

# THE NEGLECTED POTENTIAL OF MEDIUM SCALE HYDROELECTRIC PROJECTS

Up until now, Quebec's hydroelectric production has mostly been associated with very large scale projects like the James Bay and Manicouagan dams. At the other extreme, the Quebec government has left the operation of small installations, 50 megawatts (MW) or less, to the private sector, which is experiencing increasing success at that level. However, an important portion of Quebec's hydroelectric potential remains unexploited: that of medium scale projects.



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These projects, with 50 to 125 MW of installed capacity, are a far cry from the Manic-5 generating station's 1,596 MW. Still, there are some fifty potential sites that would add from 3,000 to 5,000 MW to Quebec's hydroelectric production and give rise to several billions of dollars of private investments. However, due to certain considerations, the development of these promising multifunctional sites is constantly being postponed.

## Hydro-Québec's mission

Hydro-Québec first mastered the development of large projects because they are more economical per kilowatt-hour produced. It is thanks to these large scale projects that the government corporation built up its expertise and reputation. Medium scale projects, even if they could often be very profitable, did not receive the same kind of attention.

Actually, a medium scale project can be all the more profitable for a community given that it leads to important real estate and tourist and recreational developments. However, Hydro-Québec's mission is focused on the production, transportation and distribution of electricity. Since these other potential benefits do not fall under one of these areas, they are not considered in their economic impact analyses.

It should be noted that Hydro-Québec's own size does not make it the ideal instrument for running medium scale projects. Such projects cannot support the weight of the

study and approval process applied to large projects. Neither do they require the same management method, the same business culture or the same technical requirements justified by larger projects of strategic importance to the network.

## Positive impacts on several levels

The impact of developing these medium scale projects would be felt on several levels. First, from an economic point of view, this hydroelectric production could be used to meet domestic needs, could be exported, or could serve as an extra source of power while reservoirs are being filled. It would generate direct local activity thanks to the value thus created and thanks to new jobs, especially during construction.



The slightly higher unit cost of these developments, from \$0.10 to \$0.12 per kWh, could be competitive in Ontario's market, among others, where much higher purchasing prices were still recently guaranteed, namely \$0.135 per kWh for wind energy, \$0.195 for biogas and even \$0.802 for solar energy.<sup>1</sup>

Second, hydroelectricity obviously has the advantage of being a clean and renewable energy source. It was officially recognized as such by 154 countries at the International Conference for Renewable Energies, held in Bonn, Germany in 2004.<sup>2</sup> We estimate that compared to thermal power plants such as the Tracy generating station, hydroelectricity avoids the combustion of 2,500 tonnes of fuel and the emission of 10,000 tonnes of

1. Ontario Power Authority, *FIT Price Schedule*, June 2011.  
2. Hydro-Québec, *The Main Source of Renewable Energy*, <http://hydroforthefuture.com/energie/3/the-main-source-of-renewable-energy>.

greenhouse gases for each MW installed. Moreover, medium scale hydroelectric power plants can more easily be designed on a run-of-river basis, which is to say without creating large reservoirs.

Third, medium scale power plants can accommodate the development of tourist and recreational as well as real estate potential, which must also be considered. While creating artificial lakes may displace existing ecosystems along riverbanks, it also creates a new environment ideal for aquatic life and can include the development of spawning grounds and fish ladders toward tributaries. The forced oxygenation of the water through the turbines as well as the regulation and the management of water levels to avoid destructive flooding also contribute to the vitality of these ecosystems.

Thus, with simple measures, it is possible to attenuate the environmental impacts of hydroelectric projects and to allow the regions concerned to benefit from a large new body of water, and therefore also from beaches, camping grounds, nature trails, major tourist infrastructure, etc.

Quebec is endowed with some 4,500 rivers, over 8,000 lakes with surface areas of at least 3 km<sup>2</sup>, and a far greater number of smaller lakes.<sup>3</sup> And yet, among the most frequented and the most famous (even abroad) Quebec sites for leisure, fishing and outdoor activities are the Gouin, Baskatong, Kipawa and Taureau reservoirs, which resulted directly from hydroelectric projects. Entire sub-regions survive on these reservoirs. Their existence contributed to the establishment of numerous outfitters and opened vast regions to hundreds of thousands of people, especially due to the quality of fishing to be found in reservoirs.

Access to calm bodies of water, rare and highly valued in the secondary homes market, also creates immense real estate potential on the banks of reservoirs (like Taureau and Baskatong), which would contribute to the profitability of several hydroelectric projects that are very well situated near urban centres in southern Quebec.

