



Sustainable Finance Taxonomy

Is Based on Out-of-date Science and Greenwashing Unsustainability – A response to the Business Future Pathways Report

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Sustainable Finance Taxonomy: Out-of-date Science and Unsustainable Greenwashing

Introduction

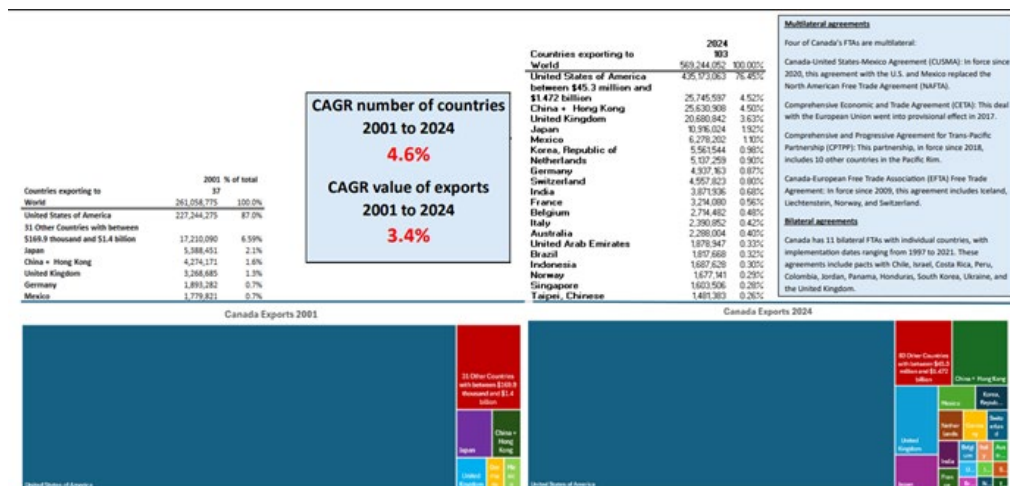
In the Sustainable Finance Taxonomy report, the introduction states:

Objectives:

The first phase of taxonomy development focuses on climate mitigation.

Prioritizing climate mitigation reflects the urgency of reducing global greenhouse gas emissions and aligns with other jurisdictions, which focus on climate mitigation first.

This is disingenuous. The "urgent problem" is that 60 jurisdictions have introduced some kind of taxonomy and Canada is "potentially" losing out on foreign direct investment (FDI) because we don't have one. Given that over half of the FDI into Canada is from the US with the 2nd place being 12% (UK) and 3rd place 11% (the Netherlands), and the US, our largest trading partner, isn't doing any of this, this claim is absurd. Should Canada shackle its golden geese to eke out a few percentage points of foreign investment? Even if Canada were to get to net-zero or absolute zero, the effect on global emissions and global temperature would be negligible -- it would be indistinguishable from the rounding error in the calculations of "global temperature."



<https://blog.friendsofscience.org/2025/10/17/facts-on-canadas-global-trade-an-open-letter-to-senior-deputy-governor-carolyn-rogers/>

Canada-US trade. Note in the above image, over the course of 20 years, Canada did diversify its trading partners from 37 to 103, only to lose export value. The inclusion of this

information is not to suggest we should not pursue additional markets, but simply to show that burdening Canadian industry with climate risk reporting and creating artificial taxonomies to attract investment in typically subsidized sectors will not help our economy or our relationship with our largest trading partner, the USA, which has abandoned climate ideology.

Is it Feasible? What is the Cost-Benefit?

Before expending time and money and public consultation to establish a framework that will impose significant burdens on industry and changes to society, one should evaluate the feasibility of the goal and provide a cost-benefit analysis.

The Business Future Pathways project for establishing Canada's "[Sustainable Finance Taxonomy](#)" has not done either, nor has this large group of high-profile executives pivoted to integrate the dramatic geopolitical and scientific changes of recent weeks. National energy security – not climate risk - was recently exposed by events in the Strait of Hormuz as the highest priority for nations. By contrast, the rationale for assessing climate risk (i.e. under OSFI'S B-15 directive) has dissolved with the [official retraction](#) of the climate damage function paper used by the Network for Greening the Financial System (NGFS) known as Kotz et al. (2024), the [official sidelining](#) of the climate catastrophe scenario known as RCP 8.5/SSP5-8.5, and the exposure that the "[Wedges](#)" study from 2004 which claimed that humanity has the technology to transition off fossil fuels (i.e. wind and solar) and this can be achieved in incremental "wedges" has been shown to be untrue.

With these, the fundamental premise of the Paris Agreement has gone out the window. There is no climate emergency – but now there is a **global energy crisis**. Thus, the Sustainable Finance Taxonomy report focus on climate mitigation is misplaced and will lead to misallocation of vital investment funds necessary to **REcarbonize Canada**.

The stated purpose of the Business Future Pathways taxonomy group is to establish definitions of the types of industries or infrastructure that are climate-aligned with the 2015 Paris Agreement, according to categories defined as green, transition, or abatement.

The report states that, "*Canada's net zero target was established in response to the Paris Agreement and the 2018 IPCC Special Report on Global Warming of 1.5° C (IPCC 2018) and therefore provides a robust and credible level of ambition for the Canadian taxonomy.*"

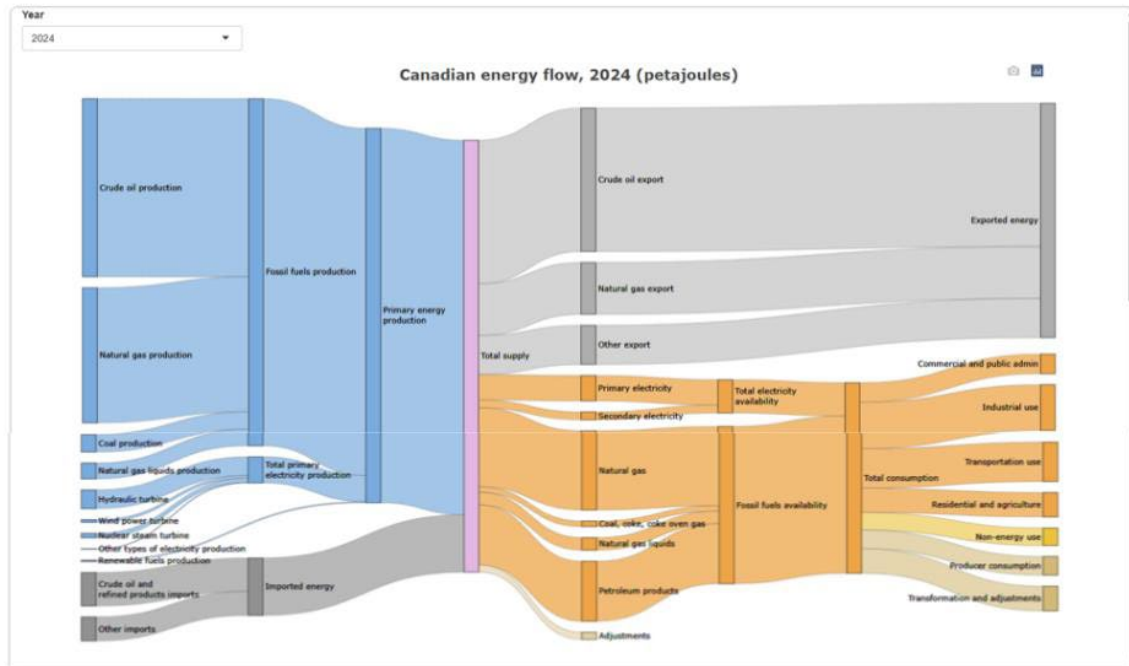
This science of IPCC's SR 1.5 is woefully out-of-date.

