consumed.

Organic foods, often cost more than conventionally grown products. Organic produce may contain fewer toxic chemicals but overall, the health benefits of organic foods is not overwhelmingly in favour of conventional products. Organically grown food items generally are less harmful to the environment as they use less chemicals to increase the crop yield. Smaller crop volumes lead to higher prices than conventional produce.

Organic waste management

The Province of Manitoba developed a Green Impact Bond Strategy to divert animal waste from landfills. In 2021, Innovative NRG was selected as the service provider to process organic waste such as animal byproducts and waste-water sludge through a patented gasification process. Their patented and proprietary Rapid Organic Conversion (ROC) can vaporize carbon-based materials. The captured energy can be used as a source of energy, reducing GHGs, reduces transportation costs, and landfill waste.

November 2024

True North Foods, Manitoba's only federally certified ruminant processing facility, announced the completion of a 32,500 square foot facility expansion featuring the installation of the cutting-edge Rapid Organic Converter (ROC) Technology by **Innovative NRG of Manitoba**. The project received ~\$1.4 million in federal support through the Agricultural Clean Technology Program, as an example of a green bond.

Key Benefits of ROC Technology

- **Environmental Impact:** Reduces carbon emissions three ways including emissions from natural gas usage, eliminating transport emissions by processing waste on-site, and diverting waste from landfills.
- **Waste Diversion:** converting specified risk material and deadstock to energy at True North Foods, with expansion capability to all organic wastes, further reducing the facility carbon footprint, cost effectively and sustainably.
- **Economic Efficiency:** With lower capital and maintenance costs than traditional technologies, ROC offers an economically sound solution with a rapid payback period, helping businesses achieve sustainability goals.

<https://www.truenorthfoods.ca/>

On Salt Spring Island, BC they are operating a large organic waste processor to handle ~20 tonnes of animal content from a local abattoir. The composting process generates a material which is used to enrich soil on nearby farms. It is expected that the capacity will increase to 60 tonnes per year. This reduces the need to collect and transport the waste to be deposited in landfills off the Island.

<https://www.cbc.ca/news/canada/british-columbia/salt-spring-island-commercial-composter-1.7612076>

Food retailers and producers

The food industry can be characterized as being an oligopoly where a small group of companies have a large control over the supply, demand, and pricing of all the products. Often this can be from the farm to the fork. If major food producers and sellers adopt ESG policies and practices, it will alleviate some food security issues. On the other hand, without their commitment, we may need more intervention by government agencies, which nobody truly wants. In spite of food shortages, the major food distribution companies continue to report record profits. That in itself is not bad, but these same companies have pled guilty in the past of pricing fixing on various items and commodities. Business ethics and corporate governance practices are inherently linked in food security discussions.

Loblaws, which pled guilty in 2015 to price fixing on bread prices for over a decade+, was found to be selling its own brand of potato chips with incorrect weights in 2023. Instead of containing 200 grams of product, when weighed, was found to only contain 103 grams. The solution from Loblaws was to issue \$20 worth of points to customers who complained, similar to their settlement on the bread price fixing scheme, to buy products from Loblaws.

Reported in 2025, Loblaw's admitted their error in charging for meat products that were underweighted in 80 stores in western Canada. Loblaw's claimed it was an isolated event. Yet this occurred with Loblaws selling underweighted chicken, pork, and beef previously. Again, Loblaws apologized for their errors. This is a chronic problem with most food retailers – underweighting products and making higher profits with very little recourse for consumers or severe action taken by the CFIA. General Mills has also admitted to underweighting practices. It's a game of *catch me if you can*.

<https://www.cbc.ca/news/canada/manitoba/manitoba-underweight-meat-proposed-class-action-1.7586065>

One of the players in the bread price fixing scheme, Grupo Bimbo, which owns Canada Bread, agreed to settle their case with a \$50M fine paid in July 2023 – nine years after participating in a scheme which began in 2001. And Loblaws finally agreed to settle their bread scam by paying a \$500M fine to be settled in 2025 – 24-years after they began the price fixing with their competition in the grocery industry!

The grocery industry adopted a code of conduct to be effective June 2025. The Canadian government saw a code of conduct as a means of controlling the price of foods through the actions of the grocery sector. The Canadian Federation of Independent Grocers, with ~7000 members, want fair competition. Smaller grocers they argue, can't demand the pricing deals which larger retailers demand from their suppliers, such as imposing listing fees to get brands on store shelves.

One of the louder protesters against the code was Loblaws, one of Canada's largest food and pharmaceutical retailers. Loblaws' retail chains and brands include: Zehrs, Your Independent Grocer, Provigo, Atlantic Superstore, Fortinos, Dominion, Independent City Market, Freshmart, Valu-mart, ARZ Fine Foods, Real Canadian Wholesale Club, T&T Supermarket, Real Canadian Liquorstore, Real Canadian Superstore, No Frills, Maxi, Extra Foods, Pharmaprix, Shoppers Drug Mart, No Name, Joe Fresh, President's Choice, and Life Brand.

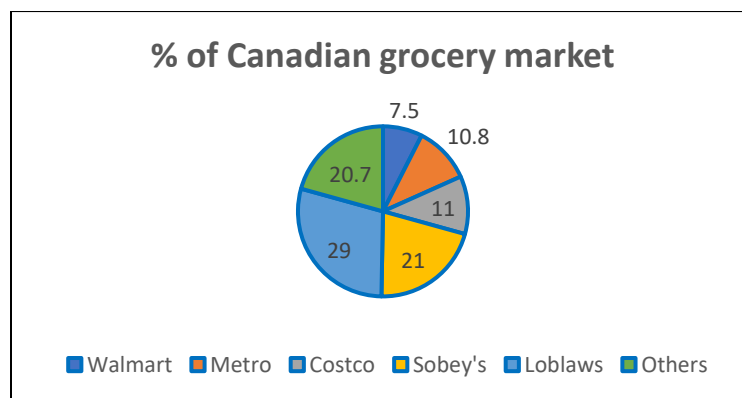
The Grocery code exposed the listing fees paid by producers to get their goods on to the retail store

shelves. And then the retailers mark up the goods to the consumers – essentially earning revenues twice on the same goods. It will be some time before any voluntary code of conduct has a measurable reduction in the cost of groceries. Prices of groceries have risen 22% since 2020.

Within a month of the new Grocery code of conduct, we saw several grocers are misleading on “Canadian made or Canadian content.” It will be investigated but represents another case of “catch me if you can” by the big grocers. <https://www.cbc.ca/news/business/label-grocer-canadian-1.7590956>

The grocery sector skirts the definition of being legally compliant and misleading in its package labeling. When the fine print is where the compliance is found, yet the advertised benefits could be considered deceptive. Case in point, Kellogg’s Vector, found in the cereal section in the grocery aisles, is not a cereal. Technically Vector is a *meal replacement*. In order to get the high level of protein from Vector, you must eat it with 200ml of skim milk. Kellogg’s is in compliance with the regulatory requirements but creating the meal replacement category is a bit much. Yes, consumers are responsible to read the labels. Swimming Canada athlete, Kate Hulford, was duped into using Vector as the labels stated 13 grams of protein. In fact, Vector only contains 5.7 grams per serving. Kellogg’s ability to meet the minimum requirement legally, is referred to as *the Ethics of Justice*; where Kellogg’s should be considering the *Ethics of Care*. Contrasting views on the same product. Is there a need for a grocery industry code of conduct? This example, along with other issues, leans towards a code, as the industry does not seem to be able to separate profits from proteins. Bluewashing continues. <https://pubmed.ncbi.nlm.nih.gov/11114990/>

In October 2020, Loblaw’s, following the lead of Walmart, told its suppliers that it would charge more fees to producers to get their brands on Loblaw shelves. The rationale, was to help Loblaw’s keep food prices low. This was reported in the Financial Post. With a 22% increase in the cost of groceries since Loblaw’s et al increased their fees, it has not achieved its goal. If fees were increased and grocery prices increased, we can surmise that Loblaw’s et al saw their profits increase. <https://financialpost.com/news/retail-marketing/loblaw-follows-walmart-in-imposing-new-fees-on-suppliers-to-help-pay-for-upgrades>



Source: Competition Bureau

Canadian grocery retailers could take a lesson from the EU retailer Carrefour. In 2024, they announced they are not going to stock products from PepsiCo because of PepsiCo’s unacceptable price increases. PepsiCo was kept off the shelves for ~4 months. Grocers act as the agents for consumers and bring to the market products as essential as food and other items. Where grocers and other retailers can pass along price increases, the original producer, such as PepsiCo in this case, needs to be cognizant of its pricing to protect market share and customer loyalty. Carrefour are sending a signal that it wants PepsiCo to be more competitive. Carrefour customers are liking this shift from the retailer telling its main supplier to sharpen its pencil.

Another EU grocer Edeka, has refused to stock Kellogg cereals in a similar action, since June 2023. Previously Edeka had a pricing dispute with Mars products which lasted 18 months from mid-2022 to February 2024. This action from Carrefour and Edeka adds to the argument for transparency which is lacking in the retail sectors on markups and marketing fees to get brands in the stores.

Mid-2024

Cocoa prices are predicted to spike again for late 2024 seasonal sales. Crop shortages in Ghana and the Ivory Coast, which account for 60% of the global cocoa supply, are only at 50% of their yield. Both countries have been hit with extreme weather conditions and crop disease. Ghana has been plagued by artisanal mining and illegal selling of cocoa pods.

Brands such as Nestles and Lindt will be passing along higher costs to grocery retailers.

<https://www.reuters.com/business/retail-consumer/nestles-chocolate-prices-focus-cocoa-costs-bite-2024-07-24/>

For further details on the Producer Price Index trend on chocolate, refer to the US Bureau of Labor Statistics. Prices have spiked 75% since 2021. In 2025, with potential tariffs being applied to the cocoa producing countries, this will add to the cost of inflation for these *treats*.

<https://fred.stlouisfed.org/series/PCU3113531135>

One innovative food producer is changing agricultural practices on a global scale – AGT Foods, based out of Saskatchewan, Canada. Their visionary leader, Murad Al-Katib, saw the opportunity to convert fallow fields into a source of *pulse-based* foods. Pulses include legumes, dry beans, dry peas, chickpeas, and lentils. GHG emissions measured in CO₂ equivalents per kilogram of peas and beans is estimated to be 0.98 and 1.79 kg, vs 99.48, 23.88, and 12.31 kg of beef, cheese, and pork, respectively. One of the largest markets for pulses is China, which traditionally has relied on plant-based proteins, while the WEIRD has favoured animal-based proteins. Pulse crops naturally inject atmospheric nitrogen, eliminating the need for nitrogen fertilizer and require less water than most crops.

In their 2023 McKinsey report, *Reducing food loss: What grocery retailers and manufacturers can do*, the authors noted that fruits and vegetables, cereals, roots and tubers incurred the greatest proportion of food loss. An astounding 50-75 M tons of tomatoes are lost during the during the harvest, postharvest handling and storage, and processing stages. In WEIRD countries, ~60-70% of tomatoes make it to a store shelf. In the developing world, only ~35 to 60% make it to the store. While it's inevitable some losses will occur, two-thirds of the loss is edible and could be safely redirected to human consumption. Meat and dairy account for ~8% of the food loss. Food security focus needs to be on reducing loss to the fruits, vegetables, cereals, roots and tubers which are global produce.

Local sourcing shortens the food supply chain which will reduce some waste, reduce pollutants, reduce over use of fertilizers, reduce transportation and storage costs, and packaging. Food security is an outstanding issue. According to the Food and Agricultural Organizations' definition, food security includes having consistent, reliable access to safe, nutritious food. When the availability, accessibility, nutritional quality and longer-term stability of food sources become strained or nonexistent, food insecurity exists. Reducing hunger is one of the 17 UN Sustainable Development Goals (UNSDG).

According to a Mordor Intelligence report, the organic meat sector, between 2023-2028, is expected to grow from US\$17.4B to US\$25.5B. This is a compounded annual growth rate of ~8%. This is in spite of a cost disparity of 67% over conventional meat products. Prices are supported due to consumer interests for health, on demand buying, quality, and sustainable practices in raising beef, poultry, fowl, lamb, and other animal proteins. There is concern that organics are being associated with *privileged* consumer choices. <https://www.mordorintelligence.com/industry-reports/organic-meat-market>

Kersia Canada, is a global food and beverage company focused on biosecurity and food safety. In 2016, Kersia recognized that sustainability in the food sector goes beyond supply and marketing. Leading by example, they have strategically adopted (9) of the UNSDG goals to address to contribute to sustainable business operations:

1. Zero Hunger (2)
2. Good health and well-being (3)
3. Quality education (4)
4. Clean water and sanitation (6)
5. Decent work and economic growth (8)
6. Industry, innovation, and infrastructure (9)
7. Responsible consumption and production (12)
8. Climate action (13)
9. Partnerships for the Goals (17)

An example of Kersia's *partnerships for the goals* is their membership in Ashoka Canada. Ashoka is aimed at affecting positive social change across communities by supporting social entrepreneurs and in education programs around diversity, language, culture, gender, and its expression.

Despite the problems associated with over use of fertilizers, there is the problem of attaining adequate supply of fertilizers due to geo/political problems. The agricultural industry is very dependent on fertilizers to maximize crop yields. A February 2023 report from Bloomberg Intelligence analyst, Alexis Maxwell, highlighted the reliance on Russia, Belarus and China for fertilizers. Canada's well-positioned to supply fertilizers from privately operated, Saskatchewan-based, Nutrien Limited but cannot meet the global demands which are required to sustain agricultural crops. Nutrien is looking at increasing production by another 40% by 2026.

Shortages of potash, phosphate, and nitrogen will continue to push food prices upwards. Morocco, with an estimated 70% of the phosphate reserves, is emerging as a global trading partner as the Russian-Ukraine war enters its 3rd year. While US farm labour costs are expected to increase by 17% by the end of 2024; fertilizers are projected to increase 70+%. Wheat and other agriculture crops in Canada and the US were hit by droughts in 2023. The war in the Ukraine has led to severe shortages. The Western Australian farmers in 2023 were poised to take advantage of another big year for their crops and substantial price increases. The poorest people tend to bear the brunt of the inflation on basic food stuffs. This shortage is going to add to the global starvation issues at least for another harvest year and have a ripple effect across the globe.

The former Director of Purchasing for Growers Supply Co., Victoria Wakefield, shared her insights on food security or food *insecurity*, as she phrased it. Retailers and consumers support local food production in three key areas:

1. Buying produce from local food producers: Increasing the availability of fresh, healthy, and affordable food in a region. This is done by purchasing locally grown food at farmers' markets, joining community-supported agriculture programs, with local government support and a strong following by consumers. Global supply chains can be disrupted, leading to shortages of certain foods. Having locally produced food suppliers lessens the dependency on imports.
2. Investing in sustainable agriculture: Supporting sustainable agriculture practices such as regenerative farming, organic farming, and permaculture ensures the long-term productivity of the land and its ability to produce food.
3. Increasing food literacy and education: Educating the community about healthy eating, cooking skills, and food preservation techniques helps to increase food security. Community centres, colleges and universities can educate individuals to make healthy food choices and reduce food waste through prioritizing local sourcing.

Greenhouse markets

Commercial greenhouse operations are expanding the sector due to food insecurity issues driven by changing weather patterns and geopolitical events. The North America and EU accounts for ~60% of the global market followed by the Asia Pacific at ~25%. The produce is primarily on tomatoes, peppers, and cucumbers, which comprise 80% of the demand. There is a financial shift towards consolidation in North American greenhouse operations. The US communications and automotive conglomerate, Cox Enterprises, set out in early 2024 to acquire greenhouse (indoor farming) companies. By early 2025 it was the largest greenhouse operation company Canada and the US markets. Cox expects an annual revenue of US\$1 B from and growing its indoor farming operations. <https://www.globalaginvesting.com/beyond-broadband-cox-launches-cox-farms-one-of-the-largest-greenhouse-operations-in-north-america/>

Vertical farms are being constructed. Literally like high rise apartments with various crops being grown on the levels. Vertical farms are touted as being better for the planet by producing quality products with a much higher yield and saving on water and land space. As the global population nears the 8-billion-mark, vertical farms are a means to address part of the sustenance requirements.

In April 2023, Up Vertical Farms opened its 50,000 ft², 10-meter high, indoor greenhouse to grow leafy vegetables. This highly automated operation uses 99% less water, 99% less fertilizer and no pesticides or herbicides. Owners, the Rashti brothers, conceived of the idea when they saw the lack of quality vegetables in remote BC communities which had to truck vegetables in from California. The short-shelf life had high spoilage rate and costly. Up Vertical, which is located in Pitt Meadows, BC on a former hayfield. Up Vertical is turning out the equivalent of a 350-acre farm on about 1 acre of land. In 2022, the Province of BC amended the agriculture rules to allow vertical farms. A good step towards food security.

Haven Greens out of Ontario produces 4000 Kgs per day of lettuce through its AI assisted greenhouse operations. Haven Greens hires local labour and does not require TFWs to support its production. The machine grown lettuce appears to be a scalable operation. <https://www.cbc.ca/news/canada/machine-lettuce-1.7528860>

Avery Farms in BC, saw increased demand for its indoor-grown, lettuce products in response to US tariffs in 2025. Avery was only harvesting 1500 heads per day, which is 10% of their capacity. This is expected to grow significantly as part of the food security strategy. <https://globalnews.ca/news/11024248/sudden-business-boom-okanagan-lettuce-growing-operatio/>

The future of farming is going to become more invested in technology to produce crops and manage costs. Researchers Murdoch and Sumner from the California Agricultural Issues Lab of the University of California, show that automation in farming operations definitely increases the revenue per acre. Pruning has a 15% up lift; Spraying a 5% up lift; Weeding and mowing a 5% up lift; Harvesting a 10% up lift. These values range from US\$ 200 – 800 per acre in economic benefits. The pressure will continue on sustainable practices and increased efficiencies to improve financial returns for farmers.

The June 2023 McKinsey & Company report, *the agricultural Transition: Building a sustainable future*, highlighted how decarbonization measures can mitigate GHGs and do so at relatively low costs. The exhaustive study had 28 recommendations for the agricultural sector to be more sustainable. There were 4 broad areas to affect GHGs: Animal proteins; Crops; Rice; and Energy.

The technical GHG mitigation recommendations to reduce millions of tCO₂e were to be realized by:

1. Increasing concentrate-to-forage ration
2. Use of biologicals
3. Direct seeding of rice
4. Reduced over-application of fertilizer

5. Expanded adoption of technologies that increase livestock production
6. Heat stress management
7. Electrification of on-farm machinery
8. Hydrogen power for on-farm machinery
9. Variable-rate fertilization
10. Improved rice paddy water management
11. Nitrogen inhibitors on crop fields
12. Improved rice straw management
13. Improved fuel efficiency in fishing vessels
14. Use of biochar as a fertilizer
15. Improved animal health and disease treatments
16. GHG-focused breeding and genetic selection
17. Feed grain processing for digestibility
18. Conversion to hybrid and electric fishing vessels
19. Incorporation of cover crops
20. Sulfate fertilization of rice
21. Nitrogen inhibitors on pastures
22. Advanced feed additives
23. Conversion from flood to drip or sprinkler irrigation
24. Low-or no-tillage
25. Shift to a higher-fat diet
26. Large-scale anaerobic manure digestion
27. Enhanced efficiency fertilizers
28. Small-scale anaerobic manure digestion

When we review the circular economy 7R Model we can see the rethink in sourcing proteins. The primary source in most of the developed world is through the meat industry. In the US it requires 18% of the land mass to raise livestock with 80% of plant proteins going to animal feed. The trend to plant-based protein consumption began ~2010 when *Beyond Meat*, through science and innovation, created new lines of plant-based proteins. This has led to a growing industry ironically controlled by the meat producing companies. Plant-based proteins, while meeting nutritional requirements for health, do not require as many resources to produce an equivalent level of proteins as meats. According to the Beef Cattle Research Council, it requires ~16,000 litres of water to produce a KG of beef, in contrast to 50% less water for plant-based proteins.

Food security and tariffs

In a report from the Canadian Press, Rosa Saba, the 2025 tariffs will impact smaller food and specialty product companies. The result could lead to fewer competitors in the markets and increased market concentration by MNCs with deeper pockets. Many SME food companies in Canada, import ingredients from the US, which are increasing in costs due to the complex supply chains and tariffs being hit with counter-tariffs. SMEs are in a difficult position to negotiate price reductions and may have to absorb price increases until they can no longer sustain their business operations. Closures and layoffs are likely to increase in the Canadian SME food sector, until the US tariff war is paused or takes a more pragmatic approach. May to July 2025 could be a critical time for smaller food and specialty product companies in Canada. Consumers lost out on choices.

Case study - Promoting a more sustainable diet

The following case citation is from the Behavioral Economics newsletter, *Information, Insights, Inspiration* | Winter 2022-23 Newsletter, by Katie De-loyde and edited by Mariliis Öeren:

One way to promote a more sustainable diet is to label food products with information about sustainability (eco-labelling), for example by providing details of water and land usage, as well as greenhouse gas emissions, using a traffic light system. Another option is the use of *social nudging*, such as telling consumers that a particular menu option is the most popular choice.

My co-authors and I wanted to discover if increasing the awareness of the impacts of different meals would influence consumers to choose a more sustainable option. To do this, we used an eco-label (Figure 1) and a social nudge label (Figure 2) to investigate whether adding these labels would influence food choice compared to a control group with no label. We conducted the study online with UK adults who were 18 years or older. These people were randomised to one of three different groups, each showing three burrito options with different accompanying menu information.



Figure 1: Eco-label.



Figure 2: Social Nudge Label.

All menus contained a photo of each burrito as well as the calorie content, a Fairtrade logo, a spice indicator, and the price, which was the same for all options. But on one menu, each burrito was also given an eco-label, with the beef option scoring '5' in red, highlighting it is unsustainable. The chicken option had a yellow '3', indicating it was neither sustainable nor unsustainable, and the vegetarian option got a green '1' for sustainable. Another menu featured a 'social nudge' – an indicator encouraging people to act according to the most sustainable option. This resembled a gold star, including the words 'Most Popular' placed alongside the vegetarian burrito. Participants were randomly shown one of the three menus and asked to pick a burrito option, as if they were normally ordering food online. They were also asked follow-up questions designed to measure their level of motivation to act sustainably and meat consumption.

Eco-labels vs Social Nudge

We found that both the eco-label and social nudge label were effective at influencing more sustainable food choices, and although both labels produced promising results, the eco-label was the most effective. Additionally, we found that a third of the participants who were given the 'control' menu – without a social nudge or eco-label – went for the beef burrito. However, this dropped to 29 per cent for those who saw the social nudge labelled menu, and to 16 per cent for those who saw the eco-labelled menu.

Considering that reducing beef intake is a specific component of many sustainability strategies, eco-labelling and/or social nudging could provide an effective method to achieve this. A mandatory eco-label could help to address some of the information gaps consumers have concerning the sustainability of the products they are buying and enable people to choose sustainably if they wish. The eco-label was particularly effective among those people who reported a high level of motivation to act sustainably. This suggests that these kinds of labels help people make dietary decisions which are in line with their personal values. However, considering we observed relatively high motivation to act sustainably among our participants, but the reported mean consumption of meat was six times per week, this suggests consumers would benefit from having information that could assist them in their goals of acting more sustainably. Currently, sustainability information about our food is not made freely available in the UK, contributing to a lack of freedom to choose for those individuals who are motivated to do so.

Furthermore, and somewhat surprisingly, participants were positive about the eco-label, with a huge 90 per cent of participants supporting the idea of an eco-label, compared to only 52 per cent of participants supporting the social nudge.

Implications

More research in real-world settings (rather than online) is essential. However initial results from our study suggests that future policy could include eco-labelling and/or a social nudge in both real-world and online settings to reduce meat consumption and help to meet global climate change targets. End of case.

Bluewashing refers to the practice of claiming social benefits without providing evidence or being verifiable. One of the reasons for bona fide 3rd party labels on products is to establish credence. The contents or labour conditions can be assessed objectively. In 2021, the Dyson group of companies was charged with alleged forced labour practices by its Asian contractor, ATA IMS Bhd. To its credit, Dyson cancelled its contract with the contractor. Dyson likely contracted with ATA as being a low-cost producer and accepted that their labour practices met international standards.

While, non-binding, the UN Global Compact to address corporate sustainability is based on 10 principles:

1. Businesses should support and respect the protection of internationally proclaimed human rights and
2. Make sure they are not complicit in human rights abuses
3. Businesses should uphold the freedom of association and the effective recognition of the right to collective bargaining
4. Elimination of all forms of forced and compulsory labour
5. Effective abolition of child labour
6. Elimination of discrimination in respect of employment and occupation
7. Businesses should support a precautionary approach to environmental challenges
8. Undertake initiatives to promote greater environmental responsibility
9. Encourage the development and diffusion of environmentally friendly technologies
10. Businesses should work against corruption in all its forms, including extortion and bribery

Canada participates through the *UN Global Compact Network Canada* (UNGC). There has been criticism of the UNGC such as lack of enforcement and independent monitoring, which opens it up to bluewashing claims. <https://unglobalcompact.org/news/5098-06-06-2023>

Long-term brand damage is seldom experienced by companies which have used greenwashing or bluewashing. The above case study shows the reverse effect of bluewashing or greenwashing, where labels actually promote a healthier diet in an economic and sustainable manner.

The labeling of many products currently, is heavily weighted on its marketing and sales. Labels are a

means of both informing and influencing our decisions. Costco must face a lawsuit for allegedly labeling its Kirkland branded tuna as being *dolphin safe*. While Costco sought dismissal of the case, in early 2023, a judge ruled that the labeling would infer to customers that the tuna met safe seafood fishing practices but it may not be able to be verified in practice.

Bottled water is mired in myths about it being healthier than tap water. Pepsi and Coca-Cola brands have acknowledged that their water source is municipal tap water. The Evian brand is sourced from natural spring waters. Spring waters contain nutrients and actually taste different than *purified* water. Bottled water in North America and elsewhere is primarily a convenience item. This requires a large number of plastic containers to store, ship and dispose of adding to environmental issues. Further, bottled water containers in every size, shape and form add to the pollution problems. We could take a lesson from the city of Paris, France. Make good, clean water easily available in as many public spaces as possible.

In January 2024, a New York judge ruled that Danone must defend its use of *carbon neutral* claims on bottles of Evian water. The judge felt that the term carbon neutral was ambiguous and confusing to consumers. Plaintiffs perceive the label to mean that the water was more environmentally friendly, yet Danone releases CO₂s during the production process.

Under USA 2022 guidelines, food products with less than 0.5 grams of transfat, which may be stated in its ingredients as partially hydrogenated oils, can have labels which claim 0%. Canada banned the use of trans fats in 2020. According to a 2019 International Food Beverage Alliance release, international food brands will *phase out* the use of trans fat to 2 grams per 100 grams of fat or oil to comply with a World Health Organization (WHO) guidelines. The IFBA was founded in 2008 by Coca-Cola, Danone, Ferrero, General Mills, Grupo Bimbo, Kellogg, Mars Wrigley, McDonald's, Mondalez International (formerly Kraft), Nestlé, PepsiCo, and Unilever. In 2025, the US withdrew from the WHO under a presidential executive order. <https://www.who.int/news/item/21-01-2025-who-comments-on-united-states--announcement-of-intent-to-withdraw>

In early 2024, Tyson Foods announced it will use more antibiotics in its food products and remove the *no antibiotics ever* tagline. Instead, Tyson will use ionophores to control coccidiosis disease in poultry products. Ionophores are not considered medically important for treating human illnesses. Tyson will label these products as NAIHM (No Antibiotics Important to Human Medicine). In 2017 Tyson had switched its chicken product lines to birds raised *without* any antibiotics.

Europe has been using the ISO 14024 *voluntary* labelling system for a few years. This is another means to reduce greenwashing claims. Companies which choose to use the ISO 14024 labels are able to differentiate their product benefits and provide an audit process which verifies their claims of being environmentally responsible.

In Canada, new legislation came into effect in June 2024, to discourage greenwashing. Under omnibus Bill C-59, the act prohibits companies from making a representation about the environmental benefits stated by a company or a product, which is not based on sufficient validation of the claims or tested using internationally acknowledged methods. The oil and gas business are not in favour of Bill C-59 as they say it lacks clarity on testing and methodologies for statements.

The Competition Bureau's recommendations on product performance claims are as follows:

Under paragraph 74.01(1)(b) of the Competition Act, you cannot make a claim about a product's performance, its effectiveness, or its length of life, unless you can prove that the claim is based on an adequate and proper test. In addition, the test must have been done before the claim is made.

Performance claims can take many forms, whether it is product labelling, or words, images and design elements on a website or social media. These claims can also include the keywords in website metadata or online advertising campaigns used to attract customers to a website.

To determine if a performance claim is supported by adequate and proper testing, the Competition Bureau looks at various elements related to the general impression an advertisement makes on consumers.

For example, to be considered adequate and proper, the testing must:

- *be conducted before the performance claims are made*
- *be done under controlled circumstances to eliminate external variables*
- *eliminate subjectivity as much as possible*
- *reflect the real-world usage of a product (such as in-home or outdoor use)*
- *support the general impression created by the marketing claims*

Marketers should avoid:

- making broad or vague claims based on testing that is only partially relevant (for example, an advertisement claims that a heat pump provides a specific level of energy savings. However, the test was conducted only in Southern Ontario, where winters tend to be much milder. Therefore, the results of the test should not be generalized to all areas of the country.)
- basing performance claims on test results that are insignificant or based on mere chance or one-time effect
- basing performance claims on studies or sales of similar products
- basing performance claims on technical books, bulletins and manuals, or anecdotal stories

In 2025, the Competition Bureau released its updated greenwashing guidelines. The revised guidelines are receiving push back from several food producers and other companies due to the confusion around meeting *internationally recognized methodologies*. It's unfortunate that the revised guidelines are not adding clarity and will simply layer complexity to the compliance requirements. <https://www.cbc.ca/radio/anti-greenwashing-green-hushing-1.7562675>

Consumers are entitled to buy whichever products are legally sold in the market and must accept that the labels are accurate as stated. Consumers are responsible for their personal decisions to make tradeoffs between cost, quality, and convenience.

Product labels

Confirmation bias is commonly used to describe how individuals are partial to or influenced by existing beliefs or expectations. If we read that a product is *eco-friendly*, and we are trying to be environmentally conscientious, we will tend to favour that product over one which does not provide any environmental differentiation, or states its actual chemical properties. The latter is seen as being harmful in our bias. A growing trend favours green and sustainable products.

Eco-friendly, sustainable, or organic products are ambiguous terms. These labels have become known as *greenwashing*. They sound good and resonate with customers but lack any evidence. ESG could be subject to greenwashing. In 2022, coffee maker Keurig paid a \$3M fine for falsely claiming their single use K pods could be recycled. US-based Glad, maker of plastic garbage bags, was fined ~\$7.0 million Cdn in Australian regulators in 2025, for falsely claiming their product was made from 50% recycled plastics, which was incorrect. <https://www.reuters.com/sustainability/boards-policy-regulation/clorox-australia-fined-52-million-over-false->

[claims-using-recycled-plastic-2025-04-14/](#)

One challenge to an environmental certification involves the use of FSC designation on wood and paper by Paper Excellence. Paper Excellence is one of Canada's largest pulp and logging companies. It has *alleged* ties to Chinese controlled Asia Pulp & Paper, which lost its FSC status in 2007 over rainforest destruction. The Indonesian-Chinese conglomerate has a history of deforestation in several markets. Asia Pulp & Paper appear to have avoided the Investment Canada Act in bad faith.

<https://www.cbc.ca/news/business/paper-excellence-app-jacson-wijaya-takeover-1.7390353>

Labels are a subset of marketing. They are to identify product benefits and inform customers of ingredients, additives, place of production, warnings, and many other marketing themes. And labels are part of a consumer protection strategy. Labels can also be confusing or obfuscating.

Case in point. Pepsico is being sued for claiming that its branded Gatorade protein bars are healthy products. It is the *implied* messaging that is the basis for the August 2024 law suit. Even though their protein bars have more sugar than the American Heart Association's recommended daily intake and only 20 grams of protein. Consumers could be misled by the PepsiCo "science-backed" claims.

<https://www.reuters.com/business/retail-consumer/pepsico-can-be-sued-over-health-claims-gatorade-protein-bars-judge-says-2024-08-15/>

Seafood giant, Conagra, settled its 2024 law suit for using labelling stating several of its product lines were Good for the Environment. US Judge Virginia Kendall said this phrase was "puffery." This suit pointed out the alleged greenwashing by Conagra and invites skepticism on the credibility of the use of MSC on products. It's also alleged that Conagra purchased the pollock from Russian fisheries. Canada prohibits the import of good produced by forced labour. MSC acknowledged that companies are reliant on social audits, which have *significant limitations*. <https://topclassactions.com/lawsuit-settlements/lawsuit-news/conagra-class-action-claims-company-falsely-advertises-certified-sustainable-seafood/>

Many consumers like to support Canadian made products. However, the labeling requirements require an understanding of the difference between a *Product of Canada* and *Made in Canada*. A *Product of Canada* label requires that 98% of its direct production costs were incurred within Canada. *Made in Canada* requires more than 51% of its direct production costs were incurred within Canada but, less than 98%. For example, the US-owned Lays brand potato chips, which are part of the PepsiCo line of goods, can be labelled *Made in Canada* because they use Canadian labour and the potatoes were grown in Canada. If a company puts the image of a maple leaf or *Made in Canada* sticker on the product, it will be held to the *Made in Canada* standards. Who actually ensures the labels are accurate? The Canadian Competition Bureau *supports* *Made in Canada* with imported parts; or *Made in Canada* with 60% Canadian content and 40% imported content. However, the Competition Bureau's role is to enforce laws *not* regulate products. Adding to the confusion, where labels do not meet the *Made in Canada* or the *Product of Canada* requirements, the labels could be referred to as *Assembled in Canada* with foreign parts, according to the Competition Bureau. The Canadian Food Inspection Agency is responsible for the *safety* of food items, not their labels. The CFIB favours labels with *roasted and blended in Canada*, or *Packaged in Canada*, or *Refined in Canada*, or *Distilled in Canada*, where goods are not fully compliant with *Product of Canada* or *Made in Canada*. All labels must conform to the *Consumer Packaging and Labelling Act and Regulations*. Could this be more obfuscated than necessary for a consumer trying to buy Canadian products in a grocery store?

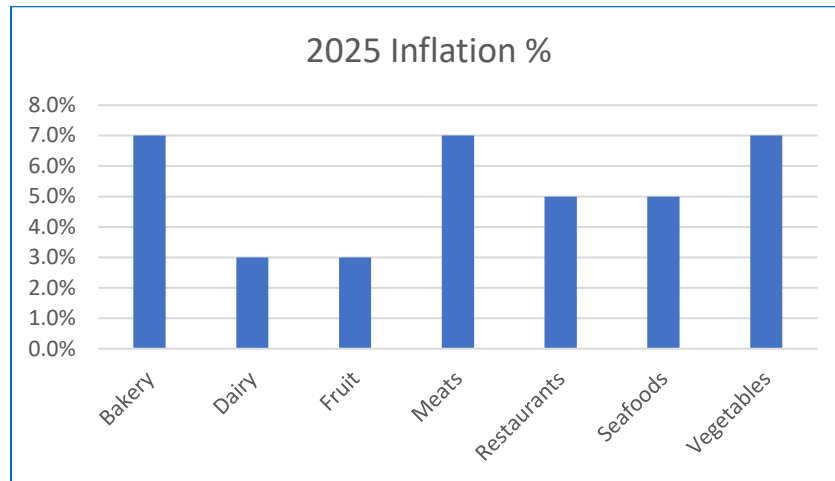
<https://www.cbc.ca/news/canada/made-in-canada-product-of-canada-1.7451556>

Food inflation 2025+

In the comprehensive Canada's Food Price Report, the cost of food in Canada in 2025, is expected to increase between 1 -7% over 2024 prices, depending on the category. The spike is being attributed to a variety of factors. A lack of retail market competition, climate change, packaging costs, exchange rates

on imports, and wage rates. <https://www.cbc.ca/news/business/food-prices-2025-1.7401612>

The breakdown is as follows:



Aquatic issues

Another example of upsetting the ecosystems occurs where individuals introduce a new species of fish into native waterways. Illegally stocked fish have been invasive in Canadian lakes and have had an *adverse impact* on native fish stocks. Native fish populations decline and are less healthy. According to a Manitoba regional fisheries manager, people have been introducing larger predatory fish in order to enjoy the new fishing experience at the expense of the biodiversity. The fish spread throughout the river and lake systems adding to the problem. <https://www.cbc.ca/news/canada/manitoba/illegal-stocking-manitoba-native-fish-1.7266081>

Switzerland is experiencing an invasive species of mussels in its lakes. Since 2014 the Quagga mussels are decimating crayfish and consuming the phytoplankton which sustains other aquatic life in its lakes. This species has spread to France and Germany via water flows and shipping vessels. <https://www.reuters.com/business/environment/mussels-invade-swiss-lakes-coating-fishing-nets-threatening-wildlife-2024-10-14/>

Cod fishing was banned for 32 years in Canada. To save the fish stocks was a massive shift in Newfoundland's traditions and employment, resulting in an economic and environmental crisis. In 2024, Newfoundland can again start to harvest cod. The total allowable catch (TAC) for 2024 will be 18,000 tonnes under strict conditions. This is ~7% of the 1980's TAC. The cod fishing sector in Newfoundland and Labrador is outraged in terms of protecting local harvesters from international fishing companies. Members of the Fish, Food and Allied Workers union are demanding a return to the stewardship fishery in Newfoundland.

In 2019, the Canadian government pledged to phase out open-net salmon farms by 2025, which did not happen. Again, in June, the Canadian government announced a phase out of open-net fish farms by 2030. The fish farms have been shown to be harmful to wild fish by spreading lice and disease. The fish farms are an important part of the economy to coastal companies and Indigenous communities. The latest announcement has been met with criticism. *"Five years to transition to land-based or closed-containment in my territory is the same as shutting our operations down," said Hereditary Chief Hasheukumiss of the Ahousaht First Nation on the west coast of Vancouver Island at a press conference.*

It is encouraging to see the results of NGOs such as the Aquaculture Seafood Council (ASC) and their mission to ensure a supply of sustainable seafood products. Costco Wholesale in Canada is a supporter of the ASC. A random purchase of Kirkland brand shrimp in October 2022 showed that it was from India

and there was no ASC certification. ~70% of shrimp from India is rate AVOID. AVOID means that the sourcing is questionable and may be due to overfishing, caught or farmed with poor management practices, or may be harmful to other marine life. Caveat emptor.

A deal was struck in 2025 by the WTO with 2/3 of its members agreeing to curb subsidies for overfished stocks and for harvesting in international waters outside of their jurisdictions. Poorer countries can access funds to enable their fleets to be financially viable as they are restricted in where they can fish. The top (5) countries which subsidize their fishing fleets are China, the EU, USA, South Korea, and Japan. <https://www.reuters.com/business/environment/deal-curb-billions-overfishing-subsidies-comes-into-force-wto-2025-09-15/>

Greek mussel harvests dropped by 90% and continued to fall over 2024. Spain had reduced mollusk harvests as well, albeit, lower volume impacts. The cause is being attributed to higher sea temperatures which destroys the mollusk shells. While Greece experienced drought and crop loss on land, it's food security and jobs on the sea are equally as threatened. The Greek aquaculture production is estimated at 600 M £. Much of the revenue is generated by small, family-owned businesses, as it has been for generations. This will not remain as a sustainable economic practice if the sea temperatures exceed the limits of aquatic life. https://www.youtube.com/watch?v=gQ2-qbO_kNM

A persistent drought in the US reduced cattle herds by 60+% by late 2024. The drought impacted the crop yield to feed cattle and meat packing plants with the lowest production since 2017. Consumers will continue to face higher beef prices, adding to their cost of living, for the foreseeable future. <https://www.cbc.ca/news/canada/calgary/beef-cattle-retail-prices-2024-1.7390730>

Food security faces a long-term problem in terms of labour shortages and ownership, largely due to demographics. Farmers are retiring with very little succession planning in place. Part of the solution will be to attract qualified, immigrant farm operators to take their place. Canadian education programs are trying to increase the interest in agribusiness as a viable career. In spite of this promotion, enrolment in agriculture programs remains at a chronic <2%. Technology has been a source of increasing production where labour remains an issue. A 2023 report from the BCG Centre for Canada's Future and the Arrell Food Institute at the University of Guelph provides good insights into the food security issues which must be addressed in the near future.

Biopiracy and seabed mining

Indigenous communities have faced the issue of biopiracy for years. Biopiracy involves taking endemic plants or their seeds, used as a source of food or medicine, and monetizing them in the global market. Companies patent the new version of the plant or its genes without paying compensation in any form to the country of origin or its people. While biopiracy has been a gray area from a legal perspective, it is certainly a moral issue and a compromise on business ethics. The 2022 UN Biodiversity Summit drafted an historical framework to address biodiversity with the following recommendations being agreed to:

- Maintaining, enhancing and restoring ecosystems, including halting species extinction and maintaining genetic diversity
- "Sustainable use" of biodiversity - essentially ensuring that species and habitats can provide the services they provide for humanity, such as food and clean water
- Ensuring that the benefits of resources from nature, like medicines that come from plants, are shared fairly and equally and that Indigenous peoples' rights are protected
- Paying for and putting resources into biodiversity: Ensuring that money and conservation efforts get to where they are needed.

Biosecurity practices are a method to prevent diseases in flocks of birds such as chickens, turkeys, ducks,

and pheasants. The highly pathogenic avian influenza continues to ravage the egg market over the past few years, driving up the price of eggs and poultry products.

A breakthrough in negotiations, as to how to care for our oceans, came about in March 2023 with the UN Convention on the Law of the Sea. After twenty years, a unified treat on protecting the high seas was reached. The high seas are those ocean areas outside of any one country's control. This is a turning point which acknowledges the need to curb the exploitation of the ocean's natural resources and how to share in this rich bounty. Mining of the ocean floor will eventually require an equivalent set of regulations similar to those for mining on the surface. While the real test will be on how to implement and monitor this policy, the step forward has been taken. For decades, commercial interests have chafed against the dependency of the sea to provide sustainable food supplies and protect marine biodiversity.

A November 2023 report published by Reuters, *The promise and risks of deep-sea mining*, by authors, Chung, Scheyder, and Trainor shows how the mining of the ocean bed is being driven by the need to find critical materials for EVs. Some mining of the ocean floor involves robots harvesting materials at depths of 5000 ft. Parts of the Pacific and Indian oceans contain significant quantities of metals and rare earths used to make lithium-ion batteries. These metals are contained in small rocks referred to as polymetallic nodules.

Several automakers and mining companies are calling for a ban on this type of mining as the removal the nodules could disrupt the ocean's ecosystem. The UN affiliated, International Seabed Authority (ISA) is drafting standards for acceptable sediment disturbance and noise for deep-sea mining. An advocate for deep-sea mining, is Vancouver-based CEO Gerard Barron of The Metals Co. Barron says that to meet the demand there are no viable options but to explore the ocean. The Metals Company is seeking approval of a license to deep sea mine from the Pacific-island state of the Republic of Nauru. Nauru has been a major source of phosphate for over 100-years. Nauru allowed strip mining of phosphate which has destroyed its environmental balance. Glencore's UK subsidiary, Glencore Energy, admitted to bribing officials in Cameroon, Guinea, Ivory Coast, Nigeria and South Sudan for preferred access to oil fields between 2011-2016.

The mining of the seabed has set up the arguments of business opportunity over science. Scientific studies have revealed that nodules on the seabed are generating oxygen through a natural seawater electrolysis. Their extraction would have an environmental impact. The Canadian mining company, The Metal Company, counterargues that their extraction is less harmful than land-based mining. It is necessary to have access to the critical metals the EV industry and others need. This will require much further debate between science and investors. Countries like Nauru have voted in favour of the investors in the past. In early 2025, Metals Company and Impossible Metals, approached the US government to seek permission to begin deep sea mining, and bypassing existing ISA recommendations. The USA is not a signatory to the ISA. <https://www.cbc.ca/news/science/deep-sea-mining-impossible-metals-1.7551439>

India is seeking bids to access sea bed sites for the mining of critical materials through its auction process, scheduled to close later in 2025.

In January 2024, Norway was the 1st country to allow deep sea mining to secure critical materials. Norway used a similar oversight process that it had in place for oil and gas exploration in the oceans. Norway expects the first licensed seabed operations will begin in 2025, covering 80,000 km². In late 2024, due to political pressure, Norway put deep sea mining permits on hold. In 2024 New Zealand changed its environmental policies which could allow for mining the seabed off its coast.

A Global Diversity Framework Fund was established in August 2023 with 40 countries committing funds

to address biodiversity losses. Biodiversity directly correlates to the economic, health and well-being of people and ecosystems. Climate change is affected by increasing temperatures. The Fund is aimed at reducing the average global temperature.

An in-depth discussion on biodiversity has been shared by GIST with a recording of their webinar, *Nature and Biodiversity Essentials*. I am pleased to attached the link: <https://www.youtube.com/watch?v=dqd-Si5TyPA>

The Biodiversity Intactness Index (BII) measures the biodiversity change in a global perspective. The BII input includes data on plants, fungi, and terrestrial animals. At present, it does not include marine species. The BII measures the impact of human activities on nature. The BII has oversight from the British Natural History Museum. <https://www.nhm.ac.uk/our-science/services/data/biodiversity-intactness-index.html>

From an ethical perspective, when scientists discover a compound in the ocean that can treat a disease, who will profit from this type of discovery? In 2010, Japanese, European, and US pharmaceutical companies filed for a cancer treating drug derived from sea sponges. Developing countries usually don't have the resources or technologies to commercialize these findings, so should companies, within the Western economies control the rights because of their access to wealth?

Industrial agriculture

Industrial agriculture with corporate farms continues to displace the small, family-owned farm businesses. Unfortunately, with the intent to reduce the cost of food products one of the trade-offs has been environmental degradation through concentrated animal feeding operations. Tonnes of animal waste seeps into the water table; air borne emissions are transferred to crops and can create E. coli infections. Antibiotics are required to keep CAFO animals healthy and promote growth.

Cattle emit tonnes of methane gas which adds to the GHG problems. The UN estimates that 30% of methane is from cows. In an attempt to reduce methane from cows, farmers are breeding low-methane cattle. There could be unintended consequences, such as digestion problems, as generations of cattle are genetically modified. Marketing programs and financial subsidies continue to favour meat-protein diets; while plant-based proteins are slowly taking market share with a lesser environmental impact. For an in-depth study on methane emissions and effects, review the Food and Agriculture Organization of the UN, 2023 report: *Methane emissions in livestock and rice systems* at: <https://www.fao.org/3/cc7607en/cc7607en.pdf>

In support of reducing methane emissions in the dairy sector, Danone, Bel Group, General Mills, Lactalis, Kraft/Heinz, and Nestlé committed to do so in December 2023 through the Dairy Methane Action Alliance. Since then, General Mills has sold its yogurt business to Lactalis. In September 2024 Danone was partnering with Ajinomoto to continue the commitments to reduce methane gas. In late 2025, Nestlé dropped out of the partnership to reduce methane emissions, likely due to increased pressure from US to downplay carbon emission strategies. <https://www.ctvnews.ca/business/article/nestle-quits-global-alliance-on-reducing-dairy-methane-emissions/>

In 2024 Denmark trialed a food additive for cows to reduce the methane emitted during their digestive process by ~30%. EU approved a feed additive in 2022 made by Royal DSM. Denmark has also introduced contentious legislation to further reduce livestock emissions. At a net/net cost of ~Cdn \$150 per cow, farmers are concerned that this taxation method will have a negative effect on their competition in the dairy markets.

Dairy farmers in Tasmania have been feeding cows a seaweed oil additive under the brand Sea Forest. Results show 25% lower methane emissions. The Ashgrove dairy has been trialing the additive on 500 cows in its herd since early 2024. The milk is branded as "Eco-Milk" and sold through large retailers in Tasmania. Eco-Milk costs about 5% more than conventional milk, which may be a price barrier for

consumers. Producers of feed additives that inhibit the release of methane have invested hundreds of millions of dollars to produce enough to feed millions of animals.

<https://www.reuters.com/business/environment/tasmanian-eco-milk-tests-shoppers-thirst-climate-friendly-dairy-2024-07-22/>

The Province of BC has a Perennial Crop Renewal program in place providing funding for producers to cull unproductive, diseased, or unmarketable cultivars; and to adopt growing systems which are better suited to handle environmental and weather conditions. Cultivars are plants which have been cultivated to produce unique traits as foods. Having resilient crops will be part of the ongoing strategy in agricultural products to be competitive in domestic and international markets.

Plant-based cheese products have attracted serious investors to Nobell Foods, including Bill Gates' Breakthrough Energy Ventures. Nobell has been able to produce casein from soybeans and is planning on launching a line of vegan mozzarella and cheddar cheeses. This is similar to the Beyond Meat technology where plant-based caseins can reproduce the tastes and textures of more conventional animal products. The soy-based cheeses will have a lesser environmental impact than dairy products, supporting the UN SDG of responsible consumption and production.

Plant-based products are facing increased pressure to reduce their cost when compared to conventional equivalent products. Beyond Meat has been dropped by several companies. Starbucks for one, in 2023, discontinued this plant-based option as consumers seek more affordable products. Inflation in the grocery sector is a growing concern. In October 2023, in BC, the cost of 1 kg of Beyond Meat was equal to the cost of 1 kg of tenderloin steak. This puts the plant-based option out of reach financially for many families. Frozen plant-based chicken is on the market and could increase the competition for meat proteins. In 2025, Canadian brand Yves Veggie Cuisine announced it was ceasing its operations as its plant-based products continued to drop in sales. <https://www.cbc.ca/news/business/yves-veggie-cuisine-discontinued-1.7620944>

Investigative reporter Ella Nilsen of CNN, in November 2022, found foreign-owned companies in Arizona are drawing vast quantities of water from the dwindling aquifer to grow alfalfa in Saudi Arabia as cattle feed. There is no legislation to limit the usage of water nor any way to track it. In 2018, Saudi Arabia banned the growing of crops for its cattle and dairy industry due to a drought. Buying crops from other countries, particularly the US, enables these Saudi industries to survive. This would appear to be an unsustainable means of providing food in the Middle East. Depending upon whom you ask, it would conflict with the UN SDG of responsible consumption and production.

California, which has been dealing with drought for decades is now converting waste water into drinking water. Waste water has been used for making ice for hockey rinks, snow for skiing hills, and crop irrigation. Now they have the technology and legislation which allows the state to treat and convert waste water to drinking water for its population. Treated water is pumped into aquifers and mixed before being brought back into the water system. San Diego hopes to have 50% of its drinking water recovered from waste water in the next 10 years.

In October 2023, the Canadian Alliance for Net-Zero Agri-Food (CANZA) was formed. CANZA operates as an initiative of Natural Step Canada and has several leading food sector members on its executive and operating committees. Staff and contractors will address the daily work load issues. The staff are comprised of representatives of the Natural Step Canada, the Smart Prosperity Institute, and the University of Guelph, Arrell Food Institute. CANZA's initial focus will be on Climate-Smart Farming techniques to sequester carbon in farm soils and improve production; and a National Biodigester Network to develop scalable means to reduce emissions and generate renewable energy.

<https://canza.ca/initiatives/carbon-farming-initiative/>

The country of Colombia has a stratified social structure and has been mired in drug cartels, armed

rebels, and a lack of human rights. In November 2023, the country of Colombia took the bold step to increase taxes aimed at “junk foods.” While there have been taxes on tobacco products and sugary drinks elsewhere, this is a first step towards the processed foods category. The tax targets ultra-processed products defined as *industrially manufactured ready-to-eat foods, as well as those high in salt and saturated fat, such as chocolates or crisps*. The Colombian diet has always been high in sodium content but the increased health care problems of cardiovascular diseases has pushed the government to intervene. It has been reported that 1/3 of Colombia’s population has high blood pressure.

“We want to avoid following the path of rich industrialized nations like the United States, where diet-linked diseases are a big problem,” said Beatriz Champagne, executive director of the Coalition for Americas’ Health, a Latin American advocacy group. “In terms of policies, Latin America is ahead of the curve.”

ESG and chemicals

REACH

Trade agreements involve the import and export of chemicals. With reference to the CETA regulations, all chemical substances, including those used in cleaning products, clothing, appliances, paints, and furniture must comply with REACH standards. REACH is the acronym for Registration, Evaluation, Authorization, and Restriction of Chemicals. REACH puts a burden of proof on the chemical manufacturers and importers of ~30,000 chemicals which must be registered for use within the EU market. Chemical handling and safety requirements in Canada is a complex labyrinth of regulations and laws. <https://www.canada.ca/en/health-canada/topics/chemical-safety.html>

Industrial innovations

Per Randy Whitaker, CFO and co-founder of Viridis Chemical, and Bhavesh Patel, senior manager at HELM AG, along with Patrick Long, director in Opportune LLP, chemical companies are responding to pressures from investors, employees, and advocacy groups to advance the agenda on renewable and biobased products. With the production of renewable ethyl acetate on the market it makes products more sustainable. Companies which are closest to the customer such as personal care, cosmetics, and paint products are most interested in this technical development. From an ESG perspective, Viridis sees its renewable chemical lines finding traction in the market. HELM, being a German-based chemical distributor, recognized that it had to pivot to respond to the stricter European standards which are aligning with decarbonization policies. Patel stated that their three main pillars are decarbonization, using the circular economy principles to recycle more efficiently, and partnering with leading companies.

Protocol Environmental Solutions, out of Vancouver, BC has been developing innovative chemical technologies for industry, eliminating the need for toxic products and dangerous methodologies. For the past decade, under its President and CEO Floyd Wandler, the patented product lines have targeted several critical sectors such as concrete, construction, commercial flooring, warehousing, welding, and marine industries. Protocol relies on new approaches to chemistry, science, and engineering to develop their *Smart Chemical Technologies*, proving that science can solve common industry problems,

improving efficacy and reducing liability, while not compromising its ESG commitments.

Hydrofluoric acid remains a common toxic compound used to pickle and passivate stainless steel after welding. Hydrofluoric acid residue must be treated as a hazardous waste material. A drop in the eye will blind a person, while a drop on the skin results in horrific burns. A much safer alternative to the use of traditional, hydrofluoric acid products, is EnviroPaste™. The efficacy of EnviroPaste™ is better, safer and means less project liability. It has a ~50% lower total cost of ownership. Yet, the status quo supports the use of hydrofluoric acid.

Concrete etching and mechanical preparation methods either result in the creation of hazardous silica dust or involve the use of toxic hydrochloric /muriatic acid. As per WorkSafeBC, “Silica is one of the most common hazards on a worksite, particularly in the construction, oil and gas, manufacturing, and agriculture industries. Silica dust can cause silicosis, a serious and irreversible lung disease. It can also cause lung cancer. Cutting, breaking, crushing, drilling, grinding, or blasting concrete or stone releases the dust. As workers breathe in the dust the silica settles in their lungs. Again, from Protocol Environmental Solutions is WashAway Xtreme™. It is water-based and fully biodegradable. Most importantly, it eliminates the silica dust problem on job sites. And, it is a ~50% lower cost solution with no health hazards!

