

Feedback Form

Regional Electricity Planning in the North of Dryden Addendum – July 30, 2025

Feedback Provided by:

Name: Linda Heron

Title: Chair

Organization: Ontario Rivers Alliance

Email: [REDACTED]

Date: 13 August 2025

To promote transparency, feedback submitted will be posted on the North of Dryden Addendum [engagement webpage](#) unless otherwise requested by the sender.

Following the North of Dryden Addendum regional planning webinar held on July 30, 2025, the Independent Electricity System Operator (IESO) is seeking feedback on the results of the options analysis and draft recommendations. A copy of the presentation as well as recording of the session can be accessed from the [engagement web page](#).

Please submit feedback to engagement@ieso.ca by August 13, 2025.

Topic	Feedback
What feedback do you have regarding the results of the detailed options analysis?	The detailed options analysis is short-sighted and incomplete when there has been no consideration of the January 2023 Ontario Provincial Climate Change

Topic	Feedback
	<p>Impact Assessment which warns that “<i>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</i>”. This is in spite of the Northwest Scoping Assessment Report highlighting the need to recognize climate change priorities.</p> <p>The analysis also did not appear to heed all the recommendations in the 2015 North of Dryden Integrated Regional Resource Plan which rejected new hydroelectric in the north due to its intermittent and unreliable nature during drought conditions, instead the decision was to construct new transmission lines into northern Ontario.</p> <p>IESO needs to do right by Ontarians and inform the Minister of Energy and Mines that there should be: NO NEW HYDROELECTRIC PROCUREMENT IN ONTARIO.</p> <p>See more detail in ORA Comments below:</p>
<p>What feedback do you have on the draft recommendations?</p>	<p>ORA supports Option 3 at a total estimated cost of \$760 M and is opposed to the IESO’s preferred Option 3 Double, at an estimated cost of \$820M, which allows for the hook-up of potential new hydroelectric projects to feed development in the Ring of Fire. There is a great deal of uncertainty surrounding our future electricity needs in northern Ontario, and becoming an “Energy Superpower” is not in the best interests of local ratepayers. \$60 M is a significant saving.</p> <p>The ORA supports non-wire alternatives wherever possible to address climate change impacts, and avoiding downed transmission lines during extreme weather events. This should save dollars in the long run, provide more reliability to ratepayers and resilience to electricity transmission infrastructure.</p> <p>See more details in ORA Comments below:</p>
<p>How can the IESO continue to engage with communities and stakeholders as these recommendations are implemented, or to help prepare for the next planning cycle?</p>	<p>It would be helpful if IESO provided verbal or written feedback to stakeholders on their major written concerns during the engagement process.</p>

General Comments/Feedback

For over a century, hydropower has been greenwashed as a clean, renewable, and non-emitting energy source. In reality, there are decades of independent peer-reviewed studies indicating that hydro dams and their reservoirs are major drivers of climate change--emitting methane, carbon and nitrous oxide throughout their entire life cycle.

Beyond greenhouse gases, their operations can reduce water quantity for long durations of time, degrade water quality, cause erosion, sedimentation, methylmercury contamination of fish, disrupt ecosystems, and threaten biodiversity. Far from being a clean and sustainable solution, hydropower poses serious environmental risks for the full life cycle of the dam.

ORA is strongly opposed to new hydroelectric projects in Ontario for a whole host of important reasons, as follows:

1. Greenwashing Hydropower:

IESO staff mentioned the “hydro scenario” a few times during the webinar; however, it was not mentioned in the presentation document. Upon reviewing the Integrated Regional Resource Plan, Northwest Region, January 2023, it became clear that staff were referring to the 2022 Ontario Power Generation (OPG) report on the potential for new hydroelectric development in northern Ontario. It reported that *“Ontario Power Generation has shared this work with the Ministry of Energy and the IESO so that it can be considered as part of the IESO’s work towards developing an achievable pathway to zero emissions in the electricity sector”*¹ and to supply power to the Ring of Fire.

