IMPACT ON THE ENVIRONMENT

QUESTION 10

What are the environmental impacts of Ontario's electricity sources?

All electricity sources have some negative impacts, but low-carbon sources damage our natural environment less than global climate change. Only energy conservation is a benign method of meeting our energy needs.

Climate change is creating new ecological conditions, which will alter and reshuffle the world's ecosystems and contribute to the continuing loss of much of Earth's biodiversity. Ontario's choice to minimize fossil fuels in its electricity system, and replace them with low-carbon electricity sources such as renewable electricity and nuclear power should, in the long-term, reduce damage to the environment.

Still, Ontario must assess and manage the negative environmental impacts of low-carbon sources of electricity, especially as the number of projects increases. Negative impacts on biodiversity can often be mitigated by smart operation and siting of electricity projects, away from areas of high value for natural heritage protection, including areas with species at risk. Specific concerns in Ontario include a weak approvals process for waterpower, no long-term depository for nuclear waste, the impact on some species from wind projects and their access roads, and the lack of consideration of the cumulative environmental impact of our electricity choices.

Contents

The details…

The consequences of climate change for our natural environment and the impact of fossil-fuelled generation

The long-term consequences of climate change will have a devastating impact not only on humans, but also on the natural environment. Changing patterns of temperature and rainfall may mean that the current geographic range of many species will no longer support them. Some species will be winners and see their ranges expand; others will be losers and at a higher risk of extinction. The ecosystems that exist today, such as Ontario's temperate and boreal forests, will be reshuffled into new combinations of species. Increased extreme weather events, such as storms and drought, will bring ecosystem responses such as flooding and forest fires. These consequences will be felt both globally and within Ontario.

For these reasons, the ECO strongly believes that fossil-fuelled generation, including the gas-fired generation that operates in Ontario, is more harmful to the environment than other electricity sources. A sustainable electricity system can include fossil-fueled generation as at most a niche contributor, not a major source of electricity. In the long run, Ontario's decarbonisation of the electricity system will reduce damage to the natural environment. The consequences of Ontario's electricity supply choices in reducing greenhouse gas emissions are discussed in Q11.

However, climate change is not the only environmental consideration for our electricity mix. Even low-carbon electricity sources, including nuclear, wind, waterpower, and solar power, have their own environmental impacts, in materials procurement, in construction, in operations, and in the disposal of its wastes. In the transition to a low-carbon energy system, it is important to actively minimize these negative effects.

In the long run, Ontario's decarbonisation of the electricity system will reduce damage to the natural environment.

How Ontario evaluates the environmental impact of electricity resources

Ontario's electricity planning framework does not explicitly compare the environmental trade-offs of different electricity resources, contrary to the ECO's recommendations in our 2016 Long-Term Energy Plan report.[1] Unwisely, there is no formal or public process to assess the cumulative environmental impact of Ontario's electricity mix, or to guide that mix moving forward. In contrast, British Columbia's electricity resource planning uses high-level metrics for impact to land (footprint of area affected by energy development), water (area of new reservoirs and length of river reaches affected by hydropower), and air (greenhouse gas emissions and criteria air contaminants), which can be compared across different possible combinations of electricity resources.[2] Ontario only evaluates the environmental merits of individual projects on a site-specific basis, through the environmental review process specified for each technology (discussed further below).

Four low-carbon electricity sources (wind, solar, waterpower, and nuclear) play a major role in Ontario today. The environmental concerns with nuclear power are very different than with wind, solar, and waterpower. Most significant are the risk of a radioactive release from an operating plant, and dealing with the radioactive waste produced on an ongoing basis. Regulatory responsibility for managing the environmental impacts

of nuclear power is primarily a federal responsibility. As nuclear refurbishment is currently a large component of Ontario's planned electricity future, both the environmental and economic impacts of nuclear power are discussed in Q14.