The Sustainable Finance Taxonomy report defines net zero as:

Net zero

The state in which greenhouse gas (GHG) emissions from economic activities are reduced to the lowest possible level and any residual emissions are balanced by equivalent removals, resulting in no net accumulation of GHGs in the atmosphere. Canada's net zero target is to achieve this outcome by no later than 2050, consistent with the Paris Agreement goals of limiting global temperature increases to well below 2° C and pursuing efforts toward 1.5° C.

Visualizing Canada's Energy by Source – The Starting Point



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It is a good idea to know your starting point in trying to change a system. The above illustration is a Sankey diagram, produced by the government of Canada. Robert Lyman did an [assessment of the diagram](#) (the 'pipes' flow left to right) in 2023. You can see the present interactive version online [here](#). His comments on the 2023 version are below:

Fossil fuels constitute 93 per cent of domestic energy supply. For all the publicity given to the alleged electrification of Canada, **domestic electricity and renewables production provides only seven per cent of our energy production.**

Fossil fuels also meet by far most of Canada's energy consumption needs. Electricity meets only 18 per cent of Canada's energy demand, slightly below the average in most other OECD countries.

Coal production remains important. In energy terms, coal production is roughly equal to hydro-electricity, which gets far more attention and government endorsement. Coal produces almost nine times as much energy as Canadian wind turbines.

Surprisingly, the combined residential and agriculture sectors account for a significant share of Canadian domestic energy demand. It is not a surprise that the transportation sector accounts for the second largest share of domestic energy demand. The costs of efforts to reduce energy demand and emissions in homes and farms get too little attention.

Is Net Zero Feasible?

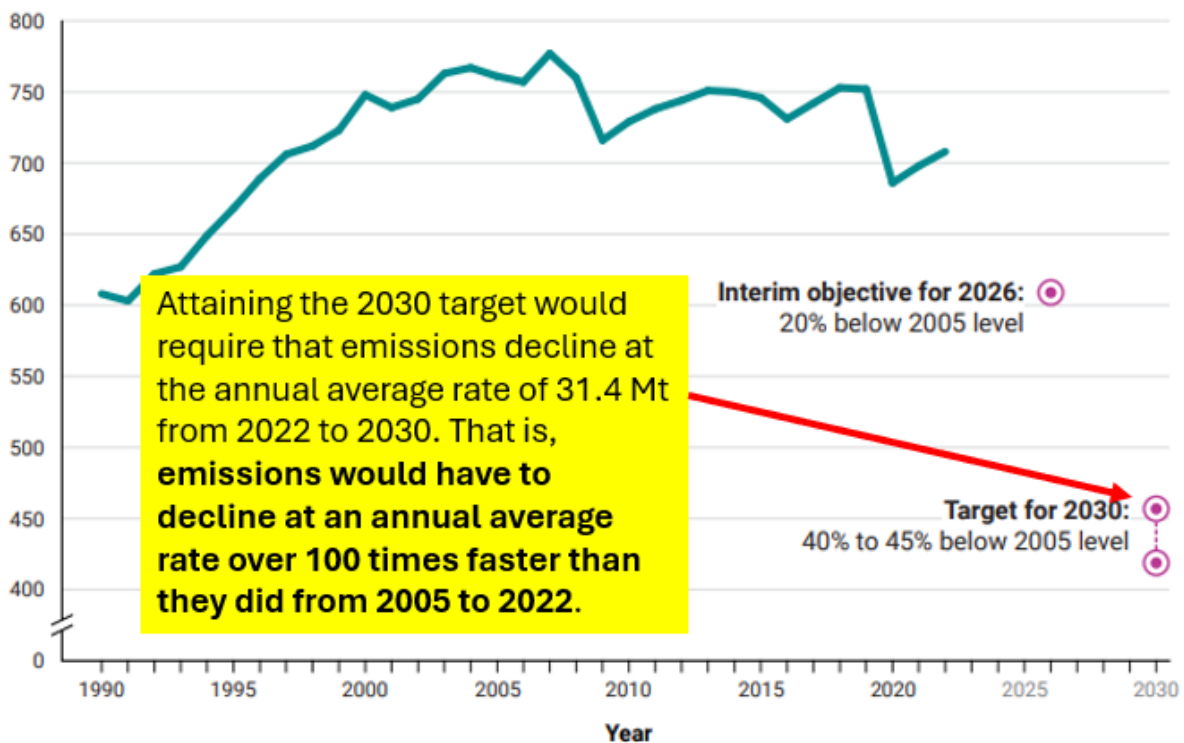
No matter that the Canadian government made a law to try and force Net Zero targets on industry and citizens, it is clearly not possible to meet Net Zero by 2030 or 2050.

Thus, preparing a Sustainable Finance Taxonomy is an **exercise in greenwashing and perhaps an inducement to fraud or misallocation of funds.**

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Exhibit 7.1—Canada's greenhouse gas emissions, projections, objective, and target

Greenhouse gas emissions
(in megatonnes of carbon
dioxide equivalent)



Note: The land use, land-use change, and forestry accounting contributions were not included because those values had not yet been published.
Source: Based on data from the National Inventory Report 1990–2022: Greenhouse Gas Sources and Sinks in Canada, Environment and Climate Change Canada, 2024

Renowned Canadian scientist, Prof. William van Wijngaarden explains that Net Zero targets are not scientifically justified and will cause significant damage to society.¹

¹ <https://www.newswire.ca/news-releases/leading-physicist-debunks-foundation-of-canada-s-net-zero-goals-816958765.html>

What is the Cost-Benefit?

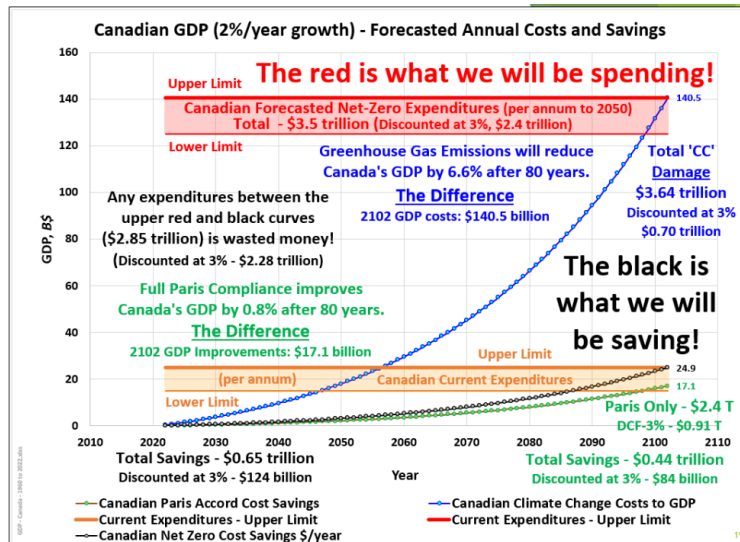
Friends of Science Society's president, Ron Davison, P. Eng., did an analysis based on full Paris Agreement compliance, only to find we will be spending trillions to save billions. This is not economically sustainable. This analysis does not include the costs to maintain Net Zero.

