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Project to build a natural gas liquefaction installation in Bécancour

Summary

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The project to build a natural gas liquefaction installation in Bécancour is subject to Articles 31.1 et seq. of the Environment Quality Act. In March 2014, the promoter, Stolt LNGaz Inc. (hereinafter referred to as Stolt) submitted a notice of the proposed project to the Ministre du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques¹. The environmental impact study was submitted to the Ministre in June 2014. During the public information and consultation phase, from November 4 to December 19, 2014, twelve requests for public hearings were addressed to the Ministre.

On January 19, 2015, the BAPE was given a mandate for an enquiry and public hearings according to Article 31.3 of the Act. The president of the BAPE, Pierre Baril, formed a Commission of enquiry for which the mandate began on February 2, 2015, for a maximum period of four months. Both parts of the public hearings were held in Bécancour, over five meetings that took place in February and March 2015. The Commission received 25 briefs, of which 19 were presented to the public hearings.

The interventions mostly concerned the subjects of natural gas supply, the relationship between hydrocarbons and greenhouse gas emissions, economic benefits for the local economy and for the regions to be served, quality of life for residents living near these sites, technological risks related to the transformation and transportation of liquefied natural gas, wetlands management and, finally, concerning the promoter's work.

The project

Stolt is a Canadian company registered in Quebec since 2014, having its headquarters in Montreal. Stolt wishes to build a natural gas liquefaction installation in the Bécancour Waterfront Industrial Park. Liquefaction of natural gas significantly reduces its volume; one cubic metre of liquefied natural gas (LNG) is the equivalent of 600 cubic metres of natural gas. This reduction in volume allows LNG to be transported to regions that are not served by gas pipelines.

Stolt's objective is to reach medium and large industries that consume considerable quantities of diesel and fuel oil for their operations or for heating. Stolt would prioritize serving Québec's North and Côte-Nord regions, as well as Eastern Canada. Stolt plans to build a methane terminal in Sept-Îles. It also plans to serve businesses in Southern Quebec that do not have access to natural gas distribution networks. While developing its markets in Quebec and elsewhere in Canada, Stolt is also considering the possibility of exporting LNG

1. Before April 23, 2014, le ministre du Développement durable, de l'Environnement, de la Faune et des Parcs.

to Europe, the North-eastern United States and the Caribbean in order to distribute the entire production of the Bécancour facility.

The project would be carried out in two phases. A first gas liquefaction unit with a production capacity of 500,000 t of LNG per year would be in service by 2018. A second unit, with an equivalent capacity, could eventually be built if Stolt achieves sufficient penetration in Quebec and Canadian markets. A LNG storage tank with a capacity of 50,000 m³ would be built along with the first phase of the project. LNG pipelines would connect the plant site to the Pier B-1 of the Bécancour port, where the LNG tankers would be loaded. The cost of the first phase of the project is estimated at \$488M.

The LNG would be chiefly transported to customers by tanker ships. In order to serve markets in or near Quebec, the promoter plans to use LNG tankers with a capacity of 15,000 m³. For export markets, the ships would have a maximum capacity of 40,000 m³. From one to three tankers would load at the plant each week. Then, from LNG terminals to the customers, transport could be done by truck or by train. LNG regasification facilities would probably be situated directly at the customer's location and under their own responsibility.

The promoter sees its business model as "small scale." The liquefaction production capacity, the volume of stored LNG and the capacity of the LNG tankers are all modest when compared with other projects of the same nature.

Justification for the project

The North American natural gas market is integrated. Because of this, reference prices are the same all across this region. What's more, there are no trade barriers for natural gas between Canada and the United States other than the capacity of transport infrastructures. After having reached a high of 31¢/m³ in 2005 and in 2008, the price of natural gas fell significantly, and has been hovering between 10 and 15¢ /m³ in recent years. The cost of fuel oil, however, after dropping temporarily in 2009 and 2010, remained high, at almost 80¢ /litre until the end of 2014. As a result, and most specifically since 2009, the cost per gigajoule (GJ) of energy produced with natural gas has been less expensive by a wide margin than the cost per gigajoule from fuel. However, since the price of petroleum products fell in late 2014, this difference has been cut in half.

