

Solar Potential

at OPG's Lambton Generating Station Site

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Overview

The Ontario Government has asked Ontario Power Generation (OPG) to investigate the potential for all types of new generation at its Lambton Generating Station.¹ This stems from the Independent Electricity System Operator's (IESO) projections that Ontario's energy demands will increase 75 per cent by 2050 due to factors, such as manufacturing, electric vehicle adoption, energy-intensive data centres, and household growth.² Industrial demand from new EVs and supply chain facilities is projected to grow 58% by 2035 (similar to adding a Toronto-sized city to the system). Data centres are forecasted to be 13% of new electricity demand and 4% of total projected Ontario demand in 2035. Ontario household growth is anticipated to grow by one million more homes or 9% of new electricity demand.

Solar generation is not only clean and renewable, but it can also be built affordably on a very short timetable. A 100-megawatt (MW) solar power plant can be built in three years from contract award date to being in service.³ New generation plans must consider the urgent need for clean, zero-emission, and affordable energy to help Ontario's economy to prosper while ensuring a sustainable future for all.

This report outlines the potential for solar electricity generation at the Lambton site.

Lambton Site Background

Ontario Power Plant's Lambton site spans 1,166 acres in St. Clair Township in the Sarnia-Lambton region.⁴ The site is the former location of a coal-fired power plant that was shut down in 2013.⁵ The site is zoned for electricity generation and is located close to existing transmission infrastructure.

If the entire Lambton site of 1,166 acres (4.7 km²) is used for grid-scale solar power generation, the area has the potential for 153 MW of solar generation capacity that can generate 190 GWh of electricity per year (Table 1). This is equivalent to the energy needs of more than 21,000 homes.⁶

Expanding grid-scale solar at the Lambton site can help to meet Ontario's annual peak electricity demand. During hot, humid summers and heatwaves, demand for electricity to power air conditioners spikes. Ontario must have the generation capacity to meet these spikes, even if much of that generation capacity is not required for most of the rest of the year. This is where solar generation literally shines because its output also spikes during hot summer days. One third of the utility-scale solar generation potential at the Lambton site (63.07 GWh/year) occurs during summer on-peak times.

Table 1 | Solar Energy Potential at OPG's Lambton Site

Site	Total area for solar power generation (m ²)	MW of potential	GWh/year	Summer peak GWh/year
Lambton	4,718,802	153.42	189.63	63.07

This area has already proven to be suited to solar generation. A 30-minute drive from Lambton is Sarnia Solar Farm, one of Canada's largest solar power projects with an 80-MW capacity spanning 950 acres⁷ (3.8 km²) and powering the equivalent of 12,800 households. When it launched in 2009, it was the world's largest operating photovoltaic farm.⁸

Clean, affordable, reliable and sustainable electricity is a cornerstone of Ontario's economy, but new investments are needed to support the growing needs of our economy. The Lambton site with its existing transmission infrastructure and zoning for generation is well placed to host new solar generation that can rapidly and affordably meet this need, ensuring Ontario households and industries can prosper.

Methodology

The spreadsheets used to perform this analysis can be found on the Ontario Clean Air Alliance website.

- The available area for grid-scale solar was obtained from Ontario Power Generation maps.⁹
- Solar panels were assumed to have 32.5 W/m².¹⁰
- PVWatts¹¹ was used to estimate the kWh/kW for ground-mount solar systems in neighbouring Courtright using default parameters and no production in January (due to snow coverage). Tilt angle was optimized (30°) and 180° azimuth were used.
- The annual generation during time of use blocks was calculated from Engineering Climate Datasets for Toronto.¹²

Sources

- 1 Government of Ontario. (2024) Ontario Generating More Energy to Meet Soaring Demand. <https://news.ontario.ca/en/release/1005403/ontario-generating-more-energy-to-meet-soaring-demand>
- 2 Independent Electricity System Operator. (2024). Electricity Demand in Ontario to Grow by 75 per cent by 2050. <https://www.ieso.ca/Corporate-IESO/Media/News-Releases/2024/10/Electricity-Demand-in-Ontario-to-Grow-by-75-per-cent-by-2050>
- 3 Current Saskatchewan solar projects of 100 - 200 MW have estimated lead times of 2.5 - 3 years from contract award date to target in-service date according to CanREA Clean Energy Procurement Calendar as of January 2025 (source: <https://public.tableau.com/app/profile/valerie.lam8829/viz/Procurementtest3/Sheet1>)
- 4 Email to Jack Gibbons, Ontario Clean Air Alliance from Steven Troup, Freedom of Information Coordinator, Ontario Power Generation, (January 9, 2025).
- 5 Government of Ontario. (2023). The End of Coal. <https://www.ontario.ca/page/end-coal>
- 6 Assuming the average residential energy use is 750 kWh per month (source: Ontario Energy Board. (2023). Defining Ontario's Typical Electricity Residential Customer 2023 Update. <https://www.oeb.ca/sites/default/files/uploads/documents/reports/2023-12/report-defining-ontarios-typical-residential-electricity-customer-20231213.pdf>).
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- 8 Ontario.ca (2010). Ontario Welcomes the World's Largest Solar PV Farm. <https://news.ontario.ca/en/release/14539/ontario-welcomes-the-worlds-largest-solar-pv-farm>
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- 10 Average for fixed angle grid-scale PV based on NREL values (source: National Renewable Energy Laboratory. (2013). Land-Use Requirements for Solar Power Plants in the United States. <https://www.nrel.gov/docs/fy13osti/56290.pdf>)
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