Toronto's Electricity Future

Affordable Renewable Energy or U.S. Nuclear & Gas?

Ontario Clean Air Alliance Research

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ONTARIO CLEAN AIR ALLIANCE

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Overview

The Portlands Energy Centre, a large gas-fired power plant on Toronto's waterfront, is Toronto's #1 smog and climate polluter.[1]

On June 26, 2024, Toronto City Council passed a motion asking Ontario's Independent Electricity System Operator (IESO) to develop a Toronto Integrated Regional Resource Plan (IRRP) to:

1	Phase-out gas-fired electricity generation at the Portlands Energy Centre by 2035, except in extreme, exceptional and emergency circumstances totalling less than 88 hours per year;
2	Rapidly increase local renewable energy generation and storage; and
3	Maximize cost-effective energy efficiency.[2]

On October 31, 2025 the IESO released its plan to meet Toronto's electricity needs to 2044.The IESO's plan ignored the requests of Toronto City Council.

The Portlands Energy Centre is Toronto's

#1 smog and climate polluter

No Plan to Phase-Out the Portlands Gas Plant by 2035

The IESO's IRRP does not include a plan to phase-out the Portlands gas plant by 2035 or by any other date.

In fact, according to the IESO's *2025 Annual Planning Outlook*, the electricity generation of Ontario's gas plants, including Portlands, in **2044** will be 23% greater than it was 2024.[3]

To make matters worse, more than 70% of Ontario's gas is imported from the U.S.[4]

No Plan to Rapidly Increase Local Renewable Energy Generation and Storage or to Maximize Cost-Effective Energy Efficiency

According to the IESO, Toronto's electricity demand will increase by up to 3,630 megawatts (MW) by 2044.[5]

Despite this rising demand, the IESO is recommending that less than 10% of this rise in demand should be met by low-cost energy efficiency, demand management and local renewables.[6]

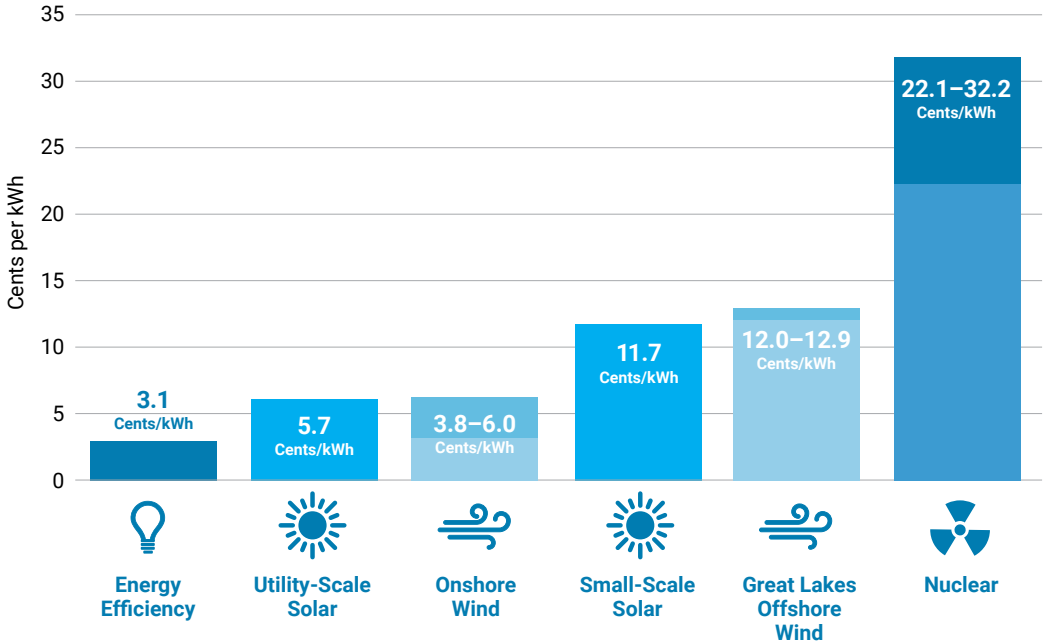
Instead, under the IESO's plan, most of Toronto's future electricity needs would be met by more gas and high-cost new nuclear reactors, including four new U.S.-developed GE-Hitachi reactors at Darlington. These new American reactors will require Ontario to import enriched uranium from the U.S. to fuel them – imports that could be curtailed at a moment's notice by the American government.[7]

Specifically, according to the provincial government's plan, nuclear power will provide 75% of Ontario's electricity supply by 2050 – up from 48.5% in 2024.[8]

This doesn't make sense since energy efficiency and renewables can meet Toronto's future electricity needs at a much lower cost than new nuclear reactors. As Figure 1 shows, new nuclear power costs 2 to 8 times more than wind and solar electricity and 10 times more than energy efficiency.

