

Digital Policy Hub – Working Paper

# Governing Sustainable AI Data Centre Growth in Canada

**Alonso Muñoz Sanchez**

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67 Erb Street West  
Waterloo, ON, Canada N2L 6C2  
cigionline.org

## About CIGI

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## About the Author

Alonso Muñoz Sanchez is a Digital Policy Hub undergraduate fellow studying public policy and international relations at the University of Toronto. His research explores how governments can reduce the carbon footprint of artificial intelligence while leveraging its potential to accelerate the net-zero energy transition. Alonso has conducted research on social innovation, climate migration and international development, and presented at conferences in Toronto, Guadalajara, Amsterdam and New York City. Alonso hopes to pursue a career at the intersection of business and policy. He has completed internships at a government-relations consulting firm and at an advocacy group representing Ontario's 444 local governments.

# Governing Sustainable AI Data Centre Growth in Canada

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## Bottom Line Up Front

Artificial intelligence (AI)-driven data centres are rapidly becoming critical infrastructure for economic competitiveness and national security, and Canada is well positioned to attract AI investment seeking clean, reliable electricity. With one of the world's lowest-emitting power systems and a cold climate that reduces cooling demand, Canada has a clear comparative advantage as data centre growth in other jurisdictions increasingly relies on fossil fuels. Yet these facilities are also highly energy-intensive, requiring large, continuous loads that are colliding with already-strained grids and competing with electrification of transport, industry and heating. This challenge is compounded by a fragmented policy landscape. Provinces are responding unevenly: Quebec and British Columbia are tightening access to hydro power; Alberta is encouraging off-grid gas generation; and Ontario is moving toward selective connection rules. In the absence of federal coordination, Canada risks misallocating scarce clean electricity, raising emissions and electricity costs, and squandering a strategic opportunity to anchor low-carbon AI infrastructure.

### Key Points

- AI-driven data centres are becoming major sources of electricity demand, placing new strain on grids that must simultaneously support electrification and emissions reduction targets.
- How this demand is met matters: unmanaged growth can increase emissions, raise electricity prices and crowd out other strategic uses of clean power.
- Governments are responding through four distinct governance approaches: incentive-heavy expansion, coordinated planning, restrictive regulation and state-led industrial strategies.
- Coordinated planning – linking data centre siting to grid capacity, clean generation and heat reuse – has proven most effective at balancing growth, system reliability and decarbonization.
- Canada's low-emitting electricity system and climate create a strong competitive advantage in attracting clean AI infrastructure, but fragmented federal-provincial governance risks undermining this opportunity without a national framework.
- The absence of federal coordination also raises sovereignty and security risks, as expanding compute capacity without oversight of energy sourcing and ownership can entrench dependence on fossil-based and foreign-controlled infrastructure.

## Recommendations

- **Develop a national AI energy strategy:** A national framework should align data centre projects with Canada's net-zero energy transition. Developed in collaboration with provincial governments, utilities companies, industry and First Nations, the strategy should guide siting of new AI compute capacity where grids can support it, integrated with low-carbon supply and designed for waste-heat recovery. Federal guidance should define the criteria for sustainable AI growth and prevent default reliance on fossil fuels.
- **Fast-track nationally significant clean power and transmission infrastructure:** Designate priority clean generation and transmission projects as projects of national interest under the Building Canada Act to accelerate approvals and construction where grid constraints threaten AI and electrification goals.
- **Mobilize national capital for energy infrastructure:** Work with Canada's Maple Eight pension funds and other long-term institutional investors to finance clean electricity and grid infrastructure as nation-building assets that support AI and long-term economic competitiveness.
- **Incentivize clean, integrated data centre design:** Condition federal capital support on projects that co-locate with renewable generation, build dedicated clean supply or integrate district heating.
- **Strengthen provincial and municipal planning authority:** Support provinces and municipalities in applying siting criteria, prioritization frameworks and, where necessary, temporary moratoria based on grid capacity and local economic value.



# Introduction

The world has seen an expansion in the scale and speed of artificial intelligence (AI) adoption. Publicly traded AI-related firms have added an estimated US\$12 trillion in market capitalization since 2022 (International Energy Agency [IEA] 2025a).