In order for LNG to be advantageous for the industries that Stolt aims to serve, it must be less expensive than fuel oil once all costs are taken into consideration, including the costs related to equipment reconversion and regasification of the LNG. The commission of enquiry noted that the cost of LNG from Gaz Métro LNG and Stolt projects would be less than \$12 /GJ, not including the cost of transporting the LNG to clients and its regasification. At this price, the LNG would have been competitive on the North American market from 2011 to 2014, while the cost of fuel oil rose to over \$20/GJ. Gaining access to natural gas, for industries that are not currently served, could reduce their energy costs by as much as 40%,

once the equipment conversion costs have been amortized. These economies would be possible inasmuch as the price difference between that of natural gas and fuel oil remains as it was from 2011 to 2014.

Many regions and industries in Quebec and in Northern Canada will not be served by natural gas distribution networks, even in the long term, because of the great distances between potential customers. With respect to the principle of economic efficiency in the *Sustainable Development Act*, the Commission of enquiry estimates that the availability of natural gas in these regions would offer greater flexibility to medium and large companies for their energy supply, and this could make them more competitive. What's more, if these industries had access to natural gas, they could reduce their greenhouse gas emissions by some 26%, significantly reduce nitrogen oxide and fine particle emissions, and eliminate sulphur dioxide emissions.

Stolt applied to the National Energy Board for a licence to export LNG. This licence application is based on a maximum annual volume of 500,000 t of LNG, the equivalent of 50% of the production of both units of the liquefaction plant. The application is being evaluated. Exporting LNG could take advantage of higher prices on other markets. However, even though the LNG market is global, prices can be quite volatile. After the prices peaked at 59¢ and 51¢ US/m³ on the markets in Japan and Spain in 2013, the price of LNG gradually settled at 28¢ and 25¢ /m³ on these markets in early 2015. The Commission of enquiry noted that with a price of about 42¢ /m³ at Stolt's plant, plus the cost of transporting the LNG overseas, it would not have been competitive in 2014, and still would not be competitive today.

The natural gas supply requirements for both liquefaction units could reach 1,330 MSm³ per year, coming from the Gaz Métro distribution network. This volume corresponds to about 22% of Quebec's annual consumption or 1.5% of that of Canada, or a minute fraction of that of North America. The National Energy Board and the Régie de l'énergie both estimate that considering the high degree of integration in North America's gas markets, satisfying Quebec and Canada's natural gas needs is not an issue. The Régie de l'énergie also notes that neither shale gas nor biogas from Quebec can be considered as supply options before 2030. The Commission of enquiry therefor estimates that, in the short term, the main issue concerning natural gas supply in Quebec is that of access to gas transport infrastructures in Quebec, rather than North America's production capacity.

Stolt answered a call for submissions from TransCanada Pipelines seeking to ensure supply for its plant for the next 15 years. For the moment, this corresponds to a volume of natural gas for one liquefaction unit. Stolt is also committed to evaluating its natural gas supply strategy and the possibility of satisfying part of its supply needs with biogas produced in Quebec from waste.

Greenhouse gas emissions

The greenhouse gas emissions (GHG) from this project were evaluated in two ways. First emissions from the Bécancour installations were estimated in the environmental impact study. Then a life cycle analysis (LCA) evaluated the GHG from this project “from cradle to grave,” in other words from the natural gas extraction well head to the use of this fuel by the customers.

The GHG from the natural gas liquefaction installations in Bécancour would be relatively modest, some 31,000 t equivalent of CO₂ annually. Over the course of its life cycle, the LNG produced by Stolt could allow a 27% reduction in GHG in relation to a situation where the same energy requirements would be chiefly met by burning diesel and heavy fuel oil. Three quarters of this reduction would take place at the phase where the customers use the energy.

