March 22, 2021

Kathleen Theoharides, Secretary
Executive Office of Energy and Environmental Affairs
Commonwealth of Massachusetts
100 Cambridge Street, Suite 900
Boston, MA 02114

By email only to: gwsa@mass.gov

Re: Massachusetts Interim Clean Energy and Climate Plan for 2030 and Decarbonization Roadmap: Comments

Dear Ms. Theoharides,

The North American Megadam Resistance Alliance (“NAMRA”) submits the following comments on Massachusetts’s interim Clean Energy and Climate Plan for 2030 (“2030 CECP”) and the Decarbonization Roadmap (“the Roadmap”). The 2030 CECP provides details on the actions the Commonwealth proposes to take through the 2020s to ensure that statewide greenhouse gas (“GHG”) emission limits are 45% below the reported 1990 level. The 2030 CECP is prepared in coordination with the development of the 2050 Decarbonization Roadmap
such that the strategies, policies, actions outlined in the plan aims to help the Commonwealth achieve net zero GHG emissions by 2050. This interim report builds upon the 2010 publication of the Clean Energy and Climate Plan for 2020 as part of the Global Warming Solution Act’s (“GWSA”) implementation policies. The Executive Office of Energy and Environmental Affairs (“EEA”) is soliciting public comment before finalizing the 2030 CECP.

As detailed below, the CECP and Roadmap proposals are flawed because Massachusetts fails to account for GHG emissions from electricity used in Massachusetts and generated elsewhere -- specifically by Canadian hydroelectricity -- in its 2030 CECP reduction strategies. Canadian hydropower imports account for about 19% of New England’s electricity usage as of 2019 according to the Independent Services Operators of New England (“ISO-NE”). Neither Massachusetts nor ISO-NE account for the greenhouse gas emissions from electricity generated by Canadian hydropower and used in New England. Nor are these emissions accounted for in Canada. This is a GHG accounting loophole at a time of climate crisis. Perpetuating this loophole under the CECP and Roadmap contravenes the GWSA by undercounting GHG emissions both in the 1990 baseline inventory and every year after that. As a result, Massachusetts’s electricity usage actually emits more GHG than what is reported. This makes Massachusetts’s GHG reporting inaccurate and paints a false picture of the state’s actual GHG emissions.

I. Factual Background

From 2000-2008, Massachusetts imported about 4,748,725 megawatt hours of electricity from Quebec Province in Canada.¹ Massachusetts has developed climate policies over the past decade to help drive emission reductions, particularly within the electricity sector. The 2050

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Decarbonization Roadmap calls for a continued transition away from carbon intensive electricity sources and toward imported Canadian hydropower and high-voltage interstate transmission lines. The roadmap falsely describes hydropower as “a clean energy generation resource” that is “highly controllable and effectively dispatchable.” In an effort to shift the state from a fossil fuel-dependent grid to a renewable energy grid, Massachusetts passed An Act to Promote Energy Diversity in 2016. In part the Act requires utilities to solicit 9.45 terawatt hours per year of “clean energy generation.” In response, utilities contracted with Central Maine Power (“CMP”) for the delivery of hydropower via high-voltage transmission lines through the New England Clean Energy Connect (“NECEC”) project. The contract was approved by the Department of Public Utilities.

The NECEC project is slated to deliver Canadian hydropower generated by 63 hydroelectric generation stations in Eastern Canada, including 1/6 of which is generated at the Upper Churchill Falls facility in Labrador/Newfoundland Province. The Canadian hydropower industry is owned by the individual provinces making them state-run monopolies. The Canadian Government and the hydropower monopolies market this hydroelectricity as “clean.” In fact, peer reviewed science shows that the emissions from Canadian hydropower can be on par with fossil fuels. This electricity destroys rivers, biodiversity and is resulting in ongoing environmental racism according to Indigenous communities from whose land most of this electricity is taken without compensation and without consent.