Training and operating AI models requires running millions of processors continuously to learn from data and respond to user queries. This computation is housed in data centres, which concentrate servers, networking hardware and cooling systems. Global investment in these facilities doubled from 2022 to 2024, reaching US\$500 billion (ibid.).

Today, AI already has substantial military, security and economic applications. AI data centres have therefore become critical infrastructure for national security and long-term economic competitiveness, but they are energy-intensive. A single hyperscale facility can consume as much electricity as 100,000 households, while the largest planned projects may require the equivalent of two million households (ibid.). Data centres already account for roughly one percent of global electricity consumption (de Vries 2023), pressuring ageing grids and increasing emissions even as many countries pursue ambitious net-zero commitments.

This tension creates a policy challenge. Demand for AI compute is accelerating, but electricity systems must simultaneously support electrification of transport, industry and heating. As data centre growth in the United States increasingly relies on natural gas, Canada has a strategic opportunity to position itself as a cleaner alternative. With a largely non-emitting electricity system and a cold climate that reduces cooling demand, Canada can attract net-zero-focused capital.

## Electricity Demand

### Trends and Projections

Electricity demand from data centres is rising rapidly and unevenly. China, Europe and the United States account for nearly 85 percent of global consumption, and by 2030 the United States and China alone will drive almost 80 percent of global growth (IEA 2025a). In Canada, 239 data centres are already operating, with provinces projecting significant additional growth driven by hyperscale developments (Harland 2025; Natural Resources Canada 2024).

In advanced economies, data centres account for more than 20 percent of projected electricity demand growth to 2030, prompting the IEA to describe the trend as a “wake-up call” for electricity systems (IEA 2025a, 15). Meeting this demand will require substantial new supply. Renewables are expected to provide roughly 45 percent of incremental electricity through 2035, while nuclear power is attracting renewed interest as a source of firm, carbon-free baseload (IEA 2025a, 2025b).

Canada’s reliance on hydroelectricity introduces additional planning risk. Variability in precipitation and temperature has reduced hydro output and electricity exports in

producing provinces, underscoring the need for diversified and resilient clean-energy supply (Statistics Canada 2024).

## Implications

The rapid growth of AI-driven data centres is placing new strain on electricity grids at a moment when systems must also accommodate economy-wide electrification. Grid congestion and long connection queues have delayed roughly 20 percent of planned projects, while competition for capacity risks slowing the deployment of electric vehicles, heat pumps and other clean technologies (IEA 2025a).

Emissions from data centre electricity consumption are projected to rise from 180 to 300 megatonnes (Mt) by 2035 in the IEA's baseline projection and up to 500 Mt in a high-growth "lift-off" scenario (ibid.). Where new data centre demand is met through fossil-fuel generation, households and businesses are subject to higher consumer electricity prices, creating political risk and public resistance to further development.

Yet AI can also lower carbon emissions, particularly in high-income, high-emission countries (Wang, Li and Li 2024; Zhong et al. 2024). Widespread adoption of AI-enabled energy efficiency could reduce global emissions by up to five percent by 2035 (IEA 2025a).

This duality leads to a rebound effect. Efficiency gains do not reduce total energy use, as lower costs and greater capability increase demand. Therefore, improvements that make models more efficient can simply enable larger models or wider deployment and ultimately increase total energy consumption (Wang, Li and Li 2024, 3).

# Canada's Position

Canada enters the global AI data centre race with significant structural advantages, but without a coherent national strategy to govern electricity-intensive AI infrastructure (Harland 2025). Two features define Canada's position.

First, Canada has a competitive energy profile. Approximately 85 percent of its electricity is non-emitting, being primarily hydro and nuclear, which makes it one of the cleanest grids in the world. Canada's cold climate reduces water consumption for cooling, and industrial electricity prices in Montreal, Toronto and Vancouver are generally cheaper than in comparable US markets (ibid.).

