

**LD 640 Testimony by Tom Saviello to the
Joint Standing Committee on Environment
and Natural Resources**

March 15, 2019

(Supplemental Evidence)

LD 640 testimony presented by Tom Saviello to the joint sanding committee on Environment and Natural Resources on 3-15-19.

Good morning. I am Tom Saviello. I am here representing myself and came to Augusta today because of the importance of LD 640. It is my first time testifying before any committee since being termed out after 16 years serving the people of Franklin County as both their State Rep and Senator. During that time I served on this committee 9 years, 6 as chair.(1)

Let me quickly give you my background: I have BS in Forestry from the University of Tennessee; a MS in Agronomy from the UM and a PHD in Forest Resources from UM. I was the manager of International Paper Northern Forest Research Center and the Environmental Manager at the Androscoggin Mill in Jay. I was instrumental in setting up the USFS climate change research site in Howland.

(<https://crsf.umaine.edu/forest-research/howland-research-forest/>)

I am sure all of you have heard about the New England Clean Energy Connect. Some know it as the "corridor". Some know it as the "one way" electric extension cord to Massachusetts. The proposed Corridor is supposed to bring so called green energy from Hydro Quebec's Dams to Massachusetts. The question remains is it really clean energy? I strongly believe the passage of this resolve will answer that question.

First we all must recognize all power generate has some environmental impact. Consider the following:

1. Solar needs panels....panels need metals.... Metals come from mining
2. Wind need wind mills..... windmill installation blasting the top of mountains off..... You and I have to look at them every day.
3. Hyrdo need flowing rivers..... Rivers need to be dammed... dams cause impoundments which destroy the habitat.

So nothing is "free". However, in the case of the hydro Quebec power source I actually am confused (easily done). Is it really green? Consider the following:

1. CLF is working to ensure that clean energy projects across New England do the most good and least harm for our climate and our communities – including emitting the lowest greenhouse gas emissions possible.
The Northern Pass project fails to meet this test. It will make us reliant on big, carbon-emitting Canadian hydropower, undermining the market for New England's own home-grown, zero-carbon renewable energy. And the construction of enormous new transmission towers will spoil some of New Hampshire's most scenic and sensitive areas.

<https://www.clf.org/making-an-impact/stopping-northern-pass/>

Yet in Maine CLF is comfortable with this “carbon emitting “ hydropower. And now CLF has signed off on the NECEC settlement agreement. I guess electric car charging stations and heat pumps made the power green enough...

2 . Fred Langan Special to The Christian Science Monitor quoted Les Milford from CLF:

“Our major concern is that an energy glut, in this case caused by buying cheap power from Quebec, means there is not economic incentive for conservation measures in New England,” says Lewis Milford of the Conservation Law Foundation, a New England environmental group.”(2)

3.Dams create greenhouse gases. When dams are built in Québec large areas of Boreal Forest are flooded. As a result, organic matter decomposes and releases methane and carbon dioxide. (I WILL COME BACK TO THIS)Currently, it is estimated that Canadian reservoirs contribute 12% to total

Canadian greenhouse gas emissions (Rosenberg et al., 1997).

By the way to date HQ has flooded nearly 7 million acres, 41 % the size of Maine.

So is the hydro power clean?

First, bear with me and let me go a bit further. Let me talk about Forest Soils and Trees as carbon sinks.

A.Forest Soil:

Please look at the three soil diagrams I have provided.

Under these conditions the organic layer comprising the topsoil is usually thick and consists of a litter layer (L) (largely undecomposed), overlying a fermentation layer (F) in which there is some decomposition of the organic remains, and this in turn overlies a humus layer (H) in which decomposition of the organic remains is more or less complete. The turnover of plant remains into nutrients that can be re-used by the trees is very slow here, and is in strong contrast with the rapid turnover experienced in the tropical rainforest.

Ideal soil 5-6% organic matter

Forest soil can have top layers 100% Organic matter to 10-20% in lower soil horizons.