Some of the key impacts of wind, solar, and waterpower are discussed briefly in this chapter, including Ontario-specific issues with approvals processes. Many relevant topics have been reviewed in more detail in previous ECO Environmental Protection Reports, including:

- the Renewable Energy Approval process for wind, solar, and bioenergy projects (2009/2010 report, sections 2.2 and 2.3; 2012/2013 report supplement, section 1.5)
- wind power rules to protect birds and bats (2011/2012 report, part 2, section 3.2), and
- impacts of waterpower on fish passage (2014/2015 report, section 4.6).

The environmental concerns with nuclear power are very different than with wind, solar, and waterpower.

The Green Energy Act's environmental review process for wind and solar projects

In 2009, the Green Energy Act (GEA) established a new and distinct environmental approvals process for solar and wind (and also for bioenergy) renewable electricity technologies, known as the Renewable Energy Approval (REA). A single REA is issued by the Ministry of the Environment and Climate Change (MOECC), with input from other ministries as necessary. Projects that receive an REA are exempt from many other approval requirements, including the ability of municipalities to control the location of projects through the Planning Act.

The MNRF and the MOECC have not comprehensively assessed how well these requirements have worked.

191 renewable electricity projects have received REAs since 2011.[3] (About half of the approximately 90 wind farms now operating in Ontario were approved under a different, earlier provincial approvals process).[4]

The REA process requires the proponent to submit extensive studies, including a natural heritage assessment to determine if natural features exist on or near the proposed project location, and if so, to evaluate their significance.[5] Renewable energy projects are generally prohibited where natural heritage protection is a priority (e.g., near or within provincially significant wetlands, significant woodlands, significant wildlife habitat, areas of natural and scientific interest).[6]

Some of these prohibitions on development are absolute (e.g., development of a generation facility within a provincially significant southern wetland), but for others, development may be allowed if an

environmental impact study is completed and the MOECC, with input from the Ministry of Natural Resources and Forestry (MNRF), determines that mitigation measures are sufficient.

The MNRF and the MOECC have not comprehensively assessed how well these requirements have worked in practice to safeguard natural heritage since the REA was introduced. The MNRF informs the ECO that it frequently recommends avoidance of natural heritage features during project planning and review of Natural Heritage Assessments. However, it does not track project modifications made in response to such advice, nor does it track how many REAs have eventually been granted at project locations where prohibitions on development would generally apply.[7]

Members of the public may appeal REAs to the Environmental Review Tribunal (ERT). Appeals can be launched on two grounds: that proceeding with the renewable energy project as approved, will result in:[8]

- serious harm to human health, and/or
- serious and irreversible harm to plant life, animal life or the natural environment.

This is the only environmental approval in Ontario that third parties (i.e., not just the approval holder) can appeal as of right, i.e., without the permission of the tribunal.[9]

The requirements of the REA process, including the right of appeal, have provided a forum to review the environmental impacts of specific renewable energy developments in a transparent manner. The ERT has required the MOECC to modify or cancel projects to prevent harm to the natural environment (as discussed below).

On the other hand, the very detailed REA process, plus the automatic right of appeal and related court proceedings, has meant that projects may face higher costs and longer timelines to bring a project into service, contrary to the original goal of the GEA, of streamlining the approvals process for renewable energy. This has particularly been an issue for wind projects, due to the high number of appeals.

Though some other jurisdictions have much higher levels of wind power than Ontario (**Q6**), Ontario has been a hot spot of anti-wind litigation. Most Ontario wind project REAs have been appealed to the ERT and/or challenged in the courts, and most REA appeals to the ERT have been for wind projects, as shown in Figure 10.1.[10] As of February 2018, there were 256 reported Canadian court and tribunal decisions on wind turbines, 170 of them in Ontario. This includes unsuccessful challenges to the Environmental Protection Act's legal test for overturning REAs (s 142.1). The average development time for Ontario wind projects after receiving a contract rose from 29 months to 41 months, for projects contracted after the GEA came into force.[11] The high costs and long delays also mean that most wind project proponents must have deep pockets, since costs must be paid upfront and no revenue is received until the project is in service and producing power.

Ontario has been a hot spot of anti-wind litigation.

