APPrO
ASSOCIATION OF POWER PRODUCERS OF ONTARIO

APPrO Response to

FEDERAL CLEAN ELECTRICITY STANDARD

Discussion Paper

April 2022

The Association of Power Producers of Ontario (APPrO) appreciates the opportunity to comment on this topic. It should be noted that it is a complex matter involving federal and provincial responsibilities as well as electricity system reliability and operations, resource adequacy, electricity markets and substantial capital investments both within the system, as well as in related energy infrastructure, such as natural gas distribution and transmission. It would not be an exaggeration to say that there are many moving pieces. It should also be noted that a very limited time was provided to prepare submissions. As a result this response is not exhaustive and has been limited in scope based on time and resources available.

About APPrO

The Association of Power Producers of Ontario (APPrO) is a non-profit organization representing the majority of Ontario's power producers and related businesses. Its 20 generator members produce most of Ontario's electricity from clean and renewable resources including nuclear,, hydro-electric, natural gas, wind, , and solar energy.

APPrO members build and operate power plants in Ontario, across Canada, and elsewhere in the world. APPrO's membership also includes fuel suppliers and marketers, contractors, equipment suppliers, consultants, local distribution companies, legal services providers, and financial organizations. APPrO's mission is to achieve an economically and environmentally sustainable electricity sector in Ontario that supports the business interests of electricity generators, ratepayers, and the provincial economy. APPrO is the preeminent voice for electrical generators in Ontario and a trusted, positive, non-partisan contributor to discussions about electricity planning and delivery.

All of APPrO's policy contributions over the last decade have been governed by a principled and cooperative approach that recognizes the importance of a transition to a net-zero economy, while facilitating the reliable, efficient, effective, fair, transparent, affordable and sustainable operation of a viable electricity sector in Ontario.

Executive Summary

The Government of Canada's recent 2030 Emissions Reduction Plan ("the Plan") signals its plans to power the economy with renewable electricity. The Plan indicated that electrifying more activities—from vehicles to heating and cooling buildings to various industrial processes—will be needed for Canada to transition to net-zero emissions by 2050. To do that, Canada needs to both increase the supply of electricity and ensure that all electricity generation has net-zero emissions. In Canada's modelling, ~35% of reductions are to come from fuel switching, primarily to electricity.

Ontario's electricity system is among the cleanest in the world. This "Clean Energy Advantage[1]" is the most important tool our province has to grow our clean economy, by enabling further deployment of new zero emitting resources and achieving our net-zero emissions goals. In 2019, greenhouse gas (GHG) emissions from Ontario's electricity system accounted for just 3% of total provincial GHG emissions – compared to more than 17% in 2005. Compared to global economies, Ontario ranks amongst the lowest from a carbon intensity perspective when compared to other jurisdictions. Ontario's electricity sector is virtually decarbonized (approximately 96 percent carbon-free) with an effective estimated emissions rate of 30g CO_2/KWh in 2019.

Ontario's Independent Electricity System Operator ("IESO") notes[2] that "Ontario has one of the cleanest systems in the world when it comes to carbon emissions per kilowatt-hour – 93% and 92% lower than the U.S. and German grids respectively, and 81% lower than the rest of Canada." This also means that 97%-98% of GHG emissions are coming from other sectors, which Ontario's electricity system can help to reduce. GHG emissions from Ontario's electricity system are expected to remain relatively low over the next decade even with the planned retirement of Pickering Nuclear Generating Station and refurbishments of other nuclear generators in the province. By 2030, provincial electricity sector GHG emissions are expected to remain over 70% below those of 2005.

Electricity is also the lifeblood of Ontario's economy, and an indispensable part of everyday life in our province. As Ontarians continue to make more climate-conscious choices and industries invest in innovation to reduce emissions, access to one of the world's cleanest electricity systems ensures we have a flexible, reliable and clean energy source to achieve our collective efforts to combat climate change.