ORA submits that referring to hydroelectric as a pathway to zero emissions is misinformation meant to greenwash hydropower and promote its interests. A 25 August 2022 Narwhal article revealed that OPG had been privately selling Clean Energy Credits to GHG polluters since 2013 and had brought in over \$5.5 million over that time.² In effect, polluters are paying to fuel climate change.

What is surprising is that since at least 2016, OPG has known that hydroelectric generation results in GHG emissions that can reach those of a gas-fired facility. How do we know that?

In 2016, OPG retained Intrinsic Corp. (Intrinsic) to compare GHG emissions associated with various methods of energy production in Ontario over the next 40 years. Table E-1 (below) in the resulting report claimed that Hydroelectric GHG emissions per Energy Production (g CO₂e/kWh) was zero (0).³ It was shocking to read something so blatantly false, so let’s explore their rationale.

Table E-1 Estimated Resource-Specific GHG Emission Rates for the Operation and Maintenance Stage	
Resource	GHG Emissions per Energy Production (g CO ₂ e/kWh)
Hydroelectric	0
Nuclear	0.15
Wind	0.74
Solar	6.15
Natural Gas	525

While the Intrinsic report acknowledged that *“during the periods of peak emissions following flooding, GHG emissions may be similar to those associated with gas-fired facilities, decreasing from a rate of 671 g CO₂e/kWh in the first year following flooding to 238 g CO₂e/kWh following the fourth year... the flooding of reservoirs and the emissions associated with the decomposition of biomass was considered*

to be a component of the construction phase and was not included within the operational stage of the current study”.⁷

It is deceptive that the GHG emissions generated from a potential 100-year operating phase of OPG’s 66 hydroelectric facilities on 24 river systems with 239 control dams throughout Ontario were totally removed from consideration. It has been common knowledge since the late 1990s that hydroelectric reservoirs are a significant and ongoing source of GHG emissions, and that methane fueling biomass continues to collect behind these dams for their full life cycle. More information on GHG emissions in section 5: Hydropower’s Dirty Secret.

It is very clear in the Intrinsic report that the process of decomposition of biomass in the reservoir was well understood as the source of carbon and methane emissions and “*similar to those associated with gas-fired facilities*”. Yet, the Intrinsic report justified eliminating the operation phase by reporting that “*GHG emissions associated with the decomposition of biomass are reported to be temporary, with some estimating a peak in emissions approximately 2 to 5 years following impoundment, followed by a gradual decline in emissions which may reach those found in natural lakes after more than 10 years* (Hydro Quebec, 2016 website ⁴)”. This was just more misinformation.

This convenient assumption originates from Hydro Quebec (HQ) commissioned studies. Some background information: HQ hired Dr. Alan Tremblay, PhD, as a Senior Environmental Advisor (over 25 years ago) to oversee all the studies listed on HQ’s website. Dr. Alan Tremblay’s name is included in all HQ citations and, therefore, cannot be considered to be third-party independent studies. In ORA’s opinion, HQ studies are biased in favour of HQ’s interests, as they don’t jive with independent research in this area. HQ has blazed a trail that governments and the waterpower industry have been eager to embrace and cite.

Sometime before 2011, HQ commissioned an independent study by Eric Duchemin, Institute of Environmental Sciences, University of Quebec, to research GHG emissions coming from Quebec hydroelectric reservoirs. Duchemin has numerous citations in the study of GHG emissions coming from reservoirs in the northern boreal regions of Quebec. However, a close read of a 2006 Duchemin et al study explains a lot, as Alan Tremblay was cited, “*However, Tremblay et al (2005) did not consider bubbling fluxes (CH₄) in their estimates*”.^{5,6} Yet methane is the worst of the GHGs as it is the most abundant and will continue to be produced over the full life of the dam.

