

**Natural Resources****One tomb raider good: Two tomb raiders better**By **Robert McCullough**

Robert McCullough

(December 23, 2021, 2:28 PM EST) -- In searching for the title to this essay I briefly considered using "If one round peg in a square hole is good, two must be better." Unfortunately, although this fits the facts better, it lacks the predatory subtext of the quote from Angelina Jolie's film *Tomb Raider*. And even that quote isn't all that good since the facts are closer to "One tomb raider good: Three tomb raiders better."

In 2018, Hydro-Quebec won the auction in Massachusetts offering to sell 1,000 megawatts of environmentally friendly hydroelectricity to the environmentally conscious citizens of that fair state. As with all Hydro-Québec contracts, the paperwork was long, written in a curiously Dickensian style, and ultimately making no pretence that the transaction would provide environmental benefits. Even stranger, the transaction did not provide the one facet of hydroelectric generation that actually is environmentally beneficial — the ability to store inexpensive off-peak energy at night and then generate the electricity during the day.

Instead, Hydro-Québec proposed selling the same energy that it was already selling to the U.S. and Ontario — baseload — but to Massachusetts. The oft repeated claim that Hydro-Québec is the world's largest battery wasn't part of the deal. And, of course, the global warming implications of reducing sales to New York and Ontario and increasing the sales to Massachusetts has no impact on the global warming at all since it simply moves thermal emissions from Massachusetts to New York.

The project has not gone well. The first transmission path through New Hampshire did not pass the review of regulators. Hydro-Quebec was ready for this and proposed a second path through Maine. This has not passed the review of Maine's voters who rejected the plan earlier this month.

The third try in New York (three tomb raiders better than two, remember) is off to a fine start, but makes even less economic and environmental sense. In this iteration, New York will buy baseload energy from Hydro-Québec largely replacing the energy the state already purchases on the spot market from Quebec — but for quite a bit more.

At the heart of this confusing policy failure is the U.S. belief that Hydro-Québec is actually surplus. Decision makers in the U.S. believe that if the U.S. builds more transmission lines, Hydro-Québec's hydroelectric generation will somehow increase. This is not a very good theory.

Hydro-Québec's average hydroelectric inflows are 220 terawatt hours per year. Hydro-Québec can store some of the inflows for later use or draw down its reservoirs for a current need. However, the limiting problem is fuel supply. Over the course of several years, the limit is 220 terawatt hours per year. Unless Hydro-Québec actually builds a new set of dams — scheduled currently for the Petit Mecatina River on the North Shore of the St. Lawrence Seaway — there is no new energy to export.

Alternatively, Hydro-Québec can build wind farms and expensive transmission to sell the wind to New York as baseload power. If the key is wind farms, New York can also build wind farms — at a lower cost — and sell them to itself. Where did this set of policies go so far wrong?

The basic idea of capturing the economics of hydrothermal diversity is not new. The idea was the basis of the electrification program that developed the storage and thermal plants in British Columbia and the Pacific Northwest 50 years ago. The Hydro-Thermal Program (the catchy name was created

at the Bonneville Power Administration) also envisaged a massive seasonal exchange of summer power from the cool northwest for winter energy from warmer California.

Is it possible to fire the Tomb Raiders and actually help reduce global warming — and even provide lower rates to New Yorkers? The answer is yes. For those who are interested in a brief discussion of the history of the Hydro-Thermal Program, it can be found here. This is not just an academic theory — it actually works very well and has worked well for many years.

The first step is to identify the valuable assets. As it happens, Hydro-Québec's dams are not the valuable assets. The valuable assets are the reservoirs behind the dams. Nor do we want more reservoirs. Unlike the Columbia River Basin where the river runs from the Rockies to the Pacific Ocean, Quebec is relatively flat. Quebec's reservoirs are massive, but relatively shallow. New reservoirs would require the elimination of vast tracts of boreal forest with significant carbon consequences. However, using the existing reservoirs better has few environmental costs. Luckily, it is possible to make a reservoir larger by updating the turbines at the dams which generate the electricity. Hydro-Québec has been slow to upgrade existing aging turbines unlike comparable institutions elsewhere.

The second step is to identify specific diversity opportunities. Using hydroelectric dams as baseload resources is costly and inefficient. Unlike thermal units, hydroelectric units are best used as peakers. They can respond quicker and more reliably in that role than almost all gas fired units. In terms of efficiency, they are better at turning off-peak energy into on-peak supplies than lithium-ion batteries.

Transmission is the key. For hydrothermal diversity to work, we need to be able to provide significant peak generation in summer when Quebec's electric heating loads are minimal and to allow the U.S. to provide off-peak energy in winter when the U.S. cooling loads are at a minimum.

The economic benefits of transmission are maximized when, like a highway, products can travel in both directions. Hydro-Québec's current proposals are one-way — to the U.S. and baseload — the same day or night and summer and winter.

Transmission does have its challenges. First of all, owners of the right of way need to get a portion of the benefits. On the Canadian side, Hydro-Québec has had a long adversarial relationship with the First Nations who actually occupy the land containing the right of way. This continues to this day. One reason for Hydro-Québec's defeat at the polls in Maine was the continued opposition of First Nations who have historically contributed their land and rivers, but received little in return. On the U.S. side, Hydro-Québec has had little respect for U.S. standards of transparency and due process. In both of the failed efforts to get transmission to the U.S., Hydro-Québec has stonewalled regulators and critics on energy and environmental issues.

The poorly drafted New York contract will probably face many of the same problems that the similarly drafted contract with Massachusetts has had in New Hampshire and Maine. The lack of transparency creates suspicions, the lack of co-operation creates enemies, and the lack of environmental substance creates opponents. All three problems are relatively easy to solve — however, I think we will find that if one tomb raider is good, two are better is the wrong model.

*Robert McCullough is principal of McCullough Research in Portland, Ore., and advises governments, utilities and Aboriginal groups from California to Quebec on energy issues.*

*Photo credit / Josie\_Desmarais ISTOCKPHOTO.COM*

*Interested in writing for us? To learn more about how you can add your voice to The Lawyer's Daily, contact Analysis Editor Peter Carter at [peter.carter@lexisnexis.ca](mailto:peter.carter@lexisnexis.ca) or call 647-776-6740.*