May 12, 2023

Submitted online to the Environmental Registry of Ontario

RE: Independent Electricity System Operator (IESO) *Pathways to Decarbonization Study* and associated Ontario Power Generation (OPG) *Made-in-Ontario Northern Hydroelectric Opportunities* Report (ERO Notice 019-6647)

To Whom It May Concern:

Thank you for the opportunity to comment on the IESO *Pathways to Decarbonization Study*, and the associated supporting reports, including the *Made-in-Ontario Northern Hydroelectric Opportunities* Report.

We are submitting this feedback in our capacities as WCS Canada scientists conducting research on species and ecosystems to inform conservation decisions. WCS Canada (wcscanada.org) is a national non-government organization that has been engaged in Ontario since 2004, with research and conservation priorities largely focused on the far north region. As some of the few scientists with continuous presence in the region, we lead ongoing field-based research programs that are currently focused on large mammals, freshwater fish, and peatlands; we support and collaborate with First Nations on community-based research and monitoring projects; and we support and collaborate with academic, government researchers, and First Nations conducting ecological studies in the region. Specifically relevant to this *Pathways to Decarbonization Study*, we have experience conducting on-the-ground fisheries research around hydropower facilities, in partnership with Moose Cree First Nation. WCS Canada also has a long-term and consistent engagement with project- and regional-level provincial and federal impact assessments, particularly for infrastructure projects in northern Ontario, including transmission projects such as the Wataynikaneyap Power Transmission Project.

We support actions to help Ontario and Canada meet their climate commitments, including efforts to reduce emissions across all sectors, and protecting natural carbon stores and sinks such as the northern forests and peatlands in the far north in Ontario. Therefore, we support transitioning Ontario's electricity production to lower emitting sources. However, **our overarching concern is that the IESO Pathways to Decarbonization Study is currently very narrowly scoped on maintaining business-as-usual approaches, and that the proposed approach will therefore fail to meet climate commitments and targets.** Meeting climate commitments and targets would require a strategy to govern the transition to a low-carbon electricity grid that would be sufficiently broad to include: 1) planning for protecting important natural carbon stores and sinks; 2) considering the full balance of emissions of all proposed projects including any emissions from changes in land use;

and 3) considering options and pathways to move to a circular economy model and reduce the demand for new materials. This reduction in the demand for new materials is critical to make the transition of the electrical grid feasible from a supply chain and environmental impacts perspective.

We provide some more specific comments and recommendations regarding the *IESO Pathways to Decarbonization Study* and the accompanying *Made-in-Ontario Northern Hydroelectric Opportunities Report* below.

1. The demand forecasts in the *Pathways to Decarbonization Study* are too narrowly scoped. We recommend including a scenario that considers mechanisms such as increased public transportation and decreased manufacturing of new materials through a shift to a circular economy.

One of our concerns about the IESO *Pathways to Decarbonization Study* is the narrow scope of the demand forecasts. The demand forecasts are a critical part of all modelling and assessments that follow, because they provide the target number for how much electricity will be needed for the various scenarios of electricity production from different sources. From the limited information provided in the Study about the two demand forecasts that were used, our understanding is that the IESO *Pathways to Decarbonization Study* assumes for both, there will be the maximum energy efficiency achievable as identified through the IESO 2019 *Achievable Potential Study*[1]. Although we agree that using the maximum energy efficiency achievable from this 2019 *Achievable Potential Study* makes sense as an assumption in the demand forecasts, the energy efficiency measures considered in that 2019 *Achievable Potential Study* were limited to cost-effective measures. They were also restricted solely to approaches that make existing business-as-usual more energy efficient, such as increased efficiency of appliances, tools, and insulation systems. We suggest that a more appropriate and comprehensive approach in the study would be include at least one scenario also includes decreases in per capita consumption, in addition to the energy efficiency measures from the 2019 *Achievable Potential Study.*

To achieve a future that avoids climate catastrophe and addresses other global environmental challenges such as biodiversity loss and pollution, there will also need to be fundamental shifts in some of the patterns of consumption. Energy efficiency with current consumption patterns will not be sufficient without curtailing of consumption rates. For example, investments in reliable mass transit options and thoughtful community planning will be needed to decrease the absolute number of personal vehicles manufactured and on the roads. Investments in a circular economy and more efficient use and recycling of existing materials is critical to reduce the need for the manufacturing of new materials. These changes to communities and economies are needed together with increased energy efficiency.

We therefore suggest that a more appropriate and comprehensive approach in the current *Pathways to Decarbonization Study* would be include at least one scenario that includes decreases in per capita consumption through some of these broader mechanisms like changes to community planning and a shift to a circular economy.