New nuclear power costs
2 to 8 times
more than wind and solar electricity

Figure 1 | Ontario's Electricity Options: A Cost Comparison[9]



N.B. The nuclear cost estimates do not include the cost of decommissioning the reactors and the storage of their radioactive wastes for one million years.

Toronto's Energy Efficiency, Renewables & Energy Storage Potential

Fortunately, Toronto has a huge, untapped energy efficiency, renewable energy and energy storage potential. By investing in these options we can reduce the electricity bills of all Ontarians by reducing the need for much more expensive new gas-fired power plants and nuclear reactors.

Energy Efficiency & Demand Management

Peak Perks

Shifting demand from peak to off-peak periods (demand response) is a very cost-effective way to reduce the need for Portlands on our hottest summer days and our coldest winter nights.

The IESO's Peak Perks program turns down the thermostats of residential and small business customers' air-conditioners and heat pumps by up to two degrees Celsius on hot summer weekdays (but not weekends and holidays) between June 1st and September 30th.

Participants are paid $75 when they enroll and $20 for each additional year that they stay enrolled.[10] These payments are equivalent to $411 per MW per business day assuming participants remain enrolled for five years,[11] which is 76% lower than the cost of power from a new gas-fired peaker plant.[12]

We need to increase the Peak Perks market share to 90% by 2030 among homeowners and small businesses with central air conditioning or a heat pump.

The Peak Perks load control program should also be expanded to include electric water heaters.[13]

Commercial, Institutional and Industrial Demand Response

The IESO also pays Toronto's large commercial, institutional and industrial consumers to shift some of their demands from peak to off-peak periods in the summer and winter months.

The payments are $332 per MW per business day in the summer and $139 per MW per business day in the winter.[14] That is, they are 80-92% lower cost than the cost of power from a new gas-fired peaker plant.

These payments are reducing Toronto's peak hour demands by approximately 5%.[15] But we can do much better. We should pay Toronto's large electricity consumers to do more load shifting in order to reduce Toronto's total peak hour demand by 10% by 2030.

Toronto has a huge, untapped energy efficiency, renewable energy and energy storage potential

Energy Efficiency

The cost of electricity from new nuclear reactors will be 22 to 32 cents per kWh. Therefore, by paying electricity consumers up to 22 to 32 cents per kWh to invest in energy efficiency measures, we can reduce everyone's electricity bill by reducing the need for much higher cost new nuclear reactors.

Unfortunately, the IESO's status quo energy efficiency programs only pay consumers approximately 3 cents per kWh on average to save electricity.[16] The IESO has never explained why it does not pursue all of Ontario's cost-effective electricity saving opportunities that will reduce the energy bills of Ontario's hard-working families and businesses.

We should be willing to pay the full incremental cost of all of Toronto's energy efficiency investment opportunities that can save electricity at a lower cost than new nuclear reactors.

Rooftop and Parking Lot Solar

According to the IESO, Toronto's total annual electricity consumption will rise by up to 18.6 billion kWh by 2044.[17]

Using conservative assumptions, McDiarmid Climate Consulting has estimated that rooftop solar on Toronto's homes, buildings and large parking lots could supply more than 60% (11.9 billion kWh) of the forecast rise in electricity consumption.[18]

Large electricity companies like Ontario Power Generation and Bruce Power are paid for every kWh of nuclear and gas power that they provide to the grid. But homeowners and small businesses with solar panels are not compensated if they supply more electricity to the grid than they purchase from it. That is, unlike large power companies, they are not paid for making net electricity exports to the grid.

This doesn't make economic sense since small-scale solar can meet our electricity needs at a lower cost than new nuclear reactors.

To cost-effectively procure rooftop and large parking lot solar, we need to establish a fair market-value standard offer price (e.g., 11.7 cents per kWh[19]) for solar power provided to Toronto's electricity grid by homeowners and small businesses.

