April 27, 2016

Michael Lyle
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Dear Mr. Lyle,

SUBJECT OWA Input to the Draft Ontario Planning Outlook

Thank you for the opportunity to provide initial input and advice in the development of the IESO "Technical Paper", as informed by the Ontario Planning Outlook (OPO) presentation posted on the IESO website. It is my understanding that the final document is to be the basis of the IESO submission to the Ministry of Energy to support the development of the next Long Term Energy Plan (LTEP) through a public engagement process. As we have discussed previously, the OWA requests the opportunity to review and comment on the actual draft Technical Paper to assist with ensuring that the information is factually accurate with respect to waterpower.

In my view, the following three (3) key themes should be incorporated into the OPO and resultant Technical Paper:

- Commitments in the 2013 LTEP;
- New Information since the 2013 LTEP; and
- Frameworks for comparative analysis.

Our recommendations in each of these areas are provided below.

1. *Commitments in the current LTEP*

Consistent with the current LTEP, hydroelectricity should be addressed as a separate theme. There should be specific factual updates to the key areas included in the current LTEP for hydro, including:

- Progress against the 9,300 MW target

The 2013 LTEP establishes a target of 9,300 MW of Ontario-based hydroelectric generation to be in service by 2025. The most recent IESO quarterly update indicated an installed capacity of 8,432 MW connected to the IESO controlled grid. The OPO should detail the commissioned, contracted and directed hydroelectric

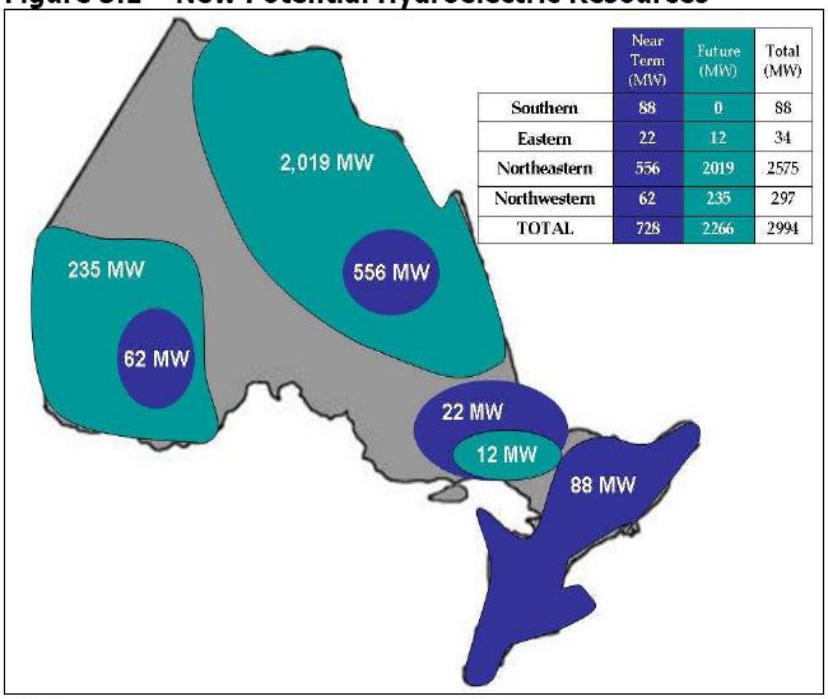
resources, include an analysis of anticipated attrition and provide an indication of the hydro still to be built and procured to achieve the target.

- Large and small hydro potential in northern Ontario

The current LTEP specifies that "the ministry is reviewing the potential for both large and small hydroelectric sites in Northern Ontario." As was detailed in the first Integrated Power System Plan (2007), Ontario's north holds significant untapped waterpower resources (see figure below, excerpted from the IPSP).