Boggy soils 100%

CARBON principle element

In the Boreal Forest OM is slow to decompose due to climate.... Holds carbon... sequesters carbon!(3)

http://www.soil-net.com/dev/page.cfm?pageid=casestudies_boreal&loginas=anon_casestudies

Recognition of the vital role played by soil carbon could mark an important if subtle shift in the discussion about global warming, which has been heavily focused on curbing emissions of fossil fuels. But a look at soil brings a sharper focus on potential carbon *sinks*. Reducing emissions is crucial, but soil carbon sequestration needs to be part of the picture as well, says Lal. The top priorities, he says, are restoring degraded and eroded lands, as well as avoiding deforestation and the farming of peatlands, which are a major reservoir of carbon and are easily decomposed upon drainage and cultivation.

https://e360.yale.edu/features/soil_as_carbon_storehouse_new_weapon_in_climate_fight

It's thought that the earth beneath our feet is holding up to three times as much carbon as is found in the atmosphere. If we can tap into its potential to suck even more carbon pollution out of the air, it would be a massive advantage.

<https://www.sciencealert.com/soil-minerals-could-be-huge-carbon-dioxide-sink>

B. Trees/Forest

Photosynthetic organisms are photoautotrophs, which means that they are able to synthesize food directly from carbon dioxide and water using energy from light

Don't be fooled by the name; a carbon sink is not where we go to wash carbon. Actually, it's something found in nature that holds or stores carbon — technically anything that absorbs more carbon than it releases.

Forests are great examples for carbon sequestration. In fact, U.S. forests alone store 14 percent of all annual carbon dioxide (CO₂) emissions from the national economy. But how does it happen? You may know that trees survive by performing a process called photosynthesis, in which the tree actually consumes CO₂. Being absorbed by trees is just one way that carbon moves through forests as part of the carbon cycle. This cycle is the process by which carbon travels from the atmosphere into the Earth and its organisms, and then travels back into the atmosphere

How? During photosynthesis, trees and plants "sequester," or absorb, carbon from the atmosphere in the form of CO₂, using it as food. The chemical equation for photosynthesis is: 6 CO₂ (the carbon they take in) + 6 H₂O (the water they absorb) + sunlight = C₆H₁₂O₆ (a sugar

called glucose) + 6 O₂ (the oxygen they release). The carbon from the CO₂ becomes part of the plant and is stored as wood. Eventually, when the plant or tree dies, the carbon it has been storing is released into the atmosphere.

<https://www.americanforests.org/blog/forests-carbon-sinks/>

4 Now let's talk about Hydro Quebec:

1. Last spring this committee held a hearing on the HQ corridor. One of the questions was about the actual "capacity" of HQ to supply this power.

In the application to Mass they stated: The HQ Hydropower Resources are already in service and require no further procurement (HRE Section 83D Application., p. 6).

Yet in a follow up email to Dan they stated:

Hydro Quebec does not need to build any additional generation infrastructure because it is in the final stages of a significant hydropower capacity build out that has added over 5000 MW of new capacity to its system. That the needed capacity would be on line by 2020. (see the email from Carolyn O'Connor HQ)

I suspect this is HQ's Romaine hydro sequence. The Romaine sequence of dams is to be completed in 2020. It will flood nearly 70,000 acres or the equivalent of 3 Maine unorganized townships.

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When Hydro-Quebec dams rivers on northern Quebec's relatively flat terrain, it floods vast areas of forests and wetlands under shallow water. The amount of power Hydro-Quebec produces per acre flooded is among the lowest of any hydropower in the world. The trees, bogs and soils Hydro-Quebec floods have been storing carbon since the last Ice Age. When flooded, this stored carbon decomposes, releasing CO₂ and methane. Both add to climate change.

To make things worse, drowned trees are gone forever and cannot grow back to remove CO₂ in the future.

Bradford H. Hager is a professor of earth sciences at MIT and a part-time resident of Mercer.

<https://www.centralmaine.com/2019/01/12/maine-compass-what-hydro-quebec-gets-wrong/>

Here's an example of their own best available science that Hydro-Quebec did not provide to the newspaper: About a decade ago, Hydro-Quebec built dams to divert the Rupert River to the Eastmain hydro facility, flooding 175 square (5)miles of virgin forest and wetlands. As a result, the first year after flooding, as much CO₂ was released as would have been released by a coal-fired power plant generating the same amount of electricity.

Fortunately, the release of CO₂ slows with time. Unfortunately, it never becomes insignificant. After five years, the total emissions from these Hydro-Quebec dams and natural gas power plants are about equal; after 10 years, the total release from hydro is "only" two-thirds that of natural gas. Extrapolating for a century, Quebec's hydro is about half as dirty as gas — something of an improvement, but in no way "carbon free."

Right of way

I have not discussed the 300 foot right of way to be cut through the middle of Maine. This will be a about a 3000 acre clear cut that will not be allowed to grown back for at least 40 years. There will be no carbon sequestration in the soil and certainly none in the trees!