Over the past decade, Ontario has had to deal with growing electricity costs, impacting ratepayers, businesses, and hampering the competitiveness of the province's manufacturing sector. Affordability of electricity has become a major focus of Ontario public concern over the past decade. To maintain affordable electricity rates and help with broader economy decarbonization, gas-fired generation should not be shut down until each asset has reached the end of its useful life. Today gas-fired generation plays a key role in Ontario's wholesale electricity market as it has a unique range of operating characteristics[3] needed for the reliable operation of the power system. As acknowledged by the IESO in

[1] https://www.ontarioscleanenergyadvantage.ca/our-advantage

[2] Decarbonization and Ontario's Electricity Sector: Assessing the impacts of phasing out natural gas generation by 2030; IESO, 2021

[3] I.e., including, (i) providing continuous energy when needed as it is generally available at all times under all weather conditions; (ii) with its flexibility, it can be ramped up or down within minutes to follow sudden changes in demand or in availability of other generators; (iii) support local power needs, avoiding need for expensive transmission projects; and it

their October 7, 2021, report *Decarbonization and Ontario's Electricity Sector: Assessing the impacts of phasing out natural gas generation by 2030*, there is currently no like-for-like replacement supply that can offer similar operating characteristics of gas generation. Therefore, the continued operation of these assets will not only help in reducing Ontario's GHG emissions more broadly but ensure reliability of the grid is maintained and importantly, it is the most-cost effective option for the ratepayer until more low-emitting generation can be placed into service. These new additions will take time to procure, site, build and connect to the grid. Given the scale of this (likely a doubling or more of current capacity) it will be important to use current assets wisely to bridge through a significant increase in demand from economy-wide electrification. Furthermore, the federal and provincial governments have imposed a significant carbon price (which is expected to increase year over year) on the remaining fossil fuel fired electricity generation facilities through the federal Greenhouse Gas Pollution Pricing Act (GGPPA) backstop when it applied and Ontario's now implemented Emissions Performance Standard (EPS), this will naturally increase the cost of gas-fired generation, resulting in it being dispatched less often but available to meet peak demand days, ensuring reliability of the grid is maintained.

As we note, Ontario's electricity sector will play an integral role in decarbonizing not only the Ontario but also the Canadian economy. The province's "Made-in-Ontario Environment Plan" indicates that Ontario will rely on increased electrification of buildings, electric vehicle transportation, industry performance standards, clean fuels, natural gas conservation, and innovations to drive decarbonization and help Ontario achieve its climate targets of reducing emissions by 30 per cent below 2005 levels by 2030.

The reliable production and dispatch of Ontario's supply of clean electricity sources is supplemented and backed up primarily by highly efficient combined cycle natural gas-fired electricity facilities. Ontario's existing and future clean electricity assets will play a vital role in helping Ontario and Canada transition to a decarbonized economy. Ontario must be able to preserve the value of its investments made on behalf of ratepayers. This includes ensuring its strategic long-term investments in gas fired generation avoid being prematurely underutilized or stranded as a result of policy actions designed to reduce economy-wide emissions.

Canada is a large and diverse country; energy is produced and consumed differently across its distinct regions. The provinces and territories differ in terms of energy resource availability, infrastructure, industries, energy and environmental policies and regulations, energy market structures, consumer preferences, and weather conditions. These differences greatly influence current and projected energy trends.

The Ontario electricity context is unique and must be both well understood and accommodated in the design and implementation of any CES. This involves both federal and provincial responsibilities as well as electricity system operations, resource adequacy, reliability, and electricity markets. The CES should take into consideration, the unique challenges and opportunities that each jurisdiction faces, with the ultimate goals of affordability, reliability and GHG reductions, and be consistent with Ontario's constitutional jurisdiction over electricity to ensure that Ontario is not treated in a discriminatory manner as a result of inconsistencies.

provides reliability services that help stabilize voltages and frequencies on the grid (*Decarbonization and Ontario's Electricity Sector: Assessing the impacts of phasing out natural gas generation by 2030;* October 7, 2021, page 9)

Key questions

The Government of Canada is seeking input regarding federal regulatory actions to support net-zero electricity generation by 2035. Please consider the following questions to support your input.