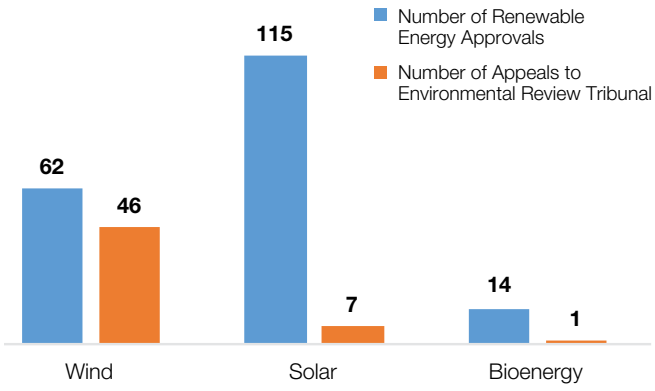

Figure 10.1. Renewable Energy Approvals appealed to Environmental Review Tribunal, by technology.

Source: Ontario Ministry of the Environment and Climate Change, information provided to the ECO in response to ECO inquiry (27 December 2017); Environmental Review Tribunal, information provided to the ECO in response to ECO inquiry (20 February 2018).

Impacts of wind energy

Human health

Many reasons have been given for opposing wind farms, including a powerfully held belief that wind turbines are harmful to human health, often because of turbine noise. All of the 46 wind projects appealed to the ERT have used serious harm to human health as one of the grounds for appeal.[12] After extensive expert evidence, and having considered numerous studies from around the globe, the ERT has consistently dismissed appeals based on alleged harm to human health. The sole exception was the Fairview wind project in Simcoe County, which was proposed to be located too close to the Collingwood airport, thus affecting aviation safety.

The noise impacts of wind on people are controlled through noise limits in the REAs, and through mandatory setbacks established by the Environmental Protection Act. Minimum setbacks for larger turbines are 550 metres from the nearest non-participating

The ERT has consistently dismissed appeals based on alleged harm to human health.

"noise receptors" (dwellings that may be used as residences, or institutional buildings).[13] Larger setbacks or additional noise study requirements apply in cases of turbines with higher sound levels or where multiple turbines are located close together.[14]

Birds and bats

Wind turbines harm birds and bats through collisions with turbines, and (in the case of bats), trauma caused by changes in air pressure near a turbine. To reduce these impacts, larger wind projects have special requirements in the REA process to identify and evaluate bird and bat habitat, and either relocate projects away from significant bird or bat habitat, or complete an environmental impact assessment that includes a mitigation plan to address negative impacts.

Projects are also required to conduct three years of post-construction monitoring for bird and bat mortality, with mitigation measures required if certain mortality thresholds are exceeded.[15] Monitoring results are reported to MOECC and to the Wind Energy Bird & Bat Monitoring Database. The latest summary reports that each Ontario turbine, on average, is responsible for roughly 17 bat kills and 6 bird kills per year.[16] With 2,465 turbines in operation at the end of 2016, this leads to a total estimate of roughly 42,000 bat kills and 15,000 bird kills annually by wind turbines. The ECO continues to recommend that wind turbines should not be permitted in Important Bird Areas.

Wind turbines harm birds and bats.

Wind turbines can harm birds or bats if sited or operated inappropriately.

Source: Government of Ontario.

The impact of wind turbines is of particular concern for bats. While there may be sites where turbine impacts on particular bird species are significant, in general, other causes of mortality (such as domestic cats and collisions with windows) are much higher than wind turbines for most birds.[17] For bats, any additional mortality is cause for serious concern. Since the GEA was passed, bat populations have come under great threat from other factors, especially white-nose syndrome, which has caused significant population declines for hibernating bat species.[18] The now endangered little brown bat accounts for about 9% of reported bat kills from wind turbines in Ontario.[19]

The MNRF reports that 17 Class 3 or 4 wind projects with an REA have detected bird or bat mortality levels that exceeded mortality thresholds. Twelve of these wind projects have exceeded the bat mortality threshold (10 detected bat kills per turbine per year, averaged over all the turbines at a facility).[20] These facilities are being "curtailed" from operating in conditions when bats are most active – when winds are 5.5 m/s or less, from sunset to sunrise from July 15th to September 30th. All of the nine projects that have completed at least one year of effectiveness monitoring after implementing curtailments saw the number of bat kills drop, with eight of the nine falling below the mortality threshold.[21] The tradeoff is that this mitigation measure reduces wind projects' ability to produce electricity at times when summer demand may be high. Nine projects are also investigating or taking steps to reduce their impact on birds.