Figure 1 – Hydroelectric Potential Included in the IPSP

Figure 3.1 – New Potential Hydroelectric Resources



	Near Term (MW)	Future (MW)	Total (MW)
Southern	88	0	88
Eastern	22	12	34
Northeastern	556	2019	2575
Northwestern	62	235	297
TOTAL	728	2266	2994

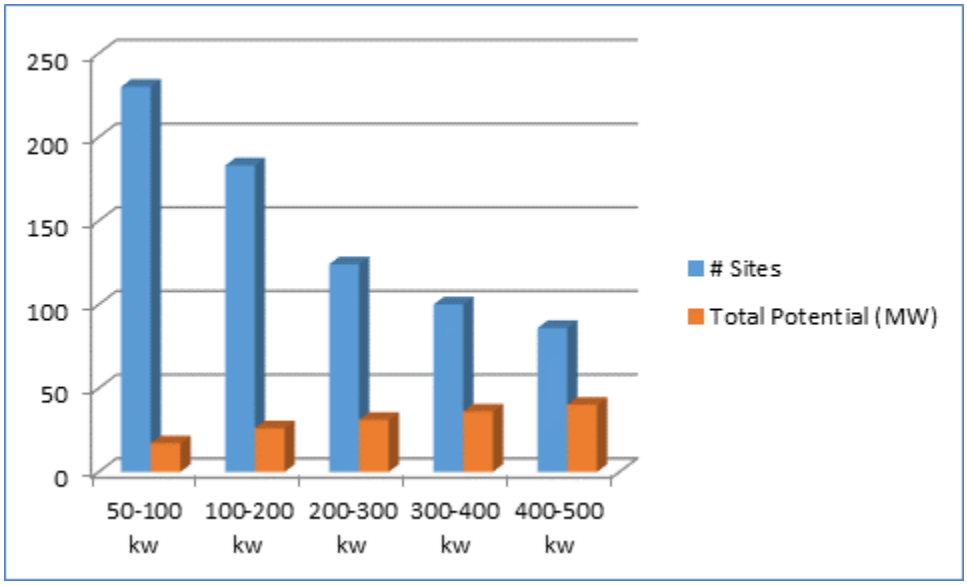
Source: OPA

The OPO should specifically include an updated analysis of this potential, particularly given that options for out-of-province waterpower are being contemplated to meet supply needs.

- Development and potential at existing infrastructure

The LTEP also indicates that "the ministry will continue to work with the sector to examine the use of existing dams to generate hydroelectric power". As evidenced in the results of the first Large Renewables Procurement and anticipated in the outcome of the current Feed in Tariff, investment at existing infrastructure is increasing. As indicated in Figure 2, there is significant small hydro potential at existing dams. The OPO should specifically reference this inventory of opportunities.

*Figure 2 – Potential at existing infrastructure**



*subset of undeveloped dams under 500 kW only

Note that both Parks Canada and the Ministry of Natural Resources and Forestry have recently proactively made infrastructure available for waterpower development, with several sites having the capacity to support facilities of 1-5 MW in size. In addition, the OPO should include specific emphasis on the importance of redeveloping existing hydro generating facilities.

- The role and inventory of pumped storage in the province.