General

1. Should interim standards be included in the period before 2035?

   ***Response**: No. This issue, as the discussion paper rightly points out, is a complex matter involving federal and provincial responsibilities as well as electricity system operations (e.g., resource adequacy, reliability, operational flexibility, electricity markets, etc.), asset owners, operators, and in the case of natural gas-fired generation, upstream suppliers including gas transmission, distribution and marketing. Interim standards will not provide the necessary line of sight and regulatory certainty for provincial authorities, electricity system operators and owners and investors.*

2. How should the CES regulation be designed to minimize stranded capital assets and associated rate impacts?

   ***Response**: First it is important to understand that current electricity assets will have economic lives beyond the proposed date. This includes both gas-fired generation and natural gas distribution and transmission systems. These costs are sunk, and recovery of and on this capital will remain important for many years and should not be prematurely extinguished. In order to minimize stranded capital assets, the CES regulation should allow existing natural gas assets (commissioned prior to 2021) to operate at least in a peaking mode to the end of useful life to the extent possible. On the gas supply side there is also the potentially for significant stranding. These are regulated entities under either federal or provincial agencies, with regulator-approved investments. For example, it is believed that gas distribution investments alone to support the operation of new gas-fired generation in Ontario since 2005 approximate $1 billion. If they are not to be utilized to their full extent, or even potentially abandoned, ratepayers would typically be accountable for the increased per unit costs of delivery given a lower volume of throughput (assuming the assets are not right sized for volume adjustment. In the case of insufficient revenues to provide a reasonable rate of return, shareholders may have to assume the ultimate risk and costs. Neither outcome is desirable. Therefore, the federal and provincial governments must undertake robust discussion of potential regulatory options to deal with this issue. This could include repurposing, for example for hydrogen/RNG or CCUS transportation, securitization or accelerated depreciation, or other ideas.*

   A clear end-point based on ample and appropriate stakeholder engagement in a top-down, bottom-up manner must be a first step in moving along the CES pathway. The Ontario IESO is undertaking a Pathways to Decarbonization Project as part of the Minister of Energy's request to evaluate a moratorium on the procurement of new natural gas generating stations, and develop a pathway to achieve zero emissions in Ontario's electricity system (due Q4 2022). APPrO has been actively engaged is this process, and recommends that the Government of Canada leverage the work of the IESO.

3. What would be an acceptable end-point emissions intensity standard to achieve the objective of the CES?

   ***Response**: Assigning an arbitrary number for an end-point emission intensity standard is not helpful. However, the ultimate end-point should be consistent across jurisdictions to prevent carbon leakage, while respecting regional differences. Flexibility must be provided to meet the end-point, i.e., credit for electrifying other sectors, and to ensure grid reliability, while taking into account interaction with carbon pricing/OBPS*

4. How do considerations differ for non-competitive electricity markets, vertically integrated utilities, etc.?

   ***Response**: APPrO's submissions focus only the Ontario electricity market, which is Canada's largest, and central to the economic and social well-being of Canada's most populous province. Nonetheless, a CES will need to be designed and implemented in a manner that is consistent and compliant with the federal constitutional authority in light of the division of powers pursuant to Canada's Constitution. Section 92A(1)(c) of the Constitution provides Ontario the exclusive jurisdiction to make laws in relation to the development, conservation and management of sites and facilities in the province for the generation and production of electrical energy.*

Compliance Flexibilities

5. Should the CES offer compliance flexibilities?

   ***Response**: Yes*

   a. What kinds of flexibilities?

      ***Response**: The CES should offer as much flexibility as possible to ensure grid reliability and affordability. Flexibility provides options for pathways to decarbonization and is therefore to be encouraged. Additionally, flexibility can spur innovative thinking which can further support achievement of the goals set out in the paper. As recent events in Ukraine reveal, unexpected events arise from time to time and require adjustment in both policy and policy execution. Good planning which focuses on the attainment of goals through flexible strategies and tactics results in far more robust plans and adaptability, as well as a greater likelihood of success.*

      The electricity sector will enable reductions in other sectors through the supply of clean electricity for the electrification of activities currently powered by fossil fuels. As such, the electricity sector should receive credits for these "removals... attributed to the sector", e.g., electrification of transportation and buildings, and for enabling the deployment of new technologies in other jurisdictions such as SMRs. Offset credits and early compliance with the 2035 standard should also be contemplated. Management of emergency circumstances, extreme weather events (i.e. freezing ice storms, flooding, and heat) transmission disruptions (force majeure), terrorism or cyber events are other situations which will require a degree of flexibility to operation of gas-fired generation assets.

b. Should the flexibilities be targeted to individual generating units? To corporate fleets of units, such as fleet averaging, etc.?