Protocol’s products are easily and safely applied to ensure the integrity of the original materials and extend asset life with significant cost reductions throughout the process and in the maintenance. Protocol is appreciated by like-minded, conscientious business owners which enjoy the benefits of market differentiation, creating new jobs, addressing environmental concerns, work place safety and dramatically reducing operational costs. Rethinking how we solve technical challenges is a circular economy challenge which Protocol has overcome. <https://innercrete.com/>

Ammonia is the key ingredient required in the manufacturing of fertilizers. One of the largest producers of ammonia is CF Industries with operations in Canada, the US and UK. CF Industries acknowledges the contributions to emission problems related to production and is making serious investments in blue and green ammonia processes. Blue ammonia is a low carbon model which utilizes carbon capture and storage to contain carbon dioxide emissions. Green ammonia uses an electrolysis system to generate carbon-free hydrogen from water. CF Industries view these alternative production methods as interim solutions to the reliance on fossil-based fuels to produce fertilizers. The economies of scale are not yet there to make the blue and green ammonias sustainable.

Drycleaning has used toxic chemicals for decades. One of the more common chemicals is Perchloroethylene (Perc). According to the Government of Alberta’s Workplace Health and Safety Bulletin, Perc causes irritation of the nose and throat and central nervous system depression. Symptoms include drowsiness, dizziness, giddiness, headache, nausea, loss of coordination, confusion and unconsciousness. The International Agency for Research on Cancer (IARC) has concluded that perchloroethylene is probably carcinogenic to humans. There are more responsible options such as liquid silicone. And yes, liquid silicone costs more than Perc and invites pushback on price.

The manufacture and import of products containing volatile organic compounds (VOCs) comes under increased scrutiny in January 2024 for most product categories. Environment and Climate Change Canada made the changes to be in effect January 2024. While there are no testing requirements, the onus is on the manufacturer or importer to meet regulatory requirements.

The challenge of changing the value proposition example:

At a case study review in early 2024, which my colleague Chris Carter and I facilitated, we invited business people from the private and public sector to critique the case. Some of the attendees were buyers, representing the demand side and others were from the business development sector, representing the supply side.

There was a discussion around the pushback to ideas which addressed ESG issues in products, and were more cost effective, yet the status quo of remaining with current suppliers, using old ideas remained. These situations can be further complicated by personal bias of decision-makers exceeding those of the larger organization.

One attendee from a lumber company said, that in spite of ESG commitments by the company, its procurement manager only considered the lowest cost, using conventional, out-of-pocket metrics. Changes to traditional sources were frowned upon. A sales company representative was only successful when they solved a problem at the direct request of a site engineer. The resolution involved using a more responsible technical solution and eliminating a labour intensive and unhealthy grinding process to remove old coatings on a tank liner. The procurement manager remained convinced it would not be successful without even trialing the technical solution. This story is not a “one off.” There are many examples of where an individual’s bias or personal views are dismissive of new options. Typically, an indication from leadership, that if the bottom line is not being affected, why change?

PFAS

Cookware and textile manufacturers need to ensure their products do not contain per- and poly-fluoroalkyl related substances (PFAS) in California, beginning in 2025. PFAS have wide spread use and have been sold for decades. PFAS are used in the military, medical equipment, and are used to put out fires that involve oil. PFAS can be used as a water repellant or in stain resistant clothing. PFAS have been linked to many health studies as they are bio accumulative and toxic. European Union member countries have proposed the ban of all PFAS unless it is “proven essential for society.” PFAS are colloquially referred to as the “forever chemicals” because they stay in the environment for decades.

In April 2024 the US EPA began testing public water supplies to prevent health issues related to PFAS. In a Reuters report, lawsuits with chemical companies contributing to drinking water problems resulted in settlements of US\$11B in 2023. The EPA allows sewage *sludge* to be used as fertilizer in many states. This material contains PFAS but is not mandated to be tested or banned in most states. One of the original users of various PFAS products is the 3M company. They have agreed to stop using PFAS in their products by the end of 2025 and have settled billions in law suits for their use of PFSA – primarily not being disclosed. <https://www.cbc.ca/news/world/3m-pfa-forever-chemicals-lawsuit-1.6886172>

In June 2024, the Province of BC filed a class-action lawsuit against several manufacturers of PFAS including 3M, DuPont, and BASF for contaminating water supplies and failing to inform the public of the known risks.

In 2024, after years of review, the Vancouver Fire & Rescue Department will spend ~Cdn \$3M to replace existing protective gear with new materials which do not contain PFAS or other toxic agents. The links to cases of cancer triggered this action. A subsidiary of US-based Johnson Controls, Tyco Fire Products agreed to pay US\$750M to settle a claim with some US public water systems that there was contamination from firefighting foam containing PFAS. The settlement was not an admission of wrongdoing by Johnson or Tyco.

In July 2023, the US Environmental Protection Agency issued new guidelines which require that any new PFSA products must ensure they are not harmful to human health or the environment *before* the chemicals can be sold to consumers. This is similar to the requirements for products related to the Precautionary Principle. The Precautionary Principle was given greater legitimacy out of the Earth Summit in 1992 under the Rio Declaration: *In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of*

serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.

Entire communities have been impacted by the persistent presence of PFAS. Decades of cancer cases and other health issues related to this forever chemical which will remain in the ecosystem. North Bay, Canada has well documented cases which have been attributed to PFAS in the lakes and water systems for 50+ years.

Related to PFAS is polytetrafluoroethylene (PTFE) which has been deemed safe to humans and has replaced PFAS in many products. Teflon® non-stick coating is a PTFE. PTFE is used as an industrial lubricant and pipe liner to resist corrosion.

The 2025 US Administration, through a presidential executive order, withdrew the commitment to set limits on toxic PFAS chemicals in industrial wastewater. <https://www.thenewlede.org/2025/01/amid-series-of-rapid-fire-policy-reversals-trump-quietly-withdraws-proposed-limits-on-pfas/>

Food sector

The food sector allows the use of chemicals if the food manufacturers decide it is safe. Under the *generally recognized as safe* (GRAS) rules, the US FDA does not have jurisdiction. GRAS rules were drafted 90+years ago to control ingredients such as sugar, vinegar and baking soda. Canada aligns with much of the FDA chemical allowances in food products. It is only in late 2024, that the FDA is trying to gain more influence over the use of chemicals in food products and food packaging. The leaching of chemicals from packaging is another source for compromised food products. These can include phthalates, BPAs, and heavy metals.

Chemical uses in the food sector are very complex. Direct impact on the health of humans is at stake. An investigation is long overdue and will likely face an uphill battle with lobbyists in the food sector to consider any amendments to the GRAS rules. <https://www.ctvnews.ca/health/toxic-chemicals-used-in-food-preparation-leach-into-human-bodies-study-finds-1.7040597>

In 2025, after ~25-years of study, red dye No. 3, was banned for use in US food products. Red dye No. 3, which is the synthetic chemical erythrosine, was banned from cosmetics and topical drugs in 1990, due to its carcinogenic attributes. Studies in Canada in 2018, failed to cause the dye to be banned from food items. It remains legal in Canada for use in candies, baked goods, and dairy products, fruits, and beverages. <https://www.ctvnews.ca/health/article/red-dye-no-3-is-now-banned-in-the-us-is-it-legal-in-canada/>

Mining sector

Illegal gold mining in the Amazon basin remains on the rise. Added to the criminal element is the abhorrent use of mercury to separate the gold from the river dredging process. Thousands of kilos are dumped directly into the Amazon each month. Peruvian officials estimate 40,000 illegal miners are operating and destroying the natural habitat and Indigenous ways of life.

Mercury contamination is not new but due to a lack of provenance with the Peruvian gold, as an example, this will exacerbate the problems for generations. Japanese industry, in the 1950s, dumped mercury into the Minamata Bay, which was absorbed by fish and shellfish resulting in mercury poisoning for thousands of local people, termed the Minamata disease. In 2013, Canada signed on to the international Minamata convention to ban new mercury mines effective in 2017. Between 1962 to 1970, a pulp mill in northern Ontario dumped 10 tonnes of neurotoxins and mercury into the water near the Grassy Narrows First Nation. The levels of mercury in the blood of the local First Nation people were 8 times more than the safe level for people. The director of WWF Colombia, Sandra Valenzuela, says that

Peru produced 125 tonnes of gold in 2022; Brazil produced 86 tonnes; Colombia 60 tonnes; and Bolivia 53 tonnes. All these countries signed the Minamata Convention. So much for the paper work to protect the people and the planet. With gold being so popular that even retailers like Costco are selling it, there should be greater assurance that the gold is produced meeting acceptable standards.

Ghana has similar illegal gold mining practices, known as *galamsey*, where individuals run small scale gold operations. The rise in gold prices has led to health issues, increased pollution of waterways, deforestation and loss of cocoa crops, and drives crime in the region. 40% of Ghana's total gold output comes from small scale operations with ~80% being illegally run. <https://www.reuters.com/world/africa/hundreds-march-against-ghanas-damaging-informal-gold-mining-boom-2024-10-11/>

Mining is been a fundamental part of our global economy. While there has been a history of atrocities in this sector, we do need to look ahead. Unfortunately, the mining sector is often one of the corporate "bad actors." Examples are too numerous to detail but one example shows the degree to which they will go to protect their interests. In 2015, a dam, allegedly owned by BHP, Vale, and Samarco collapsed unleashing environmental havoc on hundreds of Kms along the Doce River in Brazil and destroying Indigenous lands, and killing people in its path. A lawsuit in Cdn ~\$ 45 B lawsuit was initiated by 600,000 Brazilians, 46 government entities, and thousands of businesses which were impacted. BHP argues it did not own the dam (similar defense as Loblaw's in the factory collapse in 2013 in Bangladesh) and had no knowledge of its condition. The companies preferred an out of court settlement while the claimants wanted a trial. In late October 2024, the companies reached a settlement and agreed to make payments over 20-years. This may also settle related claims against the companies in the UK.

<https://www.reuters.com/business/energy/bhp-reaches-30-bln-settlement-reparation-brazil-dam-failure-2024-10-25/>

By late 2024 the courts ruled that the mining companies were not *criminally* liable for the dam collapse, which was separate from the civil suit which was not yet decided. <https://www.reuters.com/world/americas/bhp-awaits-ruling-after-reports-that-unit-cleared-criminal-charges-2015-dam-2024-11-14/>

This situation pits two schools of philosophy against each other – the theory of ethics of care and the theory of ethics of justice. In business, the former says that compassion and care enable us to be more responsive to the needs of others and help them where possible. Companies can voluntarily extend benefits or aid or provide funding to improve the quality of life. The latter philosophy, only requires compliance to the applicable laws. Do only what is required by law to address any wrong doings, or even to settle outside of the courts and admit no wrong doing. Another *15 minutes of bad news* and we move on. <https://www.reuters.com/world/uk/bhp-faces-47-billion-uk-lawsuit-over-brazilian-dam-collapse-2024-10-20/>

Extracting gold in Canadian mining operations allows for the controlled use of cyanide. The following information is from the Society for Mining, Metallurgy and Exploration's ® website, under the heading *The Safe and Effective Use of Cyanide: A process called "Cyanidation", or cyanide leaching, has been the dominant gold extraction technology since the 1970s. In this process sodium cyanide, in a dilute solution of ranging from 100 ppm to 500 ppm or 0.01% to 0.05% cyanide, is used to selectively dissolve gold from ore. The two most common processes that use cyanide for gold recovery are heap leaching and milling, also known as carbon-in-leach (CIL).*

One of the larger retailers which buys silver and gold has moved to stop buying mined gold. Jewelers, such as the Danish company, *Pandora* uses a chain of custody to ensure the provenance of the materials meets the Responsible Jewellery Council standards. Pandora buys ~340 tonnes of silver and 1 tonne of gold each year, according to their 2022 annual report. This generated 264K tonnes of CO₂. While there is a premium for suppliers to segregate recycled materials and undergo audits, it is being absorbed by Pandora. Pandora estimates that they will reduce emissions by 58,000 tonnes beginning in 2023. Metal refineries source recycled materials from industrial waste, X-ray files, electronics, and old silverware and jewelry. This is an example of how companies can reduce their upstream Scope 3 emissions. It

demonstrates that there are voluntary decisions where buyers will not support practices by sellers which do not meet the definition of value and has viable market options.

In July 2024, after a disastrous failure of its heap leach pad, at a Victoria Gold Corps' Yukon gold mining operation, the company says it may not have the funding to reopen or remediate the site or regional impact. Water sample testing from downstream creeks show cyanide contamination, potentially affecting fish and groundwater. Previous Canadian mining disasters have resulted in mines being placed in receivership and governmental agencies trying to clean up the sites at a cost of millions of dollars. This latest failure of chemical extractions in mining, could lead to revised legislation.

<https://www.aptnnews.ca/national-news/cyanide-yukon-eagle-gold-mine-victoria-gold-corp-landslide/>

ESG in construction design, materials and labour

When we consider the expenditure of materials and usage of labour in the industrial, commercial and residential construction sectors, these are among the largest drivers of emissions and consumption of resources. As the circular economy requires a rethink of designs, we can see progress in construction options.

The Canada Green Building Council (CGBC) has been a long-time proponent of green buildings. For over 20-years the CGBC has adapted the US-borne Leadership in Energy and Environmental Design or LEED® standards for the Canadian market. CGBC estimates that buildings generate 30% of all GHGs, 35% of landfill waste, and deplete 70% of the municipal water capacity. LEED's holistic approach to the construction of buildings is to lower carbon emissions, conserve resources and reduce the operating costs through sustainable practices. While developmental costs may increase to achieve a LEED Silver, Gold or Platinum rating, the TCO is reduced to the owners and the community enjoys the benefits for generations. Certified LEED buildings are rated on 9 credit categories:

1. sustainable sites;
2. water efficiency;
3. indoor environmental quality;
4. energy and atmosphere;
5. Location and transportation;
6. Innovation;
7. Regional priority;
8. materials specifications; and
9. education and awareness.

Provincial governments are impacting residential construction practices by setting energy efficiency standards and goals for builders. BC set 20% more by 2022; 40% more by 2027; and 80% more by 2032, which is the net-zero energy ready standard.

Mass timber

The movement to the innovative *mass timber* designed projects uses composite wood products rather than only traditional steel and concrete. The environmental benefits stand out such as renewable resources and wood is a natural carbon sink. The engineered composite materials are fire resistant as they tend to char on the surfaces as opposed to igniting, when a fire occurs. Structures using the mass timber design complement the traditional steel and concrete components in the foundation. High rise designs up to 18 floors are in many urban centres and continue to attract architects and developers. The Province of BC revised its building code in 2024 to allow mass timber construction in buildings up to 18 floors. Up from its previous 12-storey limit.

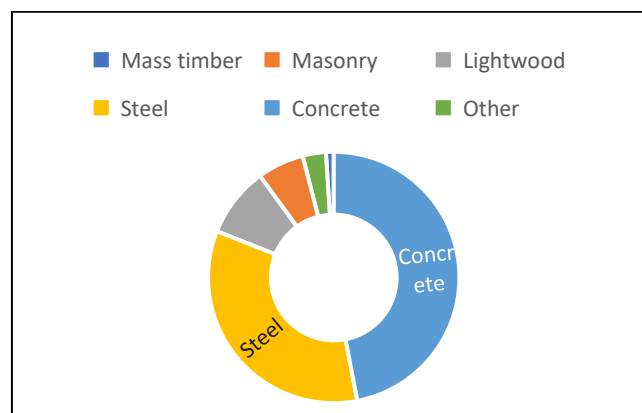
The Canadian Wood Council (CWC) supports the tall wood building concept. The CWC recommends an integrated approach throughout the design and construction phase with early supplier involvement on the material side. One of the first tall wood buildings was completed at UBC in 2017, which led to building codes being revised to accommodate the designs. Long-term costs of tall wood buildings are less costly than conventional steel, concrete and wood, as the energy costs associated with steel and concrete continue to increase.

Mass timber includes laminated beams, which have been in the market for 30-years and cross-laminated beams for columns, walls and floors. Mass timber designs lend themselves to being prefabricated which reduces the onsite construction time. Timber being a renewable resource, favours the sustainability side of the business decisions. Producing mass timber products emits less than the steel and concrete options. Mass timber's end-of-life supports the materials recycling much more easily than the concrete and steel materials. Architects and developers can factor that into the total cost of ownership.

As there is an urgent need to build more residential housing, there will be an increased demand for mass timber designs and materials. Mass timber will not replace steel and concrete but provides a good complement to conventional construction methods.

It should be noted, that mass timber is not without its detractors. Fire safety and water damage can be a concern. Insurance companies do not have certainty of the potential risks of mass timber, being a relatively new design. Building codes will need input from firefighting professionals – especially in concentrated urban areas. A fire during construction of a mass timber construction often completely destroys the site. <https://www.cbc.ca/news/canada/calgary/is-mass-timber-the-next-big-thing-in-cheaper-greener-construction-more-provinces-are-saying-yes-1.7213165>

The following chart indicates the main types of construction materials used in North America. While mass timber is ~1% it is the latest innovation in this market.



Sustainable designs

Vancouver Island Construction Association CEO, Rory Kulmala, is pleased to see how their sector is tackling ESG issues. While the production of concrete does emit GHGs, the internationally recognized CarbonCure™ project enables thousands of tonnes of CO₂ to be captured and injected into the fresh concrete. The mineralized CO₂ strengthens the concrete and remains permanently in the material even after demolition.

Kulmala references the work done by the Building Owners and Managers Association (BOMA) who advocate for sustainable buildings. Their expertise addresses energy, water, air, comfort, health and wellness, custodial, waste, sites, stakeholder engagement, pandemic responses, and purchasing to

maintain and operate the buildings. BOMA's guidance is based on Canadian-wide knowhow for the categories of Office, Enclosed Shopping Centres, Industrial, Open Air Retail, Health Care, Multi-Unit Residential Buildings and Universal structures.

From a labour perspective, construction projects are experiencing a chronic shortage of skilled trades. Looking at social enterprises as a source of labour, Canadian-based Chandos Construction has successfully partnered with SEs to provide subtrades and qualified trades people on many projects. Further, Chandos endorses the Integrated Project Delivery Finance, Operate and Maintain model to build projects with a 10% social procurement commitment. The IPD FOM provides better scheduling, cost controls and increased local labour for the project owners, which are often small to medium-sized communities.

In 2024, David LePage, of Buy Social Canada, shared collaborative results with the construction industry, local employment, social enterprises, and the City of Vancouver's community benefit agreement (CBA). A CBA is designed to create specific social benefits on construction and development projects. The new St. Paul's Hospital development in Vancouver, valued at ~\$2B+ has commitments from its design-builder, PCL Construction, to ensure 10% local hiring from equity-deserving groups, plus 10% local and 10% social purchasing. Local businesses and social enterprises involved include EMBERS, CleanStart, Demolition Impossible, Finch's Tea House, and Agro Roasters, to name a few. More details can be accessed through: <https://www.buysocialcanada.com/posts/update/city-of-vancouver-cba-policy-boosts-construction-sector-impact-on-local-projects/>

Nicole Burgess, CEO of Saskatoon Home Builders' Association, (SHBA) has been a key advocate for ESG initiatives within the residential construction industry. One notable example is through its ongoing engagement and delivery of the Canadian Home Builders' Association's (CHBA) Net Zero & Net Zero Ready program, which supports builders in constructing homes that are energy efficient and capable of producing as much energy as they consume. By providing a clear certification program for these homes, the CHBA has made it easier for consumers to identify and choose sustainable homes that align with their values and needs. The program has also helped to incentivize builders to adopt sustainable practices, which has been crucial in driving the industry's overall commitment to ESG considerations.

Increasingly builders and developers are adopting environmentally sustainable practices, such as green building materials and designs, installing renewable energy systems, and implementing sustainable landscaping. They are also reducing waste through recycling and reusing materials, as well as implementing eco-friendly waste disposal practices. The industry is committed to social sustainability, with builders designing homes and communities to accommodate diverse populations, integrating affordable housing units into their developments, and fostering social cohesion through features like parks, walking trails, and community centres. By taking a holistic approach to sustainability, the industry is demonstrating a commitment to addressing ESG challenges in a comprehensive and meaningful way.

As of May 2023, the BC Building Code requires 20% more energy efficiency for most new buildings. Part of the intended outcomes are for buildings to use less energy and reduce carbon emissions, even if a home is heated with natural gas. The cost of construction will be higher than existing building codes.

3D construction technology

One organization which has successfully overcome a big challenge in the construction sector is Outside the Box Materials (OTBM). OTBM provides scalable alternatives to conventional materials. Their TechCement™ replaces ordinary Portland cement by using an innovative *geopolymer* cement. Portland cement requires high temperatures in its production and is one of the main reasons why it is one of the largest emitters of CO₂.

TechCement™ reduces the CO₂ emissions by ~65% at a comparable cost. TechCement™ can be used in

construction, landscape materials, pavers, and precast products. One of its advantages is the ability to withstand extreme weather conditions, whereas traditional products will degrade with freeze/thaw cycles. TechCement™ uses recycled concrete as an aggregate and can be recycled and used as an aggregate itself. Having a lower permeability rating makes it ideal for marine projects and water treatment facilities. OTBM has also introduced SulfCrete™ which is in a pelletized form, replacing cement-concrete. OTBM's products are a good example where industry has embraced the circular economy principles to reduce waste and recycle resources in a systems thinking model.

OTBM's TechCement™ is being used with 3D printers to reduce housing costs. US-based, Alquist 3D has been building houses for the past couple years using print-on-demand technology. Although this construction method has been successful, Alquist's founder and CEO, Zack Mannheimer, acknowledged that using traditional concrete was "far from the most environmentally friendly material." Alquist partnered with OTBM and uses their TechCement™ to replace concrete. The use of 3D reduces waste, reduces energy costs, is storm-resistant, and competitive, as the construction time is substantially reduced. Habitat for Humanity was one of the first customers to contract for a 3D built, 1200 sq-ft home. Sustainability was an important factor for Habitat for Humanity when selecting Alquist.

<https://www.otbmaterials.com/techcement>

In July 2023 another breakthrough material to replace conventional Portland cement in concrete was poured in Seattle, called C-Crete. C-Crete is a "cement-free" product designed by C-Crete Technologies. The *binder* ingredient eliminates most of the CO₂ in the process, making C-Crete a direct competitor for concrete from a sustainability perspective. According to C-Crete's founder and president, Rouzbeh Savary, PhD. "Our binder is a drop-in replacement for Portland cement that drastically reduces carbon emissions. Given that our product meets industry standards and has cost-parity with conventional concrete, it opens up an entirely new era in construction." C-Crete is a scalable solution which may revolutionize the construction industry and building code standards. <https://ccretetech.com/news/c-cretes-groundbreaking-cement-free-concrete-gets-inaugural-pour-in-seattle/>

Construction-scale 3D home building is being used successfully by ICON, a construction-tech company out of Texas. They have built more than 100 houses in the US and Mexico by 2023. They continue to build affordable, communities using 3D house designs and construction. This type of disruptive technology could signal a big trend for the availability of low cost, durable housing. ICON has also partnered with NASA to construct facilities and habitats on the moon, using the moon's endemic surface materials. <https://www.iconbuild.com/>

In 2024, ICON are building ~40 hotels in Texas using their 3D technology and expect to open in 2026. The staffing requirements to build the concrete structure using 3D only requires 3 people. While 3D enables construction in remote areas with fewer people, there will be a social cost at some point, with lower employment. However, building houses and hotels that are more affordable is also one of society's goals. Using technology contributes to the solution of finding affordable housing.

<https://www.cbc.ca/kidsnews/post/a-company-is-building-hotel-rooms-with-a-giant-3d-printer>

Arup, an organization of global engineers and designers, is focused on the next generation of development and construction. Arup, along with the Ellen MacArthur Foundation, has produced a short video on their philosophy and approach to construction. As a synopsis, it gets down to addressing the Built Environment with 4 basic *rules*:

1. Build only what you need
2. Build with the right materials
3. Build efficiently
4. Build for the long-term

The essence of their message is, we need construction and can do so by following the principles of the circular economy and save resources and reduce GHGs. <https://www.youtube.com/watch?v=rWfKLa-QIOs>

Modular options

Using prefabrication of foundations and apartments is one solution being used to address the chronic housing shortage across Canada. Modular production systems take an industrialized approach to reduce the costs of construction and materials throughout a housing facility. The completed pieces can be *assembled* on site. While prefab houses have been on the market for decades, there is renewed interest in more sustainable designs to reduce construction costs and accelerate the time lines. The Federal government has invested in some modular projects with mixed success. However, these options do need to be considered as a means of addressing affordable housing. Prefab houses cost 10-20% less than stick built (conventional) homes. <https://www.cbc.ca/radio/costofliving/prefab-housing-shortage-1.7535092>

Nexus Modular Homes from BC, has been providing affordable housing options for several years. Their houses are built in an indoor production facility with savings of 10-20% over traditional housing methods. The production method reduces waste from ~17,000 Kgs per unit to ~2000 Kgs in a typical 2000 ft² house, with 90% less GHGs. Delivery from concept to a fully furnished house with appliances and cabinets can happen within 120 days. Many Nexus projects are for units 400 – 1700 ft². Nexus has worked with the Cowichan Housing Association and with Cowichan Tribes to provide affordable housing. <https://static1.squarespace.com/static/5eda70b23db73928bde4bc60/t/639cacd4def9391f700abe2a/1671212245573/Boulevard+Article.pdf>

The chronic homeless problem is being addressed through the accessibility to smaller, affordable accommodations. Their design is not intended as a permanent solution but as a safe temporary home for people facing social and financial problems. Entrepreneur, Ryan Donais, builds facilities which can be towed by a bicycle in urban bike lanes, if necessary, to provide shelter. These tiny homes are equipped with heat, electricity, running water, a bed, smoke detectors, and basic cooking amenities. Donais operates a non-profit company Tiny Tiny Homes and has built (3) units at a cost of \$10,000 each in Toronto.

In 2020, Toronto committed to providing 1000 modular units for homeless individuals and only completed 216 by 2025. Other Ontario cities including Peterborough, Waterloo, and Hamilton are installing small modular homes to displace tent encampments. <https://www.cbc.ca/news/canada/toronto/toronto-tiny-mobile-homes-1.7419805>

In February 2025, the City of Toronto filed a cease-and-desist order to prevent Tiny Tiny Homes from continuing to provide temporary facilities on city property and remove existing facilities. Interesting example where elected officials and administrators failed to provide tenable housing solutions to individuals and the private sector stepped in to do so, only to be shut down. <https://www.cbc.ca/news/canada/toronto/tiny-tiny-homes-cease-and-desist-toronto-1.7458835>

Nearby, Hamilton's civic leadership ordered (40) tiny homes at \$35,000 each which were ordered through a US supplier, who had them built in China. They arrived long after winter had started. No orders were awarded to local tiny home contractors, of which there are several. <https://ici.radio-canada.ca/rci/en/news/2134971/city-of-hamilton-under-fire-by-local-tiny-homes-companies-for-ordering-shelters-made-in-china>

Prefab

Calgary Alberta is completing an innovative prefab project with 84 units being installed by cranes on site and then staircases, elevators and final cladding. The modular units were built nearby and shipped into downtown Calgary. The units should be completed and occupied in early 2026. The construction shaved ~20 months off a conventional construction for residential buildings. It is intended to be affordable and aimed at lower income people earning ~50,000 per year with rents estimated at ~30% of their income.

<https://www.cbc.ca/news/canada/calgary/attainable-homes-modular-1.7600079>

An adjunct to tiny homes is the self-cleaning, prefab toilets designed and made by Urben Blu, out of Quebec. Many cities have installed these economically viable and efficient ways to operate public washrooms which are intended to reduce vandalism. These *smart* washrooms reduce the procurement process, operational costs, waste, and time. The cleanliness of the toilet facilities can be monitored remotely by phone or computer. The company has been in operation since 2014.

<https://urbenblu.com/en/company/>

Robotics in construction

Taking the idea of prefab housing in warehouses, this concept has added robotics to the process to further reduce costs and offer more affordability and flexibility to housing construction. *Promise Robotics* out of Edmonton has been bringing AI and robotics together within a warehouse operation to build houses since 2019. These combined technologies read blueprints, make the cuts to the materials, nailing and drilling of holes for wiring and plumbing for follow up assembly.

Various reports talk about the need for 1 M houses to be built per year. With the chronic labour shortage and high material costs, this is not possible through conventional construction practices. Promise Robotics and other leading-edge companies offer scalable solutions for smaller contractors to have the prefab units made available, closer to their lot locations. Promise Robotics custom programs robotic arms and AI to achieve the outcomes and can be portable – able to be set up in warehouses where the demand is required. This substantially reduces the capital investments and flexibility with designs. <https://www.cbc.ca/news/business/artificial-intelligence-robotic-arms-construction-1.7414299>

Deconstruction practices

Statistics Canada estimates that the construction, renovation, and demolition sector generate 4 million tonnes per year of waste - much of it going to landfill sites. The circular economy model sees great opportunities for recovery of materials to reduce GHGs and create employment for not-for-profit and commercial companies. Habitat for Humanity has its ReStores across Canada that accept surplus building materials and serviceable furniture for resale with funds going to community housing projects.

Other companies providing deconstruction services and material resales include: AET Group; Heritage Lumber; Light House; Ouroboros Deconstruction; Renewable Development; Unbuilders Deconstruction; and VEMA Deconstruction. Public sector entities which are expanding the deconstruction sector are Edmonton, Metro Vancouver and Toronto. https://publications.gc.ca/collections/collection_2024/eccc/en4/En4-737-2024-eng.pdf

Unbuilders Deconstruction Inc. has diverted tonnes of salvaged construction materials for reuse; resells reclaimed lumber with carbon intact; creates 6 jobs vs 1 when demolition is used; and protects the heritage of a community. The cost of deconstruction is about ½ of the cost of a demolition. Rethinking how we replace older buildings is part of the circular economy principles.

An example of the option to avoid demolition is used by Renewal Development, a Vancouver company. In 2024, Renewal Development, in partnership with Nickel Bros., stepped in to save the homes and move them to the Sts'ailes Nation, near Agassiz, BC.

"We actually saved a lot of the materials and the cabinets and the products from the basement suites that we couldn't rescue and moved them upstairs," per Founder & CEO Glyn Lewis. The houses are currently being prepped for their move. They're scheduled to make the trip up the Fraser to Agassiz in early July.

Renewal Development, a pioneering venture established in 2020 with a unique vision: to rescue, relocate, modernize, and repurpose good single-family homes from growing urban areas to non-urban communities. Breaking new ground with our innovative approach, Renewal proudly introduces a revolutionary business model to the industry.

<https://www.renewaldevelopment.ca/about>

In 2025, a formal business-to-business platform will enable construction companies to list and exchange excess and salvaged materials from projects on Vancouver Island. The intent is to reduce the waste going to landfills by making recycling much easier. The platform is Building Material Exchange (BMEx) which partnered with Habitat for Humanity where materials can be dropped off or picked up.

<https://bc.ctvnews.ca/tinder-of-construction-aims-to-keep-b-c-building-waste-out-of-landfills-1.7160060>

Risk management and insurance

Weather events as impetus

Daily weather forecasts are a visual and physical clue on local conditions. The common expression, “It’s a nice day” may be subject to debate as we deal with global warming. A nice day used to mean no rain during a wet season; or rainfall when crops needed it; or a sunny day during the usual sun, cloud, and rain cycles. The recent perplexities in global weather patterns give rise to new levels of uncertainty. Record rainfalls in some areas with debilitating droughts in other areas, creating unprecedented risks for food supplies and fresh water. Increasing temperatures threatening glacial ice packs and growing seasons for crops are definitely going to impact business operations and societies at large. Insurance companies are bracing for massive financial exposures which will need to be factored into the cost of most goods. Inflation will be incurred across the board as weather events are equally disruptive to all organizations. The circular economy will require a rethink of energy and land use. How food, water, and people will be sustained for a healthy lifestyle has still not been answered.

Rainfall in most urban areas is seen as a problem. The excess water is collected in storm drains and diverted back to the ocean, streams, or lakes as quickly as possible. This flushes a lot of surface contaminants into the water supply. Rethinking the rainfall problem could lead to diverting and temporary storage for drier periods or finding other uses for the non-potable water.

Effective May 27, 2023, in response to the California wildfire risk and high construction costs, State Farm General Insurance stopped accepting new applicants for business and personal property and casualty insurance. A State Farm spokesperson stated “The factors driving the decision are beyond our control, including climate change, reinsurance costs affecting the entire industry and global inflation.” Car and home insurance policies in Florida are no longer being written by Farmers Insurance. The 2025 fires in Los Angeles are estimated to cost US\$50B in damages with insurance covering ~10% of the cost. This will lead to insurance companies continuing to withdraw coverage for homes and businesses, based on locale.

The Insurance Bureau of Canada (IBC) paid Cdn \$ 8.5B in insured losses in 2024 as a result of weather events. Losses are much higher where uninsured losses would be included. Insurable losses continue to rise, which added to the inflation rate for consumers and businesses. The IBC supports the PRI principles as a means of mitigating insurance costs associated with extreme weather which has been occurring with more frequency. <https://www.cbc.ca/news/canada/british-columbia/insurance-rates-2025-spike-climate-canada-1.7430472>

The US-based, Aon PLC insurance company president, Eric Andersen, told a Senate committee “that climate change is injecting uncertainty into an industry built on risk prediction and has created “a crisis of confidence around the ability to predict loss.” Reinsurance companies, which help insurers pay catastrophic losses, have been withdrawing from high-risk areas around wildfires and floods in particular 2024.

Major hurricanes and wildfires have driven insurance markets into crisis in Florida, Louisiana, California and are weakening insurers in other Western states such as Colorado and Oregon. These are early days yet in the insurance of properties and assets which rub against weather-related events. Again, another factor in the debate over affordability being borne by taxpayers.

Extreme weather conditions have prompted the Canadian Federal Government to link funding for disasters to mitigation plans by provinces and territories, which will translate down to cities and towns. The categories in the plan address: disaster resilience; health and well-being; nature and biodiversity; infrastructure and disaster aid. By 2026, there will be upgraded codes for buildings, electricity, highway, and bridge design, based on the catastrophic costs which have been incurred due to fires, floods, and heat. This multi-million-dollar plan will require the levels of government to have climate resilience strategies in place to receive Federal funds for disaster relief and recovery by 2026.

The Panama Canal is limiting the size and number of ships due to a drought lowering the level of the Gatun Lake, which affects the canal system. The Panama Canal handles ~50% of the container traffic from north east Asia to the USA, according to SEKO Logistics. In 2024, shippers looked at moving goods across Panama via rail as an option to the shipping congestion. In early 2024, the Panama Canal operations further reduced the volume of ships passing by an additional ~30% due to low water levels. By mid-2024 rains had returned to the Panama allowing for increased shipping traffic.

In late 2024, Panama Canal considered a massive dam to ensure water for shipping which could come at the expense of its local farmers. The controversial dam project would disrupt artisanal farming communities with irreversible environmental degradation. The government of Panama will continue with assessments in 2025. If approved, the dam could be operational in the next 5-6 years.

In 2025, US-owned Blackrock, led a consortium to buy the Panamanian ports of Balboa and Cristobal, at the ends of the Canal. This essentially brought the Canal back under control of the USA. It is expected that US ships will not have to pay fees when navigating through the Panama Canal as part of the deal. <https://www.cnn.com/2025/03/04/business/panama-canal-port-deal-trump/index.html>

The evidence of the changing patterns was demonstrated on July 5, 2023 in Kuujuaq, in Northern Quebec. The recorded temperature was 34° C. The same day in Miami, Florida it was 33.3° C. The average July temperature in Kuujuaq is 15.6° C. The rapid loss of permafrost in the Arctic is changing the landscape and releasing tonnes of GHGs. As the permafrost melts it releases gases which contribute to higher temperatures with lakes are disappearing into deeper channels. The incidents of heat domes and atmospheric rivers are impacting humans, plants and animals in ways which are not sustainable.

As temperatures rise, there is a demand for more air conditioning. To meet the demand requires burning more coal, as other sources of energy cannot meet the demand. This results in higher GHG emissions from coal which adds to the warming problems. As the difficulty remains to reduce the average temperature of our atmosphere, conversations shift from prevention and mitigation strategies to adapting to the new reality of global warming. This is disappointing as it will diffuse the political will and funding away from prevention strategies and investments. Some adaptations will be necessary such as food crops to sustain life and for animal feed. The wealthier people in communities can afford to adapt through buying technology solutions like cooling systems. The lower income people are even more vulnerable and susceptible to problems which are due to higher temperatures.

It seems like all of Canada was on fire in mid-August 2023 and again in 2025. Evacuations of families from large urban areas from north to south and east to west. The destruction of homes, infrastructure, loss of wild life and animals, crops, and natural resources is on a scale we have not faced before. The costs of these events will not be reported for some time. Insurance companies will be developing strategies to decide which risks will be covered and at what cost.

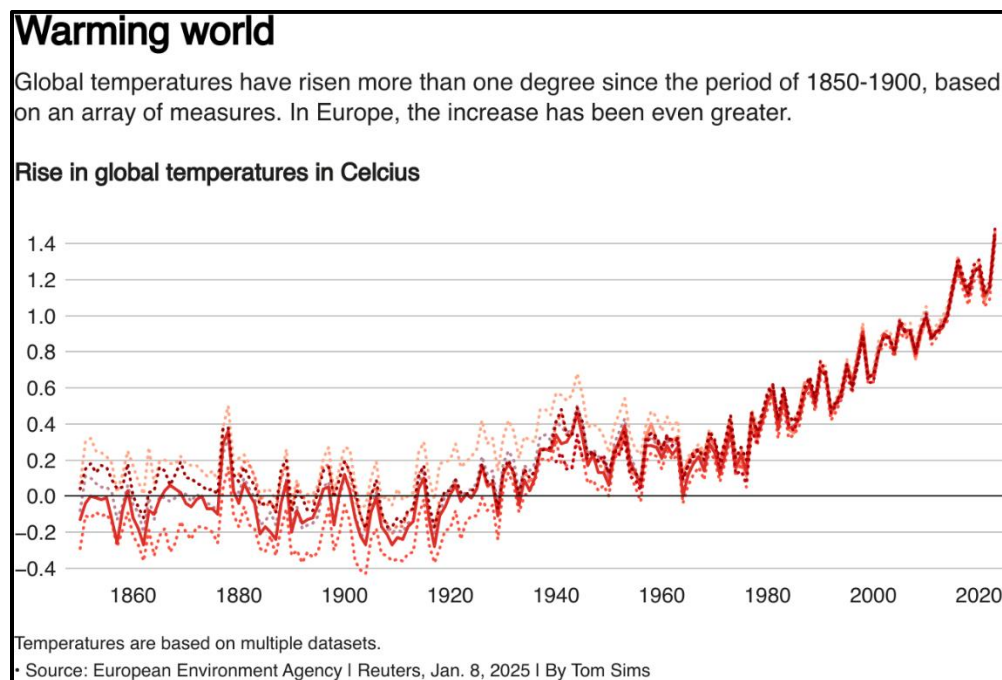
There are lessons on controlling fires which can be taken from Indigenous traditions – *cultural* burning to eliminate build up of potential fuel. For generations, Indigenous people used cultural burns to provide renewed growth of grasses for food and clothing. Each spring they would use targeted fires to protect dwellings from natural fires.

This contrasts with the *prescribed* burning which provincial agencies have used for fire prevention and infrastructure protection – which has had limited success and infamous failures. Indigenous people knew which plants to allow to grow and which invasive plants to remove. Endemic plants are a part of a region's ecosystem. Bringing in palm trees and eucalyptus trees, which are highly combustible, into Los Angeles as an example, introduced a fuel source which was not natural. This is not to say they caused the fire but added to the intensity of the catastrophic fires.

<https://www.cbc.ca/news/canada/british-columbia/cultural-burn-wildfire-b-c-california-1.7436340>

The varying nature of weather patterns which is now shifting between *normal* and extreme, adds to the level of unpredictability. However, the financial and social impacts can be catastrophic. Traditional crops may be planted and the yield can be far less than expected. Lower incomes, lower food harvests, increased costs to growers and consumers are inevitable. The increased average temperatures, if they become the new normal will require research into more weather sustainable crops – which can take a decade to assess with the temperature fluctuations. Larger companies, with groups of investors, may be able to withstand the weather-related variances but smaller producers and farmers could be taken out of the market in a shorter period of time.

We can debate the cause of increased global temperatures. But the focus needs to be on reducing the average temperature. Insurance company Munich RE, estimates its *insured* losses at US\$160 B in 2024, the highest on record. In addition to economic losses, the irreversible loss of species takes a toll which is hard to quantify. <https://www.reuters.com/business/finance/climate-change-shows-claws-with-rising-costs-disasters-munich-re-says-2025-01-09/>



Humanitarian logistics

The increased uncertainty of weather patterns and the rise of natural disasters have increased attention on humanitarian logistics. The necessity to quickly evacuate threatened communities from fires or

floods and provide disaster relief is not new. The rate of frequency appears to be on the rise in disasters and outbreaks of diseases. Rapid response teams are always on a standby until the call is received. Rapid response teams can be part of not-for-profit and faith-based organizations.

The ability to rapidly deploy resources to prevent and mitigate the impact from weather events is an adjunct of the global warming crisis. It can be challenging as compared with the normal commercial logistical issues around parts, materials, and labour shortage, where forecasts and predictability are reasonably accurate. Businesses have a good handle on how to adapt to these conditions. In a natural disaster or other unforeseen event, plan B is always in effect. Trying to move people and materiel is the ultimate challenge.

Disaster relief requires expertise in supply chain logistics. There are innumerable impacts on environmental ecosystems and social outcomes. The International Red Cross is one of the oldest and largest global organization which has humanitarian relief as its core purpose.

The International Red Cross and Red Crescent Movement is a global humanitarian network of 80 million people that helps those facing disaster, conflict, and health and social challenges. The Movement consists of the ICRC, 191 National Red Cross and Red Crescent Societies and the International Federation of Red Cross and Red Crescent Societies (IFRC). The IFRC does provide disaster relief insurance pay-outs which are generated at various cost thresholds where multi-disasters have frequently occurred. In 2024 insurance funds were paid following typhoons in Asia, floods in Nigeria, and landslides in Nepal.

There are amazing voluntary organizations which are among the first responders to disasters. One being, the Rapid Relief Team (RRT). With branches in several countries, the RRT was established in 2013 by the Plymouth Brethren Christian Church. The RRT supply meals, refreshments, and volunteers roll up their sleeves and work beside other support groups to remove debris. This enables the restoration of community services for the affected families to begin. Whether it is in a military crisis or natural disaster, the RRT volunteers are well organized to deploy as soon as possible to mitigate the conditions, with compassion, to the aid of others in need. <https://rrtglobal.org/can/relief-operations-appeals-can/rrts-2024-year->

Supply chain impacts

Risk management strategies are a key part of supply chain management and ESG. Under the larger corporate umbrella are a preponderance of issues. A shared risk for underwriters, cities, companies, communities, governments, and society in general, are issues which threaten sustainable operations.

Under the UN Environment Programme's Finance Initiative, in June 2020, a collaboration with global insurance industry companies developed its *Principles for Sustainable Insurance* (PSI). The subsequent guide distilled risk into (4) principles to be adopted:

1. We will embed in our decision-making environmental, social and governance issues relevant to our insurance business.
2. We will work together with our clients and business partners to raise awareness of environmental, social and governance issues, manage risk and develop solutions.
3. We will work together with governments, regulators and other key stakeholders to promote widespread action across society on environmental, social and governance issues.
4. We will demonstrate accountability and transparency in regularly disclosing publicly our progress in implementing the principles.

At a high-level and from a supply chain perspective, the noted risk criteria included:

- Climate change
- Environmental degradation

- Protected sites/species
- Unsustainable practices
- Animal welfare/testing
- Human rights
- Bribery and corruption
- Poor corporate governance
- Poor product safety and quality

For each of the risk criteria the PSI guide provided detailed examples and references for mitigating the relevant risk.

An example of how a risk management strategy can be implemented is provided by Volkswagen. In March 2022, Volkswagen initiated a comprehensive risk management and mitigation strategy to comply with new German laws with respect to the sourcing of raw materials. It is called the Raw Materials Due Diligence Management System (RMDDMS) aimed at conducting human rights and environmental risk management. Volkswagen put the onus on a Senior Level Steering Committee with oversight on each prioritized raw material.

Raw material extraction and production face the highest risks at the mining sites in the various countries where there can be instances of forced labour, human trafficking and environmental degradation. With the RMDDMS plan, there must be an assessment and mitigation plan for each of the priority raw materials. These (16) include: lithium, cobalt, nickel, graphite, aluminium, copper, leather, mica, tin, tantalum, gold, platinum, rubber, rare earth metals, and steel. The RMDDMS is exhaustive in its methodology and can lead to cancellation of contracts. Volkswagen is on record as not supporting the mining of materials from the seabed. A part of their strategy is to ensure that all procurement staff have sustainability as a skill set. Volkswagen offers training sessions to its suppliers as part of the RMDDMS. As a global leader in the automotive industry, this could change operations for many suppliers and competitors to follow. Volkswagen is a member of the Initiative for Responsible Mining Assurance (IRMA).

There are many different “lists of supply chain risks” which could be referred to as a means of having a checklist for risk. Depending upon which sector you are in a checklist may or may not be relevant or impactful. Each business must have a good idea on where its risks are most probably going to occur.

There are a variety of risk assessment tools and techniques such as FMEA, SMAUG, SWOT/PESTEL, Pareto, Ishikawa, or RACI. Risk management and mitigation require a combination of the tools and techniques. Errors can cause risks to be incurred. There is no expectation of being 100% error-free but there is an expectation that all reasonable best efforts will be exercised. Prioritizing risks is the role of leadership and mitigation is the role of the management.

Not having a comprehensive risk mitigation plan is the biggest risk of all. It’s surprising how many companies can be consumed by supporting their sales, production and administrative responsibilities and lose sight of the potential for serious risk; or think that it is not feasible to address the multiplicity of risks. Looking *ahead of the curve* is a must for all businesses to stay on top of risks.

The amount of due diligence any organization can allocate to the risk management and mitigation planning will vary on its resources, capabilities and financial objectives. It would be difficult to rank risks in a common order due to the fact that each has its own repercussions based on the specific outcomes or potential for probability of occurrence.

One could make the case that *inflation* is a risk. While price inflation and deflation are in continuous flux, they are a part of the market conditions. Where governments intervene and impose conditions on

suppliers in one country (carbon tax), this could put those suppliers at a competitive risk of higher costs and being less competitive. That is a government policy risk which we see quite often in a global economy. Warren Buffet's quote is *risk comes from not knowing what you're doing*.

Weather related insurance costs

Insurance companies have been hit with devastating claims related to renewable

energy options. Solar panels damaged by storms and wind turbines hit by lightning are pushing policy costs up by 20-40%. While insurance companies can pass along their cost increases, they can also stop coverage. Climate change losses are estimated at Cdn \$20B in the Q1 of 2024. State Farm and Liberty Mutual have pulled out of some US markets.

Home owners can't continue to absorb ever increasing insurance costs. Having consumers switch to solar panels with a payback of 5-6 years, only to have them not covered through insurance caused by storms, will deter the expansion of solar panels or require better designs. Climate changes are leading to more weather-related claims and will require the rethinking and redesigning of energy delivery and infrastructures in areas which could be impacted in the future.

e-risks

One significant downside to the design of batteries in EVs is that in an accident, even slight damage to the battery pack can lead to the vehicle being written off by insurance companies. This is a significant cost to insurance companies which must be borne by the consumers. A March 2023 Reuter's article, by Sean Tucker, noted that while Ford and GM have taken steps to make battery packs easier to repair, Tesla with its Model Y is almost unrepairable. The entire car is often written off. As we get more and more EVs on the road and more accidents involving EVs, this is going to push insurance rates up and require some serious redesigns to solve the problem. An EV battery pack could cost 40-50% of the vehicle's sticker price. As more EVs enter the market, there will continue to be increased numbers of accidents. Insurance rates will increase in general and specifically cost EV owners more money, as compared to typical ICE vehicles rates. Repair costs are often thousands of dollars more for EVs.

EVs have been involved in many fires. In South Korea an apartment block was heavily damaged when an EV ignited in an underground parking space. In August 2024, Korean officials are discussing whether to require automakers to disclose their EV battery brands and provide other safety precautions. E-bikes have been attributed to causing house fires.

Building owners and ferry systems are aware of these risks. Fire fighters are concerned due to the explosive properties with EV batteries and their tendency to explode. The Canadian Association of Fire Chiefs wants a national fire administration policy to set safety standards. The EVs are becoming more popular and safety regulations are lagging updates on the fire risks. <https://www.cbc.ca/news/canada/windsor/ferry-operator-s-ban-on-recalled-evs-highlights-need-for-more-safety-rules-experts-say-1.7275937>

Geopolitical events

The poly-confrontations affect supply of critical materials, finished goods, food supplies and inflation. Ideological differences between major countries results in protectionist policies. Disruptions across the supply chain can be driven by the politics and subsequent logistical problems. For decades North American and EU companies formed a dependency on imported goods. Weaning ourselves off the lowest cost producer and meeting global ESG expectations of stakeholders affects sourcing strategies. Mitigation includes diversity, redesign, onshoring investments. Supply chain mapping is a good tool for analyzing options.

Business continuity

As we face climate change with the increased risk of natural disasters from fires or floods, having a “72-hour” plan is de rigueur. In the event of a disaster, stakeholders expect that any organization should have a basic Plan B at the ready to action and cover off the first 72 hours, at a minimum. After that, disasters require multi-levels of governmental agencies and rapid response relief organizations to try and support communities first. Businesses are expected to be able to manage and recover. Insurance costs are usually prohibitive or unavailable to ensure for large-scale disasters. Mitigation plans include diversity of suppliers, process mapping for major suppliers, co-developed response plans with major suppliers, staff training and mock situation drills. Having a print version of supplier contacts in a safe location can be a low cost means of getting through the first “72.”

Long-term mitigation plans for climate-based risks are more complex. From a narrow supply chain perspective, we get into decisions about either adapting to the conditions or preventing harmful outcomes as a result of the options we take. Adapting looks at the types of materials we need and the material standards we will accept, the provenance of labour and material sources, or the design of products. Prevention includes the strategies of decarbonization of industry, transition to a circular economy, or shifting to renewable energies. We are taking these actions concurrently with science, business and political voices at the table. Business continuity in supply chains also requires a discussion on affordability.

Environmental degradation

Contributing in any way through business practices which harm the environment is a serious risk. It could lead to a compromised reputation in the communities within which an organization operates, significant fines, or the cost of defending actions in courts. Similar to business ethics and codes of conduct, the legislation varies between countries and can be interpretive. Risk of environmental degradation is mitigated through compliance with governmental policies demonstrated in the corporate behaviour. Monitoring compliance is a challenge on a global basis and yes, many bad actors escape for their misdeeds. The awareness of leading practices, local, national, and international requirements for compliance with environmental commitments and using internationally recognized standards such as ISO and other bona fide 3rd party certifications is critical. See **Addendum VII**.

Social risks

Stakeholders see companies, brands, and organizations as contributing to the advancement of social values, supporting social values, or detracting from social values. Hiring practices and ensuring inclusivity, diversity, equity, and accessibility are being monitored on an ongoing basis. Larger organizations, private or public, are the ones most under scrutiny, first. Mitigation of risks for not demonstrating commitments to social values require an awareness of leading practices, local and national requirements and using internationally recognized standards such as the ILO, UNDRIP, and actively supporting local economic development and employment. There is a role for philanthropy to support social causes and aiding the unrepresented in our communities. Giving back does not go unnoticed.

Governance risks

Both environmental and social risks are addressed through comprehensive and effective *governance* policies and practices. Not having a policy in place is a poor reflection on the leadership and the reputation of the organization. Perhaps *worse than not having* an effective policy in place, is the consistent failure to follow one’s own policies. Stakeholders, in the case of the Canadian federal government, are exasperated by yet another scathing review by the Auditor General for failing to management contract risks when engaged with external consultants. One excerpt from the 2024 report

summarizes the risk: *Of the 97 contracts awarded to McKinsey, Hogan (AG) found about 70 per cent were issued as non-competitive contracts and at least four appeared to have been designed and implemented to suit McKinsey & Company specifically.* The value of the professional service contracts is in the millions of dollars. Ironically, in March 2024, the Treasury Board of Canada released a *Manager's Guide: Key Considerations When Procuring Professional Services*.

The risk, is continued distrust for all public procurement staff across Canada. The federal government has the largest spend but the overall lack of governance leads to an apathy and outrage with very little change in practice. Political parties may change but the lack of governance and accountability is inculcated in poor governance and practices at all levels of government. There will likely be another “it’ll never happen again committee” formed but it is doubtful that there will be value for money in most government contracts. There should be consequence for not following proper policies and procedures in all organizations. <https://www.ctvnews.ca/politics/policies-procedures-often-broken-in-awarding-contracts-to-under-fire-consulting-firm-auditor-general-1.6912696>

Mitigation of a lack of governance requires updated policies which are reflected in the practices across the organization. Reporting out on outcomes and targets is an expectation by stakeholders. Non-financial reporting, following leading standards, contributes to the transparency which can be appreciated by shareholders and community stakeholders. See the Section on ESG Metrics.

Cyber threats

The Achilles’ heel for technology is cyber security. The preponderance of invasive malware remains a real threat to all parties and can easily be transferred between supply chain partners. Meat producer JBS USA paid US\$11M for a 2021 ransomware attack. Since 2023, Clorox, Dole, MGM, MKS, Caesars casinos, and other companies have been reportedly hacked by *Scattered Spider*, a nefarious group running cyber-attacks. Clorox incurred substantial 1st quarter losses due to the hacking of its IT infrastructure, as reported by Reuters. Clorox had to resort to manual processing of orders as a result of the hack. S&P Global Ratings lowered its outlook to negative for Clorox in November 2023, as the cyber-attack has compromised the financial performance of Clorox.

Several Canadian hospitals and health service providers have been hit with ransomware, accessing personal patient records. Australia’s port operator, DP World, had to close its operations for a few days in November 2023 due to a cyber security breach. Surreptitious blockchain technologies may be able to address the cyber security dilemmas. In April 2024, Canada’s London Drug operations were shut down for a week due to a security breach with an estimated revenue loss of ~\$28M.

Mitigation requires an understanding of which suppliers do have access and how they could connect to your system. Ensuring staff are not bringing in preapproved, 3rd party devices which could compromise IT security. Theft of electronic devices is a common means for hackers to assault databases. The use of a two-factor authentication (2FA) is becoming the new norm for accessing a system. Backing up data on a secure system for retrieval when necessary. Data encryption can help to defend against attacks. Blockchain technology is good. Monitoring your IT system for intrusions on a consistent basis may provide early detection or prevention. Network segmentation divides a system into specific areas which require distinct protocols for access. Having a DMZ or *demilitarized zone* on a network protects an organization’s internal system from untrusted traffic.

The larger issue with cyber security is the number of companies on the same platforms. If there is a system issue, all the companies subsequently get the problem. The July 2024 failure of CrowdStrike to protect hundreds of their clients when they launched an upgrade to their software, caused a massive outage of services for airlines and travelers. This cost airlines and passengers millions of dollars in unnecessary costs due to their poor strategy which lacked a redundant component.

Allowing so many companies and government entities to have “all their eggs in one basket” requires a rethink. The lack of a redundancy creates chaos and literally can kill people where health care services can be impacted over a transactional error. Having CrowdStrike apologize hardly mitigates the problem. <https://www.cbc.ca/news/world/cyberstrike-worldwide-outage-1.7268863>

While the CrowdStrike trigger was due to a lack of quality control, June 2024 saw a similar system-wide shutdown of automotive dealerships across North America. This was due to a criminal cyber attack on CDK, a US-based software service provider. However, similar outcomes for thousands of customers. While CrowdStrike was only for a few hours and CDK was for several days, the fact that two major systems went down over a lack of software design, within one month, means there is a need for more due diligence. CrowdStrike repeated the CDK problem from one month earlier.