Now to the "punch line

So is hydro Quebec really green power? Personally I do not think so. But I have not put the numbers to the information I have presented. I believe the resolve Senator Carson will do this.

In closing I offer the following:

1. I believe what I have presented could be basis of the mass balance analysis identified in the Resolve, which would require the Department of Environmental Protection to review all relevant, verifiable evidence on the total net effect on greenhouse gas emissions from Central Maine Power Company's New England Clean Energy Connect project.
2. DEP must either do the work or be the facilitator.
3. CMP and HQ need to be forth coming with any information required to complete this study. Lack of participation is a clear sign there is something to hide.
4. I realize the project will require revenue. Today I believe I can offer money to assist in completing this project. However, HQ and CMP each needs to match every dollar I may be able to secure.

With that I close and thank the committee for it indulgence. May I answer any questions? (6)

Filing with Mass:

... HQ probably wants to keep building more dams, but they went out of their way to tell Massachusetts they weren't going to have to build anything new to supply this contract. Building new dams is highly controversial and has its own environmental impacts because of the decomposition of all the forest that gets drowned.

WHY WOULDN'T HYDRO-QUÉBEC INVEST IN UPGRADES OF EXISTING UNITS TO MEET NECEC SUPPLY OBLIGATIONS?

Hydro-Québec's application explicitly states that it is not going to invest in upgrades to meet its supply obligations via NECEC:

All of the hydroelectric generation units that comprise the HQ Hydropower Resources are in operation and therefore have already been constructed. Although new hydroelectric generation units may be added to the HQ Hydropower Resources portfolio in the future, no new facilities or capital investments for hydroelectric generation units are required as part of this Proposal (emphasis added, HRE Section 83D Application Form, pp. 62 and 82).

WHAT WILL BE THE SOURCE OF ENERGY SUPPLY PROVIDED INTO NEW ENGLAND VIA NECEC?

NECEC is a joint venture between CMP and two of Hydro-Québec's subsidiaries: Hydro-Québec TransÉnergie ("TransÉnergie") and Hydro Renewable Energy, Inc. ("HRE"). The NECEC proposal would have HRE supply energy across a transmission line sited in Québec (built by TransÉnergie) and continuing into Maine (built by CMP). Both CMP and HRE submitted a completed application form as part of the NECEC Section 83D bid; only CMP's application was provided as part of the hearing before the Maine PUC. The public, non-confidential version of HRE's completed application form to Massachusetts (Exhibit No. JMS-5, "HRE Section 83D Application") makes it very clear that energy supplied via NECEC would come from existing hydroelectric facilities already built and operating in Québec, as illustrated by the following excerpts:

--The HQ Hydropower Resources are already in service and require no further procurement (HRE Section 83D Application., p. 6).

-- This Proposal offers a viable, low cost Clean Energy Generation delivery project with limited risk, because (i) there is no construction risk related to the generation resources which are already in service . . . (p. 4).

-- Because no new hydroelectric generation projects will be required, there will be no incremental environmental impacts from hydroelectric generation as a result of this Proposal (p. 56).1

Therefore, NECEC energy would be supplied from a portfolio of existing hydroelectric facilities already in operation located in Québec, and there would be no new incremental hydroelectric capacity built or upgraded for purposes of producing energy for delivery via NECEC.

When I pushed back we received this:

Hydro Quebec capacity

From: O'Connor, Carolyn [mailto:OConnor.Carolyn@hydro.qc.ca]
Sent: Friday, May 25, 2018 4:56 PM
To: Tartakoff, Daniel
Subject: Follow up from Hydro Quebec

Good Afternoon Daniel,

I am writing at the request of Joel Harrington from Central Maine Power. Joel asked that I provide information to you and the Environment Committee about the generation that will support the energy contract with the Massachusetts utilities. I understand that you specifically asked if any new generation infrastructure would need to be built to supply the contract.

Hydro Quebec does not need to build any additional generation infrastructure because it is in the final stages of a significant hydropower capacity build out that has added over 5000 MW of new capacity to its system. The attached slide provides

a snapshot of the timing and amount of that capacity. As you will see, a final 245-MW unit is currently under construction and expected to become operational by 2020.

Please do not hesitate to contact me if you have any additional questions about this information.

Carolyn O'Connor

External Affairs

HQUS

413-531-4353