***Response**: ECCC must respect jurisdictional differences in market design, resource availability and interconnections when considering flexibilities as it is not one size fits all. The concept of flexibility we propose suggests that these should be left to provincial governments and agencies as well as asset owners to figure out, as long as the targets are being met. Again this comports with the division of powers pursuant to Canada's Constitution.*

c. What constraints or limitations should be incorporated into flexibilities?

***Response:** Behind the meter fossil fuel power generation (e.g. industrial facilities) should be subject to the same constraints, limitations, and potential for asset stranding that traditional grid-connected utilities face.*

Emission intensity targets should apply provincially, not for a generating unit or a corporation.

6. Under what conditions should offset credits available through federal, provincial/territorial, or other programs be permitted?

***Response**: Emitting assets provide essential reliability at an affordable cost. There are no direct substitutes currently available. To mitigate negative affordability and reliability impacts, a robust offsets market must exist to balance emissions from these assets. All Canadian offset credits that meet the criteria laid out in the Pan-Canadian Greenhouse Gas Offset Framework should be permitted.*

Additionally, offset credits generated from across all economic sectors should be permitted to be used to address residual hard-to-mitigate GHG emissions in the electricity sector. The federal offsets framework should be expanded to enable cross-jurisdictional/sectoral reductions.

The use of hydrogen as a fuel for power generation, if the hydrogen is produced with a low carbon intensity source, should be considered within the offsets framework, as well as CCUS partnerings with emitting generation.

7. To what extent can negative emission technologies like BECCS and DAC contribute to meeting the obligations of a CES regulation? To what extent should they be allowed to contribute to meeting those obligations?

***Response**: The International CCS Knowledge Centre notes that "Canada and its industries need to consider all the tools available in the strive to reduce carbon dioxide (CO2) emissions and stimulate the economy to meet its climate change and sustainability commitments."*

The Centre further notes that "Most modeling scenarios show that in order to achieve emission targets significant deployment of negative emissions technologies is required. Bioenergy with CCS (or BECCS) is one of the few available that can deliver to the necessary scale. Canada has an abundance of storage opportunities, but it also has a formidable land mass with forests, marsh and wetlands, farmland, and other natural CO2 sinks. There is an opportunity for Canada to

consider the bioenergy solutions that could be paired with CCS/CCUS in order to achieve negative emissions in the country[4]."

8. Should compliance be assessed for the electricity sector on an annual or multi-year basis?

   ***Response**: If the goal is reduction of emissions by a year certain, then some form of compliance flexibility should be incorporated, for example the ability to receive credits for compliance that is achieved before targets are met, and vice versa, that ability to move compliance obligations forward for some multi-year period after which these obligations must be extinguished and the emitting asset is again on track to achieve the CES goals. Multi-year basis provides greater flexibility for outlier years, e.g., extreme weather events.*

Alignment with carbon pricing

9. Should the way in which electricity generation is currently treated by carbon pricing be changed to facilitate achieving NZ2035?

   ***Response:** A carbon price increase would increase the cost of operating the natural gas plants and would naturally raise electricity market clearing prices. This would result in some of Ontario's gas resources being dispatched less, due to real time imports being more competitive, assuming there is no carbon border adjustment. However, imports from the US would increase regional GHG emissions.*

   APPrO recently submitted comments on this issue as part of its response to the Discussion Paper on Border Carbon Adjustment[5].

   APPrO is supportive of a BCA structure that aims to level the playing field with respect to efficient and effective electricity trade with Ontario's neighbours. From a principles point of view, it does not make sense to increase the cost of emitting electricity production in Ontario but allow imported electricity to emit for free.