Rooftop solar on Toronto's homes, buildings and large parking lots could supply more than 60% of the forecast rise in electricity consumption

Lake Ontario Offshore Wind Power

According to the IESO, Great Lakes offshore wind farms would have annual capacity utilization rates of 50%.[20] Therefore, 850 Lake Ontario offshore wind turbines that are 5 MW each could meet 100% of Toronto's forecast rise in electricity consumption by 2044 (18.6 billion kWh).[21]

The total lakebed footprint of these wind turbines would be 0.085 square kilometres (km^2).[22] The total area of the Canadian section of Lake Ontario is 10,000 square km.

Electric Vehicle Battery Storage

According to the IESO, Ontario will have 6.4 to 8.1 million electric vehicles (EVs) by 2040.[23] It is reasonable to assume that approximately 20% of these EVs will be in Toronto.[24] If Toronto's EVs are combined with bi-directional chargers, they could store surplus wind and solar energy and provide power back to the grid when it is needed. Specifically, by 2040, Toronto's EVs could provide 12,800 to 16,200 MW of electricity back to the grid when it is needed.[25] That is, by 2040 the total storage capacity of Toronto's EVs will be greater than Toronto's forecast peak electricity demand in 2044 (8,330 MW).[26]

In the U.K., Octopus Energy provides free EV charging to EV owners who agree to provide power back to the grid during peak demand periods.[27]

Similarly, in France, Renault provides free EV charging to EV owners who allow their EVs to provide power back to the grid when it is needed.[28]

Toronto's EV owners should be paid to provide power back to the grid when it is needed.

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Recommendations

1 **Toronto City Council should reject** the IESO's Integrated Regional Resource Plan for Toronto.

2 **Toronto City Council should:**

Direct Toronto Hydro to develop a plan to phase-out the Portlands gas plant by 2035 (except in extreme, exceptional and emergency circumstances totalling less than 88 hours per year) and aggressively pursue all of Toronto's cost-effective energy efficiency and local renewable energy and storage options; and seek IESO funding for this plan since it will lower the energy bills of all Ontarians by reducing the need for higher-cost new gas-fired power plants and nuclear reactors.

Develop a plan to
phase-out
the Portlands gas plant by 2035

Sources

1 The Portlands gas plant is Toronto's largest single source of nitrogen oxides and greenhouse gas emissions. National Pollutant Release Inventory data search - Canada.ca; and https://open.canada.ca/data/en/dataset/a8ba14b7-7f23-462a-bdbb-83b0ef629823/resource/afc61e84-ac2a-40b2-9e1a-9525fc7d5987

2 https://secure.toronto.ca/council/agenda-item.do?item=2024.MM19.9

3 In 2024 Ontario's gas plants produced 27.4 TWh of electricity to supply Ontario demand and to make export sales. In April 2025 the IESO released its *2025 Annual Planning Outlook* and posted excel files on its web site with its forecasts of the annual electricity generation of Ontario's gas plants from 2026 to 2050 inclusive. According to the IESO's forecast, the gas plants will produce 33.92 TWh of electricity in 2044 to supply Ontario demand and to make export sales. On May 13, 2025 the IESO revised its web site excel file: *2025 Annual Planning Outlook*, Capacity Expansion Scenario, Costs, and Emissions Module Data, Figure 2. The revised file does NOT provde a forecast of the total annual electricity generation of Ontario's gas plants. The revised Figure 2 forecasts the gas plants' annual electricity generation to supply Ontario demand only; despite the fact that the IESO is planning to continue to operate the gas plants to also make export sales. Ontario Energy Board, *Ontario's System-Wide Electricity Supply Mix: 2024 Data*; and IESO, *2025 Annual Planning Outlook*, Capacity Expansion Scenario, Costs, and Emissions Module Data, Figure 2, (Original and Revised).

4 https://euzvzapheqq.exactdn.com/wp-content/uploads/2025/03/enbridge.pdf

5 IESO, *Toronto Integrated Regional Resource Plan*, (October 31, 2025), page 28, Figure 10.

6 The IESO's plan calls for energy efficiency and local renewables to meet only 121 to 320 megawatts (MW) of the forecast increase in Toronto's electricity demand between 2024 and 2044 (up to 3630 MW). *Toronto Integrated Regional Resource Plan*, pages 7 and 28.

7 https://www.theglobeandmail.com/business/article-with-us-tensions-rising-canada-lacks-its-own-uranium-enrichment/

8 Ontario, *Energy for Generations*, (June 2025), page 65, Figure 18; and Ontario Energy Board, *Ontario's Electricity Supply Mix: 2024 Data*.