In 2022, Rogers Communications went down for 24+ hours due to a technical error and a lack of overload protection-poor system design, in a distribution router. Thousands of customers and businesses were impacted. We’re not learning from these events. There will be a *next* one.

Legislated requirements

Ignorance of the law is not a defence. An organization’s leadership must be aware of its legal obligations. Moral obligations are their prerogative based on values. Competitive bid laws apply to both private and public sector organizations. It is essential that supply chain decision makers are fully aware of the legislation which could affect their decisions. Mitigation should ensure that staff training is adequate to ensure non-compliance with company policies, procedures or tender laws will not be condoned. Rogue buyers should be brought in line as soon as they appear to be crossing a line, that in their opinion, is ok. In the case of elected officials, they require training to be able to understand their role in procurement processes and decisions. Just because an organization has not been taken to court is not the litmus test for compliance with legislated requirements. Where an employee, senior staffer or an elected official makes a decision, with the best of intentions, yet knows they should not have, they face the risk of *willful blindness*, with potential personal liability.

E-waste and product stewardship programs

In 2025, e-waste continues to be a plague. Illegal shipment of e-waste continues as rules are lax and fraudulent labelling of shipments is common. The projection for e-waste generation is 80+M tonnes by 2030, largely unabated. <https://www.ctvnews.ca/world/article/thai-officials-seize-over-200-tons-of-illegally-imported-electronic-waste-from-the-us/>

Electronic waste continues to grow in all countries as devices reach their often short, end-of-life cycle. Electronic products are discarded, recycled, but can be refurbished. As volumes of e-waste increase, so does the demand for their material content or for these expired devices to be repurposed, as the circular economy supports.

The US Environmental Protection Agency (EPA) has 10 categories for e-waste:

- Large household appliances
- Small household appliances
- IT equipment
- Consumer electronics
- Light fixtures
- Toys
- Tools
- Medical devices

- Monitoring devices
- Automated dispensers

The 2019 World Economic Forum report, *A New Circular Vision for Electronics*, estimated that only 20% of the annually generated, 50 M tonnes of e-waste, is properly recycled. The value of this e-waste is ~US\$62B. There is 100 times more gold in a tonne of mobile phones than in a tonne of gold ore. The other 80% of the e-waste ends up in landfills, incinerated, or shipped to developing markets for hand sorting and recovery by *dismantlers*. The long-term effects to health and the environment are considerable due to the toxic and hazardous materials. E-waste can be defined as any electronic or electrical device that has reached its end-of-life, including batteries and related equipment.

Many companies and governmental offices schedule and budget to *refresh* their IT systems. This can be motivated by their leasing agreements to ensure the latest technologies are installed, whether the entire system requires this or not. The leasing companies encourage these upgrades similar to automobile leasing programs to generate sales revenues and profitability through consumption. It's estimated that manufacturing 1 tonne of laptops generates 10 tonnes of CO₂.

TechTarget, a US digital marketing company, recommendations for e-waste include refurbish, resell, recycle, and responsible disposal. These 4 steps require that the service providers be bona fide and reputable. IT asset disposition (ITAD) companies can be the conduits for much of the e-waste disposal and refurbishing. Buying factory recertified drives can be cost effective, reduces consumption, and can be warrantied. ITAD companies should meet R2 standards as defined by the Sustainable Electronics Recycling International (SERI) for responsible practices in accredited certification programs. Old electronic devices can also be donated to schools, charities, or youth organizations, after ensuring a security check.

Dematerialization of electronics will occur concurrently with recycling and refurbishing. Cloud computing and IoT will be addressed through design of the technology and connectivity; while reverse logistics and producer responsibility strategies will promote recapturing materials and resources under a circular approach. There needs to be an increase in efficient recycling systems. European recycling claims to be at 35% which is much better than the 80% of many countries, according to the Geneva Environment Network. Other related information on recycling is covered below under Critical Materials.

<https://sustainableelectronics.org/r2/>

Product stewardship programs have been in effect for several decades under the Canada-wide Action Plan (CAP). Initially these were set up as deposit-refund programs for beverage containers to collect and recycle to reduce landfill waste and environmental problems. Most provinces use eco-fees to cover the cost to properly dispose of tires, electronic waste, paper products, products containing mercury, hazardous materials, and automotive products. CAP was supposed to have a Phase 2 where construction and demolition waste, furniture, textiles, carpets, appliances, and ozone depleting substances were to be included.

Inherent in product design has been the issue of *planned obsolescence*. Consumer products have been designed to be constructed as efficiently as possible and at the end of their useful life, the products are expected to be thrown out. When we think of small home appliances like kettles and other gadgets, they are cheap to buy and are simply thrown into the garbage when they break down, within a relatively short period of time. Or consider the larger appliances such as stoves, fridges, air conditioners, washers, and dryers. These can have a relatively short life and are costly, if not impossible, to repair. Original equipment manufacturers (OEMs) have little interest in extending the life of these products. It's cheaper for them and generates more revenues to design-for-disposal. Energy Star rated items are built with lighter materials in their design and intended to use less energy when in service. Arguably, the lower

quality leads to a shorter life and therefore, more consumption of materials to produce goods to replace the energy efficient items – it's not a net energy saving, it literally requires more energy to keep making new items to replace the previous models. Society pays for the disposal as much of it ends up in landfill sites. Consumers should demand better value but these requests get lost in the noise of marketing.

Little progress has been made on the CAP Phase 2 to date, according to the Economics and Environmental Policy Research Network working paper of October 2019, which is sponsored partially by Environment and Climate Change Canada. Provinces rely mainly on quasi-governmental agencies to manage the waste with little legal clout to hold producers responsible. Municipal collection programs are a main source for used products and materials where it is up to households to sort their waste according to being organics, recyclables, or garbage, in their opinion. The summary of the working paper sees more potential for stewardship programs in terms of efficiency and effectiveness, but not as they are currently being managed.

Contrast our Canadian situation to that of Europe. Specifically, in France where they require that labels are an integral part of their Extended Producer Responsibility plan. Producers *must* use the approved logo on labels to inform end consumers that the product and/or its packaging can be recycled. The legislated mandate applies to household packaging; printed paper; electric and electronic equipment; batteries; tires; vehicles' medicines; furniture and furnishings; apparel, footwear, home textiles; sport and leisure boats; chemicals; in-vitro diagnostics; tobacco products; toys; sport and leisure articles; DIY and gardening supplies; textile decoration; construction products and materials; and lubricants. Non-compliance is reinforced with steep financial penalties. <https://blog.gima.com/sustainability/france-triman-labeling-requirements>

The European Commission launched the *Right to Repair* in early 2023. The proposal will ensure consumers can buy products which are able to be repaired and thereby, reduce waste. It is intended to provide an incentive for manufacturers to design more durable products and where necessary, have parts and training provided to be able to extend their life. This is part of the EU Circular Economy Action Plan.

Role of the consumer in retail sectors

2025 tariff pushback

The illegal tariffs by the US government have raised the consciousness of discerning consumers in Canada. Suddenly, there was an effort by Canadian consumers to avoid buying US brands, wherever possible. Restaurants, food retailers, and government liquor outlets are trying to adapt to this "buy Canadian" trend. If the tariffs are softened or even reduced in the future, there could be a sustained interest in Canadian brands.

While DEI is a lesser issue to most consumers, where retailers have dropped DEI due to US government pressures, there are responses being made through boycotts. In Atlanta, Georgia, a boycott of Target stores began in March 2025, because of Target's back pedaling on DEI. Local faith leadership organized the boycott, which occurs as the US tariffs will drive inflation on consumer products. However, the DEI boycott is about supporting the interests of minorities. "*Black people spend upwards of \$12 million dollars a day, and so we would expect some loyalty, some decency and some camaraderie,*" Bryant (boycott organizer) said. This led to the dismissal of Target's CEO in August 2025. <https://atlanta.capitalnews.org/target-ceo-shakeup-boycott/>

While we have seen in the labelling that Canadian products can contain imported components, the shift towards supporting Canadian brands reiterates the importance of the economic multiplier effect,

discussed previously. The redistribution of revenues and wealth by consumers buying more Canadian made goods will bolster local economic and employment interests. Yes, Canada is a relatively small market, but using the same argument, buying local can be very impactful as a result of a larger percentage of spending staying in local and regional communities.

Fast fashion

If we look at the fast fashion industry, we can see the sense of entitlement, we, as the WEIRD consumers have encouraged. As long as it is legal to buy, we will buy what we want with little regard for how the garment was made or for the individuals that made it or how it will be disposed of. Authors Naomi Klein, Elizabeth Cline, Sofi Thanhauser, and others have documented the global problems created by cheap clothing. The WEIRD American consumer buys ~60 items of clothing per year. Brands such as Adidas, Nike, Zara, H&M, and the Gap don't make anything but they have their product lines manufactured in *speed* factories or low-cost labour firms across the globe. Apparel and footwear are the source for 8% of GHGs.

In 2025, France and the EU gave US-based Circ, a textile recycler, the funding to build a €500M plant to recover cotton and polyester. The plant targets 60,000 tonnes per year once it starts up in 2028.

<https://energynews.oedigital.com/environment/2025/05/16/circ-will-build-a-500-million-cotton-and-polyester-recycling-plant-in-france>

Reporting on working conditions and the use of supplier codes of conduct have not been overly effective to address the exploitation of garment workers on such a scale. The 2013 Rana Plaza collapse in Dhaka, Bangladesh, which killed 1100 and injured 2500, was the moment which exposed the lengths to which fast fashion had stooped to. Canadian brand Joe Fresh, a division of Loblaw's, distanced themselves from any responsibility in related law suits resulting from the Rana Plaza deaths, *as they do not operate the factories*. A \$2B law suit was dismissed by Canada's high court. Loblaw's paid relief and compensation of some \$5M to Bangladeshi workers and various social agencies following the favourable ruling. While many garment marketers conduct *social audits* where they have their brands made, the audits appear to have minimal impact on sincerely addressing the social problems.

In May 2023, Nike has been charged with *taking advantage of consumers interested in eco-friendly products*, as reported in Supply Chain Dive and several other investigative media outlets. A law suit allegedly claims that Nike *falsely and misleadingly markets products as sustainable and environmentally friendly*.

Dhaka is the home base for 5,000 garment factories which employs 80-90% women in patriarchal operations. ~18 million workers in Dhaka are women with ~11 million working in the agriculture industry. The 2018 ILO report states that most of the women in the garment sectors are in vulnerable positions but are dependent upon earning their meagre wages.

The 2022 ILO report, *Decent Work in the Garment Sector Supply Chains in Asia*, shows the continent employs 60 million workers and accounts for 55% of clothing and garment exports. While wages have risen, most workers remain in vulnerable conditions in the low skilled "cut and trim" operations.

For decades retail fashion brands hid behind the statement "it's not my problem because I don't own the production company." This has been exposed as being exploitive and illegal to deny workers their fair pay. The US Department of Labor came down hard again in December 2022 in its press release: "U.S. Department of Labor Wage and Hour Division investigators found Justar Fashion – a garment contractor that produces apparel for retailers such as Stitch Fix, Indigo and Evereve – failed to pay minimum wage and overtime as required by paying workers on a piece-rate basis and at straight-time rates regardless of the overtime hours they worked. The employer also failed to keep records of hours worked. Their actions violated minimum wage, overtime and recordkeeping provisions of the Fair Labor Standards Act.

The Dept of Labor stated that 32 employees of Justar were owed US\$145,290 in back wages.

US clothing brand manager, PVH, is taking steps towards a more responsible commitment in the fashion sector. Even going so far as to tie financial support to its suppliers which meet sustainability criteria. In early 2023, PVH partnered with Standard Chartered Bank to benchmark PVH's suppliers against targeted ESG metrics. Those suppliers which meet the ESG targets will have access to more competitive financing. Standard Chartered Bank want to enable suppliers to have more resilient supply chains through investing in technologies. The ESG metrics put forward by PVH include a healthy and safe working environment; respect for human rights. PVH wants to have its operations 100% powered by renewable electricity by 2030; reduce supply chain emissions by 30% and zero waste by 2030. In the short-term, PVH want to filter out all harmful chemicals and micro-fibres in water discharge by 2025.

Further progress has been shown in the garment industry with dozens of major brands signing on to the 2021 International Accord (IA). Signatories to the IA commit to:

1. Disclosing all factories producing for them in countries with IA programs.
2. Ensuring all listed factories participate in the inspection, remediation, and safety training programs.
3. Supporting factories to ensure remediation is financially feasible.
4. Contributing to the operational costs of IA programs.

https://internationalaccord.org/signatories/?signatory_categories=pakistan-accord-brands

The scope of the IA was strengthened in 2023 with the additional Pakistan Accord. Legally binding clauses to include fabric mills and go beyond health, safety, and fire regulations in buildings to address sexual harassment, gender-based violence, and excessive working hours. The Global Living Wage Coalition has estimated that there are ~75 million workers in the garment industry, *working 10-16 hours per day, 6 days per week, for poverty-level wages*. The 2022 World Bank's extreme poverty line was raised from US\$1.95 to US\$2.15 per person per day! Globally, this impacts ~2.6B people in the G20 groups of countries. Nike buys from 5 Pakistan factories but did not sign on to the Pakistan Accord. Adidas and Puma did sign on. <https://www.reuters.com/business/retail-consumer/investor-pressure-nike-builds-over-garment-workers-rights-2024-09-05/>

ESG in the fast fashion world has a long way to go. The over use of micro-fibres and chemicals contributes to carbon emissions and pollution from waste water discharge; the social issues remain largely unresolved. The marketing to the WEIRD world far exceeds the actions to address ESG issues. QIMA Senior Business Development Partner, Dory Lanenter, reported persistent non-compliance issues involving wages, lack of training related to the use of PPEs, and child labour in their traditional ethical audits of factories. For example, many Asian-based factories partner with local schools to send children to work in the factories as non-paid internships and often in sub-standard dormitories. Sadly, in a late 2022 global survey by QIMA, there was a substantial increase in child labour use in factories from 2019 levels. QIMA audits thousands of factories per year for its clients.

A transitory material alternative has been found in the use of recycled polyester (rPET). rPET reduces CO₂ by ~80% instead of using virgin polymers, according to German owned ALPLA Group. The carbon footprint is based on the ISO 14044 standard tracking from the collection of PET bottles, transportation, cleaning, processing, and granulating. ALPLA has been researching rPET for 20-years and has successfully used rPET for 7-years. rPET fibres can also be used in the production of clothing and textiles. Canadian packaging company, CKF Inc., in BC, converted to rPET materials in 2025 for its packaging operations. <https://www.canadianpackaging.com/general/ckf-inc-ushers-in-future-growth-major-investment-in-rpet-facility-signals-shift-to-delta-b-c-177906/> QIMA has seen increasing interest in its lab testing of rPET to validate stated to actual content of recycled components.

Trade agreements allow Export Processing Zones (EPZ) to flourish legally with sovereign space allowing duty-free imports with no quotas on raw materials or the capital equipment to produce the exports. Host countries provide the EPZs with private security, private generators, avoidance of inbound/outbound taxation, and easy access to low wage labour pools from foreign multinationals. Asian factories subcontracted production to lower cost producing countries such as Honduras and controlled by the US. That's how cheap clothing gets to the WEIRD market.

Japan is witnessing a growing trend in buying 2nd hand clothing. As inflation worries rise with consumers and interest in sustainability is gaining traction, there has been increased buying of used fast fashion products. Uniqlo, a long-time Japanese brand, owned by Fast Retailing Co., began pop-up stores in Tokyo in late 2023. The Uniqlo brand items sell for ~1/3 of the original price and have been well received by consumers. This could change in 2025 as Uniqlo was found to be using cotton sourced from the controversial area of Xinjiang. <https://www.reuters.com/business/retail-consumer/uniqlo-risks-boycott-china-after-ceos-xinjiang-comment-2024-11-29/>

Where previously consumers had an aversion due to hygiene and other social factors, the acceptance of buying 2nd hand clothing may be a signal of a change in this attitude. Japan's Minister of Environment says while 34% of clothing is recycled, a lot of that is donations to low-income countries, with incineration used to dispose on excess volumes. It's estimated that only ~6% of the \$75B market fashion market is 2nd hand. A popular Japanese site, Mercari, has shown an increase in online buying of used fashion products, as reported in December in the Japan Times newspaper.

2nd hand clothing is expanding options in North American markets in late 2024. Zara, by hosting its *Pre-Owned* online service, will help to sell, repair, recycle, and donate used clothing to reduce waste, in the USA. Zara began the service in the UK earlier in 2024 and several other countries. Part of the idea behind *Pre-Owned* is to have customers post their excess clothing online and offer others to buy the items. Zara offers collection services for 2nd hand clothing from customers.

Unfortunately, donating clothing has resulted in not-for-profit organizations losing out to for-profit organizations which want to collect used clothing. When Canadian consumers decide to donate their clothing items, it was under the belief that the clothing would get into the hands of Canadians that need the clothing. Some of it does but much of it is diverted into illegal operations through various scams. This has led to exporting of clothing into emerging economies. Government agencies have very little control over this dark side of the textile trade. Unlicensed or rogue clothing bins are part of the supply chain which has received little attention but does involve millions of dollars in Canada. <https://www.ctvnews.ca/canada/threats-slashed-tires-how-cities-are-trying-to-rein-in-clothing-donation-bin-chaos-1.7086614>

The fashion sector has been exploring this type of market in the UK for some time. Retailers such as Marks & Spencer, Joules, John Lewis and others have been taking part. Brands including Mulberry, Asos, Dr Martens, and H&M are involved. <https://www.reuters.com/business/retail-consumer/zara-offer-its-secondhand-clothes-service-us-by-october-2024-09-11/>

The Ellen MacArthur Foundation and the Textiles Action Network support the circular economy principles of increased selling of reused clothing with materials designed to be circular and made from circular raw materials. This is a good step but will take decades to make a difference. <https://ellenmacarthurfoundation.org/>

Illegal labour practices

According to the NGO Walk Free, there are ~27 million people in forced labour situations and 22 million more in forced marriages. The most vulnerable are women, children, and migrants. ~6 million are women and children. Migrant workers are three times as likely to be in forced labour than non-migrant

workers. ~50% of modern slavery occurs in upper-income countries. Supply chains need a cleanup. The purpose of Walk Free is to eradicate slavery in supply chains.

The July 2023 Fashion Industry study authored by Dr. Sheng Lu Associate Professor Department of Fashion & Apparel Studies, at the University of Delaware, indicates a change in sourcing strategies. ~80% of the fashion executives are reducing their dependency on Chinese-produced apparel. This is attributed to deteriorating US-China relationships and the conditions of employment in many Chinese garment factories, such as the use of forced labour. The Dominican Republic appears to be a beneficiary in the change of sourcing. The Dominican Republic-Central America Free Trade Agreement is generating lower shipping and production costs.

Industria de Diseño Textil SA (Inditex), representing global brands like Zara, Bershka, H&M, Massimo Dutti, announced in July 2023, it will stop buying products made in Myanmar. This comes after the global campaign by IndustriALL convinced companies to divest from Myanmar due to unacceptable labour conditions which have been compounded since the 2021 political coup. IndustriALL Global Union represents ~50 million workers in 140 countries, according to its website. There is further controversy due to the European Union calling for continued sourcing from Myanmar with a focus on improving the nation's garment factories.

As per its supply chain disclosure report, H&M sources from 26 suppliers and 39 factories in Myanmar; 375 suppliers and 421 factories in China; and 137 suppliers and 227 factories in Bangladesh. When brands such as H&M make a strategic sourcing shift, along with other brands, there is a ripple effect across the globe, impacting thousands of workers.

The Worldwide Responsible Accredited Production (WRAP) is the largest factory-based certification program for clothing and footwear manufacturers. WRAP principles align with the ILO labour conventions and provide an auditable process for certification compliance.

A February 2023 report from the Federal Government's Canadian Ombudsperson for Responsible Enterprise (CORE) found that Canadian clothing companies have limited awareness about whether child labour could be in their supply chains. CORE was formed and mandated in January 2018 to investigate human rights abuses by Canadian companies operating abroad in the oil and gas, mining and garment sectors.

In July 2023, CORE launched an investigation against Nike for allegedly using slave labour and has not sufficiently responded to these claims, according to CORE. CORE also launched a case against Ralph Lauren for alleged use of forced labour in its supply chains. CORE additionally is probing Vancouver-based Dynasty Gold for allegedly using forced labour at its gold mine in Kazakhstan, near a Chinese detention centre. The CORE report stated that Dynasty "appears to have deliberately avoided participating in and co-operating with the (office's) dispute resolution process without providing any explanation."

According to Anthony Goerzen, Sobey Professor of International Business at Queens University, Smith School of Business, CORE is well-intentioned but largely ineffective. CORE lacks the power to subpoena corporate documents or testimony. Companies are opting to ignore CORE requests. CORE's biggest leverage is public embarrassment of bad actors. In an interview with writer, Kristy Strauss, in September 2023, Goerzen sees (3) barriers to CORE's success in international investigations.

1. Wrongdoing is difficult to define. A government clerk seeking a bribe to clear a shipment, when the clerk hasn't been paid for a few months, would be punishing the wrong party.
2. What right do WEIRD countries have to impose their values on foreign players and tell them what the rules are? Goerzen says this can come across as old-world colonialism.

3.If CORE shames a company operating in a developing market, and the company opts to leave that country, this only adds to problems by deterring others from investing or hiring for fear of being accused of being anti-social or anti-environmental. Promoting trade and not aid is the challenge. In Goerzen's words, the whole world is in the same boat and there is no government or regulator that has figured it out yet. I would say many of the European Union countries are more attuned and maybe have started to take a few more steps towards addressing some of these issues. But nobody knows how to do this. No one has the answer yet.

How effective can CORE be without the legitimacy of power?

The volume of unsold garments is a major global problem. In April 2020, the scientific journal, *Nature Reviews Earth & Environment*, researched that 92 M tons of waste garments result each year with 1% being recycled. The 2016 World Economic Forum estimated 150 billion garments are manufactured per year. The message here is that we can't possibly recycle or repurpose those volumes responsibly. There is a delusion that it is possible. To manage the fast fashion waste garment problem brands such as H&M, Burberry and Richemont (Cartier and Montblanc) have been incinerating their surplus inventories. In part, so they don't have to compete with discounted labels in the market. The value of the unsold inventories is in the billions of dollars and is encouraged through tax laws. In the US, 99% of duties are refunded for exporting or disposing of unsold garments. France banned the burning of unsold garments in January 2021; Spain will ban this practice in 2024.

In 2024, the need for increased transparency in sourcing in the fashion sector has been raised by various investor groups. Investors in publicly traded brands such as Inditex (Zara brand) want full disclosure of their suppliers which rivals H&M, Adidas, Puma, HugoBoss, M&S, and Primark have agreed to. Inditex is pushing back. In the EU there are ongoing debates that would require all "big" companies to disclose more information on supply chain compliance related to environmental and child labour issues. Fines could be up to 5% of revenues. Inditex currently only shares that they source from 12 main countries but no individual supplier information is provided. A Reuters report shows that Inditex has reduced sourcing in China, Spain, Portugal and India, while increasing its sourcing from Morocco, Bangladesh, and Pakistan. *Know the Chain*, which is a benchmarking initiative for brands and suppliers to increase full disclosure beyond partial sourcing information.

In advance of the pending 2026 EU regulations on textile waste, Spain's main textile retailers are voluntarily beginning a trial program to separate clothing and shoes from other waste streams. The year long trial will start in early 2025 and track the costs and changes required in the textile logistics and handling before regulations are passed by the EU. Spain estimates that 88% of used clothing ends up in landfills. It is hoped that the program named *Re-viste* will be able to recycle or reuse tonnes of materials. Spanish residents discard ~20 Kgs of clothes annually compared to ~7 Kgs in other European countries.

<https://www.reuters.com/sustainability/spains-top-fashion-retailers-launch-trial-collect-clothes-waste-2025-2024-10-10/>

Fast fashion brands Shein and Temu were shipping 600,000 packages *per day* to the US. Their low cost, popular clothing items, were being shipped in lower valued shipments to avoid taxation under the trade exemption, de minimis rule. According to Cargo Facts Consulting, in a 2024 update, Temu ships ~4,000 tonnes per day; Shein 5,000 tonnes; Alibaba 1,000 tonnes; and TikTok 800 tonnes. A November 2023 report from the Coresight Research group estimated that Shein and Inditex accounts for ~40% of the global fast fashion market. <https://www.reuters.com/business/retail-consumer/rise-fast-fashion-shein-temu-rolls-global-air-cargo-industry-2024-02-21/>

An Indonesian court acquitted a government official in July 2024, accused of human trafficking, torture, forced labour, and slavery involved in the palm oil industry. Over 600 people were found in cages on the palm plantation. While the case will be appealed, it exposed a dark side of supply chains where there is

little regard for human rights. Palm oil buyers have to be aware of these nefarious and criminal acts, yet many continue to buy the product with no regard for the human toll or environmental impact.

<https://www.reuters.com/world/asia-pacific/indonesian-court-acquits-former-official-grisly-palm-oil-slavery-case-2024-07-09/>

As one of the worst examples of corporate conduct, part of the fashion brand Armani, has been placed in a 1-year receivership by an Italian court. According to the ruling, Armani Operations outsourced the production of bags, belts and leather goods to two firms which in turn subcontracted the work to four Chinese companies whose workshops were based on the outskirts of Milan.

These companies paid people 2-3 euros (\$2.16-3.25) per hour to work 10 hours per day on average, in some cases seven days a week, to make bags that were sold to Armani's subcontractors for 93 euros, resold to Armani for 250 euros, and put on the market for about 1,800 euros, investigators said. Whether this will have a negative impact by Armani customers remains to be seen.

Italian iconic brand Dior, owned by LVMH, was found guilty in a worker exploitation investigation in 2025. An outsourced supply of handbags from an Italian-based producer were sold to Dior for ~Cdn \$90 and resold under the Dior badge for ~Cdn \$3500. Dior paid ~\$3M Cdn to support initiatives aimed at helping victims of labor exploitation. *Another 15 minutes of bad news.*

<https://www.cnn.com/2025/05/21/business/dior-payment-labor-exploitation-italy-intl>

It appears to be a systemic exploitation of migrant workers in Italy's fashion sector. Most major brands including Montblanc have been participating in *sweat shop* conditions. The brand managers have been exploiting immigrants for years. Will the customers of these fashion brands think twice about this? Or will it be another *15 minutes of bad news* and we move on? <https://www.reuters.com/world/europe/how-migrant-workers-suffered-craft-made-italy-luxury-label-2024-09-18/>

A mid-2024 QIMA's *Barometer* report on ESG in supply chains indicates that while progress is being made, there is still room for significant improvement in the areas of child labour and workplace safety, globally. Chinese factory audits, requiring *urgent need for improvement*, remains between 17-22%. QIMA factory audits for ethics have increased by 63% in recent years. Child labour audits have found critical violations have doubled since 2020. Health and safety critical violations have increased to 15%, up from 7% in 2020. https://content.qima.com/rs/944-QDO-384/images/QIMA%5Bbarometer%5D%5BQ3_2024%5D_EN%29.pdf?version=0&mkt_tok=OTQ0LVFETy0zODQAAAGUVh5s4BzPq5G8BRebqk6VakK15kl_OgZwTaV2eEuiY7s5W_d1B3wExwcljIK1zZvK26GXrkkQ2dS2fTXg6uBDCS21nG_y0GJc1XrbfXX8WHORkg

Since February 2024, the EU has expanded its application of the Digital Services Act (DSA). Under the DSA, very large online platforms (VLOP) are subject to increased diligence with respect to removing disinformation and illegal content such as hate speech, counterfeit products, and protecting minors. This will require an independent audit report on compliance. A VLOP is a VLOP with >45 million users. The VLOP users includes Alibaba, Amazon, Facebook, Instagram, LinkedIn, Pinterest, Shein, Snapchat, TikTok, Wikipedia, YouTube, and others. Bing and Google Search are designated as being very large online search engines (VLOSE).

The requirements under the DSA include:

- *Provide user-friendly mechanisms to allow users or entities to notify illegal content;*
- *Prioritise the treatment of notices submitted by so-called "trusted flaggers";*
- *Provide statements of reasons to users when their content is restricted or removed;*
- *Provide an internal complaint-handling system for users to appeal content moderation decisions;*
- *Redesign their systems to ensure a high level of privacy, security, and safety of minors;*
- *Ensure that their interfaces are not designed in a way that deceives or manipulates the users;*
- *Clearly label advertisement on their interfaces;*

- *Stop presenting targeted advertisement based on profiling of sensitive data (such as ethnic origin, political opinions or sexual orientation), or targeted at minors;*
- *Have clear terms and conditions and act in a diligent, objective and proportionate manner when applying them;*
- *Publish annual transparency reports on their content moderation processes.*

<https://techcrunch.com/2023/04/25/europe-names-19-platforms-that-must-report-algorithmic-risks-under-dsa/>

Of note for supply chain professionals, ensuring that a supply chain partner is not involved with child labour or slavery, work with the services of companies like QIMA. QIMA provide these types of audits as part of their standard suite of services for suppliers in Canada and elsewhere.

The need for 3rd parties also involves quality, environmental, and a host of other non-financial issues which can affect a brand or organizational reputation. Vigilance on supplier integrity is a business imperative. Their behaviour reflects on those of their customers.

Canada's Modern Slavery Act

Legislation under Bill S-211 was passed by Canada's parliament in May 2023, to curb child and forced labour, which came into effect in January 2024. Bill S-211 is referred to as *Forced Labour in Canadian Supply Chains*. It is colloquially referred to as the Modern Slavery Act (MSA). This requires companies to screen their supply chain partners for compliance. MSA goes beyond clothing to include all imported products and could envelope mining industries. MSA applies to companies with \$20M in assets; \$40M in revenues; and/or 250+ employees; is listed on a Canadian stock exchange; or has a place of business in Canada. The MSA requires all affected companies and *some* government institutions to annually submit a report by May 31 each year, based on a questionnaire, to the Minister of Public Safety. My sense in mid-2024, is that very few public and private sector organizations are really as aware of the Act as they should be. This will require some extended reporting times to many organizations in their initial reporting periods.

BC Hydro, as a Crown corporation which must comply with the MSA, has complied and a copy of their 2024 report is available through this link. <https://www.bchydro.com/content/dam/BCHydro/customer-portal/documents/corporate/accountability-reports/openness-accountability/bchydro-f24-report-fighting-against-forced-labour-child-labour-supply-chains-act.pdf>

Provincial and municipal government entities are not subject to the MSA reporting requirements, as per the definition of government institution in the Act. Crown corporations *may* be subject to the Act. Certainly, no government agency should be involved in any sourcing strategies with child or forced labour. For those organizations which are not subject to the MSA, they should be exercising due diligence to ensure their suppliers are not engaging in child or forced labour.

The generic questions in the Act which companies are to collect, ask about basic corporate information; if there is any knowledge of child/forced labour in the supply chain; actions taken to mitigate illegal labour practices; and copy of corporate policy relevant to the child/forced labour actions. "Reports must detail the steps taken during the previous financial year to prevent and reduce the risk that forced labour or child labour is used by them or in their supply chains."

The Act is well-intentioned but appears to be quite passive as a preventive solution. We are aware of the various countries which do not have strong human rights legislation and are still major players in global supply chains. Having a few Western companies criticize foreign companies, within countries that have competing ideologies and business ethics, will not go far to stop illegal work practices and abuse of workers. If all the companies report annually into the Ministry of Public Safety, it is likely the Ministry

will be overwhelmed with the amount of information they asked for and make it more difficult to take corrective or disciplinary actions. <https://www.publicsafety.qc.ca/cnt/cntrng-crm/frcd-lbr-cndn-spply-chns/rprtng-blqtns-en.aspx#a1>

The UK enacted their Modern Slavery Act in 2015. Australia introduced its Modern Slavery Act in 2019. Recent reviews of these two policies have shown common themes. Most companies treat the reporting as a “tick-the-box” exercise - *40% of eligible companies are not complying at all; lack of clarity, guidance, monitoring and enforcement*. Hopefully Canada can exercise more diligence.

There are 17 countries which have a policy of government imposed forced labour in private and public prisons. According to Walk Free, these countries are:

- Belarus
- Brazil
- China
- Egypt
- Eritrea
- Libya
- Mali
- Mongolia
- Myanmar
- North Korea
- Poland
- Russia
- Rwanda
- Turkmenistan
- United States of America
- Vietnam
- Zimbabwe

<https://www.walkfree.org/resources/>

It is the *abuse* of this power which forced labour legislation is trying to address. The (3) types of abuse include: compulsory prison labour; conscription requiring non-military labour; and labour for economic development beyond normal civil obligations or minor community services. The US Bureau of International Labor Affairs published an extensive list of goods made by child and forced labour.

https://www.dol.gov/sites/dolgov/files/ilab/child_labor_reports/tda2021/2022-tvpra-list-of-goods-v3.pdf

In 2023, the US enacted the Uyghur Forced Labor Prevention Act. The act prohibits all products made in the Xinjiang region from being imported into the US. Since the enactment, the US government has requested information from Nike, Adidas, and Shein over concerns regarding forced labour in garment sourcing practices involving the Uyghur region of China. In May 2024 the US has banned cotton sourcing from China’s Xinjiang region due to reports that Chinese authorities have labour camps using Uyghur and Muslim workers. Many of the Chinese companies are not located in Xinjiang but source their cotton from there. Again, in 2024, BMW, Jaguar, and Volkswagen brought auto parts and vehicles originating from the Xinjiang region into the US market. These companies were required to take immediate remedial actions.

In August 2024, the US banned more Chinese companies under the Uyghur Forced Labor Prevention Act. These included Rare Earth Magnesium Technology Group Holdings; Century Sunshine Group; Zijin Mining; and Xinjiang Habahe Ashele Copper. This reiterates the importance of ensuring the provenance of materials and the complexity of supply chain relationships across global borders.

<https://www.reuters.com/sustainability/society-equity/us-bans-imports-five-more-chinese-companies-over-uyghurs-2024-08-08/>

In late 2024, VW agreed to sell its interests in its Xinjiang operations to the Shanghai Lingang Group. Part of the deal will be to extend the partnership with Chinese auto producer SAIC, in VW’s largest market.

Another example where government has had to intervene in the market, occurred in June 2023. The Federal government put into effect, the wage-fixing and no-poaching legislation. These are now illegal practices subject to criminal charges. Where two or more employers agree to fix, maintain, decrease or control wages, these will be found to fall under the Competition Act, Subsection 45 (1.1) (a) and (b), similar to price-fixing by competitors. Price-fixing and various forms of bid-rigging have fallen under the criminal code for many years. The no-poaching applies where two or more unaffiliated companies agree to not hire employees between their organizations. Wage-fixing and no-poaching have been found to lessen competition in the market.

Supplier Inspection and Authentication

While potential partners across all industries pitch their brands through vibrant displays and grand claims, it's crucial to look beyond the surface. Authenticating suppliers and ensuring their compliance with regulatory and brand standards requires rigorous research and due diligence. This thorough approach is your best defense against the risks of misrepresentation, providing a sense of security in your decision-making.

Authenticating suppliers ensures they not only meet operational requirements and adhere to legal obligations but also align with your brand's ethical values. This process of verification allows brands to select suppliers who demonstrate transparency, reliability, and a commitment to sustainability, safety, and fair labour practices. When suppliers align with a brand's ethical standards, it helps foster trust and mutual respect, leading to stronger, long-term relationships.

Here are some practical steps to effectively authenticate suppliers, mitigate risk, and build a more reliable and ethical supply chain.

- **Conduct Thorough Background Checks:** Investigate the supplier's history, reputation, and past performance. Review references from other clients and check for any past violations or complaints related to labour, safety, or environmental standards.
- **Request and Verify Certifications:** Obtain relevant certifications that the supplier claims, such as ISO standards, sustainability credentials, or industry-specific certifications. Verify these certifications with the issuing bodies to ensure their validity and that they are current.
- **Perform On-Site Audits:** Arrange for third-party inspections or internal audit teams to visit supplier facilities and verify production capabilities, working conditions, and compliance with legal requirements such as labour laws, environmental regulations, and safety standards. Regular audits ensure ongoing compliance.
- **Use Third-Party Inspection Services:** Engage reputable third-party inspection services to provide independent assessments of the supplier's operations, including audits of labour practices, product quality, and regulatory compliance.
- **Leverage Technology for Transparency:** Implement supply chain management software that tracks supplier performance, compliance metrics, and real-time data on production processes and quality control to help bridge gaps and improve accountability.

In today's complex global marketplace, securing a trustworthy and compliant supply chain is essential for the long-term success of any brand. As a 3rd party service provider, QIMA offers audit, inspection, and certification services, along with comprehensive support to ensure compliance and safeguard a brand's reputation. With a global reach spanning 120+ countries, QIMA serves 30,000+ brands, retailers, and manufacturers with on-the-ground expertise and digital solutions, providing accuracy and visibility for quality, safety, and compliance data. For further information go to: [QIMA.com](https://qima.com) or info@qima.com

Dory Lanenter
Senior Business Development Manager
QIMA

Temporary foreign workers

Labour shortages continue to exasperate the market in most categories. Temporary foreign workers (TFW) help with seasonal employment demands but all employers are drawing from a shrinking labour pool. We know that with professional services in health care or business shortages are unprecedented and long-term supply is uncertain.

Canada's policies on TFWs remain largely ineffective to address the cases of reported chronic abuse. The UN reprimanded Canada's policy "a breeding ground for contemporary forms of slavery." The

Employment and Social Development Canada Department (ESDC) has levied fines but the fundamental monitoring of Canadian employers for compliance is missing in the governance. For exploitive employers, it's "business as usual." <https://www.cbc.ca/news/investigates/amnesty-international-temporary-foreign-worker-program>

There have been substantial increases in Canada allowing TFWs according to Employment and Social Development Canada. All sectors are short of staff and employees. The problem hampers economic development and rates of pay across the board. The highest demand is in the health care sector, which takes several years to fill with qualified staff. Transportation, which is the backbone of logistics is compromised by driver shortages.

There are serious violations of TFW employment contracts in Canada. TFWs can be hired under *closed work permits*, which requires that they can only work for a specific company. That company can exert pressure on the # of hours of work; pay rates; work schedules, and other working conditions, knowing a TFW has little right of recourse for excessive demands in the work place. Without an *open work permit*, it's impossible for a TFW to find other employment, if they quit an employer. Other employers cannot hire them as they are restricted under a closed work permit. The Federal government bears some responsibility for not providing adequate oversight in their TFW policy. According to Minister Marc Miller, "the number of workers seeking to break free of closed permits because of abuse claims has "doubled or tripled" in the last few years." It does not appear possible for the labour supply to meet the demand over the next decade. Paying higher wages does not solve the labour pool shortage, it drives inflation to deliver the same services. The quality of services is not sustainable as labour shortages compromise customer/client/patient expectations and governmental programs. Rationalization of services and product offerings is being revised to address the labour along with the material shortages in all sectors.

In September 2024, the Canadian federal government limited the number of TFWs where the focus was on *low wage* earners. This will restrict TFWs to a maximum of 1-year of employment, down from 2-years. Employers will be allowed to hire up to 10% of their workforce through TFW programs, down from the current 20%. Exceptions will be made for health care and construction labour. The ability to track and monitor TFWs by various levels of government has been criticized. The demand for TFWs may be waning as there is an increase in unemployment rates.

A Canadian Tire franchisee was investigated by the Federal and Ontario labour ministries for allegedly participating in illegal hiring of TFWs through an Alberta company. Franchisee, Ezhil Natarajan, denied the claims but was found guilty of violating the guidelines for the TFW program and fined \$111,000. Natarajan has owned and operated several Canadian Tire stores since 2012.

<https://www.cbc.ca/news/canada/toronto/ezhil-natarajan-111k-fine-temporary-foreign-workers-program-1.7652223>

Emerging Arenas

Arena industries are defined by high growth and dynamism. They capture a significant share of the economy's growth and the larger market shares of players within the sectors they impact and dominate. Their combined potential is capable of generating US\$ 29 – 48 *trillion* in the next 15-years. These arenas are expected to provide YS\$2 – 6 trillion in profits. Investors, buyers and suppliers will be shifting their attention to these sectors and likely abandoning current arenas.

The McKinsey study identified (18) arena industries which will affect our near-future and should be followed. From largest compound annual growth rate to the lowest, these are classified as being:

Continuing arenas

1. E-commerce. Companies that sell goods through digital channels and fulfill them directly
2. Electric vehicles. Manufacturers of battery, plug-in hybrid, and fuel-cell EVs
3. Cloud services. Companies that deliver on-demand cloud infrastructure and platforms as a service
4. Semiconductors. Designers and manufacturers of semiconductors, microchips, and integrated circuits as well as providers of tools for semiconductor manufacturing

Spin-off arenas

5. AI software and services (spin-off from software). Companies that provide software and services incorporating AI, excluding the hardware necessary to operate AI
6. Digital ads (spin-off from consumer internet). Platforms that enable advertisers to reach consumers digitally.
7. Streaming (spin-off from video and audio entertainment). Providers of on-demand video entertainment over the internet.

Emergent arenas

8. Shared autonomous vehicles. Operators of shared autonomous vehicle services
9. Space. Providers of space-related infrastructure and services to the commercial and state sponsored segments
10. Cybersecurity. Companies that provide protection for computer systems from unintended and unauthorized access, modification, or destruction
11. Batteries. Manufacturers of rechargeable batteries used for EVs and other technologies that are mostly linked to the energy transition.
12. Video games. Producers and distributors of games played on dedicated consoles, PCs, and mobile phones.
13. Robotics. Manufacturers of robots and providers of robotics solutions.
14. Industrial and consumer biotechnology. Providers of biotechnology-enabled products in markets like agriculture, alternative proteins, biomaterials and biochemicals, and consumer products.
15. Modular construction. Companies that operate in the modular construction value chain, from design to assembly, with volumetric modules.
16. Nuclear fission power plants. Players that construct nuclear fission power-generation facilities.
17. Future air mobility. Operators of air mobility transportation services, such as electric vertical takeoff and landing vehicles (eVTOLs) and delivery drones.
18. Drugs for obesity and related conditions. Companies that sell glucagon-like peptide-1 (GLP-1) drugs and other treatments for obesity and related conditions, such as diabetes.

Today's arenas could see a loss of their market share status. These being:

1. Biopharmaceuticals
2. Consumer electronic
3. Information-enabled business services
4. Industrial electronics
5. Payments

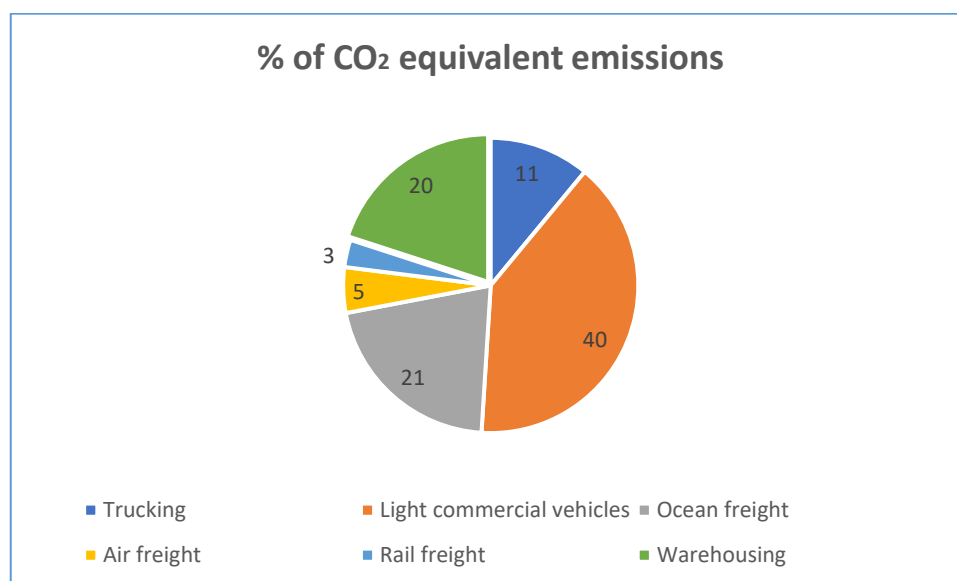
This study is a fascinating glimpse into a cloudy crystal ball, which bears monitoring.

Electrification of transportation

Electrification is perhaps the greatest investment risk in the 21st Century. The transition from fossil-fuel vehicles to EVs is driving the desire to reduce GHGs quite dramatically. This has been shown to be a very difficult objective to achieve. Political voices differ from those of science. Politicians circa 2010, landed on fully electric EVs as the solution to the problem. In hindsight, the costs of the transition far exceeded any expectations. The transition is literally not affordable within the announced time frames between 2030 and 2050.

The deliveries of goods recognize the level of emissions from a logistics perspective. It will take a combination of technologies, vehicle designs, fleet configurations, and various types of energy to make meaningful reductions overall and to reduce the cost of the last mile of delivery.

Based on the McKinsey & Company, June 2024 report, *Decarbonizing Logistics*, a summary of the emissions shows that logistics account for 7% of the global emissions. The following table provides the breakdown on this 7% of transportations emissions.



According to BC Automobile Association article, *Leading the Charge*, the average Canadian drives ~15,000 Kms per year with ~7500 of these Kms for commuting to work. The more Kms one drives, there is greater arguments to have some type of EV. It could be a BEV, HEV, PHEV or an FCEV, depending on needs such as personal, business or lifestyle choices.

Along with an EV is the need for charging stations and equipment. Level 1 AC chargers provide 8 Kms of range per hour of charging off a 120 V outlet at an average cost of \$900; Level 2 AC chargers provide 97 Kms of range per hour of charging off a 208 or 240 V outlet at an average cost of \$1300 plus installation; Level 3 DC chargers are the fastest which most public and business accesses provide, with adapter for Level 1.

The good news for EV batteries is they should last an average of 300,000 Kms. The bad news for EV batteries is their replacement costs run between \$6,500 and \$28,000 but are more plentiful in the aftermarket. Newer EVs have an average driving range of 400 Kms per charge. Weather temperatures

and the use of AC can affect the length of driving range.

A 2024 Canadian Automobile Association update for 2024 model EVs available in Canada shows the price and features of the 45 models. Within the used EV market there are hundreds of EVs available. The 2024 prices begin at Cdn \$41,748 which is ~\$10,000 more than the price of an EU Chinese EV.

<https://evbuyersguide.caa.ca/available-in-canada>

The persistent 2023-2025 drought in Western Canada added a further concern as BC Hydro was having to buy electricity to meet the demand in the province. Hydro spokesperson, Kevin Aquino, said the province imported ~20% of its electricity to meet the demand in 2023-2024. River and reservoir levels are down considerably. EVs are dependent on electrical charging stations, there needs to be an adequate supply of water to support the system. In 2024 the drought in Alberta continues, requiring farmers to truck in water to feed animals as river capacities are down to below 30% of normal levels. Cattle ranchers are considering smaller herds as the lack of water may not sustain their herds.

There will be increased pressure on BC Hydro to ensure adequate electrical supply as the push for EVs and banning natural gas will lead to problems during cold weather. The source of 40% of BC's water is from two reservoirs, which are below historical levels for 2-years in a row in 2024. Where BC exported \$1Billion in power in 2022 it imported \$500M in 2023. More imported energy will be likely as the drought continues and demand increases. This is not a sustainable market condition and either relaxing electricity regulations or policies may be required. <https://www.cbc.ca/news/canada/british-columbia/low-snowpack-raises-electricity-concerns-1.7533194>

Norway has been the leader in the number of EVs per capita. With new fully electric car sales at 79% of sales in 2022; 82% in 2023; 94% in 2024. ICE vehicles sales and leases have been discouraged through higher taxes being applied. Norway has not imposed tariffs on imported Chinese EVs like other EU countries. This resulted in large increases in market share for Chinese brands such as Volvo, MG, BYD, and Nio. Norway plans on ending ICE sales by 2025. <https://newseu.cgtn.com/news/2024-09-11/Norway-s-car-market-is-94-EVs-and-a-quarter-of-them-are-Chinese-1wNclmL8k8g/p.html>

In December 2022, the first all-electric delivery trucks rolled out of the GM Cami plant in Ingersoll, Ontario. The former Chevy Equinox plant was retrofitted to a full-scale electric vehicle plant. Orders for the BrightDrop vehicles were placed by DHL, Walmart and FedEx. The Cami plant was designed to produce 50,000 vehicles by 2025. GM planned to produce 400K EV motors per year out of its St. Catharines' facility for its e-vehicles. FedEx began rolling out its first 50 BrightDrop Zevo 600 vans in June 2023. By early 2025, GM was halting production due to slow sales of the EV trucks. By late 2025, BrightDrop has not proven to be a successful truck in the market and is being dropped by GM for production. Another sign of the failed EV market. <https://www.cbc.ca/news/canada/london/gm-to-end-electric-van-production-at-cami-plant-in-ingersoll-ont-9.6946611>

GM acquired the gigacasting supplier, Tooling & Equipment International (TEI), in November 2023. TEI was a major supplier to Tesla. Gigacasting allows for faster production of automobile frames, which can significantly reduce the costs of EVs. This will be an interesting strategy to watch as GM makes a more competitive marketplace. Making the affordability factor much less for EVs and getting more consumers into their vehicles could be a game changer for GM. Time will tell.

The first South Korean investment in Canada took place in August 2023. Quebec will benefit from EcoPro BM and SK ON's battery parts plant operation. The estimated cost is \$1.2B and will be owned by Ford and the two South Korean industrial companies. The Federal government is backing the investment with \$644M. Volta Energy, subsidiary of South Korea's Solus Advanced Materials, is building a copper foil plant in Quebec with production scheduled for 2026. POSCO and GM will also build a cathode material plant in Quebec

In early 2024, Sweden's battery manufacturer, Northvolt, announced it would locate a new plant in Quebec. The province and the federal government provided financial support valued at ~\$4.2B Cdn for the \$7B gigafactory. By October 2024, Northvolt lost its \$1.5B financial agreement from the Swedish government as Northvolt curtailed expansion plans. Northvolt filed for bankruptcy in 2025, in most of the countries it operates in. This is in spite of receiving US\$10 billion in equity, debt and public financing since its 2016 inception. Its biggest owners include Volkswagen with a 21% stake, and Goldman Sachs, with 19%. <https://www.reuters.com/markets/deals/northvolt-sells-heavy-industry-battery-business-truckmaker-scania-2025-02-18/>

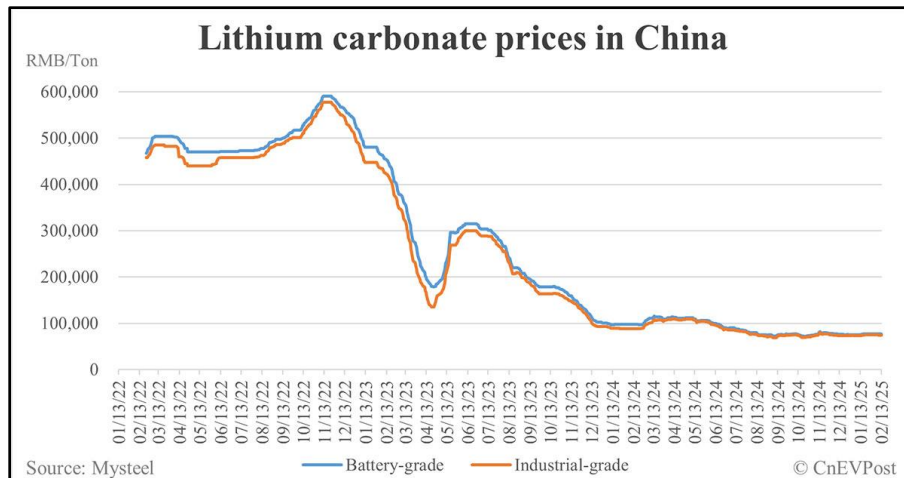
While Northvolt failed, NextStar Energy began operating its EV battery module plant in Ontario in late 2024. It took 2-years of construction for the joint venture between Stellantis and LG Energy Solution to be realized. This reiterates the risk by investors. When the plant was announced EV demands were high and now at this phase in the market, EVs are weak but hybrid demands are increasing. Stellantis is expected to be a major customer for the NextStar battery cells and modules which go into battery packs. Modules will be imported from Poland initially until NextStar can take on this role. <https://www.cbc.ca/news/canada/windsor/nextstar-ev-energy-stellantis-windsor-battery-plant-vehicle-lee-danies-1.7359593>

Another collapsed lithium battery plant investment occurred in late 2024 when Taiwanese TCC Group have cancelled their \$1B plant in Maple Ridge, BC. The Federal government made a commitment of \$80M in 2023, with great fanfare, only to see this project fail within a year. The promised jobs and commitment to training were halted. <https://bc.ctvnews.ca/taiwan-firm-halts-plan-for-1b-battery-plant-in-b-c-that-had-federal-support-1.7133799>

The BC Provincial government ZEV targets for new light duty vehicle sales and leases are 26% by 2026; 90% by 2030; and 100% by 2035. Governmental mandates are required to make the shift for electrification. The 2023 Federal government mandate requires 20% of passenger, SUVs, crossovers, and light trucks must be ZEVs by 2026; 60% by 2030; and 100% by 2035. It should be noted that the UK is planning on allowing hybrids until 2035, as it saw EV sales dropping in late 2024. The targets and penalties will serve little purpose if EVs remain unaffordable. It is highly anticipated, that during a tariff war with the US, policy revisions will be made to address the unachievable ZEV goals. <https://www.cbc.ca/news/politics/electric-vehicle-mandate-doomed-1.7577811>

In 2024, Argentina has approved a ~\$ Cdn 1B DLE project which will pump brine to the surface. The project will double the supply of lithium produced in the country, in spite of falling lithium prices. The French mining company Eramet, plans on scaling up to 24,000 tonnes per year by 2025. BYD purchased the lithium rights in Brazil in the town of Coronel Murta, part of the Jequitinhonha Valley. The site is near BYD's latest production factory. <https://cnevpost.com/2025/02/14/byd-holds-lithium-mining-rights-brazil-report/>

Another signal is lithium prices collapsing over the past year as indicated by the pull back of US-based Albemarle. Albemarle are is one of the largest lithium producers in the world. The company says that supply has exceeded the demand, which was driven by EV batteries, which have slowed down in sales. In part, lower cost options to lithium are being designed into batteries to reduce their costs. By mid-2024, lithium prices have continued to drop due to oversupply and the lack of EV sales and Albemarle continues to try and deal with their revenue losses. In 2025, Chinese EV makers can buy lithium at 1/6th of the cost at its peak in late 2022.



The *Catch 22* for EVs in Canada, is the lack of adequate infrastructures to support charging. In 2022, with EVs now only representing a small % of the market share, the charging networks cannot meet demands. If our wishes come true and we can all buy affordable EVs, the investment in open standards to charge any vehicle anywhere, on interoperable systems, will require strategic energy management programs that are currently unattainable. In late December 2023, the Canadian Federal government announced that it wants all cars sold by 2035 to be EVs. In 2023, there were 77 different EV models for sale in Canada – only the Chrysler Pacifica Hybrid was built in Canada, according to a Report on Business article. The 2017-2021 Pacifica models have a recall problem and are not allowed on some ferries due to risk of fire. JD Power reported in May 2024 that Canadian consumer interest in buying an EV is down to 11% due to being too costly for the perceived benefits. Statistics Canada indicates that zero emission vehicle sales were down again in the 4th Q of 2023. <https://www.ctvnews.ca/autos/canadians-interest-in-buying-evs-fades-as-barriers-concerns-remain-j-d-power-1.6906421>

IKEA expressed concerns at a Toronto Region Board of Trade event with EVs in an article from *Supply Professional* in early 2024, by Ritika Dubey, The Canadian Press. The IKEA caveats focused on the battery charging time. “We have to take into consideration the charging time to bring a battery up to 80 or 100 per cent overnight,” Crystal Rasa, who is leading IKEA Canada’s EV fleet transition, said in an interview following the event. What time can the vehicle be ready to be loaded and leave for deliveries? What time will the vehicle be back?”

