# Feedback Form

# Bulk Planning Updates Webinar (South and Central Bulk Plan) – May 29, 2025

## Feedback Provided by:

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Date: 19 June 2025

To promote transparency, feedback submitted will be posted on this engagement webpage unless otherwise requested by the sender.

Following the Bulk Planning Updates Webinar held on May 29, 2025, the Independent Electricity System Operator (IESO) is seeking feedback. A copy of the presentations as well as recordings of the sessions can be accessed from the engagement web page.

**Please submit feedback to communityengagement@ieso.ca by June 19, 2025.**

| Topic | Feedback |
|---|---|
| What feedback is there on the preliminary portfolios? | See Comments below. |
| What information needs to be considered regarding the preliminary portfolios? | See Comments below. |
| What additional information should be provided in future engagements to help share perspectives and insights? | See Comments below. |
| What feedback is there on interest in future resource locations or future zonal distribution of incremental resources? | See Comments below. |

## General Comments/Feedback

**1. Northern Hydro is Intermittent & Unreliable:**

In 2015, an IESO (formerly Ontario Power Authority) report entitled North of Dryden Integrated Regional Resource Plan (NDIRRP), determined that *"Northern hydroelectric generation is an energy-limited resource known to have significantly reduced output and availability during drought conditions of the river system supplying these generating units."* [1]

Run-of-river hydropower in the north, south, east and west of the province is often not cost-effective on smaller rivers due to the high construction costs and the intermittent and unreliable power that can be generated, particularly during drought conditions. The NDIRRP reported that northern hydroelectric power generation has a Firm Capacity of 15 to 30% at a cost of $16 to $66 million per MW with a development duration of 5 to 10 years.[2]

After careful analysis of all options, the NDIRRP determined that the best means of connecting remote First Nation communities in the north and enabling forecasted growth to the Ring of Fire was to build new and upgraded transmission lines, reporting that *"These recommendations are the most cost-effective options that can be implemented in a timely manner and provide flexibility for meeting a broad range of long-term forecast scenarios."*[3]

According to the 2025 Annual Planning Outlook, the Small Hydro Program refers to facilities with an installed capacity (IC) of up to 10 MW, and the Northern Hydro Program refers to hydroelectric facilities with an IC greater than 10 MW. The electricity produced by small hydro is unreliable because it peaks during the high flows of spring, when power demand is low, and produces at its lowest during the hot summer months, when consumption and demand are highest. During the low-flow season of summer or during drought conditions, many run-of-river and some smaller peaking facilities cannot operate efficiently and must be shut down.

The frequency, intensity, and duration of drought conditions in Ontario have increased since 2015 and are expected to continue intensifying as the climate warms. See section 3 below for more information.

A cost/benefit analysis should be required to determine whether these types of projects are environmentally and/or economically sustainable and viable.

**2. Hydropower's Dirty Secret:**

The hydropower industry has intensified its lobbying efforts for a new renaissance in hydropower, as capacity additions have been declining since 2013. This is due not only to the falling costs of competing technologies but also to a broader set of challenges, including high-profile cancellations, growing hydrological risks, cost and schedule overruns, technical challenges, and increasing social resistance. Now you can add greenhouse gas emissions with methane at the top of that list.

When a dam is built and land is flooded to create a reservoir, microbes decompose submerged organic matter. Throughout the dam's life, sediment and biomass accumulate behind it, in a process that leads to the emission of methane, carbon dioxide and nitrous oxide.


Methane is a potent greenhouse gas with a heat-trapping capacity 28 to 34 times greater than that of carbon dioxide on a 100-year time scale, and measured over a 20-year time period, that ratio grows to 84 to 86 times.[4] Methane is generated in reservoirs by bacteria living in oxygen-starved environments. These microbes feast on rotting organic matter from plants for energy, just like people and other animals, but instead of breathing out carbon dioxide, they breathe out methane.

A 2004 Environment Canada report states:

> *"Largely because of the climate-change driven pursuit of "clean" energy sources, attention has also focused on the role of water storage in affecting production and emission of greenhouse gases (GHG). <u>In contrast to the widespread assumption (e.g., in Intergovernmental Panel on Climate Change [IPCC] scenarios) that GHGs emitted from reservoirs are negligible, measurements made in boreal and tropical regions indicate they can be substantial</u>."* [5]

The Intergovernmental Panel on Climate Change (IPCC) guidelines report on several key factors to consider when evaluating hydroelectric projects with flooded lands (reservoirs).

