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2 August 2016

The Honourable Glenn Thibeault
Minister of Energy
By Email: Glenn.Thibeault@Ontario.ca

Re: ORA Issues and Concerns regarding Hydroelectric in the Renewable Energy Mix

Dear Minister Thibeault:

Ontario Rivers Alliance (ORA) is a Not-for-Profit grassroots organization acting as a voice for several stewardships, organizations, and private and First Nation citizens who have come together to protect, conserve and restore healthy river ecosystems.

ORA would like to congratulate you on your recent appointment as Minister of Energy. You have taken on a very challenging file; however, there is no one more capable of restoring public support and confidence in electricity generation and supply in Ontario. We look forward to working with you to ensure reliable and sustainable clean energy for our present and future generations.

ORA requested a meeting with Minister Chiarelli in a letter dated 9 March 2016, to discuss our concerns with the Feed-in-Tariff (FIT) program, and to find a better way forward. Minister Chiarelli responded in a letter dated 10 June 2016, and made it clear that the Ministry of Energy works with the IESO on the overall direction for renewable energy procurement, but that individual FIT program applications and contract offers are executed and managed by the IESO, and that the Government of Ontario is not the counterparty to FIT Contracts. However, ORA submits that the Government of Ontario must ensure that the IESO's values and principles are in alignment with an open and transparent government.

To facilitate the meeting, I have included some background information regarding our concerns, as well as recommendations - contained in Addendum 1.

ORA is very grateful for this opportunity to meet with you to discuss our issues and concerns.

Respectfully,

Linda Heron
Chair, Ontario Rivers Alliance
(705) 866-1677



Addendum 1

ORA Issues and Concerns

Background Information

Summary of Recommendations:

1. Hydroelectric that does not include fish passage, fish friendly turbines, and/or uses headponds/ reservoirs/impoundments/diversions, and/or peaking and cycling operating strategies should not be considered “renewable”, and must be excluded from any renewable energy mix.
2. Public consultation and competitive bidding must be an essential requirement under FIT policy to ensure the lowest cost to ratepayers, and to provide an opportunity for healthy discussion and input from the public before an application goes to Council for endorsement, or a FIT contract offered.
3. FIT should include kinetic and/or drainage and utility pipes, but exclude waterpower unless it is true run-of-river that includes effective upstream and downstream fish passage, and fish friendly turbines.
4. All FIT and LRP contracts should be up for renewal and reassessment every 20 years, or less.
5. Peaking incentives or disincentives must no longer be offered for hydroelectric facilities. Only a true run-of-river facility that includes effective upstream and downstream fish passage, fish friendly turbines, as well as secured up-front decommissioning provisions, should qualify for peaking incentives.
6. ORA is requesting an open and transparent process that allows government staff, the public, and Aboriginal peoples, current and full access to all documents filed with the government regarding power procurement contracts. There should be no information regarding power procurement or electricity pricing withheld from the public.

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Hydroelectric in the Renewable Energy Mix:

The claim of “clean and green hydro” is a common refrain coming from industry and governments; however, there are a multitude of studies that support the view that hydroelectric facilities today are neither clean nor green.

ORA has noticed that in your capacity as Minister of Energy you have not referred to hydroelectric as clean or green, and for that we are grateful. However, governments and utilities often use the term “clean” categorically and without caveat or qualification.¹ This is misleading - just because dams are not spewing out smoke does not mean they are clean or green. Indeed, waterpower has resulted in significant and ongoing impacts to fish and wildlife populations and habitat, to ecological processes, and to aboriginal communities for decades.²

In addition, when headponds or reservoirs are flooded, they can produce carbon dioxide and methane for decades, and possibly centuries.^{3,4} For instance,

With smaller dams storage becomes increasingly important. Reservoirs silting up or becoming overloaded with nutrients are common problems with major reservoirs and could be at least as serious where shallower bodies of water are created – the shallower a water body, the more easily eutrophic it can become. Likewise, methane generation occurs largely where water and sediment meet, and this means that a shallower water body is likely to release more methane [CH₄] per unit area than a deeper water body. Shallow reservoirs are not unlike paddy fields which are known to contribute substantially to methane emissions.....⁵