Here again, concrete examples allow us to evaluate the extent to which this is a major instrument for social and economic development. In the Laurentians, for example, one of the most important tourist regions in Quebec, a major portion of development happened around nine small reservoirs created at the beginning of the 20<sup>th</sup> century on the Rivière du Nord. Lake Masson (Sainte-Marguerite-Estérel), Lake Manitou and Lac

des Sables (Sainte-Agathe-des-Monts) as well as Lake Théodore (Saint-Adolphe) are good examples. These reservoirs were part of the successful recipes for communities where a significant share of jobs are provided directly or indirectly by tourism.

## A potential to be developed by communities

Even if carrying out technical studies and consultations and managing hydroelectric power plant projects requires in-depth knowledge, it is important to note that Hydro-Québec is not the only organization with this expertise. Several engineering firms in Quebec offer these kinds of skills and experience here and elsewhere on the international market.

The law already recognizes that it is up to regional county municipalities (RCM) and native communities to develop regional land use plans in order to evaluate the entire set of economic and environmental impacts of proposed projects.<sup>4</sup> It is these communities that should therefore decide to develop their own hydroelectric potential for projects up to 125 MW by incorporating this development into their land use plans. It should also be up to them to choose their partners through calls for proposals.

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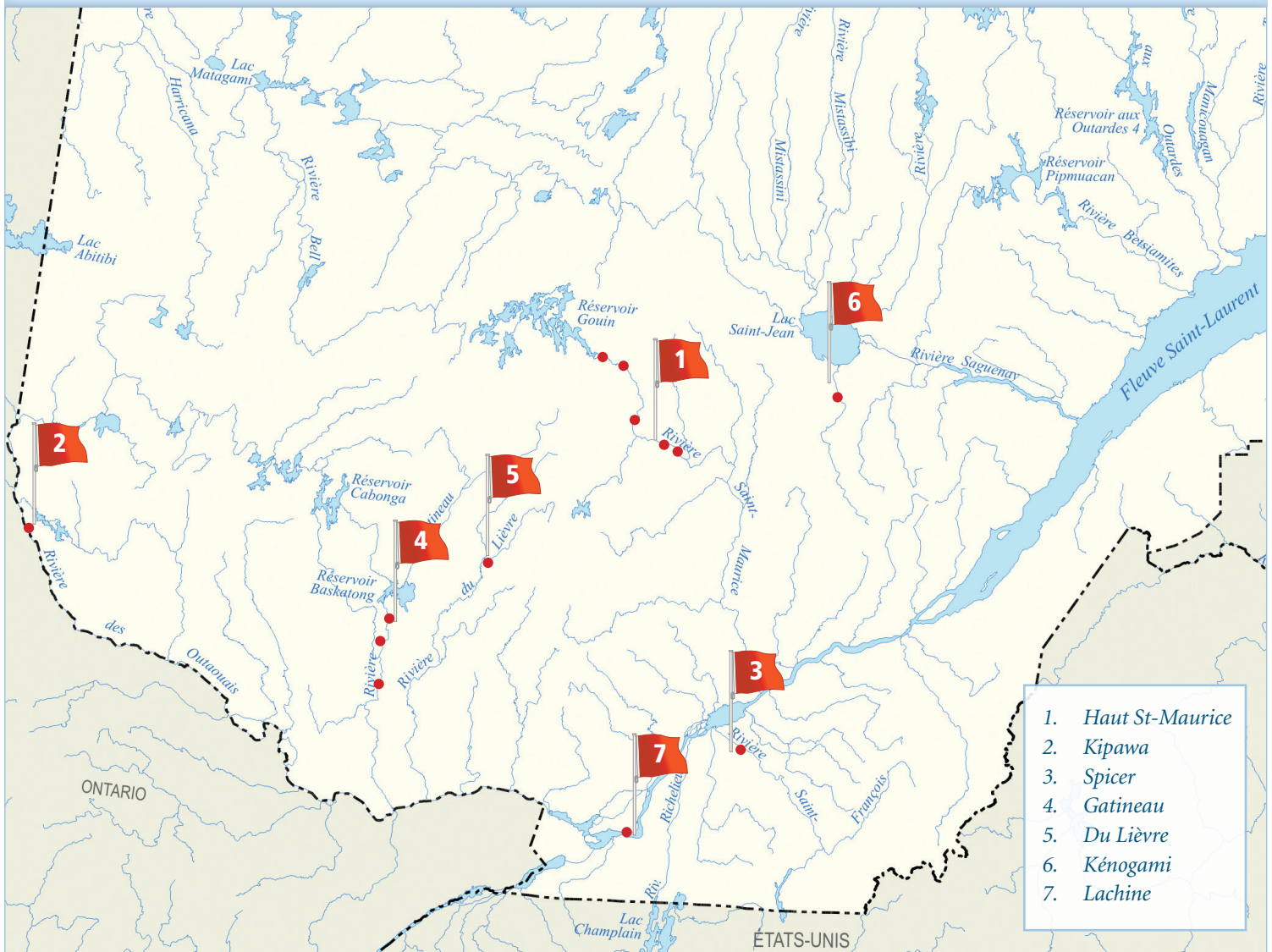
By entrusting control of the development of these medium scale hydroelectric projects to RCMs and communities, they could finally take into account all facets of projects, including flood control as well as environmental, tourist and recreational, and real estate aspects. Politically, it would surely be more appropriate and efficient for these projects to be promoted and defended regionally by representatives in the field and in the name of the populations most concerned.