*"Flooded Land emits $CO_2$, $CH_4$ and $N_2O$ in significant quantities, depending on a variety of characteristics such as age, land-use prior to flooding, climate, upstream catchment characteristics and management practices. Emissions vary spatially and over time."* [6]

*"Flooded Land is defined as: water bodies where human activities have caused changes in the amount of surface area covered by water, typically through water level regulation. Examples of Flooded Land includes reservoirs for the production of hydroelectricity, irrigation, and navigation."*[7]

*"Emissions of $CH_4$ from Flooded Land are primarily the result of $CH_4$ production induced by anoxic conditions in the sediment (see Annex 7.1). Methane can be emitted from small lakes or reservoirs via diffusive, ebullitive, and downstream emissions. Downstream $CH_4$ emissions are subdivided into degassing emissions (see Glossary) and diffusive emissions, which occur downstream from the flooded land. Methane emissions are generally higher in waterbodies with high organic matter loading and/or high internal biomass production, and low oxygen status. Due to their high emission rates and large numbers, small ponds of area < 0.1 ha have been estimated to generate 40 percent of diffusive $CH_4$ emissions from open waters globally (Holgerson & Raymond 2016). Whilst emissions from natural ponds can (at least in part) be considered natural, those from small constructed waterbodies are the result of anthropogenic activity."* [8]

For instance, the 2019 IPCC Refinement of the 2006 Guidelines for National Greenhouse Gas Inventories informs that:

*The range of Flooded Land considered in this chapter are listed in Table 7.7.'*[9]

**TABLE 7.7 (NEW)**
**TYPES OF FLOODED LAND, THEIR HUMAN USES AND GREENHOUSE GAS EMISSIONS CONSIDERED IN THIS CHAPTER**

| Flooded Land types | Human Uses | Greenhouse gas emissions for which guidance is provided in this Chapter |
|---|---|---|
| Reservoirs (including open water, drawdown zones, and degassing/downstream areas) | Hydroelectric Energy Production, Flood Control, Water Supply, Agriculture, Recreation, Navigation, Aquaculture | $CO_2$, $CH_4$ |
| Canals | Water Supply, Navigation | $CH_4$ |
| Ditches | Agriculture (e.g. irrigation, drainage, and livestock watering) | $CH_4$ |
| Ponds (Freshwater or Saline) | Agriculture, aquaculture, recreation | $CH_4$ |

A recent study out of Quebec quantified the long-term historical and future evolution of GHG emissions from 1900 to 2060, examining the cumulative global surface area of 9,195 reservoirs in four different climate zones (boreal, temperate, subtropical, and tropical) around the world. It reported:

*"reservoir-induced radiative forcing continues to rise due to ongoing increases in reservoir methane emissions, which accounted for 5.2% of global anthropogenic methane emissions in 2020. We estimate that, in the future, methane ebullition and degassing flux will make up >75% of the reservoir-induced radiative forcing, making these flux pathways key targets for improved understanding and mitigation.*

*While $CO_2$ and $CH_4$ diffusion are modelled as decreasing with reservoir age, <u>ebullition and degassing remain constant, such that these two latter emission pathways grow increasingly important with time</u>. Thus, while $CO_2$ diffusion was the dominant flux pathway in the twentieth century, C–$CH_4$ emissions, mainly via ebullition and degassing, are expected to surpass C–$CO_2$*

*around 2032 and account for 75% of reservoir C emissions by 2060. In addition, the higher greenhouse warming potential of $CH_4$, relative to $CO_2$, amplifies the climate impact of $CH_4$ emissions. Furthermore, estimated fluxes do not account for future global temperature increases or water eutrophication changes, both of which would probably stimulate $CH_4$ emissions more strongly than $CO_2$. Methane emissions, and especially $CH_4$ ebullition and degassing are expected to dominate future reservoir C-GHG release (39% and 32% in 2060, respectively; (Fig. 2 - below), implying that mitigation efforts aimed at reducing $CH_4$ fluxes via pathways could be quite effective."* [10]

The study clearly indicates that carbon dioxide and methane diffusion decrease within the first 20 or more years of a new reservoir being created; however, methane emissions through ebullition and degassing persist and can increase over time. Measurements made at hydroelectric facilities in boreal and temperate regions indicate that GHG emissions can be substantial, [11],[12] and in some instances can rise to the level of a gas-fired facility. [13]

For instance, a Swiss study of a temperate hydropower reservoir indicates that "*the total methane emissions coming from Lake Wohlen, was on average > 150 mg $CH_4$ $m^{-2}$ $d^{-1}$, which is the highest ever documented for a midlatitude reservoir. The substantial temperature-dependent methane emissions discovered in this 90-year-old reservoir indicate that temperate water bodies in older headponds can be an important but overlooked methane source*".[14]

The IPCC also reports that "*hydropower plants without or with small storage may be susceptible to climate variability, especially droughts, when the amount of water may not be sufficient to generate electricity (Premalatha et al. 2014) (Section 6.5).*[15] Reliance on hydropower in times of drought also accelerates GHG emissions when depleted reservoirs necessitate the use of fossil fuels, particularly natural gas, to fill the gap.

