R-3986-2016 : HQD – DEMANDE RELATIVE À L'APPROBATION DU PLAN D'APPROVISIONNEMENT 2017-2026

DEMANDE DE RENSEIGNEMENT N° 2 DU REGROUPEMENT NATIONAL DES CONSEILS RÉGIONAUX DE L'ENVIRONNEMENT DU QUÉBEC (« RNCREQ ») AU DISTRIBUTEUR

A. Gestion de la demande

1. **Reference: B-0006, HQD-1, Doc. 1, p. 7**

Citation :

> À plus long terme, [dans le cadre de son Plan d'approvisionnement 2014-2023] le Distributeur comptait d'abord sur les interventions en gestion de la demande en puissance, puis sur la contribution des marchés de court terme pour combler ses besoins au-delà de la contribution en puissance de ses contrats de long terme. Lors des audiences sur ce plan, en juin 2014, le Distributeur a présenté une mise à jour du bilan en puissance, mettant en évidence des besoins récurrents à long terme. Conséquemment, le Distributeur a annoncé sa volonté de lancer un appel d'offres de long terme visant l'acquisition de puissance.

Preamble:

> In this document, we will use the expression "demand response" to refer to "interventions en gestion de la demande en puissance".

Request :

1.1 Please indicate the capacity (in MW) that, in its 2014-2023 Supply Plan, HQD planned to obtain from its demand response program, year by year, for the years 2014-2023.

1.2 Please indicate the capacity (in MW) that HQD has obtained from its demand response program for each year from 2014 to 2017, broken down by program.

1.3 Please indicate the capacity (in MW) that HQD now plans to obtain from its demand response program, year by year, for the period covered by the Supply Plan 2017-2026 (the "Supply Plan"), broken down by program.

2 Reference: B-0006, HQD-1, doc. 1, p. 19, Tableau 7

Preamble:

The table indicates that the capacity available from "Nouvelles interventions en gestion de la demande en puissance" is expected to grow from 90 MW to 250 MW by next winter (2017-18), to increase to 300 MW by 2020-21, and to remain at that level thereafter.

Request:

2.1 Please explain in detail, including any supporting analysis, on what basis HQD expects to achieve 250 MW of demand response from these new interventions by next winter.

2.2 Please explain in detail, including any supporting analysis, why HQD thinks it will take three more years to achieve another 50 MW of demand response.

2.3 Please explain in detail, including any supporting analysis, why HQD does not expect to achieve demand response of more than 300 MW through the end of the planning period.

3 Reference : État d'avancement 2012 du Plan 2011-2020, *Potentiel technico-économique de gestion de la demande en puissance*

Preamble :

No reference is made to the *Potentiel technico-économique de gestion de la demande en puissance* in the Supply Plan.

Request :

3.1 Has the *Potentiel technico-économique de gestion de la demandeen puissance* filed in 2012 been updated or revised? If so, please provide a

copy of the most recent *Potentiel technico-économique de gestion de la demande en puissance* or equivalent document.

3.2 Please provide HQD's most recent estimates of each of the following, along with the analysis and methodology used to determine each of these values:

a) Demand response potential in the residential, agricultural, commercial, institutional, and industrial sectors;

b) The cost to HQD of achieving that demand response, by measure;

c) The portion of the techno-economic potential for demand response that HQD believes can be exploited (the "achievable" potential).

Where any of items a) through c) are expected to vary over time, please provide the annual projected values.

4 **Reference 1: État d'avancement 2012 du Plan 2011-2020, *Potentiel technico-économique de gestion de la demande en puissance***

Reference 2 : R-3980-2016, B-0021, HQD-4, doc. 4, p. 5.

Preamble:

The 2012 techno-economic potential study (Reference 1) appears to screen possible demand response interventions using an avoided cost of approximately 40 $/kW-yr.

