



Phasing Out Natural Gas Generation in Ontario

The IESO's response to the draft Clean Electricity Regulations

NOVEMBER 16, 2023

Ontario is on a path toward eliminating greenhouse gas emissions from the electricity grid. The Independent Electricity System Operator, the province's grid operator is preparing an orderly transition from natural gas generation to other forms of non-emitting supply while at the same time meeting our growing energy needs.

Part of this effort includes working with the federal government on its Clean Electricity Regulations (CER) that aims to impose emissions restrictions on fossil fuel generators starting in 2035.

Yet these regulations, as they are currently drafted, are not feasible and would compromise the reliability of Ontario's grid. This would undermine electrification and the ability of other sectors of the province's economy to decarbonize. The IESO shares the goal of achieving a net-zero emissions grid and will continue to collaborate closely with the federal government as it finalizes the regulations.

A Leader in Clean Energy

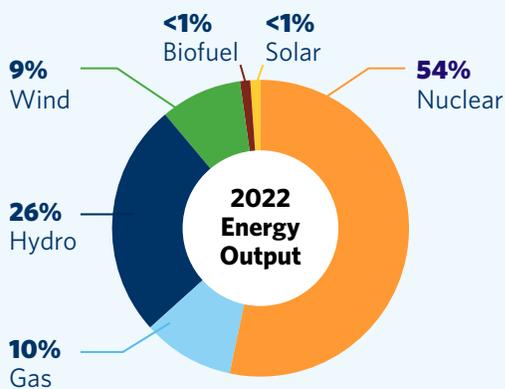
Last year, roughly 90 per cent of electricity produced in Ontario came from non-emitting generation, making our electricity system one of the cleanest in North America. The system has developed and evolved over the past 100 years, growing with the province to include new forms of supply and technology: from hydro, to coal, to nuclear, and in the last 20 years - natural gas and renewables.

What's new is the pace and scope of change impacting the system in response to growing needs. Communities across the province are growing rapidly both in terms of population and economic development. Many of them are implementing climate change action plans that include electrification projects. Homeowners and businesses are also counting on a reliable grid to charge their EVs, electrify transportation, power heavy industry and support new manufacturing facilities.

We need to reorient the electricity grid - and bring more renewables, nuclear power, conservation, and new technologies onto the system. As we do that, natural gas will play a key role by ensuring the system stays reliable and affordable while we bolster it with non-emitting alternatives.

Ontario's Electricity Supply Mix

Today, natural gas provides approximately 10 per cent of the electricity we use - even though it represents 28 per cent of total capacity in the province. This capacity is a critical piece of the reliability puzzle as it ensures the grid is reliable at all times.



The Transitional Role of Natural Gas

There is presently no form of generation on the grid that provides the same level of flexibility that natural gas does. Its ability to ramp electricity output up and down in a very short period of time and be available on standby to respond to sudden changes in demand is unique in the system.

Today, natural gas generators operate at roughly 20 per cent of their capacity. At night or weekends, when demand is low, natural gas isn't used or produces at very low levels to keep the system balanced. It's only when demand is very high that natural gas generators typically operate at higher capacity.

Over the next few years, as nuclear units are taken out of service for retirement or for refurbishments, natural gas generation will be essential to reliability until more non-emitting supply is available and new transmission lines are built - which takes time. Given the sheer scale of the effort, replacing natural gas generation by the time the CER emissions restrictions begin to take effect in 2035, is not feasible.

In the meantime, natural gas generation ensures that Ontario can continue on the path toward a zero-emissions grid without putting system reliability at risk which is key to other decarbonization projects taking place in businesses and communities across the province.

Lessons Learned from Coal

It can't be overstated how complex and enormous the task of decarbonizing the grid will be while maintaining a reliable supply of electricity. When Ontario phased out coal generation in the 2010s, it required a great deal of time and careful planning.

Replacing coal generation required a co-ordinated effort to bring new nuclear, wind and natural gas generation to the system. As new supply connected to the grid and operated reliably, the IESO phased out coal generation, step by step.