Section 2 Costs and Savings

Climate Change will cost us roughly \$3.6 T (DCF-3 - \$0.7 T). We are planning to spend (based on the 2022 budget) \$3.5 T (DCF-3 - \$2.4 T). We are spending more than CC will cost us!

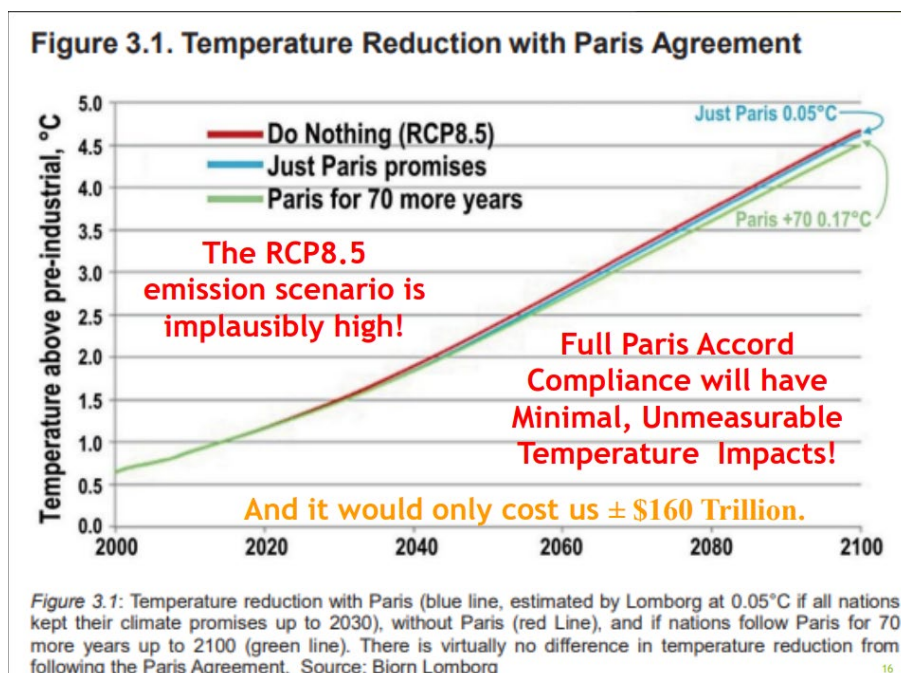
We will be wasting close to \$3 T (DCF-3 - 2.3 T)

Canadians will be spending Trillions to save Billions!



Slide deck: <https://friendsofscience.org/assets/documents/Presentation%20Handouts/ron-davison-talk-march-11-2025-final.pdf> Full presentation: <https://friendsofscience.org/library/events/friends-of-science-speaking-event-and-book-launch.html>

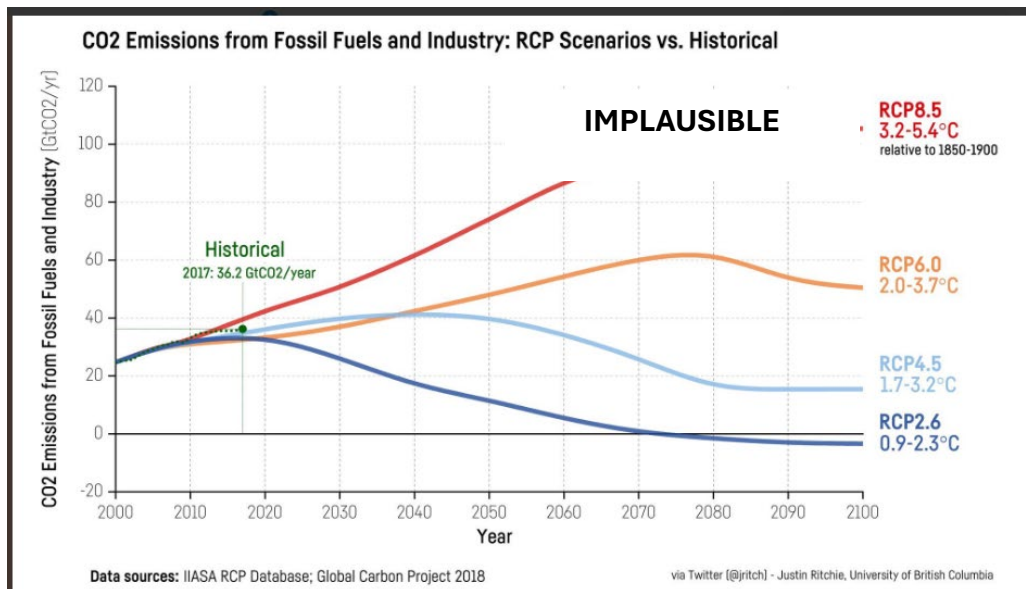
And what would be the temperature reduction benefit of meeting Paris targets? **0.05 °C.**



Without RCP 8.5 (SSP5-8.5) there is No Climate Emergency

The Representative Concentration Pathways (van Vuuren et al. 2011) were developed as a research exercise; they were never meant for policy-making. However, due to climate activism by a group of green billionaires and climate activists, RCP 8.5 became known as the 'business-as-usual' case.² The 2018 IPCC SR 1.5 report relied upon materials referencing RCP 8.5.³

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Thus, one wonders what science-based targets the Sustainable Finance Taxonomy report is referring to?

Many parties reference the Science Based Targets Initiative, however, in reality this is a conflicted organization driven by global climate activist groups. In their own words:

The SBTi is incorporated as a UK charity, with a subsidiary SBTi Services Limited, which hosts our target validation services (together with SBTi, the “SBTi Group”). Partner organizations who facilitated SBTi’s growth and development are CDP, the United Nations Global Compact, the We Mean Business Coalition, the World Resources Institute (WRI), and the World Wide Fund for Nature (WWF).⁴

² <https://www.forbes.com/sites/rogerpielke/2020/01/02/how-billionaires-tom-steyer-and-michael-bloomberg-corrupted-climate-science/>

³ Faulty Premises = Poor Public Policy on Climate, Responding to IPCC SR15 <https://blog.friendsofscience.org/2018/10/30/faulty-premises-poor-public-policy-on-climate-responding-to-ipcc-sr15/>

⁴ <https://files.sciencebasedtargets.org/production/files/Net-Zero-Standard.pdf>

Misdefining the Issue – Two Conflicting Definitions of Climate Change

Mitigation vs Adaptation

Few people realize there are two official, conflicting definitions of climate change.⁵ The United Nations Framework Convention on Climate Change (UNFCCC) is a solely political organization; their definition, as Dr. Judith Curry says, put the cart-before-the-horse in 1992 by stating in Article 2⁶ that greenhouse gases cause ‘dangerous anthropogenic interference’ with the climate system, when no such evidence existed then, nor does it empirically exist now. Politicians rely on, and most climate/energy policies are based on, the faulty UNFCCC definition.

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By contrast, the Intergovernmental Panel on Climate Change (IPCC) is a scientific body whose definition of climate change includes natural (e.g., solar and ocean cycles), as well as human-caused factors (including land use, water diversion and deforestation – not just GHGs). Thus, society should prepare for expected natural climate changes by employing adaptation strategies, as **GHG reduction will not stop climate change**.