It is also important to consider that creating a hydroelectric reservoir on a previously untamed riverine ecosystem can transform a healthy ecosystem from a GHG sink into a relatively large source of emissions into the atmosphere.[16]

You can turn off a gas-fired facility when a cleaner form of electricity comes along; however, a hydroelectric reservoir will continue to emit methane until the dam is removed. You cannot just turn off emissions coming from a reservoir because biomass continues to collect behind the dam. The problem is consequential because these facilities will be in place for a century or more, and upfront dam decommissioning funds are not required by the province. This is a huge problem because dam removal has proven to be cost-prohibitive, as it can add up to $millions, and there is little to no funding available for decommissioning dams.

### 3. Ontario's Own Climate Risk Assessment Spells the Death Knell for Hydropower:

Credible risk projections and assessments are crucial for determining whether hydropower projects will remain a viable and reliable resource over the short and long term, as well as for understanding their environmental and socio-economic impacts throughout the full life cycle of the dam, which proponents claim is approximately 100 years.

The *Ontario Provincial Climate Change Impact Assessment (2023)* utilized historical and projected future climate data as fundamental components to assess the risks and consequences of extreme weather events, as well as projections of future climate risks. It reports that "*changes in Ontario's climate are expected to continue at unprecedented rates… and it will pose indirect threats to things like water availability and water quality."*[17] The report further indicates that northern Ontario, which experiences on average four extreme heat days annually, is projected to see upwards of 35 such days each year. Southern Ontario will see upwards of 55-60 extreme heat days annually by the 2080s—a fourfold increase from the current annual average of 16 days. These changes threaten stream temperature regimes, species survival, wetland retention, and seasonal flows.

In addition, *"Climate change poses risks to water sources, which affect supply and quality. Dry conditions and extreme hot temperatures change water balances and cause disruptions to the water flow regulation service, leading to reduced surface and groundwater levels, changes in intra-annual patterns of water availability, loss of available freshwater supplies for human use, wetland drying and loss, changes in distribution and abundance of animal and fish species and altered ecosystem function over a long term."*[18]

This assessment confirms that climate change will have severe negative impacts on the intermittent and unreliable nature of hydropower generation; however, it will also have significant effects on water quality, water quantity, aquatic life, riverine ecosystem sustainability, and the communities that rely on these freshwater resources.

Despite perceptions of reliability, hydropower is **highly vulnerable to seasonal and long-term hydrological fluctuations.** According to Statistics Canada, total electricity generated in Canada decreased by 3.9% year-over-year in 2023. It was the hottest summer on record since 1940, according to Environment and Climate Change Canada (ECCC), and hydropower is susceptible to persistent dry conditions. In 2023, Western and Central Canada received below, or well below-average amounts of precipitation, putting a strain on hydroelectric generation and exports. In fact, Quebec (-9.3%), British Columbia (-21.5%) and Manitoba (-12.1%) were affected by drought conditions and saw electricity generation drop as a result.[19] In 2024, persistent dry conditions continued to reduce hydroelectric generation, similar to what was experienced in 2023. In fact, during the months of February, March and April 2024, Canada became a net electricity importer, rather than a net electricity exporter.[20]

In fact, "*2024 was the warmest year on record, and the first year to exceed the 1.5°C threshold established by the Paris Agreement… Although ECCC is forecasting only a 17% chance of exceeding the 1.5°C threshold in 2025, their decadal forecasts indicate that the next five years are likely to be the warmest five-year period on record."*[21]

Just this morning, *Indicators of Global Climate Change*, was released by a group of 60 international scientists reporting that *"Things aren't just getting worse. They're getting worse faster," said study co-author Zeke Hausfather of the tech firm Stripe and the climate monitoring group Berkeley Earth. "We're actively moving in the wrong direction in a critical period of time that we would need to meet our most ambitious climate goals..."* [22]

Building new hydropower facilities now is an investment that will not be operational for another 5 to 10 years. With climate change advancing at such an increasingly rapid pace, hydropower poses a significant risk to ratepayers' investments and returns in an increasingly volatile, problematic, and diminishing energy resource. New hydropower will also place riverine ecosystems and their connecting lakes at ever-increasing risk, when we should instead be removing dams to increase freshwater ecosystem resilience.

