

**RESPONSES BY HYDRO-QUÉBEC DISTRIBUTION  
TO REQUEST FOR INFORMATION NO. 3  
FROM ROÉÉ**

**AUTONOMOUS GRIDS**



*Responses to request for information no. 3 from ROÉÉ*

**R-3864-2014  
Information request no. 3 from ROÉÉ (expert Tim Weis)  
to Hydro-Québec**

**1. BACKGROUND TO SUPPLY PLAN**

**1.1 The Distributor's strategy**

**Reference:**

- (i) R-3864-2013, HQD-2, document 1, section 1.1

**Questions**

**1.1.1.** What is the "long term horizon" that is considered?

**Response:**

**This term refers to the Plan horizon.**

**1.1.2.** In the elaboration of its strategy and in the evaluation and choice of means to satisfy the energy needs of Quebecers in the autonomous grids, does Hydro-Quebec take account of and price:

**a)** Local exterior and interior air quality and health impacts and costs? If not, why not? If yes, please explain the methodology used and provide the documentation relating to these results;

**Response:**

**The choice of a source of supply is a matter of cost minimization. When assessing projects, the Distributor takes care to obey the regulations and requirements in force, including those related to the environment.**

**b)** fuel spill and soil contamination risks and costs? If not, why not? If yes, please explain the methodology used and provide the documentation relating to these results;

**Response:**

**See the response to question 1.1.2 a).**

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c) required carbon offsets? What offsets are required? At what price?

**Response:**

**See the response to question 13.1 from the CFIB in exhibit HQD-4, document 4.<sup>1</sup>**

1.1.3. What is the projected fuel price being used for determining strategy, planning and choice of means to satisfy energy needs in the autonomous grids? Do these prices reflect any anticipated carbon pricing?

**Response:**

**See the response to question 2.1 of request for information no. 2 from the GRAME in exhibit HQD-4, document 5.<sup>2</sup>**

1.1.4. Are values for subsidies included in delivered diesel fuel costs?

**Response:**

**See the response to question 2.1 of request for information no. 2 from the GRAME in exhibit HQD-4, document 5.**

***1.2. Follow-up to the 2011–2020 Supply Plan strategy***

**Reference:**

- (i) R-3864-2013, HQD-2, document 1, section 1.2
- (ii) R-3864-2013, HQD 4, document 1 (responses to request for information no. 1 from the Régie), question 16

**Questions**

1.2.1. a) In reference (i), it is mentioned that for JEDs in the Îles de la Madeleine and in Kangiqsualujjuaq, studies are continuing. Are these technical feasibility or economic studies? When will they be publicly available?

**Response:**

**See the responses to questions 16.1–16.4 of the Régie's request for information no. 1 in exhibit HQD-4, document 1.<sup>3</sup>**

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**b)** Is the Kangiqsualujjuaq analysis being done in isolation or as part of a regional approach to Ungava/Nunavik more broadly? Has there been regional level consultations or planning for alternatives?

**Response:**

**If the results of the pre-feasibility study show that the project is technically feasible, economically viable, environmentally acceptable, and favourably received by the communities concerned, the Distributor will study the possibility of adapting it to other Nunavik grids.**

**c)** In reference (ii), in response to Régie question 16.2, Hydro-Québec states that the Kangiqsualujjuaq JED would not be economic now? Please provide details and the basis of these results?

**Response:**

**The results are still preliminary. Phase 2 of the study is designed to find approaches for improving the economic viability of this project.**

**d)** According to Hydro-Quebec, what are the primary reasons for the slow progress toward JED projects in the autonomous grids?

**Response:**

**See the response to question 16.3 of the Régie's request for information no. 1 in exhibit HQD-4, document 1.**

**See also the response to question 7.1 of request for information no. 2 from the GRAME in exhibit HQD-4, document 5.<sup>4</sup>**

**e)** Has Hydro-Quebec carried out studies of the institutional, social and political barriers that reside with Hydro-Quebec and those that reside with the local administrations and populations to the advancement of JED projects? Has Hydro-Québec sought appropriate solutions, including by consultation and collaboration with the local populations? Please provide details.

**Response:**

**The Distributor does not possess such studies.**

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f) Has Hydro-Québec conducted benchmarking or other studies regarding progress of JEDs in other jurisdictions and how success elsewhere can be translated into success in the autonomous grids? If not, why not? If yes, please provide the relevant studies and documentation.