As discussed in Roger Pielke, Jr.’s 2005 paper on this topic, “Effective global warming policy does not depend upon consensus on whether or not future climate changes will constitute “dangerous interference.” So as a point of departure, it is worth considering how policies might be different if the framework for action was based on the IPCC definition of climate change. **This alternative perspective argues that as a first step it is necessary to consider climate policy as distinct from energy policy and to take those steps already recognized as serving common interests, commonly called “no regrets.” The underlying hypothesis is that these common interest actions will be more effective in addressing issues of climate change than would be continuation of the present approach.**

“One consequence of the [UN]FCCC’s narrow definition of climate change is that it necessarily subjugates all of climate policy to energy policy (Fig. 1).” ... “Proponents of this approach view energy policy as a “big knob” on the “control panel” of global policy makers who seek to modulate the behavior of the climate system (Pielke et al., 2000).” ... “An essential, but frequently overlooked conclusion of the IPCC is that **“even under the most ambitious abatement policies some climate change is likely to occur,”** (IPCC, 1995) and that “anthropogenic climate change will persist for many centuries” (IPCC, 2001).”

⁵ <https://www.uvic.ca/research/centres/globalstudies/assets/docs/publications/RPielke.pdf>

⁶ <https://unfccc.int/resource/ccsites/zimbabwe/conven/text/art02.htm>

Is there a transition in progress? No.

There is an addition of so-called 'green' energy in progress – at great expense.

From Robert Lyman's summary of the [2026 Statistical Review of World Energy](#):

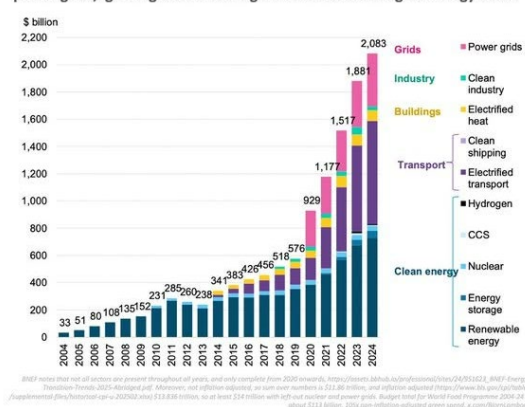
"There is no question as to where the majority of the emissions increases are occurring. In

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Green Transition \$14+ trillion

From 2004-2024, the world has squandered at least \$14 trillion on green. That is 100x what we spent on avoiding hunger through World Food Programme.

Costs are rapidly increasing and underestimated — this counts only pure costs of renewables, electric cars, heat pumps, hydrogen, carbon capture, and power grids; ignoring considerable growth losses from higher energy costs.



2025 the OECD produced only 11,161 million tonnes of carbon dioxide equivalent (31.2%), while the non-OECD countries produced 24,645 million tonnes (68.8%). The United States, Canada and Europe combined produced 8,888 million tonnes, or less than 25% of the global total, while China and India combined produced 14,182 million tonnes or almost 40%. **To place that in context, if by some miracle the United States, Canada and Europe were able to completely cease GHG emissions within the next five years, the United Nations-endorsed goal of reducing global emissions by at least 43% by 2030 still would not come even close to being met.**

Source: Bjorn Lomborg: Climate campaigners tell you green is cheap. It isn't. Global green transition cost is now \$14+ trillion, rising with over \$2 trillion/year (2% of global GDP) - 105x our spending to avoid hunger.

Still, CO₂ emissions set another record last year https://assets.bbhub.io/.../951623_BNEF-Energy-Transition...

You can see all the references in my Twitter thread: <https://x.com/BjornLomborg/status/1900933656966803808>

The 2026 edition of the Statistical Review of World Energy, like virtually all of its predecessors back to the year 2000, documented the continuing (indeed, growing) percentage of the world energy needs that are supplied by hydrocarbons. In 2025 it was 87%. In other words, hydrocarbons remain essential to the world's energy security, economic wellbeing and food production. There is no evidence that this growth in demand, with the associated greenhouse gas emissions, will decline significantly in the near future. **Indeed, 69% of the current global GHG emissions are produced by the non-OECD countries**, for which reliance on hydrocarbons is essential to their economic growth and the wellbeing of their growing populations. The trend, in other words, is for economic and population-driven growth in hydrocarbons use and related emissions. The companies that ignore this trend are the ones whose financial prospects are likely to be most at risk, not

those who pretend that climate policies in the OECD countries will change energy consumption patterns.

In JP Morgan’s “Heliocentrism” of 2025, energy analyst Michael Cembalist noted that “Reality Bites. Goldman Sachs has been at the forefront of aggressive renewable transition projections in its Carbonomics series. However, they struck a much more cautious tone in their October 2024 piece, particularly as it relates to slow progress on hydrogen, carbon capture and coal decommissioning. Goldman now assumes a **“longer life for hydrocarbon assets”, growing demand for natural gas as a transition fuel until 2050, and the need for new oil & gas development beyond 2040.** What a difference a year makes.”

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The Sustainable Finance Taxonomy does not recognize this reality, which is much amplified with the spring 2026 closure/complications in the Strait of Hormuz and the resulting global deficits of Gulf Coast crude oil, LNG, urea for fertilizer, helium (for hi-tech processes), and materials necessary for processing copper, to name a few critical issues.

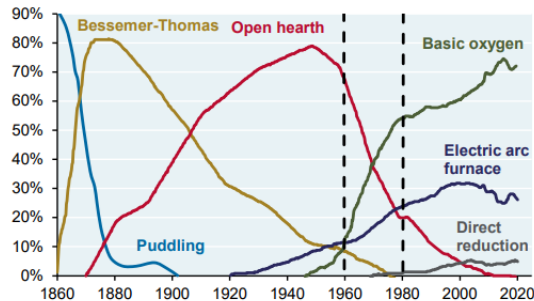
In 2024, JPMorgan’s Michael Cembalist highlighted some transition examples that really worked ⁷– not because of taxonomy for investors, but because the processes were so much better that they paid for the transition themselves.

⁷ <https://cdn.jpmorganfunds.com/content/dam/jpm-am-aem/global/en/insights/eye-on-the-market/heliocentrism-amv.pdf>

Are all industrial transitions as gradual as the current one? No, but it's important to understand why. Rapid industrial transitions can occur but usually require substantial improvements in terms of cost, time and energy. One example is shown on the left: the rapid shift in steel production from open hearth furnaces to basic oxygen furnaces and electric arc furnaces. This transition accelerated during the 1970's when energy prices soared and took place in just 20 years. The catalyst: new technologies cut steel production times to **less than a tenth** of open hearth furnaces, allowing for 80%-90% energy savings¹⁴.

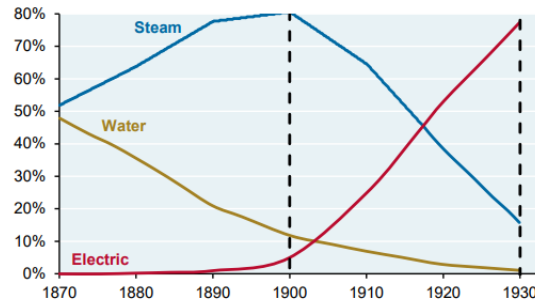
Another rapid transition: when electricity replaced steam engines and turbines in industrial plants in ~30 years in the early 1900's. Electricity offered enormous economic benefits: fewer power losses, more reliable and consistent power than belt-driven systems they replaced, elimination of linear production paths connected to overhead belts and the ability to organize production by the flow of parts rather than transmission of power¹⁵.