For bats, any additional mortality is cause for serious concern.

More recent REAs have paid greater attention to impact on bats, with mitigation measures that are stricter than required by the MNRF's Bats and Bat Habitats: Guidelines for Wind Power Projects. For the Amherst Island wind project, these measures include proactively turning off turbines at low wind speeds during times when bats are at most risk, and turning off turbines at higher speeds as well, if bat mortality is detected.

Substantial research is underway on ways to reduce bat and raptor mortality. This research could lead to further curtailments.

Other environmental impacts

Other environmental values can be damaged by the access roads to wind developments. In several cases, the ERT has amended or revoked REAs to avoid

"serious and irreversible harm to plant life, animal life or the natural environment." For example:

- the Settler's Landing wind project in Kawartha Lakes was proposed for development in an area that would be (in part) on a significant woodland on the Oak Ridges Moraine. The ERT removed one turbine and an access road in order to limit damage to the woodland, and also required additional rehabilitation measures
- the Ostrander Point wind project in Prince Edward County had its REA revoked because its access road would have caused serious and irreversible harm to the local population of the threatened Blanding's turtle, even though the MNRF had issued an "overall benefit" permit under the Endangered Species Act. This site was also in an Important Bird Area, and
- the White Pines wind project (also in Prince Edward County) had its REA amended (removing two-thirds of the turbines), also due to impact on Blanding's turtle and the little brown bat.

Wind projects also use a large amount of concrete, and at end of life will require disposal of the large blades.

Solar (photovoltaic) power is perhaps the most environmentally benign of our electricity generation options.

Solar power

Solar (photovoltaic) power is perhaps the most environmentally benign of our electricity generation options. Solar power has no direct emissions of pollutants to air or water, although it does use rare materials that may come from around the world. Noise is produced by the electrical inverters at solar farms, but is much less than from wind projects, and is generally not a major concern.[22] Ground-mounted solar projects larger than 500 kilowatts are required to obtain a Renewable Energy Approval.[23]

Probably the greatest downside of solar farms is their relatively low energy density. The total amount of land that must be used to generate a unit of electricity (and may therefore be unavailable for other uses, such as wildlife habitat or food production) is larger for solar than for most other electricity resources. For example, the large solar farm in Kingston with a nameplate capacity of 100 megawatts (MW) will use 261 hectares (2.6 square kilometres) of land and 426,000 panels. To prevent solar farms from covering a large amount of good agricultural land, the Feed-in Tariff (FIT) program restricted development of ground-mounted solar projects on prime (soil class 1, 2, or 3) agricultural lands, and these prohibitions are proposed to continue under net metering.[24]

Solar farms generate clean electricity but occupy a large land area (Enbridge solar farm in Sarnia).

Source: Enbridge.

Of course, solar facilities integrated with buildings and structures, such as rooftop projects, make complementary use of existing operations and do not require additional land; Ontario has recognized this as a benefit and has favoured rooftop solar in its renewable energy policies, through higher tariff rates and no requirement for an environmental approval.

Waterpower

In contrast to wind and solar resources, waterpower usually depends on specific sites where large drops in river elevation allow for electricity production. There is little or no ability to mitigate negative environmental impacts by moving a project, so much of the environmental decision-making occurs at the site selection process.

Dams can be used to increase the height of a natural water drop and produce more electricity; if the water level behind the dam is allowed to rise and fall, then the dams can also serve as a form of electricity storage, producing power when it is needed the most. Unfortunately, the characteristics that make a development more valuable to the electricity system can make it more damaging from an ecological perspective. The higher a dam is, the farther upstream the aquatic environment is altered, and storage behind reservoirs leads to unnatural changes in water levels, flow rates, and river morphology (erosion and sedimentation).[25] Hydroelectric stations and dams also pose a direct threat to fish and a barrier to fish migration, yet few Ontario waterpower facilities have fishways. Mitigation measures, such as maintaining minimum river flow levels, and using structures that reduce intake into turbines, can reduce environmental impacts.