Also, in a 2011 Montreal Gazette news article, Duchemin said,

“(Hydro-Quebec) has the tendency to minimize the importance of the emissions from its reservoirs... You transform the forest, the river, the valley into a huge immovable zone where you have enormous amounts of micro bacteria where a huge amount of methane is emitted that was not emitted before.” What’s more, Duchemin said, reservoirs continue to emit greenhouse gases for decades because they are the depositories for all the gaseous biomass in the reservoir watershed. Eric Duchemin, PhD, Environmental Sciences.⁷

Unfortunately, this article has been totally wiped clean from the Montreal Gazette archives and the web; however, I am pleased to report that early on, the article was posted to ORA’s website Blog. Dr. Duchemin has an online presence, and his comments can easily be verified.

It isn’t surprising to hear hydropower proponents making false claims about hydropower; however, turning a blind eye to the significant and ongoing environmental impacts of hydropower and the blatant disinformation and reasoning behind the claims 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.

2. 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.”*⁸

Run-of-river hydropower in the north and much 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.⁹

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.”*¹⁰

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.

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.”*¹¹ 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.”¹²

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.¹³ 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.¹⁴

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.”¹⁵ 2025 is already turning out to be much hotter and drier than 2024.

In 2024, a group of 60 international scientists released [Indicators of Global Climate Change](#), 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...”¹⁶

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.”¹⁷

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.”¹⁸

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*.¹⁹ 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.

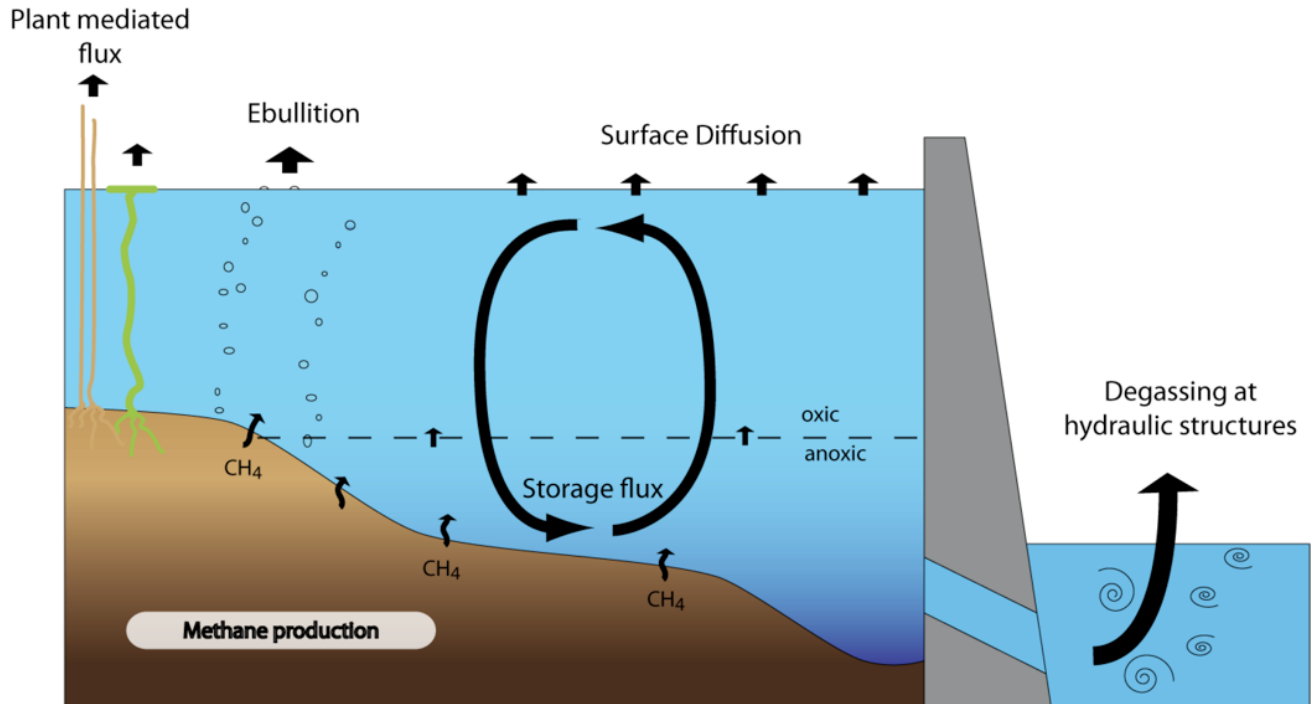
As a result of Minister Lecce’s desire to become a Global Energy Superpower, the “*IESO’s 2025 Annual Planning Outlook forecasts system-level net annual energy demand to grow 75 per cent—to 262 terawatt-hours by 2050—which is a significantly higher increase than the 60 per cent growth forecast in the 2024 Annual Planning Outlook within the same timeframe.*”²⁰ 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. 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.²¹ 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). 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.”²²