The effect of damming on methane emissions conducted in a central European impounded river revealed that the reservoir reaches are a major source of methane emissions and that areal emission rates far exceed previous estimates for temperate reservoirs or rivers. It showed that sediment accumulation correlates with methane production and subsequent ebullitive release rates. Results suggested that sedimentation-driven methane emissions from dammed river hot spot sites can potentially increase global freshwater emissions by up to 7%.⁶

The hydro lobby is very powerful and deep pocketed, and has gone to great lengths to ignore studies that clearly demonstrate the significant contribution that reservoirs make to total world GHG emissions.⁷ Shifts in water temperatures, or the availability of fresh water due to climate change could lead to reductions in electricity production capacity in more than two thirds of the world’s power plants, said a study from an Austrian research centre. In fact, Keywan Riahi, Director of the Energy Program at the International Institute for Applied Systems Analysis says, “power plants are not only causing climate change, but they might also be affected in major ways by climate”.⁸

The collateral environmental damage caused by dams and waterpower facilities has been well documented for decades⁹, 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), declining biodiversity^{10,11,12,13,14}, impaired water quality (including blue-green algae and elevation of mercury concentrations in fish tissue); and are key threats to imperiled aquatic species.^{15,16} Significant ecological damage from waterpower has been ongoing for many decades in Ontario^{17,18,19} and in other locations throughout the world.²⁰ In the past, attempts to effectively mitigate many of these impacts have been sporadic to non-existent in Ontario.



According to a new NASA and National Science Foundation funded study of more than half of the world's freshwater supply, climate change is rapidly warming lakes around the world, threatening freshwater supplies and ecosystems. The rate of warming is faster than either the ocean or the atmosphere²¹, with even greater warming in northern Canada²². As warming rates increase over the next century, algal blooms, which can rob water of oxygen, are projected to increase 20 percent in lakes, and emissions of methane will increase by 4 percent over the next decade.²³ Additionally, new studies are reporting on the increased evaporation rates from reservoirs²⁴, and there are increasing reports from around the globe of rivers and lakes drying up. Consequently, a rapidly changing climate may not support the hydro facilities we already have,²⁵ let alone support the notion that more hydroelectric dams and reservoirs are a good idea.

In fact, the World Economic Forum in its "Global Risks 2015" report lists "water crises" as its number one global risk in terms of impact – beating out the rapid spread of infectious disease, weapons of mass destruction, and failure of climate-change adaptation.²⁶

In addition, hydroelectric projects often overestimate economic benefits, and underestimate their far-reaching effects on biodiversity and critically important fisheries. Current site-specific assessments largely ignore cumulative impacts on hydrology and ecosystem services, in favour of profits, and to the detriment of the environment and citizens.

The obvious need for provision of safe and effective fish passage and fish friendly turbines at waterpower facilities has also been largely ignored in Ontario, by both the federal and provincial governments²⁷, where there are currently only 2 or 3 fish bypasses installed at hydroelectric facilities across the province. There are also no up-front dam decommissioning provisions required when a new or upgraded waterpower facility is approved – unlike in the mining industry where a mining company cannot commence or recommence mining operations until a certified Closure Plan and the associated Financial Assurance are in place.²⁸

ORA questions the label of “renewable” for hydroelectric that uses reservoirs/headponds when water quality, habitat and/or fisheries are degraded/jeopardized, and when water in its reservoirs is lost through evaporation.²⁹

Hydroelectric facilities should not be an “*eligible renewable energy resource if it will cause an adverse impact on instream beneficial uses or cause a change in the volume or timing of streamflow*”.³⁰ Hydroelectric can cause major damage to fish and wildlife, water quality, communities and businesses that rely on healthy rivers. It is also the only “renewable” energy source that can drive species toward extinction.