This, however, took place at a time when demand for electricity was relatively stable and replacement options with similar operating characteristics - including natural gas - were readily available. Phasing out natural gas generation will be a more complex process. It will require the careful addition of new forms of supply while at the same time managing growing demand.

Ensuring an Orderly Transition

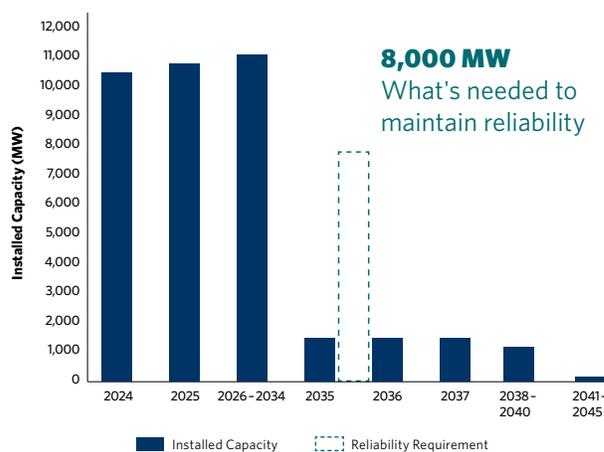
The CER's emissions restrictions starting in 2035 are not achievable without putting at risk the reliability of the electricity system, electrification of the broader economy and economic growth.

The IESO is recommending three amendments to the draft regulations:

- **Allow more of Ontario's natural gas generators to operate without restrictions beyond 2035.** Ontario built the majority of its natural gas generators in the 2000s to replace coal generation. Many will have been in operation for 20 years as of 2035, with significant remaining useful life, but will be faced with severe limitations in their ability to support grid reliability before sufficient replacement supply can be built. The IESO recommends changing the prescribed life threshold to 30 years for generation built before 2025.
- **Modify approach to the 450 annual operating hour exception for gas turbines that reach their prescribed life threshold.** The IESO is assessing this requirement as additional hours will be essential to manage the risk of blackouts. The reliance on natural gas will be dependent on the availability of new supply and transmission – which will take time and careful planning.

- **Update the CER to conform with North American reliability standards.** Electricity system operators are much like air traffic controllers overseeing all activity on the grid, and have the authority to direct generators and other suppliers to meet real-time system needs. The CER provisions would require “after-the-fact” approvals that would interfere with the ability of operators to respond in emergency situations.

Unabated Natural Gas Capacity Under Proposed Regulation



Given their age, most generation units under this proposed regulation would need to drastically reduce output in 2035. As a result, only a small number of generators would be available to operate outside those limitations, well below what is needed to operate the system reliably.

Ontario's Legacy Natural Gas Fleet

As demand can change by one third throughout a day, the grid needs some flexible generation capacity available to turn on and off quickly, increase and decrease output, and to be on standby in case of sudden system changes.

With the loss of some of our nuclear generation later this decade, Ontario will need all resources available, including some additional natural gas generation in the short term.

This extra supply is expected to be used in a limited way, increasing emissions by only two to four per cent over original projections.

While natural gas capacity will be needed for the foreseeable future, the actual output (and by extension, emissions) from these facilities will start to decline in the early 2030s as new supply connects to the grid.

Building an Emissions-Free Grid

Eliminating emissions from the grid will require a concerted effort on a number of fronts – and it will all need to happen in close co-ordination. Given the unique characteristics of natural gas generation, the IESO will require different forms of flexible supply working together to fill the role gas generation currently plays in order to maintain reliability. More work will be needed. Here's a snapshot of what is currently planned in Ontario:

2024-2025



New commitments to small hydro facilities



New capacity exchange agreement with Hydro Quebec



First large battery facility comes online



New market opportunities for local energy projects



Launch expanded energy efficiency programs



New transmission lines bring power to Southern and Northeast Ontario (2025 - 2030)

2032



Darlington and Bruce nuclear refurbishments largely complete

2026-2028



Battery fleet grows, contributing to Ontario's system needs

2029



First small modular reactor powers up

2030-2034



Proposed Pickering refurbishment



Non-emitting generation fleet continues to grow

2040



Most Ontario natural gas generation reach end of life

Independent Electricity System Operator

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