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 CO₂ and CH₄ diffusion are modelled as decreasing with reservoir age, ebullition and degassing remain constant, such that these two latter emission pathways grow increasingly

important with time. Thus, while CO₂ diffusion was the dominant flux pathway in the twentieth century, C–CH₄ emissions, mainly via ebullition and degassing, are expected to surpass C–CO₂ around 2032 and account for 75% of reservoir C emissions by 2060. In addition, the higher greenhouse warming potential of CH₄, relative to CO₂, amplifies the climate impact of CH₄ emissions. Furthermore, estimated fluxes do not account for future global temperature increases or water eutrophication changes, both of which would probably stimulate CH₄ emissions more strongly than CO₂. Methane emissions, and especially CH₄ 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 CH₄ fluxes via pathways could be quite effective.”²³

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, ^{24,25} and in some instances can rise to the level of a gas-fired facility. ²⁶

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 CH₄ 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”.*²⁷

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).”*²⁸ 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.²⁹

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.

6. Dirty Hydropower:

The promotion of hydropower as “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. The socio-economic costs of these losses are generally ignored,^{30,31} 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)^{32,33}, declining biodiversity³⁴, impaired water quality (including elevation of mercury concentrations in fish tissue)^{35,36}, and are critical threats to imperilled aquatic species.³⁷

Significant ecological damage from waterpower has been ongoing for many decades in Ontario and other locations worldwide.³⁸ In fact, in Ontario, dams are considered to be a major factor in the extirpation of Ontario's Atlantic Salmon stock³⁹, one of the most important causes of anthropogenic mortalities and decline of Ontario's American Eel⁴⁰, and a key threat to Ontario's declining Lake Sturgeon populations.^{41,42,43}



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, only two facilities in all of Ontario are fitted with operating fishways.

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.⁴⁴

"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.⁴⁵ "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%⁴⁶ to 7%⁴⁷) 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.⁴⁸
- **Biodiversity loss:** Dams act as physical barriers that block longitudinal connectivity and upstream-downstream movement of aquatic species.⁴⁹ 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.⁵⁰
- **Sediment trapping:** Reservoirs trap up to 60% of river sediment, which starves downstream ecosystems of nutrients, erodes riverbeds, and damages wetlands.⁵¹
- **Thermal pollution:** Blocked flow and stratification in reservoirs alter water temperature, quality, quantity, and oxygen levels, harming aquatic species and the downstream ecosystem.⁵²
- **Methylmercury contamination:** Flooded vegetation creates elevated levels of methylmercury in fish, posing health risks to wildlife and humans that can persist for decades.⁵³

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

7. Conclusion:

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.

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.

ORA strongly recommends no new hydroelectric procurement in Ontario.

Thank you for this opportunity to comment!