IKEA uses electric delivery vehicles of various sizes and has a dedicated team to optimize their efficiency and algorithm-based delivery routes. “There’s a never-ending analysis of what is the optimal configuration between the vehicle size, the type of order our customers are choosing to purchase,” Rasa said. “Seasonality (also) comes into effect (deciding) how much product can go on a truck.” Other roadblocks include obtaining electrification permits, choosing efficient chargers and adapting to the lower battery life of cold weather.

The company started small with 10 trucks deployed in Montreal and Vancouver. Since then, IKEA’s electric delivery fleet has expanded 15 per cent in the past two years to include Toronto and Ottawa, with plans to be in Calgary, Edmonton, Winnipeg, Halifax and Quebec City. The company has set a goal of having its delivery fleet in major cities be 100 per cent zero-emission by 2025. Another delivery company, Mycourier, at the event, said they can’t fully give up gas-powered vehicles until charging infrastructure improves.

As we are witnessing increased droughts in various parts of Canada and when winter storms can take

down electricity grids, PHEV vehicles make a lot of sense. They are affordable and provide a power option. Hydro power is dependent on sufficient water supplies. Completely moving 100% away from ICE vehicles, could be a risk that it unnecessary to take over the next decade. PHEVs are low emission vehicles but not zero emission vehicles.

One of the behavioural issues related to PHEVs, using data from the EU, drivers don't bother to plug them in and simply drive using gasoline. This defeats the intended purpose of have the dual energy options. Drivers were only using the electric motor option 30% of the time. In part this is due to a lack of charging stations and driving only short distances with early PHEV models. The implication was consumers were spending more to buy the PHEV but were not using the electric feature to reduce emissions, which was the original intent. EV manufacturers are able to report their sales targets are being met by selling PHEVs. Not a net-net gain. Changing people's behaviour was not designed into the PHEVs. <https://www.cbc.ca/news/climate/plug-in-hybrids-pollution-explained-9.6987863>

e-flation

e-flation is a term this author has coined to describe the spike in the cost of living in response to the decarbonization strategies underway. Combined with food security issues, labour shortages, a housing crisis, and geo/political uncertainty, the cost of living is affecting the quality of life and our well-being on a global basis. e-flation is an economic and social issue across Canada.

There is an inflationary component to the shift towards EVs away from ICE vehicles for consumers and commercial customers. Research shows that in 2020, the *average* price for a *used vehicle* was \$22,500 while it was \$38,451 in 2024. Most of the used vehicles in 2020 would be ICE models. An increase of ~70% in price over the period for used vehicles. The average price for a new EV in 2020 was \$54,668 while it was \$73,000 in 2024. An increase of ~35% over the period.

A 2024 update from BCAA comparing ICE and EVs shows that:

- Sedans: The Tesla Model 3, a popular EV sedan, starts at around \$50,990 CAD, while a comparable gas-powered sedan like the Honda Accord starts at about \$37,500 CAD.
- SUVs: Similarly, the Hyundai Kona EV begins in the region of \$49,000 CAD, compared to the Hyundai Kona gas-powered SUV at around \$28,000 CAD.
- Trucks: Shopping for a truck? The Ford F-150 Lightning EV starts at \$59,995, while a gas-powered Ford F-150 starts at \$49,955 CAD.

https://www.bcaa.com/Blog/Automotive/Charge-ahead-into-EV-driving?utm_source=SilverpopMailing&utm_medium=email&utm_campaign=C000002285_000155437_2782-C03%20Seniors%202782%20E-letter%20September%202024%2009/12/2024%2006:24

The 2024 Toyota Rav4 SUV ICE model sells for ~\$36,000 while the all-electric Hyundai Ioniq 5 sells for \$57,000 (without incentives). This represents a 60% price disparity between similar sized vehicles. Another example of e-flation on consumers.

An average union wage earner made \$62,000 in 2020 while earning \$70,000 in 2024. An increase of 14% over the period.

This equates to a 2020 *used vehicle* eating 36% of a worker's wages in 2020 and 55% in 2024. A new EV in 2020 would eat 41% of a worker's wages. In 2024 a new EV would eat 95% of a worker's wages. A person entering the workforce in 2020 had a good chance to buy an affordable vehicle for transportation and commuting needs. This has been drastically reduced by governmental policies including protectionism as we transition away from ICE vehicles.

We will assume that hybrid vehicle costs would fit somewhere in between the ICE and EVs. EVs have got to come down in price and it is doubtful if they can and be affordable within the near future. As the government mandates the ban on ICE vehicles, we hope that hybrid vehicles will bridge the gap and be an acceptable compromise on emissions and e-flation concerns.

The e-flation problem was reiterated by the Canadian government's Parliamentary Budget Office (PBO) in September 2024. EVs made up 11% of 2023 vehicle sales in Canada. A PBO study comparing EVs to ICE passenger vehicles over an *8-year period*, shows that EVs cost slightly less over time but in 2024, are not affordable enough to attract the number of buyers needed to meet the government targets by 2030. Plug-in hybrids accounted for only 3% of all vehicle sales in 2023. In the EU in 2023, 25% of new vehicles were EVs. The EU has 11 EV options that cost less than Cdn \$45,000 – in Canada there are only 2.

<https://www.cbc.ca/news/politics/evs-costs-report-operate-maintain-1.7308948>

To add to the pressure of achieving the banning of ICE vehicles, if auto manufacturers do not meet the governmental targets set for new EV and hybrid vehicle sales, effective in 2026, they will be forced to comply. The enforcement could mean imposed penalties in the form of credits they must buy or financial penalties. An option for automakers is to withhold the sales of ICE models and force consumers and commercial customers to buy higher priced EVs and hybrid models. This will have an inflationary impact as intervenes in a "free market" model.

In early 2025, the EU dropped its stringent emission targets as they posed an economic hurdle few automakers could achieve. The EU formula is based on a penalty of 95 Euro in excess of CO₂ g/km x the # of vehicles sold. They will allow CO₂ emission reductions of 15% compared to 2021 levels to be realized over a 3-year period *average* (2025-2027). This could make their automakers more competitive and avoid penalties. <https://www.europarl.europa.eu/news/en/press-room/20250502IPR28225/co2-emissions-ep-adopts-flexibility-measures-for-carmakers>

The total number of vehicles sold in the US in 2023 was 15.5M with EVs accounting for ~10% of the market. According to a Cox Automotive report in February 2024, Tesla had ~50% of the US market in EV sales. In Canada, in 2023, the total number of vehicle sales was 177,000, with EVs accounting for 10% of the sales. An S&P Mobility report in 2024 stated that 99% of Tesla Ys and Model 3s were built in Tesla's Giga Shanghai facility. <https://driveteslacanada.ca/news/tesla-model-y-maintains-top-spot-for-canadian-ev-sales-in-q3/>

Growth in EU and North American EVs is hampered by *insufficient product choices and inconvenient charging experiences*. We've seen more competitive pricing from Chinese car manufacturers taking market share. China continues to expand EV sales with 78% of new sales in EVs being Chinese brands. Legacy auto manufacturers such as Ford, GM, VW, and Stellantis, must continue to support ICE models while transitioning to EV products. Newer EV manufacturers are not burdened with the legacy costs and are able to make larger investments to grow their market share. <https://www.reuters.com/business/autos-transportation/global-ev-market-growth-slow-this-year-lower-subsidies-report-2024-01-08/>

Geely is one of China's top 10 automakers in terms of volume of sales and is the major shareholder in Volvo. The popular Polestar 2 will continue to be made in China. However, EU and US tariffs may require a greater production shift into the US. Polestar was able to arrange bank financing in mid-2024 to provide much needed cash. In 2025 Polestar received a US\$450M loan to stay afloat as sales lag on EVs.

It will produce the Polestar 3 SUV model for the US and EU markets out of its South Carolina facility. This rapid change in planning is to avoid the tariffs being imposed in EU and the US. From its South Carolina facility it was planning on producing EVs for the EU (40%), the US (30%), and Asia-Pacific (30%). Branded as the EX30 under the Volvo brand, Polestar planned on selling their EVs in the US at a price ~\$8000 less than the Tesla Y model. <https://www.reuters.com/business/autos-transportation/ev-firm-polestar-expects-positive-fourth-quarter-gross-margin-despite-slow-2024-10-11/>

To further complicate issues for Polestar, the US government is not allowing Chinese vehicle hardware and software to be used in the US for national security concerns. This potentially curtails Polestar's US operations. <https://www.reuters.com/business/autos-transportation/biden-proposal-would-effectively-prohibit-sale-polestar-cars-us-automaker-says-2024-10-28/>

Geely is expanding its line of plug-in hybrid vehicles. Their Leishen EM-I technology enables 2.62 L of fuel per 100 Kms, using the gas/battery power for a range of 2300 Kms. Geely is targeting the BYD hybrid market share. Geely's hybrid technology will be installed in Renault, Volvo, and Lotus brand vehicles. BYD hybrids boast 2.9 L/100 Kms and a range of 2100 Kms. Chinese market shares show BYD with ~35%; Geely at 7.4%; and Tesla at 6.5%. <https://www.reuters.com/business/autos-transportation/chinese-automaker-geely-steps-up-challenge-byd-with-new-hybrid-tech-2024-10-30/>

Reuters reported GM's CEO Barra, says they will build EVs to *demand*. Ford announced production cut backs due to slower demand for EVs. Ford will push for more PHEVs as they are lower in price and offer greater assurance of operations which EVs face with limited range and charging. Renault cancelled its IPO offering on its EV business Ampere. S. Korea's battery maker LG Energy Solution predicts a slower demand in 2024. Morgan Stanley analyst Adam Jonas says the EV market is *over-supplied vs demand*. The German auto association, VDA, said EVs including hybrids fell 16% in 2024. In the UK, Lordstown Motors, Proterra, and Sweden's Volta trucks have gone bankrupt.

"We know the EV market is not going to grow linearly," GM CFO Paul Jacobson said Tuesday. "We are prepared to flex between ICE and EV production." GM has realized "spending US \$36M per day trying to be the 'next Tesla' isn't working," Morgan Stanley analyst Adam Jonas said in February 2024.

The EV charging systems are going to need to be standardized to reduce the cost of the infrastructure for consumers and commercial customers to recharge batteries. Tesla, as one of the first manufacturers out of the gate with their proprietary system, are allowing Ford and GM to design their EVs to be able to charge vehicles through the Tesla-type of connector. Tesla has the largest charging system and having multiple types of connectors could be chaotic and unaffordable to expand the EV market. As we have seen with many electronic devices, the industry needs to agree on a standard to create a scalable network, rather than try and have a captive audience for only brand specific users. There could be fees for non-Tesla EV owners to access the Tesla charging network.

e-vehicle financial payback

According to a reference in December 2023 *AutoTrader*, 40% of Canadians considering an EV see the price as the biggest barrier. A 2025 internal combustion engine (ICE) Hyundai Kona starts at ~\$27,000 while its EV version is ~\$48,000. If we use an operating cost for fuel and maintenance of \$.38 per km (April 2025 consumer carbon tax removed on gasoline) for the Kona ICE and only \$.06 for charging and maintenance for the EV Kona, it would take ~4.4 years to break-even on the purchase price. This is about the same number of years as it cost in 2024, using ~15,000 kms per year for the average driver.

These estimates suggest that an ICE vehicle costs 6.5 times more to operate than an EV but unless you are driving far more than 15,000 KMs per year, the payback is questionable. The average price of a used vehicle is \$37,700 which is a 3% increase year-over-year; while an average new vehicle is \$67,491 which is 15.4% year-over-year. In other words, affordability is a real issue. Requiring more people to buy higher priced vehicles will add to inflation. Emissions and emotions are on a collision course.

<https://vancouversun.com/news/canada/electric-vehicle-interest-down-autotrader/wcm/b3dab43b-89d2-45d8-96ff-b93e17edb034>

2025 Break-even costs comparing EV vs ICE models

Model	Purchase price	Operating cost per km
Kona ICE	\$27000	\$0.38
Kona EV	\$48000	\$0.06

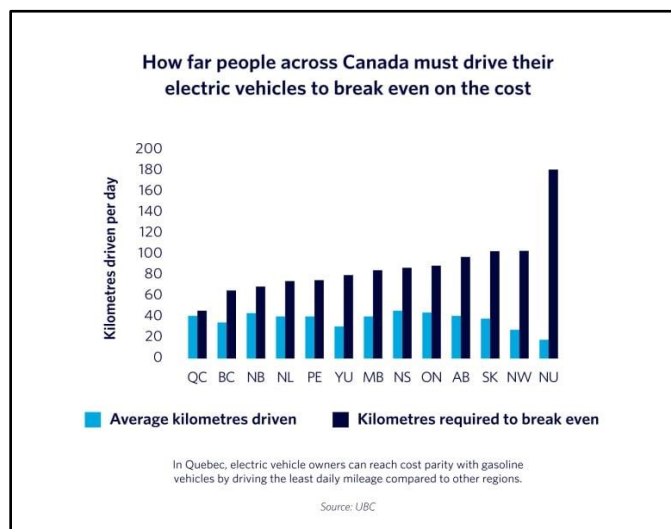
Kona models break-even:

Purchase price savings $48,000 - 27,000 = 21,000$ in favour of ICE

Operating costs savings $.38 - .06 = .32$ savings in favour of EV

Break-even savings of $21,000 / .32 = 64,705$ kms / $15,000$ kms per year = **4.4 years**

The chart below shows how many Kms one would need to drive, over **7-years**, to breakeven when buying an EV over an ICE vehicle. Which other products might a consumer buy and hope to breakeven over 7-years of steady use? None come to mind.



Canadian EV production and subsidies

Most subsidies for EVs ended in early 2025, as announced at various levels of government. The Canadian Vehicle Manufacturers Association says that there is no ability to meet net zero emissions from vehicles by 2035, without support from governments. The Federal government banned the sale of new internal combustion engines (ICE) in passenger vehicles by 2035. Canada mandated that 50% of new cars be emission free by 2030. This needs to be revised in light of current market conditions in early 2025.

Canada provided heavy subsidies to try and promote EVs, which remain unaffordable without government interventions. This forced lower income families to buy a higher cost EV as ICE models were being discouraged. This tracks with the experience of EV automakers withdrawing from the field. In early 2024 GM credited its recent revenue growth from ICE vehicles, not EVs. In June 2024, GM was reducing its EV sales forecasts by 20%. In July 2024, Ford was *not* going forward with EV production of SUVs at its Oakville, Ontario plant, which it had proposed for 2025-2027. Instead, Ford is going to make larger, ICE models of its F-Series trucks, in 2026, citing slower demand and growth for EVs.

In September 2025, the Canadian government announced the inevitable “pause” on ZEV mandated sales targets. EVs have proven to be unaffordable after years of subsidies and low sales. This should provide a time for a new ZEV strategy to be developed with affordability as its core theme.

The Canadian government wanted ~65,000 charging stations across Canada by 2027 while the industry

argues there should be hundreds of 1000's more to meet the demand. Norway, which has one of the highest ratios of EVs per capita, has 8000 chargers for its population of 5.3 million, in a climate similar to Canada. This would extrapolate to ~64,000 chargers required for Canada. In Europe the target is one public charger for every 10 EVs. This extrapolates to Canada requiring ~4 M public chargers by 2050.

The EU's external audit report says that the 2035 targets are not going to be achievable unless there is a greater reliance on cheaper imported EVs. This of course threatens EU jobs. This is likely a concern in the US and Canada as affordability drains the finances of individuals. Having to buy a much higher cost EV rather than an affordable ICE vehicle seems absurd on the face of it. Not having an EV charging network capable of handling the political timetable, adds to the serious levels of risk. Pushing consumers into debt instead of having a better transition plan in terms of timing and technology options does not appear to be sustainable. 2035 targets may be unrealistic. <https://www.reuters.com/business/autos-transportation/eus-2050-net-zero-goals-risk-ev-rollout-faces-setbacks-2024-04-22/>

e-batteries

EV pricing is driven by battery costs. Technologies have been changing rapidly. Not only in the materials being used but to reduce the weight and increase distance between charges. Investors, including governments, have been exposed to betting on one type of battery design, only to find that a lower cost, better operating design has made their previous investment largely redundant. According to the consumer data analytics company, JD Power, the average life of an e-battery is ~200,000 – 400,000 kms, before serious degradation requires it to be replaced. This was a 2023 study.

There are several types of EV batteries on the market. They can be solid state, lithium-ion, lithium-iron-phosphate, graphite-silicon, or sodium-ion. These designs use additional critical materials such as copper, manganese, nickel, cobalt, zinc, and aluminium.

In 2024, the thinking on EV vehicles is not greater range, it's to get their costs down. EVs, at present, are not affordable to encourage scalable demand. The weak link in the chain is the cost of the batteries. Part of the current range limitation of EVs is their weight. The average weight for an ICE small, medium and large vehicle is 1037, 1333, and 1827Kgs respectively. Their EV counterparts are 1230 (+18%), 1640 (+23%), and 2265 (+24%) Kgs heavier. Stellantis CEO Taveres, says that battery weight must be reduced by 50% over the next decade to address environmental and affordability issues.

The costliest component of an EV is the battery. Stellantis and Renault are partnering with Chinese battery maker, CATL in Europe, to make cheaper Lithium iron phosphate (LFP) batteries. CATL has an LFP battery capable of 1000 kms on a single charge. South Korea's LGES is producing LFP batteries for Renault vehicles. CATL provides financial support in its supply chain to promote battery innovation. <https://www.reuters.com/business/energy/chinas-catl-offers-suppliers-financial-support-drive-battery-innovation-2024-12-13/>

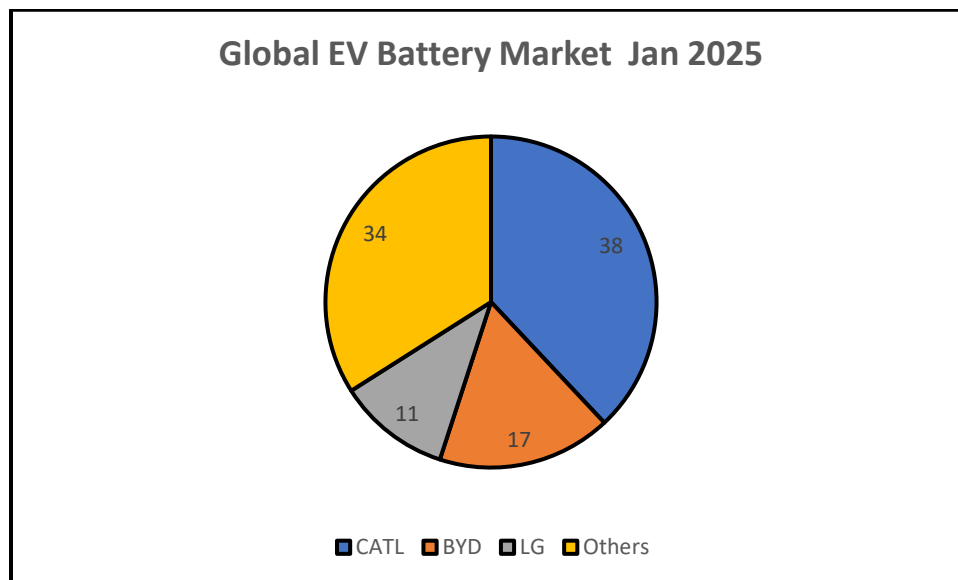
Cathodes are the ~30% of the cost for an EV battery, with most batteries using nickel or LFP. LGES is partnering with several Chinese battery manufacturers to bring down the battery costs for EU EV makers. Chinese battery makers dominate the LFP cathode supply market. LFP is used by Chinese EV automakers as a reliable and more affordable option to nickel. <https://www.reuters.com/technology/lg-energy-solution-talks-with-chinese-firms-make-low-cost-ev-batteries-europe-2024-07-24/>

EV battery market

EV automakers are investing in a wide variety of technologies and materials to reduce the cost of batteries. In 2025, lithium-manganese rich (LMR) technology is the latest to be chased by GM and Ford in pursuit of breakthrough technology. LG is a lead supplier in LMR technology. <https://www.reuters.com/business/energy/gm-lg-make-new-lower-cost-cells-future-evs-2025-05-13/>

The following graph provides the data on market share of battery manufacturers vying for the EV and renewable energy markets. CATL continued to take more of the market in 2025.

<https://cnevpost.com/2025/02/14/byd-holds-lithium-mining-rights-brazil-report/> Source: SNE Research



GM is investing US\$50M in Energy Exploration Technologies Inc (EnergyX) to develop lithium extraction and refinery technology. This will enable GM to control the costs from raw materials through to full battery cell production. EnergyX's direct lithium extraction process (DLE) can produce lithium metal directly from brine and into an anode-ready for EV batteries. DLE could replace the slower and more costly traditional evaporation ponds, which require more energy, land, water usage said GM in its 2023 press release. GM is also buying 32,000+ tonnes of manganese sulfate from Australian mineral company Element 25. As part of the deal, GM will help finance a new facility in Louisiana to produce battery grade manganese sulfate from Element 25, which qualifies for EV tax credits under the US Inflation Reduction Act. In early 2024 GM invested US\$150M in Canadian mining company Nouveau Monde Graphite to acquire 18,000 tonnes of graphite for battery anodes over a 6-year deal.

In 2025, Stellantis and LG Energy began their \$5B lithium-ion EV battery plant in Brampton, Ontario, under the name NextStar Energy. Lithium-ion technology may be surpassed by sodium-ion batteries, as sodium is cheap and plentiful. This reiterates the risk in e-battery investments by companies and with government backing.

In early 2025, Honda put its Ontario battery plant project on hold for 2-years, as EV sales continue to slow due to tariffs and current cost structures. Honda's \$15B EV and battery plant investment involved complex venture partnerships to bring the essential EV components in-house, to reduce overall manufacturing costs by a targeted 20%. The Alliston plants were supposed to employ ~4000 people in total. This vertical manufacturing model included South Korea's steel manufacturer POSCO for battery cathodes and Asahi Kasei Plastics for battery separators. <https://www.cbc.ca/news/business/honda-canada-ev-announcement-1.7533402>

GM will spend US\$ 1B to retool existing ICE production facilities in the US to make EVs, under a US government incentive program. GM and LGES have plans to open a US \$ 2.6 B battery cell manufacturing plant in Lansing, Michigan along with upgrading the site to produce EVs.

GM signed an agreement in August 2024 with Samsung to build an EV battery plant in Indiana. The US\$ 3 B will begin production in 2026 and include prismatic and cylindrical cells.

Portugal has one of the largest deposits of lithium bearing materials in its north eastern region of Barroso. It's estimated the site could provide 28 M tonnes of high-grade lithium for EV batteries. Barroso is a food and agriculture organization heritage site. Local residents do not support the opening of a mine and are refusing to sell land for mining to preserve this important agricultural area. A British mining company doing exploration in the area, may ask the Portuguese government to intervene in the land sale. <https://news.mongabay.com/2023/12/a-lithium-goldmine-is-buried-under-one-of-europes-last-heritage-farming-systems/>

Serbia has a rich lithium site, which is being protested by NGOs and citizens for its potential environmental problems. The owner, Rio Tinto, estimates the mine could provide 90% of the EU's current demand for EV batteries. The Serbian government has approved a license to operate which has been on hold for 2-years, since 2022. Serbia and the EU signed an MOU in July 2024 to proceed. The mine could provide a much-needed boost to Serbia's economy.

ACC, an EU lithium-ion EV battery maker in a joint venture with Stellantis and Mercedes announced in mid-2024, it has paused production. Its existing EU plants in Germany and Italy are pivoting to produce lower cost LFP batteries to meet a slowing demand for EVs. Stellantis is now working with Chinese battery maker CATL on an LFP battery plant in the EU. The Stellantis investment with ACC is now in serious doubt. <https://www.reuters.com/business/autos-transportation/italy-reallocate-eu-funds-earmarked-stellantis-gigafactory-2024-09-17/>

US-based OneD, has designed graphite batteries with silicon wires saving US \$281 per unit vs graphite-only batteries. GM has invested in OneD, as this technology reduces the battery weight by 20%. Ford is aggressively trying to reduce its battery costs by 50% through its sourcing strategies. BMW is using LFP batteries which reduces its costs by 60%.

S. Korean, SK On, an EV battery company is poised to mass produce LFP batteries for the 2026 market. Again, the intent is to reduce dependency on higher cost materials such as cobalt. LFP batteries will also be supplied by S. Korea's LG Energy and Samsung SDI, as they pursue the EV battery market and try to rival China as competition. In 2024 SK On is trying to get more automakers to use SK's *prismatic* batteries. SK On wants to expand its prismatic production over its current *pouch cell* design. There are pros and cons for each type of battery. Both types compete against the cylindrical design used by many automakers. <https://www.reuters.com/world/asia-pacific/south-korea-sk-talks-supply-prismatic-ev-batteries-it-seeks-turnaround-2024-07-12/>

CellLink design replaced wire harnessing in vehicles by using laminated sheets, which are substantially lower in cost and are made and installed using robots rather than labour. In April 2024, CellLink received US government financing of \$362M to locate a plant in Texas to make wire harnessing devices. Addionics uses 60% less copper than other EV batteries. Most automakers are designing out the need for rare earth materials due to geo/political sourcing issues. Germany-based Veekim is designing EV motors with magnets using a form of iron powder and 3D printed copper wire to reduce motor costs by 20% and avoid rare earths. GM's CFO, Paul Jacobson, wants its 2024 fixed costs per EV to be reduced by ~US\$20,000 over 2023, including battery production tax credits and GHG reduction benefits.

Israeli battery company Addionics, has designed electrodes using a porous, 3-D copper and aluminium material using 60% less copper. GM is looking at the applications for the Addionics' battery as it is less costly than other battery designs. Addionics may locate a battery plant in the US by 2027.

The ability for EV manufacturers to be able to pivot to respond to lower cost production and technology advantages will be key to their financial success. Building a new facility and infrastructures around designs that are 6-months old, is inviting increased risks. Getting new EV models out to the market

quickly and affordably will be a race won by those companies which can run lean operations in a continuously improving milieu. Signing long term contracts for critical materials that could be quickly designed out of the final products, will require some good negotiations and creative exit clauses in contracts. To this point, Renault has exited its common purchasing agreement with Nissan and Mitsubishi in order to make decisions in a more agile manner. European EV markets are becoming regionalized due to regulatory requirements and infrastructure systems.

e-leasing

EU leasing patterns give another insight into the economic problems with EVs – EV are not holding their resale values. Leasing of EVs accounts for ~80% of new EV sales, compared to 60% for all new vehicles. Of the 80% for new EVs, corporate and commercial businesses account for 60% of the leases. Leases are based on depreciation values of the new vehicles and their estimated residual value at the end of the lease. When the resale values are lower than expected, the leasing companies lose considerably. One of the main reasons for Hertz in North America to dump its EV rentals – not enough resale value for used EVs. Hertz wrote down US\$150M on ~20,000 EVs. This is in contrast for similar year ICE vehicles which have not depreciated as much. Therefore, leasing companies have to charge more EVs than they expected and buyers are reluctant to pay more. New EV leases are more than double the cost from 2021 in 2024. Leasing companies are trying to extend the 3-year usual lease period to longer time periods than ICE vehicles to reduce the financial risks. Raising prices for EV leases discourages the EV sales further. <https://www.reuters.com/business/autos-transportation/leasing-model-behind-europes-ev-drive-risk-breakdown-2024-08-13/>

e-transit buses

The 2023 E-Bus financial debacle in Edmonton, casts doubt on the feasibility and affordability of EVs in public transit. This has a ripple effect of casting doubts on other government ventures, which start with a good story by the politicians and end with a nightmare for the taxpayer. In February 2024, Edmonton has filed a Cdn \$82M law suit for breach of contract and negligence against its bus supplier Proterra, who is in bankruptcy protection. Edmonton's fleet manager said that only 28 of the 60 buses are capable of running at any time. The initial purchase from Proterra was ~\$60M. Proterra sold its assets to Phoenix Motor Inc.

Edmonton has begun using hydrogen powered buses. Edmonton concurrently operates diesel and electric buses in its transit system. The Edmonton E-buses have run into serious operating and maintenance problems since their 2020 installation. A November 2023 CBC report, states that many E-buses can't operate due to mechanical failures and the inability to get parts. The latter problem is compounded by the OEM, Proterra, filing for bankruptcy protection in the US and can't supply parts. The business case for the E-buses was to save ~30% on the cost of running diesel buses – those savings are long gone. <https://www.cbc.ca/news/canada/edmonton/edmonton-buses-proterra-1.7035186>

Looking at a successful and sustainable solution for e-buses can be seen at the Schiphol Airport in Amsterdam. For 6 years they have been operating 100 e-buses powered mainly by solar and wind energy. Canadian cities can learn from other successful e-bus systems and avoid further financial debacles.

BC Transit selected Proterra as its e-bus supplier in mid-2022, as a \$20M investment, which suffered when Proterra went bankrupt. BC Transit ordered 33 Nova Bus LFSe+ E-buses in May 2024 to continue its investment to hit GHG reduction targets. No funding was announced. Nova Bus ceased producing its E-buses in the US in 2023 and will focus on Canada. Nova Bus is owned by the Volvo Group which acquired Proterra's battery business in November 2023. Nova Bus is supplying other Canadian cities including Brampton, Saskatoon, Regina, and Durham.

In early 2023, the first battery-powered public transit bus line was initiated in Vancouver with four

Canadian-made Nova LFS+ brand vehicles and two charging stations. The announcement from the operator, TransLink, stated the buses cost \$1.1M each and are expected to save \$40K each per year when compared to diesel units. There was no indication as to the cost of the charging stations, which will likely be in the multiple-millions. An additional 11 BEV buses are on order with another 385 to be delivered by 2030. The four older diesel vehicles they replaced emit 280 tonnes more than the BEVs. If we use \$50 per tonne as the cost of GHGs that's a further savings of \$14k per year. It's a payback of ~25 years even with reduced GHGs. Therein lies the rub with affordable and clean energy. Currently it is difficult to get one without the other.

Regina has 20 Nova e-buses on order at a cost of \$47M with the charging stations and 50% subsidies to come from Federal grants. The projected life of the e-bus is ~17-years. The estimated savings are \$44k in fuel and 60 tonnes of GHGs per year. Regina expects to run a fleet of 53 buses by 2040. Using Regina's cost estimates, BC Transit's order of 33 buses would approximate \$70M with an expected 50% government subsidy to follow.

Canadian-made NFI's New Flyer e-buses have been purchased by BC Transit, Ottawa and Toronto. NFI produces a wide variety of electric and other optional fuel transit buses. NFI has the resiliency with its lineup of vehicles to avoid being dependent on the fickle e-bus demand. In March 2025, the Federal government agreed to give BC Transit \$189M over 10-years. <https://www.cbc.ca/news/canada/british-columbia/metro-vancouver-transit-funding-1.7490218>

TransLink is forging ahead with E-buses in the face of a million-dollar deficit with its operations. A report by Transit's VP of Financial Services, stated *TransLink's structural deficit starts becoming apparent in 2026, and grows progressively, as expenditures outpace existing revenue sources. For the years 2026 to 2033, based on the scope of 2022 Investment Plan and before any additional scope of the 10-Year Priorities is included, the total funding gap is \$4.7 billion. To fill this gap, TransLink would need approximately \$600 million per year in new revenues starting in 2026.* In 2025, the Federal government agreed to fund Transit with \$~2B over 10-years for its planned capital budget, starting in 2026.

To help fund TransLink between 2025-2027, there will be a 0.5% property tax increase in Metro Vancouver; a 5% general fare increase; \$1.50 fare increase for YVR trips; parking tax increases of 20%; and \$312M from the BC government on behalf of all taxpayers. Affordability is the real issue. <https://www.cbc.ca/news/canada/british-columbia/translink-funding-increases-1.7507285>

Electrification of school buses has a tremendous potential to address GHG reduction targets. When we consider the millions of buses and trucks currently reliant on fossil fuels, the conversion should be cause to reflect and rethink how we move people and products. An August 2023, Pembina Institute report estimates that the average ICE school bus emits 27 tCO₂e per year. Diesel exhaust-related health costs are ~\$2.3B per year.

Quebec-based Lion Electric was producing a minimal amount of electric school buses (e-SB). Their purpose-built e-SBs are zero emission vehicles. Lion designed and manufactured e-trucks, mini-buses, refuse and utility trucks. Similar to EVs, most e-SBs are not affordable. Even with subsidies, the e-SBs have proven to be unaffordable for school districts. Lion Electric filed for bankruptcy protection in late 2024. In early 2025, Lion Electric was sold to a new group of investors, under a *reverse vesting order* where previous debts were expunged. This means that the Province of Quebec could lose \$140M and the Federal government a further \$50M which they invested in Lion. <https://www.theglobeandmail.com/business/article-lion-electric-set-for-revival-under-new-owners/>

In June 2024, Lang Bus Lines received \$44M to supply 200 e-SBs to the London, Ontario school system. Half of the funding is from the Federal Zero Emission Transit Fund (ZETF) and the balance from the Canadian Infrastructure Bank. The e-SBs should reduce GHGs by 4200 tonnes per year. If the life of an e-

SB were 10 years, that would extrapolate to 42,000 less tonnes of GHGs over their operational life. This equates to a cost of ~\$1000 per tonne! Or *convert* the existing diesel designs to electric-power and save ~\$22M and still save 42,000 tonnes of GHGs. <https://www.cbc.ca/news/canada/london/local-school-bus-company-gets-44m-boost-to-electrify-fleet-1.7242068>

One exception to the e-bus struggles is Letende, out of Quebec. Their all electric *Electrip* model bus was designed for Canadian weather conditions. They use aluminium to reduce weight with a body to withstand corrosion. Letende partnered with Cummins which provides the electric powertrain. Although Letende is less than 10-years old, TransLink is trialing a Letende e-bus in early 2025. Based on sales of similar e-buses to the state of Vermont, Letende models cost Cdn ~\$ 3.2 M per bus.

<https://electricautonomy.ca/automakers/electric-buses/2022-03-03/quebec-letenda-electric-bus/>

A September 2024 article by CBC writer Janyce McGregor, highlighted the government funding problems and the slow pace of conversion with e-SBs. Again, this reiterates the high capital costs of e-SBs. *You can replace three diesel school buses for the cost of one emissions-free public transit bus.* Arguably, funding e-SBs would reduce more emissions than public transit due to the volume of diesel school buses on the roads. <https://www.cbc.ca/news/politics/green-school-bus-funding-delays-1.7314006>

With only 2% of the ~51,000 Canadian school buses being electric, to achieve the announced reduction of diesel school buses for one advocacy group, it would require 2800 clean emission vehicles per year. Unaffordable. PEI rushed to buy ~200 Lion e-SBs in 2021. In 2024, only ~100 of the 360-school bus fleet is electric with ~25 being in the shop for repair at any given time. <https://www.cbc.ca/news/canada/prince-edward-island/pei-school-buses-electric-breakdown-education-1.7114185>

The school bus sector is an oligopoly operating in Canada and the US. The school bus market is controlled by ~6 manufacturers. In Canada the committee which oversees the sector has a potentially conflicting mix of owners and other administrators controlling the design and electrification transition. So much so, that the committee had their sector rules, referred to as the *D250 regs*, to disallow the conversion of ICE buses to other fuels. It began with the trials of hydrogen fuel conversions which were disallowed, mainly because it did not support selling new vehicles. Case in point, in 2023 a BC school District announced it was replacing its fleet of diesel buses with Lion Electric e-SBs. The economics of this decision are rooted more in politics than science. The average price of an e-SB is \$395,000 (after federal subsidies) and the cost of a diesel school bus is \$202,500, as stated by the school district. The district will save \$15,000 per year in fuel and maintenance. This realizes a payback of $(\$192,500/15,000) = 12.8$ years. The school district said they replaced their diesel buses every 12 years and *hoped* that the e-buses lasted longer. Affordability is a real factor for taxpayers.

In the July 26, 2024 edition of Newsweek magazine interview with Blue Bird bus CEO, Britton Smith, further doubts on the value of e-SBs were validated. Per Smith, the e-SB industry operates 500,000 school buses. By mid-2024, 2% were e-SBs while 93% were still running diesel with others using propane. 9% of Blue Bird's sales are e-SBs. Per Smith, a diesel school bus costs US\$150K while an e-SB costs US\$350K. The funding for e-buses is made available through the US Bipartisan Infrastructure Law. It costs US\$.79 per mile to operate a diesel unit and only US\$.19 per mile for an e-SB. The savings of US\$.60 per mile goes towards the potential return on the capital investment difference of US\$200K. An average school bus travels ~12,000 miles per year (50 miles per day) for a savings of \$7,200 per year. The payback period would be $(\$200,000/7200) = 27$ years! Yes, there is a reduction in GHG emissions with an e-SB over a diesel bus, but this small return adds to the unaffordability argument.

The above e-SB examples using a microeconomic model of a Canadian school District and the macroeconomic market described by Blue Bird shows how widely estimates of costs and savings range. Both examples show the payback is not reasonable and the e-SB strategy with government funding needs a revisit or at least a prioritization on projects. The funding is finite and the same taxpayers

cannot meet all of the competing demands concurrently.

There are about 60 school districts in the Province of BC which will all want to make the transition to e-SBs. The price tag will be in the multi-millions without considering the infrastructure investments for power. If, the school bus committee and the politicians were objective, they would allow the conversion of existing school buses to e-buses. Leasing these buses could be done at a cost of ~\$50,000 per year for 4-years; after which the lease rate would be reduced as the cost of conversion is recovered. If we look at the Canadian school bus market, we could save \$billions with conversion of existing ICEs to e-buses.

The Canadian school bus market operates 40,000 – 50,000 school buses. While Ontario has invested in battery plants and other EV parts strategies, it has not invested in e-SBs. The global e-SB market is estimated at US\$3B by 2030. The potential job growth if Ontario decided to build e-SBs, could result in 13,000 new jobs with Cdn \$2B in economic output, along with 350 K tCO₂e removed from emissions, per Toronto Star, climate change reporter, Marco Oved, in September 2023.

The BC government also funds the Go Electric School Bus Program administered through the Fraser Basin Council. Incentive rebates were available for school bus fleet operators such as school districts, private contractors, independent and Indigenous school fleets. Rebates were up to \$150,000 to buy a new e-SB; up to \$6,000 to buy and install a Level 2 charging station; and \$5,000 towards infrastructure assessment plans. No funding mentioned for the *conversion* of existing vehicles.

Most governments are quick to support the transition to EVs of any type. Rebates are open to individuals, businesses, non-profits and all BC-based public sector organizations. The targeted electric vehicles are new motor vehicles, cargo e-bikes, airport, port and utility vehicles. Vehicles which do not qualify for the rebate program are those where the manufacturer-suggested retail price is >\$55,000 for cars and >\$70,000 for larger vehicles. All applications are subject to the availability of funds. No funding for the *conversion* of existing vehicles.

Chinese electric bus manufacturer BYD, builds electric buses in Lancaster, California. With the late 2024 US administration ban on Chinese software and hardware in EVs, this could impact e-bus production at this US facility. <https://www.reuters.com/business/autos-transportation/gm-ford-would-need-halt-chinese-vehicles-exports-us-under-rule-official-says-2024-09-23/>

e-school bus options

Vancouver-based RiiSE EV company is rethinking the electrification of many types of vehicles, including the everyday school bus. RiiSE EV has opted to go where few others have gone. Retrofitting and converting gas and diesel buses and shuttles to electric power. They also apply their know-how to sports and classic cars, fleet and utility vehicles. <https://riiseev.com/>

The RiiSE EV strategy aligns with the circular economy value which states that everything begins with the design. Taking existing resources and repurposing them for other uses, substantially reduces the consumption of new raw materials and enables a sustainable economic model with a lower environmental impact over the life of the vehicles. However, RiiSE EV faces some political and legal hurdles intentionally placed to prevent the conversions.

As there is a shift towards lower emission e-SBs, it is a good time to objectively look at the sourcing strategies on replacing diesel e-SBs, across Canada. Procurement professionals and the industry need more cost effective, affordable options, with less reliance on BIG governments to justify further investments in technologies and designs. Don't limit the options to only new vehicles when conversions offer at least a bridge towards GHG reductions without going into massive debts.

Another option to the electric school bus funding dilemma, is to place a moratorium on any further decisions. In the interim, buy carbon offsets for the estimated GHGs out of the government funds, if it is that much of a priority. Concurrently, form industry, school District, and government panels to investigate the problem and make recommendations for the next fiscal school year. Review the current sourcing strategies which school districts are obligated to follow.

Instead of buying e-SBs, there is the option of clean-diesel school buses. More affordable and do not require a charging system. Good option for Canadian school districts.

Many procurement professionals think the current process for buying e-SBs is not fair or transparent and is not delivering value for money. Rather than the one-size-fits-all government solutions of funding only new e-SBs, look at the variety of technologies, the energy options in the regions, and the flexibility offered by converting existing vehicles to cleaner modes of transportation for school children. There are affordable options which could be funded. BC is investing in a hydrogen hub – that could work for several school districts with hydrogen-fueled buses. The Province of BC is importing electricity from coal-fired plants, as we are in a drought. Hundreds of school districts in Canada rely on the portable classrooms heated by propane or the costliest, electric baseboards. Redirect the savings from converting diesel e-SBs to replacing portables or installing efficient HVAC systems. We need more affordable options. The same taxpayer is footing the costs of e-flation.

Clean-diesel buses

An emerging option from Canadian bus manufacturer, NFI Group, is their *Xcelsior* transit bus. 90% of the NFI group models use common supply chain components across their legacy products and EVs. NFI offers clean diesel, natural gas, hybrid electric, trolley, battery and fuel cell energy options. Their flexibility builds in a resilient strategy as technologies and customer preferences adapt to zero emission buses. In 2025, the York Region ordered ~170 clean-diesel buses to complement York's existing 535 bus fleet. Clean-diesel run on ultra-low-sulphur-diesel fuels, which reduce GHGs much greater than conventional diesel buses. Clean-diesel buses cost ~30% less than comparative e-bus models, reducing capital costs. As the payback on e-school buses is very low, the clean-diesel option makes more sense. Reduce GHGs and save the capital. Using York as an example, if they could save \$100K per clean-diesel bus in lieu of buying e-buses, the capital savings are ~\$17 M – people could ride for free! Several companies manufacture the engines and use them in clean-diesel fleets in North America.

<https://www.supplypro.ca/york-region-transit-to-guy-170-buses-from-new-flyer/>

e-construction equipment

Most major construction equipment manufacturers have rolled out new product lines which are fully electric. These models eliminate the need for diesel fuels, have equivalent payload capacities, operate quieter, and need less maintenance. Volvo reported a savings of \$2400 when operating an electric machine for 400 hours as compared to a diesel machine. Volvo ceased the manufacturing of compact wheel loaders and compactors in 2019 as it launched its electric versions.

The construction and excavating industry have plug-in cranes. These pieces of equipment have the same lifting capacity as their diesel-powered cousins. But, no emissions, quiet operating, 4-hour battery power when unplugged, keep on operating when plugged in, and with electric motors, fewer parts for maintenance. The circular economy is pushing all designs to be more responsible and affordable.

In a city such as Toronto, as an example, noise from conventional construction equipment requires that it shut down between 7pm and 7am. Quieter electric equipment could extend the work day in these situations, increasing productivity.

Swiss-based Kuhn-Gruppe converted a 40-tonne Komatsu HB 605-7 rock truck into an eDumper. It's

capable of carrying 59 tonnes of material without stopping. In a mining application the eDumper uses a regenerative braking system which recharges its 600 kw per hour batteries when going downhill. The battery pack weighs 4082Kgs. The conversion capability supports the circular economy principles of refurbishing existing equipment and rethinking how we use manufactured products.

Komatsu's autonomous mining trucks operate in 5 countries with reduced operational costs; increased production; reduced maintenance costs; and reduced accident risks. Brazilian mining company Vale, has partnered with Komatsu and Cummins to develop haul trucks running on ethanol and diesel. The trial could lead to retrofitting existing diesel-powered haul trucks with the dual fuel capability. Potentially this could reduce GHGs by 70%. The trucks have a payload of 230 to 290 tons.

<https://www.reuters.com/sustainability/brazilian-miner-vale-partners-with-komatsu-cummins-develop-low-emission-trucks-2024-07-11/>

Caterpillar has produced its 793 all electric mine haul truck. Fully loaded, it can reach a speed of 60 kmh. It recaptures the energy on a down slope to recharge the battery. Caterpillar also has an autonomous, 100-Ton 777 off-highway truck. The MoneyWeek report stated Caterpillar has 580+ autonomous haulage vehicles operating in 24 mining sites. Cat has developed software to enable a single machine to operate remotely; or multiple vehicles concurrently; or operate a completely autonomous fleet of mining trucks with no human intervention.

Caterpillar operates autonomous vehicles is at the Côté Gold mine near Timmins, Ontario. The mine currently operates 14 electric trucks, with a 200-tonne load capacity, and another 9 expected for full production. The vehicles provide a ~30% increase in productivity. The communication systems allow for only (2) operators to control the mine trucks.

Fortescue has opted to order 450+ electric mining vehicles in late 2024 from the Liebherr brand. This would include autonomous battery-electric vehicles, electric excavators, and dozers. This fleet will replace 2/3 of its existing fleet and reduce Scope 1 emissions by ~50%. Fortescue's mining operations currently burn 450 million litres of diesel fuel per year. <https://www.reuters.com/sustainability/climate-energy/australias-fortescue-signs-28-bln-green-equipment-partnership-with-liebherr-2024-09-24/>

e-first responder vehicles

Several North American cities have ordered electric fire service trucks from Austrian-based manufacturer, Rosenbauer Group. E-fire trucks have the benefits seen in other EVs such as less maintenance requirements, 60% lower emissions, and lower fuel costs. The chassis design allows a lower profile for fire fighters to access equipment and board the vehicle. The height can also be raised to travel over debris. The Rosenbauer design uses a BMW diesel engine for pumping operations and charging when required. Victoria's Rosenbauer E-fire trucks cost Cdn \$1.7M; the City of Burnaby has (4) on order from Safetek Emergency Vehicles at a cost of \$9.7M. The price tag on E-fire trucks is ~Cdn \$300-500K more than a conventional diesel model.

BC Emergency Health Services (BCEHS) will use the Ford Mach E for paramedics to respond to calls. Quebec-based Demers Ambulances and Lion Electric have developed a fully electric eFX ambulance. The all-electric ambulance will have a range of up to 200 Kms on a single charge. The design allows for a much lower chassis height making patient care easier.

The first fully electric RCMP cruiser was put into service in February 2023 in Langford, BC. This is part of a national trial to test the functionality, capabilities, and limitations with EVs for the RCMP across Canada. The Tesla Y model is suitable for milder climates while it may not be viable for northern communities. Other EVs such as the Ford Mach-E SUV and Ford F-150 are on order. In August 2024, Ford announced they are delaying the Ford F-150 EVs due to lack of demand and return on investment.

e-vessels

Norway launched the first all-electric ferry with rechargeable battery system, in 2019, claiming 90% reductions in emissions and 80% reductions in cost. Electric ferries run much quieter when compared with the traditional diesel engine powered designs. Two electric propulsion ferries were ordered for operating in Ontario in 2021. In 2021, New York ordered its first, 150 passenger electric ferry for commuters. It would seem that all-electric ferries could replace many of the diesel-powered fleets as a scalable solution.

British Columbia announced in 2021, it would be accelerating the conversion of its fleet to electrify (6) ferries. However, this \$135 M plan was contingent upon federal and provincial funds. In October 2023, they had to pull back on their e-ferry plans, as funding was *not* provided. The BC ferry fleet failed to deliver the promised reduction of emissions, using a 2008 benchmark level, and it is doubtful it will meet the 2030 targets. This was reported by Rochelle Baker, through the *Local Journalism Initiative*.

The waters off British Columbia saw the first all-electric tugboat in July 2023. The *Wamis*, the first of 3 tugs, will be deployed in Kitimat to service the LNG ship operations. With 100% electric power and a total of 5000 kWh of battery capacity.

e-planes

Backed by an A-list of investors, US-based REGENT developed its Viceroy Seaglider – a 12-passenger plus crew variant with 160 nautical mile range with existing battery technology. This all-electric craft designed for water-based transportation carries 12 people can travel up to 300 KPH. The Seaglider is a scalable model which could give conventional seaplanes and e-planes, effective competition.

<https://www.regentcraft.com/seagliderviceroy>

Vancouver-based Harbour Air converted a 1955 aircraft to run on an H55 battery with a MagniX electric propulsion unit (EPU) in 2019. In 2024 they have committed to ordering (50) MagniX engines to convert another (12) planes by 2027 and then retrofit the rest of their fleet. <https://bc.ctvnews.ca/harbour-air-commits-to-buying-50-electric-engines-for-seaplane-fleet-1.6862273>

Seattle-based Eviation, is producing its version of an electric commuter aircraft. In 2022, Eviation received an order for 75 of these 9-passenger, zero emission craft. Eviation uses similar technology to Harbour Air in its e-plane. The planes have the capability of flying for ~1-hour after 30 minutes of charging. United Airlines has ordered 100, 19-seater Swedish-manufactured electric planes from Heart Aerospace. <https://www.eviation.com/>

United is researching the use electric vertical takeoff and landing (eVTOL) aircraft to move passengers who now drive ~250 miles or less to fly instead, according to its VP of Corporate Development Mike Leskinen. In an ESG Impact report in October 2022, by rethinking short flight demands, eVTOL could fill a gap in the market that is currently taken by automobiles. Consumer versions of 2–4-person electric aircraft are on the market in the form of eVTOL models. Aircraft contribute ~3% of the global CO2 emissions. <https://search.app/R9rVsE64JH9eZo9U7>

Rolls Royce has converted a conventional fossil-fuel aircraft engine into a green-hydrogen fueled engine for European short-haul air carrier EasyJet. Rolls Royce has been electrifying its products and is on a path to decarbonize on its path towards zero carbon. This prototype engine increases the possibilities for expanded hydrogen fuel options.

Vancouver-based Helijet International ordered an Alia electric vertical-takeoff aircraft for its fleet in late 2023. The eVTOL has wings but responds like a helicopter, carrying 5 passengers and a pilot. Alia is built by US-based Beta Technologies. The eVTOL design is the basic concept for air taxis. China approved the use of autonomous air taxis in 2023. Author Benedikt Kloss estimates the nascent air taxi market to be

worth billions of dollars in the near future. Air taxis, with pilots, will be available in some US markets, starting in Chicago through United Airlines partnership with Archer Airlines eVTOLS and other air taxi configurations.

Airlines are increasing their use of sustainable aviation fuels (SAF). SAF emit much lower CO₂ levels but not zero. Airlines speculate that electric planes could serve small markets; hydrogen-fueled planes for medium-sized markets; and SAF-powered jet engines required for major cities. The International Air Transport Association (IATA) reports that in 2022, the production of SAF was forecast to reach 300M litres. However, IATA estimates that a production of 450B litres will be required annually to achieve Net Zero targets for 2050. Airlines have increased their commitments to SAF by entering into *offtake* agreements with SAF producers. This will support the financial commitments from the supply side for the demand side. SAF can be produced from cooking oil, corn, waste or hydrogen.

In late 2023, US-based corn farmers and ethanol producers were successful in their lobby for tax credits from the US government to be applied to promote the use of SAF and bio-based fuels in the airline industry. SAF cost 3-5 times the price of fossil-fuel based jet fuels. The final approval on credits will require a model which measures emissions similar to the ICAO methodology. The increased use of corn for fuels, again, pits food against energy as an option.

SAF production should increase with the startup of a new facility in Spain to provide biofuels and SAF. Cepsa and Apical Group's Bio-Oils will produce 2.5 M tons of biofuels of which, 800,000 tons will be SAF, by 2030. The facility will convert waste cooking oils and other organic materials into a renewable energy source.

A Reuters 2024 report indicates that airlines contribute 2-3% of global emissions. Fuel comprises ~30% of an airline's operating costs. To transition to SAF fuels by 2030 it would cost airline companies US\$ 1.45 – 3.2 trillion, making it a questionable investment, at this time. Ticket prices will increase.

<https://www.reuters.com/sustainability/un-led-talks-weigh-goal-reduce-aviation-emissions-thorough-less-polluting-fuels-2023-11-24/>

SAF investment in China is driving the supply of aviation fuels. Junheng Industry Group Biotech, Zhejiang Jiaao Enprotech, and Tianzhou New Energy are building facilities for late 2025 start up. They collectively expect to produce 100 M tonnes of SAF per year. That could meet 2.5% of China's current demand for aviation fuel. China currently produces 100,000 tonnes of SAF per year. The feedstock would be based on used cooking oil (UCO) which China currently exports mainly to the US and Singapore. The exported volume of UCO from China is ~2 M tonnes per year. In 2024, China launched a technical research centre to set standards for SAF fuels. China consumes ~11% of the global jet fuel production. It is expected that once the SAF standards are approved, the Chinese government will mandate SAF fuel for air travel.

	Airline	SAF investment (US\$)
1	Air France-KLM	2023, \$4.7 M in DG Fuels targeting 10% SAG by 2030
2	EASYJET	2022, 5-year SAF supply deal with Q8Aviation division of Kuwait Petroleum
3	FINNAIR	2022, 5-year \$192 M with Gevo for 21,000 tonnes per year until 2027
4	IAG (British Airways, Iberia, Veuling, Aer Lingus, Level)	2025, 14-year deal buying 785,000 tonnes of e-SAF; buying 14,700 tonnes of SAF from Phillips 66; Microsoft participated in Phillips 66 deal to reduce travel emissions
5	IAG	2026, 10-year deal to buy 220,000 tonnes of SAF from wood biomass jointly with Southwest Airlines who will buy 670,000 tonnes over 15-years
6	Iceland Air	2023, green hydrogen deal with IdunnH2 for 45,000 tonnes of SAF from 2028 onwards

7	JetBlue	2024, buying ~16 M US gallons of blended SAF from Valero Energy
8	Lufthansa	2023, 60,000 tonnes per year from HCS Group in 2026. 2022, partnered with OMV which also supplies Austrian Airlines
9	Norwegian Air	2023, commitment to buy 20% of fuel needs from SAF plant in Norway starting in 2026
10	Ryanair	2022, 360,000 tonnes from Shell from 2025-2030 2023, 160,000 tonnes from OMV as part of 8-year deal
11	Virgin Atlantic	2022, 8-year deal to buy 260,000 tonnes from Gevo in a joint venture with Delta Airlines
12	WIZZ Air	2023, Investing \$6.1 M in biofuel company Firefly to supply 525,000 tonnes starting in 2028
13	Air Canada	2022, began buying 9.5M L of SAF from Neste and are investing \$50M for other low carbon fuels
14	WestJet	2022, buying SAF from Neste and 2024 from Shell Aviation
15	Air New Zealand	2024, buying 9.0 M litres of SAF from Neste through LAX location to reduce GHGs by ~80%. In mid-2024, ANZ said it will drop its 2030 emission targets, which could include not using SAF.
16	DHL	2023, DHL's GoGreen Plus buys SAF from BP, Neste, and World Energy.
17	LATAM Airlines Group	LATAM and Aeromexico piggyback off a Delta airline contract and can buy credits to offset emissions. LATAM considering conversion to SAF made from sugar cane in 2025+
18	Delta Airlines	Began using SAF in September 2024 sourced from Minnesota SAF Hub. Delta buying 10 million gallons of SAF from Shell for LAX terminal as part of commitment to 200 million gallons by 2035.