9 For the cost of small-scale solar, see IESO, A*nnual Planning Outlook: Resource Costs and Trends*, (March 2024), page 5. For the other electricity supply costs see: Chelsea Hotaling, Energy Futures Group, *Levelized Cost of Energy ("LCOE") Calculations*, (May 2025), Table 3, assuming Investment Tax Credit at 30%. We have converted the U.S. $ estimates to Canadian dollars by multiplying by 1.39. For cost of energy efficiency see: IESO, *2025-2027 Demand Side Management Program Plan*, (January 2025), page 7.

10 https://saveonenergy.ca/For-Your-Home/Peak-Perks?utm_source=bing&utm_medium=Paid&utm_campaign=IESO_1463_Microsoft_Search_Peak_Perks_Resi_Flight2&utm_id=IESO_1463&msclkid=45b6987d0c831604dd7cf0a11d0e6574

11 A customer that is enrolled in Peak Perks for five years will receive an average annual payment of $31 ($155/5). There are 84 business days between June 1 and September 30. Therefore, the average payment per business day is $0.37 ($31/84 days). According to the IESO, it assumes a peak demand reduction of 0.9 kW per device for each activation of the Peak Perks program. Therefore, its cost per kW of demand reduction is $0.41 per kW ($0.37/0.9) or $411 per MW per business day. Email to Jack Gibbons from IESO Customer Relations, (May 22, 2024).

12 In May 2024, the IESO agreed to pay Atura Power approximately $1,681 per MW per business day to build and operate a 430 MW gas-fired peaker plant (business days exclude weekends and holidays). IESO, *Long-Term RFP (LT1 RFP) – Final Results*, (May 9, 2024).

13 https://www.aceee.org/sites/default/files/pdfs/demand_flexibility_of_water_heaters_-_encrypt.pdf

14 IESO, *Capacity Auction: Post-Auction Report*, (December 5, 2024).

15 The IESO has contracted for 231 MW of demand reductions in the summer of 2025 and 190 MW of demand reductions in the winter of 2025/26 in Toronto. Toronto's annual peak hour demand is approximately 4,700 MW. *Capacity Auction: Post-Auction Report*; and Government of Ontario News Release, "Ontario and Toronto Planning for City's Growing Electricity Needs", (April 11, 2024).

16 The IESO's 2025-2027 *Demand Side Management Plan* forecasts that its average cost of saving a kWh will be 3.1 cents. *2025-2027 Demand Side Management Program Plan*, (January 2025), page 7.

17 In 2024 Toronto Hydro's customers consumed 24.2 billion kWh. The IESO is forecasting that Toronto's demand for electricity will grow by up to 77% by 2044. Toronto Hydro, *Annual Information Form for the Year Ended December 31, 2024*, page 18; and IESO, *Toronto Integrated Regional Resource Plan*, (October 31, 2025), page 28, Figure 10.

18 McDiarmid Climate Consulting, *Transforming Toronto with Solar*, (November 21, 2024), pages 5 & 6.

19 According to the IESO, the cost of small-scale solar is 11.7 cents per kWh. IESO, *Annual Planning Outlook: Resource Costs and Trends*, (March 2024), page 5.

20 IESO, *Pathways to Decarbonization, Appendix B*, (December 15, 2022), page 29.

21 4250 MW x 8760 hours per year x 0.5 = 18.6 billion kWh.

22 Assuming 850 (5 MW) wind turbines each with a lakebed foot print of 100 square metres.

Sources

23 IESO, *IESO Demand & Conservation Planning Technical Paper: Electric Vehicles*, (July 2025), page 7.

24 Toronto's peak electricity demand is approximately 20% of Ontario's peak electricity demand. "Ontario and Toronto Planning for the City's Growing Electricity Needs".

25 Assuming the average capacity of EV bi-directional chargers is 10 kW. https://www.power-sonic.com/guide-to-level-2-ev-charging/#:~:text=Charging%20speeds%20for%20Level%202,Level%203%20DC%20fast%20charging

26 *Toronto Integrated Regional Resource Plan*, page 28, Figure 10.

27 https://octopus.energy/power-pack/

28 https://www.mobilityhouse.com/int_en/our-company/newsroom/article/charge-for-free-renault-group-mobilize-and-the-mobility-house-launch-vehicle-to-grid-in-france-while-germany-is-establishing-the-regulatory-framework


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