According to Reference 2, the avoided cost of capacity starting in 2018-2019 is now estimated at 108 $/kW-yr ($ 2016, indexed to inflation)

Request:

4.1 Please describe the methodology used by HQD to evaluate its avoided costs.

4.2 Is this methodology applied to evaluate the benefit of peak demand savings from demand response measures in different sectors?

4.2.1 Please provide the relevant values and any studies that have been performed in this regard.

4.3 Has HQD evaluated the implications of the increase in the avoided cost for capacity from $40 to $108/kW-yr on the techno-economic potential for demand response? If so, please provide relevant documents.

4.3.1 If not, please describe how HQD intends to take this change into account going forwards.

5 Reference: B-0006, HQD-1, doc. 1, p. 19 & 20, Tableau 7 & Tableau 8

Preamble:

The four identified interventions in Table 8 do not directly correspond to the rows in Table 7, and do not include annual values for each year.

Request:

5.1 Please identify which rows in Table 7 correspond to or include each of the lines in Table 8.

5.2 Please provide the annual planned reductions in peak power needs resulting from the four identified interventions in Table 8.

5.2.1 In doing so, please separate the annual plans for MW of peak reduction from "Biénergie résidentielle et chauffe-eau à trois elements" into their two components: "Biénergie résidentielle" and "chauffe-eau à trois elements".

5.2.2 Please identify the programs that make up the category, "Nouvelles interventions en GDP" and provide the expected annual planned reductions for each.

5.3 How much peak reduction due to demand response does HQD expect to acquire from each of the six modeled sub-sectors of industrial use (Pâtes et papiers; Pétrole et chimie; Mines; Sidérurgie, fonte et affinage; Divers manufacturiers; et Alumineries), for each year until 2026?

6 Reference: B-0006, HQD-1, doc. 1, p. 20-22

Preamble:

This section of the Supply Plan describes HQD's planned demand response interventions, but does not provide detail regarding how the interventions will be implemented over the course of the year.

Request:

6.1 How often and for how many hours at a time does HQD expect to call its demand response resources?

6.2 Does HQD's demand response implementation plan vary by customer class or type of intervention? If so, how does it vary?

6.3 How will HQD make the decision to call on these resources?

6.4 Will HQD directly administer the program, or work with an outside firm?

6.5 If there will be an outside administrator, will an RFP or Tender be issued? How will the administrator be selected? Will the administrator be subject to a performance contract?

6.6 What are the expected costs for each type of demand response resource (including both per-unit costs and overall program costs)? How were those costs developed? Please identify which portion of costs are incentives to the customer vs. other implementation costs.

7 Reference 1: B-0006, HQD-1, doc. 1, p. 21-22

Reference 2 : R-3972-2016, A-0025, transcripts, Feb. 14, 2017, pages 183-189

Preamble:

Reference 1 describes HQD's planned pilots or demonstration programs to address residential dual energy and interruptible programs, including those for space heating with "Chauffage distribué (plinthes électriques)," and "Chauffage central," and interruptible residential water heaters.

In its testimony before the Régie in R-3972-2016 (Reference 2), HQD witnesses provided additional detail concerning ongoing research and pilot projects, beyond that which is found in the Supply Plan.

Request:

7.1 Please describe each of these pilots or demonstration projects in detail.

7.2 Has HQD estimated the techno-economic and/or achievable potential for demand response from each of these residential loads? If so, please provide the most recent estimates along with estimated costs.

7.3 Are programs addressing these residential end uses reflected in the values provided in Table 7 (page 19) or Table 8 (page 20)? If so, where are they included? If not, why not?

7.4 For these pilot projects and any other recent or planned pilot projects related to demand response, please indicate:

7.4.1 Expected start and finish dates;

7.4.2 Budget;

7.4.3 Project objectives; and

7.4.4 Private sector, governmental, or academic project partners.

7.5 Please describe the documentation that generally accompanies a pilot project at HQD (for example, final proposal for approval, interim reports, final report, etc.).