Rapid energy-saving steel transition of the 1960s/1970s
Percent of global steel production



Source: Lauri Holappa, Aalto University, March 2019; Boston Metal, May 2022

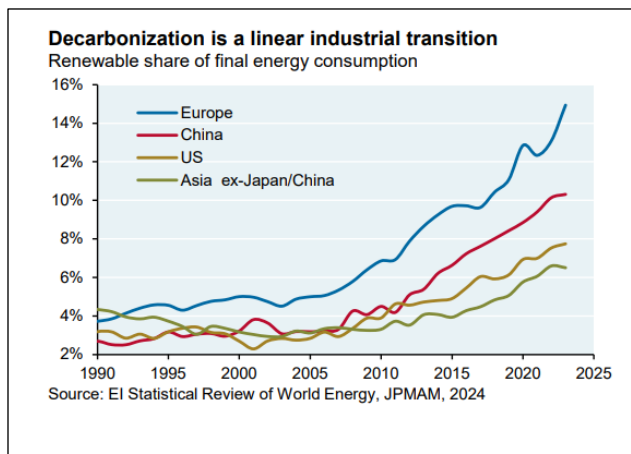
Electricity replaces steam in the early 20th century
Percent of US industrial mechanical power use



Source: Warren Devine, Journal of Economic History, 1983

In contrast: most renewable technologies do not entail massive improvements in cost or energy efficiency. They can sharply reduce carbon footprints, but that does not create substantial economic incentives in a world without a large universal price on carbon. **The bottom line: fast historical industrial transitions financed themselves via returns accruing to innovators and early adopters, while the gradual and linear renewable transition shown on the prior page has required \$9 trillion of global spending since 2010 to move along.**

He refers to this chart:



Cembalist writes:

How fast is the transition going?
Europe leads with its renewable share growing at 0.6% per year since 2010, followed by China at 0.4% and the US at 0.3%. At that pace, Europe needs ~20 years to reach a 30% renewable share

Misleading the Public on “Green”

Unfortunately, the so-called ‘green’ category misleads people. Renewable energy generation, batteries and some storage technologies as well as electric vehicles use far more critical minerals that conventional generation – meaning that at the ‘back-end’ of their production, they are far more energy intense in terms of mining and mineral processing. Most of these items are also transported by sea can carriers, thousands of

miles across the ocean using marine diesel. To date, solar panels cannot be recycled; old wind turbines are being buried, not recycled, old EV batteries and grid-scale battery farms have a risk of toxic,⁸ uncontrollable thermal fires.⁹ There is nothing green about this “green-eligible activities” category.

Figure 1. Proposed categories for the Canadian taxonomy

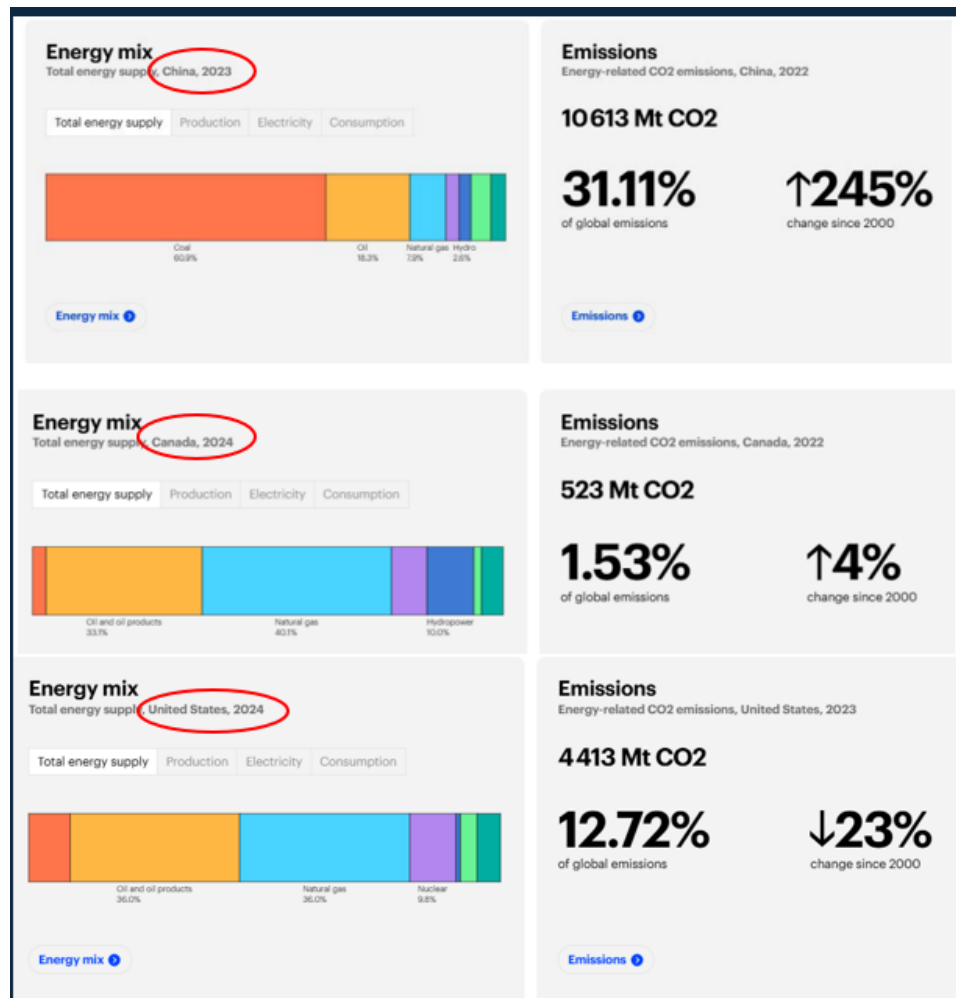
CLASSIFICATION	GENERAL PRINCIPLE	EXAMPLES
Green-eligible activities	- Zero to near-zero emissions climate solutions, or activities that directly enable these climate solutions - Experience demand growth in Paris-aligned pathways - Embody low transition risk and high transition opportunity, and must expand to achieve Canada's net zero commitment	Renewable energy generation, batteries and storage technologies, electric vehicles
Transition-eligible activities and measures	- Materially high Scope 1 emissions today - Potential to achieve scale of decarbonization necessary to align with green definition by 2050 - Continued stable or growing demand in Paris-aligned pathways due to a lack of technically feasible low-carbon substitutes	Cement, steel, and chemicals manufacturing
Abatement-eligible measures	- Select emissions-reduction investments for activities that have materially high Scope 1 emissions today - High likelihood of declining global demand in Paris-aligned pathways, due to high downstream Scope 3 emissions that cannot be fully decarbonized	Select emissions-reduction projects in upstream oil and gas production

As noted above, regarding technology transitions, *‘taxonomy’, subsidies, and regulation are not necessary if a new technology provides substantial improvements of cost, time and energy*. Thus, the “**Transition-eligible activities and measures**” will simply burden manufacturers with much higher costs and the risk of lawfare, vis a vis their Net Zero emissions reporting, for the sole benefit of reducing carbon dioxide emissions for the unscientific and unattainable goal of Net Zero 2050.