Hydro-Québec's main role would thus be to establish a contract for the purchase of the energy produced and maybe to become a nominal partner in the projects, which would allow to go forward within the current legal framework. Hydro-Québec could even then have the right to buy the property titles of the best projects according to a "cost-plus" formula. Moreover, these projects would offer excellent, relatively low-risk and profitable investment opportunities for our financial institutions.

Hydroelectric development has played an essential role in the modernization of Quebec for a century. Development opportunities set aside up until now could still play this kind of role. A favourable political climate is all that is needed for this neglected potential to enrich and improve those communities that want to harness it. —

3. Natural Resources Canada, *The Atlas of Canada – Lakes*, <http://atlas.nrcan.gc.ca/site/english/learningresources/facts/lakes.html>.  
4. *An Act respecting land use planning and development*, R.S.Q., ch. A-19.1, s. 3.

Figure 1 - Examples of projects



Such medium scale projects could be developed in various regions, like these few examples located in southern Quebec (see their exact locations on the map above).

### 1. The Haut Saint-Maurice

It would be possible to develop five medium scale projects, each with 60 to 65 MW of power, while limiting the area submerged to some fifteen square kilometres. A large complementary development would be possible with regards to employment, transportation, an airport, vacation resorts and outdoor activities. Numerous jobs could be created in the native community of Wemotaci. Projects are equally feasible in the other tributaries of the Saint-Maurice River, especially the Vermillion, Trench and Matawin Rivers.

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### 2. The Kipawa Reservoir

This large Ottawa River reservoir, built by the Canadian government at the beginning of the last century, is already more than sufficient to add a full-time 70 MW power plant without significantly impacting the environment. Developed by the community, this project would be by far the most profitable in Quebec at this time, and would provide a return on investment within just a few years.



### 3. The Spicer Rapids (Drummondville)

By flooding eight kilometres of the inhospitable canyon with unstable walls along the Saint Francois River downstream from Drummondville, an accessible reservoir would be created with some 18 km of shoreline, open for real estate development, in a region lacking in lakes. The installed capacity could reach up to 65 MW, and the project would submerge at most half of a square kilometre of land. Assuming a parcelling out of properties with 50 metres of shoreline each, approximately 350 properties could be built. With an average value of \$400,000 per property, this would mean an investment of \$140 million into the region.

### 4. The Gatineau River

Between the Mercier Dam and the Paugan Reservoir, in the Maniwaki – Grand Remous region, there are at least three interesting sites for projects, for a total potential on the order of 130 to 160 MW. One of these is situated on the Kitigan Zibi native reserve, just south of Maniwaki. In their current state, the very steep banks make the river difficult to access. The project could include exceptional touristic and outdoor development, in addition to providing an important road link between the two banks of the Gatineau River.

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### 5. Upper Du Lièvre River (Ferme-Neuve)

Eighty kilometres upstream from Mont-Laurier, a 60 m high waterfall could accommodate a 50 to 60 MW power plant whose reservoir would put an end to the repeated floods experienced all along this large river, especially in the Ferme-Neuve region.

### 6. Lake St. John and the Saguenay

With a single reservoir located at the northern edge of the Laurentian Park, it would be possible to intercept the waters of the three main tributaries of the Kenogami Reservoir and install a power plant on the order of 125 MW. This would also permanently shelter the entire La Baie region from another eventual flood the size of the floods that occurred in 1996. Around 10 other projects could be worth studying on the Rats, Mistassini and Mistassibi Rivers.

### 7. The Lachine Rapids

The dikes of the Montreal region's first hydroelectric power plant are still in place in the Lachine Rapids. It would be possible for the private sector to rearrange and properly secure the premises and install three or four new turbine generator groups for 45 to 60 MW of power. The project would enhance the shoreline of the LaSalle sector.



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