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2 MASS. EXEC. OFF. OF ENERGY AND ENV’T AFF., MASSACHUSETTS 2050 DECARBONIZATION ROADMAP at 55 (2020)
3 Id. at 63.
4 MASS. EXEC. OFF. OF ENERGY AND ENV’T AFF., INTERIM 2030 CECP 35 (2020).
5 Id. at 8, 35.
6 Hydro-Quebec Has Left Quebec’s First Nations Behind, BANGOR DAILY NEWS (Feb. 7, 2021), https://bangordailynews.com/2021/02/07/opinion/contributors/hydro-quebec-has-left-quebecs-first-nations-behind/.
HydroQuebec’s electricity generation has been negatively impacting Indigenous communities since the 1970s and the new dams built for export to Massachusetts via NECEC perpetuate what they describe as cultural genocide. Flooding lowlands to create hydropower storage reservoirs has led to the release of methylmercury from plants and soil which poisons wild caught foods including fish, duck, and seals relied on for physical and spiritual survival by groups such as the Pessamit Innu First Nation and the Innu and Inuit.8 The dams and associated related infrastructure such as transmission corridors have shifted migratory patterns for fish and key game animals hunted by Indigenous people, further disrupting their food sources.9 Construction and operation of hydroelectric facilities has destroyed and continues to destroy ancestral lands and traditional livelihoods of Indigenous people in Eastern Canada, including communities in Labrador impacted by Hydro-Quebec’s production and export of one-sixth of its electricity supply generated at the Upper Churchill facility. The Phase 1 Lower Churchill project, the Muskrat Falls dam, was built without the consent of all Indigenous community members and over the opposition of the Grand Riverkeeper of Labrador, Inc. and a wide network of social justice, environmental and Indigenous groups. Massachusetts’ refusal to acknowledge the climate injustices and environmental racism perpetuated by Hydro-Quebec’ electricity imports is at odds with the professed “climate justice” and “environmental justice” pronouncements of the CECP and Roadmap and Governor Baker’s own policies. Importing more of this hydropower via NECEC so HydroQuebec, a state-owned monopoly, can grow its profits by selling to U.S. consumers is not acceptable.10

8 Id.; see also Hydro-Quebec and the Mercury Issue, HYDRO-QUEBEC, https://www.hydroquebec.com/sustainable-development/specialized-documentation/mercury.html (last visited March 12, 2021) (HydroQuebec conducted a study and acknowledged the increase of mercury levels in its reservoirs, but nonetheless concluded that “the health benefits of eating fish far outweigh the mercury-related risks”).
9 Hydro-Quebec Has Left Quebec’s First Nations Behind, supra note 3.
10 See id. (discussing how HydroQuebec makes billions of dollars each year by profiting off its illegitimate occupation of indigenous land).
The NECEC Canadian hydropower import proposal faces strong public opposition and has divided government officials. Corridor opponents in Maine have collected 80,506 certified signatures for a state-wide referendum to require legislative approval for any electrical power line exceeding 50 miles. The NECEC project requires 53 miles of new corridor and will cut through treasured mountain areas of Northern Maine. Much of the controversy surrounds the concern that NECEC will precipitate irreparable environmental damage to Maine’s prized landscapes with little return for Maine residents. In October 2020, the Natural Resources Council of Maine, Sierra Club Maine, and Appalachian Mountain Club filed a federal lawsuit in the U.S. District of Maine challenging the U.S. Army Corps of Engineers’ Environmental Assessment of the NECEC project. The case is currently before the First Circuit which granted the plaintiffs’ injunction pending appeal on January 15, 2021.