Second, Canada's policy architecture is fragmented. Provinces and territories have primary jurisdiction over energy and natural resources, producing ten distinct regulatory environments and no national allocation framework. Except for Quebec, utilities provide grid connections on a first-come-first-served basis, favouring the fastest mover rather than the highest-value user (ibid.).

## Provinces

Quebec and British Columbia rely on hydroelectric systems that provide low-carbon electricity at low industrial rates. Both provinces marketed this advantage and attracted

hyperscale operators including Amazon Web Services, Google, IBM and Microsoft. British Columbia introduced a temporary discounted electricity rate for data centres in 2022, which reached its capacity by 2023. Quebec has shifted to a government-led framework prioritizing projects based on economic and environmental criteria; since its adoption in 2023, no new proposals have been approved. In both provinces, any new demand would require expensive system expansion and could raise consumer electricity rates (ibid.).

Alberta's deregulated electricity market and abundant natural resources have positioned the province to attract new AI-focused data centre investments. Alberta's Artificial Intelligence Data Centres Strategy supports off-grid or partially off-grid development, encouraging operators to "bring your own power" by pairing data centres with dedicated gas-fired generation (Merwat 2024; Government of Alberta 2024). This approach enables rapid deployment and avoids constraints on the public grid; however, full build-out of proposed facilities would double electricity sector emissions, reversing gains from the coal phase-out (Harland 2025). At the same time, Alberta's oil-and-gas infrastructure and drilling capacity create an opportunity to deploy advanced geothermal power as a source of carbon-free electricity for data centres. In the United States, firms such as Fervo Energy are already developing geothermal power to supply 24/7 carbon-free electricity for data centres (Morene 2025).

Ontario presents an intermediate position. Its electricity system is anchored in nuclear and hydro, supplemented by natural gas and renewables, and is already facing new load growth from electric vehicle manufacturing. Data centres are projected to account for 13 percent of new provincial electricity demand by 2035 (Government of Ontario 2025). In 2025, the province introduced Bill 40, authorizing the independent electricity system operator to condition or deny grid connection for "specified load facilities" unless they demonstrate strategic or economic benefit (Coban, Gralnick and Thomson 2025). Ontario also retains more than 60 active district energy systems, which could facilitate heat-reuse integration (Government of Ontario 2025).

## Federal Policy

The Canadian Sovereign AI Compute Strategy commits up to CDN\$700 million to expand domestic AI compute capacity and CDN\$1 billion to develop public supercomputing infrastructure.<sup>1</sup> This, however, does not address the electricity demands of data centres.

The Clean Electricity Strategy identifies AI and data centres as part of a broader shift requiring new generation and transmission, and commits the federal government to scaling pilot projects and funding electricity-related research and development (Natural Resources Canada 2024). However, no specific federal guidance exists on how provinces should allocate scarce clean energy or manage the emissions impact of data centre expansion. Despite limited federal jurisdiction over energy and natural resources, this gap poses material national risks. If demand is met primarily through natural gas generation, six gigawatts of new facilities could increase national carbon emissions by three percent (Merwat 2024).

The absence of a federal framework raises questions of sovereignty and security. Expanding domestic compute capacity without corresponding oversight of energy

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<sup>1</sup> See <https://ised-isde.canada.ca/site/ised/en/canadian-sovereign-ai-compute-strategy>.

sourcing, siting and ownership risks entrenching dependence on foreign-controlled infrastructure and fossil-based power.

# Comparative Governance

To situate Canada’s choices within a broader policy landscape, four governance frameworks emerge. As summarized in Table 1, these frameworks are organized in a spectrum from market-driven to state-directed approaches.

**Table 1: Policy Instruments for Data Centres**

Incentives	Coordinated Planning	Regulations	State-Led Expansion
Market power		State power	
Subsidies	District energy	Moratoria	Centralized planning
Tax credits	Conditional siting	Zoning mandates	Mandatory standards
Rezoning	Waste-heat recovery	Ecodesign requirements	National rating systems
Research and development spending		Reuse heat requirements	
United States	Finland, Denmark	European Union (including Ireland), Singapore	China
High growth	High growth	Low growth	High growth
High environmental risk	Low environmental risk	Low environmental risk	Low environmental risk

Source: Author.