7.6 For each of these recent and ongoing pilot projects, please provide copies of the most recent and most complete documentation that exists. If production of these documents requires signing a non-disclosure agreement, please provide one so that the documents may be obtained.

7.7 For each of these measures, please describe the commercial roll-out that is envisioned if the pilot or demonstration is successful. For example:

7.7.1 Does HQD intend to carry out the programs itself, or to engage an administrator?

7.7.2 Does HQD intend to partner with an equipment supplier, or to provide specifications and let multiple providers participate?

7.7.3 Does HQD intend to pre-establish a limit on participation, or to allow open enrollment?

8 Reference: B-0006, HQD-1, doc. 1, p. 19 & 20, Tableau 7 & Tableau 8

Preamble:

These tables indicate that HQD has substantial demand response programs in place today, achieving at least 850 MW of demand reduction from interruptible electricity.

Request:

8.1 Please describe in detail the demand response programs HQD has implemented over the last five years.

8.2 Over the last five years, has HQD implemented demand response programs directly, or did it use a contracted administrator?

8.3 How has HQD evaluated the programs implemented over the last five years? Please provide all reports regarding these program evaluations.

8.4 What types of load reductions did HQD seek for each program or class in each of the last five years? (For example, direct load control for water heaters for residential, curtailment requests for industrial users, etc.)

8.5 What was the cost per MW and per MWh of reduction, for each program or class, in each of the last five years?

8.6 How much peak reduction due to demand response has HQD acquired from each of the six modeled sub-sectors of industrial use (Pâtes et papiers; Pétrole et chimie; Mines; Sidérurgie, fonte et affinage; Divers manufacturiers; et Alumineries) in each of the last 5 years?

8.7 Was there a maximum number of times demand response resources could be called in each of the last five years? Was there a cap on the number of consecutive hours the resource had to reduce demand?

8.8 How often were such resources called in each of the last five years? For how many hours were resources called at a time? Were resources seasonal, or were they required to be available year-round?

8.9 What types of demand response resources were most likely to respond over the last five years? What types (for example industry, building type, class, or sector) of customers responded best? Worst?

8.10 How was performance of each demand response program implemented over the last five years measured? Was it measured based on a baseline load estimate? How was that baseline developed? Did it use a regression analysis? Did it use, for example, a 10-day rolling average?

8.11 What was the performance of each program (i.e., what percentage of interruptible load responded when called) in each of the last five years? Was there a provision to opt-out of the demand reduction? If so, please describe the provision. Were there penalties assessed for non-performance? If so, what were those penalties and how were they applied?

8.12 What fraction of participating demand response resources were deployed during HQD's system peak demand (peak hour and peak 300 hours) in each of the last five years?

8.13 What were the incentives offered to customers for participation in each demand response program implemented for the last five years?

8.14 Please provide historical data by year (going back at least 5 years) corresponding to the rows of Table 8 indicating the achieved demand response or other peak reductions in each of the four categories shown on that Table.

8.15 With respect to past programs as well as those described in this Supply Plan:

a) What types of resources does HQD utilize when designing its demand response programs? Does it consult industry reports? (If so, please provide the reports utilized.) Does HQD rely on consultants? Do stakeholders have input into the demand response program design process?

b) How are programs modified over time? What is the feedback/review process like?

c) Who is responsible for designing the programs? For reaching out to customers? For evaluating programs?

9 Reference: B-0008, HQD-1, doc. 2.2, section 4 (p. 17-18) and Table 2D-9 (page 59)

Preamble:

These pages describe the contributions to peak demand from various end uses, but do not break these contributions down into their component parts by class, industry, etc.