**Response:**

**The Distributor, through the intermediary of the Canadian Off Grid Utility Association (COGUA), is monitoring progress on renewable energy projects in the other autonomous grids of Canada. So far, none of the participating companies has plans for wind-diesel projects.**

**2. PORTRAIT OF THE TERRITORIES**

**Reference:**

(i) R-3864-2013, HQD-2, document 1, sections 2 and 4.1

**Questions**

**2.1 a)** In describing the production equipment and arrangements deployed to satisfy the electricity needs of the five regions that make up the autonomous grids, no mention is made of diesel storage capacity and associated costs. Capacity shortages have posed economic and development challenges in Ontario recently. Storage capacity is not mentioned as a design requirement in section 4.1 of reference (i). Is there a fuel storage planning requirement?

**Response:**

**The Distributor makes sure that it has sufficient and safe storage capacity to power its facilities.**

**b)** How is fuel imported into each community? How does it arrive in emergencies? Have emergency shipments been required? If so, at what cost?

**Response:**

**Fuel is delivered by boat or by truck, depending on the station's location. The Distributor has not needed to resort to emergency deliveries in recent years.**

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**3. SUPPLY STRATEGY**

**Reference:**

- i) R-3864-2013, HQD-2, document 1, section 5
- ii) R-3748-2010, C-SE-AQLPA-0015, pp. 9–11
- iii) R-3854-2013, HQD-9, document 2, pp. 13–14

**Preamble**

- iii) “The most significant measures [in the technical/economic potential assessment for Basse Côte-Nord] have to do with electric heating: increased insulation of floors and roofs, photovoltaic technology, and cold climate or geothermal heat pumps.”

“For electricity [in Haute-Mauricie], the most significant potential comes from measures involving photovoltaic technology.”

**Questions**

- 3.1 a)** Does Hydro-Quebec have long-term energy sustainability requirements and goals with respect to the supply of the autonomous grids and with respect to energy security and local supplies?

**Response:**

**The Distributor intends to put forward any renewable energy projects that are found to be technically feasible, economically viable, environmentally acceptable, and favourably received by the communities concerned.**

**b)** In elaborating its supply strategy, especially for communities north of the 53rd parallel, has Hydro-Quebec considered setting a long-term goal of providing most or all energy needs (including space and water heating) through non-thermal generating capacity (wind, solar, hydro and underwater turbines) and through reduction in energy consumption and energy efficiency measures? If not, why not? If yes, please provide the studies and documents relating to this exercise.

**Response:**

**See the response to question 3.1 a).**

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- 3.2.** Directing communities that heat with fossil fuels, towards electricity water and space heating can help with long-term sustainability if electricity supply is targeted to become renewably fuelled. Would such fuel switching toward electricity be considered counter to energy efficiency targets/programs?

**Response:**

**See the response to question 3.1 a).**

- 3.3.** With respect to renewables:

**a)** In the view of Hydro-Quebec, what are the major secular and factors that have changed since its last supply plan that may influence the feasibility and economics of renewables?

**Response:**

**See the response to questions 16.1–16.4 of request for information no. 1 from the Régie in exhibit HQD-4, document 1.<sup>5</sup>**

**b)** Are regional development and employment aspects being taken into account? Concretely, how? When will wind-diesel results be available? What/when are next steps/efforts being considered? What/when are next steps?

**Response:**

**See the response to question 2.1 of request for information no. 2 from the GRAME in exhibit HQD-4, document 5.<sup>6</sup>**

**c)** With respect to the studies of JED, are the studies being undertaken still preliminary? What are the next steps? What is the critical path for the development and coming on line of JED projects?

**Response:**

**See the response to questions 16.2–16.3 of request for information no. 1 from the Régie in exhibit HQD-4, document 1.**



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**d)** Considering the characteristics of photovoltaic solar panels as described in references (ii) and (iii), and the rapidly falling costs of PV systems in particular, why did Hydro-Quebec omit any reference to solar water heating and photovoltaic electricity production in its consideration of renewables in its supply plan?

**Response:**

**See the response to question 4.14 of request for information no. 2 from the GRAME in exhibit HQD-4, document 5.<sup>7</sup>**

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**<sup>1</sup> Reference:**

(i) Exhibit B-0009, HQD-2, document 1, page 6, lines 17–21

**Preamble:**

(i) The studies concerning wind-diesel systems in Îles-de-la-Madeleine and Kangiqsualujjuaq are continuing. The eventual results of the studies will help to establish the general conditions for the success of this type of project in other grids, particularly as regards wind turbine siting. Concerning the other renewable energy projects, the Distributor is awaiting the results of feasibility studies.