[1] https://www.ieso.ca/2019-conservation-achievable-potential-study

The inclusion of a low-consumption scenario is important not only as a point of comparison (especially respecting myriad impacts associated with continued and unchecked growth), but also to reflect the reality that we are unlikely to meet climate change targets and maintain valued natural systems without these changes to communities and economies. The projected land area needed for new infrastructure to meet the projected energy demand in the current *Pathways to Decarbonization Study* is fourteen times the size of Toronto. Without a low-consumption scenario as among plausible scenarios of alternate futures, it is impossible to explore whether and how this land area needed for new infrastructure could be reduced. This would be misleading to the Ontario public.

2. We disagree with the recommendation from OPG to remove the prohibition on hydropower in provincial parks and conservation reserves in the Made-in-Ontario Northern Hydroelectric Opportunities Report.

Hydropower dams are long-lasting structures that fundamentally change the ecosystem in which they are situated. They have significant impacts on the waterways and surrounding landscapes, including blocking the movements fish and other aquatic animals[2]; creating impoundments that flood the land upstream of the facilities, causes changes to the thermal profile of the water, and increase concentrations of the toxin methylmercury in the water system for decades[3]; and dramatically altering the patterns of water flow below the facilities, often in a way that fundamentally changes the aquatic community[4] and reduces quality habitat like fish spawning habitat[5].

Since hydropower facilities cause profound changes to the watershed both upstream and downstream, site-specific considerations aren't appropriate, and need to be considered at the scale of the watershed, in partnership with Indigenous governments, and with consultation from local communities. Siting decisions also need to consider the cumulative effects of other developments existing or planned in the watershed scale, to determine whether the watershed will be able to support the additional hydropower facility while also continuing to support other values and objectives important for the communities living in and around the watershed.

The objectives of Ontario provincial parks are: "1) To permanently protect representative ecosystems, biodiversity and provincially significant elements of Ontario's natural and cultural heritage and to manage these areas to ensure that ecological integrity is maintained; 2) To provide opportunities for ecologically sustainable outdoor recreation opportunities and encourage

[2] Zarfl et al. 2019. Future large hydropower dams impact global freshwater megafauna. Nature 18531. https://www.nature.com/articles/s41598-019-54980-8

[3] Calder et al. 2016. Future impacts of hydroelectric power development on methylmercury exposures of Canadian Indigenous communities. Environmental Science and Technology 50: 13115-13122. https://pubs.acs.org/doi/abs/10.1021/acs.est.6b04447

[4] Freeman et al. 2003. Ecosystem-level consequences of migratory faunal depletion caused by dams. American Fisheries Society Symposium 35: 255-266. https://scholarworks.umass.edu/fishpassage_journal_articles/1264/

[5] Barbarossa et al. 2020. Impacts of current and future large dams on the geographic range connectivity of freshwater fish worldwide. Proceedings of the National Academy of Sciences of the United States of America 117: 3648-3655. https://www.pnas.org/doi/10.1073/pnas.1912776117

associated economic benefits; 3) To provide opportunities for residents of Ontario and visitors to increase their knowledge and appreciation of Ontario's natural and cultural heritage; and 4) To facilitate scientific research and to provide points of reference to support monitoring of ecological change on the broader landscape."[6] Accordingly, it is difficult to envision a scenario where new hydropower development within a provincial park would be compatible with these objectives, and would be viable outcome from a watershed planning perspective.

3. We disagree with the recommendation from OPG in the *Made-in-Ontario Northern Hydroelectric Opportunities Report* to revisit the 25 MW limit on the size of hydroelectric facilities in northern Ontario, in the absence of a comprehensive study of environmental and social implications.

In the *Made-in-Ontario Northern Hydroelectric Opportunities Report*, OPG notes that larger facilities reduce the price per MW costs, and therefore recommends revising the 25 MW limit on the size of hydroelectric facilities in northern Ontario.

However, the document provides no context for what studies or information would inform a decision to revisit the limit, and we have concerns about recommendation both to revise the limit, and about the lack of justification for doing so. Our recommendation is that the 25 MW limit should only be revisited when there is clear justification based on comprehensive study of environmental and social implications, rather than based solely on price per MW. For example, if it can be demonstrated clearly through a comprehensive study that a single, larger facility will have a smaller cumulative environmental impact on the waterway than several smaller facilities, then this would be the only scenario in which revisiting the 25 MW limit, in partnership with Indigenous governments and in consultation with local communities and scientific experts, should be considered. In any other case, we oppose revisiting the 25 MW limit in northern Ontario.