Request:

9.1 For each end-use sector (residential, agricultural, commercial, institutional, and industrial), please provide:

9.1.1 The number of customers in the sector, as well as the projected changes in these numbers from 2017 through 2026;

9.1.2 The demand at the time of HQD's system peak (the "coincident peak" demand) for each of the last three years;

9.1.3 The projected changes in coincident peak demand from 2017 through 2026;

9.1.4 For the purpose of creating a histogram of customer demand during peak demand periods, please provide the distribution of customer contributions to peak demand for each of the last three years. Please provide this information in terms of the number of customers falling into each bin (e.g., for the residential sector, 0-5 kW, 5-10 kW, 10-15 kW, etc.), with not less than 20 bins per sector.

9.1.4.1 In the alternative, please provide each customer's hourly electricity consumption for the peak day for each of the years 2013, 2014, and 2015, and indicate which sector the customer is in. Please remove all personally identifying information (such as customer name, address, and account number). If production of this data requires a signed non-disclosure agreement, please provide one so the data may be obtained.

If HQD only possesses this information requested for combinations of sectors (e.g. residential and agricultural), or for only some sectors, please respond for the available combinations or sectors.

9.2 Please provide the dates and times of HQD's system peak (peak hour, and 300 peak hours) in each of the last five years.

9.3 For each of the last three years, please provide the HQD system load in each hour, in working electronic format.

9.4 Please confirm that the winter peak demands shown in Table 2D-9 are the coincident peak demand. If they are not, please provide the equivalent data for the coincident peak.

9.5 Please identify the P50 projected coincident peak demand for each of the purposes shown in Table 2D-9 for each of the years of the Supply Plan.

9.5.1 Please identify the P80 projected coincident peak demand for each of the purposes shown in Table 2D-9 for each of the years of the Supply Plan.

9.6 Please provide any analysis that divides "other uses" (section 4.5 on page 18) into components by end use application or sector.

9.7 Please provide past (at least the last three years) and projected (through 2026) annual peak demand and coincident peak demand from the six industrial sub-sectors identified in Table 2A-9 (Pâtes et papiers; Pétrole et chimie; Mines; Sidérurgie, fonte et affinage; Divers manufacturiers; et Alumineries).

10 Reference: "The 2030 Energy Policy : Energy in Québec A Source of Growth", p. 52

Citation:

Advanced management of demand
The next-generation meter, which has already been installed on the premises of the majority of Hydro-Québec's customers, is the focal point of a smart grid. The meters make it possible to network the homes of consumers who decide to generate part or all of the electricity that they consume. Through the "net metering" option that Hydro-Québec already offers, the consumers can return their surplus electricity to the Hydro-Québec system and thereby contribute to solving the problem of peak period demand, in return for credits. Moreover, in the near future Hydro-Québec's advanced metering infrastructure will make it easier to manage peak period power demand since it will be possible to voluntarily remotely control certain especially energy-intensive equipment such as water heaters.

Preamble:

The Supply Plan indicates increased use of automation and remote control in residential demand management (HQD-1, doc. 1, p. 21). However, it does not discuss the use of rate design or of advanced metering infrastructure (AMI, or

"smart meters") for this purpose.

Request:

10.1 Please describe in detail HQD's plans to use AMI as part of actions to reduce peak demand.

10.2 Please explain how net metering "contribute[s] to solving the problem of peak period demand".

10.3 Has HQD evaluated the potential for critical peak price rates or peak time rebates to impact customer peak demand in any rate class? For residential customers? If so, please provide any evaluation reports or other documents describing this potential.

10.4 Has HQD conducted any pilots of critical peak price rates or peak time rebates to measure their impact on residential peak consumption? If so, please provide descriptions and any reports developed that describe the results of these pilots.

10.5 Are the smart meters that HQD is deploying to customers capable of:

a) Communicating directly with home appliances through home area network ("HAN") protocols such as Zigbee or Wifi?

b) Measuring customer peak demand and the time and day of that demand?

c) Measuring electric use in 15-minute intervals? One-hour intervals?

d) Measuring power quality and power factor?

e) Reporting customer use to HQD at least daily?