⁸ Toxic fluoride gas emissions from lithium-ion battery fires <https://www.nature.com/articles/s41598-017-09784-z>

⁹ NFPA - Hazard Assessment of Lithium Ion Battery Energy Storage Systems <https://www.nfpa.org/education-and-research/research/fire-protection-research-foundation/projects-and-reports/hazard-assessment-of-lithium-ion-battery-energy-storage-systems>

To put this in context, China is the world's leading manufacturer. Their energy mix by source is shown below. Compare. The orange bar is coal. Coal is abundant, affordable, and provides reliable power, and thermal coal provides the essential high-intensity heat necessary for manufacturing wind and solar devices, EVs and batteries. Why do we want to disadvantage our industries?



The “**abatement-eligible measures**” category is also unrealistic. The taxonomy report mentions Carbon Capture and Storage (CCS) as a key abatement measure.

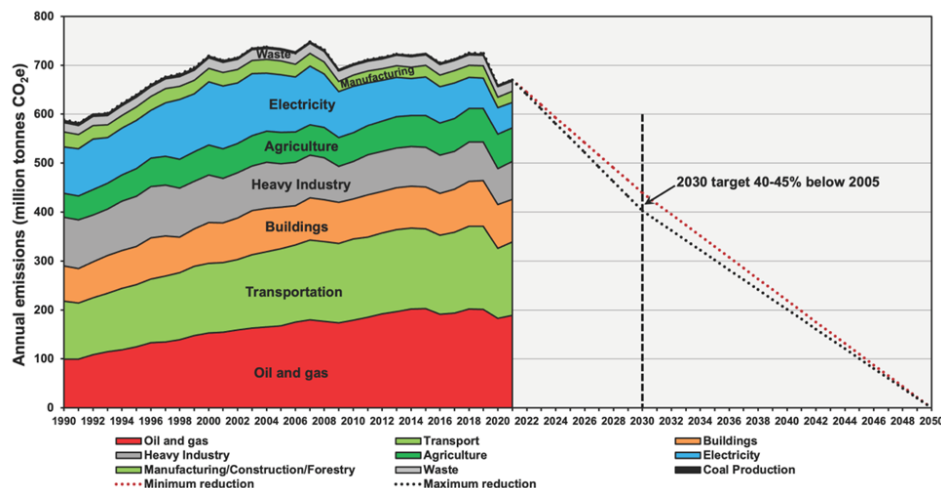
Consider that the present Pathways/Oil Sands Alliance CCS is estimated to cost between \$20 - \$30 billion, 75% of which will be paid/subsidized by taxpayers, to move some 6 million tonnes CO2e/yr to an underground storage facility. The plan is to gradually increase capacity, but that is not a given. Could Canada afford to do a 33-to-38-fold increase in CCS?

The Canada Energy Regulator (CER) and Canadian Centre for Policy Analysis (CCPA) have conflicting views about “Getting to Net Zero” as this Friends of Science Society report shows.¹⁰

The key conclusions from CCPA’s *Getting to Net-Zero* (pp.62-63):

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- Canada’s March 2023 policies would see only a 16% reduction in emissions below 2022 levels by 2050 and must be greatly strengthened.
- To offset the relatively large proportion of fossil fuels in 2050 end-use energy demand, the **CER over-relied on CCUS (33 to 38-fold increase)**, and a **thousand-fold increase in direct air capture**. This is a high-risk strategy. Instead, Mr. Hughes recommends reducing end-use demand for fossil fuels.
- The CER’s Canada net-zero scenario assumed maintaining high levels of fossil fuel production for export in 2050, along with carbon capture and direct air capture to offset emissions from producing oil and gas for export.



Getting to Net Zero is not a realistic goal. Taxonomy will not change that. Canada should be maximizing our resource riches, ensuring national energy security in a time of global deficit, and ensuring that our power grid is built out with dispatchable conventional power generation, not weather-dependent wind and solar.

¹⁰ <https://blog.friendsofscience.org/2024/03/15/getting-to-net-zero-in-canada/>

Focus on Electricity Must Prioritize Reliable, Dispatchable Power Generation

The Sustainable Finance Taxonomy report focusses first on the electricity sector. The federal government is planning to spend \$1 trillion to double the power grid by 2050. The government and several climate activist groups, including the Canadian Climate Institute claim that by building out an east-west power grid, electricity would be more affordable for Canadians. This is not supported by the evidence in other jurisdictions.

The government's focus is on a 'clean energy' power grid – presumably wind, solar and batteries, as recommended by the Canadian Climate Institute in their report "Power Play."¹¹ Unfortunately, this then gives the Sustainable Finance Taxonomy report an aura of a conflict of interest, as the report is a project of the Canadian Climate Institute's "Business Futures Pathways" and the Canadian Climate Institute is primarily government funded.

A Nov. 08, 2025, article by Clean Technica describes the east-west power grid as a second *Golden Spike* for Canada:¹²

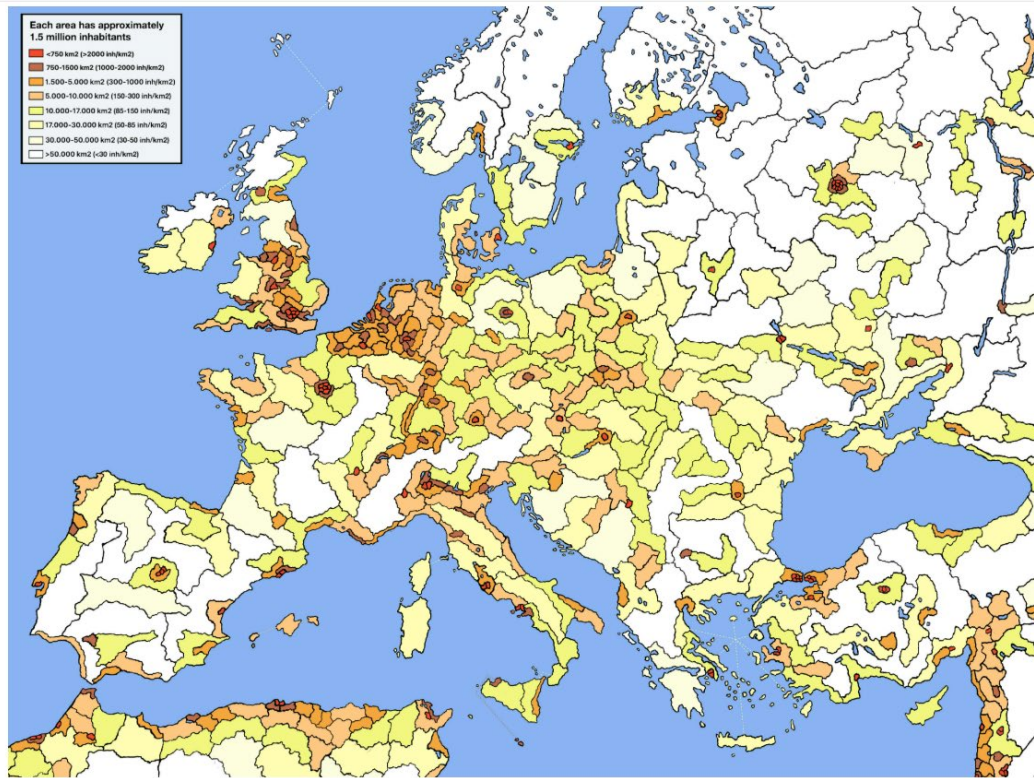
Mark Carney's first budget as Prime Minister quietly provided Canada with the ingredients for something the country has lacked for a century: a truly national electricity backbone. The Clean Electricity Investment Tax Credit, a 15% refundable credit on new generation, storage, and the transmission of electricity between provinces and territories, looks like a simple fiscal tool. It is not. It is the seed of a connected, modern grid that could knit together the regional islands of Canadian electricity into a single low-carbon engine for the electrified economy ahead. And it's far from the only lever that can be pulled to drive Canada's second Golden Spike, this one delivering clean electrons sea-to-sea, not freight and passengers on gleaming rails.