The pending problem for China's SAF production is increased tariffs and dumping duties imposed by the EU in mid-2024. China has been supplying the SAF producers such as Repsol, Shell and Neste. As the demand slows, China is looking to Singapore and other markets to shipped the millions of tonnes of used cooking oil, which is the base for biofuels. Biofuel pricing has dropped by ~50% from 2023 due to oversupply. <https://www.reuters.com/business/energy/chinas-biodiesel-producers-seek-new-outlets-hefty-eu-tariffs-bite-2024-08-16/>

Most EU airlines have increased air fares to reflect the costs of SAF. Lufthansa, Air France and Norwegian Air have added between Cdn \$20 -100 for *environmental* fees. More airlines plan increases in 2025.

The British oil and gas company, BP, expanded its investments in biofuels and SAF, after buying out Bunge Bioenergia in June 2024. This involved (11) sugar cane processing sites in Brazil with a massive biofuel base. One of the outputs is expected to be cellulosic ethanol. This is a similar strategy to Shell partnering with Brazil's Cosan. The Achilles heel for biofuels is the correlation to diesel fuel prices. As diesel prices rise or fall, potential buyers of biofuels weigh the economic advantages and often vote with their wallet rather than the environment.

The BP strategy on biofuels was halted in 2025 as it announced it was halting biofuel production in Australia, Germany, Holland, and the USA. Shell also shelved its biofuel plans. Biofuel investment remains in Spain and Brazil. The underperforming biofuel returns indicate that costs are exceeding the perceived environmental benefits. <https://www.globalbankingandfinance.com/BP-BIOFUEL-ROTTERDAM-6d075da9-bec1-426a-b6d7-b99ebf8ee990>

A caveat on SAF bears repeating. Walsh, former head of British Airways and the 2024 Director General of IATA, cautions mandates on airlines to use SAF due to the price disparity with other jet fuels. In a speech to IATA's annual general meeting in June 2024, Walsh reiterated his concerns. The following story board captures the highlights on approaches to decarbonize airlines and address climate change:

More taxes were not the solution to achieving net zero and that the current "parade of fragmented green tax proposals" were prohibiting people from flying sustainably and grounding all but the rich. Walsh put forward eight approaches that he argued would improve the world's progress towards greener aviation, which included a call for provisions to be put in place that would allow certain green policies to be reviewed and scrapped if they did not work. "Measures must have provisions for review and abandonment if they are not producing the intended results," he said. "Some good ideas will certainly translate into good policies. And many may not. "When a policy has clearly failed – especially when costs

outweigh benefits – regulators must have the courage to stop, and change tack fast.” Walsh said the global industry needed global solutions and IATA would be pushing for globally recognized and accepted rules to reduce carbon emissions, while also calling for measures be put in place to direct more fossil fuel investment into sustainable aviation fuels (SAFs). A number of countries are bringing in SAF mandates, which put requirements on providers to use a certain percentage of the fuel in their aircraft. SAFs can be sourced from food-waste oil and fats, green and municipal waste and non-food crops, and it is claimed they could cut emissions by 80% compared with traditional fuels. However, critics say hopes for the technology are overblown, with a report by the Institute for Policy Studies thinktank arguing efforts to bring SAFs up to scale are too far off track to avert the climate crisis. The UK is poised to pass its own SAF mandate in January next year, which will put in place laws that require 2% of all jet fuel used by airlines to come from sustainable and low-carbon sources by the end of 2025, and 10% by 2030. SAF now equates to just more than 0.5% of the globe’s fuel needs. Walsh said these mandates faced a number of problems, with governments sometimes mandating airlines to buy SAF in quantities that did not exist. He said this often resulted in producers being hit with fines and passing them on to airlines. “We witnessed this in France where fuel suppliers are happy to accept penalties for their failure to supply the SAF mandate. They simply exercise their monopoly power and pass those costs on [to] airlines. This must be stopped,” he said.

Net-net pricing meaning the production and transportation emissions are factored into the 80% reduction. Net-net pricing recognizes where both parties reduce their emissions, through their business operations, it is a sustainable benefit referred to as a net-net pricing model. If one party increases emissions in its process in order for another party to reduce its emissions, it is not a true environmental or economic benefit.

2025 saw the emergence of sustainable marine fuel (SMF). The partnership between DHL and Henkel supports their commitment to using SMF to reduce emissions in marine logistics. The initial agreement will cover ~9000 TEUs. This is a scalable solution and will be monitored by 3rd party auditing SGS.

<https://www.supplypro.ca/dhl-henkel-to-enhance-sustainable-marine-fuel-use/>

As business colleague, Minto Roy, Co-Founder & Managing Partner with Social Print Paper emphasizes, *“Transformative net-net procurement pricing strategies ensure emission reduction policies are accurately reflected and represented when reviewing supply chain partners and products and services required to support day to day operations. Net-net pricing further ensures supply chain partners are proactive in sourcing, supplying and advancing the uptake of products and services that align with organizational ESG policy versus products and services that reflect no measurable or positive change.”*

e-transportation emissions

GHGs emissions increased between 2021-2022 according to the Canadian Climate Institute studies. The levels of GHGs in 2022 are the same as they were in 2005. While electrification and decarbonization of transportation will continue, this is a long-term investment strategy with a lot of uncertainty attached to its success to reduce emissions and provide an affordable transition to cleaner energy. Affordability will play a big role in the acceleration to, or deceleration from, EVs and other forms of transportation.

<https://climateinstitute.ca/news/evidence-of-progress-canadian-emissions-down-from-peak-as-economy-decouples-emissions-from-growth/>

e-workers

China leads the way with the development and deployment of humanoid robots. In 2024, China invested US\$2.8 B in robotics and humanoid robots. China-based, UBTECH Robotics, have tested their humanoids at a Geely EV factory and will be trialing them at Audi in China. The cost of a humanoid factory worker is ~ US\$30,000. The number of robotics operating in China in 2022, exceeded all other global markets combined. The market for humanoids is expected to grow exponentially.

Production robots have been led by companies in Japan (Fanuc), Switzerland (ABB) and Germany (Kuka). Kuka has been owned by Chinese appliance maker, Midea, since a 2016 acquisition.

<https://www.reuters.com/technology/chinas-robot-makers-chase-tesla-deliver-humanoid-workers-2024-08-23/>

EV competition and affordability

In early 2025, EV sales and government willingness to continue to offer tax incentives to build them

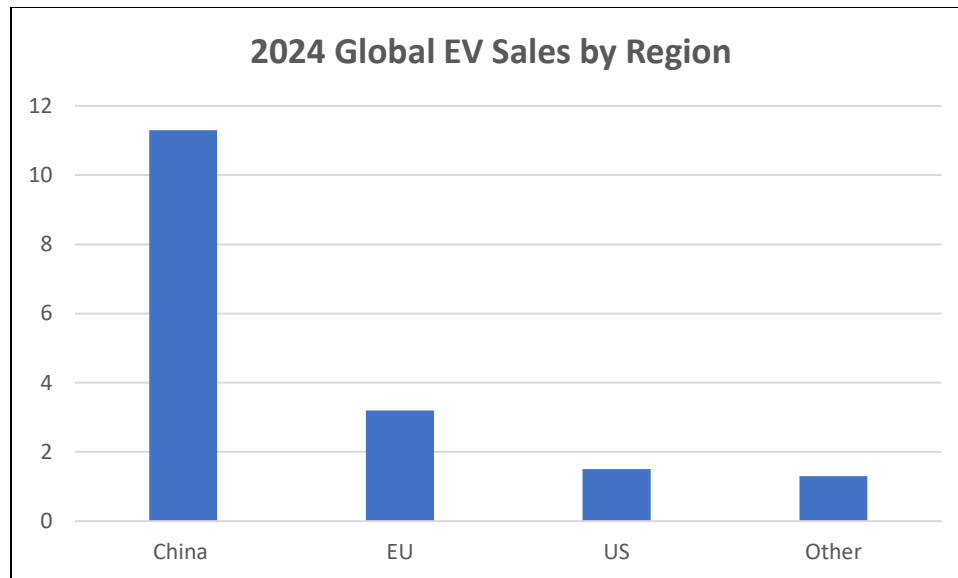
dropped off sharply. In Canada, there was a need to revisit the applicable legislation around EVs. Hybrids appear to be the affordable compromise. As EV automakers withdraw or pause their production, due to slumping sales and global tariff confusion, the EV strategies are being tested to the max.

By May 2025, it was acknowledged that \$34B investments in Canada are in financial stress. This does not include the billions of tax credits and subsidies provided by various levels of government. Northvolt has filed for bankruptcy. With all of these announcements came significant job creation, which are threatened and face further pressure from US trade war. <https://www.cbc.ca/news/canada/ev-investments-canada-facts-1.7533719>

Committed	\$B	Brand
2024	15	Honda
2023	7	VW
~~2023~~	~~7~~	~~Northvolt~~
2022	5	Stellantis

Discussions on the auto sector are important, as few sectors drive such a large part of the economy and supply chain strategies. Millions of parts come together, formed from raw materials sourced globally, and distributed through every mode of transportation for final assembly in many different countries. The countries which provide the parts and assembly benefit greatly from the increased labour, as jobs in the auto sector are higher paying and involve thousands of workers. The emissions from autos can be mitigated through design, technologies, and the types of fuels for energy. The attention of political interest is always on alert to protect their auto market revenues and taxes. For the last two decades we have seen a clash over environmental concerns and the emergence of EVs as *the* favoured solution. We have a variety of emission deadlines in 2025+. Affordability and protectionism pitted geo/political ideologies against each other. China is on one side with the US and EU on the other. China has an edge on EVs on cost advantages and capacity; while the US/EU are trying to find compromises on trade agreements and support economic growth.

The International Energy Agency provided the data for total EV sales in 2024, which included BEVs, PHEVs and EVs. The leading country is China, which sells 1 million EVs per *month*, dominated by the BYD brand. BYD’s supply chain is vertically integrated from batteries to owning the ships sending its production across the globe, focused on all emerging countries. Canada, by contrast sold ~2% of the volume China sells. China is on pace to produce 70% of global EV production. The global EV sales in 2024 were ~17 million vehicles. <https://www.iea.org/reports/global-ev-outlook-2025/executive-summary>



Most consumers cannot afford EVs and investors pulled back. PHEVs are the flavour of the day – reduced GHGs and more affordable. Battery competition by design and costs continue to evolve. Government agencies, which have sponsored EV and battery production are now faced with increased financial risks. Taxpayers, by proxy, are facing additional risks due to the EV market’s inability to make affordable vehicles for the larger mass market, made in Cda/US/EU.

As EU EV sales dropped and market uncertainty increased, in March 2025, the EU announced that emission reduction targets for 2025 have been extended to 2028. This extension adds to the uncertainty in the investor and manufacturing sectors which have based business plans on the initial 2025 targets. While the extension is understandable, it will be perceived as an advantage or disadvantage to the various EU automakers, and Chinese EV companies and their strategies.

EU and North American automakers are trying to pivot to respond to increased competition from Chinese automakers. China has the technologies, scale within its domestic market, government backing, quality, and security of critical materials. Tough competition.

The CEO of Mazda stated *“EV is absolutely important technology, and we are developing it. But [in the U.S.] EVs last year [were] about 6% of the market. This year it is 8%. And out of that 8%, 57% was Tesla. Other EVs are not taking off, inventory is piling up.”*

All automakers are vying for their share of the EV market. It is getting crowded and financially risky for the companies and the governmental programs which support the transition away from ICEs. With the push for zero emission vehicles stalling, as incentives in the form of subsidies are phased out, EVs are still unaffordable. PHEVs are a good option but are not net zero.

Affordability on the part of consumers to buy EVs and for automakers to adapt and make profits is a barrier. Canada, being a significantly smaller market, will likely see its Federal and Provincial net zero targets be revised in light of the economic barriers, as the EU did in 2025. Reducing the average temperature is the real target. Amending net zero targets may be an economic and environmental compromise but blindly staying the course would be irresponsible. <https://www.reuters.com/business/autos-transportation/biden-administration-relax-ev-rule-tailpipe-emissions-ny-times-2024-02-18/>

Canadian tariffs

In 2024, China launched a counter investigation into anti-dumping of Canada's canola. Canola is a critical part of farming revenues and will have an immediate impact on the harvest. China buys $\frac{3}{4}$ of Canada's canola crop per year.

The Federal government continues to provide massive investment subsidies to non-Chinese EV makers. Following the US position on tariffs on Chinese imports, Minister Champagne went on record about Chinese manufactured EVs saying "Canada has never been and will never be a backdoor [for] China in the North American market and our U.S. friends understand that."

Governments have had to step in and provide funding, guarantee loan repayments, pass legislation which supports EVs, and discourage imports, primarily from China. The Tesla model Y and model 3, which have been popular in Canada, as one of the limited choices, are made in Shanghai, China.

Emission targets being revised 2026

An example of the collapse of the EV market was signaled when the BC government announced it's scrapping the zero-emission mandate for new vehicle sales. The strategy has not worked and the problem of new EVs being unaffordable, combined with the 2025+ trade wars, has shown to be economically unviable.

While this decision involves a lot of political positioning by various provinces and previous federal government edicts, it brings to a close the zeal for unrealistic emission targets. The Federal government will unveil emission targets for 2026 which will not resemble previous targets. Owners of EVs may be faced with large write downs on the value of their vehicles at the end of their ownership. EV manufacturers will be scrambling to pivot to maintain profitability and likely look for government assistance.

It remains to be seen if Canada will allow Chinese EVs into the Canadian market at a reduced tariff rate. The US government will try to have influence in these decisions. <https://www.cbc.ca/news/canada/british-columbia/bc-electric-vehicle-rebates-sales-mandates-9.6984032>

The problem in Canada for increasing tariffs on import EVs is that it increases the costs for consumers. Mid-2024 EV sales were ~10% of vehicle sales, which primarily reflected early adopters buying the higher priced EVs. Making the transition to cleaner energy requires a shift to 60-70% of vehicle sales to be EVs in the next few years. Affordability is one of the biggest barriers. Competing against the Chinese EV makers in a nascent Canadian industry, supported by government subsidies is a big risk for all parties. The Chinese dominance is irrefutable in terms of lower prices, types of models, use of technology, and market share – in spite of being restricted from entering the North American market.

Canadian demand for EVs continued to fall in 2025. In an Auto Trader report, buyers were concerned with reduced government subsidies, lack of infrastructure, and long-term costs. EVs depreciate quickly in value over ICE models. <https://www.ctvnews.ca/business/autos/article/canadians-interest-in-buying-an-ev-falls-for-third-year-in-a-row-autotrader-survey/>

EU Tariffs

2025 finds the EU trying to navigate the US tariff confusion. The threats will result in some tariffs but ow

much and on which products are uncertain – and for how long they might remain in effect.

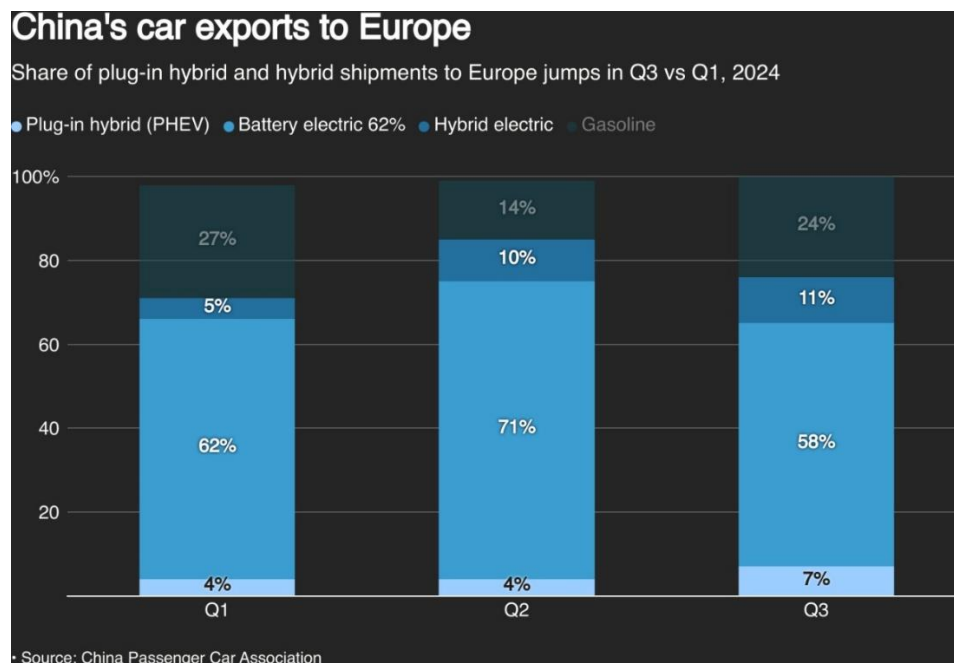
Several EU auto plants are planning to be closed with buyers from China interested in taking over the assets. EU automakers are not on track to achieve emission reductions for 2030+.

<https://www.reuters.com/business/autos-transportation/car-plants-europe-n-america-face-closures-2025-gartner-says-report-2025-01-16/>

The EU ruling on Chinese EV imports came into effect in late 2024 for a period of 5-years. Chinese EV automakers saw this as being an unfair threat to their market share. The EU voted to impose the tariffs was highly controversial within the EU commission. There are ongoing negotiations between China and the EU to seek a compromise.

The response from the China auto makers is to ramp up the sale of their hybrid models for the EU market. Tariffs on EVs do NOT apply to hybrids – which happen to be the more affordable vehicle offered by most brands. BYD, SAIC, Geely and other Chinese auto makers expect to increase hybrid sales by 20%+ in 2025. To do so, they will eat into VW and other EU brands with more models at lower prices. With tariffs on North American EVs, the EU is a great target for Chinese PHEV models.

The following graph from the Chinese Passenger Car Association shows the shift to PHEVs.



<https://www.reuters.com/business/autos-transportation/china-automakers-pivot-hybrids-europe-counter-ev-tariffs-2024-12-05/>

The EU legacy EV makers are playing catch up. The EV tariffs imposed by the EU ranged from 7.8% on Tesla to 35.3% on SAIC vehicles, on top of the usual 10% import duty. EV exports from China to EU increased dramatically in advance of the tariffs being imposed.

By late 2024, China's Ministry of Commerce advised Chinese EV makers to *"pause their heavy asset investments in the EU which backed the tariffs."* Those countries which *agreed to impose* tariffs include: Italy, France, Poland, Netherlands, Ireland, Latvia, Lithuania, Estonia, Bulgaria, and Denmark.

Those countries *against* imposing tariffs: Germany, Hungary, Malta, Slovenia, and Slovakia. The countries which *abstained*: Belgium, Croatia, Czech Republic, Greece, Spain, Cyprus, Luxembourg, Austria, Portugal, Romania, Sweden and Finland.

Notably, Norway did not impose tariffs on Chinese EVs and as a country has achieved 94% of new

vehicles sold being EVs. Chinese brands including Volvo, MG, Nio, and BYD have taken much of the market. Norway sees the Chinese EVs as driving competition and making them affordable for more consumers. <https://newseu.cgtn.com/news/2024-09-11/Norway-s-car-market-is-94-EVs-and-a-quarter-of-them-are-Chinese-1wNclmL8k8g/p.html>

The EU conducted investigations into Chinese solar power companies to see whether the subsidies allow companies to submit *overly advantageous* offers. Over capacity in the Chinese solar power sector will push out other suppliers. This has led to a lower global price at unsustainable rates for solar products. The IEA estimates that 95% of solar panels and parts are manufactured in China. EU utilities and panel installers do not support import reductions. In June 2024, Chinese solar panel manufacturers are looking for protection from their government, as they admit they have an over capacity of solar panel production. Prices on Chinese made solar panels are plummeting. <https://www.reuters.com/business/energy/china-solar-panel-manufacturers-seek-government-action-halt-freefall-prices-2024-06-12/>

The EU launched an investigation into subsidies for Chinese wind turbine suppliers who compete against the European suppliers including Vestas, Siemens Energy and Nordex. German Chancellor Scholz went on record as wanting *fair* competition without the dumping of Chinese products. The EU is also investigating Chinese manufactured medical devices. Supply chain cost pressures continue. Certainly, many health care organizations are buying the lower cost Chinese medical devices, otherwise, no need for another lengthy investigation.

Based on data from Wood Mackenzie, (6) Chinese turbine suppliers provided 66% of the ~93,000MW generated in 2023. The Chinese turbine companies have mainly sold their products in China. The other (4) EU turbine companies provided a combined total of 31,000M of power. In 2024, Germany placed its first turbine order with Chinese manufacturer Mingyang. Mingyang is the 2nd largest turbine producer. A division of the Chinese turbine company Goldwind, is going to build a turbine blade operation in Ferreira, Spain. <https://www.reuters.com/sustainability/climate-energy/chinese-wind-turbine-makers-move-into-europe-trade-tensions-flare-2024-07-19/>

France has subsidized EVs for lower income people (~Cdn \$20,000 per year) to afford to lease an EV for Cdn ~\$150 per month. In February 2024, France *paused* these subsidies as there were not enough French cars which qualified for the subsidy program. The French government had budgeted ~Cdn \$1B+ for the program. In a subtle form of protectionism, for vehicles to be eligible for the subsidy program in France, they had to be manufactured within certain tolerances as to the amount of carbon emissions which was generated in their manufacturing and shipping.

In a related case previously, the EU investigated Chinese train manufacturer CRRC Qingdao Sifang Locomotive, which ended up withdrawing from a Bulgarian tender for e-trains. The investigation could go on until November 2024. <https://www.reuters.com/business/energy/eu-opens-investigations-into-foreign-subsidies-solar-sector-2024-04-03/>

BMW, Mercedes and VW executives have gone on record as *not* supporting tariffs on Chinese EVs. They are all dependent on bilateral revenues from Chinese brands. All EVs sold in EU require Chinese manufactured parts. Tariffs or restrictions, will only to the cost for consumers. In a May 2024 Reuters interview, Stellantis CEO Tavares, stated "*When you fight against the competition to absorb 30% of cost competitiveness edge in favour of the Chinese, there are social consequences. But the governments, the governments of Europe, they don't want to face that reality right now,*" Tavares said. Tavares said that *tariffs would only fuel inflation in the regions where they are imposed, potentially impacting sales and production.* Tavares has gone on record as saying that Stellantis must cost its supply chain and production costs to be competitive.

In late 2024, China retaliated by adding import tariffs on EU pork, dairy, and brandy as well as an

antidumping investigation. This tariff tiff will add billions of dollars in additional costs to consumers across the EU and in China.

There is a lot of complexity in the EU where China's EV makers are joint venture partners with many EU legacy EV brands. The negotiations will require diplomacy. The provenance of auto parts and labour will get a deeper dive by bureaucrats in all countries. The tariffs are being referred to as an economic cold war.

The Chinese tariffs on EU goods involve Cdn ~\$ 50B per year. Germany which has been hit hard by slumping vehicle sales will have an additional burden to bear on its finances as exports to China will be impacted by the tariffs. Tariffs will include a wide variety of products such as vehicles, pharmaceuticals, cosmetics, aircraft, leather, footwear, copper, a wide variety of agriculture products, and semi-conductors.

The chart below shows the value of the affected goods from 5 of the EU countries, using 2023 data from Chinese governmental customs records.

<https://www.reuters.com/business/autos-transportation/eu-slaps-tariffs-chinese-evs-risking-beijing-payback-2024-10-29/>

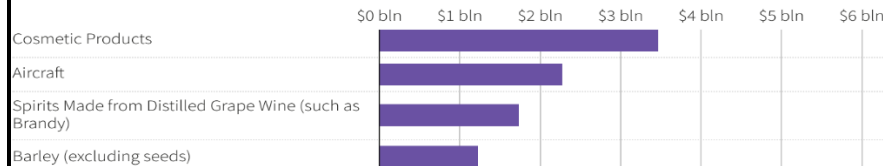
China's top imports by value from major EU nations

2023 annual data

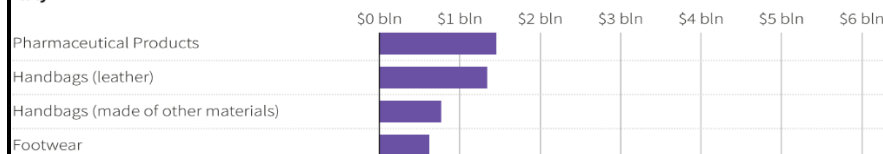
Germany



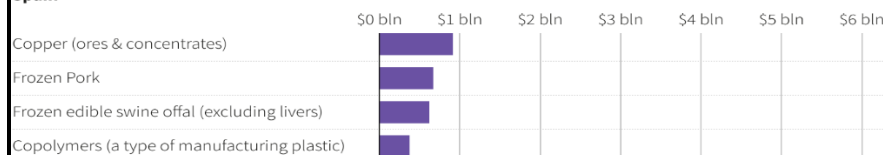
France



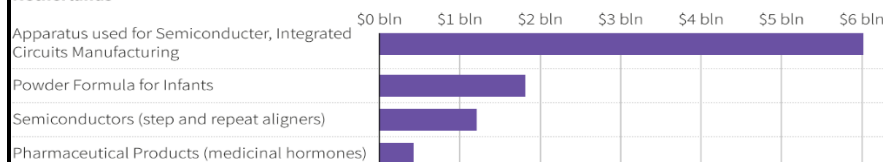
Italy



Spain



Netherlands



Source: China Customs | Reuters, Sept. 13, 2024

US Tariffs

The US government *illegally* imposed arbitrary tariffs on Canada, and Mexico in March 2025, despite having trade agreements, such as CUSMA, in place. China was also hit with tariffs. The US used false claims about border security, allowing drugs and aliens to enter the US, and trade deficits, as part of their rationale. The resulting trade and financial chaos, investment uncertainty, and lack of trust between former trading partners, will echo for decades. This is a very fluid situation and speculation on outcomes would be irresponsible on my part at this time.

An example of the confusion around US tariffs - the US told any country importing gas or oil from Venezuela in March 2025, they would face a 25% tariff for doing so. The US revoked permission for Chevron to bring oil into the US from Venezuela in February 2025. In an about face, in July 2025 the US granted Chevron permission to resume producing oil in Venezuela and ship into the US.

<https://www.argusmedia.com/en/news-and-insights/latest-market-news/2714041-venezuela-oil-may-re-enter-us-market-update>

Tariffs as a form of penalty

Tariffs are essentially a form of taxation on imported goods between countries, which most economists, based on history, see as being regressive. In 2025, the USA is trying to reverse the course with the perceived problems its economic and manufacturing policies created 35-40 years ago. Then, ownership and major investors in industry exported jobs and production to the lowest cost countries, that were ideologically acceptable to the US. Political support through trade agreements allowed for this transition to occur. The winning bid for iconic US Steel was made by Japan's Nippon Steel in 2024. The political optics of having US Steel become foreign owned is too embarrassing for a US government. Tax cuts will be applied to US Steel in 2025, to try and save the company founded by JP Morgan and Andrew Carnegie.

Made in the USA began to disappear on many retail and industrial goods from the late 1970s onward. Mexico and Japan were initial winners and began to supply vehicles, parts, appliances, and electronics back to the US. This US policy continued to expand in Asia. China joined the WTO in 2001 and has grown into a global economic power. Now, US politicians and some businesses are saying this unfair competition of low-cost goods has to stop. If the transition away from US manufactured goods took time; repatriating the jobs and economic benefits will also take time. Tariffs are the quick fix of applying a bandage to a hemorrhage.

It is highly doubtful that a US-based company would build phones again within the USA. This was tried by Motorola a decade ago with its *Made in the USA* tagline. It was a financial disaster. Motorola assembled phone in the US briefly but all parts were imported. It proved too difficult to attract qualified staff; overcome costly logistics; provide job training and staff retention; and fierce competition.

https://www.cnn.com/2025/08/04/tech/smartphones-made-in-the-us-motorola-tariffs?cid=ios_app

In 2025, the US decided to impose tariffs on most goods imported into the US, including those from Canada. Trade between Canada and the US will be tied to other US political objectives such as illegal immigration and drugs. It remains to be seen what the actual tariffs will be on which products, and how these will be affected. The US president thought that CUSMA was the best deal "ever in our history" when it came into effect; and in 2025, he says CUSMA is terrible and the US got short changed.

The proposed changes in the US strategy interjects additional financial risks for many companies which geared up for US/Canadian-made EVs, which did not materialize, due to lack of affordability. The US is doubling down on protectionism, as they admit the Chinese EVs and other technology advancements have beat the US in the market to this point. The removal of US governmental EV subsidy programs will increase consumers pricing and could put several US-based EV makers into deeper financial problems. While reducing subsidies will impact Tesla, Tesla being an established US EV producer, will not face the same economic consequences of the policy reversal as its competitors. <https://www.reuters.com/business/autos-transportation/trump-transition-team-plans-sweeping-rollback-biden-ev-emissions-policies-2024-12-16/>

A list of the products affected by the 2025 US tariffs can be reviewed at: <https://www.canada.ca/en/department-finance/news/2025/02/list-of-products-from-the-united-states-subject-to-25-per-cent-tariffs-effective-february-4-2025.html>

Pros for tariffs on goods going into the US

- Protect domestic industries – can lead to complacency and the lack of innovation by US companies. One key cost advantage of emerging economies is their lower labour rates to produce similar goods.
- Penalize foreign companies where unfair subsidies or dumping is supported by their government – dumping is illegal but requires lengthy investigations to prove damage.
- Support domestic political agendas such as curbing illegal immigration or drug trade – a bargaining chip during ongoing negotiations. US demand for drugs has gone on unabated for

years.

- Foreign companies may have to reduce their pricing in order to ship into the US, which reduces the exporter's profits – in the long-term, it may not do anything other than add to US consumer costs.
- Encourage foreign countries to buy more US products – this is unlikely to make any difference on consumer products being exported out of the US. There is a leveraging opportunity to have more countries buy energy from the US in the form of LNG to offset trade imbalances.
- Inflict harm without requiring military resources by imposing restrictive tariffs – a risky tactic and makes the BRICS group of countries look more welcoming as trading partners to those opposed to US impositions.

Cons with US tariffs

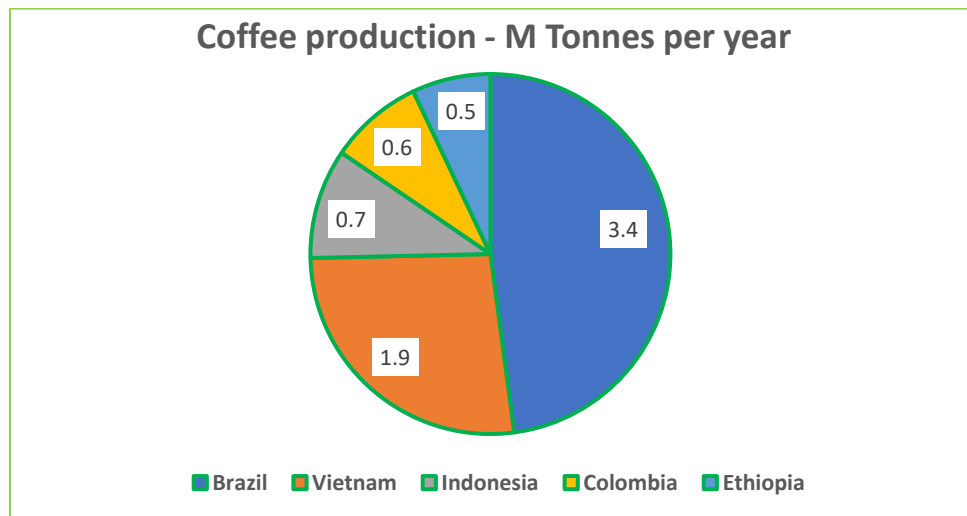
- While the US Treasury collects tariff fees, the increased costs are borne by the US importer in their cost of goods to consumers at higher prices. US brands such as Nike depend on Vietnam and SE Asia for low-cost production, which benefits US consumers. Other brands such as Adidas, Lululemon, Columbia, Amer, and Arc'teryx are in a similar situation. These brands relocated from China a few years ago due to pressure to move their production out of China.
- Smaller countries which have been selling to the US, do not have enough buying power to buy more goods from the US, such as Vietnam or Cambodia. This creates social and economic pressures within these SE Asian countries. For example, Vietnam has a ~US \$120B surplus with the US. If the US wants to expand into hotels in Vietnam, that could be a means of addressing tariff problems. China is a major economic player in Vietnam and SE Asia currently.
<https://www.reuters.com/business/retail-consumer/us-tariffs-vietnam-would-be-blow-nike-other-sportswear-brands-2025-04-01/>
- Tariffs lead to retaliations, often placed on emotions. The World Bank found that taxes on steel imports during the first Trump administration, barely made any difference on employment to the 140,000 US steel workers; Walmart employs 1.6M Americans by comparison. Retaliatory tariffs by China on US agriculture exports required the US government to financially support US farmers.
- The disruption to global supply chains is an unknown cost at this time. As the tariffs are changing daily as to rates and which commodities, it can't be predicted what the long-term will look like. The US stock market, which is one indicator of US wealth, has been hammered. In the short-term, trillions of dollars were lost. The US tariff tactics will continue to be revised as economic shocks are assessed.
- The complexity of supply chains has created foreign companies which specialize in various component manufacturing or technologies. These companies are under contracts with US importers and manufacturers. Again, difficult to quickly undo – tariffs will be incurred.

Impact on Canadian Imports by US tariffs

As reported in the Report on Business, May 2025, by Maria Postelnyak, shipments to the US have been rerouted to Canada. Products such as FMCG, chemicals and automotive supplies are being warehoused in large volumes. Part of the rationale is to hold shipments temporarily in storage in the hope that tariffs will be rolled back by the US. However, there are considerable risks such as storage costs exceeding tariffs; seasonal goods have a short life; limited storage capacity; threats to existing Canadian manufacturers of like goods; and deep discounting in order to sell off inventories.

Using our everyday consumption of coffees, much of which comes from emerging economies, we see the potential impact of inflation on this commodity. There are ~76 countries which export coffees. Brazil, being the highest producer, will be hit with 10% tariffs on imports into the USA. While Vietnam,

as the 2nd highest producer, will face 46% tariffs on coffee beans. *Data source: UN Food and Agriculture, 2025.*



To emerging economies, the social and economic impacts will take several months to be felt. Most exporters/importers filled their pipelines with more orders to avoid tariffs. By late summer there could be a more accurate sense of the cost of inflation to US consumers and other countries around the globe. In late August of 2025, the “buying season” traditionally begins with US companies placing millions in orders with foreign companies. There are no short term means to have anything of significance made in the USA within a few months – and in the end, it could be reversed. China and its BRICS partners are able to adapt more quickly than western democracies. This is a wild card to be played.

In September 2025, the African Growth and Opportunity Act (AGOA) is due for renewal by the USA. Several of the 32 member countries have been targeted with tariffs of 50%. The AGOA has been in place for 25-years and has contributed to the economic development by the member countries. Whether the AGOA will be renewed adds to the angst of the emerging economies which need the ability to export to the US at competitive rates. https://www.dw.com/en/what-happens-if-trump-trashes-the-agoa-pact/a-72274345?maca=en-newsletter_en_bulletin-2097-xml-newsletter&at_medium=Newsletter&at_campaign=EN%2020Daily%20Bulletin&at_dw_language=en&at_number=20250421&r=7373402280018818&lid=3402818&pm_in=292587-%

Not to be left out, Australia’s Prime Minister Albanese announced its *Future Made in Australia Act* to provide subsidies for renewable energy and related manufacturing. This will encourage government buyers to support local business, incentives for investors and legislative amendments to accelerate projects. The Reuters report went on to say that this was not a return to protectionism or isolationism but a new form of competition. The value of the Act was ~Cdn \$18B over 10-years. Australia also declared nickel as a critical material which allows Australian mining companies access to low-cost loans to open mines to reduce imported nickel from Indonesia.

Trade agreements cover a wide range of goods and services. The *rules of origin* determine what if any tariffs may apply to exported goods. The Canada Border Services Agency follows the rules of origin which set out how much production must occur in Canada or in another country for the goods to be considered "originating in" that foreign country and entitled to a specific tariff treatment. This ensures that zero or reduced duty rates are only applied to countries with a Canadian trade agreement.

Rules of Origin

Proof of origin claims for preferential tariff treatment must be supported by the proof of origin required by the [Proof of Origin of Imported Goods Regulations](#). Depending on the goods and tariff treatment, proof of origin may be one of the following:

- a certificate of origin in a prescribed format
- an exporter's statement of origin
- an origin declaration
- a certification of origin containing minimum data elements in no prescribed format

The importer must have valid proof of origin in their possession at the time of accounting to be provided to the CBSA upon request.

Under the **CUSMA**, the importer, exporter or producer certifies the origin with a **set of minimum data elements**. This can be provided electronically, on an invoice or any other document. The customs administration of the **country of import** performs verifications by communicating with the importer, exporter or producer of the goods.

Under the **CEFTA, CETA and CUFTA**, the exporter certifies the origin with an **origin declaration**. This can be provided electronically, on an invoice or any commercial document that describes the originating product in sufficient detail to enable its identification. The customs administration of the **country of export** performs verifications on behalf of the country of import.

Under the **CPTPP**, the importer, exporter or producer certifies the origin with a **set of minimum data requirements**. This can be provided electronically or on any commercial document. If an invoice was issued in a non-Party to the CPTPP, the certification of origin must be provided separately from the invoice. The customs administration of the **country of import** performs verifications by communicating with the importer, exporter or producer of the goods.

Chinese EV Competition

China has demonstrated how *the cat fish* effect impacts a market. The cat fish effect refers to how a leader in any market, pushes weaker competitors to raise their game. We see this in the global competition with EVs. EV sales in China went from 6% of car sales in 2020 to ~50% by the end of 2024. EU, Canada, and US automakers are scrambling to close the gap in production and costs.

The over achiever in the Chinese EV market is BYD. They succeeded in being the world's largest car seller by 2025. BYD's 2024- 4th quarter profit jumped 73% to US\$2 B. The *grain of salt* with the number of reported Chinese vehicle sales is the exporting of new cars as used cars. This skews the new car sales volumes as China ships out surplus vehicles with *zero-mileage*. Zero-mileage vehicles are new vehicles. This practice meant that 90% of the exported 400,000 used vehicles, in 2024, were zero-mileage.

<https://www.msn.com/en-ca/money/other/exclusive-local-chinese-governments-promote-zero-mileage-used-car-exports-inflating-sales-growth-figures/ar-AA1HizL5>

The domestic auto market in China has changed dramatically since 2019. In 2019 only 38% of the vehicles in China were made by a Chinese producer. By mid-2024, that has shifted to 56%. While the source of this data is *the China Association of Automobile Manufacturers*, it is probably accurate given the market losses by legacy brands from the EU and US which were selling ICE vehicles to China for many years and lost their hold. China owns the global EV market at present.

A 2025 report by Reuters, recaps the drop in foreign vehicle sales in China from 2020 to the end of 2024. VW down 22%; Toyota flat; Honda down 50%; GM down 65%; Nissan down 50%; and Porsche down 50%. All the while, Chinese brand domestic sales are taking the market.

With the 2025 trade wars in EU and the USA, Chinese auto makers are shifting to South Africa. Brands include BYD, Changan, Chery, Dayun, DongFeng, Great Wall, Leapmotor, and Omoda & Jaecoo selling and assembling hybrids and PHEVs in the market – not EVs, as there is a lack of infrastructure.

<https://www.reuters.com/business/autos-transportation/facing-global-headwinds-chinese-automakers-make-play-africa-2025-06-26/>

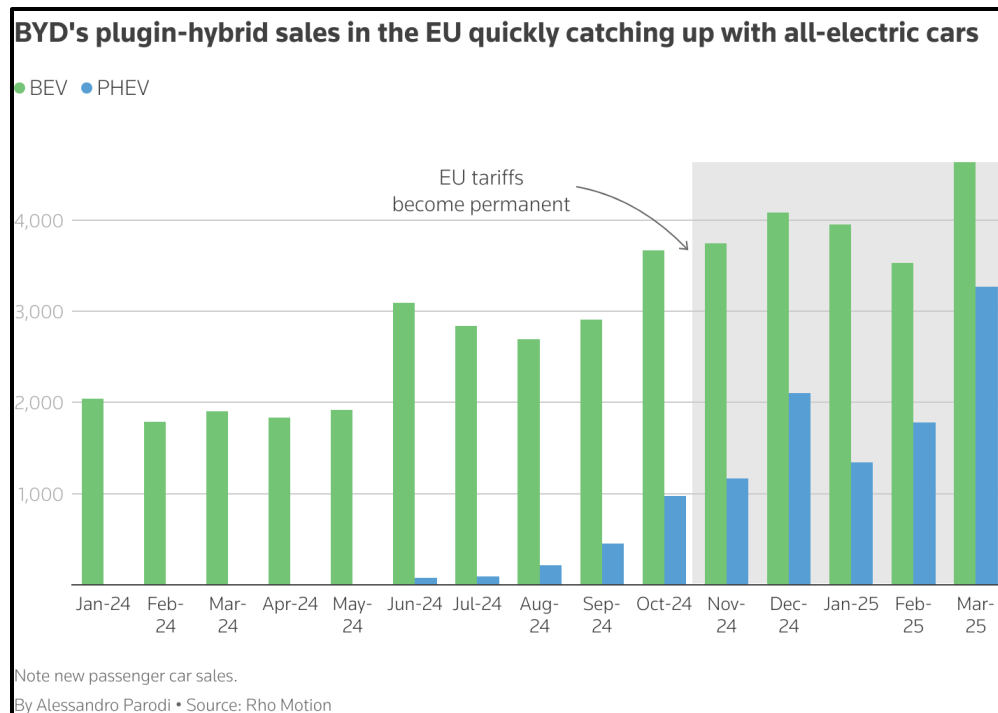
Reuters outlined the Chinese strategy of winning the EU market. Marketing tactics, used by all of the legacy car makers, such as sponsoring major sporting events, expanded dealer networks, leasing options for resale values, warranty protection, parts availability, partnering with EU existing brand dealers, and sufficient servicing and repair outlets. Safety ratings being improved to meet EU requirements. Fleet buyers want the brand support to be widely available if they are going to buy Chinese brand vehicles. While Chinese imports to the EU have been adapted for the market, they are now investing in designing for the EU. With deep pockets backed by the Chinese state government, generating profits quickly is not an immediate concern in their long-term strategy.

Another unusual partnering is taking place in 2024 with Renault relaunching its Twingo EV vehicle. Renault is working with a Chinese engineering company to bring the Twingo to market faster with a target price of ~Cdn\$ 28,000.

Europe continues to be a hot spot for Chinese EV automakers. **Chery** is moving into Italy, Spain, UK, and Poland with lower priced EVs in 2024. Chery and **BYD** are concurrently setting up production facilities in Vietnam and Spain – Spain initiated the talks with Chery to take over an idle Nissan plant which was shuttered in 2021. Chery is going to use their Barcelona facility to produce 150,000 vehicles per year for export by 2029 in a joint venture with Spanish company Ebro-EV Motors. Chery will make EVs and ICE models. Stellantis, which has a production facility in Italy is concerned about its market share if Chery increases EV production in Italy. Interesting negotiations for the parties involved. Stellantis partner, Leapmotor is shipping semi-knocked down (SKD) EV car kits to Poland for assembly. Leapmotor is also moving into the German, French, Spanish and Italian lower end EV markets. While EU governments are concerned that Chinese government EV subsidies may be unfair, it will be a difficult problem to defend the EU subsidies to EU EV automakers and say that Chinese subsidies are unfair.

Due to tariffs, BYD, Chery, and SAIC pivoted to the PHEVs and away from their EV models in 2025. Their EU sales have eaten the Tesla market. While BEVs are subject to a 27% EU tariff, PHEVs are only at 10%.

<https://www.reuters.com/business/autos-transportation/chinese-ev-makers-sell-more-plugin-hybrids-eu-avoid-tariffs-research-firm-says-2025-05-01/>

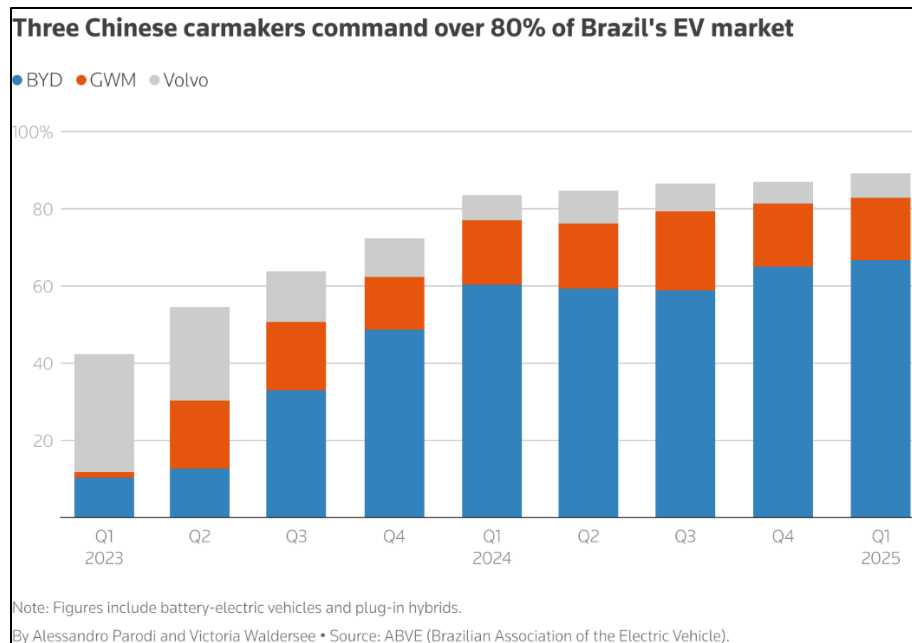


In 2024, Chinese automaker **SAIC** Motor Corp. began exporting more than 1.3 million EVs and will increase to 1.5 million EVs in 2025. SAIC sells into the South East Asia, Mexico, South America and Europe, with plans to build a plant in Europe. Chinese automakers are more vertically integrated in their supply chain than other EU rivals. The integration allows for lower production costs, closely tied to demand.

Car wars include the subsidy probe in EU with Chinese EV imports and the call for increased protection for US manufactured EVs. VW has partnered with Chinese automaker Xpeng in a similar game plan to Stellantis with Leapmotor. Drive down costs and increase global markets. For Stellantis and VW, it's a sign that trying to compete against the innovative and low-cost Chinese brands is not working. Buying into their ownership keeps cash flows and investment opportunities alive. VW would brand the Xpeng but the essential design and technology is from Xpeng. A cost reduction of 40% is part of the strategy between VW and **Xpeng** for the Chinese EV market. VW is also partnering with the other major Chinese EV automaker SAIC. In 2025 Leapmotor produced an EV priced at Cdn \$29,000 while BYD is sold one EV model at Cdn \$15,000! Some electric bicycles cost as much as \$2500 in Canada.

China's success in the EV market has led to their ordering 47 more car-carrying ships to meet their export demand. The buyers include SAIC, Chery, BYD, COSCO and other major transportation companies. This investment reflects the comments from Chinese officials that a large part of China's EV competitiveness is founded in its connected supply chain and logistics systems.

In Canada, EVs account for only ~10% of the new car sales and is dropping. BYD is producing EVs in Europe, Australia, USA, Brazil, India and is selling into Japan and Indonesia. BYD opened its first EV factory in Thailand in 2024. Brazil is the largest Chinese new energy vehicle market, surpassing Belgium in mid-2024. BYD sales account for most of Brazil's EV market. <https://www.reuters.com/business/finance/china-floods-brazil-with-cheap-evs-triggering-backlash-2025-06-19/>



Shortly after BYD opened in Thailand in 2024, other factories began to close. They could not compete with the lower cost BYD imported vehicles. Thailand has imposed a 7% tax on Chinese imports but not a tariff. Thailand has lost ~50,000 jobs over the past year as many industries cannot compete with imports. <https://www.reuters.com/markets/asia/thai-economy-faces-upheaval-due-factory-closures-cheap-chinese-imports-2024-07-14/>

BYD is building an EV charging network in 8 major cities in Brazil beginning in 2024, with 600 charging stations. BYD sees Brazil and Latin America as big investment opportunities. BYD has been using a Chinese contractor to build factories outside of China. The contractor, Jinjiang Group, was charged with human trafficking, illegal working conditions, and the use of forced labour, in Brazil. BYD and Jinjiang deny the claims. Jinjiang does bring Chinese workers into Brazil for construction and may be displacing local workers in other BYD sites. <https://www.reuters.com/business/autos-transportation/chinese-workers-byd-brazil-factory-signed-contracts-with-abusive-clauses-2025-01-31/>

BYD announced it is opening production facilities in Hungary. BYD is opening production of EV trucks in Mexico in May 2024 with the sale of the Shark model – only for sales in Mexico to challenge Ford and GM. Both these locations give greater access to more *free trade* access to EV customers within recognized trading blocs. The BYD plant in Mexico could allow their highly competitive EVs to enter the Canadian and US markets through the CUSMA agreement. This also reduces import tariffs for BYD by being part of the CUSMA bloc. Import tariffs on BYDs run ~27% which makes them less competitive than vehicles made by existing companies located within the CUSMA countries. This loophole in CUSMA is being closed by the US government in concert with Canada.

BYD, SAIC, and **Great Wall Motor** are all expanding into Europe and are taking increased market share. Great Wall has been producing vehicles in Russia since 2019 and is expanding production along with its rival Chery. BYD is building a major facility in Hungary. They have an affordable EV that could sell for less than Cdn \$30,000. Hungary is an important trading partner with China. In mid-2025 BYD announced a delay in production in Hungary and is shifting production to Turkey. BYD is trying to find a balance between lower labour costs in Turkey and facing EU tariffs. <https://cnevpost.com/2025/07/22/byd-to-delay-mass-production-hungary-plant/>

Another Chinese EV maker, **Aiways**, also agreed to merge with US special purpose acquisition company (SPAC), Hudson Acquisition Corp. Aiways has been selling its EVs in the EU. The intent is to provide funds for Aiways as it struggles to survive in the Chinese domestic market. Hudson is a US-based investment company.

Within the Chinese domestic market there is increased competition between Chinese EV makers. In May 2024, **Nio** revealed it is launching its Onvo L60 SUV targeting a 12% lower price than the Tesla Y. Onvo EVs will use BYD batteries to reduce supply costs and swap out batteries at ~1000 stations and be able to access 25,000 chargers. Nio will sell into the EU, in spite of the ongoing EU tariffs in late 2025 with its competitively priced Firefly, aimed at Mercedes and BMW products. Other Chinese EVs in financial trouble are WM and Human Horizons which have suspended production due to the price wars.

To add further competition to the EV market is CATL the battery and energy storage company out of China. It's founder Zeng, has plans for an EV chassis designed by CATL with a battery integrated into the frame to prevent damage, and a range of 800 Kms on a single charge. Zeng estimated that the EV chassis from CATL would reduce development cost to a breakeven of only 10,000 EVs to be sold. CATL is not wanting to get into the EV production, only provide the EV chassis to existing EV makers. Similar to the role of Magna over the past decades in the North American market for ICE vehicles. Ready to make EV designs are not new and were introduced by Xpeng and engineering firm Launch Design.

CATL developed its EVOGO battery exchange services. EV batteries can be swapped out in minutes. Nio implemented the battery swap convenience for Chinese customers. CATL is building out EVOGO charging stations across China. <https://www.reuters.com/business/energy/catl-says-it-will-build-over-1000-battery-swapping-stations-2025-2024-12-18/>

EV strategies 2025+

EV demand by brands

EV automakers are running in circles as to how to respond to the shift away from EVs by the US government in 2025. A decade of investment is in danger of being lost in production and for investors with the whipsaw approach being directed by US officials against EV vehicles. Mandates include that production be done in the US or face tariffs which make imported vehicles unaffordable. Canada will have to follow the US and could not be seen to be importing foreign EVs and allowing them to be shipped into the US.

Hybrid vehicles sales increased dramatically over EV sales in 2024. EVs have proven to be too costly for consumers and the charging networks are not available enough to support larger demands. Hybrids are an affordable option. Toyota hybrids cost about the same as their ICE vehicles. Ford's F-150 hybrids are competitive with the F-150 ICE models. Ford delayed further EV production as it continues to lose billions and will push for more hybrid models. Hybrid versions provide a hedge for changes in government legislation around emission targets.

According to Statistics Canada, in the 2nd Q of 2024, ZEVs comprised 12.9% of all new motor vehicle sales, which is up from 10.1% from the 2nd Q of 2023. PHEV models were the highest increase in sales. Hitting the 20% target of all new vehicles being a ZEV by 2026 will be a struggle.

<https://www.reuters.com/business/autos-transportation/why-fords-three-row-electric-personal-bullet-train-suv-went-off-rails-2024-08-22/>

Houston, we have a problem. By late 2024 we saw cracks and chasms in the all-EV roll outs by many brands. Fully electric EVs are not what the consumer wants due to affordability. Investors in EU are seeing massive losses in share values at GM, VW, BMW, Mercedes, Renault and Stellantis. The losses range from 29-50% from highs earlier this year. The competition from Chinese brands and the affordability factor of EU made vehicles is weighing down the stocks. North America is not immune to this type of investor remorse.

By late 2025, EVs are being unplugged across North America and in the EU. In Canada, 50% of the approved 2024 EV projects and plans have collapsed, with the losses in the billions of dollars. There are always exceptions, but unaffordability without heavy government subsidies has popped the EV bubble. Gabriel Friedman provided good insights in her October 24 2025 article in the Financial Post. <https://financialpost.com/author/gfriedmanpostmedia/>

A Reuters' report and other research provided a synopsis of the EV automaker strategies and concerns.

Audi (a division of VW) is partnering with Chinese EV maker SAIC to develop new vehicle designs to reduce the *time-to-market* by 30% in order to be more competitive. Audi expect the new vehicles to be on the market within a year. Chinese and EU car makers are becoming more integrated with designs and co-production facilities as competition continues to rise and will be another negotiation point for protectionist policies. Audi is considering ending production of the Q8 e-tron EV model at its Brussels plant and laying off workers in late 2024. Audi is struggling financially at the end of 2024 and has planned layoffs for 2025.

BMW In 2024, BMW is building new battery assembly plants in Germany, Hungary, US, Mexico and China to provide in-country access to key components for its vehicle production. In late 2024, BMW, VW, Renault, and the Italian government are wanting the EU regulations on banning new fossil-fuel powered vehicles by 2035 to be delayed and reviewed. BMW say that the current path requires increased dependency on Chinese made batteries and components. <https://www.reuters.com/business/autos-transportation/bmw-ceo-says-europe-must-cancel-ban-petrol-engines-reduce-reliance-china-2024-10-15/>

Ford Motors is reducing its investments in EVs from 30% down to 40% and increasing hybrid production. Ford also stopped planning for an e-SUV model and delaying an e-F150 model. Ford is using Chinese CATL battery technology. Using CATL technology has created political concerns. In late 2024 Ford stock prices fell 5% due to a Morgan Stanley report citing the market conditions with high inventories, falling prices, and weakening demand. Ford reported lower domestic sales in Q3 2024. Ford will pause production of its Lightning EV pickup for 6-weeks in late 2024. Ford is planning further layoffs in the EU as EV sales decline sharply with a lack of government incentives.