Rather than list all of the numerous negative impacts of hydro within the body of this letter, we refer you to our in-depth report entitled “Hydro Impacts 101 – The Trade-offs” (Report) for your review and consideration. This Report is a comprehensive compilation of a small representation of the multitude of studies describing the negative environmental and socio-economic impacts that are likely to result from both large and small waterpower facilities.

Recommendation: Hydroelectric that does not include fish passage, fish friendly turbines, and/or uses headponds/ reservoirs/impoundments/diversions, and/or peaking and cycling operating strategies should not be considered “renewable”, and should be excluded from any renewable energy mix.



Feed-in-Tariff (FIT) and Large Renewable Procurement (LRP):

Under FIT 4, the Independent Electricity System Operator (IESO) increased the price paid to waterpower operators from 14.8 cents/kWh in 2013, to 24.6 cents/kWh in 2016. This resulted in a huge increase of 40 waterpower applications under 500 kWh, with a total net output of 13 MW. It is not surprising that there is such a gold rush mentality with the generous increase in prices paid for these small hydroelectric facilities.

Ultimately there were 9 waterpower projects approved to receive FIT 4 Contracts, with a total Nameplate Capacity of 2.722 MW; however, the net output would more realistically generate a total of 500 kWh to 800 kWh of power. The approved FIT Contracts ranged from 35 kWh to 500 kWh. It is incomprehensible that the IESO would even consider such small waterpower projects when the total amount of power generated by these 9 waterpower projects is so disproportionate to the potential risk and impacts to Ontario riverine ecosystems over the next 40 years.

The high level information provided by the IESO makes it impossible to decipher the type of projects, or how many rivers would be impacted. If these smaller applications are for drainage and utility pipes, then ORA is very much in favor; however, if they are for hydroelectric dams that will block the passage of fish, chop up fish, and do not provide any up-front dam decommissioning provisions, then ORA is very much opposed.

These tiny projects will receive 40 year FIT Contracts, and in a warming world, these types of projects are ill-advised when extreme weather could impair riverine health and/or result in dam failure. For instance, in 2015, 18 dams were breached in one flood event in South Carolina.³¹ During the low flow season of summer or during drought conditions many true run-of-river, and even some peaking facilities, especially on smaller rivers, cannot operate and have to be shut down due to low flows.

These small waterpower projects would not contribute in any meaningful way to the power grid, but instead represent 40 years of death by a thousand cuts to many Ontario rivers. Even true run-of-river dams fragment habitat, chop up fish, and impede flow and vital nutrients to the downstream.

In fact, building a true run-of-river facility is often not cost-effective on smaller rivers because of the high cost of construction, and the small amount of power that would be produced as a result of low and unreliable flows – as low as 15 to 30% of Installed Capacity³². The daily, seasonal and annual variations of small hydro operations are intermittent and therefore not dependable. The electricity produced by small hydro is unreliable because it peaks during the high flows of spring when power is in low demand, 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 true run-of-river and even some peaking facilities, especially on smaller rivers, cannot operate efficiently, and often have to be shut down.

To further highlight this point, in 2014 an analysis was conducted by the Ontario Power Authority to determine the best means of connection for remote First Nation communities, and to enable forecasted growth to the Ring of Fire. It reported "*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.*"³³ In fact the recommendation of this report was to not build any new hydroelectric facilities, but primarily to build new transmission lines.



“The accumulated effects of multiple small-scale waterpower operations could amount to similar overall environmental degradation per unit of electricity generated as is caused by larger projects.”³⁴ In fact the cumulative impacts of many small projects can be even larger, depending on the circumstance.^{35,36}

ORA has been encouraged to see important changes to the LRP program that require proponent pre-approval, competitive bids, and reduced increases in waterpower procurement; however, there are still important improvements required.

Unlike the LRP process, FIT applicants are not required to consult with the public, and have already approached the municipality and received endorsement without the public having had any knowledge of the proposal, or opportunity for input.