**Questions:**

13.1. Please describe how the Distributor is accounting for the greenhouse gas cap-and-trade system in its analyses, particularly as regards costs.

**Response:**

**In light of the *Regulation respecting a cap-and-trade system for greenhouse gas emission allowances*, in force since 2013, the Distributor is incorporating the costs for those thermal power stations whose emissions exceed 25,000 tons. The price of emission allowances is subject to a floor price.**

**See also the response to question 19.3 of the Régie's request for information no. 1 in exhibit HQD-4, document 1.**

**Response to question 19.3 of the Régie's request for information no. 1, HQD-4, document 1:**

**19. References:** (i) Exhibit B-0009, HQD-2, document 1, p. 5;

(ii) Exhibit B-0009, HQD-2, document 1, p. 7;

(iii) <http://www.newswire.ca/fr/story/1264881/gaz-metro-gnl-lance-unappel-de-soumissions-sans-engagement-pour-du-gaz-naturel-liquefie>;

(iv) <http://affaires.lapresse.ca/economie/energie-etressources/201310/22/01-4702178-gaz-metro-un-client-a-1000-km-dedistance.php>;

(v) [http://www.yukonenergy.ca/media/site\\_documents/LNG\\_Life\\_Cycle\\_Assessment\\_-](http://www.yukonenergy.ca/media/site_documents/LNG_Life_Cycle_Assessment_-)

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[\\_Pembina\\_Institute\\_-\\_Final\\_Report;](#)

(vi)

[http://www.yukonenergy.ca/media/site\\_documents/1260\\_ICF%20Marbek%20Final%20Report\\_LNG\\_lifecycle\\_july2013.pdf](http://www.yukonenergy.ca/media/site_documents/1260_ICF%20Marbek%20Final%20Report_LNG_lifecycle_july2013.pdf).

**Preamble:**

(i) “The Distributor is carrying out its basic mission in the autonomous grids, which is to meet the customers’ requirements at the lowest cost, in both the short and the long term.”

(ii) “The operating cost of the thermal power stations is very high because of fuel prices (see Appendix 3). In addition, most of the stations are obsolescent and will eventually require investments in order to keep them operating.... Apart from generation capacity issues, the Distributor will also have to deal with excess CO2 emissions from the Cap-aux-Meules generating station. In 2012, the plant’s emissions exceeded 125,000 CO2-equivalent tons, or five times higher than the authorized ceiling. In 2013, the Distributor will proceed to purchase the allowances necessary to cover the excess emissions on an annual basis.”

(iii) and (iv) The press clippings cited in the reference show that liquefied natural gas (LNG) is becoming an option that may be given consideration for its economic viability in remote territories.

(v) An excerpt from page 28 of the report *LNG for Yukon Energy Power Generation: A Life Cycle Emissions Inventory* (The Pembina Institute, July 2013) reads: “The environmental performance of the LNG system modeled was better than the diesel pathway across all categories of environmental impact.... LNG performance is specific to Shell’s Jumping Pound facility.”

(vi) An excerpt on page (iii) of the final report titled *Yukon Plant Fuel Life Cycle Analysis* (ICF International, 2 July 2013) reads:

“Yukon Energy Corporation (YEC) wants to understand direct and indirect environmental consequences associated with the use of liquefied natural gas (LNG) for power generation at an electricity generating facility (planned project) versus an equivalently sized diesel-fueled facility in the city of Whitehorse.... The full lifecycle, from drilling through full production and processing, transportation of fuel to Whitehorse and combustion to generate electricity has been considered for each alternative studied, which constitutes three pathways from wellhead to transmission line. The study pathways are:

1. Conventional natural gas extraction and processing in the Foothills of Alberta to produce LNG for transportation to Whitehorse and subsequent electricity generation using a natural gas fired engine;
2. Shale (unconventional) gas extraction using hydraulic fracturing in northeastern British Columbia to produce LNG for transportation to Whitehorse and subsequent electricity generation using a natural gas fired engine; and
3. Crude extraction on the North Slope of Alaska, transportation of the crude to a refinery in northwestern Washington to produce diesel fuel, followed by transportation of the diesel to Whitehorse and subsequent electricity generation using a diesel fired engine.

