

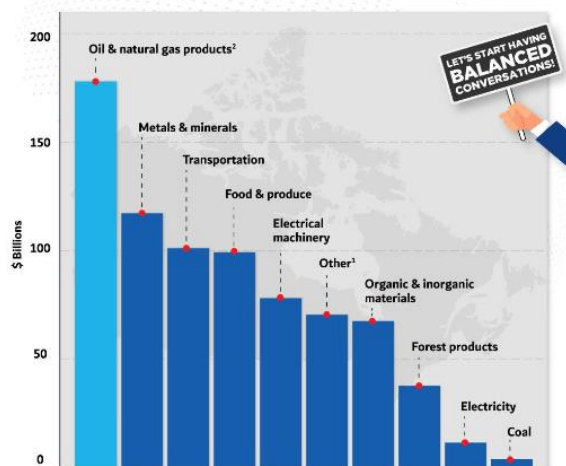
Repurposing Prosperity: How Canada Can Transform Its Resource Networks for a Sustainable Future

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As climate change accelerates and captures the world's attention, Canada faces a grave dilemma: how to preserve its economic strength while transitioning to a low-carbon future. With investors scrutinizing emissions and consumers increasingly favoring sustainable alternatives, **the country must rethink its historic reliance on natural resources and export-driven growth -- or else they risk falling behind in the global race for sustainability.**

The Canadian Paradox



Canada's prosperity has long been tied to its natural wealth. Oil, gas, minerals, lumber, and energy production have anchored national output and exports for decades. In the first quarter of 2025, natural resources generated \$357.5 billion in GDP, about 12.1% of the economy¹, while supporting 1.7 million jobs across the country². These industries are not peripheral; they are fundamental to Canada's economic identity.

Canada's Top Exports, by Type (Image Source: Canada Action)

The challenge is that they also dominate Canada's emissions profile. In 2023, the oil and gas sector alone produced roughly 30% of national greenhouse gases, making it the single largest source of emissions. More broadly, the energy sector accounted for over 80% of the total³. What has been Canada's greatest differentiating strength has also its most pressing vulnerability.

Global conditions are compounding this tension, as Canada's reliance on resource exports is no longer judged solely on price or volume. Increasingly, it is evaluated on climate risk. As recent consumer trends gravitate toward low-carbon alternatives and trade partners are introducing carbon border adjustment mechanisms (CBAMs)⁴ -- tariffs

that penalize imports based on their embedded emissions -- modern investors increasingly weigh firms' exposure to carbon risk as well⁵. These shifts threaten the competitiveness of resource-based exports, leaving Canada in an awkward position: the very industries that were foundational to its prosperity now risk undermining its future growth.

External pressures

On an international scale, global capital markets are changing. Listed companies are now expected to disclose how climate change affects their operations, financing, and long-term strategy. These standards are not niche; they are becoming mainstream. By 2024, the International Financial Reporting Standards (IFRS) introduced IFRS S1 and S2, which require firms to outline both physical and transition risks from climate change, as well as opportunities in the low-carbon economy⁶.

Canadian investors are already signaling how serious this is. In 2023, the heads of 11 major pension funds, representing over \$2 trillion in assets, jointly urged companies to adopt the new disclosure framework⁷. Their rationale is clear: without standardized information, investors can't gauge the risks of carbon-heavy industries or shift money toward safer, low-carbon options.

This puts traditional resource sectors under increasing scrutiny. It is no longer enough to generate output, as firms must also prove that they can withstand the rising costs of carbon pricing, increasing CBAMs, and shifts in consumer demand. For an economy so intertwined with its natural resource industry, these disclosure standards are reshaping the rules of global economic competitiveness.

Other countries are following suit as well. Brazil is building a national cap-and-trade system, giving firms incentives to cut emissions and align with low-carbon trade partners. Switzerland has pledged a 65% reduction by 2030, using both domestic measures and international credits (ITMOs), with its Klik Foundation set to acquire 20 million ITMOs by 2030. Japan has committed to deep emission cuts of 60% by 2035 and 73% by 2040, pairing this with a mandatory carbon pricing scheme and its Joint Crediting Mechanism to secure reductions abroad⁸. Evidently, international pressure is mounting, and Canada must keep pace in the seemingly global race toward sustainability.

Case Study: Rotterdam's Hydrogen Port

So why is Canada falling behind? Other countries are proactively finding scientific and industrial pathways to decarbonize, while Canada remains tied to this resource-focused status quo. The Port of Rotterdam in the Netherlands provides a striking example of what a future-oriented transition looks like.

