RÉGIE DE L'ÉNERGIE

DOSSIER : R-3848-2013

DEMANDE D'APPROBATION DES CARACTÉRISTIQUES DU SERVICE D'INTÉGRATION ÉOLIENNE ET DE LA GRILLE D'ANALYSE EN VUE DE L'ACQUISITION D'UN SERVICE D'INTÉGRATION ÉOLIENNE

RÉPONSES D'ÉNERGIE BROOKFIELD MARKETING S.E.C. (« EBM») À LA DEMANDE DE RENSEIGNEMENTS N^{O} 1 DE LA RÉGIE DE L'ÉNERGIE

Montréal, le 6 décembre 2013

REPONSES DE EBM A LA DEMANDE DE RENSEIGNEMENTS N° 1 DE LA RÉGIE DE L'ÉNERGIE RELATIVE A LA DEMANDE D'APPROBATION DES CARACTÉRISTIQUES DU SERVICE D'INTÉGRATION ÉOLIENNE ET DE LA GRILLE D'ANALYSE EN VUE DE L'ACQUISITION D'UN SERVICE D'INTÉGRATION ÉOLIENNE

1. Références : (i) Décret 352-2003;
(ii) Décret 926-2005;
(iii) Décrets 1043-2008 et 1045-2008;
(iv) Pièce C-UC-0009, p. 40.

Préambule :

(i) « […] *Le bloc visé au paragraphe 1° du premier alinéa est assorti d'une garantie de puissance hydroélectrique installée au Québec, sous forme de convention d'équilibrage souscrite par le distributeur d'électricité auprès d'un autre fournisseur québécois ou d'Hydro-Québec, dans ses activités de production d'électricité*. » [nous soulignons]

(ii) « […] *Le bloc visé au premier alinéa est assorti d'un service d'équilibrage et de puissance complémentaire sous forme d'une entente d'intégration de l'énergie éolienne souscrite par le distributeur d'électricité auprès d'un autre fournisseur québécois ou d'Hydro-Québec, dans ses activités de production d'électricité*. » [nous soulignons]

(iii) « […] *Ce bloc d'énergie est assorti d'un service d'équilibrage et de puissance complémentaire sous forme d'une entente d'intégration de l'énergie éolienne souscrite par le distributeur d'électricité auprès d'Hydro-Québec dans ses activités de production d'électricité ou d'un autre fournisseur d'électricité québécois*. » [nous soulignons]

(iv) L'UC a précisé ce qu'elle entend par service d'équilibrage :

« *Selon l'extrait ci-haut, le Distributeur associe le service d'équilibrage à la fourniture de l'énergie de retours.*

UC soumet que cette nouvelle façon du Distributeur de définir le service d'équilibrage pourrait causer certaines confusions, puisque le terme « service d'équilibrage » se comprend différemment dans les décrets relatifs à l'énergie éolienne et dans l'entente d'intégration éolienne actuelle.

Dans les décrets, le gouvernement mentionne deux types de services : le service d'équilibrage et le service de puissance complémentaire. Donc, dans les décrets, le service d'équilibrage comprend tout ce qui n'est pas de service de puissance complémentaire, par exemple, les retours d'énergie, l'absorption de l'excédent entre la production réelle et les retours d'énergie, les services complémentaires.

Dans l'entente d'intégration actuelle, le paragraphe intitulé « 5.1 Service d'équilibrage éolien » réfère à l'écart entre la production réelle et la prévision de production par le Distributeur. D'ailleurs, les tableaux présentés par le Distributeur dans le présent dossier relativement au coût

de l'entente actuelle abondent dans le même sens en écrivant « *Service d'équilibrage (art. 7.1) Coût des écarts de prévision ($)* ». » [nous soulignons]

Demandes :

1.1 Veuillez préciser, selon votre compréhension, ce que doit comprendre, selon le cas, la « *convention d'équilibrage* » ou « *l'entente d'intégration de l'énergie éolienne* », décrites dans les Décrets. Veuillez notamment préciser si les services complémentaires font partie, ou non, de cette entente ou convention et expliquer votre réponse.