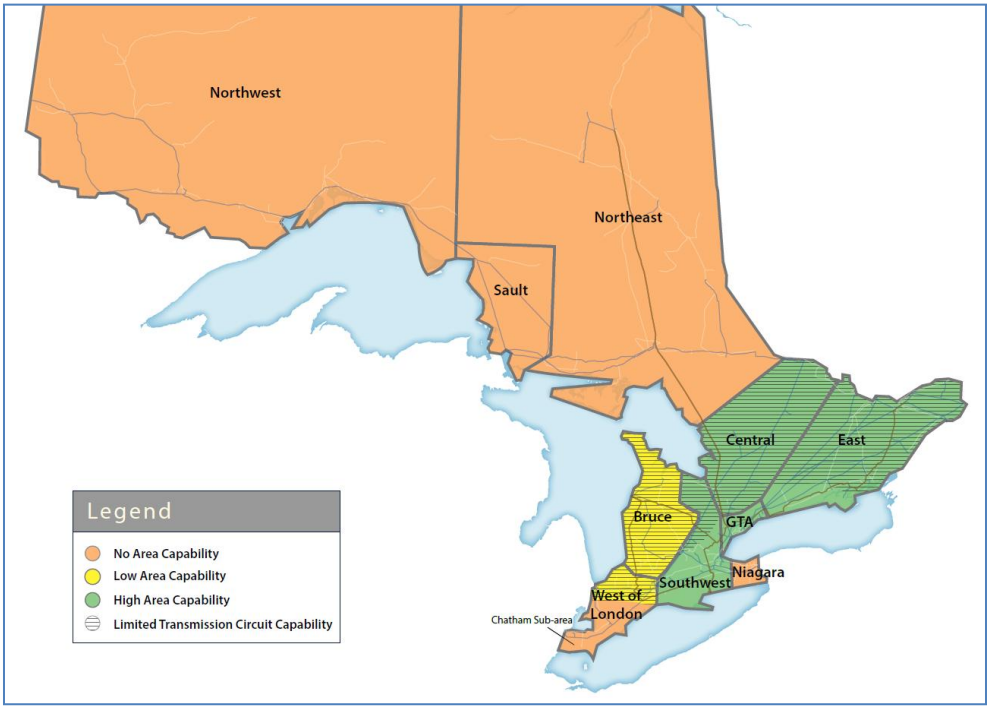
Finally, the LTEP indicates that "Pumped Storage projects will continue to be examined to determine their cost effectiveness and their ability to provide value to ratepayers". The OWA previously provided the Ontario Power Authority (OPA) with an extensive inventory of more than 5,000 MW of pumped storage potential across the province. The OPO should specifically address the practical potential of pumped storage to contribute to Ontario's long term electricity requirements and the procurement options for the attributes provided.

2. *New Information since the 2013 LTEP*

- Under-subscription of procurement allocations and transmission capacity

In a number of recent procurements, waterpower has been unable to meet the MW targets established (e.g. HESOP, LRP). This has been due largely if not entirely to the requirement that connection capacity be available at the time of contracting rather than at the time of commissioning. According to the most recent information posted by the IESO (see below), it is questionable whether there remains capacity across the province to connect even the renewable energy directed to be procured under LRP II and FIT 5.

Figure 3 – Connection Capacity Availability – April 2016



The OPO should specifically identify this key impediment to waterpower development in particular, the need for processes to take into account transmission capacity at the time of commissioning rather than at contracting and identify options to address the issue. For example, a linkage of waterpower and transmission development timelines for priority transmission projects such as the East West Tie would enable significant new investment.

- Waterpower development timelines and costs

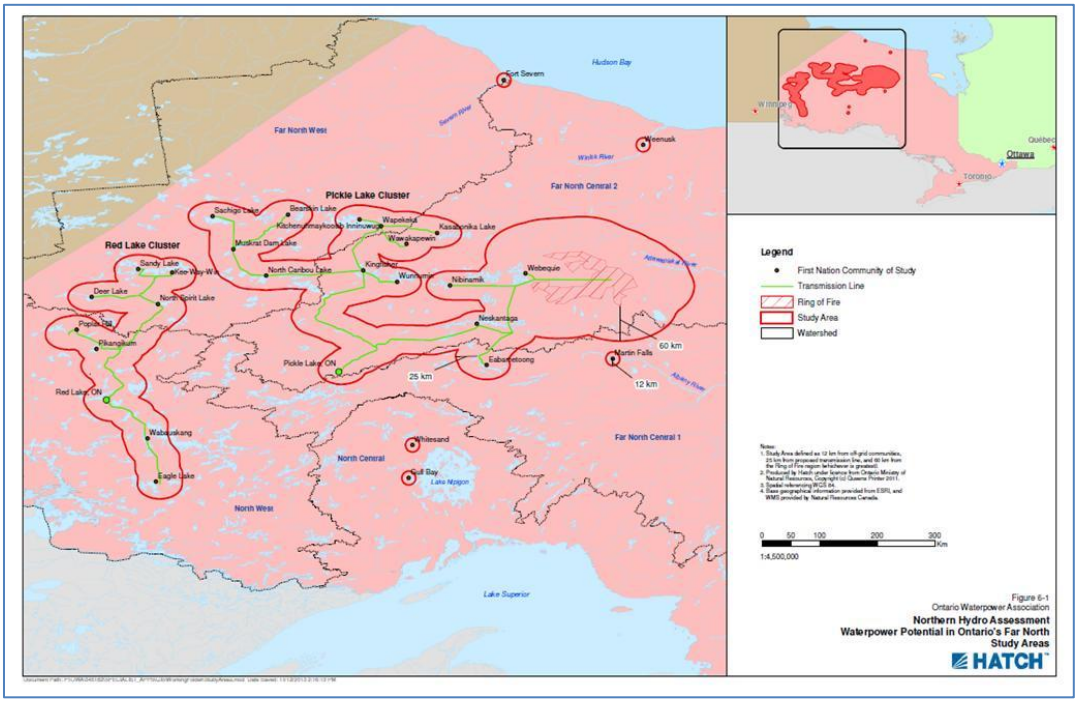
In June 2013 the Minister of Energy issued a Directive to the OPA that, among other things, provided for the extension of the Commercial Operation Date for hydroelectric facilities from five (5) to eight (8) years "in acknowledgement of the unique regulatory approvals requirements for waterpower projects...". All subsequent procurements have adopted the eight (8) year development timeline for waterpower. The OPO should specifically address the longer lead time for waterpower development and factor this into the planning process – for example, to meet a supply requirement in 2025, waterpower would have to be procured in 2016/2017.