Linda Heron,
Chair, Ontario Rivers Alliance
info@ontarioriversalliance.ca
<https://ontarioriversalliance.ca/blog>

¹ *Integrated Regional Resource Plan, Northwest Region, January 13, 2023, IESO, 8.4.2 Enabling Hydro Generation. P-76/89*

² *Ontario Power Generation has made \$5.5 million privately selling clean energy credits, by Fatima Syed, The Narwhal, 25 August 2022.*

³ *Greenhouse Gas Emissions Associated with Various Methods of Power Generation in Ontario, Intrinsic, October 2016.*

⁴ *Hydro Quebec. 2016. Greenhouse gas emissions and reservoirs. Accessed August 2016.*

-
- ⁵ Duchemin et al., "First Assessment of Methane and Carbon Dioxide Emissions from Shallow and Deep Zones of Boreal Reservoirs upon Ice Break-up." March 2006.
- ⁶ Tremblay A., Therrien J., Hamelin B., Wichmann E. & LeDrew L. (2005) GHG emissions from boreal reservoirs and natural aquatic ecosystems. In: *Greenhouse Gas Emissions: Fluxes and Processes. Hydroelectric Reservoirs and Natural Environments* (eds A. Tremblay, L. Varfalvy, C. Roehm & M. Garneau) pp. 209–31. Springer, New York.
- ⁷ *Hydro Power's Dirty Side*, The Montreal Gazette, By William Marsden, Postmedia News April 15, 2011.
- ⁸ *North of Dryden Integrated Regional Resource Plan – January 27, 2015*, by OPA/IESO. P-124/158 Online: <http://www.noma.on.ca/upload/documents/north-of-dryden-report-2015-01-27.pdf>
- ⁹ *North of Dryden Integrated Regional Resource Plan – January 27, 2015*, by OPA/IESO. P-127/158, Table 56: Summary of Renewable Generation Options. Online: <http://www.noma.on.ca/upload/documents/north-of-dryden-report-2015-01-27.pdf>
- ¹⁰ *North of Dryden Integrated Regional Resource Plan – January 27, 2015*, by OPA/IESO. P-115/158 Online: <http://www.noma.on.ca/upload/documents/north-of-dryden-report-2015-01-27.pdf>
- ¹¹ Ontario Provincial Climate Change Impact Assessment, Technical Report, January 2023. Online: <https://www.ontario.ca/files/2023-11/mecp-ontario-provincial-climate-change-impact-assessment-en-2023-11-21.pdf>
- ¹² Ibid.
- ¹³ Hydroelectricity generation dries up amid low precipitation and record high temperatures: Electricity year in review 2023. StatsCan. March 5, 2024. <https://www.statcan.gc.ca/o1/en/plus/5776-hydroelectricity-generation-dries-amid-low-precipitation-and-record-high-temperatures>
- ¹⁴ Dry weather dampens overall generation: Electricity year in review, 2024. StatsCan. May 15, 2025. <https://www.statcan.gc.ca/o1/en/plus/8076-dry-weather-dampens-overall-generation-electricity-year-review-2024>
- ¹⁵ *2025 forecasted to rival 2024 for record-breaking heat*. By Hayley Dosser, Canadian Centre for Climate Services, 23 January 2025.