Once known primarily as Europe's largest fossil fuel importer, Rotterdam is rapidly reinventing itself into a hydrogen and ammonia gateway for Northwest Europe. The port is home to Holland Hydrogen 1, Europe's first major renewable hydrogen plant (200 MW capacity), and ELYgator, a second 200 MW electrolyzer project powered by offshore wind farms. These facilities will supply clean hydrogen directly to heavy industry, reducing reliance on natural gas⁹.

Rotterdam is also testing ammonia bunkering pilots for shipping, constructing an ammonia terminal and cracker to enable large-scale imports, and investing in Porthos, a CO₂ transport and storage project under the North Sea. Meanwhile, its new hydrogen pipeline network, depicted in the image below, will eventually link the port with industrial clusters in Germany and Belgium, establishing Rotterdam as the backbone of a European hydrogen economy⁹.

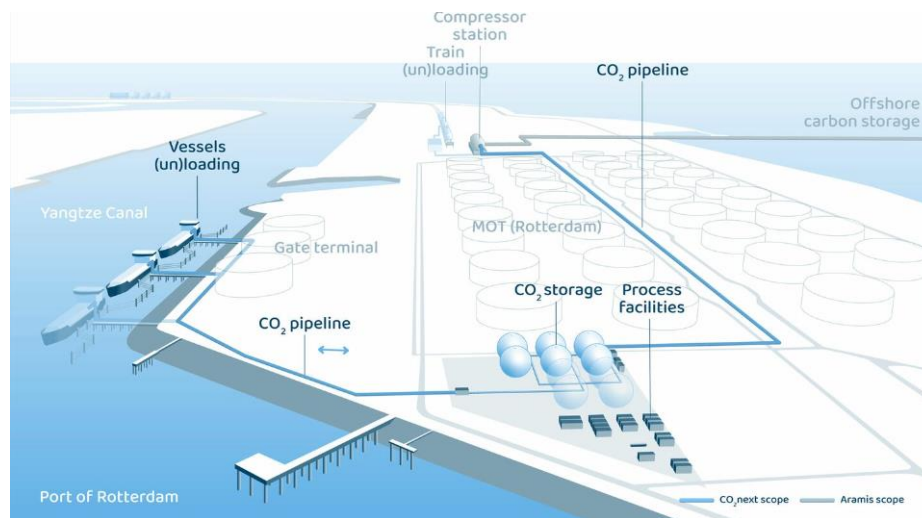


Diagram of Rotterdam's CO₂next project (Image Source: Port of Rotterdam)

Even in the face of higher costs and global economic uncertainty, the Netherlands continues to push forward, innovatively repurposing infrastructure once used for fossil fuels into low-carbon supports. Instead of exporting coal and oil, they can host integrated facilities for electrolysis, CO₂ storage, and clean-fuel shipping, giving the Netherlands a strong head start in the transition.

Exploring Solutions: Reimagining Canada's Pipelines

Canada's pipeline network has long been the backbone of its natural resource economy. Stretching across provinces and connecting to major ports, these pipelines move billions of dollars' worth of crude oil and natural gas each year. But they are also a major climate liability, as pipeline transportation alone released 10.7 megatons of CO₂ equivalent in 2021¹⁰, largely from energy use in pumping stations and methane leakage.

Transmission and distribution leaks add another approximate 2.4 Mt CO₂e¹¹, making pipelines not just transporters of fossil fuels, but direct emitters themselves.

This poses both a challenge and an opportunity. If Canada continues to operate these networks as fossil transporters, it locks in emissions for decades. However, if we can pivot and repurpose them, these same steel corridors could carry the hydrogen, ammonia, and captured CO₂; the fuels of the future. Unlike building entirely new assets, repurposing pipelines and terminals leverages Canada's existing expertise in natural resource transportation, as well as a skilled workforce. It lowers costs while also giving fossil-heavy provinces like Alberta and Newfoundland a stake in the transition.

As depicted in the Rotterdam case study above, this pivot is feasible. Rotterdam is transforming its oil port into a hydrogen hub, linking offshore wind-powered electrolyzers to industrial clusters through pipelines. The port is also developing CO₂ transport and storage through the Porthos project, showing how a major logistics center can serve multiple low-carbon functions, from hydrogen production and storage to ammonia bunkering and carbon capture⁹. Rotterdam's integrated approach demonstrates that existing fossil infrastructure can be repurposed efficiently, providing a clear blueprint for Canada.