The OWA has undertaken a cost input analysis of waterpower projects developed or in development in Ontario since 2009 and has determined that key costs drivers are related to the regulatory approvals process, construction and connection. Moreover, permitting and approvals requirements are having a direct impact on construction costs (e.g. timing windows). While the OWA continues to work with line Ministries to advance regulatory rationalization, connection costs remain a key concern and should be specifically identified as a risk factor in the OPO.

- Ontario's Far North

In 2014, the OWA published, in collaboration with the IESO and the Ministries of Energy and Natural Resources, a report updating the waterpower potential in Ontario's Far North (see below). Included in the report is an updated inventory of waterpower potential and cost estimates for sites in proximity to Remote Communities, the Ring of Fire and in the Moose River Basin

Figure 4 – Waterpower in Ontario's Far North



The OWA has since been working directly with remote First Nations, Aboriginal organizations and transmission proponents to support the inclusion of waterpower development opportunities in land use planning, energy planning and environmental assessment. The OPO should specifically include the outcomes of this publication, particularly with respect to the government's commitment to extend transmission to remote communities.

- Key policy changes of relevance to increasing waterpower's potential

Indirectly related to the planning outlook are a number of key advancements led by the Ministry of Natural Resources and Forestry (MNRF), including:

- Provision for development in excess of 25 MW in the Northern Rivers (MNRF);
- Precedent for development within Parks and Protected areas (Newpost Creek);
- Potential for increased operational flexibility/peaking at existing facilities (review of Water Management Plans for existing facilities); and
- Improved access to MNRF structures (>200) for waterpower development.