GM cut its EV production forecasts and declined to commit to its 1 M EVs by the end of 2025. GM stock fell as a result negative report from Morgan Stanley in late 2024 due to poor market conditions. GM and **Hyundai** have agreed to a non-binding agreement to collaborate on vehicle designs, supply chain strategies for sourcing steel and battery materials, and clean-energy technologies to reduce costs. GM is looking at utilizing CATL technology at a US-based plant operated by Japanese owned TDK. GM invested ~Cdn \$ 800M into a joint venture with Canadian mining company, *Lithium Americas*, in late 2024 to access lithium in Nevada. GM domestic sales continued to slide in Q3 2024. GM is projected to lose ~US\$ 2B by 2025 on its *Cruise* models with EV losses to add another US\$2B in 2025. In late 2024 GM wrote off US\$ 5B from its joint ventures in China and is exiting its robotaxi investments. <https://www.reuters.com/markets/deals/gm-sell-its-stake-michigan-battery-plant-lg-energy-solution-2024-12-02/>

Honda is planning a new line of EVs using solid-state batteries, replacing the lithium-ion design. Solid-

state batteries will increase the driving distance; reduce battery size by 50%; reduce battery weight by 35%; and costs by 25% by 2030. Honda will focus on the hybrid market as EVs are not growing in the auto market. Hybrids, as most auto makers are seeing, is the reasonable tradeoff between ICE and EVs. Honda will build its Civic model, which was originally slated to be built in Mexico, in the US, due to the 2025 tariffs. <https://www.reuters.com/business/autos-transportation/japans-honda-scale-back-electric-vehicles-concentrate-hybrids-2025-05-20/>

Hyundai is moving towards more hybrids as EV sales sagged in 2024. Together with its affiliate **Kia**, they see hybrids as a more affordable option for customers. Hyundai expects to increase hybrid sales by 40% by 2028. To achieve their hybrid targets, Hyundai is shifting production to its extended-range electric vehicle (EREV). The EREV has a larger battery pack than current hybrids and runs on electricity, using its ICE to recharge the battery. Its EREVs are slated for 2026 in North America and China. EREVs having a driving range of ~900 kms. Hyundai had been posting record profits in early 2024. Kia has been producing EVs in China. In 2025, Hyundai is slowing EV production in Korea as US tariffs curb the demand. Hyundai announced a US\$21B investment in US operations. <https://www.reuters.com/business/autos-transportation/south-koreas-hyundai-unveil-20-billion-investment-us-cnbc-report-says-2025-03-24/>

3-Row EVs are becoming one of the more popular designs. Hyundai is accelerating the production of 3-row EV SUVs for the North American and Korean markets. 3-row EVs are replacing the conventional minivan designs. Kia, GM, Lucid, Rivian, Tesla Y, VinFast, and Volvo are all bringing out 3-row EVs for 2025. Ford did not continue with the 3-row EV and shifted to the hybrid model designs.

In early 2024, **Mercedes-Benz** stated that its EVs and hybrids would only comprise 50% of their production by 2030, which is 5-years later than its 2021 commitments. It also reduced battery capacities to try and sync with declining sales. Mercedes is going to continue to manufacture ICE models for the next decade, according to CEO Ola Kaelleni, in February 2024. Mercedes will be challenged in the EU with the Chinese Nio Firefly model. Mercedes reiterated in 2025 they are going to focus more on ICE vehicles in hybrid models than fully electric.

Nissan completely missed the hybrid market and sales are diving in the US and China. In 2025, Nissan planned to cut capacity by 20%, and find Cdn\$ 3B in cost savings. Nissan bet all-in on EVs which proved to be a financial disaster. Nissan terminated its US\$1B investment in an EV battery in Japan in early 2025, as it tries to remain solvent. Nissan has laid off 15% of its total # of employees and is closing plants. Nissan supplier Marelli, filed for bankruptcy in early 2025. Marelli is part of the US global investment firm KKR. Nissan began deferring payments, up to two months in some cases, to key suppliers in mid-2025 to conserve cash. Nissan began talks with Foxconn to produce EVs as a means of maintaining production. Nissan reported a Q1 2025 profit loss of ~\$500M as it continued to struggle. Nissan put up its headquarters in Yokohama for sale with KKR being the high bidder. KKR would then lease back the headquarters to Nissan, as Nissan tries to stay solvent. <https://www.japantimes.co.jp/business/2025/08/21/kkr-frontrunner-nissan-hq/>

Porsche is only committing to 80% all electric vehicles by 2030 if demand can justify the investment. Porsche sales in China dropped ~30% over 2024. Porsche is controlled by VW.

Renault is back pedaling on its 2022 EV commitments and is considering EVs and ICE vehicles for another decade. Well beyond 2030 targets. Renaults has seen higher hybrid vehicle sales in mid-2024 as EVs sales decline, due to affordability. Hybrid sales were 25% of the Renault brand sales in 2023 and are 35% in 2024. Renault has introduced a new type of low-cost transmission which can be used in different hybrid vehicle models reducing costs and weight. As Renault cuts back on EVs their hybrids are winning market share from its EU competitors in late 2024.

The EU CO emission targets limit emissions to *94 grams per kilometer* for 2025. Renault's hybrids are

now down to 95 grams per Km; Ford and VW average 123 and 124 grams respectively.

<https://www.reuters.com/business/autos-transportation/low-cost-hybrid-tech-gives-renault-breathing-space-tough-ev-transition-2024-10-14/>

Rivian's sales E-truck sales have fallen dramatically and their ramp up costs grew in 2024. Rivian has been looking at its supplier sourcing options and facility locations to reduce production costs. Whether this brand will be sustainable economically, remains to be seen. In April 2024, Rivian announced further layoffs to protect its gross margin as EV sales slow due to affordability with ICE alternatives. Amazon is a major buyer of Rivian vehicles and investor. In August 2024, Rivian experienced a parts shortage on top of software problems and had to reduce its electric delivery van production. This will have a ripple effect with Amazon. Amazon owns 16% of Rivian and has ordered 100,000 electric delivery vans for deployment by 2030. That volume requires an average product of 1300+ units per month. In late 2024 Rivian's stock value fell ~6%. By late 2024 Rivian required a further investment from VW as part of their joint venture. In early 2025, VW and Rivian agreed to a partnership to invest in a shared software designed vehicle platform (SDVP) to reduce upstream costs for future vehicles.

<https://rivian.com/newsroom/article/rivian-and-volkswagen-group-announce-plans-for-joint-venture>

Stellantis stopped production of its Fiat EV for a month in late 2024, due to slow demand. In mid-2024, Stellantis changed direction to focus on its *mild hybrid vehicles*. These are cars without a plug and use a 48-volt battery, a dual-clutch with a braking energy-recovery system. According to Stellantis, it has a similar CO₂ benefit at a lower cost. The range of this design is ~1 KM in pure electric mode vs 80 Kms for the plug-in hybrid models. In late 2024, Stellantis saw output decline by ~40% at its Italian factories. Its US sales continued to drop in Q3 2024. Stellantis North American models include Chrysler, Dodge, Fiat, Jeep, Maserati, and Ram.

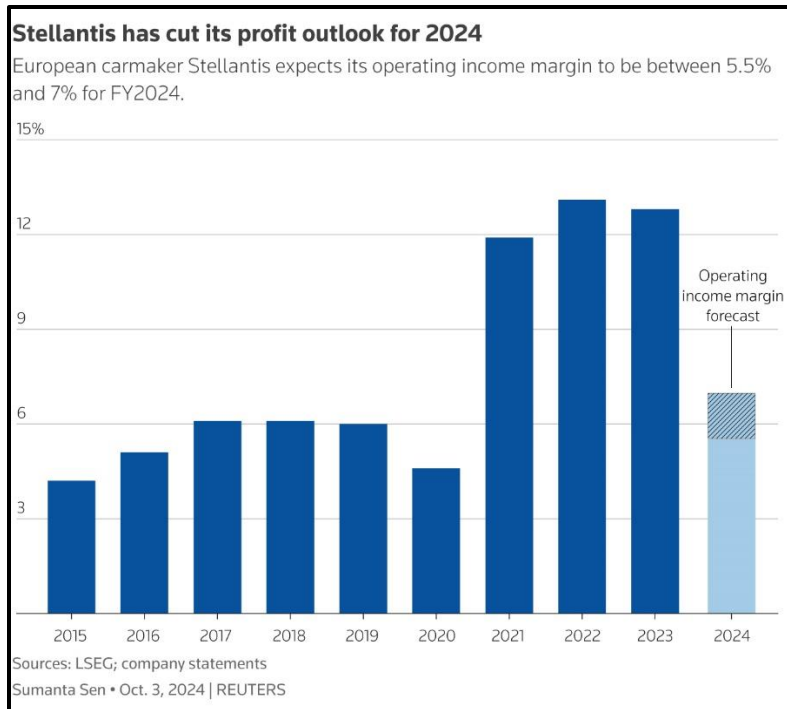
Under the supply chain strategy of "if you can't beat 'em, buy 'em" Stellantis controls 51% of the smaller Chinese EV automaker, Leapmotor International. This gives Stellantis increased access to the Chinese market and opens up access for Chinese made EVs into EU and North America.

These types of partnerships will likely shake out the race-to-the-bottom price wars between the various EV brands. Stellantis EVs are made in China and assembled in Poland, selling for ~Cdn \$ 30,000. Leapmotor has launched sales of its SUV model in Malaysia in late 2024. Stellantis share values continue to drop in October 2024 with further erosion of sales being predicted. Its inventories are bloated and is overly reliant on US vehicle sales to carry the load. It's anticipated that Stellantis will burn through ~Cdn \$ 14B by the end of 2024. Stellantis is also making moves with its senior management teams.

https://www.cnn.com/2024/09/30/business/stellantis-profits-plunge-china-competition?cid=ios_app

In late 2024 Stellantis announced a new assembly line for production of vehicles. *The STLA Frame platform, will support full-size trucks and SUVs. Platforms are thought of as a skateboard on which many different types of vehicles can be built, and include important electrical and mechanical components of the car.* Stellantis is delaying its Ram EV models until sometime in 2025. <https://www.reuters.com/business/autos-transportation/stellantis-unveils-technology-support-flexible-ev-hybrid-auto-production-2024-11-19/>

The graph below of Stellantis' 2024 operating income forecasts shows the depth of the automaker's financial struggles. Slow EV sales and high inventory costs are adding to the debt load with 2024 income down ~50% from 2023. While Stellantis can be criticized for adapting to market conditions, they and their EU competitors are facing critical declines in operational incomes. No quick turnaround is expected and shareholders are not pleased and governmental incentives have not changed the demand for EVs. The EU tariffs have bought EU EV makers some time but the Chinese EV competition is poised to pounce on expanding their market share. <https://www.reuters.com/business/autos-transportation/stellantis-top-level-shake-up-fails-provide-quick-boost-2024-10-11/>



By late 2024, Stellantis terminated its CEO Tavares for failing to read the market and pursuing aggressive targets which could not be achieved. Stellantis has lost 40% of its share value and has surplus vehicle inventories in its key markets. <https://www.reuters.com/business/autos-transportation/stellantis-ceo-carlos-tavares-resigns-source-2024-12-01/>

Tesla CEO Musk, fears that Chinese automakers will demolish global rivals without trade barriers. He went on to say Chinese car companies were the "most competitive" and "will have significant success outside of China, depending on what kind of tariffs or trade barriers are established." Tesla announced in April 2024 it will abandon its long-time pursuit of selling *affordable EVs to the masses*. This is largely due to the unprecedented competition from the lower cost Chinese EVs.

Tesla was going to sell robotaxis in the US market beginning in October 2024, according to Musk. Robotaxis essentially are self-driving EVs or driverless taxis or autonomous vehicles which are operated by ridesharing or ride hailing service companies. Again, China's ride-hailing company Didi Global partnered with EV company GAC Aion to mass produce EV robotaxis for the Chinese market in early 2025. GM dropped its pursuit of robotaxi technology in late 2024. <https://www.reuters.com/business/autos-transportation/tesla-reports-third-quarter-deliveries-below-estimates-2024-10-02/>

In 2025, Tesla is losing significant EU EV market share to Chinese auto makers of PHEVs. Sales of Tesla EVs are down 40% while Chinese vehicles are up ~1000% in early 2025.

Toyota is cutting its EV production by ~30% to 1.0 M EVs in 2026 from their 1.5M target and a drop of 20+% for 2025 profits due to US tariffs. Toyota continues to reap benefits from the sales of hybrid vehicles. Hybrids generate higher profit margins than ICE models. Toyota does not believe that EVs are the only option. They see multiple types of NEVs which include the hybrids, hydrogen fuel-cells, greener fuels, and emerging technologies taking a share of the market. Toyota is shifting design to include the solid-state battery technology. As global automakers see a cooling of EV sales, there are other competing fuel options to address the affordability problem. While ICE vehicles may be phased out, there is a lot of room for other NEV strategies. This only adds to the risk and angst of investors – including government subsidies.

Toyota had been viewed as a laggard in the global EV market. With EV sales dropping due to cost, Toyota continues to expand their hybrid research in affordable options. Toyota announced its next generation of engines designed to use gasoline or biofuels in hybrid version vehicles. Toyota is the largest automaker by volume of sales as it owns ~20% of Subaru and 5% of Mazda. These three automakers will use the new engine designs, with 10% less weight and a lower profile, to deal with lower emission regulations, especially in the EU market. Toyota continues with its “multi-pathway” approach to transition from ICE to hybrid models. Their Q1 sales were ~40% gas-electric hybrid vehicles. Their PHEV, fuel-cell and fully EV models combined for ~3% of sales. By late 2024 Toyota saw a ~20% drop in sales in Japan for their brand.

Toyota reported a further slide in US domestic markets sales in Q3 2024. To counter this, Toyota will be pushing for increased market share in China by producing 3 million vehicles per year by 2030 in the Chinese market through joint ventures with local partners. In 2025, Toyota and its Chinese, state-owned partner, GAC, introduced a new smart EV into China. The basic model Bozhi 3X sells at Cdn \$20,000. Toyota *Motors* failed to take over Toyota *Industries* with US\$33B in an attempt to restructure the governance of the auto maker in mid-2025. Toyota’s chairman said in late 2024, *“a shift to an electric vehicle-only future would lead to job losses among those who have been working on engine-related technologies, including at the many suppliers in the sector.”*

VinFast launched into the Canadian and US markets, while only shipping 3000 vehicles to the US in 2023. VinFast is part of the Vietnam conglomerate, Vingroup JSC. VinFast appeared to be in financial trouble in early 2024, as it continued to lose billions of \$. VinFast reportedly lost ~Cdn \$800M in the 1st quarter of 2024. In July 2024, VinFast put its announced US plant on hold until 2028 due to low EV sales. VinFast required a further investment by its ownership of Cdn \$4.0B in late 2024, hoping to break even by 2026. VinFast are expanding their Vietnam location with another production facility in 2025. In mid-2025, VinFast announced it would produce EVs in the Indian market. The VinFast US\$2B investment will target the *affordable* sector which is served by Tata and Mahindra, while Hyundai, Mercedes and Audi serve the higher end market. <https://www.ctvnews.ca/business/autos/article/vietnam-automaker-vinfast-opens-factory-in-india-eyeing-growth-in-asia/>

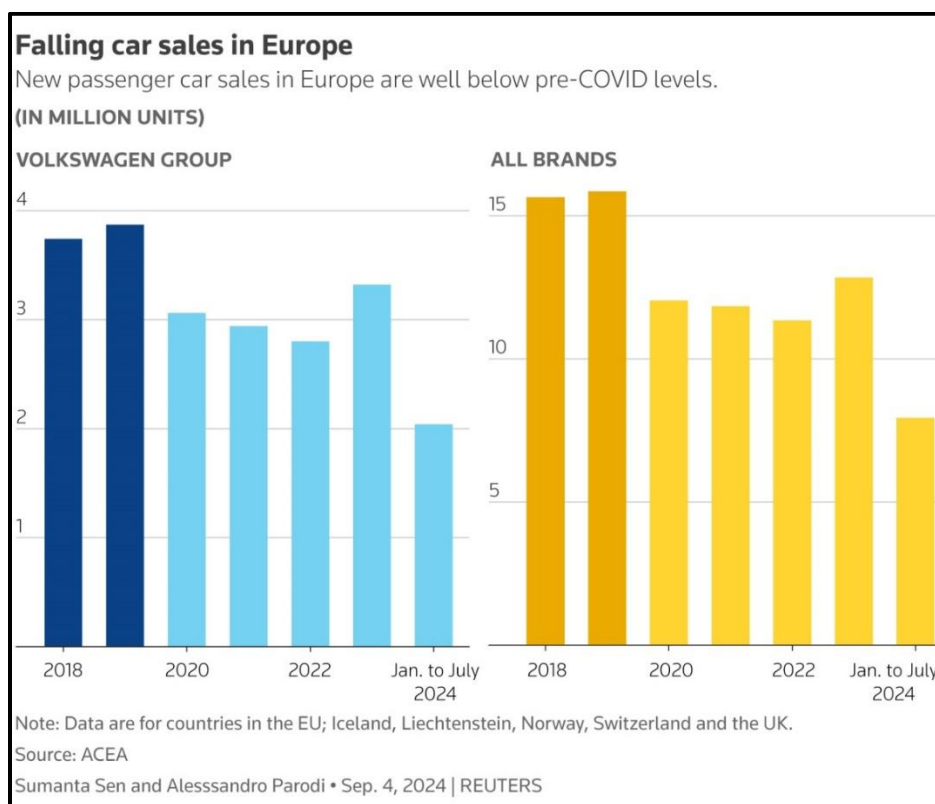
Volvo, controlled by Chinese automaker Geely, will not commit to 100% EVs by 2030. Volvo is committing to a mix of EVs, hybrids, and *mild* hybrids by 2030. <https://www.reuters.com/business/autos-transportation/carmakers-adjust-electrification-plans-ev-demand-slows-2024-09-06/>

By September 2024, Volvo’s EV strategy changed dramatically. Volvo announced that plug-in hybrids would be a critical part of its profitability and that it had *abandoned* its plan to sell fully electric EVs by 2030. Ironically Volvo said that *affordability* was an issue and increased competition from Chinese EVs was cutting into Volvo’s market. <https://www.reuters.com/business/autos-transportation/volvo-cars-scales-back-electric-vehicle-ambition-2024-09-04/>

VW says it will maintain 70% EV sales in the EU and 50% in the US and China, although this seems doubtful with the problems VW is facing with increased competition in the EU and tariffs in China. VW is holding back on its planned battery plant in Germany as it follows the EV demand. In mid-2024 Volkswagen made a major investment in US-based Rivian to accelerate EV software development for VW. VW’s Rivian vehicle sales have not met expectations. VW’s Cariad software has not been as successful as hoped and the partnering with Rivian is to correct course to be more competitive. This will complement the VW agreement with China’s Xpeng to make VW more competitive in the EV market. Xpeng and Rivian are described as start-ups with software being their key strength. VW plans to have the Rivian software, central computer and wiring available in 2028 models. VW wrote off its investment in the Northvolt battery company, which went into bankruptcy in late 2024. VW exited from its operations in Xinjiang in China while it extended its partnership with SAIC until 2040.

<https://www.reuters.com/business/autos-transportation/vw-exit-xinjiang-operation-with-sales-local-plant-test-track-sources-say-2024-11-27/>

By late 2024, VW planned to shutter (3) factories in Germany and lay off thousands of workers to survive financially. VW are looking at revising long-term employment agreements and its organizational structure as a means to remain liquid. VW is the major EU auto maker and its ability to survive in the market will have a ripple effect with other auto makers in a shrinking market. This could have an impact over the next 2-3 years. <https://www.reuters.com/business/autos-transportation/volkswagen-plans-major-layoffs-shut-least-three-german-plants-works-council-head-2024-10-28/>



After a year in planning, the IONNA fast-charging system for EVs is targeting 30,000 charging ports across North America by 2030. IONNA is funded by Mercedes, GM, Stellantis, Honda, BMW, and Hyundai-Kia to compete against the Tesla network. Market changes in 2025 threaten this strategy.

In 2024, Chipmaker, Nvidia, which is a US-based MNC secured EV business in China with (4) automakers – Li Auto, Great Wall Motor, Zeekr and Xiaomi. This is a complex agreement which creates significant growth for Nvidia, while remaining in compliance with the US controls on exports of advanced semiconductors to China. Other US-based chip suppliers such as Intel and Qualcomm are also expanding market opportunities in China's automotive and communication device sectors. The 2022 US CHIPS and Science Act was aimed at increasing US domestic supply of semiconductors and reduce reliance on Chinese products. In March 2024, the Chinese government announced a phase out US-made microprocessors targeting Intel, Microsoft and AMD from government computers and servers. Intel's CEO was forced to resign in late 2024 for not adapting to market trends such as AI as Intel's competitors profited from doing so. https://www.cnn.com/2024/12/02/tech/intel-ceo-pat-gelsinger-resigns?cid=ios_app

Auto market capacity

In early 2025, most western auto makers brands have retracted their optimistic sales forecasts as the

barrage of changing tariffs does not permit accurate projections in the market. Concerns over increased pricing to consumers to the slumping EV sales, hampers all manufacturers. Governments are reducing or eliminating EV subsidies. In Canada, there will need to be a revision to the mandates for new EV sales as a % of vehicles sold. EV sales continue to drop in Canada as there were less rebates and other government incentives. <https://financialpost.com/commodities/ev-sales-in-canada-dropped-sharply-in-march>

A common denominator emerging in the auto sector globally is the excess capacity at the various production facilities. The excess capacity in the EV sector is compounded by the slowing demand and the affordability factor. The EU higher cost countries producing vehicles include France, Germany, Italy and UK. Lower cost countries are Czech Republic, Slovakia, Spain, and Turkey. Many EV models are built in the facilities with significant overhead costs, where capacity drops correlate to lower demand.

As *capacity utilization* rates dip to 70%, it is difficult to be profitable. At 80-90% capacity utilization, it is seen as being cost effective. Although difficult to forecast precisely, VW, Renault, and Stellantis are experiencing utilization rates down to 54% from 65% in August 2024 with further drops in this metric predicted by the end of 2024. Production costs need to be spread over low volume outputs with high fixed costs, eating into profits.

With governments pushing for more *home-grown* production, in the case of Germany, VW EVs are being produced at their highest cost facilities with demand plunging. Wage comparisons between higher and lower cost countries exacerbate the capacity shortfalls. Germany pays 59 Euros per hour; Czech Republic pays 21 Euros; Hungary pays 16 Euros; while China pays ~4 Euros. Lower-cost countries are only slipping from 83% down to 79% in capacity utilization rates. China is producing vehicles in Hungary, Turkey, and Poland for shipping across the EU as consumers want affordable vehicles.

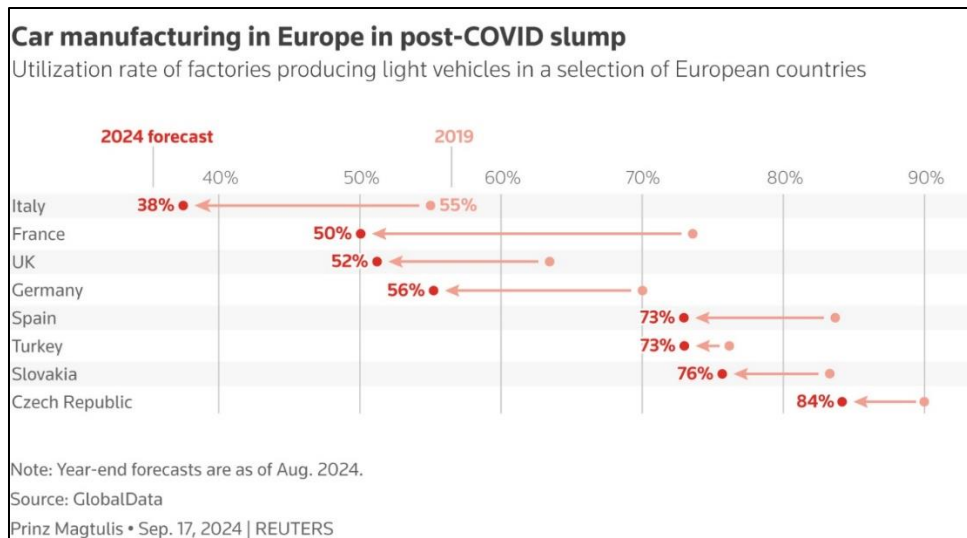
EU automakers are facing unsustainable market conditions. Cost cutting is an obvious strategy by the EU brands but will be hard to beat the Asian competition. There is also the ripple effect with high-paying auto sector jobs being lost, resulting in further layoffs, which are already underway with many EU automakers. Shifting production from Germany to Turkey, as an example, helps sell a few more lower cost vehicles but leaves a large hole in German employment. A political situation which is not easy to resolve. The UK doesn't see that it can reach its EV ZEV targets by the end of 2024. The legislation required 22% of an automakers new vehicle sales must be purely electric.

<https://www.reuters.com/business/autos-transportation/british-auto-industry-set-miss-2024-ev-sales-target-trade-body-warns-2024-10-03/>

Canada and the US have different tactics from the EU but affordable options are still lacking for consumers in the transition away from ICE to EVs and hybrids.

GlobalData provided a graph of the forecast factory utilization rates in the EU.

<https://www.reuters.com/business/autos-transportation/vw-labour-clash-spotlights-europes-car-factory-conundrum-2024-09-25/>



The culling of the EV herd is underway. With major EV companies filing for bankruptcy such as Northvolt and Fisker Automotive, the financial future of those left in the game, invites higher risks. The list of bankruptcies is growing, with Arrival, Byton, ELMS, HiPhi, Lion Electric, Proterra, Lordstown, Uniti, WM Motor, Zhidou, and other EV players going under. Increased competition is still reliant on waning governmental subsidies.

Critical materials

Decarbonization has shown that the concentration of rare-earth metals favours China; the DRC has the cobalt; and Indonesia has nickel. Geo/political tensions and trade agreements will require increased diplomacy from global countries to access sufficient materials. The economic pressures to have affordable materials and sustainable supply is daunting. Compromises will be made between respecting human rights and accessing materials. The competing interests between economic, social, and environmental interests will test governance policies and practices.

The largest supply of nickel globally is from Indonesia and is controlled by China. The island of Sulawesi, which focuses on nickel processing, employs 70,000 workers. The December 2023 fire at Tsingshan Stainless Steel, killed 19 people, with dozens injured as reported by Reuters. Workers staged rallies to improve working conditions with threats of strike action. While fashion gets a lot of attention for poor working conditions, the industrial side of the labour markets in foreign countries gets less attention. Supply is the main focus for manufacturers. In late 2024, Britain committed to collaborating with Indonesia to supply critical materials. <https://www.reuters.com/markets/commodities/indonesia-britain-sign-collaboration-agreement-critical-minerals-2024-09-18/>

A common denominator in every sector is the severe shortages of critical metals to meet the demand in chips for electronics, as one example. The circular economy can provide part of the solution. Canadian-based Li-Cycle Holdings Corp deployed technology to extract metals from e-waste. Traditionally e-waste has been burned which emits noxious fluorine chemicals and is very inefficient. Li-Cycle shredded tonnes of e-waste in a water-solution which eliminated emissions and recovered 95% of the critical materials vs ~50% through the burning method. Recovering critical metals is much cheaper than mining raw materials.

By May 2025, Li-Cycle's shares plunged 65% and the company was put up for sale. In spite of Glencore's

financial support and a further Cdn \$650 M loan from the US government to build a battery processing operation in New York, the recovery of specialty materials has not proven to be financially sustainable for Li-Cycle.

Swiss mining company Glencore, partnered with Canadian-based Cyclic Materials to supply 10,000 tonnes of recycled copper to be processed through its Quebec refinery. It's estimated to take 10-years and US \$5 B to start a copper mine. In late 2024, copper is trading at US\$ 9200 per tonne. Using recycled copper reduces the environmental footprint considerably. Extracting ore to produce and smelt copper emits 4 tonnes of carbon per tonne of copper; using recycled copper reduces emissions by 65%.

<https://www.reuters.com/markets/commodities/glencore-ties-up-with-cyclic-materials-copper-recycling-push-2024-12-11/>

In Europe in 2024, Italian truck and bus manufacturer Iveco Group, as part of an extended producer responsibility program, will partner with BASF to recycle lithium-ion batteries. This aligns with the extended producer responsibility requirement where manufacturers are responsible for products they introduce to a market and in the post-consumer and end-of-life stage. BASF will convert the collected batteries into *black mass* to recover critical materials for further use.

Ascend Elements out of Massachusetts, entered into an agreement with US Honda Motor Co, Ltd. to process recovered lithium-ion battery materials for new EV batteries. Ascend refer to this as a *closed-loop* process which will include other critical materials such as cobalt and nickel. <https://ascendelements.com/>

Renault partnered with French utility company Suez, to begin a closed-loop recycling of materials through *The Future is NEUTRAL* group. The objective is to access recovered materials needed in the auto industry without relying primarily on virgin materials. Part of circular economy principles.

<https://www.reuters.com/markets/europe/suez-takes-stake-renault-recycling-unit-future-is-neutral-2024-10-03/>

A University of Waterloo, *Journal of Hazardous Materials*, showed that the amount of e-waste generated annually globally is ~2.5 M tonnes and is forecast to be ~70 M tonnes by 2030. Canada creates 1 M tonnes per year with less than 20% being collected and recycled. The researchers, supporting the circular economy model, suggest that attention should be on designs of electronic devices and equipment to enable repairs, refurbishments and product life extension as opposed to only recycling and recovery methods. This could lead to urban mining for the extraction of critical metals.

Canada is the only country in the Western Hemisphere with *most* of the minerals and metals required to product EV batteries; however, the quantities are low. A 2023 Globe and Mail reports summarized Canada's lithium supply as *tiny* when compared to the production and reserves in Argentina, Australia, and Chile and more recently in Spain and Serbia. Canada is one of the (3) largest producers of battery grade nickel but its major nickel producers were sold to foreign companies years ago. Canada has less than 3% of cobalt reserves whereas the DRC produces 70% of the world's supply. According to Natural Resources Canada, Canada's graphite reserves are less than 2%, all of which comes from Quebec – China meets 80% of the global demand. In Canada, manganese, which is another critical EV battery material, is only available through imports from South Africa, Australia, and China. Canada has a deposit of bastnaesite, which is a rare mineral used for making magnets for EV motors. One of the first operations to produce bastnaesite ingots was in Saskatchewan. While the ore is worth ~\$5-10K per tonne, the finished ingots are worth ~\$200,000 per tonne.

Chile is feeling the effects of the retreat on lithium prices in early 2025. Falling demand led to the cancellation of the BYD and Tsingshan metals group's US\$233M project to build lithium cathode plants in Chile. Other deals have collapsed including agreements with Posco and Samsung.

<https://www.reuters.com/markets/commodities/chinas-byd-tsingshan-scrap-plans-chile-lithium-plants-newspaper-reports-2025-05-07/>

Canada is in a good trade position for socio and geopolitical interests. The investment opportunities to develop this market will attract leading mining and manufacturing companies. The tenuous relationships with Russia and China, which both have considerable critical and rare mineral resources, will require diplomacy to ensure global supplies. Canada ordered (3) Chinese mining companies operating in Canada, to divest of their investments in critical materials, citing national security, in late 2022.

The Critical Minerals Market Review by the IEA, raised three concerns:

1. Can future supplies keep up with the rapid pace of demand growth in climate-driven scenarios?
2. Can those supplies come from diversified sources?
3. Can those volumes be supplied from clean and responsible sources?

The answers are mixed and will require further global collaboration within a tense geo/political market to address these pressing questions. Estimates show that China has 2/3 of the critical minerals. There is more concentration of sources with limited options to diversity. There is mixed progress on the environmental and social sourcing conditions. www.iea.org/Data-and-statistics/data-tools/critical-minerals-data-explorer

This is in contrast to the Canada allowing Chinese state-owned Zijin Mining Group to acquire Canadian lithium mining company Neo Lithium Corp in early 2022 for \$960M. At present Canada has minimal refining processes for critical battery minerals and the environmental approval process for a new mine can take 5-10 years. The James Bay Lithium Mine project was approved in early 2023, with 270+ conditions, after a 5-year environmental impact study and is expected to open in 2025. The only active lithium mine in Canada as of February 2023 is the Chinese owned Sinomine Resource Group in Northern Manitoba and the lithium ore is refined in China. <http://en.sinomine.cn/>

Canada's Supreme Court ruled that Bill C69, the Impact Assessment Act of 2019, was in large part, unconstitutional. This will reduce the redundant federal over reach imposed by Bill C69 on construction, resource mining, and gas and oil projects, as examples. The provinces can conduct their own due diligence on environmental impact assessments, as they have been doing, and ensure that projects will be compliant.

The 2025 Federal government will revisit Bill C69 to build cooperation between the various levels of government as part of the need to ensure economic growth for the Canadian natural resources sector. The original Bill was intended to ensure environmental issues were addressed but it led to inefficient bureaucracies adding an inordinate amount of time, costs, and with few tangible benefits for the duplication of approvals. Bill C69 is viewed as an impediment to economic development when faced with the US trade war and trying to open other markets.

The mining of critical materials creates tension between environmental, social, and economic interests. A case in point is the potential mining of vast nickel reserves in northern Ontario. This could take place in what is referred to as the Ring of Fire, with an estimated worth of Cdn \$ 90B over 20-years. A sensitive ecological area where local Indigenous peoples are concerned with contamination of waterways and long-term environmental degradation. The main mining company is Wyloo Metals, controlled by Australian businessman, Andrew Forrest. Forrest has several ongoing investments in other parts of Canada. Two of the nine Indigenous groups in the Ring of Fire have signed MOUs with Wyloo. Others need more time and completion of an environmental impact study before deciding. <https://www.cbc.ca/news/canada/thunder-bay/wyloo-metals-ceo-update-1.7092369>

Forrest is trying to create a new commodity for *green* nickel to be traded on Germany's Metalshub in late 2024. Metalshub provides the provenance of the nickel as well as its estimated carbon footprint and ESG data. Currently Indonesia produces most of the nickel but uses coal-fired production methods. Green nickel is lower in carbon emissions as it is produced using renewable energy, waste reduction

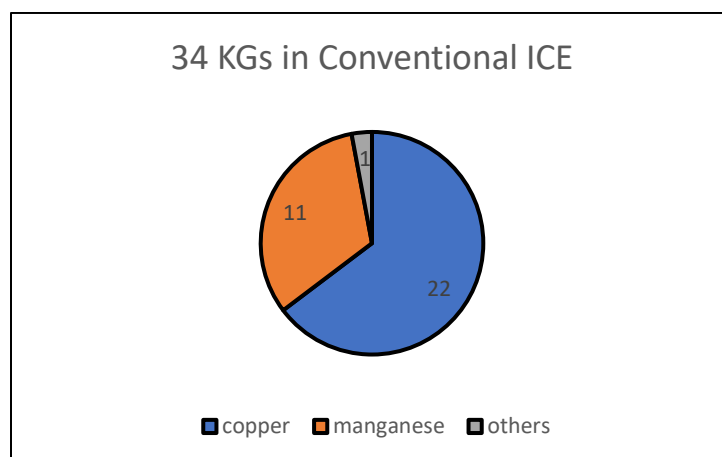
using hydrometallurgical processes and water remediation. Another aim of green nickel is to cooperate with local communities to improve economic and social outcomes. Green nickel costs more to produce and therefore is seeking its own metals exchange. <https://www.reuters.com/markets/commodities/nickel-miner-wyloo-sell-its-low-carbon-metal-platform-metals-hub-2024-10-01/>

It would not be out of the question to see cartels for rare and critical minerals being formed as OPEC leveraged its fortuitous role in the oil market, decades ago. The transition away from fossil fuels to other energy options needs economic strategies and policies to make it sustainable. The March 2023 USA and Japan Critical Materials Agreement includes no duties to be imposed on critical materials; and promotes many of the 7R circular economy practices to reduce the demand for virgin material extraction.

According to the International Energy Agency the world will need twice the volume of metals currently being used to produce EVs by 2040, with a projected volume up to 4 times to achieve net zero goals.

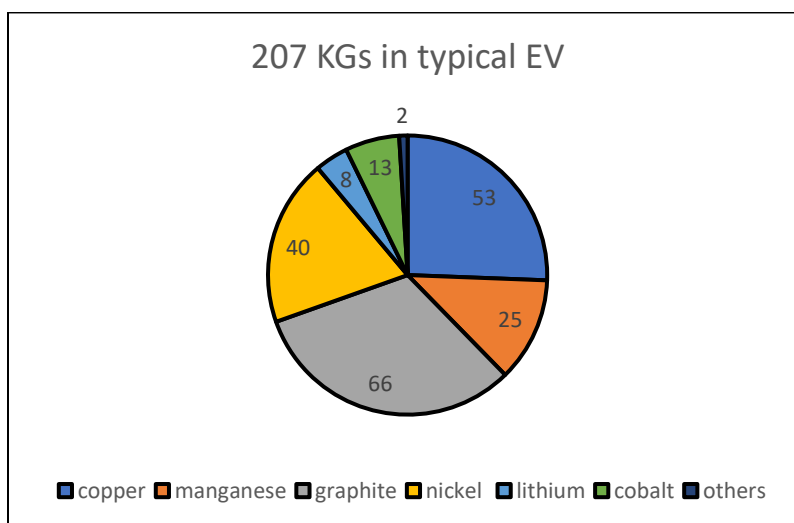
<https://www.reuters.com/graphics/MINING-DEEPSEA/CLIMATE/zjpqezqzlpz/>

Metal content in an ICE



Source IEA (2021)

Metal content in an EV



Source IEA (2021)

Ford Motors secured its supply of lithium in multiple deals which will run into 2034, with suppliers located in the USA, Canada, and Chile. Ford has targeted the production of 600,000 EVs for 2023-2024 and wants to ramp up to 2 million units per year by 2026. The risk of locking up supply is shown in early 2024 as the price of critical battery materials has plummeted from their heights. As chronicled by Financial Post writer, Thomas Biesheuvel, lithium prices are down 80% from 2021; cobalt down 66%; nickel down 45%. Opening new mines can take decades. Investors are subject to the EV market slowing and the demand for critical materials cooling. In mid-2024, lithium prices are still relatively low as demand seems linked to slower EV sales.

Long-term contract strategies for the supply of lithium and other critical minerals need to plan for the wide variances in price which is affected by demand. As EV sales slow, as other battery designs use different technologies and materials, so goes the price of lithium. The first strategy in the nascent EV manufacturing sector was securing a supply of lithium in early 2021. By late 2024, the strategy is to consider pricing negotiations with the mining companies and governments involved as demand falters. Hybrids use a lot of the similar materials but overall demands are down as well.



In late 2024, the US government approved a lithium mining project in Nevada as part of its strategy to be less reliant on imported critical materials for battery production. This ends a 6-year review involving environmental assessments on a rare flower requiring changes to the extraction processes. Australia's Ioneer is the owner of the mine and has commitments from Ford, Toyota and Panasonic for outputs.
<https://www.reuters.com/markets/commodities/biden-administration-approves-ioneers-nevada-lithium-mine-2024-10-24/>

Investment in critical materials was increasingly uncertain in mid-2024. Affected by dropping consumer demand for EVs and softening government targets to ban sales of new ICE vehicles by 2030, investors are not stepping forward. Political leadership and pending changes in government policies contributes further to the doubts of expanding investments in the EU and US. An executive with a major European chemicals group that supplies battery materials said many companies are assuming that there will be a delay of about two years in the energy transition with 2030 projections now being moved back to 2032.

The trend towards increased sales of hybrids makes an impact on the demand for specific critical materials in batteries. Hybrids, which use gas and electric power, convert emissions to water vapour with platinum, palladium, and rhodium. These materials have been in decline as fully electric vehicles do not require these materials. Hybrids are shifting the demand away from nickel and cobalt. Hybrid batteries are ~1/3 less in weight than pure EV batteries – far fewer material volumes. EVs weigh ~25%

more than similar sized IVE models. i.e. Hyundai Kona 1386 Kgs while the Kona EV model is 1705 Kgs. The Tesla Model S weighs in at 2166 Kgs. The increased weight of EVs is why provinces want to charge fees for road maintenance costs.

<https://www.reuters.com/markets/commodities/hybrid-cars-throw-lifeline-platinum-metals-2024-09-09/>

Several countries are wanting to work out an agreement with Indonesia on the supply of critical materials. Under the Minerals Security Partnership (MSP) formed in 2023 by 14 governments, including Canada, they want to extend the agreement to include Indonesia. The MSP is intended to ensure supply of minerals such as lithium and rare earths to meet zero-carbon targets. Sourcing could qualify for tax credits by private companies under the US Inflation Reduction Act. According to Transparency International's rating of Indonesia's corruption perceptions index score, they rank relatively low at 34/100 on their government's public sector to be free of corruption. One of the concerns with the IEA is sourcing responsibly. <https://www.transparency.org/en/cpi/2022/index/idn>

As companies search for critical minerals, the country of Kazakhstan is emerging as a new source. The former Russian republic, is rich in lithium, cobalt, gold, manganese, nickel, titanium, uranium, and graphite which are seeing increased demand. Kazakhstan is a reliable country and has signed supply agreement with the EU and the UK. Major mining companies including BHP, Rio Tinto, First Quantum Minerals, Fortescue, and Teck are engaged in Kazakhstan. The country has agreed to Russian sanctions and using shipping routes which bypass Russia. <https://www.reuters.com/markets/commodities/metals-rich-kazakhstan-seeks-niche-battery-supply-chain-2024-09-13/>

ESG as a misguided direction

For all of the positive outcomes attributed to ESG, this VUCA period has sounded alarm bells. One of the loudest complaints comes from Elon Musk, credited with restarting the EV movement. In May 2022, after poor labour relation reports, poor handling of traffic deaths, and alleged racial misconduct, Tesla was removed from the S&P's ESG Index. Musk retorted ESG is a scam and claimed that ratings agencies lost their integrity.

The private sector is cognizant of stakeholder capitalism; however, post pandemic pressures such as extreme inflation and across-the-board shortages are downplaying ESG as a priority. Globe and Mail writer Jeff Jones, stated in a July 2022 article that "in good times, we can afford everything; in tough times, we reset our priorities." We are facing wars, inflation, economic uncertainty, political polarization and therefore, ESG interest abates. In late 2024, inflation in Canada had been reduced to the 2% target set by the Bank of Canada. This could mean further interest rate cuts before the end of 2024.

<https://www.cbc.ca/news/business/inflation-bank-of-canada-target-1.7325365>

Compounding the challenges to ESG from a private sector perspective, is the lack of evidence that there is a correlation between improved financial performance and ESG policies being in place. There are a few claims of shareholders having satisfactory returns where companies have adopted ESG policies but they are the few, not the many. Stated another way, investors want their corporate governance expectations to continue and environmental and social issues are a distraction.

Adding to the ESG perplexity are the reporting metrics. Self-appointed, 3rd party agencies use their own methods for calculating results. Without a recognized set of reporting outcomes or definitions, it is difficult to find credibility in reports and support increased pressure for the supply side to improve. Scope 1, 2, and 3 emissions, supplier diversity, green products, green operations, anti-corruption, or carbon offset project returns can all be part of this reporting miasma.

Professors Cornell and Damodaran, in their 2020 paper, *Valuing ESG: Doing Good or Sounding Good?*

found that Bloomberg's ESG data covers 120 environmental, social, and governance indicators. While all the raters include the most highly publicized indicators in their ratings yet still fail to agree on how these indicators are to be measured. The professors go on to conclude the hype regarding ESG has vastly outrun the reality of both what it is and what it can deliver.

ESG doubters had suspicions confirmed when, after a lengthy investigation by the British Guardian, German Die Zeit, and non-profit SourceMaterial, found that one of the largest voluntary carbon markets (VCM) investment companies, Verra, was not meeting expectations. Verra was allegedly over-issuing carbon credits involving major companies such as BHP, Shell, and Gucci. The challenge is that Verra's baseline calculations are flawed. As this involves billions of dollars there is definitely a shadow being cast over the use of VCM funds to offset GHGs and the credibility of the VCM companies. Charges of greenwashing have been made by Fossil Free Netherlands against KLM Airlines, which it is defending in court.

Concerns in the VCM were further confirmed in a Reuters report by writers Twidale and Mcfarlane in August 2023. VCMs are receding for the first time in 7-years as doubts as to their carbon claims become more dubious. Nestlé and Gucci continue to withdraw from the offset credits and look for reductions in their own operations. Many of the carbon investments are aimed at forest protection offset credits but the results are not meeting expectations. Offsets prices have fallen ~80% in the cost per tonne for carbon contracts in the past two-years. Activists have long worried that offsets could lead to polluters carrying on as usual.

Another example of carbon credit offsets struggling in the volunteer market can be seen in BC's *Great Bear Rainforest*. An Indigenous-led group of stewards, called the Guardian Watchmen, monitor a vast coastal area helping distressed boaters, survey levels of ocean crabs, prevent illegal fishing, hunting, and logging, among other duties. The funding for the services is intended to be through the sale of carbon offsets. The offsets are sold by a group of (9) First Nations to protect forests that would otherwise be logged. The offsets are a critical part of their revenues. This 6-year agreement, however, is struggling to maintain its financial viability. The Province of BC has been the main buyer of the offsets to date and has only contributed 50% of the anticipated revenue. While the agreement has curbed logging, it has led to continued logging of more valuable timber. https://www.theguardian.com/environment/article/2024/may/30/it-was-like-the-wild-west-meet-the-first-nations-guardians-protecting-canadas-pristine-shores?CMP=Share_iOSApp_Other

The hope for this program may be linked to increased mandates for private companies to offset their emissions and use this Indigenous program to buy their credits. It was initially thought that this innovative funding would lead to more examples, but since being launched in 2016, it is still a doubtful model, without further government intervention.

In the US, it was expected that their Security Exchange Commission (SEC) would require detailed disclosure in 2023 by publicly traded companies on carbon emissions and climate risk mitigation plans. The Sarbanes-Oxley Act will necessitate those Canadian branches of US-based companies to report. Politicians in several US states have turned up the backlash and have stated that companies such as BlackRock will be barred from handling state pension funds if they use ESG benchmarks.

A Financial Post article, citing Assistant Professor at Carleton's Sprott School of Business, Leanne Keddie, stated there is no evidence ESG leads to sustainability. "Until people wrap their heads around this distinction, we are going to continue to have confusion on this point. ESG ratings will continue to tell investors about the risks/opportunities they face on ESG topics but not on how a firm contributes towards a sustainable world." Charles Cho, professor of sustainability accounting at York University's Schulich School of Business, said a mini-industry has sprung up to measure and catalogue

environmental, social and governance impacts, with a money-making motive that hurts credibility. “ESG ratings have evolved to become a product to sell,” he said, adding that they can be hard to compare, biased and misleading. “So, they don’t really mean much.”

In 2025, the UK is considering more robust and transparent regulations for companies which rate corporate ESG performance for investors. These companies are channeling billions of dollars into sustainable investments. The UK concern is over the credibility of the companies which provide the ratings. <https://www.reuters.com/world/uk/britain-propose-law-next-year-regulate-esg-raters-2024-08-08/>

Countering the fog of reporting is fiduciary investment leader BlackRock Inc. They are committed to full disclosure and encourage the use of the TCFD and / or the SASB frameworks. BlackRock supports industry reporting out on specific and operational standards or to state which global standards any company has found to be appropriate – but make full disclosure.

In March 2022, a Harvard Business Review article by Professor Sanjai Bhagat, concluded that *investing in sustainable funds that prioritize ESG goals is supposed to help improve the environmental and social sustainability of business practices. Unfortunately, close analysis suggests that it's not only not making much difference to companies' actual ESG performance, it may actually be directing capital into poor business performers. The article further stated: Why are ESG funds doing so badly? Part of the explanation may simply be that an express focus on ESG is redundant: in competitive labor markets and product markets, corporate managers trying to maximize long-term shareholder value should of their own accord pay attention to employee, customer, community, and environmental interests. On this basis, setting ESG targets may actually distort decision making.* <https://hbr.org/2022/03/an-inconvenient-truth-about-esg-investing>

Warren Buffet, who manages US\$500B in market capitalization, is on record as saying that Berkshire Hathaway hires managers to *do the right things* when running their various businesses. However, Buffet also says that tracking and reporting ESG metrics is of no value to running a company and they do not do it. Responding to questionnaires from 3rd parties does not add value. One of their utilities, in Iowa, was designed to use sell 100% wind power and used this renewable energy because it makes good business sense over other energy options. But he is not going to report out on the GHGs etc., to other interested stakeholders. This point was reiterated in early 2024 where shareholders rejected proposals to report on environmental and social values, and diversity, equity and inclusivity, which Buffet dismisses outright, as a business metric. Hard to argue with success.

Adding to the debate on ESG strategies, and with CCUS as the target, is Australian businessman, Andrew Forrest, executive chairman of Fortescue Metals. Forrest stated the carbon capture systems were greenwashing and further, "There's a simple question from business leaders...when do we stop burning fossil fuels?" "If you want to drive capital...we must have clear and obvious disincentives for what is doing harm and clear incentives for what is doing good." He made these remarks at the IEA conference in February 2024.

There are definitely arguments to be made to ESG practices affecting profitability and reducing emissions. If corporate managers are supposed find the balance in their oversight roles, by targeting outcomes as described in the circular economy principles and the UNSDG, then a litmus test would be a lowering of global temperatures. Everyone loses if the latter doesn't occur.

[Impediments to the ESG agenda](#)

Throughout the discussions on ESG, we try to show that the value proposition for business is much greater where ESG is embedded in policies and practices. One question which comes to mind, if ESG is so great, why isn't everybody doing it? A fair comment and one to respond to in more depth. We talk about

resistance from investors as they see ESG detracting from profitability, even in the short-term, while other market leaders are acting responsibly.

For supply chain management on the demand side, which converts the requirements into commercial terms and conditions, there must be clear and concise language. The inevitable question arises as to how to justify any incremental price differences in sourcing. For a public sector entity, how can any price increase be defended when spending public funds?

We need to look at the total cost of ownership (TCO) and not just the out-of-pocket costs. The latter is much easier to calculate; short-term cost projections are simpler than longer-term estimates. There are so many unknown variables, beyond the control of all parties, which cannot be predicted involving extended time frames.

Most decisions are not black and white on ESG issues. They are herring bone or gray at best. There can be a subjective interpretation of the issues. Organizations must convey the expected level of quality and performance as related to the TCO, inclusive of ESG values. Excuses contribute to the lack of action to deal with environmental, social and governance issues. Below are (11) reasons which contribute to the impediment of ESG in supply chains and organizational commitments.

1. Supply chain dysfunction

An assessable limitation to implementing ESG are organizational problems related to the effectiveness of a supply chain team to function strategically. Where there is disbursed authority amongst department heads or managers across the organization, they are more focused on their operational responsibilities than a broader commitment to ESG. ESG is a distraction away from their core services and need for performance-based outcomes and profits. Without having ESG in some form in their job description, it becomes a nice thing to do.

Where there is a designated supply chain team, that is not seen as a resource to the larger organization, the tendency is to try and offload ESG responsibility on the procurement group. This signals that the organization has an ESG plan within their supply chain but it is a token commitment – green washing. If the supply chain team is struggling with developing meaningful KPIs on basic functions, expecting ESG to be effectively managed would be a false hope. If the supply chain team lacks a policy which is comprehensive in scope and supported by the senior management team, ESG will be an “off-the-side-of-the-desk” workload issue.

When we see organizations deal with ESG head on and make it a part of their core values, we see supply chains that can provide the leadership and garner commitment from their supplier base and other stakeholders.

2. ESG costs too much

ESG compliance will be a cost of doing business. Responsible practices lead to reduced waste, less pollution, improved health, economic development, respect for diverse social interests, cultures, and supports increased profits, where the benefits outweigh the costs. There are costs of reporting out on standards or factory audits to prevent child labour. But your customers will want to know how your business operates through transparent reporting. We know that many countries have a different set of

values for human rights and environmental standards but if they are in your supply chain, it's your problem now.

Arguably EVs are not affordable. Governments are subsidizing their manufacturing costs and providing incentives to potential buyers. The cost of *not* addressing environmental and social issues is not responsible nor affordable in the long-term.

A few years ago, we couldn't afford to take the lead out of gasoline. We couldn't afford not to, from an environmental perspective. At one time, we couldn't afford a public healthcare system. Now healthcare is seen as a mandatory component of all progressive government programs. It's complex.

3. Balance between the importance of financial costs vs ESG values

For many organizations, there is a great debate as to the weighting of the financial factors vs non-financial factors when entering into contracts with a supplier. What percentage of the decision should be weighted on the cost of the goods or services vs the ESG values which could be realized? Companies which favour the importance of the financial impact, use a model which leans towards the lowest cost, regardless of ESG factors. Many government policies state a maximum of 10-20% for social or environmental criteria. These arbitrary percentages, then are applied to all contracts involving some form of a competitive bid. The lower percentages imply that 80-90% will be based on the cost.

Some would argue that the financial importance should be at least 50% of the final decision, while others argue that 50% would minimize any ESG advantages in a deal. There is a great deal of debate on how to weigh the financial costs vs ESG values. What if we didn't set a target or preferred maximum for financial factors? Could we still afford to do business? What types of controls would we need to prevent financial chaos?

One option is to use a *value-per-point* model. No debate is required to determine the weighting of financial vs non-financial criteria. The total value of points allocated for the non-financial criteria are divided into the total cost and the resulting value-per-point outcomes indicates the *best value*.

The following example will illustrate the difference between conventional models weighting financials over non-financial criteria and the value-per-point model.

Your organization issues a competitive bid for landscaping services for its multiple locations. There are (4) potential bidders, A, B, C, and D. As part of the scope of work for the services to be delivered, your organization ensures that the *environment* is not being harmed in the landscaping operations (no gas-powered leaf blowers); the *design* should use endemic materials (local plants and materials); the *performance* of the bidders has been assessed through experience and reference checks; *social impact* to your organization means considering the hiring of Indigenous people and/or those facing systemic barriers to employment by the bidders; maintenance is important to address seasonal patterns (no pesticides, herbicides or fossil-based fertilizers); and the capacity of the bidders ensures their availability and ability to respond to service requests. The total points for the decision are a maximum of 50 points, with the each of the criterion being allocated predetermined weightings.

In Figure 1 we can see that the non-financial score favours bidder D with bidder C being a close 2nd.

Figure 1 Non-financial scoring

Criteria	A	B	C	D	Maximum points
Environmental experience	7.8	7	7.9	8.1	10
Design	5	5	5	5	5
Performance	7	7	8.4	8.5	10
Social impact	8	8	8	8.3	10
Maintenance	5	5	5	5	5
Capacity	6	7.4	8.5	8.5	10
Total value points	38.8	39.4	42.8	43.4	50

Figure 2 The objective value of the bids received

When your organization looks at the bids which were submitted, they were as follows:

Bidder price	A	B	C	D
\$	560,000	558,000	555,000	562,000

To quantify which bidder should receive the contract, simply divide each bidder's price by the total # of points per criterion. Therefore, **Bidder D** provides to be the best value (562,000/43.4) at \$12,949 per point. While Bidder C provides the 2nd best value at (555,000/42.8) at \$12,967 per point. Even though Bidder C has the lowest bid, the best value for your organization is with Bidder D. Bidder D, with the *highest* bid, represents the higher ESG values which aligns with your corporate objectives, brand, and commitments to the community. As an organization, the value-per-point model allows you to assess the financial impact and have it balanced with other corporate commitments.