## Incentives

Incentive-heavy regimes see data centres as strategic infrastructure for economic development and compete to attract projects with subsidies, tax incentives and flexible siting rules. A notable example of this model is the United States, the world’s largest data centre electricity consumer (IEA 2025a).

At the state level, Virginia has implemented “the most diverse sets” of policy instruments to effectively position Northern Virginia among the top 10 data centre markets in the world (Soares, Yarime and Klemun 2024, 9; IEA 2025a). These include lower electricity rates for data centre projects and tax exemptions for hardware such as chillers and semiconductors (Soares, Yarime and Klemun 2024). When energy infrastructure in existing industrial zones lacks the capacity to connect a facility to the grid, municipal and county authorities have identified residential and agricultural lands with sufficient electricity capacity and rezoned these to allow for industrial development (ibid.). California has expanded and upgraded infrastructure for renewable energy to meet data centre demand, which has decreased electricity costs for residents (Harland 2025).

At the federal level, US President Donald Trump signed an executive order on July 23, 2025, to “facilitate the rapid and efficient buildout” of AI data centres, instructing federal agencies to accelerate permitting timelines, expand the use of categorical exclusions under the National Environmental Policy Act and make federal lands available for siting (The White House 2025).

While incentive-driven policy has been effective at attracting data centre projects, it has been ineffective at managing environmental risks, and has shifted system costs onto electricity networks and consumers. In regions with high concentrations of data centres, household electricity costs have increased by as much as 267 percent over a five-year period (Saul et al. 2025).

## Coordinated Planning

A second approach is coordinated planning, which treats data centres as components of the broader energy and decarbonization system. Rather than relying on blanket incentives or outright restrictions, it shapes the conditions under which growth can occur.

Nordic countries have adopted this approach. Their planning frameworks link data centre developments to electricity availability and district heating networks. In Finland, Microsoft's hyperscale data centre cluster is being developed through a coordinated public utility-industry partnership involving municipal authorities and Fortum, a local district heating utility. The project is designed to recover waste heat from data centre operations and feed it into the city of Espoo's district heating system, supplying heat to 100,000 homes and enabling the closure of a coal-fired heating plant (Paulsson, Lundgren and Pohjanpalo 2025).

This model is the result of early stage coordination among governments, utility providers and industry to ensure facilities are located where renewable supply is available and where waste heat can be recovered and redistributed. Because Nordic grids are already largely decarbonized through hydro, wind and nuclear generation, new data centre connections are assessed based on system efficiency.

For jurisdictions with the institutional capacity and clean energy systems to support it, coordinated planning provides a pathway to accommodate rapid data centre growth while maintaining grid stability and advancing decarbonization objectives.

## Regulations

Regulatory regimes slow or redirect data centre expansion where it conflicts with grid capacity and climate targets. The most prominent tool in this category is the moratorium, a temporary suspension of approvals for new facilities, often employed by municipal or subnational governments. Moratoria buy time to reassess grid capacity and set siting rules aligned with economic and environmental objectives.

In the Netherlands, the city of Amsterdam imposed a year-long moratorium in 2019 due to grid congestion and land-use impacts. Upon its conclusion, the municipality allowed data centre development only in designated zones and established requirements to reuse and provide residual heat to households (Soares, Yarime and Klemun 2024).

In Ireland, the independent national utility operator issued a moratorium in Dublin in 2021, which was reversed after intervention from Ireland's Foreign Direct Investment Agency. In tandem, the Commission for Regulation of Utilities issued a national re-evaluation of data centre policy, granting projects with connection rights on case-to-case

bases, and mandating generation and storage capacity equivalent to electricity demand (ibid.).

Singapore enacted a three-year moratorium in 2019, pausing approvals for new projects and construction of already-approved projects. Upon its conclusion in 2022, the government launched a pilot system that prioritized decarbonization commitments. The policy capped power usage effectiveness (PUE) to 1.3 PUE, which averaged at 1.8 PUE pre-moratorium. It also limited annual power capacity for new projects at 60 megawatts, insufficient for hyperscale facilities (ibid.).