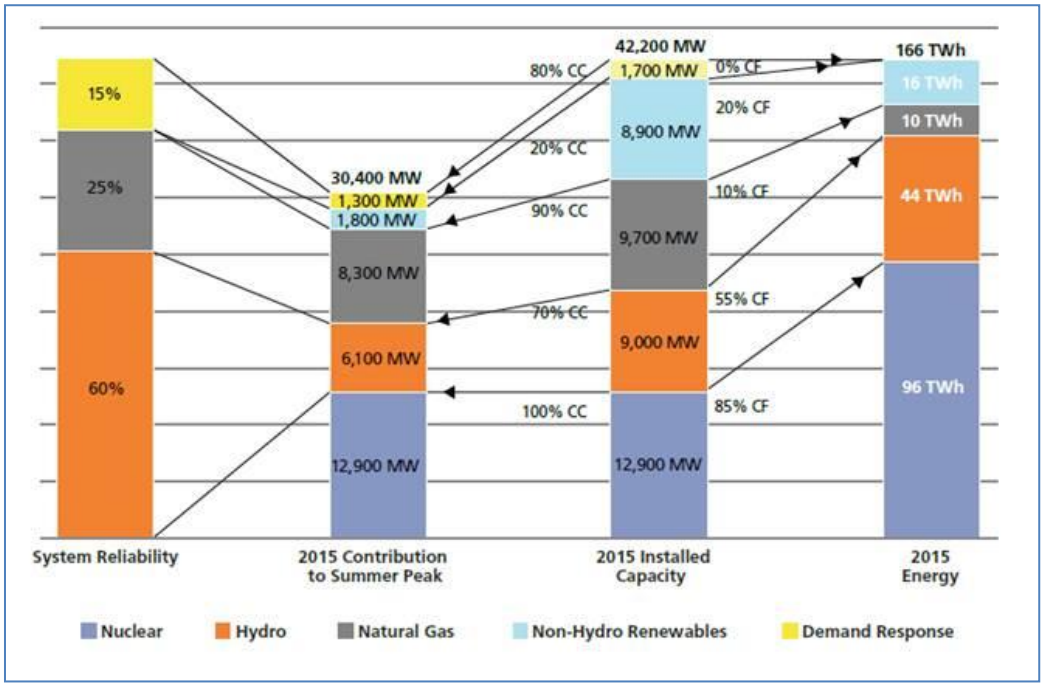
Individually and collectively these initiatives can enable the expansion of waterpower development and generation in the province. The OPO should recognize these key policy changes and resultant opportunities. The OWA can provide additional details with respect to this generation potential.

3. Frameworks for comparative analysis

As has been done in the past by the OPA, a fact-based comparative analysis of electricity supply options for the future should be an essential component of the outlook provided to the Ministry, both to support public engagement as well as decision making. It is recommended that the OPO apply the following frameworks over the long term planning horizon (with examples given):

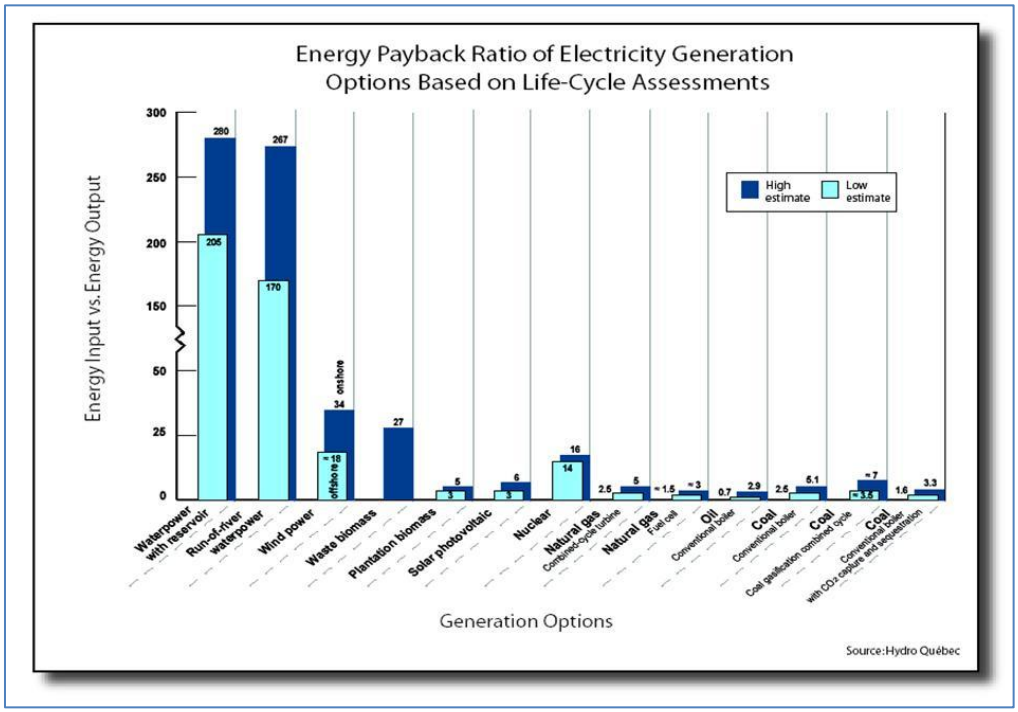
- Electricity Values (Capacity, Energy, Contribution to Peak, System Reliability)