- ¹⁶ *More extreme weather on the way, as greenhouse gas accumulation accelerates, scientists say*. By Seth Berenstein, Canada's National Observer, June 18, 2025.
- ¹⁷ *Letter dated October 21, 2022, from Todd Smith, Minister of Energy, to Mr. Richard Dicteri, Chair, Ontario Energy Board*.
- ¹⁸ *Ontario Energy Board. Report to the Minister of Energy, Improving Distribution Sector Resilience, Responsiveness and Cost Efficiency*, June 29, 2023.
- ¹⁹ *Energy for Generations, Ontario's Integrated Plan to Power the Strongest Economy in the G7*. June 2025.
- ²⁰ *Annual Planning Outlook, Ontario's electricity system needs: 2026-2050*, April 2025.
- ²¹ Myhre, G., Shindell, D., Breon, F.-M., Collins, W., Fuglestedt, J., Huang, J., Koch, D., Lamarque, J.F., Lee, D., Mendoza, B., Nakajima, T., Robock, A., Stephens, G., Takemura, T., Zhang, H., Anthropogenic and natural radiative forcing. In *Climate Change 2013: The Physical Science Basis. Contribution of Working Group I to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*; Stocker, T. F., Qin, D., Plattner, G.-K., Tignor, M., Allen, S. K., Boschung, J., Nauels, A., Bex, V., Midgely, P. M., Eds.; Cambridge University Press: Cambridge, U.K. and New York, U.S.A., 2013.
- ²² Environment Canada. 2004. *Threats to Water Availability in Canada*. National Water Research Institute, Burlington, Ontario. NWRI Scientific Assessment Report Series No. 3 and ACSD Science Assessment Series No. 1. 32-150 p.
- ²³ Soued, C., Harrison, J.A., Mercier-Blais, S. et al. Reservoir CO₂ and CH₄ emissions and their climate impact over the period 1900–2060. *Nat. Geosci.* **15**, 700–705 (2022). <https://doi.org/10.1038/s41561-022-01004-2>
- ²⁴ St. Louis, V.L., Kelly, C.A., Duchemin, E., Rudd, J.W.M., Rosenberg, D.M. 2000. Reservoir Surfaces as sources of greenhouse gases to the atmosphere: a global estimate. *BioScience* 50(9) : 766-775. Online: <https://academic.oup.com/bioscience/article/50/9/766/269391>
- ²⁵ World Commission on Dams. 2000. *Introduction to Global Change, Working Paper of the World Commission on Dams, Secretariat of the World Commission on Dams*, Cape Town, South Africa.
- ²⁶ Scherer, L., & Pfister, S. (2016). Hydropower's Biogenic Carbon Footprint. *PLOS ONE*, 11(9), e0161947. <https://doi.org/10.1371/journal.pone.0161947>
- ²⁷ DelSontro, Tonya, McGinnis, Daniel F., Sobek, Sebastian, Ostrovsky, Ilia, Wehrli, Bernhard, 2010, *Extreme Methane Emissions from a Swiss Hydropower Reservoir: Contribution from Bubbling Sediments*. Online: <https://pubs.acs.org/doi/full/10.1021/es9031369>