## 4. Two Different Paths Forward:

### Todd Smith, Minister of Energy:

On October 21, 2022, Todd Smith, Minister of Energy, directed the Chair of the Ontario Energy Board to "… *work with the Ministry of Energy and other partners as needed to ensure proposals reflect current and anticipated future extreme weather impacts and best practices in climate change resilience, including insights from the Ministry of Environment, Conservation and Parks' Provincial Climate Change*

*Impact Assessment. This report may also, as possible, reflect input from the workshops being held on the future of the OEB's approach to sector regulation."* [23]

In June of 2023, the OEB responded with a Report to the Minister of Energy: Improving Distribution Sector Resilience, Responsiveness and Cost Efficiency. The OEB report concurred: *"Climate change means that the likelihood and severity of extreme weather are growing. Some storms are expected to inflict considerably more damage to infrastructure, making resilience expectations warranted. The OEB's view is that a more robust and consistent approach, applied to all distributors, is required in order to better protect Ontario customers and electricity distribution infrastructure."* [24]

**Stephen Lecce, Minister of Energy & Mines:**

In June of 2024, Stephen Lecce was sworn in as Minister of Energy and Mines. In June of 2025 he announced a new path forward by issuing a Minister's Message*, Energy for Generations: Ontario's Integrated Plan to Power the Strongest Economy in the G7".*[25] The report misleadingly greenwashes hydropower as clean and non-emitting and is totally void of the words "climate change", or any short or long-term view of planning or risk assessment of its effects on the resilience and longevity of such a water reliant electricity resource as hydropower. The report is also primarily focused on becoming a "*Global Energy Superpower*" and having the "*Strongest Economy in the G7".*

If this new Minister does not take *the Ontario Climate Change Risk Assessment – Technical Report (January 2023)* seriously, Ontario will face numerous Hydropower Boondoggles, and risks miscalculating Ontario's capacity requirements.

This government is also working to place the planning costs and risks of some of these hydropower projects on the backs of Ontario ratepayers – see my comments on *ERO-025-0449 – Advancing New Hydroelectric Generation in Ontario*. This would enable Ontario Power Generation to recover risky speculative pre-development costs from electricity ratepayers, regardless of whether a project is ultimately approved, constructed, or ever becomes operational. This represents a fundamental shift in risk from the proponent to the public, eroding accountability and violating the principles of prudent energy regulation. The planning process for one of these projects can cost millions; however, this amendment to the *Ontario Energy Board Act, 1998*, would also open up the same opportunity for other proponents and projects.

As a result of Minister Lecce's desire to become a Global Energy Superpower, the "*IESO's 2025 Annual Planning Outlook forecasts system-level net annual energy demand to grow 75 per cent—to 262 terawatt-hours by 2050—which is a significantly higher increase than the 60 per cent growth forecast in the 2024 Annual Planning Outlook within the same timeframe."*[26] The 2024 Annual Planning Outlook figure was forecasted to meet our needs up to 2050; however, it appears that an additional 15 percent of capacity pushes us into the Global Energy Superpower category.

Minister Lecce's short-sighted report and the IESO's documentation failed to address the significant risk that climate change poses to hydropower generation under its increasingly frequent and intense warming conditions. Consequently, it is highly likely that any new hydropower project will prove to have been technically infeasible, ecologically damaging, and financially disastrous to Ontario ratepayers and hydro proponents.

**5. Greenwashing Dirty Hydropower:**

The promotion of hydropower as "renewable," "clean," and "non-emitting" is among the more common and serious forms of misinformation being presented to the world during this growing climate crisis, which threatens humanity's very existence on the planet.

Labelling hydropower as a “renewable” energy source is misleading, as a very high environmental and socio-economic price has been paid in the past in terms of losses to valued natural resources due to the installation of dams and hydropower facilities. The socio-economic costs of these losses are generally ignored,[27,28] and rarely revealed to the public.

The collateral environmental damage caused by dams and waterpower facilities has been well documented for decades, including the loss or serious decline in migratory fish species (waterpower facilities are key factors in the listing of some iconic fish species as species at risk in Ontario and elsewhere)[29,30], declining biodiversity[31], impaired water quality (including elevation of mercury concentrations in fish tissue)[32,33,] and are critical threats to imperilled aquatic species.[34]

Significant ecological damage from waterpower has been ongoing for many decades in Ontario and other locations worldwide.[35] In fact, in Ontario, dams are considered to be a major factor in the extirpation of Ontario’s Atlantic Salmon stock[36], one of the most important causes of anthropogenic mortalities and decline of Ontario’s American Eel[37], and a key threat to Ontario’s declining Lake Sturgeon populations.[38,39,40]

Lake Sturgeon stranded in a hydroelectric facility’s overflow channel.