Recent Ontario hydropower development and the Class EA process

The first round of the FIT program developed under the GEA awarded 57 contracts for small waterpower projects throughout the province, many on Crown land in northern Ontario. These projects did not include large new dams, however, they often were "run-of-river with modified peaking"[26] – allowing for water storage (through headponds) on a shorter timescale (over the course of a day), and consequently altering water levels and flows. Hydro projects were designed this way because the FIT contracts provided higher prices for power delivered at peak time of day, to recognize the greater economic value of peaking power to the electricity system.

Unlike wind, solar, and biogas, the environmental approval process for most waterpower projects is a class Environmental Assessment (EA), led by the proponent.[27] Class EAs are "intended for projects that are carried out routinely; and have predictable and mitigable effects to the environment."[28] The MOECC does not have a formal approval role in this process for individual projects, but does participate and review documentation submitted by the proponent to ensure that the requirements of the Class EA process have been completed.[29] Class EAs do not provide an effective review of the site selection process.[30]

In the ECO's opinion, this approach is not suitable for new waterpower projects, and the proponent-led model has been an inadequate form of environmental review. The most prominent example is Xeneca Power, a company that was initially awarded FIT contracts for 19 different sites. In an unusually scathing review of the completeness of Xeneca's submission for one such project ("The Chute" on the Ivanhoe River), the MOECC raised many concerns, including: mid-stream changes to the project without adequate analysis of the environmental impacts and potential mitigation measures, inadequate consultation, and lack of transparency.[31] The MOECC concluded that the project was not planned in accordance with the requirements of the Class EA, and advised Xeneca to take additional actions, in effect, temporarily blocking the project from proceeding. Ultimately, Xeneca's FIT contracts were terminated for all 19 proposed projects.

The Class EA also appears to have had limited success in meeting the objectives of developers in getting projects built on time and budget. Progress reports by the Ontario Waterpower Association have noted concerns with the high fixed costs of the environmental assessment process and the long timelines to move projects through the process.[32] Despite these problems, the MOECC has indicated that it is not considering changes to the regulatory approval model for waterpower projects.[33] In 2018, the Ontario Waterpower Association will be completing a five-year review of the Class EA, during which it will consider the efficiency and effectiveness of the Class EA planning process, assess new legislative requirements and evaluate best practices of direct relevance to waterpower projects.[34]

The environmental footprint of waterpower development is usually lower if it takes place at sites that have already been altered – for example, making use of dams that were built for other purposes (e.g., flood control, navigation), or sites where existing waterpower facilities exist, but opportunities exist to increase their electricity generation capacity (e.g., by upgrading to more efficient turbines). The largest hydro development in Ontario in recent years is Ontario Power Generation's Lower Mattagami Project, which added 438 MW of new capacity through major upgrades at four existing waterpower stations.

Q10

What are the environmental impacts of Ontario's electricity sources?

Multiple use of waterways for hydropower and navigation – Big Chute on the Trent-Severn Waterway.

Source: Ontario Power Generation.

Hydro procurements since the first round of the FIT program (the Hydroelectric Contract Incentive and the Hydroelectric Standard Offer Program) have focused on these opportunities to upgrade at sites of existing dams.[35] This trend continued in the Large Renewable Procurement where all four hydro projects awarded contracts will be located on the Trent-Severn waterway, adjacent to already existing dams. The 2017 Long-Term Energy Plan mentions additional opportunities to get more from existing waterpower assets.