10. How might the treatment of electricity under the OBPS have to change to align with the CES?

    ***Response**: To achieve net-zero electricity grid by 2035, the price on carbon emissions must be strengthened and the emissions standard would need to be tightened. However, as emissions standards are ratcheted down and carbon pricing increases, this will result in carbon leakage and competitiveness issues that must be considered. See also above, Question 9.*

Treatment of natural gas generation

11. What is the role of natural gas in a net-zero electricity sector before 2035? Post-2035?

    ***Response**: Gas assets provide valuable capacity to the Ontario grid and should be used to provide capacity until the end of their useful life. Ontario's current gas-fired generation installed capacity is about 11,000 MW, accounting for about 25% of total installed capacity in the province and about 7% of energy production. The life expectancy and useful economic life of most plants, based on a total life of 35-40 years, will stretch to 2040 and beyond.*

[4] Canada's CO2 Landscape : A Guide Map for Sources & Sinks; The International CCS Knowledge Centre, April 2021
[5] APPrO Comments on the discussion paper "Exploring Border Carbon Adjustments for Canada", February 2022

Shutting down an existing plant that still has useful life removes a cost-effective source of capacity from the system that may need only limited sustaining capital and fixed costs to operate. If the government's goals are an affordable and reliable energy transition, then continued operation of existing gas plants would be a cost-effective source of capacity for Ontario's ratepayer, until new non-emitting generation can be placed in-service.

As noted earlier, retiring the plants early will result in stranded natural gas generation assets, in addition to numerous pipelines and other infrastructure that may no longer be required, but will continue to be paid for by Ontario's energy customers.

Existing natural gas-fired generation can support electrification by dealing with the demand uncertainty until Ontario can add more non-emitting baseload generation so that CO2 emissions do not increase on a sustained basis. If all gas-fired generation is phased out after only 20 years of operation (the most aggressive scenario assuming contracts are not renewed, the supply deficit could reach up to 15,000 MW as opposed to the roughly 4,000 MW deficit reported in the IESO's latest Annual Planning Outlook.

This generation can also integrate intermittent renewables: not many other supply resources in Ontario are capable of fully replicating the range of supply attributes provided by gas-fired generators. By contrast, given that wind and solar supply resources are weather-dependent to provide energy, their supply can change very quickly, even minute-by-minute – the result of a sudden change in wind patterns or cloud cover, amongst many other factors. Once a gas-fired generator is on-line, it is capable of quickly increasing or decreasing supply in response to grid and electricity market conditions.

APPrO supports the continued use of gas to meet peak electricity needs until end of life or until there is a suitable technology that provides similar flexibility associated with gas that is both affordable for customers and maintains the reliability and security of the Ontario grid.

In 2021, the Ontario Independent Electricity System Operator (IESO) produced a report[6] which determined that the complete phase-out of gas generation by 2030 would lead to blackouts as electricity would not always be available where and when needed. It noted that gas generation currently plays an important role as it is almost always available, responding quickly to changes in consumption and balancing variable output from wind and solar generation.

The IESO noted that "…it will be necessary to rely on existing gas generators for a number of years to support wide-scale emissions reductions...phasing out gas generation by 2030 would result in blackouts and hinder electrification, but could be considered given more time and planning."

On October 7, 2021 Ontario's Minister of Energy wrote[7] to the IESO requesting that it evaluate a moratorium on the procurement of new natural gas generating stations in this decade (reliability, cost, environmental considerations) and develop an achievable pathway to phase out natural gas generation and achieve zero emissions in the electricity sector. This work, due to be

[6] Natural Gas Phase-Out Impact Assessment. IESO, October, 2021

[7] www.ieso.ca/-/media/Files/IESO/Document-Library/corporate/ministerial-directives/Letter-from-Minister-Gas-Phase-Out-Impact-Assessment.ashx

finalized in Q4, 2022, should be leveraged by the federal government.

12. What flexibility should be allowed to use natural gas to maintain reliability in rare and extreme weather, emergencies, or other special circumstances? Which additional operating conditions/scenarios, if any, should be given special consideration?