In this example, if Bidder D, had submitted a bid at \$563,000 that would represent a lesser value-per-point than Bidder C (563,000/43.4) at \$12,972 per point. This means that while you have set ESG as being important, when comparing the value-per-point between C and D, the best value shifts to C. The message here is that bidders, like D, must also be competitive in the market and can't expect customers to over pay on the value for money.

Figure 3 below, represents a conventional, financial weighted model. With pricing at 50% or greater, the lowest bid would have to be accepted with Bidder C. Your organization would have to be satisfied with lower expectations on ESG values. This sends a mixed message to the market. Pricing is more important than the ESG values.

Figure 3 Conventional, financial weighted model using 50%

Criteria	A	B	C	D	Total
Environmental experience	7.8	7	7.9	8.1	10
Design	5	5	5	5	5
Performance	7	7	8.4	8.5	10
Social impact	8	8	8	8.3	10

Maintenance	5	5	5	5	5
Capacity	6	7.4	8.5	8.5	10
Total value points	38.8	39.4	42.8	43.4	50
Pricing	560,000	558,000	555,000	562,000	
Score out of 50%	49.55	49.73	50	49.38	50
Total score	88.35	89.13	92.8	92.78	100

While the example above is very close in outcomes between C and D, it demonstrates how being *price-focused* can come at the expense of being *value-focused*. Setting arbitrary benchmarks such as a percentage for pricing, detracts from ESG values and always favours the low bidder.

The value-per-point model provides an objective means to assess ESG values and be well aware of the financial implications.

Long time colleague and supply chain professional, James Rusty Joerin, shared his experience on a 2024 housing project with a BC Indigenous business society. Rusty was the procurement consultant on this innovative project.

The British Columbia Indigenous Housing Society (BCIHS) owns numerous buildings and sought to obtain the services of an Indigenous owned property maintenance contractor. The goal was to reduce the number of contracts the BCIHS was managing and create administrative efficiencies. The society offers affordable rental housing to persons of indigenous heritage in a large metropolitan area. A majority (51%+) indigenous owned property maintenance contractor was mandatory.

The Process:

A two-stage procurement process was selected as the means to find a suitable contractor. The first stage was a Request for Pre-Qualifications (RFPQ) to find a number of contractors that were indigenous owned and had the experience and capacity to perform and manage a large maintenance contract. The RFPQ was posted on the BCIHS website and indigenous organizations and groups around the metropolitan area were informed of the opportunity and requested to share this with their contacts and members. BCIHS received several responses and after careful evaluation determined that two proponents demonstrated the ownership, experience, and capacity to perform the services.

The two short listed respondents were then invited to respond to a Negotiated Request for Proposal (NRFP) to provide residential building maintenance services including the management of specialized services contracts. A best value selection process was stated in the NRFP. Proponents were informed that the proposal offering the lowest cost per point scored on the subjective criteria would become the leading proponent with which a contract could be negotiated.

The subjective criteria were:

Methodology: (5) property maintenance scenarios were stated with the proponents asked to provide their process to perform the tasks required to completed the work;

Capacity: proponents were to provide the details about the number of employees and skills available; subcontractors for specialized services which they would hire; a tools and equipment inventory list; and their ability to respond to service requests on a 24/7 basis.

Governance and administrative controls: proponents were to provided existing policies and procedures with respect to the employment of Indigenous heritage; training program options for staff; invoicing for services with an audit trail.

Each of the above criteria were weighted with the total number of available points equalling 100.

Cost / Price Criteria:

To ensure that prices offered could be compared a table was created showing a possible number of annual hours of effort by different job descriptions with the respondent asked to state the hourly rate for each. Proponents were required to state a percentage markup on materials invoices that could be submitted.

The total annual projected cost proposed would then be divided by the total score of the subjective criteria to determine the best value proposal. This is referred to as the value-per-point model.

Value-per-Point:

A value per point (VPP) process is best applied where services and other non-financial benefits represent the intent or purpose for issuing a competitive bidding process. Much more objective than simply comparing the total lowest price from each proponent.

4. Complexity

Depending on the nature of the goods or services which an organization is involved in, the complexity of the issues around ESG can be overwhelming. Small service providers may only need to change one or two products within a short time span while others such as a larger manufacturing company will require significant investments over a longer period of time to be able to align with more ESG values. Getting tier 1 and 2 suppliers to comply takes additional time. However, the learning curve is getting better as more companies and organizations are able to learn from the early adopters and share their success.

Eliminating the use of single-use plastic bags and using another type of plant-based container, is still going to impact the environment in some way. Knowing that PVC is causing massive environmental problems should be the impetus to move away from harmful plastics. But it doesn't. As long as a product is deemed by a government agency to be sold legally, consumers and customers will buy it. Changing behaviours is a social issue and often leads to charges for non-plastic or reusable paper. Eliminating plastic is a technical, economic and environmental issue. Resolving problems related to the use of plastics defaults to a governmental responsibility and not to the producers of the plastics.

Allowing reusable tote bags and containers made from recycled plastics is not really making an improvement. Using lower emission E-Methanol is better than bunker diesel fuels, but it's still a problem. Glass can be recycled but many glass jars end up in the landfills after use. Plant-based packaging is sold on the market but there can be a slight premium to use it, therefore, we continue to allow Styrofoam packaging, which will never decompose but it's *cheaper*.

Carbon taxes, carbon offsets, and other means to mitigate GHGs are complex from a financial and policy perspective.

5. Lack of internal expertise

These are still early days in the implementation of ESG in most businesses and governmental operations. Workload is compounded by staffing shortages. Trying to juxtapose ESG values and practices into the decision-making, off the side-of-the-desk, exceeds the ability of staff to effectively take on this objective. Therefore, external expertise is required.

External expertise, for larger organizations will require cross-functional expertise to address the various operations which an organization maintains. Fleet management and inventory and distribution are common functions yet have a different ESG focus. Trade agreements, contract management and supplier development are concurrent areas of focus for implementing ESG. Larger organizations will need a team of experts to cover issues from technical performance, measuring and monitoring GHGs, to reporting standards.

The messaging from the C-Suite and to external and internal stakeholders is a critical part of the ESG journey. Finance must be able to develop the appropriate reporting metrics for credibility. Policies can be written and other initiatives can be conducted concurrent with adaptations to market opportunities. External expertise is used to develop strategies and enable their implementation.

Training requirements are essential to adapt to the new value proposition. Change management practices are as important as the priorities the organization chooses to address. Changing behaviours, shaped by decades of using price or quality as a limited determinant for a decision, requires some patience and reiteration of the purpose of business and its responsibilities. We know that greenwashing and bluewashing have been exhibited by the poor actors in various market segments – that only reiterates the skepticism by customers on a company’s values.

External expertise becomes part of the equation of how to implement ESG. The supply chain management role is a great starting point but must be coordinated across the organization. While bringing in external consultants will be viewed as an additional expense, the investment is to complement the managerial talent and for the management to be able to assimilate ESG into their overall performance planning. Competition will dictate the speed and ability to respond to the emerging issues.

6. Lack of awareness

It’s important for senior management and Boards to be cognizant of the ESG shift in the expectations of all stakeholders. There is no excuse for saying ESG doesn’t apply to us or it’s only for the big companies. Someone will eat your lunch. There is a need for an ongoing scan of the markets and government legislation as to how these changes could directly or indirectly impact a business. The emergence of green skills in all sectors requires strategic input and support.

In a 2024, *Economist Impact Report*, the top three gaps in senior executive awareness and actions on developing green skills were based on: willingness to invest; lack of endorsement; and lack of clarity. In other words, not seeing the green skill sets as a business imperative.

There are few goods, services, policies, or practices which have not been produced, provided, written or adapted by other organizations. There are few secrets to success with ESG. The mindset of being responsible and acting sustainably, is probably the biggest impediment or enabler. If we are limited by our conventional thinking, where fear of failure rules rather than exploring the opportunities, we continue to stay in our comfort zone. Emerging issues and interests are constant.

ESG is a Mindset with a Culture of Value

Conventional thinking	ESG thinking
Short-term costs	Long-term investments
Follow	Lead
Self interests	Community interests
Make good deals	Make deals that do good

Comfort and complacency	Courage and culture
Ethic of justice	Ethic of care
Consumption of resources	Conservation of resources

7. Competing interests

While adapting an ESG culture, many organizations will develop new products, services, and technologies. Companies are trying to enter new markets. These efforts will continue and profitability must be maintained for the financial sustainability of the company. Balancing the priorities becomes a more significant challenge; and again, is affected by how competitors are addressing their ESG priorities.

With respect to public sector entities, there can be elected officials wanting changes during their term. They will focus on targeted social or environmental or economic development concerns. Existing policies or bylaws may need to be adapted, which requires a shift in priorities.

Suppliers of status quo products which are being replaced by more responsible or less harmful products, can be reluctant to adapt. In some cases, this means cannibalizing their existing products and convincing customers to switch. It means giving up their market position and competing against newer products on the market.

Time availability confines most staff to deal with the immediate needs and not the desired objectives, such as a policy. This requires external resources which also provide a fresh approach to ideas held by existing leadership and management.

8. Follow the leader

Many smaller organizations delay the foray into ESG and try to see how the larger organizations adapt first. It seems less risky. Or they wait for government legislation, which affects them and all their competitors and therefore must be undertaken. There are certainly pros and cons for waiting or delaying ESG strategies; yet again, your competitors may force the need to change. Senior management should be developing contingency plans for the inevitable ESG commitments.

Smaller organizations often follow the market leaders. This makes sense much of the time; but not all of the time. The DEI resistance based on US ideologies in 2025, is a good example. While many US-led corporations have amended their policies to downplay DEI, leading corporations see value in a diverse work force. US governmental regulations require that DEI policies be scrubbed in order to qualify for government contracts. Leading organizations have shown that they can “walk and chew gum at the same time.” US-led and other global corporations need to attract and retain high-performing staff, diversity has shown to be effective – DEI is being “rebranded” but not forgotten.

9. Policy is an end, not a means

This occurs too often and results in platitudes and not the intended impact. Drafting an ESG policy without adequately changing practices, is another form of bluewashing. Continuing to source materials from countries or suppliers that do not respect the ILO standards, yet your policy implies that this is important, fails the ESG compliance test and damages the image of the company.

10. Reporting metrics are confusing

They can be. But they can be navigated. Select the ones which are most appropriate to the reporting company and align your organization accordingly. Drawing from the UNSDGs and circular economy principles is a good start towards reporting out. We learn as we go but we need to be seen to be going in the right direction. <https://www.iso.org/news/2025/09/iso-and-ghgp-partnership>

11. Ensuring compliance with supplier codes of conduct

It sounds difficult to evaluate the commitments of a supplier factory across the globe but it's relatively easy. Companies such as QIMA specialize in providing credible audits on all types of inspections. Having supplier codes of conduct in place without being able to ensure compliance could be seen as bluwashing.

Digitalization of business⁴

Knowing about digital technology and the need to transform business is no longer good enough. As companies across all industries embrace the changes of our increasingly digital work, we are seeing leaders at the helm of these companies dive deeper into how technology is being implemented and controlled.

For the organization to succeed as a Digital Enterprise it has to transform itself to meet the challenges of our post-industrial Digital Age, by embracing an adaptive culture, employing technology at its core, and creating new business models.

Employing technology at the core of the business is called *Tech@Core*. Determining whether the organization is Tech@Core requires an assessment and positive yes on the following aspects:

- Leaders understand the critical nature of tech to their business and are tech savvy
- Leaders depend on technology to create innovative customer journeys
- Customer value replaces cost as primary performance measure
- Speed and ability replace cost and efficiency as technology drivers
- Technology knowledge and experience are continuously evolving
- Leaders promote fast, frequent experimentation and learning, while maintaining the discipline to select and evaluate the right experiments
- Reducing cycle time maximizes the value from learning

To strengthen the organization's technology capabilities, the following steps could be taken:

- Shift the technology fitness function to speed and adaptability
- Accelerate technology edge over competitors
- Maintain awareness and take advantage of technology shifts and trends
- Develop and maintain a digital technology platform strategy
- Reduce technical debt to increase speed and adaptability
- Get key technology staff involved and constantly improve their capability

Organizations with successful digital transformation will likely use more sophisticated technologies such

⁴ A special thanks to **Andries Jacobs** Ph.D., [M.Com](#), CMC Controls Assurance and Systems Transformation. PDO Solutions Ltd. for the digitalization notes

as AI, the Internet of Things, and advanced neural machine-learning techniques.

For organizations to generate a technology shift and follow or lead trends, information and intelligence regarding the following six guiding principles must be gathered, analyzed, and formulated:

1. Signals: What are you seeing that is indicative of this shift?
2. Business input: How might this shift impact your business?
3. Horizon: What is the time horizon for the trends within the shift?
4. Urgency: How urgently do you need to react to the trend?
5. Technical impact: What capabilities will you need to implement your strategies?
6. Actionable advice: What advice will you offer your organization on how to approach and use the shifts and trends?

The organization's capability to adapt to value driven digital transformation practices, based on an understanding of the six guiding principles, will be critical to success.

What is digital transformation?

Rather than thinking about digital transformation as a trend with a clearly defined beginning and end, think of it instead as a series of waves in the ocean, each of which makes an impact before giving way to the next one. But, as is always the case, as one wave crests others form behind it. And even though many of us are still adjusting to the changes brought by its predecessor, the next wave of digital transformation is already upon us.

To ride the individual waves and take advantage of the extraordinary productivity growth each wave brings, and understanding of the technology makeup of the wave.

- First wave – Digitalization: Arise from adoption of personal computers, use of mainframe and mini-computers, desktop publishing, communication applications, and computer-aided design.
- Second Wave - The internet: Arise from US military network (ARPANET), National Science Foundation Network as internet backbone (NSFNET) linking of emerging internet services (ISP), Hypertext transfer protocol (HTTP), world-wide web (WWW), and Internet (commercialization of NSFNET).
- Third Wave – Digital transformation: Known as the Fourth Industrial Revolution, or the Second Machine Age. Arise from the intersection of cloud computing, big data, Internet of Things, Artificial Intelligence, across the market.

To date, the current wave, also known as the third wave, is profoundly more disruptive than what happened in waves one and two. The third Wave or Digital transformation wave comprises the following technologies:

- Cloud computing: As a model of accessing shared pools of configurable hardware and software resources, that can be rapidly positioned with minimal management effort via the internet.
- Big data: Big data is critical important for training Artificial Intelligence (AI) algorithms. Digital transformation initiatives require the capability to manage data at petabyte scale.
- Internet of Things (IoT): Connecting any device equipped with adequate processing and communication capabilities to the internet for sending and receiving data.
- Artificial Intelligence: The science and engineering of making intelligent machines and computer programs capable of learning and problem solving in way that normally require human intelligence. With machine learning as a subset of AI learning from example and experience,

rather than depending on pre-coded or pre-defined rules that characterize traditional algorithms.

As digital transformation is a disruptive force, it has rapidly become a household name and the focus of the corporate world. Business leaders who focus on digital transformation understand that to survive, their organization will have to go through fundamental change.

AI as universal engine of execution

Within the Third Wave AI is the most advanced and disruptive. As digital technology increasingly shapes “what we do” and enables a rapidly growing number of tasks and processes. AI is becoming the new operational foundation of the business, the core of the company’s operating model, defining how the company drives the execution of tasks. AI is not only displacing human activity; it is changing the very concept of the organization.

We have to be clear in understanding AI is not a standalone technology, rather the *science of making inanimate objects smart*. AI helps to solve problems through performing tasks which involve skills such as pattern recognition, prediction, optimization, and recommendation generation, based on data from videos, images, audio, numerics, text and more.

The value of an organization is shaped by its business and operating models. The business model encompasses the strategy of the organization: how it seeks to differentiate itself from competitors by providing and monetizing its unique set of goods and services. The operating model encompasses the systems, processes, and capabilities that enable the delivery of goods and services to the organization’s customers.

The operating model delivers the value promised to customers. Whereas the business model creates a goal for value creation and capture, the operating model is the plan to fulfill the goal. As such the operating model is critical in shaping the actual value of the organization. Ultimately the goal of the operating model is to deliver value of scale, to achieve sufficient scope, and to respond to change by engaging in sufficient learning.

Managing scale is about designing an operating model to deliver as much value to as many customers as possible at the lowest cost. Improving scale involves efficiently increasing the production volume or the number of customers served.

The organization’s scope is defined as the range of activities it performs. Economics of scope is an important enabler to establish multiple lines of business, manage multiple business units and create true conglomerates. AI could be used as an enabler to increase or optimize the variety of products and services the organization offers to its customers. AI driven assets and capabilities can help the organization reach economics across diverse business.

The learning function of an AI driven operating model is driving the continuous improvement, increasing operating performance over time, and developing new products and services.

The circular economy refers to all the efforts in seeking a systematic and scientific method to transform the traditional “take-make-waste” one way flow of resources to a circular based approach. It is not simply about recycling, but also rebuilding the environment that we have disrupted, as well as trying to design a new system such that the externalities we exert on the environment as we produce and consume are mitigated.

Let’s have a look how organizations are using AI achieving their Circular Economy targets.

ZenRobotics⁵, founded in 2007 was the first company to leverage AI and robotics in a demanding waste processing environment. The company used AI and robotics to recover recyclables from waste. Robotics adopt as a technology allows greater flexibility in waste sorting, enabling operators to react quickly to changes in a waste stream and increasing the rate of recovery and purity of secondary materials. Using AI, the waste is monitored by cameras and sensors. The robots make autonomous decisions on which objects to pick, separating the waste fractions quickly with high precision.

Tomra⁶ is renowned for developing the world's first high-capacity near infrared (NIR) sensor for waste sorting applications. The organization creates solutions for optimal resource productivity. They designed an algorithm that can analyze images to identify non-uniform produce that does not sell in grocery. It can arrange goods into grades so it can be put to best use, thus reducing waste.

NotCo⁷ developed a robust process by using AI algorithms to originate plant-based foods that replace meat, fish, dairy and egg-based products. A similar approach is being taken by New Age Meats⁸, which uses AI to model and optimize the conditions for producing lab-grown meat. The machine learning algorithm identifies new plant-based foods and compiles food formulas by detecting patterns at a molecular level and analyzing flavour molecules.

Digitalization potential

With the advancement of AI and the real possibilities it can offer us, there is no doubt that it will be a very great asset for helping us to achieve a truly circular economy. The endless data solutions that are relevant across all industries can enable us to see the fruition of our circular economy ideals become a reality in a much faster period of time.

As more industries realize the importance of changing from a linear economy to a circular one, it is hoped that further development in this field will persuade these industries that not only does it make moral sense but also an economic revenue growing sense, to embrace the change. AI and digital advancement hold the potential to accelerate our returns from investment in technology. Along with the pending benefits is the responsibility to apply technologies for the greater good. Here is to hoping that AI will be the solution to building a cleaner, less wasteful and successful new world.

Blockchain

Blockchain technology is changing supply chain practices with the ability to share data, its security, and the smart capabilities. The provenance of materials and labour will enable a transparency which can prevent fraud, eliminate intermediaries, and automate processing. Authors Köhler and Pizzol, in their publication, *Technology Assessment of Blockchain-Based Technologies in the Food Supply Chain*, summarized the elimination of staff intervention in perfunctory clerical roles to try and address these issues. People can't adequately cope with the volume of information on the traceability of labour and materials and hope to stop illegal practices, spoiled good in-transit, or lost shipments. Blockchain is

⁵ <https://zenrobotics.com/>

⁶ <https://www.tomra.com/en/about-us>

⁷ <https://notco.com/us/products/notmilk>

⁸ <https://newagemeats.com/>

meeting the challenge where consumers and customers expect accelerated delivery times with reduced handling costs.

Walmart had deployed blockchain as a solution to the last mile traffic jams. It's patented *Smart Package* utilizes a blockchain-formulated application to scan environmental conditions, locations, and private key addresses of shippers, carriers, and customers.

Blockchain is being used to trace the source and embedded carbon levels in EV batteries. In Europe, starting in 2024, batteries must disclose their carbon footprint. British-based Circular, is the service provider to French battery maker ACC, which makes batteries for Stellantis, Mercedes Benz and other EV auto makers. Circular provides trace services of materials for many sectors to ensure ESG commitments are validated and to address risk management issues in raw materials and finished goods from critical materials to plastics and recycled content.

Proof of delivery (PoD) has been a pervasive problem for all companies shipping products for many years. The hours of time spent to confirm deliveries or locate missing packages is overwhelming from a staffing perspective, for just the PoD portion of a shipment. Ensuring refrigerated goods are kept at the correct temperature is difficult to communicate expeditiously in a paper-based world. Again, blockchain can ensure real time data is transferred to the parties involved to meet shipping specifications, facilitate transactions, and complete the record keeping within a secure, distributed ledger, efficiently.

EV batteries now have a *passport* which provides all of the information as to the provenance of materials from a mine to an individual car, components, recycled content, and carbon content. It's capable of tracking supplier energy costs and renewable energy sources. Volvo partnered with Circular to develop the product, estimated to add ~\$10.00 per vehicle. They launched the blockchain-based technology for its EX90 SUV in 2024, being manufactured in the USA. The EU wanted this data available by 2027, but Volvo has delivered in advance.

Cryptocurrency

Built off blockchain technology, cryptocurrencies are both a speculative commodity and a means of making payments between supply chain partners. Walmart and DLT Labs in Canada have been using the distributed ledger technology to track, trace, and process payments and reconciliations since early 2020. This involves 60 of Walmart's carriers, 500,000 shipments per year, and its 400 Canadian retail outlets, leading to substantially reduced massive numbers of transactions requiring clerical staff to try and manage. One carrier reported a 97% reduction in invoicing discrepancies. One of the root causes of the previous system was the fact that Walmart had to deal with multiple information systems. Blockchain brings them all onto one platform.

Walmart's Global Chief Technology Officer, Suresh Kumar, said that "Crypto will become an important part of how customers transact." Large retailers and trucking companies will likely follow suit and adopt similar blockchain with cryptocurrency options now that Walmart has proven its viability.

The infamous collapse of FTX in November 2022, after only 3-years in operation, added to the perceived levels of risk with cryptocurrencies as a secure form of payment and investment. In late 2023, the IMF encourages public sector financial organizations to continue to draft regulations on the use of central bank digital currencies (CBDC). ~60 countries are looking at how CBDCs can replace the use of cash and still have secure funds, while supporting cross border payments. Financial inclusion is an important aspect of retailing in emerging and low-income countries. FTX was ordered by a US court in mid-2024, to pay US ~\$13B to customers under its bankruptcy liquidation. <https://www.reuters.com/technology/crypto-exchange-ftx-ordered-pay-127-bln-customers-us-cftc-says-2024-08-08/>

In November 2023, *Binance*, the largest crypto currency exchange, pled guilty for failure to comply with

the US Bank Secrecy Act, and paid a fine of US\$4B. Binance failed to maintain an effective anti-money laundering program and its founder, Canadian national Changpeng Zhao, participated in illegal transactions with Iran, Cuba, Syria, and Russia. This adds to the complexity of trying to reign in cryptocurrency transactions in a lawful manner. <https://www.justice.gov/opa/pr/binance-and-ceo-plead-guilty-federal-charges-4b-resolution>

In early 2024, several exchange-traded funds (ETF), tied to the spot price of bitcoin, were approved for trading by the US SEC. While cryptocurrencies are still viewed as risky, it will be interesting to track these volatile assets.

By late 2024, cryptocurrencies got a boost from the US election, where Republican policies favour renewed interest in cryptocurrencies. The industry anticipates a wide spread adoption of digital assets for integration with the US banking services and the SEC. They expect new governance regulations to enable an expansion of bitcoin strategies.

The emergence of *stablecoins* tied to the US currency occurred in 2025. Stablecoins operate within an introductory legal framework intended to promote their use with US currency. Most transactions take place outside of the US and are linked with crypto assets. Stablecoins are useful where domestic financial systems are weak or with regulated international financial transactions due to capital controls or sanctions. A cautionary warning with stablecoins is the potential for private companies to issue stable coins which is a threat to existing governmental currencies. Privatization of *seigniorage* could be in the hands of a few uber rich companies or individuals. This could endanger international monetary systems and public confidence. BRICs countries want to move away from the US currency and may find stablecoins a means of undermining the US currency and long-term stability of global currencies, if unchecked. <https://www.imf.org/en/Publications/fandd/issues/2025/09/stablecoins-tokens-global-dominance-helene-rey>

Actions to advance the ESG agenda

Advocating actions are best and easier where there are formal policies in place. However, many organizations do not have corporate policies and are still able to affect changes which consider ESG values. Exercising one's professional fortitude is always an expected form of behaviour and we don't need a policy to state that-it's implicit. Realizing value for money is implicit. Doing good is implicit.

Actions speak louder than words. Actions motivate others to take up like challenges. It's a great idea if there is not a lot of experience to start with small steps-but start! Going out and making a difference builds self-esteem, confidence, and is fulfilling from a personal and professional perspective.

Regardless, we can always do more within our respective spheres of influence. If you haven't yet, consider:

1. Advocate to senior management on raising the ESG profile
2. Talk with key suppliers as to their transition plans for ESG success
3. Keep key stakeholders informed
4. Support buying local for economic development and increased social opportunities
5. Work with social enterprises in terms of hiring individuals and buying goods
6. Engage with not-for-profit organizations to increase their capacity and your awareness
7. Volunteer your managerial expertise or time
8. Encourage volunteerism by staff
9. Allocate a % of your requirements to ensure local assurance of supplies
10. Buy Fair Trade certified products to complement sourcing requirements
11. Review your product commodities and identify where resource conservation could apply

12. Ensure responsible recycling of used goods
13. Get involved at the design stage of products to identify responsible options
14. Consider living wage programs
15. For larger organizations and public sector groups, look at unbundling large contracts to increase opportunities for SMEs and SEs
16. Measure your Scope 1 and 2 emissions and look for reductions
17. Work with suppliers to reduce Scope 3 emissions
18. Ensure your supply chain has conflict free materials
19. Revise job descriptions to include ESG responsibility
20. Assess how to deconstruct vs demolition of buildings and structures for replacement or removal
21. Encourage staff to display international flags which represent their diversity
22. Host local food days to showcase suppliers
23. Organize clothing donations and cover shipping costs
24. Host events which showcase ethnicity and diversity of cultures
25. Share information across multiple networks
26. Eliminate waste through design and practices
27. Weight the total cost of ownership when decision-making
28. Ensure policies reflect stakeholder interests and practices follow accordingly
29. Adopt a supplier code of conduct
30. Ensure business ethics are meeting or exceeding expectations
31. Develop KPIs and report out
32. Support community gardens
33. Install a vermiculture container for waste foods
34. Hire co-op students
35. Consider gift matching by company with employee causes
36. Reimburse staff for taking public transit
37. Denounce discrimination and harassment
38. Support products which align with the circular economy principles
39. Use P-cards to support local businesses
40. Think beyond the lowest cost
41. Affect and accept professional responsibility
42. Challenge the status quo in practices
43. Offset GHGs from corporate travel
44. Support local artisans when buying corporate schwag
45. Share best practices with suppliers
46. Implement a decarbonization strategy
47. Take actions within your sphere of influence
48. Be a discerning consumer
49. Be a responsible customer
50. Build a leading ESG organization
- 51. Hire Larry!**

Coda comments

Rationale supporting ESG

Environmental, social and governance practices are a means to demonstrate a commitment to do good for all stakeholders, which includes the natural ecosystem. We will continue to extract resources to sustain our lives but we know we can do so in a more responsible manner. Business operations can be sustainable and profitable without doing harm. To continue supply chain operations which knowingly are not aligned with internationally recognized standards is willful blindness. Willful blindness is a conscious decision to avoid acting responsibly as it conflicts with one's self-interests where the end cannot be justified by the means.

The need for due diligence in business investments will continue to challenge business and government leaders. Infrastructure improvements in all transportation modes is a basic requirement to sustain competitiveness as a country. Technology will play a larger role in business solutions aimed at efficiency gains. There is as much risk with inaction as there is in a risk of a poor investment.

Sustaining success in business has moved beyond simply making profits. Stakeholder capitalism wants to know how those profits are being achieved. A combination of environmental, economic and social values is required to provide a balanced solution. The ratio between these three elements will change as conditions and practices are revised through technical advances and as stakeholder expectations are raised. Stakeholder capitalism is the acknowledgement that values are multi-dimensional. Whereas, shareholder capitalism was one-dimensional, we have seen that a broader set of values, which ESG encompasses, brings the economic, environmental and social interests into a common framework for value. Each of the components must be addressed to ensure a sustainable organization and the communities which it serves-either directly or indirectly. ESG is not a philosophy, it is a value proposition which concurrently addresses the needs of all stakeholders, not just investors.

While we are trying collectively to reduce the average global temperatures to survive as a people, we would prefer to do so without any economic sacrifices. The WEIRD world is concerned about the damage to the environment and natural ecosystems but argues over what might be a reasonable time frame to achieve the scientific targets. Affordability is confronted by economic investment in a circular economy to be able to attain the desired objectives.

Circular economy

Repurposing resources through design innovations allows us to save existing resources and materials and support continued economic activities. This foray into the circular economy encourages and requires many sectors to rethink how they are going to function in the years ahead. Appropriate compromises need to be made as society cannot continue to absorb tonnes of waste materials, which are increasing year-over-year.

The fate of paper bottles may land in the reluctance of consumers to change their buying habits from what they know. Until there are E-vehicles which are more affordable, due to technical advancements, tax subsidies will continue for the foreseeable future. The ban on the manufacture and import of many plastic products required legislation as the industry stuck with the status quo due to the fear of increased costs. More investments in circular economy designs of products may require some type of legislation to make them viable where there is a good scientific case for long-term economic, social and environmental benefits. Legal challenges to legislated requirements, such as the ban on plastics, should be expected in a democracy. Moral responsibility requires legitimacy to be enforceable.

The data from various studies showing a net increase in employment may help to alleviate the fear of

large job losses in the transition to the circular economy. There will be asymmetrical shifts based on market sectors, technology, and how each are affected by the circular economy. Supply chains will need to prepare and adapt in order to remain economically viable and socially responsible.

The positivity related to the outcomes by leading companies which have adopted the circular economy principles and practices, should encourage and embolden other organizations to do so. When we can realize savings in energy, resources, labour, and offset the impact to climate change, we are on the right track.

Energy

Doug Lightfoot, an esteemed Mechanical Engineer (retired), says *all fuels are not equal*. His summary considers oil, as currently the most valuable for its ability to be liquified for fuel to support transportation, as a source of plastics, and for its petrochemical properties; Coal is still a major source of electricity and can be liquified; Natural gas for heating, ability to formulate with hydrogen and for fertilizers; Wind and solar for electricity can be costly with needs for storage; Nuclear is seen as the safest and most reliable; and biomass is entering the markets but may compete with foods. Fossil fuels still power 80% of the energy needs. Oil and coal are diminishing in most western markets due to regulations and renewable energy alternatives becoming more affordable.

Energy and fuel alternatives must continue to be developed in scalable formats to make meaningful reductions in GHGs. Scientists reiterate the criticality of the 2030 reduction target of 1.5° C to achieve the mean global average temperature of 13.6° C. This will approximate the period of 1850-1890, being the preindustrial period benchmark, as agreed in the 2015 Paris Climate Agreement. Different geographical locations will need to find which type of energy is affordable for their needs as compared to other countries. The European Union's climate monitoring service reported that in 2023, the world experienced temperatures which averaged more than 1.5C.

Hydroelectricity will compete with hydrogen fuels in some sectors. Renewable energies will be multifaceted. It will take decades, and is highly improbable that a single renewable energy source will dominate all sectors. Much as today, where fossil fuels dominate the commercial, industrial and transportation sectors alongside other forms of energy. According to Lightfoot, the US burns ~200 tons of coal per second!

LNG which appeared to be a good option in the energy markets due to its lower CO₂ emissions, has shown to be a *greater* problem due to its higher methane emissions. The infrastructure investments and engine conversions to adapt to LNG may need to be scaled back dramatically with high financial losses attached. As science is able to measure the impact of various fuels and assess their global impact, this invites more risk in the market for investors, making renewable energy more attractive.

Environment

The environment is quite literally a global problem and will require collaboration between international players on where priorities should be focused. One of the root causes to environmental problems is the design of products. We will transition to a circular economy which will have at its centre, a reduction in consumption of materials and resource conservation. Reducing the burning of coal in countries like the US, India and China will have a large impact on the reduction of GHG emissions.

The environment has been on our radar for 50-years and we have only recently realized how ineffective our tactics have been to mitigate our collective impact. The clock is ticking and more urgency is necessary to address our common problems. The WEIRD economy used the emerging economy countries as dumping grounds for our waste products for decades. This allowed the continued design-for-disposal strategy in the production of goods. The consumption of water, a necessity for survival, was

seen as an infinite supply and could never run out. Global warming is melting glaciers at a rate that threatens water supplies. In spite of these signs, we wait for government edicts to curb our thirst for water in production and attaining natural resources to sustain a life style which conflicts with the balance of the ecosystem. Yes, EVs may be good but they will also entail an increased toll on the environment as we hasten to extract the ore required to make the batteries and other components.

The environment gets more attention when it affects potential economic interests or social values. The voice of science should have a stronger presence in boardrooms, as there are more responsible solutions. Some of these solutions will not have the same ROI but can be more sustainable. Science needs to be present at the government policy planning stage to have the long-term perspective as to how we transition away from the fossil fuel economy. Science and research will need to make the case for which technologies should be supported in design and marketing and which, just because we can make it, should be given closer scrutiny. Science gave us plastics and Teflon, arguably a benefit in the short-term for economics and consumer convenience but turned out to be an environmental catastrophe in the long term.

Technology

Digitalization enables the transformation from an economy based on massive consumption to one based on strategic conservation of resources. Supply chain resilience will embrace technical advancements to solve logistical problems. Electrification and decarbonization will require massive investments for scalable solutions. As the example of Maersk and IBM's partnership with TradeLens failed due to a lack of uptake in the shipping sector, this reiterates the need that any solutions must meet the interests of at least a mass of customers which makes commercialization viable.

Disruptive technologies will continue changing how we do business and how we move goods for resilient sourcing in an economy framed around circularity. As new pharmaceutical products may be discovered in our oceans, it will create debates as to who benefits from these breakthroughs. Sharing of land resources has largely been determined by the companies that buy the rights to control. Agreements, such as the UN Convention on the Law of the Sea, are causing a pause and reflection as to how to manage the wealth of the oceans, where there are few sovereign rights. Developing countries will want an equitable share or access to these relatively new resources.

Role of governments

In Canada, governments come in three forms: Federal, Provincial, and Municipal. Other governmental entities are Crown corporations, Universities, Schools, and Hospitals. In a democracy we are open to new politicians every few years to try and get the correct monetary, fiscal and social policies in place. The uncertainty of newly elected officials contributes to a reluctance on the part of private sector businesses to respond to the various edicts and legislation, as their shelf life is often tied to a political ideology. Each variation of a government entity will have its own procurement policy and practice. While ideas may be shared, they often are buying the same goods and services, from the same suppliers, under separate contracts, and different sets of criteria. In the smaller communities and towns, government spending has minimal oversight and is influenced directly by locally elected officials.

Carbon taxes or some form of internalizing the cost of decarbonization will require fiscal policies by many governments to address inequities in geopolitical locales. If country A offers a lower taxation rate than country B, it will attract some producers who intentionally avoid the carbon taxes. Transparency of operations and the provenance of goods will require a robust monitoring and auditing process.

Legislation, based on scientific research, is the best means to affect the requisite change. Industry seldom is capable of voluntarily reducing emissions and consumptions without governmental

intervention or incentives. Consumers are at the receiving end of the problem and it is the source which needs to be corrected for designs, materials, production, health, and economic sustainability. Government intervention was required to shift to LED bulbs from incandescent. E-vehicles require substantial tax breaks to manufacturers to encourage more people to buy them and build an affordable market.

There are an estimated 600,000 EV vehicles in the market in Canada in 2025. That is a potential source for recovering critical materials. At this time, there is no effective regulations addressing the recycling of EV batteries. Although EV sales are tumbling, existing materials are in the market and need legislation in place to have an orderly collection system. This is part of the circular economy and again, reiterates the lack of leadership by governments to plan ahead.

The rapid acceptance and growth of GAI and other technologies in all sectors will need to be monitored closely. While expanding jobs there will typically be winners and losers in these asynchronous events. Adapting policies and ensuring the right incentives are in place to protect economic development and social values will be an important role for governments to play.

In 2018, the government of Canada finally banned asbestos, 30-years after the World Health Organization declared it a carcinogen. The lobbying by the Quebec-based asbestos mining and exporting companies continued unabated for decades. Effective January 2024, there is a requirement to have government approved licenses in order to work on sites containing asbestos in British Columbia. WorkSafe BC has stated that there have been 1200 asbestos-related deaths since 2002. Even within the legislated ban on asbestos, there remains many exemptions. This type of foot dragging by governments undermines the credibility with other government edicts to address environmental and health issues.

The social procurement strategies deployed by governmental agencies at all levels must continue and be amplified. It is creating meaningful employment for people facing systemic barriers to employment, which represent the disenfranchised in our communities. When they are engaged in work the studies show that there is a drop in crime, improved physical and mental health, less dependency on social programs, improved self-esteem, increased local spending, and reduced shelter costs. Social procurement does NOT cost government agencies more to train and hire these individuals. It's a win-win for all parties. Private sector companies are facing a labour shortage for the balance of the decade for a variety of reasons. One of the labour pools which is available to tap, is those potential workers who typically face barriers to employment. Every community has them and employers should be encouraged to *accommodate* their needs to build the social capital and meet growing labour demands. The World Health Organization estimates that 15% of the global population is dealing with some form of a disability. That equates to 6M+ people in Canada.

Weather-related disasters and long-term climate change strategies will require major funding by the Federal government to assist the other levels of government to become more resilient. This financial support will take place on a global scale. As money moves without being hampered by borders, so do the effects of global warming. As the PRI stated in their *Inevitable Policy Response* report, governments must be aggressive in ensuring industry and consumers change their practices for a sustainable future.

In a startling 2024 European Court of Human Rights' (ECtHR) ruling, it was found that the Swiss government failed to do enough to combat climate change. This will echo across many countries and indicates a level of liability for insufficient actions being taken to address issues which affect climate change. This could lead to more of the 46 signatory countries to the ECtHR being charged for failing in their governmental responsibilities. The court stated that the Swiss government failed to comply with GHG emission reduction targets and had not set a carbon budget. The decision cannot be appealed. The ECtHR ruling could echo far beyond the EU.

The echo was heard in the UK in mid-2024. NGOs took the UK policy on climate adaption to court. Their case states that the government failed to protect citizens from risks related to higher temperatures, flooding and extreme weather. Specifically, lacking in proper objectives as opposed to generic recommendations. <https://www.reuters.com/world/uk/britains-climate-change-plan-challenged-landmark-court-case-2024-07-23/>

The US shift in ideologies, which supports renewed exploration of fossil fuels in 2025, will need to be grappled with for many years by other countries which trade with the US. Scientific concerns will be trumped by political agendas favouring an appearance of an economic advantage to the US. After the CUSMA agreement was concluded, the US president at the time, said it was the best deal ever done. Now a few short years later, it needs to be torn up because the US feels it got the short end of the stick. Breaking trade agreements or not respecting existing agreements, is an attempt to move away from the rule of law. It sets a dangerous precedent on many fronts.

Buy Canadian Policy

In late 2025, the Public Services and Procurement Canada announced it will draft a *Buy Canadian Policy* to support government commitments to rebuilding an economic model with less dependency on US markets. The government wants to prioritize Canadian suppliers, materials, local labour, and modernize the procurement processes for small, medium businesses to have a better chance of winning government contracts. The government is seeking input from business leaders. No date was set as to when such a policy may come into effect.

Highlights of the federal procurement policy are:

- Requiring local content in federal contracts to ensure government spending supports Canadian workers, businesses, and communities.
- Prioritizing Canadian steel and softwood lumber in major defence and construction projects, with flexibility to expand to other key materials.
- Implementing reciprocal procurement policies with trusted partners to promote fairness and protect Canadian jobs.
- Launching a Small and Medium Business Procurement Program to cut red tape and help SMEs navigate the federal procurement system more easily.

<https://www.supplypro.ca/ottawa-to-implement-buy-canadian-procurement-policy/>

Concurrently, the federal government is reforming its procurement procedure for Defence contracts.

<https://www.supplypro.ca/liberals-roll-out-new-defence-investment-agency-to-speed-up-military-purchasing/>

Role of consumers

Consumers are customers, stakeholders, taxpayers, voters, and represent a significant portion of the demand side. Changing behaviours and habits will take science, education, and tradeoffs with health, convenience, and costs. Costs dictate the priorities for family choices. Buying an EV may be put off for an ICE due to cost. Fast foods may address the convenience factor but not the long-term health issues. Vinyl siding on a house rather than wood may be faster for the builder and reduce construction costs to the owner but eventually the vinyl will fail. Buying plastic products is largely driven by an implication that disposable products can be fully recycled, which we now know is not entirely true. The unseen microplastics have contaminated every region on the planet. The collective conscience of consumer choices chafes against the collective self-interests of many sellers. The circular economy will assist through the initial design of items but may take further legislation for force change and alter

consumptive habits.

Food Banks Canada reports that food affordability has driven up the visits to food banks dramatically. ~20% of those needing to visit food banks have jobs. Many are children under 18-years of age. It's not the lack of food; it's the cost of the food. The marketing strategies of all goods, including food to consumers, must reset the balance between the need for sales, health, and consumption of resources. The production and distribution contribute to environmental problems while the actual health or safety of the consumer is sometimes an afterthought. Our look at packaging is the tip of the iceberg. We have to have continuous governmental interventions to assure the wellness of the consumers, fish, animals, poultry, and plants are respected. <https://www.cbc.ca/news/canada/food-bank-use-highest-in-canadian-history-hunger-count-2023-report-1.7006464>

Consumers need to hold corporations responsible for their actions. This is done primarily by not buying their products or other brands when egregious acts are committed. The J&J (alleged) baby powder being contaminated and knowingly selling it long after this was known, is similar to the tobacco companies hiding, downplaying, and denying the effects on health for decades. In the end, they wrote a cheque and continue on as if nothing has happened.

Consumers have an important role in their community's economic and social development. Buying from a *local* business and an MNC should not be a binary decision. You can buy from both sellers in the market. We know there is a greater benefit when buying from a local supplier than a foreign-owned MNC and should base decisions which balance our needs. Yes, the cost of consumer items is important but it's the *hidden* costs that we can lose sight of such as the local business going bankrupt because it comes down to the scale of economies. The hidden costs of MNCs affecting cultural and social values. Older, established retailers failed to adapt to the Walmart wave of competition and paid the cost. Their customers did not see the value proposition in the consumer's favour any longer. There are growing oligopolistic markets based on the lowest cost of goods and not necessarily the real value of those goods. Consumers can exercise their sense of conscious capitalism in decisions around local vs MNCs or imports vs domestic products.

Case in point, 300+-year-old iconic Hudson's Bay Company filed for bankruptcy in 2025 for not adapting to the retail customer buying patterns. The Bay has been owned and controlled for the past few decades by US-based NRCD Equity. Liquidation of the Bay will lead to termination of ~9000 employees as the retail sector continues to crater. There will be a negative social ripple due to that many employees being terminated as other retailers cannot fill that void in the market. Online marketing continues to eat "someone's lunch."

Shein supply chain under mounting cost pressures:

China's ultra-fast fashion company operates by using hundreds of local "Shein villages" in rural China to produce low-cost garments. Each village has many small batch entrepreneurs which have participated in the export of US\$30B per year of products to online, global customers. Consumers have little concern as to the social impacts of the workers, only to get the latest trending low-cost items, as quickly as possible.

In 2025, the production in China is changing with the revisions to the aforementioned de minimis rules new tariff threats, and the shift to Vietnam for production of fast fashion goods. Shifting production to Vietnam will cost Shein more to produce the items, but will likely be passed on to consumers.

Many of the Shein village operators will close shop as they can't afford to relocate to other locales.

<https://www.reuters.com/business/retail-consumer/sheins-tariff-busting-shift-hits-home-chinese-factory-hub-2025-04-16/>

One of the world's most valuable companies, and one which has had tremendous impact on consumers

globally, is Johnson & Johnson (J&J). For over 135 years, J&J products have been accepted into homes and hospitals based on a level of trust in their brands. J&J's annual sales are US\$ 98B+ and employ ~155,000 people. The darker side of J&J is being aired in their fight to avoid settlements with their baby powder and other talc products. Allegedly these products contained asbestos resulting in deaths due to mesothelioma, ovarian and other cancers. In 2021 J&J set up the LTL Management LLC company and filed for bankruptcy to avoid paying billions of dollars in claims and cap the settlements. According to attorney Andy Birchfield, representing the cancer victims, involving thousands of law suits, "J&J has spent two years trying to convince us that somehow a company worth a half-trillion dollars is bankrupt. It's time for the nonsense to stop and for J&J to accept responsibility." In May 2024, J&J is proposing a \$US 6.5B settlement in an attempt to settle many of the lawsuits it is facing. In September 2024, J&J was proposing a 3rd bankruptcy case valued at \$US 10B to avoid further litigation.

<https://www.reuters.com/business/healthcare-pharmaceuticals/jj-subsiary-files-bankruptcy-advance-8-billion-talc-settlement-2024-09-20/>

In 2020, J&J stopped selling its baby powder in Canada and the US but continued to allow sales elsewhere. Consumers and health care customers seem to have adopted an attitude of apathy for corporate misdeeds and default to a court making the decisions, with seldom any backlash for their favourite brands, in spite of being duped for decades - allegedly. Again, *15 minutes of bad news*, and we move on.

Consumers are entitled to their opinions. It will take more of a collective conscience to change conditions and acknowledge that cheap clothing should not come at the expense of the worker which made them. The same theory applies to paper-based packaging in general. If consumers know there is an environmental benefit for switching to paper from glass or PVC plastic, they will buy what is most responsible. Consumers can't afford to say they won't support it if there may be a slight premium for paper alternatives, as they can't afford not to. Consumers should be made aware of potential hazards when using any product and the company behind the brand needs to accept their responsibility for profits and liabilities when bringing it to market. E-vehicles come at a premium but are sold on the basis of their long-term environmental benefits. Consumers are literally in the driver's seat on responsible choices. Intuitively, consumers want to buy responsible products but the marketing noise obfuscates decisions.

Consumers are facing increasing affordability factors in Canada. With increases in property taxes, rising governmental service costs, recycling fees, energy and fuel taxes, along with inflation due to shortages of supplies, it is becoming more difficult to support long-term ESG decisions. While many favour the promising ESG solutions to address global warming and related issues, in the short-term, all programs are paid for by the same consumer through consumption taxes in some form. Affordability limitations are a real concern as to how far and how fast ESG practices can be rolled out.

Plant-based proteins, which are arguably more sustainable, face resistance due to inflation affecting menu decisions by retailers and restaurants, reflecting their customer's waning demand. Countering the pressure on plant-based products is the sustained growth of organic products, including meats. Concern for health benefits of organic products is offsetting some of the rising prices. Common commodities such as coffee, are being directly impacted by global warming and changing weather patterns. In early 2025 coffee prices are expected to spike due to the prolonged 2024 droughts in Brazil and Vietnam. These two countries produce ~50% of the global supply of coffees. Other crops grown in these countries will see price increases passed along to consumers.

The EV market is affected by consumers wanting to buy affordable EVs. There are cracks in this market which are compromising the development of the EVs and the ability to achieve net zero. The CEO of Enterprise Mobility, Taylor, stated in late 2023, on the adoption of EVs, "*Quite honestly, the demand has*

always been low. It's just slow. It's not where it needs to be. The demand is low because the infrastructure is low. For us, it is an evolution, and the customer has to drive it. We have not put a goal on it. We will move as fast as the customer. We never want to surprise them with new technology." The CEO of Mazda, Moro, reiterated this point on EVs as well, "How we get to zero is up to consumer choice and social infrastructure."

By late 2025, the demise of the EV market is showing chasms – not cracks. Canadian government subsidies have stopped and EV projects are financially doomed. Consumers face massive write downs on fully electric EVs which depreciate faster than conventional vehicles. This has resulted in an increased demand for used ICE vehicles and older model EVs – new EV sales are down dramatically.

Consumers, in their dual role as the taxpayer, saw their governments subsidize billions to make the EV market successful in an effort to reduce emissions – and it's not working. EVs are not achieving the results which were expected. The government subsidy was the consumers paying for the government investment which will likely produce several financial collapses in the EV auto sector. As governments invested in e-buses, which have already gone bankrupt, the return on investment for taxpayers, through the government as proxy, may not achieve emission reductions and run down the funding options. With increased carbon taxes, failed EV and E-bus manufacturers, feverish mining of critical materials, and a higher cost of living, it may be time to stop and recalibrate the risks.

Heat pumps

Consumers are being pushed towards net-zero with the conversion to heat pumps. It's complicated. Heat pumps are not without controversy as to their cost benefits in light of the affordability issues. Heat pumps can reduce GHGs more than most other forms of HVAC equipment.

An example, using the BC Hydro heat pump cost calculator:

1. single detached home ~1500 ft²
2. *lower mainland region of BC*
3. current natural gas furnace 2-10 years old
4. heating seasonal performance factor (HSPF) of 11.5+

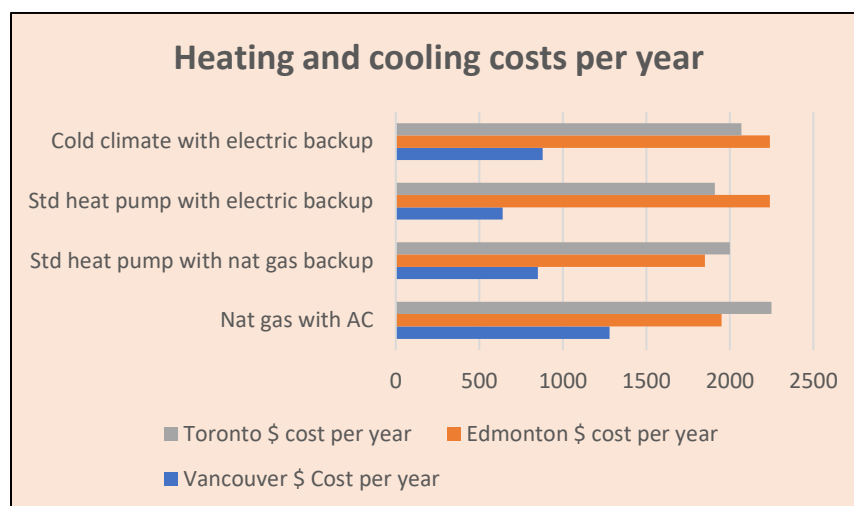
The results of this simple formula showed savings of \$107 per *year* for the life of the heat pump. Their useful life is predicted to be ~15 years with proper maintenance. Buying a unit and having it installed for \$5000, after rebates, is a doubtful investment. In *Central and Northern BC*, replacing electric base board heating, could save \$619 per year, making it affordable in terms of payback.

The rebate schemes consider the cooling requirements using the Seasonal Energy Efficiency Ratio (SEER) of a heat pump to qualify. Most installations require an inspection of a home, prior to qualifying for a grant. There are incentives available to convert to heat pumps from oil and propane, which has sparked a debate between various levels of government as to why natural gas was not included.

Getting off oil and propane fuels for heating homes does yield a dramatic difference in utility savings. For existing natural gas homes, it may be best to let the useful life of an existing furnace and AC unit lapse. The benefits vary widely depending upon geographical location, age of existing HVAC equipment, and the age of the owners. Part of the affordability considerations.

A comparison of the cost of heat pumps for residential heating and cooling shows that where you live, has a large impact on the costs and therefore any benefits. The Canadian Climate Institute has an interactive calculator which allows you to change the variables of type of energy and the type of backup equipment which is required. The backup equipment is a big factor when considering any heat pump. Using a 1980, ~1700 ft² period house, shows the differences in heating and cooling between the 3 cities

of Vancouver, Edmonton, and Toronto. The *average* lowest cost is a standard heat pump with electric backup in Vancouver at \$640 per year, with the highest cost being a natural gas furnace with air conditioning in Toronto at \$2250 per year. A difference of \$610 per year. <https://climateinstitute.ca/reports/heat-pumps-canada/>



Eastern Canada relied on heating oil and propane for decades and must convert to heat pumps. This conversion requires the availability of large supplies of heat pumps and qualified contractors to install these units in a timely manner. Heating oils will be phased out through various government programs as it is one of the highest emitters of GHGs and has a small market size across Canada.

It would be a good idea to tie extended producer responsibility to heat pumps as well, where we have government driven carbon pricing schemes. Older furnaces have lasted 35 years while a 2023 heat pump has a ~15-20-year average life. That means consuming more resources to achieve marginal savings, in many instances, to replace the units more often. If manufacturers designed their heat pumps to last ~25-30 years, that would make more economic and environmental sense. Government intervention may require that only heat pumps with specific HSPF and SEER ratings be allowed to be sold in the market.

For 2025-2026, the BC government earmarked \$100M for low to middle income residents to retrofit their accommodations with heat pumps. People with a low income will be unlikely go out to buy \$8000-19,000 heat pumps, even if there are government rebates. The cost of basic living requirements is escalating. <https://www.cbc.ca/news/canada/british-columbia/b-c-expands-heat-pump-program-to-make-it-more-affordable-for-people-with-low-incomes-1.7505937>

As we see more products with digital features and onboard electronics, the cost of repairs is increasing with only technicians able to make the repairs – even for common home appliances such as washers/dryers and dish washers. Manufacturers are making products technically advanced with various circuitry; being designed to be produced at a lower cost; and intended to consume less energy; however, the tradeoff is that the end customers are paying exorbitant repair costs. Extended producer responsibility requirements would see better designs which extend the relatively short life cycle of products and make them easier to repair. There should be an incentive by manufacturers to lengthen the life of electronics rather than shorten their useful life to sell more. The latter contributes to higher resource consumption and emissions, offsetting energy saving benefits.

Role of private sector

Innovation on all fronts leads to the advancement of ESG goals. It will be an asymmetrical transition as some sectors will be able to adapt to new technologies while others will be on an exit trajectory. The EV boom aligns with circular economy goals but requires substantial investment in infrastructure to make these vehicles a viable option. Charging stations in cities and rural areas must prepare for the pending demand or it will constrain the growth. Research firm, Dunskey Energy and Climate, recommend Level 2 chargers which can recharge a BEV in ~8-hours and a HEV in ~4-hours.

Concurrent is the transition from the fossil fuel based economic development and dependency, to a decarbonized transportation structure. The use of zero emission (ZE) vehicles in all sectors are going to be advanced by continued investment in proven technologies. While vehicles currently are reliant on fossil-fuels, ZE vehicles will only be successful with significant reduction in battery weight and costs; operational constraints must overcome the recharging times and limited travel distance; and infrastructure availability for the various green fuels and adequate and charging and refueling grid. All of these combined need to address commercial and economic viability.

The transition to electric cars for commuters faces similar challenges to get the masses out of traditional ICE vehicles and address the affordability gap. Increased government legislation and use of taxes as an incentive will support the transition. GAI is changing production processes from the drawing board to the shop floor. Introducing technologies that can maintain a healthy balance sheet and be respective of social interests will be a significant undertaking.