R. 1.1 : Les expressions « convention d'équilibrage » ou « entente d'intégration éolienne » réfèrent à la même notion soit l'entente offrant le(s) service(s) requis pour compenser la variabilité et l'intermittence de la production d'énergie éolienne des blocs d'énergie obtenus par les différents appels d'offres, afin d'éviter les impacts sur le réseau électrique.[1]

Selon notre expert, monsieur Marshall, ceci se traduit par l'obtention des services complémentaires additionnels décrits à son rapport en sus de ce qui est actuellement fourni par l'Entente de services complémentaires du 15 février 2005 liés à l'introduction de la production éolienne.

En ce sens, nous sommes en désaccord avec la définition de « service d'équilibrage » proposée par UC.

La définition que nous proposons est en ligne avec la définition fournie par la Régie de l'expression « service d'équilibrage » qui constitue un approvisionnement et qui requiert un appel d'offres (D-2011-193 au paragraphe 98 ainsi que les décisions D-2005-76 aux pages 5 et 6 et D-2006-27 à la page 4).

Cette définition respecte aussi la position exprimée par la Régie aux paragraphes 138 et 139 de la décision D-2011-193 lorsqu'elle indique que la puissance complémentaire ou garantie de puissance exigée des Décrets se limite au niveau de puissance requis seulement aux fins de l'équilibrage ou de l'intégration éolienne. À ce titre, il y a lieu de rappeler que le NPCC a reconnu que le niveau de puissance requis représente 30% de la capacité installée.

De plus, ces expressions ne couvrent pas les besoins ou services indiqués par la Régie au paragraphe 134 de la décision D-2011-193 en ce qu'ils ne sont pas exigés des Décrets, mais plutôt liés à des besoins de flexibilité d'utilisation des sources d'approvisionnements du Distributeur dont les retraits modulés (ceci contredit aussi la proposition formulée par UC), la puissance complémentaire

[1] Ceci est conforme à ce qui est véhiculé par le Distributeur dans le rapport préparé par le NPCC daté du 27 février 2013 https://www.npcc.org/Library/Resource%20Adequacy/RCCApprovedLngRangeOverview(February%2027,%202013).pdf dont les extraits pertinents sont inclus à titre d'annexe A à la présente à la page 48.

(supplémentaire) à la hauteur de 15 % en hiver etc. Chacun de ces services devraient aussi faire l'objet d'appels d'offres distincts.

1.2 Veuillez préciser, selon votre compréhension, ce que doit comprendre le « *service d'équilibrage* » décrit dans les Décrets. Veuillez notamment préciser si les services complémentaires font partie du service d'équilibrage et expliquer votre réponse.

R. 1.2 : Nous vous référons à la réponse formulée à la question précédente.

ANNEXE A

Northeast Power Coordinating Council

2012 Long Range Adequacy Overview

Approved by the RCC

February 27, 2013

Conducted by the

NPCC CP-8 Working Group

kV transformers later in this decade at the 500 kV Milton Switching Station is one of the options under consideration.

The transmission projects that are under various stages of construction and the planned projects will address the transmission constraints identified. The transmitters in Ontario together with the OPA proactively plan the transmission network in order to ensure timely system adjustments, upgrades, and expansions. Delays to the in-service dates of bulk transmission projects resulting from delays in obtaining required approvals or delays in construction may result in increased congestion or Special Protection Systems (post-contingency generation rejection) in the interim.

System reinforcements are also being considered in a number of regional areas throughout the province, such as Kitchener-Waterloo-Cambridge-Guelph, York Region, and Ottawa, in order to maintain a reliable local supply of electricity. The OPA's regional planning approach addresses project delays. Regional planning develops options for each need, in a coordinated manner, guided by principles that maintain a long-term view that anticipates uncertainties and maintains flexibility. Conservation, supply, and transmission plans are coordinated to deliver the solutions that are required for each locale.

Québec

The Québec Area is projecting adequate Planning Reserve Margins throughout the long-term assessment period, varying between 12.1 and 15 percent. For the first year considered in this assessment, the 2013/2014 winter peak, the Anticipated Reserve Margin is 12.36 percent, which is above the NERC Reference Reserve Margin of 10 percent. Québec's Anticipated Reserve Margin for the 2012/2013 winter is projected to be 10.8 percent, also above the NERC Reference Margin Level 9.6 percent.[34] The NERC Reference Reserve Margin Levels are drawn from the most recent Québec Balancing Authority Area Comprehensive Review of Resource Adequacy.