In general, larger facilities have a larger environmental footprint, and as noted above, the environmental impacts can be considerable. Particularly in the relatively flat topography of northern Ontario, reservoir flooding tends to cover a large area of land. Northern Ontario is also already a geographic area with relatively high levels of methylmercury in many waterways and subsistence fish, due to global deposition patterns, and qualities of the local geology and soils[7]. Particularly based on this existing concern about methylmercury, the risks of any new hydropower need to be carefully considered in the context of current methylmercury levels, and potential elevations from new hydropower development.

Indigenous Peoples are already disproportionately affected by methylmercury from hydropower facilities[3], and have inherent and Treaty Rights to healthy subsistence fisheries. Therefore, it is also crucial to consider environmental impacts, and potential impacts on Treaty Rights for any decision for new hydropower – and especially for larger facilities in northern Ontario, given these existing issues.

[6] https://www.ontario.ca/laws/statute/s06012

[7] Ponton et al. 2022. Mercury, selenium and arsenic concentrations in Canadian freshwater fish and a perspective on human consumption intake and risk. Journal of Hazardous Materials Advances 6: 100060. https://www.sciencedirect.com/science/article/pii/S2772416622000171

4. It is critical that the climate impacts of any new hydropower project are identified and considered during planning phases.

Neither *the Made-in-Ontario Northern Hydroelectric Opportunities Report* nor the *Pathways to Decarbonization Study* consider the emissions impacts of disturbances to the landscape, but this is a critical component of any comprehensive decarbonisation plan. Natural ecosystems store and sequester vast amounts of carbon, and this carbon tends to be lost through disturbances to the landscape. In particular, flooding reservoirs for hydropower can have dramatic impacts on greenhouse gas emissions, particularly in the first few decades after flooding[8]. The Hudson Bay Lowlands (the second largest peatland complex in the world) is located in northern Ontario. Hydropower development is known to cause total carbon loss through both direct removal of peat and indirect carbon loss through vegetation clearance, drainage, and flooding[9]. To justify the proposed scenarios as a viable approach to reducing overall emissions, these landscape impacts need to be calculated and considered.

5. A distributed system would decrease the environmental impacts of transmission lines, particularly for northern Ontario, relative to the scenarios outlined in the *Pathways to Decarbonization Study*.

Overall, there is a heavy reliance in the IESO *Pathways to Decarbonization Study* on large northern hydropower development, and then large transmission projects to connect these remote facilities to the existing power grid to transport energy to southern markets. This approach ignores the potential for investment in approaches like distributed systems to reduce the need for this scale of transmission. We recommend a broader scoping of options for distributed systems, with more and smaller scale electricity generation incorporated into communities, such as smaller scale solar and wind, rather than reliance on new building of massive remote projects and the accompanying massive transmission and infrastructure (such as roads) that this would require. A distributed system could meet electricity needs more locally, with a smaller infrastructure footprint, and would particularly reduce the disturbance and impact to intact boreal and peatland ecosystems in northern Ontario relative to the proposed transmission lines and infrastructure outlined in the current scenarios.

In conclusion, the current *Pathways to Decarbonization Study* identifies that an energy mix for Ontario's electricity grid is feasible without natural gas within a business-as-usual economic and social approach. However, this falls well short of a comprehensive approach to examining decarbonisation and exploring the full set of options for meeting climate commitments and targets within the electricity system.

[8] Lavasseur et al. 2021. Improving the accuracy of electricity carbon footprint: Estimation of hydroelectric reservoir greenhouse gas emissions. Renewable and Sustainable Energy Reviews 136: 110433. https://www.sciencedirect.com/science/article/pii/S1364032120307206

[9] Harris et al. 2021. The essential carbon service provided by northern peatlands. Frontiers in Ecology and the Environment 20: 222-230. https://esajournals.onlinelibrary.wiley.com/doi/10.1002/fee.2437

Overall, we recommend that the IESO *Pathways to Decarbonization Study*: 1) Be expanded to include a more comprehensive assessment of tools and approaches to decarbonisation beyond limited business-as-usual approaches explored in current version; and 2) All scenarios need to consider the emissions impacts of the proposed development on the landscape as part of the assessment.

Further, we oppose recommendations to increase the size and available locations for hydropower development without a robust environmental assessment and clear rationale based in environmental and community values within the associated *Made-in-Ontario Northern Hydroelectric Opportunities Report*.

Thank you for your consideration of our recommendations and concerns. We welcome opportunities to engage in any discussions regarding our submission.

Sincerely,

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