Some jurisdictions implement binding standards. Germany will require facilities to reuse 10 percent of heat and energy in 2026 and 15 percent in 2028 (IEA 2025a). Additionally, revisions to the European Union’s Energy Efficiency Directive “introduce obligations” for data centre projects to monitor and report their energy performance.<sup>2</sup>

While this policy regime is effective at mitigating the impact of data centres on carbon emissions and electricity grids, it compromises competitiveness.

## State-Led Expansion

A final policy approach is state-led expansion. China, the world’s second largest consumer of data centre-related electricity (ibid.), treats data centres as core components of industrial policy and built a policy architecture that guides their design, construction and operation (Li et al. 2023).

This framework serves three core functions: establishing technical standards, enabling large-scale deployment and improving energy efficiency and emissions performance. The policy trajectory began with the Ministry of Industry and Information Technology’s 2013 Guiding Opinions on the Construction and Layout of Data Centers, which called for standardization and the development of metrics for energy efficiency. The government has since launched a series of subsequent policies that have progressively built out a robust national system for technical standards, evaluation and certification (ibid.).

These efforts have produced measurable outcomes. China has certified 153 “green data centres” intended to function as replicable demonstration models. The state has also developed a national catalogue of approved “advanced applicable technologies” that data centre operators are expected to adopt, with documented improvements in energy efficiency and emissions performance (ibid., 8).

China’s scale in clean energy deployment, data centre construction and industrial financing means that it will shape technical standards, supply chains and investment flows across Asia and beyond. As clean-energy infrastructure and AI-related compute increasingly expand in the Asia Pacific region, governance approaches emerging from China and neighbouring economies will influence global norms.

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<sup>2</sup> See [https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/energy-efficiency-directive\\_en](https://energy.ec.europa.eu/topics/energy-efficiency/energy-efficiency-targets-directive-and-rules/energy-efficiency-directive_en).

# Policy Recommendations

- **Develop a national AI energy strategy:** A national framework should align data centre projects with Canada’s net-zero energy transition. Developed in collaboration with provincial governments, utilities companies, industry and First Nations, the strategy should guide siting of new AI compute capacity where grids can support it, integrated with low-carbon supply and designed for waste-heat recovery. Federal guidance should define the criteria for sustainable AI growth and prevent default reliance on fossil fuels.
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## Works Cited

- Coban, Daliana, Daniel Gralnick and Ian T. D. Thomson. 2025. “An Addendum to ‘Connecting Data Centres in Ontario: Key Considerations and Challenges.’” *Energy Regulation Quarterly* 13 (3). <https://energyregulationquarterly.ca/articles/an-addendum-to-connecting-data-centres-in-ontario-key-considerations-and-challenges>.
- de Vries, Alex. 2023. “The Growing Energy Footprint of Artificial Intelligence.” *Joule* 7 (10): 2191–94. <https://doi.org/10.1016/j.joule.2023.09.004>.
- Government of Alberta. 2024. *Alberta’s AI Data Centre Strategy: Powering the future of artificial intelligence*. December. <https://open.alberta.ca/publications/albertas-ai-data-centre-strategy>.