The environmental consequences of waterpower development are also a concern for imports from Quebec. The province of Quebec has engaged in extensive landscape alteration through hydro development, building large dams that have turned free-flowing rivers into lakes and flooded thousands of kilometres of land. Hydro-Quebec continues to build dams on more remote rivers to produce hydroelectricity – the Romaine River on the north shore of the St. Lawrence being the most recent example. Hydro-Quebec's current Strategic Plan indicates that it will determine its next major hydro project once the Romaine project is completed.[36] This may occur regardless of Ontario's actions, but it is also possible that an export contract to Ontario could help establish a business case for what might otherwise be an uneconomic project.

Even low-carbon sources can cause harm, particularly if built in the wrong locations.

Conclusion

Over the long term, Ontario's shift to renewable electricity and nuclear power is an improvement over fossil fuelled-generation from an environmental perspective. However, given the scale of Ontario's electricity use, even these low-carbon sources can cause harm, particularly if built in the wrong locations. For more on the environmental impacts of nuclear, see Q14. Energy conservation avoids the negative impacts of expanding our electricity infrastructure, and reduces the environmental footprint of Ontario's electricity use, another reason that it should be given a high priority.

Endnotes

1. Environmental Commissioner of Ontario, Developing the 2017 Long-Term Energy Plan (Toronto: ECO, December 2016) at 15.
2. BC Hydro, Integrated Resource Plan (Vancouver: BC Hydro, 25 November 2013) at 6-65.
3. A complete up-to-date list of Renewable Energy Approvals can be found online: <www.ontario.ca/page/renewable-energy-projects-listing>. At the time of writing, two projects had been refused REAs while eight are currently marked as "application returned or withdrawn".
4. The environmental screening process under O Reg 116/01 of the Environmental Assessment Act.
5. Specific requirements are described in: Ontario Ministry of Natural Resources, Natural Heritage Assessment Guide for Renewable Energy Projects, 2nd edition (Ontario: Queen's Printer, 2012).
6. O Reg 359/09, s. 37-46.
7. Ontario Ministry of Natural Resources and Forestry, information provided to the ECO in response to ECO inquiry (12 January 2018).
8. Environmental Protection Act, s 142.1(3).
9. The Planning Act also has quite broad appeal provisions.
10. Environmental Review Tribunal, information provided to the ECO in response to ECO inquiry (20 February 2018).
11. Margaret Loudermilk, Renewable Energy Policy and Wind Generation in Ontario (Toronto: Ivey Foundation, January 2017) at 1. However, the report is not able to conclusively determine that the Renewable Energy Approval process is the reason for the longer development times.
12. Environmental Review Tribunal, information provided to the ECO in response to ECO inquiry (20 February 2018).
13. O Reg 359/09, s 54. Large turbines are those >50 kW, and with a sound level >102 dBA or height >70 metres. Further guidance is found in: Ontario Ministry of the Environment, Technical Guide to Renewable Energy Approvals (Ontario: Queen's Printer, 2013) at 74.
14. O Reg 359/09, s 54-55. Ontario Ministry of the Environment, Technical Guide to Renewable Energy Approvals (Ontario: Queen's Printer, 2013) at 77.
15. Ontario Ministry of Natural Resources, Bird and Bird Habitats: Guidelines for Wind Power Projects (Ontario: Queen's Printer, 2011); Ontario Ministry of Natural Resources, Bats and Bat Habitats: Guidelines for Wind Power Projects (Ontario: Queen's Printer, 2011); See Environmental Commissioner of Ontario, "New Wind Power Rules to Protect Birds and Bats" in Losing Our Touch, Annual Report 2011/2012 Part 2 (Toronto: ECO, October 2012) at 77 for a review of these documents.
16. Bird Studies Canada, Canadian Wind Energy Association, Environment Canada and Ontario Ministry of Natural Resources, Wind Energy Bird and Bat Monitoring Database Summary of the Findings from Post-construction Monitoring Reports (July 2017) at 37, online: <www.bsc-eoc.org/resources/wind/Jul2017_Wind_Database_Summary.pdf>.
17. "Save Bird Lives: Wind Turbines", online: Nature Canada <naturecanada.ca/initiatives/save-bird-lives/wind-turbines/>. [Accessed 28 February 2018].
18. Environmental Commissioner of Ontario, "White-nose Syndrome: Tragedy of the Bats" in Small Steps Forward, Environmental Protection Report 2015/2016 Volume Two (Toronto: ECO, 2016).
19. Bird Studies Canada, Canadian Wind Energy Association, Environment Canada and Ontario Ministry of Natural Resources, Wind Energy Bird and Bat Monitoring Database Summary of the Findings from Post-construction Monitoring Reports (July 2017) at 18, online: <www.bsc-eoc.org/resources/wind/Jul2017_Wind_Database_Summary.pdf>.
20. The number detected will be less than the number actually killed. The Ontario-wide estimate of 17 bat kills per turbine per year is based on an upward correction of detected bat kills to account for this difference.
21. Ontario Ministry of Natural Resources and Forestry, information provided to the ECO in response to ECO inquiry (12 January 2018).
22. A noise study report is required for large (class 3) solar projects as part of the REA, but there are no mandatory setback distances as there are for large wind projects. Ontario Ministry of the Environment, Technical Guide to Renewable Energy Approvals (Ontario: Queen's Printer, 2013) at 183.
23. Smaller ground-mounted solar projects between 10 kilowatts and 500 kilowatts are eligible for a streamlined approval through the Environmental Activity & Sector Registry. Roof-mounted projects of any size and ground-mounted solar projects <10 kilowatts do not require any form of environmental approval.
24. Environmental Registry Regulation Proposal #013-1916, Proposed New Regulation to be made under the Electricity Act, 1998 (28 November 2017).
25. The waterpower Class EA recognizes the importance of the water management regime (impact on water levels and flows) on aquatic ecology. Ontario Waterpower Association, Class Environmental Assessment for Waterpower Projects, 7th Edition (Ontario Waterpower Association: November 2017) at 21.
26. Ibid, at 83.
27. New facilities larger than 200 megawatts in capacity would need to undertake an individual Environmental Assessment.
28. Ontario Waterpower Association, Class Environmental Assessment for Waterpower Projects, 7th Edition (Ontario Waterpower Association, November 2017) at 11.
29. Ontario Ministry of the Environment and Climate Change, Ontario Waterpower Association, and Ontario Ministry of Natural Resources and Forestry, Roles and Responsibilities With Respect to the Class Environmental Assessment for Waterpower Projects Process (Toronto: MOECC, 2014) online: <www.owa.ca/wp-content/uploads/2017/01/Class-EA-Roles-Fact-Sheet-MOECC-OWA-MNRF.pdf>. The Ministry of the Environment and Climate Change is also required to consider "bump-up" requests (part II order requests) from the public as to whether a project should go through a more rigorous individual Environmental Assessment – however, the Ministry has never granted an part II order request for a waterpower project.