Sensitivity analyses were carried out during the life cycle analysis (LCA) in order take into consideration the fact that most of the natural consumed in Quebec currently comes from the United States. Also taken into consideration were the high variability of fugitive emissions and the updated Global warming potential (GWP) factors. Even with these modifications to the LCA hypothesis, the GHG emissions reduction associated with the replacing of fuel oil or diesel with natural gas remains significant, in the order of 23%.

The Commission of enquiry is of the opinion that in the short and medium term, the Stolt project would have a positive effect on Quebec's GHG emissions record, insofar as the majority of the LNG produced at the Stolt installations in Bécancour would be delivered and used in Québec.

According to GHG cap-and-trade regulations, Stolt is considered a fuel distributor. From the start of its operations, Stolt would produce 500,000 t of LNG. The use of this LNG would generate GHG emissions of more than 25,000 t equivalent of CO₂ annually. Stolt would therefore have to buy emission rights in order to cover all of these emissions, with the exception of the LNG volumes sold to companies that are already subject to cap-and-trade regulations.

Potential impacts on the receiving communities

The Stolt plant and the pier used to load the LNG tankers would be situated at more than 5.6 km from the urban cores of Bécancour and Gentilly, and from the Wôlinak Abenaki reserve on the south shore of the St. Lawrence River, and more than 4.8 km from the urban core of the town of Champlain on the north shore. There are isolated residences at 1.2 km from the pier on the north shore, and 2.5 km from the plant on the south shore.

Atmospheric emissions from the Stolt project would not have a significant impact on the quantity of contaminants in the Bécancour Waterfront Industrial Park. The maximum ambient air concentrations would respect the MDDELCC air-quality standards. With the

addition of a thermal oxidiser, the odour of hydrogen sulphide from the processing of acid gases would not be noticed.

Fine particle emissions ($PM_{2.5}$) from the Stolt project would also be very low. However, the Commission of enquiry considers that a progressive increase of these emissions in the industrial park could contribute to increasing health-related risks. As such, the Bécancour Waterfront Industrial Park, in collaboration with the chief emitting companies, should establish a global strategy to reduce fine particle emissions at the source.

When the liquefaction plant is in operation, average noise levels for one hour (L_{eq1}) would be less than the limits indicated in the 98-01 MDDELCC instruction notes, at all of the measuring points including the three isolated residences closest to the plant. If we add the noise from loading the LNG tankers at pier B-1, we would observe an increase of 1 dB, in relation to the initial noise at these three residences over a 24-hour period (L_{dn}). With Stolt's commitment to reduce the noise level of the tankers when they are being loaded, the noise level for north-shore residents should not increase. The Commission of enquiry believes that, as much as possible, Stolt should load the tankers during the day.

Potential impacts on the natural environment

The wetlands located on the site of the Stolt plant, covering 1.9 ha, would be completely destroyed. According to several experts, this area has little ecological value. However, the Commission of enquiry is of the opinion that Stolt should make a commitment to compensate the loss of this area in order to avoid a net loss, or preferably to achieve a net gain in size and function of this area. This compensation should be carried out prior to the construction of the liquefaction installation.

In fact, the plan for compensation measures regarding the loss of wetlands was not available at the time of the public hearings. It was therefore impossible for the participants and the Commission of enquiry to analyse the promoter's intentions. The Commission thus considers that the MDDELCC should oblige Stolt to make this plan available to the public for consultation, in respect to the principles of *Access to information* and *Participation and commitment* of the *Sustainable Development Act*.

The natural gas liquefaction plant planned by Stolt would be built outside of the high-current zone (a 20 year recurrence) and would be protected from low-current floods (a 100 year recurrence), as prescribed by the Bécancour municipal policy regarding the protection of riverbanks, shore areas and floodplains.

The MRC of Bécancour and the Bécancour Waterfront Industrial Park (SIPB) have been committed to a planning process for the development and conservation of the industrial park since 2012. The Commission of enquiry is of the opinion that in respect to the principles of environmental protection, equity and social solidarity of the *Sustainable Development Act*, the MRC of Bécancour and the SIPB should complete, without further delay, the

elaboration of the Development and conservation plan for the industrial park in order to avoid having new modifications added piece by piece, and to establish restriction zones to industrial development.