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		<b>GHG</b> kg CO <sub>2</sub> e/MWh	<b>NO<sub>x</sub></b> kg NO <sub>x</sub> /MWh	<b>SO<sub>2</sub></b> kg SO <sub>2</sub> /MWh	<b>CO</b> kg CO/MWh	<b>PM</b> kg PM/MWh	<b>Water</b> L/MWh
Shale Gas	Base Case	594.3	2.1	0.2	1.2	0.2	178.2
Conventional Natural Gas	Base Case	679.5	2.3	2.2	1.7	0.7	5.6
Diesel	Base Case	694.8	17.8	1.2	1.2	1.1	52.9

19.3. Please explain how the cap-and-trade system has or will have a direct or indirect influence on the operating costs of the other thermal power stations in the autonomous grids.

**Response:**

The Cap-aux-Meules station is the only thermal power station in the autonomous grids that emits more than 25,000 CO<sub>2</sub>-equivalent tons per year over the period covered by the Plan (see exhibit HQD-2, document 1 (B-0009), page 7, note 3).

**<sup>2</sup> 2. Requests**

**2.1** (Refs. i and ii) Please present the details of the calculations performed to arrive at (1) the costs of production and (2) the avoided costs?

**Response:**

The Distributor reiterates that the Régie has on several occasions ruled on the nature and role of requests for information, whose purpose is essentially to seek clarification on that which is not clear in the Distributor's evidence. Such requests must also be helpful to the Régie in its deliberations.

The Distributor submits that a request is not relevant where, for example, it concerns outdated historical data or seeks to obtain information at an excessive and/or superfluous level of detail.

Additionally, in the case at hand, questions relating to subjects not covered by a supply plan are out of bounds. Thus, the Régie has clarified the scope of review of the Plan, particularly in regard to questions relating to the Comprehensive Energy Efficiency Plan (decision 2013-183, para. 16) and to avoided costs (decision D-2014-017, para. 28). It would appear neither necessary nor relevant to the analysis of this Plan to provide requested on these subjects, nor on the costs in the autonomous grids or on commercial interventions, including the Comprehensive Energy Efficiency Plan.

For these reasons, the Distributor asserts that the intervener's request is not helpful to the review of the Supply Plan and greatly exceeds the requirements set out in Chapter 3 of the Filing Guide.

<sup>3</sup> 16. References: (i) Case R-3748-2010, decision D-2011-162, p. 97;

(ii) Case R-3814-2012, decision D-2013-037, p. 136;

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(iii) Exhibit B-0009, pp. 20–2.

**Preamble:**

(i) “[354] the Régie notes, from the RNCREQ expert's report, that commercial wind-diesel systems have been in operation for over a decade. It recalls that the first wind-diesel project was to be commissioned in Nunavik in 2008. The Régie asks the Distributor to update the wind-diesel expert report for the Nunavik and Îles-de-la-Madeleine territories and to file the update as part of the 2012 progress report on the Plan. The updated cost-benefit analysis must take account of various operational scenarios for the diesel gensets as well as the valuation of the surplus wind-generated electricity. The Distributor must also develop a concrete and rapid deployment plan for wind-diesel systems in the autonomous grids, for filing in the context of the 2014–2023 Supply Plan.” [Our emphasis.]

(ii) “[549] On this subject, the Régie reiterates that the Distributor must develop a specific and rapid deployment plan for wind-diesel systems in the autonomous grids, to be filed in the context of the 2014–2023 Supply Plan.”

(iii) In section 5.2.2, the Distributor presents a progress report on renewable energy projects. On the subject of wind-diesel, the Distributor states:

“The Distributor is continuing its study of two ongoing projects, one in Îles-de-la-Madeleine and the other in Nunavik (Kangiqsualujjuaq). Results so far from the technical assessment of the potential for integrating the Cap-aux-Meules and Kangiqsuallujjuaq stations into the grid have been satisfactory. The Distributor’s assessment of the cost-effectiveness of these projects will continue. Once the studies are completed, the Distributor will update the expert report on the development of the wind-diesel systems in Îles-de-la-Madeleine and Nunavik. Follow-up will be done in 2014 as part of the progress report on the Plan.” [Our emphasis.]

**Requests:**

16.1. Please submit the results to date of the technical studies for the integration of the Cap-aux-Meules and Kangiqsuallujjuaq power stations into the grids.

**Response:**

**The results of the technical studies show that it would be technically possible to do wind-diesel projects at Cap-aux-Meules and Kangiqsuallujjuaq.**

**Cap-aux-Meules power station**

The wind turbine site is in the northeastern portion of the archipelago in the Dune-du-Nord area. Given the constraints under which Nav Canada (NavCan) is working, the site is more remote than the one initially chosen. A bylaw amending the zoning plan was passed accordingly. The technical study was done with a concept comprising three wind turbines with nameplate capacity of 2.05 MW each for a total of 6.15 MW.