The Planning Reserve Margins projected in this assessment are adequate and result mostly from the commissioning of additional resources, most of which are new hydro projects, such as La Sarcelle Generating Station, the Romaine River Complex (Romaine 1, 2, 3, and 4), additional capacity at Sainte-Margerite-3 Generating Station, and wind and biomass resources. Moreover, an additional amount of Demand Response programs contributes to this adequate level of projected reserve margins.

In this assessment, the Gentilly-2 nuclear station will be out of service for decommissioning at the end of 2012. The Tracy and La Citière thermal generating stations have also been permanently retired.

[34] Additional information on the 2012/2013 winter season can be found in the NERC *Winter Reliability Assessment*: http://www.nerc.com/page.php?cid=4|61.

Demand

The compound annual growth rate (CAGR) forecast for Total Internal Demand is 0.79 percent during the next 10 years (2013/2014 – 2022/2023 winter seasons), which is slightly lower than the one percent growth rate forecast reported in the 2011 LTRA. As for the Net Energy for Load (NEL), the average growth rate forecast is also 0.8 percent, compared to a 0.6 percent growth rate forecasted last year. The Net Internal Demand for the 2013/2014 winter peak is projected to be 37,810 MW, which is 267 MW higher than the forecasted 2012/2013 winter peak demand. The demand forecast methods used in this assessment have not changed from previous years

Hydro-Québec's demand and energy-sales forecasting is Hydro-Québec Distribution's responsibility. First, the energy-sales forecast is built on the forecast from four different consumption sectors – domestic, commercial, small and medium-size industrial and large industrial. The model types used in the forecasting process are different for each sector and are based on end-use and/or econometric models. They consider weather variables, economic-driver forecasts, demographics, energy efficiency, and different information about large industrial customers. This forecast is normalized for weather conditions based on an historical trend weather analysis.

The requirements are obtained by adding transmission and distribution losses to the sales forecasts. The monthly peak demand is then calculated by applying load factors to each end-use and/or sectors sales. The sum of these monthly end-use/sector peak demands is the total monthly peak demand.

Load Forecast Uncertainty (LFU) includes weather and load uncertainties. Weather uncertainty is due to variations in weather conditions. It is based on a 36-year of temperatures (1971-2006) adjusted for a global warming annual effect of 0.30 °C (0.54 °F) per decade starting in 1971. Moreover, each year of historical climatic data is shifted up to ±3 days to gain information on conditions that occurred during either a weekend or a weekday. Such an exercise generates a set of 252 different demand scenarios. The base case scenario is the arithmetical average of the peak hour in each of those 252 scenarios. Load uncertainty is due to the uncertainty of economic and demographic variables that affect demand forecast and the residual errors from the models. The Overall uncertainty is defined as the independent combination of climatic uncertainty and load uncertainty.

Demand Side Management

The only Demand Response programs in the Québec Area specifically designed for peak-load reduction during winter operating periods are interruptible demand programs (for large industrial customers) totaling 1,660 MW for the 2013/2014 winter period, decreasing to 1,300 MW by the final year of the assessment (Table 15). It is usually used in situations when load is expected to reach high levels or when resources are *not* expected to be sufficient to meet load at peak periods. Demand Response is relatively

stable over the assessment period, with a maximum reached for the 2013/2014 winter peak period.

Table 15
Québec Projected Demand-Side Management

	Short-Term		
NPCC-Québec-Winter	2013/14	2014/15	2015/16
Direct Control Load Management (DCLM)	250	250	250
Contractually Interruptible (Curtailable)	1,660	1,439	1,439
Critical Peak-Pricing (CPP) with Control	0	0	0
Load as a Capacity Resource	0	0	0
TOTAL RESOURCE-SIDE DEMAND RESPONSE	1,910	1,689	1,689
TOTAL ENERGY EFFICIENCY	1,980	2,150	2,300
TOTAL DEMAND-SIDE MANAGEMENT	**3,890**	**3,839**	**3,989**

Total Energy Efficiency/Conservation is included in the forecast load and accounts for 1,980 MW at the 2013/2014 winter peak period. Energy Efficiency is growing throughout the entire period of the assessment. The total on-peak Demand Response and Energy Efficiency/Conservation for the 2022/2023 winter period is projected to be approximately 4,740 MW.