Recommendations:

Public consultation and competitive bidding must be an essential requirement under FIT policy to ensure lowest cost to ratepayers, and to provide an opportunity for healthy discussion and input from the public before an application goes to Council for endorsement, or a FIT contract offered.

FIT should include kinetic and/or drainage and utility pipes, but exclude waterpower unless it is true run-of-river that includes effective upstream and downstream fish passage, and fish friendly turbines.

All FIT and LRP contracts should be up for renewal and reassessment every 20 years – or less.

Peak Demand Incentives and Disincentives:

The Green Energy Act and Green Economy Act offer peak demand incentives and disincentives, which encourage harmful daily peaking operating strategies at hydroelectric facilities. In order to maximize hydroelectric power generation and profits, a common operating strategy utilizes seasonal operating bands to peak on a daily basis. The strategy is to hold back water during off-peak hours, in order to produce power during peak demand hours. If a generator produces power for its own use, it will offset grid power costs – if a generator produces power to supply the grid it earns a higher price/profits.

For instance, Vale, in Sudbury, generates power at its Nairn Centre and High Falls Generating Stations, on the Spanish River, in order to “*offset power required from the provincial grid*”. “*Vale is responding to electricity market price/signals*.” “*When demand is high so is the price, and when demand is low the price is low. The provincial electricity demand varies considerably every day, and also changes with the seasons*”. *Vale’s generation operating strategy changed due to a change in allocation of Electricity Market charges that occurred in 2011.*³⁷

Vale informed ORA that it saves millions of dollars annually by producing more of their own power on very hot days when peak demand is greater. In order to achieve these savings Vale can and does use its seasonal operating bands on a daily basis in order to peak their facilities. This allows Vale, at will, to fluctuate water levels, with reports of fluctuations of up to 4 feet in a day – all without the benefit of an environmental assessment to determine the impacts. These extreme and intermittent fluctuations in water levels and flow velocity creates havoc on the riverine ecosystem when shoreline residents lose their docks, eggs from nesting loons are washed away, and water quality is degraded. These are only the visible and obvious impacts –



no one knows what the long-term impacts will be on the fishery, endangered species, and the riverine ecosystem.

Currently there is no regulatory requirement to undertake an environmental assessment that would gauge the impacts and/or trade-offs that these water management changes would have on the riverine ecosystem. Approval under the Waterpower Class Environmental Assessment is only required when physical changes to a facility would result in an increase in Installed Capacity of 25% or more.

Additionally, there is no approved Spanish and Vermilion Rivers Water Management Plan (SVWMP), as it has been in draft form since 2002, some 15 years. There is certainly no incentive for Vale to finalize the draft SVWMP when there is no authority or mechanism requiring compliance.

Also in this vein, the Enerdu Generating Station in Almonte was responsible for damage to the Appleton Wetland, a Provincially Significant Wetland, when it used seasonal operating bands on a daily basis to maximize power generation, and there are very likely many other facilities that have changed their operating strategies to take advantage of peak demand incentives.

Undoubtedly there has been untold damage resulting from the GEA - legislation purporting to protect our environment. It is no wonder that the public has lost confidence and there is so much local resistance to these “*renewable energy*” projects. The system is broken and must be reformed if we are to protect and conserve water - our most precious resource.

Recommendation: Peaking incentives or disincentives must no longer be offered for hydroelectric facilities. Only a true run-of-river facility that includes effective upstream and downstream fish passage, fish friendly turbines, as well as secured up-front decommissioning provisions, should qualify for peaking incentives.

Transparency:

Early in 2011, Xeneca Power Development Inc. (Xeneca) was awarded 19 FIT Contracts. In March of 2015, Xeneca informed stakeholders that it would be restructuring, and that it would cancel some of its FIT contracts. ORA attempted to obtain a list of terminated FIT Contracts from the IESO in the fall of 2015; however, we were informed that this was proprietary information and was not available to the public. Consequently, in February of this year, ORA filed a Freedom of Information Application (FIPPA) with the IESO in order to obtain a list of terminated FIT Contracts. On the 28th of May 2016 we received a partial list of 16, and on the 8th July 2016 we received the completed list of all 19 of Xeneca’s terminated FIT Contracts.