The article goes on to claim that "Canada's electricity system was built for another era" and denounces the north-south, rather than east-west flow of electrons. This is misleading.

Why does the north-south orientation of the Canada-US power grid exist? The reasons are primarily economic, based on population clusters and densities. Though people frequently refer to the European Union as a model of interconnected power grids, where they share vast amounts of power by transmission line, the fact is that Europe is dotted with dozens of high density cities of a million people or more, making it economically feasible to build out the grid in this fashion.

¹¹ <https://climateinstitute.ca/wp-content/uploads/2026/06/Power-Play-report-Canadian-Climate-Institute.pdf>

¹² <https://cleantechnica.com/2025/11/08/a-second-golden-spike-for-an-electrified-canada-using-carneys-budget-to-link-the-provinces/>



Map showing population density across Europe with areas grouped by inhabitants per km².

Population Density Map of Europe – Regional Overview



<https://www.guideoftheworld.com/europe-population-map.html>

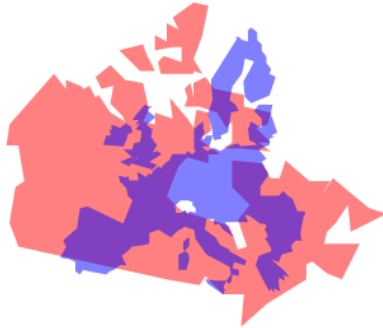
By contrast in Canada, the three largest cities between Toronto and Calgary are Winnipeg (~700,000), Saskatoon (~331,000), and Regina (~230,000). The Highway 1 distance between Toronto and Calgary (Hwy 1) is 3455 km. East-west transmission lines are not economic. That's why they have not been built. The solution is not subsidies, but common sense.

MapFight

Canada ↔ European Union (2017) %

Canada (9,984,670 km²) is **2.3** times as big as
European Union (2017) (4,422,773 km²).

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- If the climate finance premise is that "climate change is intensifying" (not supported by the evidence as shown by Prof. van Wijngaarden) then we need a power grid that is NOT weather dependent.
- No matter what, we do need to build additional generation – transmission lines do not replace the need for **additional dispatchable generation**. It is a fallacy that 'wind is always blowing somewhere' – wind patterns are regional, just ask Germany and the UK about the consequences of 'dunkelflaute'. They are grateful for nuclear from France, saving them from blackouts.^{13 14 15}
- If "sustainable" energy is more affordable, then we can eliminate forthwith all government subsidies.
- "Sustainable" energy is subject to the vagaries of short-term (wind, sun) and long-term (drought - hydro) weather, yet one of the major roles of our energy systems is to protect us from weather. British Columbia is into its third year of importing power from the United States: Quebec Hydro has had a few high-profile curtailments of sending power to the USA – last winter the newly opened New England Clean Connect line **sent no power** to New England during a severe storm. **Quebec needed the power for domestic use, especially since home heating has been converted to electricity.** More

¹³ The True Cost of Wind and Solar Electricity in Alberta <https://blog.friendsofscience.org/2021/04/25/the-true-cost-of-wind-and-solar-electricity-in-alberta/>

¹⁴ What You Really Need to Know about Renewable Energy (That the Pembina Institute Won't Tell You) <https://blog.friendsofscience.org/2021/10/20/what-you-really-need-to-know-about-renewable-energy-that-the-pembina-institute-wont-tell-you-parts-a-and-b/>

¹⁵ Net Zero and the Future Power Grid <https://friendsofscience.org/library/events/net-zero-and-the-future-power-grid.html>

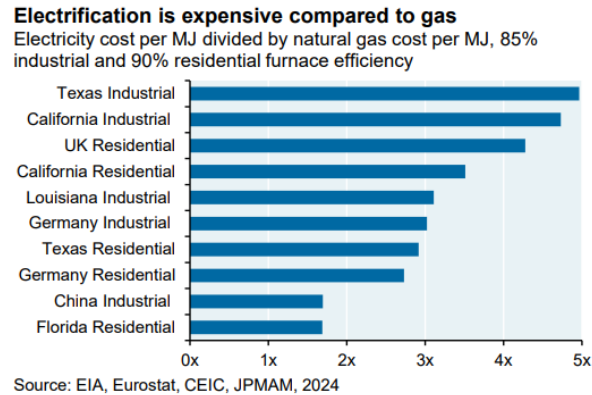
recently during a heat dome, Quebec Hydro failed to send power to New York via the new Champlain Hudson Power Express. CHPE is a 339-mile (545 km) \$6 billion clean energy transmission line that delivers 1,250 MW to NYC.

- These incidents illustrate why ‘islanded’ provincial power grids, with some interconnectivity, are the reliable standard, as the system is designed with redundancy to fully serve that jurisdiction’s peak power demand in times of extreme conditions.
- **Important consideration:** As Canada-US trade uncertainty continues, what if we double the capacity of our grid and Canada's growth slows dramatically due to debt load, the potential loss of a large amount of trade with the United States, the ongoing drain of businesses to the US, and exceptionally high carbon-dioxide taxes compared to most of the rest of the world?
- Though the prime minister’s announcement of the National Electricity Strategy stated: “Canada's national grid strategy "could" deliver \$15 billion in energy savings by 2050”¹⁶— that's not even the rounding error on the estimated cost of the grid build-out.
- The announcement also states the plan is to “Explore how to finance the build-out...”, (presumably the Sustainability Finance Taxonomy report is part of this effort), but this is unnecessary as:
 - Regulators have known how to do this for 100 years
 - Subsidies do not make things economic
 - Government financing will only add debt and taxes that are not related to electricity consumption, which is very bad utility economics
- The announcement also claimed that it is necessary to “connect fragmented grids.” This is nonsense as shown in a report “The Integrative Illusion” which is based on seven decades of electricity generation data in Canada.¹⁷ The only duplicative infrastructure are wind and solar farms that have huge excess capacity but to operate on the grid, must be backed up with dispatchable generation and kilometers of transmission lines that are never used to capacity.

¹⁶ <https://www.pm.gc.ca/en/news/news-releases/2026/05/14/prime-minister-carney-announces-forthcoming-national-electricity>

¹⁷ <https://macdonaldlaurier.ca/the-integration-illusion-seven-decades-of-electricity-trade-data-and-the-case-against-market-restructuring-in-canada/>

- As for 'wasted power' referred to in the announcement, think of the "wasted power" on 3000 km long transmission lines, where line losses could be excessive. Even high voltage DC (Direct Current) lines have line losses and in addition have losses in converting AC to DC and vice versa, as local grids run on AC power.