II. Legal Background

Massachusetts passed the GWSA in 2008 to establish a comprehensive regulatory program that would address climate change through ambitious GHG reduction targets. The overarching goal of the GWSA is to reduce emissions 10-25% below statewide 1990 levels by 2020 and at least 80% below by 2050. EEA has also adopted a statewide target of Net Zero GHG

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13 Id.
14 Id.
emissions by 2050 which Governor Baker announced in January 2020.\textsuperscript{17} To help achieve these goals, the GWSA provides a framework for Massachusetts to promulgate reporting mandates for large GHG-emitting facilities and establish a baseline assessment of statewide GHG emissions.\textsuperscript{18}

Under Section 3(a) of the GWSA, EEA is required to adopt “an interim 2030 emissions limit accompanied by plans to achieve this limit in accordance with said section 4; provided, however, that the 2030 interim emissions limits shall maximize the ability of the commonwealth to meet the 2050 emissions limits.”\textsuperscript{19} Section 4 outlines several factors to be considered by the Secretary in developing the targets, such as the feasibility of the measures to comply with the emissions limit, the potential economic and noneconomic benefits of reduction measures, and the relative contribution of each source to statewide GHG emission levels.\textsuperscript{20} As implied by the language of Section 3(a), the priority of the provision is to ensure that the 2030 CECP sets Massachusetts on track to achieve its 2050 emission targets.

Section 2(5) of the GWSA states that Massachusetts’s Department of Environmental Protection (“DEP”) shall establish reporting requirements for GHG emissions from all consumed electricity sources.\textsuperscript{21} This includes “transmission and distribution of line losses from electricity generated within the commonwealth or imported from outside the commonwealth.”\textsuperscript{22} Thus, GHG emissions from facilities other than those located in Massachusetts should be reported since those sources contribute to the total consumption of electricity in the state. Further, the statute does not distinguish between national and international sources of electricity. The NECEC contract, approved by the Department of Public Utilities with the support of the Department of

\textsuperscript{19} GWSA, § 3(b)(2) (2008).
\textsuperscript{20} Id. §§ 4(b), (d), (e).
\textsuperscript{21} Id. § 2(5).
\textsuperscript{22} Id.
Energy Resources ("DOER") but over the opposition of the Attorney General of Massachusetts for the delivery of Canadian hydropower falls under this reporting mandate. However, neither Massachusetts nor ISO-NE have a reporting mechanism or system to account for GHGs from HydroQuebec hydropower that is currently imported to and used in Massachusetts or what will be used in the future -- meaning these emissions omitted from the Commonwealth’s GHG emissions inventory. According to sworn testimony in proceedings before the U.S. International Trade Commission in 2020, NECEC’s 20-year contract “roughly equates to about 17 percent of [Massachusetts] total electric demand.”23 Thus, 17% of the electricity will be counted as having zero emissions when this is not the case.

III. Greenhouse Gas Emissions From Hydropower

Hydropower is often referred to as a “low-carbon” and “renewable” source of electricity.24 This myth has been challenged for decades. Over the last 15 years, scientists have increasingly acknowledged the significant amounts of carbon dioxide (“CO2”) and methane that can be released by hydropower facilities.25 Mounting evidence reveals elevated CO2 and methane levels following the creation of a hydroelectric reservoir.26 This initial uptick in GHG emissions can be attributed primarily to the decay of submerged trees and disturbed sediments after flooding.27 CO2 and methane emissions that result from organic matter decomposition can decline following the initial flooding, as revealed by a study on the Eastmain reservoir in

25 Brad Hager Dec. at 3.
26 Cristian Teodoru et al., The Net Carbon Footprint of a Newly Created Boreal Hydroelectric Reservoir, GLOBAL BIOGEOCHEMICAL CYCLES, May 2012, at 1.
Quebec, Canada, but levels stabilize at values that are still higher than those from the surrounding landscape.\textsuperscript{28} The release of GHG emissions due to biomass decomposition from flooding is the largest source of direct GHG emission for hydropower.\textsuperscript{29} Sources of indirect emissions from hydropower include construction work on the facility itself, transportation of materials and workers, and waste disposal.\textsuperscript{30}