    ***Response**: Even with the addition of more renewable generation, since currently there is no like-for-like replacement supply that can provide the same operating characteristics, natural gas generation will be needed post-2035 to maintain system reliability and as such it should operate until the end of its useful life. Natural gas with CCUS will also have a role depending on the path of the technology and the unit energy cost in Ontario post-2035. Natural gas co-fired with low-carbon hydrogen or Renewable Natural Gas (RNG) should be given preference to a facility that only fires natural gas.*

    If the government's goals are an affordable and reliable energy transition to net zero grid by 2035, then continued operation of existing gas plants would be a cost-effective source of peaking capacity for Ontario's rate-payer. Existing gas plants may only need limited sustaining capital and fixed costs to operate. The reliance on natural gas will decrease as new non-emitting generation can be placed in-service, and during the transition the existence of natural gas generation in a peaking power role will not impede the penetration of these nascent generation technologies.

    Gas is compatible with and complementary to additions of new low-emitting generation technologies like SMR.

Treatment of industry, private generation and remote generation

13. How should the CES treat electricity generated by cogeneration units that is sold to the electricity system? Should the CES apply fully to cogeneration units by 2035 or should it phase-in its application to cogeneration units after 2035?
14. What are the benefits of applying a CES to industrial generation units? What are the challenges of doing so? Of not doing so?
15. How should the CES consider electricity generation in remote, northern, and Indigenous communities?
16. How should the CES consider distributed energy resources?

    ***Response**: APPrO has no comments with respect to the treatment of industry, private generation and remote generation.*

Treatment of biomass

17. If CO2 emissions from biomass combustion are not counted towards compliance under a CES, to what degree might biomass generation increase?
18. What types of biomass are suited to electricity generation? What are their characteristics with respect to regenerative life cycle, non-CO2 GHG emissions, and land use characteristics?
19. What emissions reporting and compliance requirements for biomass generation should be considered to ensure that nature is protected and land-based emissions do not increase?

***Response**: APPrO has no comments with respect to the treatment of biomass.*

Other Questions

20. What additional investments are anticipated to be necessary to achieve NZ2035 to help ensure affordability for consumers?
21. What role could existing and expanded energy efficiency programming play in helping to meet new demand as they transition towards net-zero 2035? What are the constraints for additional efficiency measures? Technological? Policy? Other?
22. What other factors should the government consider in developing the CES?

***Response**: More funding support for nuclear, hydro, carbon capture technologies, hydrogen, and energy storage is required for a net-zero grid in Ontario. If the electricity system needs to rely on less gas generation, the energy needs to be replaced to maintain reliability of the grid. Achieving a net zero carbon economy by 2050 will require the addition of substantial new baseload generation to the system, such as hydroelectricity and nuclear.*

Hydropower can play a significant role in meeting the future electricity supply needs for Ontario as it provides:

- *Opportunities for large scale energy and capacity*
- *A good generation mix in Ontario requires hydropower to maintain reliability: it provides flexibility and ancillary benefits to the grid which are unmatched from other generation sources*
- *Economic and socioeconomic benefits for the Province*

Appropriate electricity demand growth scenarios need to be considered.

Any reliance on inter-provincial and international imports also needs to be carefully considered.

The Discussion Paper only focuses on electricity generation. However, to meet growing demand for electricity while also becoming non-emitting and resilient to the impacts of climate change, the entire electricity system, including distribution and transmission needs to be considered.

If the system needs to rely on less gas generation, the energy needs to be replaced to maintain reliability of the grid. If this energy is to be replaced by imports, the government must take into account import capacity of a province/territory.

In Ontario, there are currently over 6,500 MW of import capability from interconnections with neighboring markets, however, only a fraction would be available at the time of system need. Ontario's transmission system has been designed and constructed based on existing load centers and large generators. Gas-fired generators are already built and strategically located where demand is highest. This helps to reduce congestion on transmission lines that may reduce the amount of supply that can flow from distant generators.

Regulatory capacity and process improvements are needed to enable timely approval and development of new resources and infrastructure to deliver a net-zero grid by 2035.

Ontario is already moving forward with its Pathways to Decarbonization Study. The report is expected back from the IESO in November 2022. The output from this study, undertaken by the

statutory and expert organization charged among other duties with power system cost, reliability, and timing should be carefully considered and leveraged by ECCC as part of its process.