11 Reference: "The 2030 Energy Policy: Energy in Québec A Source of Growth", p. 41 and 52

Citation:

Page 41:

The targets of the 2015-2020 Transportation Electrification Action Plan

- BRING TO 100 000 THE NUMBER OF ELECTRIC AND RECHARGEABLE HYBRID VEHICLES REGISTERED IN QUÉBEC.

- REDUCE BY 150 000 TONNES THE ANNUAL GHG EMISSIONS PRODUCED BY THE TRANSPORTATION SECTOR.

- REDUCE BY 66 MILLION THE NUMBER OF LITRES OF FUEL CONSUMED ANNUALLY IN QUÉBEC.

- BRING TO 5 000 THE NUMBER OF JOBS IN THE ELECTRIC VEHICLE INDUSTRY AND MAKE TOTAL INVESTMENTS OF $500 MILLION.

The attainment of these targets marks a step toward an even more ambitious target of 300 000 electric vehicles on the road by 2026 and 1 000 000 in 2030, i.e. 20% of all light-duty vehicles.

Page 52:

Electric vehicles as a solution to the grid's peak period demand
The notion of vehicle-grid and vehicle-home energy exchanges seeks to use the energy stored in an electric vehicle's battery as an auxiliary source to inject energy into a grid at peak periods or to temporarily supply a home during an outage, in the same way as a generator. A project carried out by Hydro-Québec has demonstrated the concept's feasibility, i.e. the vehicle-home energy exchange option, which appears to be the most realistic short-term solution.

Preamble:

The Supply Plan projections of peak demand and demand response do not mention any impact from electric vehicles.

Request:

11.1 Please describe HQD's approach to planning for the incorporation of electric vehicles into the province's electric system, including plans for impacts on electric sales and on peak demand.

11.2 Please describe in detail the "vehicle-home energy exchange option" project carried out by Hydro-Québec, and provide the final report.

11.3 How many electric vehicles and rechargeable hybrid vehicles does HQD project will be registered in Québec in each of the years of the Supply Plan (2017-2026)?

11.4 How many public, workplace, and residential electric vehicle charging stations does HQD project will be operational in Québec in each of the years of the Supply Plan (2017-2026)?

11.5 Please provide any estimates that HQD has made regarding the peak impacts of electric vehicles. Please provide any supporting documentation and assumptions.

11.6 How much would peak demand increase in 2020, compared with the peak demand presented in the Supply Plan, if there were 100 000 electric and rechargeable hybrid vehicles registered in Québec?

11.7 How much would peak demand increase in 2026, compared with the peak demand presented in the Supply Plan, if there were 300 000 electric and rechargeable hybrid vehicles registered in Québec?

11.8 Please provide any estimates or projections that HQD has made regarding the potential of electric vehicles or electric vehicle charging stations to participate in demand response programs. Do these estimates or projections include the use of electric energy withdrawn from electric vehicle batteries?

12 Reference: "The 2030 Energy Policy : Energy in Québec A Source of Growth", p. 52

Citation:

Large power storage
The objective of large power storage is to make available more energy than the generating fleet or electric power transmission line can produce or transmit at a given moment. A prototype large power storage system that operates like a rechargeable megabattery is now being tested. It could supply electricity to 23 houses for an entire day.

Photo: Prototype of a large power storage system made by Esstalion Technologies Inc., a joint venture between Hydro-Québec and Sony.

Preamble:

The Supply Plan projections of peak demand and demand response do not mention any impact from electric or thermal storage.

Request:

12.1 Please describe HQD's approach to planning for the incorporation of electric and/or thermal storage into the province's electric system, including plans for impacts on electric sales and on peak demand.

12.2 Please provide any evaluations (including estimates or projections) that HQD has conducted or has in its possession regarding the potential for electric storage to reduce peak demand or participate in demand response, distinguishing between distributed (on-site) storage and utility-scale storage.