Risks related to the liquefaction of natural gas

The sensitive elements in the area surrounding the projected installation include the urban cores and the isolated residences mentioned above, certain infrastructures, and neighbouring enterprises that produce or use dangerous materials. The cryogenic pipeline that would transport the LNG from the Stolt storage tank to the pier B-1, for example, would pass within 100 m of bulk liquid storage tanks belonging to the enterprise Servitank.

The promoter is counting on having an appropriate design for equipment that will limit the occurrence of accidents. Stolt specifically plans to use a failsafe LNG storage tank with double walls. What's more, the pipeline that would carry the LNG from the storage tank to the pier would have vacuum double walls. The Commission of enquiry notes that the international safety records of natural gas liquefaction installations seem to be good until now.

Some potential accident scenarios have been simulated in order to evaluate their consequences. The greatest distances of the impact for the accident scenarios evaluated would be about 300 m. The potential effects of all the simulated accidents remained within the limits of the Bécancour Waterfront Industrial Park and would not reach the closest resident located at a distance of 1.2 km.

The Commission of enquiry noted that in the case of a technological accident at the Stolt plant or along the LNG pipeline, thermal radiation could create a domino effect, which could be felt up to a distance of 230 m. The transport infrastructures, pipelines and Servitank are all within this limit, as well as part of the properties of the TRT ETGO and ABI companies. What's more, if the Servitank ammonium nitrate storage tank were to explode, it could provoke a domino effect leading to the rupture of the Stolt LNG pipeline. It should be noted that Servitank plans to build a second ammonium nitrate tank next to the existing one. They have already obtained authorisation to build additional bulk liquid storage tanks.

The Commission of enquiry is of the opinion that Stolt must take the risks associated with Servitank's future storage tanks into consideration for the final design of its installations. As well, the MDDELCC should require Stolt to present all of the potential accident scenarios that could provoke a significant domino effect so that the Ministère take them into consideration before authorising the project.

The residential population would not be affected in the case of an accident in Stolt's natural gas liquefaction installations, even if one considers the cumulated effect of all the accident scenarios evaluated. The Commission of enquiry is of the opinion that the main issue regarding the technological risks related to the Stolt project would be to maintain a high level

of safety for the workers within the limits of the Bécancour Waterfront Industrial Park and, more specifically around the Stolt installations.

Stolt's emergency response plan would be coordinated with that of the city of Bécancour, considering that if an accident were to happen, the City's emergency measures would apply. In regard to communication of risk, several measures have recently been implemented by the City to alert the residents and the companies in the case of an accident. However, the City is slow in finalizing its communication plan while intending to integrate it with its Civil protection plan. The Commission of enquiry is of the opinion that the municipality of Bécancour should speed up its efforts to finalize and to put its technological risk communication plan in operation. It was supposed to be in operation since the spring of 2014. The Commission believes that the municipality of Bécancour should update its Emergency cover plan as quickly as possible, in respect to the *Fire Safety Act*.

Risks related to maritime transport of liquefied natural gas

The MDDELCC has not required the promoter to evaluate marine risks in the impact study. However, on February 20, 2015, soon after the first phase of the public hearings, the Ministère revised its requirements, in the course of its environmental analysis of the project, and requested the promoter to supply additional information concerning the potential collision of a tanker with the pier during the transshipment of LNG.

Stolt has committed to follow the federal TERMPOL review process on a voluntary basis. The studies carried out during this exercise must take into consideration the risks to which the communities bordering the route followed by the tankers carrying dangerous materials would be exposed, as well as the risks related to transshipment operations between the tankers and the shore. On April 20, 2015, Stolt submitted a preliminary report that examines the risks related to the port operations in Bécancour. However, no accident scenario concerning the St. Lawrence River was presented in this document.

Records of maritime accidents involving LNG tankers, from around the world, reveal a small probability of LNG spills, and of little impact on people in the case of accidents. What's more, an LNG spill on the St. Lawrence River would probably have little impact on water quality because the LNG would evaporate.