The Ontario Waterpower Association and the waterpower industry have proven to be irresponsible and extremely negligent in failing to offer even the most basic mitigation measures to protect fish populations and the health of riverine ecosystems. There are a total of 225 hydroelectric facilities in Ontario (with many more times that number of control dams to contain the reservoirs), including 66 hydropower facilities in Ontario owned by OPG; however, <u>only two facilities in all of Ontario are fitted with operating fishways</u>.

Minister Lecce’s “Energy for Generations” and the “2025 Annual Planning Outlook” greenwash hydroelectric power as a “clean”, “reliable” and “non-emitting” resource and refers to the Clean Electricity Regulations, which include hydropower as a clean electricity resource.[41]

“Clean” and “non-emitting” energy refers to electricity sources that produce no climate-warming greenhouse gas emissions; however, that is certainly not the case with hydropower. There are almost three decades of independent, peer-reviewed studies refuting these claims, with reports indicating that hydroelectric reservoirs in boreal, temperate, and tropical regions are a significant and ongoing source of biogenic GHG emissions, including methane, which in some instances can reach the same emission rate as gas-fired facilities.[42] “Reliable” is not so in the face of climate change, as noted previously.

It is no longer acceptable to trade off valued ecosystem resources, such as clean water, fisheries, wetlands, and healthy rivers, for so-called clean, green, non-emitting or renewable energy generation without effective mitigation and without clear and transparent public and First Nation consultation on what these trade-offs would entail.

## 6. Major Environmental Trade-Offs from Hydropower:

Hydroelectric projects have been greenwashed for more than a century. Proponents and governments promote them as clean, non-emitting, zero-emission, low-emitting, green or renewable, but this overlooks a long list of well-documented and often irreversible environmental harms:

- **Methane Emissions:** Hydropower reservoirs make a significant daily contribution (5%[43] to 7%[44]) to the Earth's accumulation of greenhouse gases in the atmosphere.
- **Habitat fragmentation**: Dams block connectivity and migratory routes, isolating aquatic populations and accelerating the local extirpation of valued species.[45]
- **Biodiversity loss:** Dams act as physical barriers that block longitudinal connectivity and upstream-downstream movement of aquatic species.[46] There are 225 hydroelectric facilities in Ontario, and only two operating fishways.
- **Hydropeaking disruptions**: Sudden changes in flow from turbine operations can cause fish stranding, bank destabilization, and habitat destruction.[47]
- **Sediment trapping**: Reservoirs trap up to 60% of river sediment, which starves downstream ecosystems of nutrients, erodes riverbeds, and damages wetlands.[48]
- **Thermal pollution**: Blocked flow and stratification in reservoirs alter water temperature, quality, quantity, and oxygen levels, harming aquatic species and the downstream ecosystem.[49]
- **Methylmercury contamination**: Flooded vegetation creates elevated levels of methylmercury in fish, posing health risks to wildlife and humans that can persist for decades.[50]

These are not theoretical risks—they are inherent characteristics of hydroelectric infrastructure.

## 7. Conclusion:

Turning a blind eye to the significant and ongoing environmental impacts of hydropower, as well as the blatant disinformation and flawed reasoning behind the claims of non-emitting, clean, green, and renewable hydropower, brings to mind the tobacco and oil and gas industries in the 1960s and 1980s. The tobacco industry knew the dangers of smoking to a person's health, yet despite the dangers, it still misled the public into believing it was safe. The oil and gas industry knew all along that oil and gas emissions would lead civilization off a climate cliff, and yet failed to act. Don't let the hydropower industry do the same.

The Minister of Energy and Mines is misleading the public and Indigenous communities about the environmental impacts of hydropower and its reservoirs, which are fueling climate change. He has also ignored the province's own Climate Change Risk Assessment and climate science in general.

## 8. Recommendation:

ORA strongly recommends no new hydroelectric procurement in Ontario! Ontario needs real climate solutions—not more outdated infrastructure that will accelerate climate change, compromise our freshwater resources, undermine sustainability and biodiversity, and destroy public trust. We must build resilience into our lakes and rivers by removing dams and restoring riverine ecosystems--not erecting more barriers to the health of our freshwater ecosystems.

Thank you for this opportunity to comment!

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https://ontarioriversalliance.ca/blog

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