- ²⁸ Clarke, L., Y.-M. Wei, A. De La Vega Navarro, A. Garg, A. N. Hahmann, S. Khennas, I. M. L. Azevedo, A. Löscher, A. K. Singh, L. Steg, G. Strbac, K. Wada, 2022: Energy Systems. In IPCC, 2022: Climate Change 2022: Mitigation of Climate Change. Contribution of Working Group III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [P. R. Shukla, J. Skea, R. Slade, A. Al Khourdajie, R. van Diemen, D. McCollum, M. Pathak, S. Some, P. Vyas, R. Fradera, M. Belkacemi, A. Hasija, G. Lisboa, S. Luz, J. Malley, (eds.)]. Cambridge University Press, Cambridge, UK and New York, NY, USA.
doi: 10.1017/9781009157926.008. Chapter 6, 6.4.2.3 Hydroelectric Power. P-753/2258
Online: https://www.ipcc.ch/report/ar6/wg3/downloads/report/IPCC_AR6_WGIII_FullReport.pdf
- ²⁹ St. Louis, V.L., Kelly, C.A., Duchemin, E., Rudd, J.W.M., Rosenberg, D.M. 2000. Reservoir Surfaces as sources of greenhouse gases to the atmosphere: a global estimate. *BioScience* 50(9): 766-775. Online: <https://academic.oup.com/bioscience/article/50/9/766/269391>
- ³⁰ Wang, G., Fang, Q., Zhang, L., Chen, W., Chen, Z., Hong, H. 2010. Valuing the effects of hydropower development on watershed ecosystem services: Case studies in the Jiulong River Watershed, Fujian Province, China. *Estuarine Coastal and Shelf Science*. 86.3
- ³¹ Institute for Fisheries Resources. 1996. Cost of Doing Nothing: The economic burden of salmon declines in the Columbia River basin. Report No. 1 of 3.
Online: <https://pcffa.org/wp-content/uploads/2016/10/CDNReport-Columbia.pdf>
- ³² MacGregor, R., Casselman, J., Greig, L., Dettmers, J., Allen, W.A., McDermott, L., and Haxton, T. 2013. Recovery Strategy for the American Eel (*Anguilla rostrata*) in Ontario. Ontario Recovery Strategy Series. Prepared for Ontario Ministry of Natural Resources, Peterborough, Ontario. x + 119 pp. P-45.
- ³³ MacGregor, R., Haxton, T., Greig, L., Casselman, J.M., Dettmers, J.M., Allen, W.A., Oliver, D.G., and McDermott, L. 2015. The demise of American Eel in the upper St. Lawrence River, Lake Ontario, Ottawa River and associated watersheds: implications of regional cumulative effects in Ontario. Pages 149–188 in N. Fisher, P. LeBlanc, C. A. Rose, and B. Sadler, editors. Managing the impacts of human activities on fish habitat: the governance, practices, and science. American Fisheries Society, Symposium 78, Bethesda, Maryland.
- ³⁴ Carew-Reid, J., Kempinski, J., and Clausen, A. 2010. Biodiversity and Development of the Hydropower Sector: Lessons from the Vietnamese Experience – Volume I: Review of the Effects of Hydropower Development on Biodiversity in Vietnam. ICEM – International Centre for Environmental Management, Prepared for the Critical Ecosystem Partnership Fund, Hanoi, Viet Nam.
Online: <https://www.icem.com.au/documents/biodiversity/bioHPdevt/Volume%20I%20Biodiversity%20and%20Development%20of%20hydropower-Vietnam%20experience.pdf>
- ³⁵ Bodaly, R.A., Beaty, K., Hendzel, L., Majewski, A., Paterson, M., Rolfhus, K., Penn, A., St. Louis, V., Hall, B., Matthews, C., Cherewyk, K., Mailman, M., Hurley, J., Schiff, S., Venkiteswaran, J. Experimenting with Hydroelectric Reservoirs, 3 pp. Environment Science and Technology. American Chemical Society. Online: <http://library.certh.gr/libfiles/PDF/GEN-PAPYR-1135-ENVIRONMENTAL-by-BODALY-in-EST-V-38-ISS-18-PP-346A-352A-Y-2004.pdf>
- ³⁶ Kelly, C.A. et al. (1997). Experimental Lakes Area Reservoir Project (ELARP). Increases in fluxes of greenhouse gases and methyl mercury following flooding of an experimental reservoir, *Environ. Sci. Technol*, 31(5), 1334-1344, doi:10.1021/ES9604931.
- ³⁷ Wilcove D.S., Rothstein, D., Dubow, J., Phillips, A., Losos, E. 1998. Quantifying threats to imperiled species in the United States *BioScience* 48: 607–615. Online: <http://faculty.washington.edu/timbillo/Readings and documents/global div patterns origins/general tropical biodiv conservation/Wilcove et al Bioscience 1998 Quantifying threats to biodiv.pdf>
- ³⁸ World Commission on Dams. 2000. Introduction to Global Change, Working Paper of the World Commission on Dams, Secretariat of the World Commission on Dams, Cape Town, South Africa.
- ³⁹ Ontario Ministry of Natural Resources 2013. *Restoration of Atlantic Salmon to Lake Ontario: past, present and future*.
- ⁴⁰ MacGregor, R., Casselman, J., Greig, L., Dettmers, J., Allen, W.A., McDermott, L., and Haxton, T. 2013. Recovery Strategy for the American Eel (*Anguilla rostrata*) in Ontario. Ontario Recovery Strategy Series. Prepared for Ontario Ministry of Natural Resources, Peterborough, Ontario. x + 119 pp. P-45.
- ⁴¹ Golder Associates Ltd. 2011. Recovery Strategy for Lake Sturgeon (*Acipenser fulvescens*) – Northwestern Ontario, Great Lakes-Upper St. Lawrence River and Southern Hudson Bay-James Bay populations in Ontario. Ontario Recovery Strategy, Series. Prepared for the Ontario Ministry of Natural Resources, Peterborough, Ontario. vii + 77 pp.
- ⁴² Committee on the Status of Endangered Wildlife in Canada (COSEWIC). 2006. COSEWIC assessment and update status report on the lake sturgeon *Acipenser fulvescens* in Canada. Ottawa. Online: http://www.sararegistry.gc.ca/document/default_e.cfm?documentID=1376