On a yearly basis, Hydro-Québec Distribution presents its Energy Efficiency Plan Update, "Plan global en efficacité énergétique," to the Québec Energy Board for the next and upcoming years. This plan focuses on energy conservation measures and includes programs tailored to residential customers, commercial and institutional markets, small and medium industrial customers, and large-power customers. Examples of programs and tools for promoting energy savings for the residential customers include old refrigerator recycling, electronic thermostats, low-energy lighting, etc. The provincial government, through its Ministry of Natural Resources, also implements Energy Efficiency/Conservation programs, mainly in the area of building standards and housing insulation.

Generation

At the time of this assessment, available resources for the next winter in the Québec Area are evaluated at 39,502 MW, most of which are hydropower generation (97 percent). Wind and biomass resources, which are owned and operated by Independent Power Producers (IPPs) and under long-term power purchase agreements with Hydro-Québec Distribution and Hydro-Québec Production, account for two percent of the available capacity. Hydro-Québec Production also operates one fuel oil generating station (for peaking purposes), which represents about one percent of the total available capacity (Table 16).

Table 16
Québec Current Capacity[35]

NPCC-Québec-Winter	Current Capacity	Current Share
Coal	0	0.0%
Petroleum	436	1.1%
Gas	0	0.0%
Nuclear	0	0.0%
Other/Unknown	0	0.0%
Renewables	39,066	98.9%
TOTAL	**39,502**	**100.0%**

The Existing-Certain capacity increased by an amount of 1,240 MW since the previous assessment, of which 720 MW are from hydropower generation and 520 MW from wind and biomass.

TransCanada Energy's 547MW natural gas combined-cycle generating station in Bécancour is mothballed and accounts for the total Existing-Inoperable resources. Each summer, Hydro-Québec Distribution must decide whether to mothball the Bécancour power plant for an additional year or to re-start it for the coming year. Although this plant is expected to be mothballed until December 2017, it could be re-started sooner if needed.

As mentioned above, the Gentilly 2 nuclear station (675 MW) will be out of service for decommissioning at the end of 2012. Two thermal generating stations have also been permanently retired since the last assessment—Tracy (450 MW) and La Citière (280 MW). In the previous assessment, the Tracy power plant was mothballed over the entire assessment period.

The temporary unit shutdown and retirements described above are offset by the commissioning of new resources. The last two units of La Sarcelle Hydro Generating Station (50 MW each) are to be commissioned during the 2012/2013 winter period. The Romaine-2 (622 MW) and Romaine-1 (260 MW) Hydro Generating Station are under construction and are expected to be commissioned for the 2014/2015 and 2016/2017 winter peak periods respectively. The added capacity at Sainte-Margerite-3 is expected to be commissioned for the 2017/2018 winter peak period, adding 440 MW of capacity. Two other generating stations at the Romaine Complex (Romaine-3 and Romaine-4) are expected to be commissioned later during the assessment period (2017/2018 and 2020/2021), adding 668 MW of capacity to the system

- In recent years, Hydro-Québec Distribution has launched several calls for tenders and electricity purchase programs for new renewable supplies, which will also be commissioned in the next years:
- 2,290 MW of wind power to be commissioned between 2012 and 2015.

[35] "Current" represents Existing-Certain and Future-Planned projections for the 2012 summer (for summer-peaking assessment areas) or 2012/2013 winter (for winter-peaking assessment areas). "Share" represents the share (percent) of total Existing-Certain and Future-Planned capacity projected for the peak season.

- 125 MW generated by small hydro plants (50 MW and less) developed in partnership with local and First Nations communities, will be commissioned between 2012 and 2014.
- 300 MW generated from biomass to be commissioned between 2012 and 2016.

As for behind-the-meter generation, it is negligible and is included in the load forecast. For hydro resources, maximum capacity is set equal to the power that each plant can generate at its maximum rating during two full hours, while expected on-peak capacity is set equal to maximum capacity minus scheduled maintenance outages and restrictions.