Figure 5 – Electricity Values



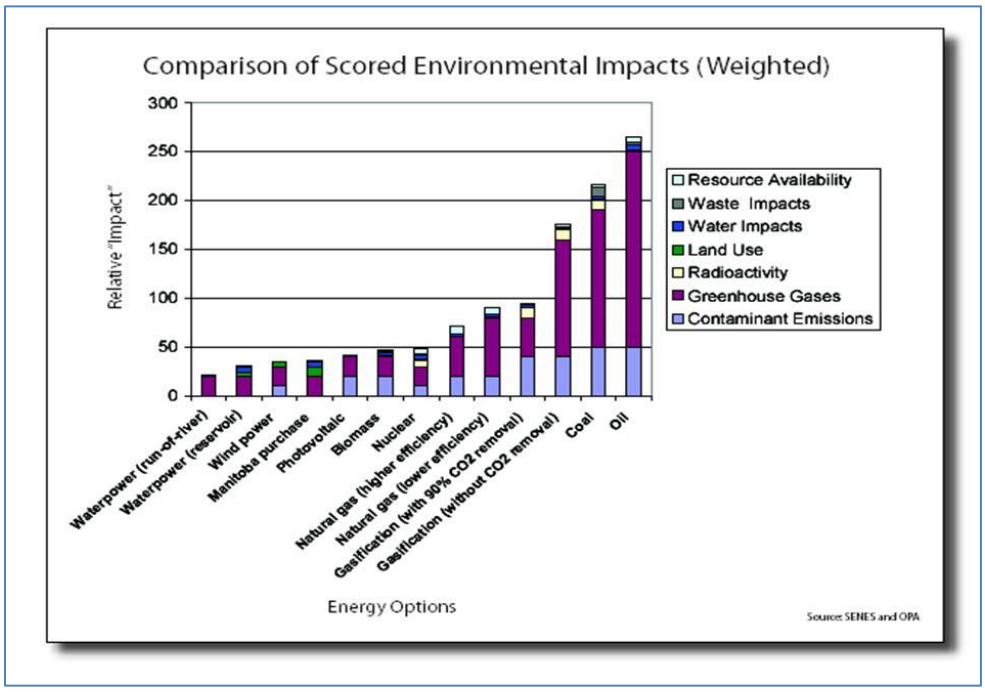
- Life Cycle Analysis (lifespan of assets, energy/cost contributions over time, decommissioning)

Figure 6 – Energy Payback Values



- Environmental Cost Accounting (comparison of environmental costs – carbon, water/land use, waste)

Figure 7 – Environmental Values



In each of these analytical frameworks, waterpower's value relative to alternatives is evident. As the imperative of climate change influences provincial policy, the importance of the energy, economic and environmental attributes of waterpower will only increase.

In summary, it is recommended that the Ontario Planning Outlook include:

- a separate and distinct section focused on hydroelectricity;
- details of the commissioned, contracted and directed hydroelectric resources and an indication of the hydro still to be built and procured to achieve the target;
- an updated analysis of waterpower potential in northern Ontario;
- an inventory of opportunities for retrofitting existing infrastructure;
- emphasis on the importance of redeveloping existing hydro facilities;
- details of the practical potential of pumped storage to contribute to Ontario's long term electricity requirements and the procurement options for the attributes provided;
- an analysis of the issue of the timing of transmission capacity for waterpower, the need for concurrent rather than sequential development and options to address the issue;
- consideration of the longer lead times for waterpower development in the context of planning horizons;
- an identification of the issue of connection costs;
- the findings of the OWA's "Waterpower in the Far North" report;
- recognition of the key MNRF policy changes and resultant waterpower opportunities; and
- a framework for the evaluation of generation options that includes electricity values, lifecycle analysis and environmental cost accounting.

Thank you for the opportunity to provide initial input. I look forward to continuing to contribute to the process.

Paul Norris
President
Ontario Waterpower Association

Copy: OWA Board of Directors