30. As the beds of most waterways are Crown land, the MNRF can influence the waterpower site selection process by determining whether to grant access to Crown land for potential waterpower development. Ontario Ministry of Natural Resources and Forestry, Renewable Energy on Crown Land Policy (10 February 2014), online: <dr6j45jk9xcmk.cloudfront.net/documents/2906/stdprod-095543.pdf>.

31. Letter from Ontario Ministry of the Environment and Climate Change to Xeneca Power Development (2 March 2012), online: <www.ontarioriversalliance.ca/wp-content/uploads/2014/07/MOEtoXeneca-TheChute-ER.pdf>.

32. Ontario Waterpower Association, Five Year Review, Class Environmental Assessment for Waterpower Projects (24 December 2013) at 2.

33. Ontario Ministry of the Environment and Climate Change, information provided to the ECO in response to ECO inquiry (27 December 2017).

34. Ontario Ministry of the Environment and Climate Change, information provided to the ECO in response to ECO inquiry (8 March 2017).

35. Subsequent rounds of FIT procurements open to all renewable energy sources have had only very minor participation from hydro projects (9 projects totalling 2.7 MW in FIT 4, 1 project of 60 kW in FIT 3, no waterpower projects in FIT 2 or FIT 5).

36. Hydro Quebec, Strategic Plan 2016-2020: Setting new sights with our clean energy (undated) at 10.