<https://cdn.jpmorganfunds.com/content/dam/jpm-am-aem/global/en/insights/eye-on-the-market/heliocentrism-amv.pdf>

No Material Supply Chain; China Owns the Critical Minerals Market

Simon Michaux's study for the Geological Survey of Finland shows that there is no material supply chain for Net Zero 2050 (below). New mines take about 20 years to go from discovery to operation in Canada¹⁸; very few mineral processing plants exist in North America.

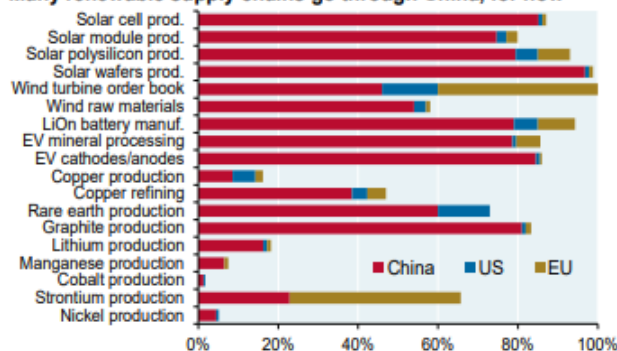
Metal	Element	Total metal required produce one generation of technology units to phase out fossil fuels (tonnes)	Global Metal Production 2019 (tonnes)	Years to produce metal at 2019 rates of production (years)
Copper	Cu	4 575 523 674	24 200 000	189,1
Nickel	Ni	940 578 114	2 350 142	400,2
Lithium	Li	944 150 293	95 170 *	9920,7
Cobalt	Co	218 396 990	126 019	1733,0
Graphite (natural flake)	C	8 973 640 257	1 156 300 ♦	3287,9
Graphite (synthetic)	C		1 573 000 ♦	-
Silicon (Metallurgical)	Si	49 571 460	8 410 000	5,9
Vanadium	V	681 865 986	96 021 *	7101,2
Rare Earth Metals				
Neodymium	Nd	965 183	23 900	40,4
Germanium	Ge	4 163 162	143	29113,0
Lanthanum	La	5 970 738	35 800	166,8
Praseodymium	Pr	235 387	7 500	31,4
Dysprosium	Dy	196 207	1 000	196,2
Terbium	Tb	16 771	280	59,9

¹⁸ <https://www.mining.com/canadas-20-year-mine-timeline-hits-multibillion-dollar-wall/>

Michaux simply extrapolated the 2019 mining values to those required for the first generation of new technologies for global Net Zero plans. This is unsustainable.

As both Michael Cembalist of JP Morgan and retired energy economist, Robert Lyman, have noted, national energy security for the ‘green’ industries is fundamentally compromised, being held in the hands of China.

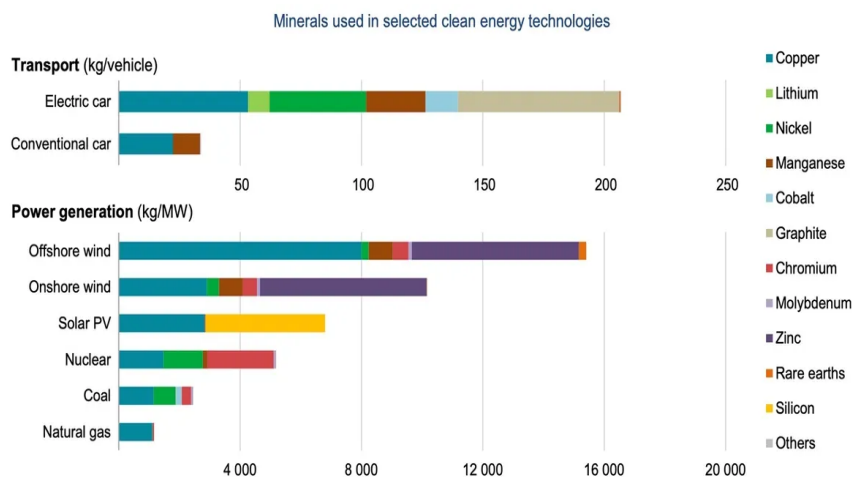
Many renewable supply chains go through China, for now



Source: Benchmark Mineral Intelligence, BNEF, EC, IEA, S&P, USGS, JPMAM. 2022.

<https://cdn.jpmorganfunds.com/content/dam/jpm-am-aem/global/en/insights/eye-on-the-market/heliocentrism-amv.pdf>

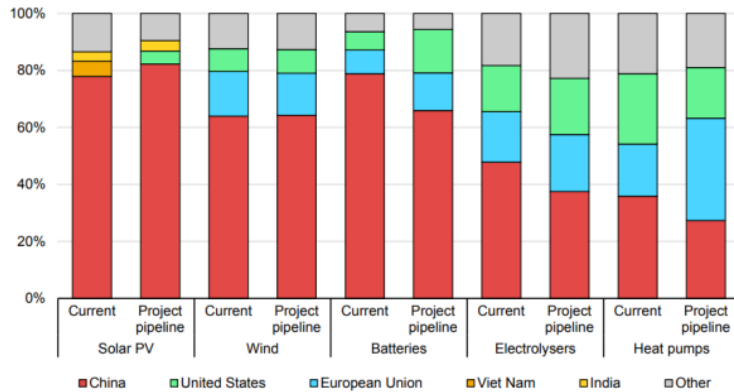
As mentioned earlier in this document, ‘green’ technologies use more rare earth minerals than conventional technologies and thus have a much larger energy and emissions/pollution footprint, greenwashed by the ‘clean’ label.



In his report “Multi-polar World at Risk”,¹⁹ Robert Lyman argues that China’s overwhelming manufacturing and mineral processing capacity can entangle the world in supply chain issues and affect national security.

¹⁹ <https://blog.friendsofscience.org/2024/04/25/a-multi-polar-world-at-risk/>

Figure 7 Geographical concentration of current and announced manufacturing capacity



IEA. CC BY 4.0.

Notes: Wind refers to onshore wind nacelles in this analysis. For electrolysers, the analysis only includes projects for which location data was available. Shares are based on manufacturing capacity. "Current" refers to installed capacity data for 2022. "Project pipeline" refers to the sum of current installed capacity and all announced manufacturing capacity additions (as of end-Q3 2023) through to 2030. "Other" refers to the aggregate of all capacity outside of the top three countries/regions for each technology and timeframe.

Source: IEA analysis based on data from InfoLink, BNEF, WoodMac, BMI and UN Comtrade.



In Closing

The scientific basis of the alleged climate emergency (and thus the need for Net Zero) has been dissolved by the official elimination of the climate catastrophe scenario known as RCP 8.5 (SSP5-8.5). Taxonomies don't resolve economics. **The world has changed – national energy security and economic power based on conventional energy and expanded dispatchable power generation must be Canada's focus.**

REcarbonize Canada.



About Friends of Science Society

Friends of Science Society is an independent group of earth, atmospheric and solar scientists, engineers, and citizens that is celebrating its 24th year of offering climate science insights. After a thorough review of a broad spectrum of literature on climate change, Friends of Science Society has concluded that the sun is the main driver of climate change, not carbon dioxide (CO₂).

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