Environmental and Climate Considerations of AI and Data Centers

Policy Note

BRIEFING
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environmental defence

Artificial Intelligence (AI) and data centers are rapidly expanding, with significant implications for Canada's environmental goals and energy systems. While these technologies offer economic and environmental opportunities, they also present challenges related to electricity demand, water consumption, and potential delays to the energy transition.

Key Points

- Data centers consume approximately 1.5% of global electricity, projected to reach 3% by 2030[1]
- In 2024, all North American countries (excluding the USA) accounted for just 1.03% of installed data center capacity, a share expected to decline to 0.9% by 2030.[2]
- Data centers will represent 13% of new electricity demand and 4% of total demand in Ontario in 2035.[3] Québec anticipates an increase of 4.1 TWh in data centre electricity demand between 2023-2032 (equivalent to 2.3% of total provincial demand in 2032).[4]
- The International Energy Agency (IEA) estimates that renewables are projected to be the fastest growing source of electricity for data centers, increasing annually by 22% between 2023 and 2040.[5]
- Data centres water consumption will rise to 1.2 trillion litres per year by 2030.[6]
- 44% of upstream oil and gas companies use AI in exploration, and 41% of downstream companies use it in refining activities.[7] AI increases oil and gas output, directly in opposition to the scientific and legal requirement to phase out fossil fuels.
- In contrast, an efficient integration of AI into the power, food and mobility sectors could result in a 3.2-5.4GtCO2e annual emissions reduction by 2035.[8]

Policy Recommendations

1. **Establish mandatory efficiency standards**: Require binding Power Usage Effectiveness (PUE), Carbon Usage Effectiveness (CUE) and Water Usage Effectiveness (WUE) standards for all data centers.
2. **Mandate 100% renewable energy for new data center developments:** Ensure new data centers source electricity from verified renewable energy sources with hourly matching targets of 100% by 2035. Hourly matching goes beyond annual averages, requiring that data center consumption aligns in real time with renewable generation on the grid, ensuring that clean energy is actually available for every hour of operation rather than being offset later.
3. **Mandatory environmental disclosures:** Require all data center and AI service providers to publicly report annual metrics on greenhouse gas emissions, energy and water consumption, waste generation and electricity sources.

4. **Restrict AI applications that increase fossil fuel production:** prohibit the use of AI technologies that directly expands oil and gas extraction
5. **Ensure fair cost distribution for AI-related energy demand:** Prevent infrastructure costs from being shifted to residential and business ratepayers while ensuring data centers pay fair electricity rates
6. **Limit disinformation proliferated by AI:** Establish standards holding AI services providers accountable for generating, promoting or amplifying false or misleading information

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