The lack of governance as to the claims of misuse of carbon offsets to reduce GHGs and improve the air quality is a concern. This does not mean that VCM programs are all part of a scam but it does rightfully challenge any statements being made as to their credibility and value to address global warming. The cloud of doubt will hang over the billion-dollar VCM market for some time.

Food security and fresh water should remain a top priority to protect. Without these we will not have a sustainable anything. The circular economy is addressing these issues but will require a rethinking of our food production processes throughout the supply chain.

Responsible investing is a growing market sector. To achieve the ESG goals, such as reducing the average global temperature, will require billions of dollars in investment by the private sector. It's encouraging when companies such as OTB Materials reinvent the building block for cement-free concrete and do so competitively.

As Dylan Goggs, CEO of CleanStart says, *socially responsible businesses shouldn't be a thing. Businesses should be socially responsible. They are a large engine in the world we live in, and we shouldn't rely on the benevolence of business owners to do what's right.*

Supply chain responsibilities

The anchoring effect of the status quo is difficult to overcome. New ideas invite risk. New ideas threaten existing products and services. New ideas imply that what we are doing may be wrong. Disruptive technologies can turn a business or sector on its head. But supply chain professionals need to be vigilant and be able to see around the corner at the next best thing. Keeping on top of the best and leading practices is a serious issue to remain competitive or relevant.

Policies are the starting point for adopting ESG practices. The governance which follows requires developing KPIs to be measured and monitored. Without good data analysis you are simply guessing or maintaining the status quo of "we've always done it this way." Don't be afraid to be humbled when inviting external advisors with expertise to complement internal resources. KPIs are primarily for the organizations' external stakeholder's information and internally to assess managerial progress and

competencies. If it can be measured, it can be managed better.

While the cost of goods sold has been weighted on the lowest cost, having a resilient supply chain needs to have a balance between price, delivery, quality and service. Customer retention can be affected by availability of goods and the ease of ordering. Packaging is an important part of the customer interaction and we know it has an environmental impact. The last mile of distribution will likely remain the highest cost but will also be reduced from today's cost factor of delivery as improvements in systems and materials are adopted. By using 3rd party certification standards which ensure conflict-free materials; environmentally responsible materials; safe working conditions; respect for human rights; validating the provenance of materials; supporting ethical business conduct across a supply chain; reducing Scope 1, 2, and 3 emissions; building a diverse supplier base; and meeting inclusivity, diversity, equity, and accessibility expectations; the supply chain is being strategic and affecting value.

When we consider the loss of small, medium businesses and social enterprises to large big-box operations, there could be a case made to strategize for localized commitments. Larger organizations could scan for locally based companies to draw goods and services from, especially around discretionary spending practices. Corporate swag, artwork, cultural events, catering, subtrades, hiring people with employment barriers, or the inclusion of endemic materials in designs. Participation in recycling programs and being part of the reverse logistics cycles demonstrates that ESG can take many types of benefits, without adding significant costs.

Supply chains are immersed in every organization's environmental and social footprint. Yet, a 2023 study by Efficio, a global supply chain consultancy, recaps that 93% of C-suites target revenues and profit maximization. This compares to 66% on net-zero plans and 71% on social impact. For supply chain professionals, 2/3 continue to assess financial strength and service capacity of their suppliers, with less than 1/3 looking at ethics and governance issues. About ½ of the supply chain decision-makers say that incentives do not include climate-related priorities. These self-limiting governance gaps impede the ESG agenda.

Public sector procurement organizations act as the conduit between government policies and the market and bear the responsibility to operationalize legislation. Their main tools are the competitive bidding and tendering documents which state the criteria and weighting. These documents must clearly send the message that ESG is the means to affect change in value. All trade agreements, whether domestic or international, allow for exemptions from competitive bidding processes, where *persons with disabilities, non-profit organizations, philanthropic institutions, or prison labour are involved*.

Cryptocurrencies may be embraced in supply chains as more organizations and Canadian banking institutions gain comfort with their credibility. The increased efficiencies and transparency with reduced transactional costs are too big to ignore. The business ethics and trust with cryptocurrencies now needs more attention than the technology behind it.

Complicating the consideration of various types of currencies in general, is the push by Brazil, Russia, India, China, and South Africa (BRICS) to use local currencies for their cross-border transactions and exclude the US dollar. The BRICS want to support their economic growth using their national currencies for efficiency in international trade. BRICS is also considering how to create its own *international reserve currency*. The US\$ as the benchmark for international trade has slipped from 71% a few decades ago to 59% by 2023.

The G7 countries include the US, UK, France, Canada, Italy, Japan, and Germany. The G7 use the US\$ and Euro as their benchmark for international trade. While BRICS is comprised of more emerging economies, the G7 is mainly the WEIRD group. The BRICS and G7 have many ideological and ESG differences.

The G20 countries contain members of both the G7 and BRICS. The G20 is comprised of Argentina, Australia, Brazil, Canada, China, France, Germany, India, Indonesia, Italy, Japan, Korea, Mexico, Russia, Saudi Arabia, South Africa, Turkey, UK, US, the EU and the African Union. The G20 countries are the primary players in the reduction of emissions, although there is no agreed to strategy or time frame to do so.

Affordability

Affordability is a common problem at most times. Aspirational goals are often revised as the reality of the funding requirements becomes the reality. We are rolling the dice on a variety of renewable energy sources and EVs, in the hope that this will address environmental problems while not accelerating economic problems with additional social stress. We have options from nuclear to hydrogen to renewable fuels to convert existing ICE vehicles. The politics, marketing, and carbon taxation incentive models are all in favour of renewables and EVs at a less-than-a-decade pace to achieve. Let's hope it works because we aren't talking about many Plan Bs.

Reducing Scope 3 emissions has been estimated at US\$ 3+trillion dollars per year to achieve the net zero goals. These costs, if completed, will impact the inflation of most goods needed by consumers. Who will pay for these massive investments remains uncertain.

Governments must be cognizant of the need to make the transition in a means which is affordable to the same taxpayer base. Affordability encumbers taxpayers in all aspects of their lives. On the goods and services necessary for food, shelter, and clothing; for protection and mitigation of the environment on the land, sea, and in the air; for the protection of species of plants and animals; for basic municipal services; for defending legal rights; for the digitalization of public services; for law enforcement; for electrification of transportation; for entertainment; for social justice; for military defence; for infrastructure upgrades, maintenance, and installations; for education; for health care services; for insurance; and the list continues to expand. While the needs may be necessary so does the ability to afford the investments within an acceptable time period.

Assessing the impact of affordability can be determined by the cost per family in Canada. In 2024, Canada has a population of ~40M people. Of that, there are ~11M families. If the Federal government provides ~\$52B in subsidies, over 10 years, to support the EV manufacturers, using 11M as the denominator, that equates to \$5090 per year, per family, over this period. For every dollar the Federal government spends, we can use the 11M family population to see what the financial impact could be per family.

To address affordability in larger urban areas, housing densification is being touted as the affordable solution. This means taking the same land mass and allowing more to live within the same geographical footprint. This is achieved through building more high-rise units or allowing more housing units on the land which is available. In Vancouver, Canada this is changing the neighbourhoods which formerly for decades, allowed for single family, detached homes, with back and front yards. Children walked to local schools. There were wide open parks and even golf courses. This layout existed in most large cities across Canada until the early 2000s. This spacious living was one of Canada's unique assets where people could own their property and have a lifestyle with a yard, fence and pets to roam in. Canada was the place *with miles and miles of miles and miles*. This abundance of space also shaped neighbourhood social values and cultures.

As we now compress more people into smaller housing units to find a more economically and environmentally sustainable option, we don't know the long-term impact on social values. We may all get along or we may find that lack of open spaces leads to increased stress. Lesser individual options. A more transient residential base. A decline in neighbourhood camaraderie and identities. Densification is

still a social experiment yet to be determined across a spectrum of outcomes. The newer generations are resigning themselves to not owning a home and not owning a car. The difference is their lack of options, which previous generations enjoyed, based around the economic reality to find a means to live affordably.

Private sector companies are concurrently investing in viable options to address the requisite needs to be sustainable and responsible. They are part of the transition to a new economy based on renewable energy and concern for climate change. The affordability factor is a larger impediment to our ability to meet the expectations which can be identified and must be financially prioritized as well. ESG does not occur without the other *E* – economic sustainability.

Science, law, economics, and politics chafe against each other as we debate the best route to take towards sustainable solutions. It appears there are several paths, which lack certainty, as to where and how we will arrive. We will send many companies on ahead to research and invest around the obstacles. Some will be unsuccessful while others will find a niche. Others will find an El Dorado for their followers. This, however, is the perspective from the WEIRD world. Developing economies have competing interests, asynchronous timetables, traditional cultures, and accustomed ideologies which they apply to definition of sustainability. Their social tenets must be factored into the WEIRD world decisions. Outcomes can have unintended and unimagined consequences without a holistic approach.

We can see competing interests and priorities when we look at the key contributors to global warming solutions. We are in the circular economy and its commitments; the pursuit and challenges of renewable energies; the transition to the electrification of transportation with limited infrastructure; decarbonization requiring trillions of dollars in investment in an economy rooted in fossil fuels; the UN SDGs which require organizations to be much more responsible from a WEIRD perspective, while emerging economies struggle for basic human rights and needs; social values aimed at improving the health and potential for millions of people facing systemic barriers to employment while businesses struggle for economic sustainability; the environment is no longer able to absorb the emissions, plastics, waste, pollutants, chemicals, packaging, and plethora of other toxic contaminants while we try to agree on standards and policies to mitigate environmental degradation or perhaps worse, throw in the towel and think of how to adapt to a less than desirable environment.

Affordability is the elephant in the room.

Leadership

Business ethics and conduct needs a rethink. Every industry has had its bad actors. Tolerance of tactless personal behaviours such as misogyny, LGBTQ+ discrimination, racial bias, workplace harassment, intimidation, and bullying are recognized as conduct unworthy and unacceptable in leadership. Effective business leaders ensure the well-being of others and the importance of governance to drive results. Implementing DEI strategies into an organization and within its supplier base curbs these egregious behaviours. ESG strategies are part of good corporate values contributing to healthy communities. Issues such as greenwashing and bluewashing are a detriment to advancing the gravitas of ESG.

The sustainability skills as defined by Asahi for their Board are part of the mindset required to achieve the outcomes which align with the UNSDG, circular economy and ensure a resilient supply chain and business. Actions start at the top and people behave in the way they are rewarded.

Leaders are in a tough position as we morph from a carbon-based economy into a circular economy. There are going to be winners and losers. The investment opportunities invite risks with high rewards but also threaten the very existence of long-time companies in many industries. Leaders are going to face tougher questions from their Boards, Councils, and international partners as to how they will

sustain their position or exit with dignity.

Paulus Polman stated in a 2022 Fortune article, following the COP27 climate talks, *there's no need to feel hopeless—but we must recognize that our politics is failing to deliver vital climate action. We must find other ways to close the ambition gap, get the money moving, get business driving urgent coalitions, and make sure young people are firmly in the driving seat. Then, it will be up to politics to catch up.*

So, we will continue to make new EVs, adapt to renewable sources of energy while burning fossil fuels, and introduce devices which appear to save energy in the long-term and hope, that collectively, this will do the intended job. We will convince each other that we have the time. Intervention by governments may take on a whole new set of rules if we start to sell waterfront properties as the Arctic Sea ice continues to melt.

Charles C. Mann, in his book *The Wizard and the Prophet*, captures the debates between technology and science as being the problem for the planet or the savior. Production and profitability are compatible with sustainable growth through the options presented in the circular economy. It takes awareness, which leads to advocacy, and most of all, actions.

My motivation for this publication was to encourage supply chain professionals and other leaders to exercise their professional fortitude. Take the risks as necessary. Break some rules. Colour outside the lines. As my colleague Maureen Sullivan says, *choose courage over comfort*. Perfection is not the goal and learning from failure, is healthy for all.

Do what you can, within your sphere of influence, to make the most responsible decisions.

About the Author

Larry Berglund's supply chain experience includes leadership positions in the forest industry, public health care, municipal government, university operations, academia, and consulting services. As a consultant he drafts procurement policies, templates, develops strategies, conducts audits and implements best and leading practices.

He facilitates online and in-person workshops on buying, business ethics, circular economy, competitive bidding, contract management, inventory management, leadership, risk management, social procurement, operations management, supplier performance evaluations, performance metrics, and supply chain policies and strategies. He provides on-site supply chain operational reviews.

Larry was an academic coach for supply chain courses in the Athabasca University Leadership & Management Development program, including environmental responsibility. He was the procurement advisor to the Auditor General for Local Government (BC). In 2017, 2018 and 2019 Larry presented on advanced supply chain strategies to the United Nations staff in Brindisi, Italy. He was a founding member and the procurement advisor to the BC Social Procurement Initiative. Larry also facilitates supply chain training workshops for The Procurement School. In 2020, he presented to the World Bank in Washington, DC on social procurement strategies and contributed to a World Bank research paper in 2021. He has developed supply chain and ESG courses for the University of Alberta.

He is a contributing writer to Supply Professional magazine. Larry has written several other books on supply chain management related subjects:

- ***Food, Finance, and Philosophy***: A Role for Supply Management in Corporate Social Responsibility;
- ***Good Planets are Hard to Buy***: A Management Handbook for Creating Conscious Capitalism, Sustainability Principles and Supply Chain Excellence;
- ***Plan It for Our Planet***: Social Procurement Practices, Policies, Principles and Plans for the Supply Chain; and
- ***It's the People, Not the Paper***: Managing Contracts and Measuring Performance for Professionals

Larry holds an MBA, an SCMP and is a Fellow of Supply Chain Canada. He is an inductee to the Athabasca University, Faculty of Business, MBA Hall of Fame. In 2021 he received an Honourary Life Membership from the Supply Chain Canada, BC Institute. In 2024, he was recognized by the National Institute of Supply Chain Leaders, as an Environmental and Social Influencer.

Larry announced his official retirement from business in December 2025.

He is a published song writer, along with musicians, Nick Rugg and Wil Cuperus.

Phone: 778-895-5358

Mail: lberglund@prezplus.com

Website: www.larryberglund.com



Abbreviations and Acronyms

2FA	Two-factor authentication
7R Model	7 Principles of the Circular Economy
A4S	Accounting for Sustainability
AESS	Automatic Engine Shut-Down/Start-Up Systems
AI	Artificial intelligence
ALAN	As local as possible, as international as necessary
AMR	Autonomous mobile robots
API	Application Programming Interface
APU/GS	Auxiliary Power Units and Generator Sets
AR	Augmented reality
ASC	Aquaculture Seafood Council
BESS	Battery energy storage systems
BEV	Battery electric vehicle
BIPOC	Black, Indigenous, People of Colour
BLE	Bluetooth Low Energy
BOL	Bills of lading
BOMA	Building Owners and Managers Association
Bots	Software that operates and performs repetitive tasks
Bpd	Barrels per day
BRICS	Brazil, Russia, India, China and South Africa
CAFO	Confined Animal Feeding Operation
CAMSC	Canadian Aboriginal and Minority Supply Council
CAP	Canada-wide Action Plan
CBDC	Central bank digital currency
CCIB	Canadian Council for Indigenous Business
CCC	Community Contribution Company
CCUS	Carbon capture, utilization and storage technology
CDC	Center for Disease Control
CDR	Carbon dioxide removal
CEPA	Canadian Environmental Protection Act
CFC	Chlorofluorocarbon
CGBC	Canada Green Building Council
CHBA	Canadian Home Builders Association
CIRS	Centre for Interactive Research on Sustainability
CIW	Canadian Index of Wellbeing
CME	Canadian Manufacturers and Exporters
CNG	Compressed natural gas
CORE	Canadian Ombudsperson for Responsible Enterprise
CoRo	Cargo recognition
CPG	Consumer packaged goods
CSDDD	Corporate sustainability due diligence directive
CSP	Concentrated solar power
CUSMA	Canada United States Mexico Trade Agreement

CWC	Canadian Wood Council
DaaS	Delivery-as-a-service
DACS	Direct air capture and storage
DEI	Diversity, Equity, Inclusivity
DLE	Direct lithium extraction
DRC	Democratic Republic of the Congo
DRI/EAF	Direct reduced iron/electric arc furnace
DTIP	Digital Train Inspection Portal
DSA	Digital Service Act
ECtHR	European Court of Human Rights
eDCT	Electrified dual-clutch transmission
EDM	Electric drive module
EEO	Equal employment opportunity
EFI	Equitable food initiative
ELD	Electronic logging devices
EPEAT	Electronic Products Environmental Assessment Tool
EPS	Expanded polystyrene
EPU	Electric propulsion unit
EPZ	Export Processing Zones
EREV	Extended range electric vehicle
e-SB	Electric school bus
EUDR	European Union's Regulation on Deforestation Free Products
EV	Electric vehicle
eVTOL	Electric vertical takeoff and landing
FADR	First attempt delivery rate
FCA	Fair Cobalt Alliance
FCEV	Fuel cell electric vehicle
FFE	Forty-foot container Equivalent unit
FMCG	Fast moving consumer goods
FMEA	Failure Mode Effect Analysis
FOHakaDFH	Fuel Operated Heaters aka Direct Fired Heaters
FSC	Forest Stewardship Council
FSD	Full self-driving
FT	Fair trade
GAI	Generative AI
GFANZ	Glasgow Financial Alliance for Net Zero
GHG	Greenhouse gas
GHI	Gross Happiness Index
GLEC	Global Logistics Emissions Council
GRAS	Generally recognized as safe
GRI	Global Reporting Initiative
GW	Gigawatt = 1,000,000,000 watts
HFC	Hydrofluorocarbon
HUD	Heads up display
IA	International Accord

IAASB	International Auditing and Assurance Standards Board
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
ICAO	International Civil Aviation Organization
ICE	Internal combustion engine
ICGN	International Corporate Governance Network
IDEA	Inclusivity, diversity, equity, and accessibility
IEA	International Energy Agency
IFBA	International Food Brands Alliance
ILO	International Labour Organization
IoT	Internet of Things
IRENA	International Renewable Energy Agency
IRMA	Initiative for Raw Materials Assurance
ISA	International Seabed Authority
ISAE	International Standard on Assurance Engagement 3000
ISO	International Standards Organization
ISSB	International Sustainability Standards Board
JIT	Just in time
KPI	Key Performance Indicator
KWh	Kilowatt hours
LaaS	Logistics-as-a-service
LDDES	Long-duration energy storage
LEED	Leadership in Energy and Environmental Design
LFP	Lithium iron phosphate
LiDAR	Light detection and ranging
LMR	Lithium-manganese rich
LNG	Liquid natural gas
LTL	Less than truck load
LWD	Logistics, warehousing, and distribution
Maglev	Magnetic levitation
MFC	Micro fulfillment centres
MNC	Multi-national corporation
MRA	Mutual recognition agreement
MSC	Marine Stewardship Council
Mt CO ₂ Eq	Total Emissions (MTCO ₂) = Emissions MTCO ₂ + CH ₄ Emissions (MTCO ₂ Eq.) + N ₂ O Emissions (MTCO ₂ Eq.)
NAIHM	No Antibiotics Important to Human Medicine
NEV	New energy vehicle
NGO	Non-Governmental Organization
OBPS	Output-based pricing system
OECD	Organization for Economic Co-Operation and Development
OMS	Order Management System
OTIF	On time, in full
PARS	Pre-Arrival Review Systems
PEF	Polyethylene furanoate

PERC	Perchloroethylene
PESTEL	Political, economic, social, technical, environmental, legal
PET	PolyEthylene Terephthalate
PFAS	Perfluoroalkyl substances
PHEV	Plug-in hybrid electric vehicle
PLA	Polylactic acid
PoD	Proof of delivery
PRI	Principles for Responsible Investment
PSI	Principles for Sustainable Insurance
PUD	Parcel, pickup and delivery
PV	Photovoltaic
PVC	Polyvinyl chloride
QR	Quick Response
R2	Responsible recycling®
RaaS	Robotics as a service
REACH	Registration, evaluation, authorization, and restriction of chemicals
REDD	Reducing emissions from deforestation and forest degradation
RFID	Radio frequency identification
RNG	Renewable natural gas
rPET	Recycled PET
RPUC	Responsible Plastic Use Coalition
RTTV	Real time transportation visibility
SaaS	Software-as-a-service
SAF	Sustainable aviation fuel
SASB	Sustainability Accounting Standards Board
SBTi	Science Based Targets initiative
Scope 1 emissions	Directly caused from organization-owned resources
Scope 2 emissions	Indirectly caused by the production process used by an organization
Scope 3 emissions	Indirectly produced by 3 rd party supplier operations
SCS	Shore connection system
SDG	Sustainable development goals
SE	Social enterprise
SERI	Sustainable Environmental Recycling International
SFI	Sustainable Forestry Initiative
SIB	Social impact bond
SIPP	Ships in product packaging
SKD	Semi knocked down
SKU	Stock keeping unit
SLAM	Simultaneous localization and mapping algorithm
SME	Small, medium enterprise
SMR	Small modular reactor
SPAC	Special purpose acquisition company
SRHBA	Saskatoon & Region Home Builders' Association
SROI	Social Return on Investment
STEM	Science, Technology, Engineering, Mathematics

tCO ₂ e	Tonnes of CO ₂ emissions
TCFD	Task Force on Climate-related Financial Disclosures
TES	Thermal Energy Storage
TW	Terawatt = 1,000,000,000,000 watts (trillion)
UCO	Used cooking oil
UNDRIP	UN Declaration on the Rights of Indigenous Peoples
UNGC	UN Global Compact Network Canada
UWB	Ultrawide band
VABEs	Values, Assumptions, Beliefs, Expectations
VCM	Voluntary Carbon Market
VLOP	Very large online platform
VLOSE	Very large online search engine
VOC	Volatile organic compound
VUCA	Volatile, Uncertain, Complex, Ambiguous
WEIRD	Western, Educated, Industrialized, Rich, and Democratic
WMO	World Meteorological Organization
WMS	Warehouse Management System
WRAP	Worldwide Responsible Accredited Production
WTFC	Women's Trucking Federation of Canada
ZEV	Zero emission vehicle

Senior Leadership Reflection on ESG Status

Date _____

The set of questions below, are intended to create an in-house dialogue on what your organization is doing to demonstrate its commitments to ESG values in practice. This includes a scan of its upstream and downstream supply chain partners; the awareness of senior management on the importance of ESG to be part of the organizational commitments to the communities, customers, and clients it serves; the organization's ability to stay current with emerging ESG issues, which can affect its business, either directly or indirectly; a risk management assessment for potential liabilities for actions or inactions on ESG; the resources required to be successful in the deployment of ESG strategies; and how the organization can demonstrate leadership in the delivery of products and services in a competitive market. The questions are to prompt ideas and encourage an open debate on ESG. There isn't one model to consider, although the fundamental values are similar for all organizations to consider, prior to or having implemented ESG.

There are no right or wrong answers. The takeaways from this exercise are to provide senior management with the opportunity to bring increased value to all stakeholders and reinforce its brand, community esteem, and social impact. For public sector entities, the questions can be revised but essentially the same level of probity into ESG practices is required.

Those in attendance at this review should involve representatives from operations, finance, supply chain, sales/marketing, communications, quality management, and logistics. Bringing in external advisors or academics to share their views and provide unfiltered tenets to the discussions is healthy and necessary. Organizations which are trying to understand ESG want to get up to speed quickly and learn from the experience of other organizations.

The kickoff to this session should be provided by a C-Suite executive with their ideas and opinions on why or how ESG needs to be a business imperative. By having a senior executive start the session, this gives it the gravitas needed, which infers the criticality to get ESG right. This type of annual review will encourage continuous commitments to elevating ESG across the organization and to its stakeholders.

Various business analytical tools should be considered to support this objective review. Interviews with key stakeholders and interest groups should be factored into the led up to the kickoff. This would include quantitative and qualitative data to be presented or developed as an outcome.

There can be several levels of ESG experience within organizations. Some may have been involved for several years while others are still exploring ESG and wondering how to bring it inside their organization. The questions can be revised based on the maturity of the ESG strategy.

The outcomes to the questions will likely lead to other discussion threads and follow up detailed reports to validate or clarify the status of various issues. From this exercise, the senior team will need to look at priorities and timelines to develop an appropriate responsive strategy. This will undoubtedly trigger some compromises between stakeholder and organizational capacities and interests-similar to other strategic challenges.

The data gathered can be used to build a baseline to compare progress through annualized reviews. It should be expected that there will be some uncomfortable conversations and discussions. It's best to have these sensitive or open sessions within your own walls rather than reading about them in the media.

The long-term is to ensure that the credibility and social license of the organization is deemed to be respectful and responsible. Perfection is not required nor expected. But an evidenced based approach should be conducted annually to be sure the ESG goals are actioned and on target. Supply chains are an effective means of sending signals to the market. And the market is always listening!

Questions to be discussed through the lens of ESG:

1. What market intelligence or insights have we gathered on ESG issues for our market?
2. How do our major stakeholders view ESG in the current market conditions?
3. How effective are we at adopting international 3rd party standards?
4. How do our strategies and practices align with the principles of the circular economy?
5. How do our strategies and practices align with the UN SDG goals?
6. Are our supply chain policies current with leading practices?
7. How do we monitor our suppliers for their ESG commitments or compliance?
8. How do our recruitment and retention strategies support IDEA?
9. How are we addressing the Truth and Reconciliation Commission Calls to Action?
10. What types of ESG practices, from other leading organizations, could we apply to our practices?
11. Which natural resources could be conserved through changes in our design, processes or operations?
12. How do our customers deal with non-value-added costs associated with our products?
13. Which types of information, about our organization, might we be concerned with being exposed?
14. Which social enterprises are we engaged with in our supply chain operations?
15. Which community programs are we supporting?
16. How do we support small businesses in the communities we serve?
17. Where might liabilities be incurred within the next 3-5 years for our actions or inactions?
18. Which resources such as subject matter, operational, or financial investment might we need?
19. What is driving change in our industry?
20. Where can we demonstrate leadership or differentiate from others in our markets?
21. What types of reporting are we providing internally and externally?
22. What are we doing over the next year to advance our ESG commitments?
23. What if we do nothing?

Follow up actions:

Corporate Self-Assessment on ESG Commitments

The following self-assessment tool, is provided with the permission of Dale Neef, long-time supply chain consultant and fellow of Ernst & Young's Center for Business Innovation.

The senior management team can use the following information as a guide on their journey to implement ESG into company practices and share with its shareholders and stakeholders. The template is intended to provide insights into how ESG is integrated across the organization and with external stakeholders. Each section could be given a rating out of 10, as an example, and use this to build an objective tracking as to how well a company is improving over a timeline.

There are (3) main sections in this template: Environmental, Social, and Economic.

Environmental

1. Our company has a formal environmental policy which has been endorsed by the senior management team and is publicly available on our website.

Yes ☐ No ☐ Being developed ☐

2. How does our policy commit our company to adopt long-term strategic and operational environmental goals?

Provide examples:

3. We have established objectives and SMART metrics covering our environmental performance for reporting.

Yes ☐ No ☐ Being developed ☐

4. How does our company ensure that the environmental objectives and targets contribute to continuous improvement?

Provide examples:

5.Our employees are fully aware of our environmental policy and understand their roles and responsibilities in assisting our company to improve its environmental record.

Yes ☐ No ☐ Being developed ☐

6.How does our company engage our staff in improving our environmental record?

Provide examples:

7.Our company has established a compliance and review process to evaluate its environmental record.

Yes ☐ No ☐ Being developed ☐

8.How does our company use this review process to reduce or mitigate its environmental impacts?

Provide examples:

9.Our company regularly and consistently communicates its environmental performance to our stakeholders.

Yes ☐ No ☐ Being developed ☐

10. How does our company collect and use feedback from our stakeholders to manage and improve our environmental performance?

Yes ☐ No ☐ Being developed ☐

Social

1. Our company has a formal social policy making a commitment to achieving a positive social impact.

Yes ☐ No ☐ Being developed ☐

2. How does our policy promote an active involvement, dialogue, and engagement with the communities we operate within?

Provide examples:

3. Through stakeholder interactions and dialogue our company has established SMART metrics on a range of issues which demonstrates our commitment to social values in our business operations.

Provide examples:

4. How is social responsibility integrated into our company's business strategy and operational practices, with inclusivity, diversity, equity and accessibility (IDEA) with social enterprises, small, medium enterprises, minority-owned and Indigenous businesses? Provide examples:

5. Our employees are fully aware of our social policy and understand their roles and responsibilities in assisting our company to improve our social commitments.

Yes ☐ No ☐ Being developed ☐

6. How does our company support, encourage, and give recognition to staff for taking forward the commitment to social responsibility?

Provide examples:

7. Our company regularly reviews its commitments with its stakeholders and takes corrective actions where necessary.

Yes ☐ No ☐ Being developed ☐

8. How does our company build relationships with our staff, suppliers, customers, and other stakeholders to demonstrate our commitment to strong business ethics and conduct?

Provide examples:

9. Our social policy is made available to people within our company and external stakeholders.

Yes ☐ No ☐ Being developed ☐

10. How are our policies, objectives, and targets championed and rolled out across our company and to external parties?

Provide examples:

Economic

Profitability is critical to our success. Our customers expect and receive the best value for the products and services which we provide in a competitive market. Our customers have choices and we want them to choose us as a valued community supplier.

1.Our company has a long-term viability plan to achieve its financial goals and objectives which includes all aspects of our business operations as well as environmental and social commitments.

Yes ☐ No ☐ Being developed ☐

2.How does our company manage any conflicting views between economic interests and the environmental and social commitments?

Provide examples:

3. Our company has developed key processes which have an economic impact on society.

Yes ☐ No ☐ Being developed ☐

4.How does our company support local, regional, national or international economic development initiatives beyond what is necessary for our own growth?

Provide examples:

5. Our company has developed a model to invest in its employees to enhance our competitiveness.

Yes ☐ No ☐ Being developed ☐

6. How does our company identify the needs and concerns of our economic stakeholders?

Provide examples:

7. Our company shares knowledge and best practices in the interest of our community or region's economic success.

Yes ☐ No ☐ Being developed ☐

8. How does our company evaluate its business performance in terms of impact on society?

Provide examples:

9. Our company publicly reports on its economic contribution to the community or regions we are operating within.

Yes ☐ No ☐ Being developed ☐

10. How does our company evaluate awareness of and satisfaction with its economic contribution to the community or regions we are operating within?



ADDENDUM III

UN Sustainable Development Goals Self Assessment

DATE _____

RATING SCALE: 1 Low...10 High

Referring to the 17 UN SD Goals, how does your organization address, include, practice, demonstrate a concern, operationalize, strategize, quantify, or report out on these factors.

These actions may be done directly or indirectly through products or services which are provided to customers; through community programs which are supported; through policies; and some may not be applicable. A consensus-based rating involving senior management and key operational and finance staff mitigates bias. If some goals are not applicable, revise the rating accordingly.

Some goals may be pending or being planned for which they can also be rated.

	GOAL	RATING	COMMENT
1	No poverty		
2	Zero hunger		
3	Good health and well-being		
4	Quality education		
5	Gender equality		
6	Clean water and sanitation		
7	Affordable and clean energy		
8	Decent work and economic growth		
9	Industry, innovation and infrastructure		
10	Reduced inequalities		
11	Sustainable cities and communities		
12	Responsible consumption and production		
13	Climate action		
14	Life below water		
15	Life on land		
16	Peace, justice and strong institutions		
17	Partnerships for the Goals		
	MAXIMUM SCORE	170	

Follow up actions for improvement:

Circular Economy Principles Self Assessment

In your organization, rate the ability of the materials used in the production, application, or usage of the final product, including packaging, shipping, and waste to align with the circular economy principles. If a principle is not applicable, adjust the rating accordingly.

We are using the 7R model for the purpose of relating to the principles of the circular economy to the critical design phase.

A consensus-based rating involving senior management and key operational and finance staff mitigates bias.

DATE _____

RATING SCALE: 1 Low...10 High

	PRINCIPLE	RATING	COMMENT
1	Recyclable content		
2	Repairable after use		
3	Reusable for service		
4	Repurposable for service		
5	Refurbishable after use		
6	Reduces consumption of materials, energy		
7	Rethink if it can be better		
8	Responsible with leading practices		
	MAXIMUM SCORE	80	

Follow up actions for improvement:

Total Cost of Ownership Worksheet

Calculating or estimating the TCO is not easy. While many aspects are intuitive, as we have more familiarity or history with various cost drivers and ESG factors, there are assumptions which may not be valid or hard to validate. TCOs can be referred to as life cycle assessments as well.

The cost drivers are intended as a prompt to develop a more comprehensive perspective of the TCO.

The list is not exhaustive. Using the TCO worksheet as a guide, with a cross-section of staff and other stakeholders, try to determine the as-is costs associated for the sections which apply to your needs. The sections based on type of costs are:

- A. Acquisition
- B. Installation
- C. Operational
- D. Warehousing/Inventory
- E. End of life
- F. Risks
- G. Social commitments
- H. IT specific
- I. Productivity benefits
- J. Environmental benefits
- K. Business case synopsis

At best, you will have a more accurate projected TCO. As actual experience is gained, the variables associated with each of the types of costs can be validated and used as a baseline to compare incremental changes when materials, methods, technology, policies, practices, and other business influence impact the bottom-line.

Section I refers to looking at potential productivity benefits over the useful life of the equipment, project or process being considered. This is an important part of a business plan and estimating of TCO when looking at options on technology or design over the long-term.

Cost driver	Cost Cdn \$	Notes
SECTION A		
Acquisition cost		
Contract price (rent/lease/services)		Applicable standards, 3 rd party certifications, specifications, fair trade, LEED, capital, NPV
Customs clearance		Name of agency
Insurance		In transit, liability, political risk, export credit, self-insure, FMEA
Currency rates		Hedge fees, inflation risks, futures contracts
Air freight/ocean/rail		Lead times
Courier/trucking		Intermodal, load limits

Startup costs		One-time charges, testing, acceptance
Packaging/shoring		removal
Fuel storage and delivery		Cost to install and handling equip
Amortization/depreciation rate		# of years or within its useful life
Rental purchase option		Buy-out, first right of refusal options
Testing, inspection		3 rd party, in-house
Vendor experience		Probability of success; expected monetary value
Intellectual property rights		Legal fees; registration; escrow
Training		Include for probable upgrades x the # of affected staff; operational and maintenance; remote vs on site
Opportunity costs		NPV; ROI; payback hurdle; IRR
Restrictive covenants		Non-compete period of key personnel, relocation, mutually exclusive contracts
Cost to change supplier		One-time, standardization, training, support
INCO terms		Country of origin; certificate of origin; FOB;
Economic multiplier effect		Assess local social and economic development costs; local vs MNC

SECTION B		
Installation		
Labour		In-house cost with benefits, contractor, standards, permits, inspection
Materials		Direct and indirect
Equipment rental		Daily, weekly, monthly
Transportation		Permits, inspection, demurrage
Renovations		Permits, inspections, licensing, certification, Hazmat
Hours of access		Local by-laws
Pilot vehicles		Minimum # of hours
Time frame		Late penalties; early incentives
Temporary loss of production		Rate per hour, per shift, effect on ROI

SECTION C		
Operational costs		
Energy rate of consumption by source		Gas, diesel, propane, CNG, LNG, geothermal, solar, biomass
Emissions per tonne by source		Current and projected

Consumable materials		Renewable, recyclable
Maintenance – labour, parts, materials		SLA, in-house, training, OEM, after market, tooling
Water consumption rate		Incremental change
IT support		Software maintenance, labour, in-house, contract, license costs per # of licenses
IT energy		Incremental change
Warranties		Period of coverage; rates for exceeding; covenants
Fixed costs		Investment less residual
Variable costs		Cost per unit of production

SECTION D		
Warehouse/Inventory costs		
Security		Physical, electronic
Financial carrying costs		Weighted average cost of capital
Labour		Union, non-union
Materials		Packaging, pallets, film, plastics, degradable, recyclable
Equipment		Mobile, compactors, scanners
Space at current market rate per ² ft		Fixed term
Property tax		Current and projected
Insurance		Liability, fire, theft, earthquake, and restrictive covenants
3PL		Warehousing, distribution, customs
Technologies		Warehousing, logistics, last mile, drones, software apps

SECTION E		
End of life		
Disposal of parts/inventory		Write down costs based on book value
(trade-in value)		Residual value
Removal - labour		In situ
Removal - materials		In situ
Contract termination – lease/rental		Balance owing or buy out costs
Recyclable content		Segregation, sorting
Packaging		Collection, compacting
Landfill fees		Municipal, regional

Soil remediation		Cost per tonne, trucking, equipment
Decommissioning		Title transfer, liability insurance, waivers
Waste		By products for sale, salvage, asset recovery, waste audit

SECTION F		
Risks		
Country of origin		Transparency International Index, political stability, provenance of labour, materials
Prototype		Certificate of destruction, learning curve
Network capability		Integrity of security
Emergency		Spare parts, service, availability, technical changes, contingency plans
Image, brand		Customer perception of value
Cost of non-performance/compliance		Correct defects, loss of market, customer defection
Technology		Competition; disruptive technology;
Contingency costs		Risk management assessment and mitigation plan
Legal counsel		Internal, 3 rd party, compliance with trade agreements, laws, and regulations
Failure Mode Effects Analysis (FMEA)		Assess level of risk impacts, costs, and early detection methods, Probability Index rating

SECTION G		
Social commitments		
Employment		Local employment, diversity of work force, # of FTE positions, temporary foreign labour, people facing barriers, social return on investment
Training		Skills upgrading, qualifications, certification, train-the-trainer programs, apprenticeships, course materials
Use of endemic materials		Replacement of imports, use of local foods, local material content, landscaping supplies
Telework		% of time, technical requirements, security, policy, practices, space reduction
Staff retention		Turnover rate
Teleconferencing		% of time, travel cost reduction, equipment, 3 rd party service provider, IT security
Wages		Incremental costs of living wage, fair wage, minimum wage, incentive programs, piece work
Change management		Time frame, training, culture
Health and safety		Base line measurement, employee well-being
Philanthropical issues		Sponsorships, grants, donations, gifts-in-kind, executive coaching, mentoring

Suppliers		# of SMEs, % of business with SMEs, # of social enterprises, % of business with SEs, key value indicators, Indigenous peoples, fair trade certified, target groups, ESG policy, local vs MNC, economic multiplier effect

SECTION H		
IT specific		
Hardware		Version; refresh dates;
Software		Applications and services
Licensing		Cost per license
Software code in escrow		3 rd party
Workstations		# of stations
Migration costs		# of months; penalties/bonuses
Version upgrades		# expected over contract period;
Installation		Shared responsibility; turnkey operation; NDA; go-live date
Network compatibility		Photocopier security integrity
Training		Train-the -trainer; off site or in-house
Energy		consumption
Server capacity		Data centres, location of server re: US Patriot Act
Testing		Responsibility; completion dates
Security		Ensure full levels of security
Intellectual property		NDA; patents; escrow; trademarks; copyrights
Legal advice		In-house; external
Maintenance		Turnkey; shared services;
Insurance		Performance agreement; bondable
Redundant systems		Back up; emergency
FTEs		Staffing level requirements
Interfaces		Existing; potential; costs
Performance guarantee		Uptime or minimum down time;
Service		3 rd party costs; response time; SLA
Telework		Security; accessibility
Digitalization		Opportunities

SECTION I		
Productivity benefits		Lower unit costs; increased output; improved quality; less waste; market share; reduced COGS
Expected useful life		Length of project; # of years, life of asset

SECTION J		
Environmental benefits		
Energy savings		Compared to baseline or current sources; renewable energy
Emission reductions		Compared to baseline or current sources
Emission offsets		Carbon tax, bona fide certification
Reduction in toxic materials		Tonnes, types, material substitution
Reduction in packaging		Tonnes, types
Reduction in waste generated		Tonnes, waste disposal bins
Reduction in travel costs		# of miles
Reduction in consumables		Incremental volume or costs
Reduction in water consumption		Incremental volume or costs
Renewable sourcing		Type of materials, content
Organic content		Certification
Cost to audit or monitor		Contracted service fees
Cost of reporting		Departmental, annual reports, personnel

SECTION K		
Business case synopsis		
Applicable taxes		Carbon taxes, carbon credits, carbon reduction incentives
Exemptions from governmental agencies		Qualify for funding
Inflation rate		Over life of the Project or its value to your org'n
Total cost of ownership		# of years, cost per year, cost of goods sold, cost per unit of production, cost per operational hours of service

Key Assumptions:

SWOT highlights:

PESTEL review

(Risk) FMEA Probability Index

Recommendations:

Definitions of terms

From a business perspective, within ESG policies, is the need to provide definitions. Definitions are part of the messaging to internal staff and the wide-variety of external stakeholders. Definitions reflect the organization values and intent which must be evidenced in their operational and administrative practices. If the definitions do not align with consistency in practices, it creates a contradiction and detracts from the gravitas of all strategies. Policies devolve into platitudes.

Effective governance requires staff training in order to have a common understanding of the values which are being espoused and shared, where definitions contribute to a greater understanding of the commitments. Policies reflect the *corporate* values and supersede those of the individuals which work for the organization. As values change over time, there is a need to review policies and the definitions used to describe values.

In 1987, the UN Brundtland Commission provided one of the first definitions for *sustainability* – “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” This broad definition was subject to interpretation yet paved the way for many governments and corporations to build on and adapt to demonstrate their commitments and align with their values.

Definitions often form part of a contractual agreement between buyers and sellers. Contractual terms and conditions are quite prescriptive and explicit. Policy definitions are more descriptive and implicit.

The following definitions are shared as a means of continuing to draft more effective business policies and support ESG. The definitions are intended to provide inspirational and aspirational motivation for subsequent definitions as we gain more experiential knowledge with governance strategies.

Arenas – Arenas in the market are a category of industries defined by high growth and dynamism.

Barrierred individual – A person facing *systemic* barriers to employment where accommodation may be required to enable their hiring and successful job performance. Barriers can include ethnicity, cultural differences, physical or mental incapacities, gender bias, limited access to public transit, elder/child care responsibilities, age discrimination, or other impediments to entering the work force.

Best value - To establish the best value of goods/services/construction, proposals may be evaluated not only on purchase price and associated life cycle costs, but also on cultural, ethical, environmental and/or social considerations, delivery, servicing, and the capacity of the bidder to meet other criteria, all stated in the bid/proposal documents.

Bluewashing – claiming or implying there are social benefits associated with a product or service but not being able to provide evidence to back up the statements.

Business ethics - A company’s set of values and behavioural expectations, to be reflected in the actions of its management and staff, when performing their responsibilities, for the best of interests of all stakeholders.

Economic governance – A company’s processes which contribute to its financial success while protecting their property and intellectual rights, physical assets, and ongoing operations through contractual obligations.

Environmental responsibility – The accepted duty by a company to take the necessary actions to mitigate or prevent impacts on the natural ecosystem throughout its supply chain and operations.

ESG – A company's set of environmental, social, and governance policies and practices which support sustainability initiatives.

Externality costs – a cost that is caused by the actions of one party but is incurred or absorbed by another party.

Fair Trade – Products which are certified by Fairtrade Canada©

Global Warming – Increasing the Earth's average temperature due to GHGs from anthropogenic activity.

Greenwashing – claiming or implying there are environmental benefits attributed to the use of products without being able to provide evidence of the statements.

Life cycle cost – A cost analysis which may include but is not limited to the costs related to administrative, cultural, social, environmental and economic development, shipping, packaging, energy, warranty, consumable supplies, transition, training and the like.

Minority-owned business - A business which is at least 51% owned, operated, and controlled by women, Indigenous peoples, or a visible minority.

Net-net pricing – refers to the final price paid by a customer for the product or service after accounting for all costs, fees, rebates, tariffs, shipping, consumption, and can include externality costs for environmental degradation or social impact costs.

Net Zero – The difference between the GHG emissions and the ability of the biosphere to absorb the volume of carbon. Can be referred to as being carbon neutral.

Place-based social value - unique social, economic, and environmental benefits to a community or local area ensuring interventions positively impact those targeted areas.

Provenance – The validation of the original source of labour or materials.

Science based targets initiative - A collaborative group between the CDP, UN Global Compact, World Resources Institute and the World Wide Fund for Nature which sets targets to reduce emissions using the latest climate science methods.

Scope 1, 2, and 3 emissions – Scope 1: GHGs which are a direct result of sources controlled or owned by a company; Scope 2: GHGs related to all purchases of energy for power, steam, heat, or cooling; Scope 3: GHGs which are related to the activities from assets not controlled or owned by the *reporting* company but which indirectly impact its value chain.

Social enterprises – Not for profit organizations that operate as a business, with a purpose, to support social values in a financially sustainable model.

Social Impact – A measurable change on social issues or outcomes resulting from business decisions.

Social procurement – The contracting and spending practices which ensure the inclusion of cultural, economic, ethical, social values, and environmental outcomes being considered prior to any commitments being awarded.

Social responsibility – The commitment by an organization to all its stakeholders by adopting policies and practices which contribute to the well-being of society.

Social return on investment – A means of integrating social, environmental and economic values into decision-making, where outcomes can be quantitatively measured.

Supply chain – the *primary* company and its direct suppliers involved in the production or delivery of goods or services

Supplier diversity – A strategy which supports increased opportunities to contract with companies that may be minority-owned, women-owned, Indigenous-owned, nascent operations, LGBTQ+, or veteran-owned.

Sustainability - Products and services which meet or exceed environmental standards, labour, and safety codes, the wellness of people, respect biodiversity, and provide the best value, which can be responsibly provided.

Value chain – each activity across a supply chain, to produce a good or service, adds value, either through materials, labour or handling. Each *secondary* partner in the supply chain adds *value*.

3rd Party Certification and Audit Services

There are literally thousands of 3rd party for-profit and not-for-profit organizations, which interact with supply chains across Canada and the globe. These organizations validate standards and specifications, procedures, processes and monitoring on a wide variety of value chain and ESG actions. Receiving their certification of compliance or approval can often mean the difference between getting or losing an order.

Compliance can include human rights, emissions, social values, quality control, energy systems, environmental practices, reporting, resource extraction or harvesting, production, working conditions, and material specifications and designs. The 3rd parties are an important part of the stakeholders for any business and community. A company may operate in Canada, USA, or Europe, yet these 3rd parties could be monitoring their practices for compliance and consistency from anywhere. The provenance of labour and materials is important for qualifying for many government contracts and branded products. When sourcing responsibly, there should be a means of certifying or validating the labour or material content.

Some of the more recognized international organizations are:

- Amnesty International
- Bureau Veritas
- Canadian Aboriginal and Minority Supply Council
- Canadian Council for Indigenous Business
- David Suzuki Foundation
- Ecologic labels
- Electronic Product Environmental Assessment Tool
- Energy Star
- EPEAT
- Equitable Food Initiative
- Fair Labor Association
- Fair Trade International
- Forest Stewardship Council
- Green Peace
- Green Seal
- Human Rights Watch Canada
- Intertek
- International Organization for Standardization (ISO)
- Leadership in Energy and Environmental Design
- Maquila Solidarity Network
- Marine Stewardship Council
- Mining Watch Canada

- Ocean Wise®
- Openview Service
- Oxfam International
- QIMA
- Rain Forest Action Network
- Rain Forest Alliance
- Restriction of Hazardous Substances
- SGS
- Sierra Club
- Social Accountability 8000
- Transparency International
- TÜV Rheinland
- Verité
- Waste Electrical and Electronic Equipment Directive
- Worker Rights Consortium
- World Wild Life Fund
- Worldwide Responsible Apparel Production

Poem

Against Coercion by Commerce

Larry Berglund

Business is of a common purpose in three domains –
What we do is done by many;
Individually we seek to feel appreciated about our sway;
Collectively we affect value through the vessel of exchange.

But the richness of the colours is fading;
Once resonant harmonics are a cacophonic distraction;
Reflections have turned into rationalizations of perspective;
Time is consumed but not for respite.

Leaders are of the moment without concern there be a legacy –
With expeditious recompense, absent the trials of time;
These few make the choices for the many – with an air of virtuous satisfaction;
Apathy is the friend of their followers.
Power dependent on dominance, is of fleeting value.

The diversity of ideologies can be twisted into competing interests;
Ends are achieved though scant of worth;
The image of responsibility can be the mask for not;
Success is measured by consumptive excess.

Awareness of possibility is as essential as water;
Earnest endeavours exorcise entitlement;
Conscious capitalism is the enemy of greed;
Uncertainty is a friend to appease.

Perfection is not the purpose – nor the expectation;
Sincerity is the companion of effort;
Enacting one's beliefs is the start;
Outcomes are never certain; there is always more to see.

Choose to do well;
Don't fault the past;
Act for all;
We can all prosper with dignity and respect.

Seek goodness from the Universe;
We always receive;
Ask to receive;
The Universe will respond in kind.

Recommended Reading List

The recommended reading list I suggest below, is focused on business actions which are rooted in ESG, supply chain management and business practices. These are my personal preferences, which I have based on reading from a wide variety of sources. Undoubtedly, the reader will find that I have left off many other excellent publications, *which are a must read*. I will gladly consider other publications for future iterations; however, we need to get the 1st list out. I've added some philosophical readings as well. Decisions are affected by our personal values and philosophies – many of which morph over time as we gain knowledge and insights from others and our experience.

I began the initial listing a few decades ago. Most of the students, colleagues, and clients I have had the pleasure to interact with, have found it helpful to point them in the right direction.

We learn from history and 1st hand experience. We learn about best and leading practices from people that have found success with the ideas in a workplace setting or market sector. This is why I have selected these readings. I have used the reading materials in case studies and have validated the ideas through trial and error in the real world.

A few of the authors are colleagues which I respect; others are also leading thinkers from the past and present, whose opinions, thoughts, and words I have found to be inspirational or add clarity to our discussions on ESG and supply chain management. Many ideas cause us to reflect on the status quo of conventional thinking and rethink our intent and purpose moving forward.

Of course, I have included the seminal work of Rachel Carson, *Silent Spring*. The 1962 book started many people on the journey to ask why are we allowing the indiscriminate marketing and selling of chemicals. Carson was among the first to call attention to the disastrous environmental problems being concocted by industry. Joni Mitchell was concerned about this when she sang *you don't know what you've got til it's gone*.

I share the list with you to expand our awareness of the multiple issues and the complexity we collectively face; and to provide hopeful solutions. Because we don't know what we've got til it's gone.

Subscriptions/Publications	Publisher
• Financial Post • Harvard Business Review • Legal Edge • McKinsey Insights • Procura+ Manual 3rd edition • Report on Business • Reuters Canada • Supply Chain Dive • Supply Professional Magazine • Want China Times	- National Post - Harvard University - The Procurement School. - McKinsey & Company - ICLEI - Globe and Mail - Thomson Reuters - Industry Dive Inc. - Annex Printing - wantchinatimes.com
Books	Authors
1. 21 Lessons for the 21st Century 2. An Army of Problem Solvers	- Yuval Harari - Shaun Loney

3. Blockchain Revolution	Dan/Alex Tapscott
4. Brief History of the World	Yuval Harari
5. Cannibals with Forks	John Elkington
6. Civilization	Niall Ferguson
7. Collapse	Jared Diamond
8. Corporation	Joel Bakan
9. Cradle to Cradle	McDonough/Braungart
10. Creative Act	Rick Rubin
11. Ecology of Commerce	Paul Hawken
12. Economics of Happiness	Mark Anielski
13. Embers	Richard Wagamese
14. ESG in Business	Larry Berglund
15. Food, Finance, and Philosophy	Larry Berglund
16. Freakonomics	Levitt/Dubner
17. Freefall	Joseph Stiglitz
18. Good Planets Are Hard to Buy	Larry Berglund
19. Green to Gold	Daniel C. Esty
20. Guide to Practical Procurement	Maureen Sullivan
21. Guns, Germs and Steel	Jared Diamond
22. Heat	George Monbiot
23. Honest Truth About Dishonesty	Dan Ariely
24. Information System Implementations	Andries Jacobs
25. It's the People, Not the Paper	Larry Berglund
26. Leadership Challenge	Kouzes/Posner
27. Leading Change	John Kotter
28. Level Three Leadership	James Clawson
29. Market for Virtue	David Vogel
30. Marketplace Revolution	David LePage
31. Misbehaving	Richard Thaler
32. No Logo	Naomi Klein
33. Omnivore's Dilemma	Michael Pollan
34. Plan It for Our Planet	Larry Berglund
35. Reckoning	David Halberstam
36. Sacred Balance	David Suzuki
37. Silent Spring	Rachel Carson
38. Social Procurement Manual	Yunus Social Business
39. Thinking Fast and Slow	Daniel Kahneman
40. Third Pillar	Raghuram Rajan
41. Why Nations Fail	Acemoglu/Robinson
42. Wizard and the Prophet	Charles Mann
43. Work Like Nature	Lea Elliott
44. World is Hot, Flat and Crowded 2.0	Thomas Friedman

Buy Social Canada⁹

Who is Buy Social Canada?

We are a social enterprise that believes that procurement is more than an economic transaction, it contributes to community social and economic goals. We see opportunities to buy and sell with impact at all levels in the marketplace. Through social procurement advocacy, education and consulting, we are taking back control from the invisible hand of capitalism. As we create a social value marketplace, we are unleashing the transformative power of the market.

Our small, dynamic, women-led team works across Canada on everything related to social procurement.

What do we do?

We bring together purpose driven purchasers and social value suppliers to build business relationships that generate social benefits for communities across the country. We work with community, private sector and public sector to provide training, develop policy and share resources. We offer a recognized, Canada-wide social enterprise certification that opens the door to our growing network of social purchasers.

Every purchase has an economic, environmental, cultural, and social impact, whether intended or not. The collective effort of leveraging social value from purchasing has a powerful and positive ripple effect on our communities.

At Buy Social Canada, we believe in building community capital: healthy communities that are rich in human, social, cultural, physical and economic capital. We are redefining how goods and services are bought and sold. By building relationships between social suppliers and purchasers, Buy Social Canada is leading the movement for community capital creators across the country.

Our Services

Social Enterprise Certification

Verify the impact of Certified Social Enterprises, businesses that sell goods or services, embed a social, cultural or environmental purpose into the business, and reinvest the majority of profits into their social mission. [Find social enterprises across Canada in the directory](#). Boost your social procurement engagement by connecting with Buy Social Canada and likeminded organizations at our national community of practice, or at a regional roundtable.

Consulting

Buy Social Canada's social procurement consulting services include: strategy and policy development, stakeholder engagement and change management, implementation and action plan design and roll out, tools and tactics, measurement and reporting, and social procurement in construction, often known as Community Benefit Agreements.

⁹ Thanks to Tori Williamson, COO Buy Social Canada

Training

With courses for purchasers and suppliers, we equip teams with the skills and knowledge to buy and sell with impact wherever you're at in your journey. Our 8-hour Social Procurement Professional Certificate course is offered online regularly.

Engagement

Boost your social procurement engagement by connecting with Buy Social Canada and likeminded organizations at our national community of practice, or at a regional roundtable.

BCSPI

Buy Social Canada manages the British Columbia Social Procurement Initiative, a public sector collaboration to share resources and learnings.

Social Purchasing Partnerships

Boost your organization's impact and reputation by working with Buy Social Canada to develop and advance your social procurement practice. Get connected to social enterprises to buy from and access exclusive learning and networking events.

Free Support

Buy Social Canada's mandate is to advance social procurement and social enterprise across the country. We sell paid services as outlined above which supports our work to provide a range of free supports through our [open-source resources](#), [free events](#), and our [monthly newsletter](#). By working with Buy Social Canada you are supporting the advancement of social procurement and social enterprise across Canada.

If you have any questions, please contact info@buysocialcanada.com.



Scope 1, 2, and 3 Emissions