GHG emissions from reservoirs are highly dynamic and can vary greatly depending on location, age, and climate.\textsuperscript{31} An ideal reservoir is one sited in narrow mountain valleys above the treeline.\textsuperscript{32} Since these areas have less vegetation, they do not emit as much as GHGs as the shallow, lowland areas with forests once they are flooded. Unfortunately, “many of HydroQuebec’s reservoirs flood vast tracts of low-lying woodlands, resulting in massive deforestation” and thus produce higher emission levels.\textsuperscript{33} Peer-reviewed scientific literature ranks the carbon footprint of HydroQuebec amongst the dirtiest hydropower generators in the world.\textsuperscript{34} One particular study revealed that GHG emissions from six of HydroQuebec’s reservoirs range from about that of a natural gas power plant to over twice that of coal-fired power plants.\textsuperscript{35} Another study of a 485 MW reservoir in Northern Quebec found that net CO2 equivalent emissions rate of a new hydroelectric dam in a boreal forest landscape could exceed the emissions of a new natural gas facility over the first few years of the asset’s life.\textsuperscript{36}

\textsuperscript{28} Teodoru et al., supra note 21, at 12.
\textsuperscript{29} William Steinhurst et al., *Hydropower Greenhouse Gas Emissions*, SYNAPSE ENERGY ECON. 12 (2012)
\textsuperscript{30} Id. at 11.
\textsuperscript{31} Teodoru et al., supra note 21, at 1.
\textsuperscript{32} Brad Hager Dec. at 6–7.
\textsuperscript{33} Id.
\textsuperscript{34} Id. at 8.
\textsuperscript{35} See id. at 3 (emissions from natural gas power plants are approximately 400g CO2e per kilowatt hour and approximately 1,000g CO2e per kilowatt hours from coal power plants).
\textsuperscript{36} See Teodoru et al., supra note 21.
Studies suggest that hydropower production could release more GHG emissions than fossil fuel energy when taking into account the entire life cycle of the emissions.\(^{37}\) A comprehensive understanding of life cycle GHG emissions from hydroelectric dams requires the application of a life cycle assessment (“LCA”).\(^{38}\) An LCA is a method used to evaluate the totality of environmental impacts of a product or service from “cradle to grave.”\(^{39}\) As part of an LCA for a hydroelectric dam, GHG emissions are calculated beginning with the construction of the facility all the way through the decommissioning phase.\(^{40}\) Failing to account for emissions at the “end-of-life stage” could lead to an underestimation of a dams’ total GHG contribution.\(^{41}\) It is important to factor in the impacts of decommissioning hydroelectric facilities at the end of their life cycle when considering this particular energy source and its implications for climate change.\(^{42}\) In addition, one study concluded that newly flooded boreal reservoirs (such as HydroQuebec’s) “have life cycle emissions that likely exceed those of other renewable sources.”\(^{43}\)

A GHG such as CO2 does not remain localized once emitted.\(^ {44}\) Rather, CO2 disperses evenly throughout the atmosphere and transcends the borders of any state or country.\(^ {45}\) This is known as the “spillover effect” which recognizes that the costs and benefits of GHG regulations may not be fully internalized within a state.\(^ {46}\) Addressing climate change requires the consideration of global emissions rather than just local emissions.\(^ {47}\) This is especially pertinent in

\(^ {37}\) Song et al., supra note 19.
\(^ {39}\) Id.
\(^ {40}\) See id.
\(^ {41}\) Song et al., supra note 19, at 14.
\(^ {42}\) See Pacca, supra note 31, at 291–92.
\(^ {43}\) William Steinhurst et al., supra note 26, at 20.
\(^ {45}\) Id.
\(^ {46}\) Id. at 680.
\(^ {47}\) Brad Hager Dec. at 2.
the context of hydropower, an energy source that has been found to emit a global average of 173 kg of CO2 and 2.95 kg of methane per megawatt hour of electricity produced.  