- Government of Ontario. 2025. *Energy for Generations: Ontario's Integrated Plan to Power the Strongest Economy in the G7*. June. [www.ontario.ca/files/2025-07/mem-energy-for-generations-en-2025-07-18.pdf](http://www.ontario.ca/files/2025-07/mem-energy-for-generations-en-2025-07-18.pdf).
- Harland, Kate. 2025. "Is there a smart way to integrate artificial intelligence data centres into Canada's electricity grids?" Canadian Climate Institute, March 31. <https://climateinstitute.ca/smart-way-integrate-artificial-intelligence-data-centres-canada-electricity-grids/>.
- IEA. 2025a. *Energy and AI*. April 10. [www.iea.org/reports/energy-and-ai](http://www.iea.org/reports/energy-and-ai).
- — . 2025b. *World Energy Outlook 2025*. November 12. [www.iea.org/reports/world-energy-outlook-2025](http://www.iea.org/reports/world-energy-outlook-2025).
- Li, Guozhu, Zixuan Sun, Qingqin Wang, Shuai Wang, Kailiang Huang, Naini Zhao, Yanqiang Di et al. 2023. "China's green data center development: Policies and carbon reduction technology path." *Environmental Research* 231: 116248. <https://doi.org/10.1016/j.envres.2023.116248>.
- Merwat, Shaz. 2024. "Power Struggle: How AI Is Challenging Canada's Electricity Grid." RBC Climate Action Institute, December 4. [www.rbc.com/en/thought-leadership/climate-action-institute/power-struggle-how-ai-is-challenging-canadas-electricity-grid/](http://www.rbc.com/en/thought-leadership/climate-action-institute/power-struggle-how-ai-is-challenging-canadas-electricity-grid/).
- Morene, Benoît. 2025. "Fervo Energy Raises \$462 Million, Lands Google as Investor." *The Wall Street Journal*, December 10. [www.wsj.com/finance/fervo-energy-raises-462-million-lands-google-as-investor-27a06c13](http://www.wsj.com/finance/fervo-energy-raises-462-million-lands-google-as-investor-27a06c13).
- Natural Resources Canada. 2024. *Powering Canada's Future: A Clean Electricity Strategy*. Government of Canada. <https://natural-resources.canada.ca/sites/admin/files/documents/2025-08/Clean-Electricity-Strategy.pdf>.
- Paulsson, Lars, Kari Lundgren and Kati Pohjanpalo. 2025. "Power-Hungry Data Centers Are Warming Homes in the Nordics." Bloomberg, May 14. [www.bloomberg.com/news/features/2025-05-14/finland-s-data-centers-are-heating-cities-too](http://www.bloomberg.com/news/features/2025-05-14/finland-s-data-centers-are-heating-cities-too).
- Saul, Josh, Leonardo Nicoletti, Demetrios Pogkas, Dina Bass and Naureen Malik. 2025. "AI Data Centers Are Sending Power Bills Soaring." Bloomberg, September 29. [www.bloomberg.com/graphics/2025-ai-data-centers-electricity-prices/](http://www.bloomberg.com/graphics/2025-ai-data-centers-electricity-prices/).
- Soares, Ian Varela, Masaru Yarime and Magdalena Klemun. 2024. "Balancing the Trade-Off between Data Center Development and Its Environmental Impacts: A Comparative Analysis of Data Center Policymaking in Singapore, Netherlands, Ireland, Germany, USA, and the UK." *Environmental Science & Policy* 157: 103769. <https://doi.org/10.1016/j.envsci.2024.103769>.
- Statistics Canada. 2024. "Hydroelectricity Generation Dries Up Amid Low Precipitation and Record High Temperatures: Electricity Year in Review 2023." March 5. [www.statcan.gc.ca/o1/en/plus/5776-hydroelectricity-generation-dries-amid-low-precipitation-and-record-high-temperatures](http://www.statcan.gc.ca/o1/en/plus/5776-hydroelectricity-generation-dries-amid-low-precipitation-and-record-high-temperatures).
- The White House. 2025. "Accelerating Federal Permitting of Data Center Infrastructure." Executive Order, July 23. [www.whitehouse.gov/presidential-actions/2025/07/accelerating-federal-permitting-of-data-center-infrastructure/](http://www.whitehouse.gov/presidential-actions/2025/07/accelerating-federal-permitting-of-data-center-infrastructure/).
- Wang, Qiang, Yuanfan Li and Rongrong Li. 2024. "Ecological Footprints, Carbon Emissions, and Energy Transitions: The Impact of Artificial Intelligence (AI)." *Humanities and Social Sciences Communications* 11, 1043. <https://doi.org/10.1057/s41599-024-03520-5>.
- Zhong, Junhao, Yilin Zhong, Minghui Han, Tianjian Yang and Qinghua Zhang. 2024. "The Impact of AI on Carbon Emissions: Evidence from 66 Countries." *Applied Economics* 56 (25): 2975–89. <https://doi.org/10.1080/00036846.2023.2203461>.