The greatest distances of the impact in the accident scenarios related to Stolt's port operations in Bécancour remain within the limits of the industrial park. The nearest residences are too far away to be affected. However, if an accident were to happen to a LNG tanker navigating on the St. Lawrence River and lead to a spill that would catch fire, people who live or travel close to the shores could find themselves within the 3-kW/m² limits of thermal radiation.

In a sustainable development perspective, the Commission of enquiry is of the opinion that the MDDELCC should include all of the activities that are essential to the viability of the

project in the instructions that it gives for projects submitted to the environmental evaluation process. In this way, in the case of the Stolt project, the risks associated with LNG transport to the intended markets would have to be included in the impact study.

The Commission believes that in respect to the principles *Access to information* and *Participation and commitment* of the *Sustainable Development Act*, the population should have been informed and consulted concerning the risks related to the port operations in Bécancour and of LNG transport on the St. Lawrence River. Thus, Stolt should make public the accident scenarios and the Marine Emergency Response Plan, and organize information sessions with the citizens Bécancour and Champlain, because these documents were not available at the time of the public hearings.

In finishing, the Commission considers the Ministère de la Sécurité publique should ensure that the communities that could be affected by an accident involving the marine transport of liquefied natural gas, petroleum products or chemical products have the information necessary to update, as needed, their emergency response plan.

Economic benefits

Stolt estimates the cost of the first phase of its project at \$488M. This first phase would create an added value of about \$217M for Quebec. The total impact, in terms of jobs, would be 1,930 person years of employment for a period of about two years.

When the Stolt plant would be in operation, almost three quarters of its annual expenses would go to the importation of natural gas. Maintenance contracts and the supply of goods and services for the plant would be in the order of \$16M annually, corresponding to the creation or safeguarding of 85 jobs with suppliers. Some 30 jobs would be created at the plant, and about 20 more at the Stolt headquarters in Montreal. As well, some 50 jobs would be related to operating each of the tankers used to transport the LNG.

Many regional organisations, workers and entrepreneurs of the Centre-du-Québec region have insisted on the importance of Stolt implementing measures to encourage regional benefits of this project. It has been suggested that Stolt offer smaller contracts, for which a larger number of local businesses would be able to submit offers. What's more, the Commission of enquiry is of the opinion that Stolt should commit to favouring Quebec shipbuilders when awarding contracts for the reparation and maintenance of LNG tankers.

Corporate social responsibility

Stolt is committed to implement a management system for health, safety and environmental protection, as well as a social responsibility program, all while working in concert with local stakeholders. Stolt is also committed to making public, and easily accessible to citizens, environmental reports concerning the project, as soon as these reports are submitted to

governmental authorities. The Commission of enquiry is of the opinion that Stolt should be responsible for financing the monitoring committee.

There are currently no regulations concerning the minimum level of civil liability insurance or financial guarantee required in the case of companies such as Stolt, which produce and store dangerous materials. The federal Act C-3, planned for 2018, would provide LNG maritime transport with a compensation plan of up to \$450M.

The Commission of enquiry believes that in respect to the principle *Polluter pays* and *Social equity and solidarity* of the *Sustainable Development Act*, the MDDELCC should foresee a legal framework that stipulates the minimum level of civil liability insurance and financial guarantees required for businesses that produce or store dangerous materials, and this, in order to avoid the general public having to assume the costs in the case of an accident or the closing of these companies' installations. What's more, Stolt should make public the value of the insurance that it intends to purchase.

Conclusion

In conclusion, considering the limited potential impact on the receiving communities and the natural environment, being that the technological risks associated with the liquefaction and loading of the LNG would be contained within the industrial park, and considering the relatively small scale of the project, which aims chiefly to supply industries in North-east Quebec and Canada that do not currently have access to natural gas, the Commission of enquiry is of the opinion that the Stolt LNGaz project is acceptable. However, in order for Quebec to benefit from this project's potential economic and environmental advantages, it would be necessary that a large proportion of the LNG produced by Stolt be specifically sold to Quebec industries rather than being exported.