IV. The 2030 CECP Fails to Account For Hydropower Emissions

Hydropower emissions exceed that of all other renewable energies and are far greater than previously assumed. The uncertainties that persist in measuring emissions from hydroelectricity generation underscores the need for more extensive monitoring and investigation. Underlying these uncertainties is the idea that hydropower is not as universally beneficial to climate needs as previously claimed. Collecting more data on emissions and minimizing climate impacts must be a priority in the design and construction of new hydropower facilities. A comprehensive evaluation of hydropower is vital for Massachusetts to determine the feasibility of this energy source for its emission reduction goals. However, EEA has neglected to account for emissions from hydroelectric dams in its interim 2030 CECP.

As DOER testified, over a 20-year period 17% of Massachusetts electricity consumption will be coming from NECEC hydropower imports (assuming the transmission corridor is ever built). Massachusetts must account for the emissions from existing and future Canadian hydropower imports. Otherwise, it is playing a dangerous shell game with GHG accounting during a climate crisis – the very crisis the CECP and Roadmap purport to address.

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49 Id. at 1.
51 Id.
The CECP and Massachusetts’s GHG emission inventory are supposed to account for, at a minimum, direct GHG emissions.\textsuperscript{52} Direct emissions are defined under the GWSA as “emissions from sources that are owned or operated, in whole or in part, by an entity or facility including, but not limited to, emissions from factory stacks, manufacturing processes and vents, and company owned or company-leased motor vehicles.”\textsuperscript{53} This definition broadly encompasses all energy sources that are owned or operated by an entity without qualification. HydroQuebec’s generating fleet comprises of 61 hydroelectric generating stations, 24 thermal plants, and 28 large reservoirs\textsuperscript{54} which will be employed to supply the NECEC project, plus the Upper Churchill hydropower facility in Labrador that accounts for 1/6\textsuperscript{th} of Hydro-Quebec’s supply, for a total of 63 generating stations used to supply exports. Hydro-Quebec itself identified that its hydropower facilities release an estimated 17 kg of CO2 emissions per megawatt hour.\textsuperscript{55} Even ignoring the scientific evidence that this estimate is far too low,\textsuperscript{56} Massachusetts should have at least accounted for the acknowledged emissions from Hydro-Quebec’s energy generation. Just as coal-fired power plants must report the emissions from their smokestacks, Hydro-Quebec must report the direct emissions of each kilowatt imported into Massachusetts. To date, the Canadian hydropower industry, including Hydro-Quebec, has failed to substantiate claims of “low carbon” or “zero carbon” emissions from its hydroelectricity generation.

Massachusetts’s GHG inventory does not include GHG reporting on a lifecycle basis.\textsuperscript{57} In an internal memo from 2013, DEP officials recognized the existence of lifecycle GHG emissions from large-scale hydropower sources but stated that “taking these into account is not consistent

\textsuperscript{52} Bram Claeys & Sharon Weber, Memo Re: GHG Emissions From Large Hydro in the Context of the CECP, Mass. DEP, (April 9, 2013) [hereinafter Mass. DEP GHG Memo].
\textsuperscript{53} GWSA, § 1 (2008).
\textsuperscript{55} Brad Hager Dec. at 3.
\textsuperscript{56} Id.
\textsuperscript{57} Mass. DEP GHG Memo, supra note 43.
with the current scope of the CECP and GHG inventory for any fuel.\textsuperscript{58} Since lifecycle emissions are not considered for any other type of electric generation, Massachusetts officials apparently believed it to be inappropriate to consider them for hydropower. This stance is legally and scientifically wrong, and it enables EEA to ignore the GHG emissions associated with the creation, operation, and decommissioning of Hydro-Quebec facilities including the Upper Churchill generating station that produce electricity for export to Massachusetts.\textsuperscript{59} If the goal of the 2030 CECP is to set Massachusetts on a path towards decarbonization, the state must take into account hydropower emissions from “cradle to grave.” Furthermore, LCA’s for hydropower typically cover a minimum time period of 100 years.\textsuperscript{60} The time frame for adequately assessing GHG emissions does not align with Massachusetts’s goal to reach net zero emissions by 2050.

