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ILLUSTRATION: Map: Andrew Barr, National Post / QUEBEC'S BLUE GOLD: Seasonal water would be captured in Northern Quebec, and then released to run down the Ottawa and Saint Lawrence Rivers to the Atlantic. The new flow of water through the Saint Lawrence would free up water resources for use in the Great Lakes and south through the Mississippi River. ;  
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### **L'eau du nord: blue gold; The 'Northern Waters' project would give Quebec fresh water for export and more hydroelectricity**

Water is likely to become one of the key resources of the 21st century. Although we have problems to deal with, such as the dropping level of the Great Lakes and localized pollution issues, we are lucky in Canada to have some of the largest renewable freshwater reservoirs on the planet. Elsewhere in the world, particularly among our neighbours to the south, people would be willing to pay considerable sums to access a small part of this water.

The increased importance of water is reflected in the fact that policy statements and government interventions related to water management are multiplying. Unfortunately, most of these focus on restricting water usage and preventing a more rational use, instead of looking at ways to make the most of this natural resource.

In Quebec, for example, the debate over exporting large quantities of northern water has never really taken place. The only minimally detailed proposal that was ever discussed was that of the so-called "Grand Canal," first made in the 1960s and then revived by a group of business people in the 1980s.

It was a grandiose project, along the scale of the pyramids of Giza, involving the construction of a massive dam closing James Bay and a long canal diverting the accumulated fresh water to the Great Lakes. Several nuclear power plants would have been required just to pump the water, and the cost of the project at the time was estimated at \$100-billion, which would be \$175-billion today -- three times the annual budget of the entire Quebec government!

What has always been missing to allow for a proper rational discussion of this opportunity was a technically realistic, sustainable plan to develop the resource, a project that doesn't involve

massive changes to the ecosystem and that would be financially viable.

The image that comes to mind for most people when discussing the idea of bulk water exports is either this pharaoh-scale project or the diversion and depletion of a major river. But there is a third option, that I have dubbed the Northern Waters project, which would be to use only the surplus water generated by seasonal flooding.

There are three rivers in the James Bay basin, just north of the Abitibi region, which have not been developed for hydroelectric power: the Broadback, Waswanipi and Bell. The Northern Waters project would capture the seasonal runoff and gather it in basins before it flows into the northern lowlands. Compared to the Grand Canal project, 85% of pumping efforts would thus be eliminated.

The surplus waters would then be diverted via the natural riverbeds through a series of pumping stations along the Bell River into the Ottawa River valley. From this, the additional average flow of 800 cubic metres of water per second (CMS) would flow into the Ottawa River, down to the Saint Lawrence just above Montreal.

It would be exploited by adding more power facilities to the existing dams on the Ottawa River or through a more intensive use of existing plants which are not running at full capacity. This would involve very modest civil engineering works compared to past Quebec projects -- without flooding the surrounding landscape. The net energy produced (more than 14 terawatt-hours annually) could contribute in large part to making the project viable, before negotiating any sale of fresh water.

Northern Waters could provide new water supplies to 150 million people. For Quebec, the main benefit of the project would be the export of a large quantity of fresh water, without one drop having to leave the province. Water would flow down the Ottawa River to the Saint Lawrence, and to the Atlantic--as it always has. But the new flow of water down the Saint Lawrence would free up water resources in the Great Lakes.

Current treaties between Canada and the United States and between bordering states and provinces regulate the water level and establish a certain flow in the Saint Lawrence, under the International Joint Commission. The flow of 800 CMS from an alternative source into the Saint Lawrence River would theoretically reduce the amount of water required from the Great Lakes by as much.

Part of the newly available quantity of water could be used to regulate the level of the Saint Lawrence River and Great Lakes. Ontarians and Americans may also choose to use a certain quantity for their freshwater-consumption needs. The diverted water could theoretically serve the needs of some 150 million people. The surplus could be delivered to the Midwest and South

via a detour through the Chicago Canal and Mississippi River.

The debate over the necessity for populations in the Great Lakes area to use large amounts of the fresh water from these great reservoirs in the medium term has already begun and could lead to a major political conflict between Canada and the United States. The Northern Waters project would be an ingenious way to resolve this problem on a commercial basis.

The environmental impact of the Northern Waters project would be relatively small. As mentioned, the project would capture seasonal surplus waters only and not upset ecosystems by completely diverting and draining the rivers involved. The 800 CMS diverted correspond to just 6.3% of the total flow into James Bay and a maximum of 2% of Quebec's fresh water. There is thus no reason to fear a major advance of saltwater from Hudson Bay toward the south.

Considering that ocean levels may rise in the coming decades due to global warming, the Northern Waters diversion may have the positive effect of offsetting this by turning Quebec's fresh waters back into the continent. The environmental impact in the floodwater catchment basin would be limited by the maximal use of the naturally existing bodies of water. Given the quantity of water diverted compared to the volume of the reservoirs, mercury would not be a problem either since it only leaches in high concentrations out of recently submerged lands when the water is dormant for long periods.

The environmental impact on the Ottawa River would also be minimal, since its flow would be kept stable and well below natural flood levels. Finally, there is the crucial and well-known fact that hydroelectricity is a non-polluting, renewable form of energy that does not produce greenhouse gases.

The profitability of the Northern Waters project is unquestionable. Taking inflation and financing costs into account, the total cost of the Northern Waters project is estimated at \$15-billion in current dollars at the end of 2022, when the project would be completed. We are light-years away from the \$175-billion Grand Canal project.

The minimum annual revenue from the sale of energy produced on the Quebec market in 2018 is estimated at close to \$2-billion, which is 14% of the amount invested. More revenues could flow from the additional value of energy sold during peak periods and from energy export sales and pollution credits, if such a credit system were functional here in 15 years.

The revenue generated by exporting fresh water would be the result of complex negotiations between state, provincial and federal governments. At best, we can hypothesize the value of water. A first estimation method would be to calculate the cost of desalinating an equivalent quantity of saltwater. At the current cost of about \$0.85 per cubic metre, this suggests the spectacular amount of more than \$20 billion for 25 billion cubic metres of water diverted

annually.

Another way to estimate this value would be to assume that each of the 150 million people whose needs could be served by the project would pay the very reasonable rate of \$50 per year. In this case, annual income from the exports would be \$7.5 billion.

Whatever the outcome of negotiations, and given the probable increase in the value of water in the coming years, this revenue from the sale of water would contribute significantly to the financial health of the Quebec government and the general prosperity of Quebecers and Canadians in general.

The Northern Waters project proposes developing Quebec's blue gold in a realistic and environmentally respectful manner. The project would be viable even if it were limited to its hydroelectric dimension. By adding water exports, it would allow Quebecers to generate wealth thanks to the increasing demand for a rare resource found in abundance on our territory, exactly as oil exporting regions do. Given the project's considerable benefits, limited environmental impact and reasonable costs, it deserves objective and open-minded analysis. - This is from a commentary to be released today by the **Montreal Economic Institute. F. Pierre Gingras, a specialist in industrial engineering, worked for 31 years in the construction of hydroelectric projects at Hydro-Quebec, including 17 as division manager for the planning and estimation of major projects.**