-
- ⁴³ Haxton, T.J., Friday, M., Cano, T. and Hendry, C. 2014. Variation in lake sturgeon (*Acipenser fulvescens* Rafinesque, 1817) in rivers across Ontario, Canada
- ⁴⁴ 2025 Annual Planning Outlook, April 2025, P-78/87.
- ⁴⁵ Scherer, L., & Pfister, S. (2016). Hydropower's Biogenic Carbon Footprint. *PLOS ONE*, 11(9), e0161947. <https://doi.org/10.1371/journal.pone.0161947>
- ⁴⁶ DelSontro, Tonya, McGinnis, Daniel F., Sobek, Sebastian, Ostrovsky, Ilia, Wehrli, Bernhard, 2010, Extreme Methane Emissions from a Swiss Hydropower Reservoir: Contribution from Bubbling Sediments. Online: <https://pubs.acs.org/doi/full/10.1021/es9031369>
- ⁴⁷ Maeck, A., DelSontro, T., McGinnis, D.F, Fischer, H., Flury, S., Schmidt, M., Fietzek, P. and Lorke, A., 2013. Sediment Trapping by Dams Creates Methane Emission Hot Spots, *Environmental Science and Technology*, 8130-8137, Online: <http://www.dx.doi.org/10.1021/es4003907>
- ⁴⁸ Catherine M. Pringle, Mary C. Freeman, Byron J. Freeman, Regional Effects of Hydrologic Alterations on Riverine Macrobiota in the New World. *BioScience*, Volume 50, Issue 9, September 2000, Pages 807-823. [https://doi.org/10.1641/0006-3568\(2000\)050\[0807:REOHAQ\]2.0.CO;2](https://doi.org/10.1641/0006-3568(2000)050[0807:REOHAQ]2.0.CO;2)
- ⁴⁹ He, F., Zarfl, C., Tockner, K. et al. Hydropower impacts on riverine biodiversity. *Nat Rev Earth Environ* **5**, 755–772 (2024). <https://doi.org/10.1038/s43017-024-00596-0>
- ⁵⁰ Glowa, S. et al, 2022. Evaluating the risk of fish stranding due to hydropeaking in a large continental. river. <https://harvest.usask.ca/items/8d5a76b4-bc0e-488f-9916-7bb7596bff19>
- ⁵¹ Maavara T, et al. River dam impacts on biogeochemical cycling. *Nature Reviews Earth & Environment*. 2020;1:127–142. <https://eprints.whiterose.ac.uk/id/eprint/156411/8/NATREVEARTHENVIRON-19-043%20Maavara%20-%20for%20Lee.pdf>
- ⁵² Schmutz S, Moog O, eds. *Riverine Ecosystem Management*. Springer; 2018. https://www.researchgate.net/publication/325032930_Riverine_Ecosystem_Management_Science_for_Governi ng_Towards_a_Sustainable_Future
- ⁵³ St. Louis VL, et al. The Rise and Fall of Mercury Methylation in an Experimental Reservoir. *Environmental Science & Technology*. 2004;38(8):2559–2566. https://www.sfei.org/sites/default/files/events/St.Louis_et_al_2004.ES%26T.pdf