The 2030 CECP itself only mentions hydropower a handful of times when describing the procurement of “clean energy” to achieve the goal of Net Zero emissions in 2050.\textsuperscript{61} Characterizing hydropower as “clean” is a glaring misrepresentation of the scientific evidence demonstrating that hydroelectricity production in fact emits significant amounts of CO2 and methane. In particular, it disregards the apparent discrepancies between Hydro-Quebec’s allegedly minimal carbon footprint and the science showing significant emissions from its reservoirs.\textsuperscript{62} Furthermore, the question of whether the NECEC project will result in the construction of new hydroelectric reservoirs in Quebec is not fully settled.\textsuperscript{63} The possibility remains that HydroQuebec will need to construct new reservoirs to meet the growing demand for energy, resulting in additional flooding and elevated GHG emission levels due to organic matter

\textsuperscript{58} Id.
\textsuperscript{59} See Pacca, \textit{supra} note 31, at 290.
\textsuperscript{60} See, e.g., William Steinhurst et al., \textit{supra} note 26, at 16.
\textsuperscript{62} See Brad Hager Dec. at 8.
\textsuperscript{63} Id.
decomposition. The Canadian government states that it plans to build more dams to supply electricity to the U.S. New dams are under construction on the Romaine River, the Lower Churchill Project (Muskrat Falls) was built for export, and Nalcor Energy is planning to build a third dam on the Churchill River at Gull Island for export out of the province via the Atlantic Loop. This means that Massachusetts is responsible for new dam construction in Canada-massive multi-billion dollar dams that would never be allowed to be in New England where even the smallest dam removal is the subject of millions in state spending and self-congratulation for saving river ecology.

A study requested by the U.S. Department of Energy (“DOE”) further highlights the uncertainty surrounding the GHG emission data and information for the NECEC project. In 2019, DOE expended taxpayer dollars to contract for a review of CMP’s analysis of purported climate benefits from Canadian hydropower delivered by the NECEC transmission lines. The scope of the review included scientific reports that reflected a broad range of assumptions for the project. Ultimately, these reports did not allow the reviewer to make any conclusive statements on the reasonableness of the GHG emissions data. The information provided in the studies was “not sufficient . . . to perform a detailed assessment,” reinforcing the need for Massachusetts to adequately evaluate hydropower emissions before relying upon this energy source to meet its emission reduction targets.

V. Conclusion

See id.; Teodoru et al., supra note 21, at 11. A recent study concluded that HydroQuebec would be unable to meet the export demand from the NECEC project, possibly necessitating the construction of new hydroelectric facilities. CANADIAN HYDROPOWER EXPORTS TO THE NORTHEAST U.S.: NEW TRANSMISSION CORRIDORS LINKED TO POTENTIAL NEW DAMS, NORTHBRIDGE ENERGY PARTNERS.

Brad Hager Dec. at 3.


Id.

Id.

Id.
Stated bluntly, “[h]ydropower is dirty energy, and should be regarded just like fossil fuel.” There is documented scientific evidence that hydroelectric reservoirs emit substantial amounts of GHGs during the flooding stages of construction and throughout the entire life cycle of the facility. Multiple studies have concluded that these emission levels exceed those of traditional renewable energies and hover near those of fossil fuel plants. However, Massachusetts plans to increase reliance on imported hydroelectricity from Quebec without accounting for the related GHG emissions – even though NECEC will be supplying 17% of the state’s electricity if the CMP corridor is built. The Commonwealth completely disregards these emissions as it attempts to decarbonize the state and achieve net zero emissions by 2050. Massachusetts must consider GHG emission from hydropower as it pushes the state towards its clean energy goals and these considerations should be reflected in the 2030 CECP.

Very truly yours,

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Additional resources: https://www.dropbox.com/sh/qoob5nh5gak3n2y/AABUMcoMEjoxAMzs2YMUKina?dl=0