It is very disappointing that our organization had to resort to filing a FIPPA in the first place, considering this government ran on a platform of providing an open and transparent government. However, this important information was withheld from the public, as well as from the Ministry of Natural Resources and Forestry (MNRF), and apparently the Ministry of Environment and Climate Change (MOECC) as well.

The list of terminated FIT Contracts revealed that the last of Xeneca’s 19 FIT Contracts were terminated on 9 July of 2015, only 2 days after the Blanche River Environmental Report was formally rejected by the MOECC – the 4th in a row. ORA checked with the IESO, and the Manager of Renewable Energy Contracts informed us that once a FIT Contract is terminated, it cannot be reinstated.



Surprisingly, it appears that the MOECC and MNRF staff continued to work on Xeneca's project files for a year when there was no possibility of any of their 19 projects proceeding, and stakeholders have been left to twist in the wind for all that time. As a taxpayer and stakeholder, this is unacceptable.

Recommendation: ORA is requesting an open and transparent process that allows government staff, the public, and Aboriginal peoples, current and full access to all documents filed with the government regarding power procurement contracts. There should be no information regarding power procurement or electricity pricing withheld from the public.

Conclusion

The Ministry of Energy has included hydroelectric in its renewable energy mix, and the generous rates and peaking bonuses have encouraged a rash of new hydro facilities to be proposed, as well as upgrades and changes to operating strategies that allow facilities to hold water back from downstream flow in order to produce power during peak demand hours. Many power producers arbitrarily adjust their operating strategy by using seasonal operating bands to peak on a daily basis – without first conducting an environmental assessment to determine the potential impacts, or the sustainability of the operation.

Climate change will impose some of its greatest effects on both the long-term availability and the short-term variability of water resources in many regions of Ontario. These effects have already been felt through increased frequency and magnitude of droughts, extreme rain and flooding, destruction of infrastructure, illness and disease, duration of accumulated snowpack, and changes in soil moisture and runoff. These effects have also created havoc with municipal waste water treatment facilities that were never built with climate change in mind, and are releasing massive amounts of untreated and undertreated effluent/nutrients into riverine ecosystems, only to be trapped behind peaking facilities.

The Ministry of Energy's Statement of Environmental Values requires that it considers the effects of its decisions on current and future generations, consistent with sustainable development principles, and considers and evaluates environmental benefits and risks when planning future initiatives. This includes considering the differing environmental impacts of energy sources and technologies, including greenhouse gas emissions, and providing opportunities for increased use of cleaner sources of energy.³⁸

Whether large or small, hydroelectric proposals generate huge public and stakeholder pushback, and for good reason, as they can severely impact on communities, recreation, fisheries, drinking water, and livelihoods – with no possibility of a “no” outcome.

Hydroelectric isn't the answer to our climate change dilemma – it is the absolute wrong prescription for a warming climate with increasing intensity of droughts and flooding. Protecting our freshwater must be recognized as an issue of national security – it is essential to our own, and our children's survival on this planet.

¹ <http://www.nationalnewswatch.com/2016/01/08/energy-on-the-table-as-alberta-and-manitoba-premiers-meet-in-winnipeg-2/#.VpFTzjYjkVQ>



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- ³⁰ *California Public Utilities Code Section 399.12, Section (1)(A)*.
- ³¹ *South Carolina flooding : 18 dams breached, more trouble ahead*
- ³² *North of Dryden Integrated Regional Resource Plan – January 27, 2015, by OPA/IESO. P-56 & 124*
- ³³ *North of Dryden Integrated Regional Resource Plan – January 27, 2015, by OPA/IESO. P-56 & 124.*
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- ³⁸ *Statement of Environmental Values: Ministry of Energy, Environmental Bill of Rights, Government of Ontario*.