Biomass and wind resources are owned by Independent Power Producers (IPPs). These IPPs have signed contractual agreements with Hydro-Québec. Therefore, for biomass resources, maximum capacity and expected on-peak capacity are equal to contractual capacity, representing almost 100 percent of nameplate capacity. For wind resources, capacity contribution at peak is estimated at 30 percent of contractual capacity, which represents 490 MW and 973 MW respectively for the 2012/2013 (current) and 2022/2023 winter periods. The maximum wind capacity is equal to contractual capacity, which generally equals to its nameplate capacity. For summer peak periods, the expected on-peak wind capacity is set to zero as wind resources are completely derated (Table 17).

Table 17
Québec Renewable Capacity [36]

	Current	
NPCC-Québec-Winter	Capacity	Share
Hydro	38,315	98.1%
Pumped Storage	0	0.0%
Geothermal	0	0.0%
Wind	490	1.3%
Biomass	261	0.7%
Solar	0	0.0%
TOTAL	39,066	100.0%

Wind generation integration has not significantly impacted day-to-day operation of the system, and the actual level of wind generation does not require particular operating procedures. However, with the increasing amount of wind in the system, the foreseeable impact on system management may show up, and the following are under study:

- Wind generation variability on system load and interconnection ramping.
- Frequency and voltage regulation problems.
- Increase of start-ups/shutdowns of hydroelectric units due to load following coupled with wind variability; efficiency losses in generating units also expected.
- Reduction of low-load operation flexibility due to low inertial response of wind generation coupled to must-run hydroelectric generation.

[36] "Current" represents Existing-Certain and Future-Planned projections for the 2012 summer (for summer-peaking assessment areas) or 2012/2013 winter (for winter-peaking assessment areas). "Share" represents the share (percent) of total Existing-Certain and Future-Planned capacity projected for the peak season.

Capacity Transactions

Expected capacity purchases are planned by Hydro-Québec Distribution as needed for the Québec internal demand. These purchases are set at 1,100 MW throughout the assessment period and may be supplied by resources located in Québec or in neighboring markets. In this regard, Hydro-Québec Distribution has designated the Massena–Châteauguay (1,000 MW) and Dennison–Langlois (100 MW) interconnections' transfer capacity to meet its resource requirements during winter peak periods. These purchases are not backed by firm long-term contracts. However, on a yearly basis, Hydro-Québec Distribution proceeds with short-term capacity purchases (UCAP) in order to meet its capacity requirements if needed.

The Québec Area will support firm capacity sales totaling 398 MW to New England and Ontario (Cornwall) during the 2013/2014 winter peak, backed by Firm contracts for both generation and transmission, but which will decline to 145 MW in 2020 (Table 18). Moreover, 228 MW of Firm exports for the 2014/2015 winter period and 500 MW for the 2015/2016 winter peak are committed for neighboring area's needs.

Table 18
Québec Projected Capacity Transactions

NPCC-Québec-Winter	2013/14	2014/15	2015/16	2016/17	2017/18
Expected Imports	1,100	1,100	1,100	1,100	1,100
Firm Imports	0	0	0	0	0
TOTAL IMPORTS	1,100	1,100	1,100	1,100	1,100
Expected Exports	0	0	0	0	0
Firm Exports	398	626	676	151	151
TOTAL EXPORTS	398	626	676	151	151
TOTAL NET CAPACITY TRANSACTIONS	**702**	**474**	**424**	**949**	**949**

The Québec Area does not rely on any emergency capacity imports to meet its Reserve Margin Reference Level.

Transmission

This section briefly describes the BPS transmission additions anticipated to be in service during the assessment period. Descriptions for each project of particular importance are also included below

The Romaine River Hydro Complex Integration

Construction of the first phase of transmission infrastructures for the Romaine River Hydro Complex project has now begun. The generating stations will be integrated on a 735 kV infrastructure initially operated at 315 kV. Romaine-2 and Romaine-1 will be integrated in 2014/2016 at Arnaud 735/315 kV substation. Romaine-3 and Romaine-4 will be integrated in 2017/2020 at Montagnais 735/315 kV substation.

Main system upgrades for this project require construction for 2014 of a new 735 kV switching station to be named "Aux Outardes," located between the existing Micoua and Manicouagan Transformer Stations. Two 735 kV lines will be redirected into the new station and one new 735 kV line (3 miles) will be built between Aux Outardes and Micoua.