12.2.1 Please provide any cost estimates on a $/kW basis.

12.3 Please provide any evaluations (including estimates or projections) that HQD has conducted or has in its possession regarding the potential for thermal storage to reduce peak demand or participate in demand response.

12.3.1 Please provide any cost estimates on a $/kW basis.

12.4 Please identify any other sources of value (such as energy price arbitrage, avoided distribution infrastructure, frequency regulation, or other ancillary services) attributed to electric or thermal energy storage in these evaluations.

13 Reference: B-0006, HQD-1, doc. 1, p. 22

Preamble:

The Supply Plan discusses the option of communicating with customers to encourage them to wisely use electricity during peak periods, but any such voluntary reductions are not estimated or included in the projections of peak demand or demand response reductions.

Request:

13.1 Has HQD evaluated or measured the peak demand reduction impact resulting from such communications?

13.2 How frequently has HQD used such communications to encourage peak demand reduction? Does HQD limit the number of such efforts per winter? If so, why and to what number?

13.3 Please explain HQD's viewpoint concerning the relationship between these communication tools and the other demand response measures discussed in the Supply Plan.

14 Reference: B-0006, HQD-1, doc. 1, p. 22

Preamble:

The Supply Plan discusses HQD's ongoing efforts to identify new interventions for the management of peak demand.

Request:

14.1 How does HQD integrate the technologies and other interventions identified through this process into its peak demand management plan?

14.2 Does HQD have a formal program or process for the evaluation of new technologies or interventions for the management of peak demand? If so, please provide documentation describing that formal program or process.

15 Reference : R-3972-2016, A-0025, transcripts, Feb. 14, 2017, pages 193-195

Preamble:

In its testimony before the Régie in R-3972-2016, HQD witnesses provided described studies currently underway at the Laboratoire des technologies de l'énergie (LTÉ) concerning automation for demand response.

Request:

15.1 Please describe the mission of the Institut de recherche d'Hydro-Québec (IREQ) and the LTÉ with respect to energy efficiency, electric and thermal energy storage, and demand response, and their role in developing HQD's demand response measures.

15.2 Please describe in detail the ongoing research projects at IREQ and at LTÉ that are relevant to HQD's demand response measures. For each project, please provide:

15.2.1 The end use and sector targeted by the possible measure;

15.2.2 The timeline for the project; and

15.2.3 The objectives of the research.

16 Reference : R-3972-2016, A-0025, transcripts, Feb. 14, 2017, pages 187-188

Preamble:

In their testimony before the Régie in R-3972-2016, HQD witnesses indicated that they are studying the use of aggregators or integrators, functioning as energy service companies, with respect to demand response.

Request:

16.1 Has HQD produced or had produced by consultants or other third parties any studies with respect to the potential role of energy service companies, aggregators or integrators in the provision of demand response? If so, please provide copies.

16.2 Please describe HQD's view of the possible role of energy service companies, aggregators or integrators, with respect to demand response in Quebec.

17 Reference: B-0006, HQD-1, doc. 1, p. 21

Preamble:

The Supply Plan discusses HQD's ongoing efforts to maintain participation in dual-energy heating programs and Rate DT. It also identifies the desire to test remote control of dual-energy systems.

Request:

17.1 Please provide the number of participants in Rate DT by year for the last 5 years, as well as the projected number of participants through 2026.

17.2 What is HQD's understanding as to why participation in Rate DT has been declining or may decline in future?

17.3 Please provide the most recent estimates of the techno-economic and/or achievable potential of dual-energy heating to reduce winter peak demand, with and without remote control, along with any estimated costs.

17.4 Please identify whether the use of cold climate electric heat pumps in dual-energy heating systems has been included in the projection of sales or peak demand included in the Supply Plan. If so, please describe how it has been incorporated.

17.5 Please describe how the potential impacts of remote control of dual-energy heating systems is included in the projections of peak demand or demand response presented in the Supply Plan.