Now, imagine applying this model to Canada's already vast pipeline infrastructure. For example, the Irving Oil Refinery in Saint John, New Brunswick, has a deep-water terminal capable of receiving supertankers¹². This infrastructure could be adapted to export hydrogen or ammonia, leveraging their existing hydrogen electrolyzer¹³. Additionally, the Ridley Energy Export Facility in British Columbia is developing a coastal terminal with the capability to export liquefied petroleum gases and methanol, which could also be expanded to include hydrogen exports¹⁴.

Projected Sustainability

These pipelines are a clear contributor to Canada's growing carbon footprint, making their transformation a pressing priority. By repurposing them for hydrogen, ammonia, or CO₂ transport, Canada can demonstrate to investors and global partners that it is actively embracing low-carbon alternatives. This approach also positions the country to keep pace in the global sustainability race. In answering the question of how to balance economic reliance on natural resources with climate commitments, Canada has internally held the solution all along; by leveraging the very resources and infrastructure that built Canada's economy, we can drive the transition to a cleaner, competitive future.

References

1. Statistics Canada. (2025, June 30). *Natural resource indicators, first quarter 2025*. Statcan.gc.ca. <https://www150.statcan.gc.ca/n1/daily-quotidien/250630/dq250630a-eng.htm>
2. Government of Canada. (2025, January 9). *10 Key Facts on Canada's Natural Resources - 2023*. Canada.ca. <https://naturalresources.canada.ca/science-data/data-analysis/10-keyfactscanada-s-natural-resources-2023>
3. Government of Canada. (March 2025). *Greenhouse gas emissions*. Canada.ca. <https://www.canada.ca/en/environment-climate-change/services/environmental-indicators/greenhouse-gas-emissions.html>
4. Clausing, K., Colmer, J., Hsiao, A., & Wolfram, C. (September 2025). *The global effects of carbon border adjustment mechanisms*. Discussion Paper No. 2097. Centre for Economic Performance. <https://cep.lse.ac.uk/pubs/download/dp2097.pdf>
5. Bolton, P., & Kacperczyk, M. (2021). Do Investors Care about Carbon Risk? *Journal of Financial Economics*, 2097(2), 517-549. <https://doi.org/10.1016/j.jfineco.2021.05.00>
6. IFRS. (2023). *IFRS S2 Climate-related Disclosures*. <https://www.ifrs.org/issued-standards/ifrs-sustainability-standards-navigator/ifrs-s2-climate-related-disclosures/>
7. McCool, S. (2023, June 28). *CEOs of Leading Canadian Pension Plan Investment Managers support Inaugural International Sustainability Standards Board (ISSB) Standards*. CPP Investments.

<https://www.cppinvestments.com/newsroom/ceos-of-leading-canadian-pension-plan-investment-managers-support-inaugural-international-sustainability-standards-board-issb-standards/>

8. Carbon Market Institute. (2025). *V3 International Carbon Market Update Q1 2025*. <https://carbonmarketinstitute.org/app/uploads/2025/04/International-Carbon-Market-Update-Q1-2025-1.pdf>
9. Port of Rotterdam. (2025, May 7). *The hydrogen system is taking shape*. <https://www.portofrotterdam.com/en/news-and-press-releases/hydrogen-system-taking-shape>
10. Canada Energy Regulator. (2022, January 12). *Market Snapshot: “Greening” Canada’s pipeline infrastructure*. <https://www.cer-rec.gc.ca/en/data-analysis/energy-markets/market-snapshots/2022/market-snapshot-greening-canadas-pipeline-infrastructure.html>
11. Government of Canada. (2025). *Greenhouse gas sources and sinks in Canada: executive summary 2025*. <https://www.canada.ca/en/environment-climate-change/services/climate-change/greenhouse-gas-emissions/sources-sinks-executive-summary-2025.html>
12. Irving Oil. (n.d.). *Irving Canaport*. <https://www.irvingoil.com/en-CA/discover-irving/canaport>
13. Irving Oil. (2022, July 12). *Irving Oil to introduce hydrogen for the regional market - a first-of-its-kind investment from a Canadian refiner*. <https://www.irvingoil.com/en-CA/press-room/irving-oil-introduce-hydrogen-for-the-regional-market-first-its-kind-investment-canadian>

14. AltaGas. (n.d.). *Ridley Island Energy Export Facility*.

<https://www.altagas.ca/infrastructure/operations/ridley-island-energy-export-facility>

Images:

Canada Action. (2025, July 17). *Graphs: Canada's Economic Performance and the*

Impact of Natural Resources. <https://www.canadaaction.ca/canadian-economy-impact-natural-resources-graphs>

Port of Rotterdam. (2025, May 7). *The hydrogen system is taking shape*.

<https://www.portofrotterdam.com/en/news-and-press-releases/hydrogen-system-taking-shape>