To provide for the stability of the supply, the impact will be minimized by planned modifications to the grid that will be validated by means of simulation. A 1.5 MW-flywheel will be used for the purposes of load-frequency control. Annual generation is estimated at about 22.5 GWh, corresponding to a load factor of 42%.

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**Kangihsuallujuaq power station**

The wind turbine will be installed 1.2 km from the generating station. The technical study was done on the basis of a wind turbine with a nameplate capacity of 800 kW, which will be designed to withstand Arctic climatic conditions. The technical study served to define the operating modes and the systems to be implemented in order to provide for optimal operation of the grid; i.e., operation that minimizes the impacts for the customer even during disruptions. A 250-kW flywheel will support load-frequency control. Annual generation is estimated at about 1.7 GWh, corresponding to a load factor of 24%.

16.2. Please indicate when the cost-efficiency analyses of the Cap-aux-Meules and Kangihsuallujuaq projects will be completed. If they cannot be completed before the beginning of May 2014, please detail the reasons why not.

**Response:**

**The Distributor conducted preliminary economic analyses for each of the two projects. These analyses were performed on the basis of phase 1 of the pre-feasibility studies.**

**Assuming the costs determined in phase 1, the economic analyses show that the Kangihsuallujuaq wind-diesel project would not be cost-efficient at this stage, while the Cap-aux-Meules project would have a slight economic advantage. Moreover, the implementation of wind-diesel in Îles-de-la-Madeleine will have to be analyzed in light of a possible scenario involving connection to Percé.**

**Phase 2 of the pre-feasibility studies will allow the Distributor to clarify the operating mode to be implemented and to determine the costs of each project. It will take at least 12 months from the start of phase 2 of each pre-feasibility study to obtain results.**

16.3. Please justify the two-year delay in filing the updated expert report on the development of wind-diesel systems for the autonomous grids, requested by the Régie in reference (i).

**Response:**

**The Distributor reiterates that the expert report on the development of wind-diesel systems for the autonomous grids cannot be produced and filed as long as the studies of the Cap-aux-Meules and Kangihsuallujuaq projects have not been completed.**

**The Distributor reiterates that the rejection of the sites by NavCan forced it to identify new sites for the projects, which had a major impact on the timeline for the studies. The Distributor also had to retain an expert to review the sites identified in the expert report mentioned in reference (i).**

16.4. Please comment on the feasibility of filing, by early May 2014, the updated expert report on the development of wind-diesel systems for Îles-de-la-Madeleine and Nunavik as well as the specific and rapid deployment plan for wind-diesel requested by the Régie in reference (i). If it is impossible to do this, please detail the reasons why.

**Response:**

**See the response to question 16.3.**

**<sup>4</sup> 7. Requests**

**Original : 2014-04-07**

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7.1. Considering the Régie's request for the development of a specific and rapid deployment plan for wind-diesel in the autonomous grids, please explain the problems encountered and the impediments to the development of this technology.

**Response:**

**The main impediment to the development of this technology is its cost of implementation, particularly in Nunavik.**

**Numerous factors explain this high cost, including:**

- the **difficulty reconciling the need to select windy sites close to the power stations (so as to reduce costs) with the need to keep sites far enough away that they do not interfere with air transportation;**
- the **high construction costs associated with working in an extremely remote, isolated area;**
- the **highly limited resources available in the Arctic (e.g., heavy equipment, contractors, room and board, hardware, concrete);**
- **a small annual window for marine transport;**
- the **communities' desire for financial compensation or royalties;**
- **the need to adapt the equipment to the Arctic climate;**
- the **availability of wind turbines suited to the demand;**
- the **need to install additional equipment to provide for grid stability.**
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<sup>5</sup> See questions 16.1–16.4 of the Régie's request for information in exhibit HQD-4, document 1 (see above).

<sup>6</sup> Request for information no. 2 from GRAME in exhibit HQD-4, document 5 (see above).

<sup>7</sup> 4.14. (Refs. x and xi) In the rate case concerning the previous supply plan, the Régie asked the Distributor to consider photovoltaic solar panels in the context of the review of the technical/economic potential assessment for the autonomous grids, yet in the Nunavik case, in Table 3 (electrical technical/economic potential – Renewable energy measures – 5-year horizon (in MWh)), the photovoltaic renewable energy measure is not measured. Please clarify whether the Distributor asked Technosim inc. to assess this measure for Nunavik ?

**Response :**

**This measure does not appear in the assessment because its cost of implementation is higher than the avoided costs.**