

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**

**DEMANDE DE RENSEIGNEMENTS N° 1
DE L'EXPERT D'ÉNERGIE BROOKFIELD MARKETING S.E.C. (« EBM »)
ET DE L'AQCIE/CIFQ
WILLIAM K. MARSHALL
ADRESSÉE AU DISTRIBUTEUR**

Montréal, le 13 septembre 2013

**Demande de renseignements n° 1
de l'expert d'Énergie Brookfield Marketing s.e.c. (« EBM ») et de l'AQCIE/CIFQ
William K. Marshall
relative à 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 adressée au Distributeur**

1. Reference : **File 3848-2013, HQD-1, Document 1 (translation), p. 8, l. 9 to 12 :**

Preamble:

"Bidders shall be asked to submit a price per megawatthour that applies to returns of energy (corresponding to 35% of the contract quantity). They may also submit a price applicable to the differences between the forecast wind power generation and the actual wind power generation.

Lastly, given the uncertainties associated with the actual annual volumes of wind power generation, the difference, either positive or negative, between the actual wind power generation and the returns of contract energy shall involve a compensation between the Distributor and the service supplier."

Questions :

- 1.1 Exactly how will HQD evaluate bids if prices are given for total energy in one bid and for the differences in another bid? Please explain with an illustrative numerical example.
- 1.2 What energy price will apply for the annual energy compensation?

2. References : **(i) File R-3848-2013, HQD-1, Document 1 (translation), p. 7, l. 5 to 13:
(ii) File R-3648-2007 (Supply plan 2008-2017), decision D-2008-133,
p. 41, 42:**

Preamble:

(i) *"The wind power integration services sought by the Distributor is described as follows:*

(i) The supplier shall absorb the variable wind power generation in real time, up to a quantity that will be determined in its bid, with said quantity representing the "contract quantity."

(ii) The supplier shall return at all times a quantity of electricity that corresponds to 35% of the contract capacity.

(iii) During the Winter Period, the energy returns described in (ii) include a capacity guarantee, with additional penalties applying if the delivered quantity is less than the supplier's commitment."

(ii) "4.1.2 LIVRAISONS UNIFORMES

La Régie constate que la concordance des besoins du Distributeur et de la production supérieure des éoliennes en période d'hiver contribue à diminuer le besoin d'équilibrage tout au long de l'année.

De plus, le Distributeur dispose d'un contrat d'électricité patrimoniale qui permet un reclassement des bâtonnets de la courbe des puissances classées selon ses besoins réels ainsi que d'une entente cadre qui permet de répondre en temps réel aux besoins imprévisibles du Distributeur au-delà du profil de l'électricité patrimoniale. Ces deux outils fournissent au Distributeur une grande flexibilité et lui procurent un avantage unique par rapport aux autres distributeurs d'électricité.

Selon le rapport de balisage réalisé par le Distributeur, la variabilité de la production éolienne diminue avec une plus grande dispersion géographique des éoliennes sur le territoire. La Régie constate que la prise en compte de ce facteur dans le renouvellement ou l'élaboration d'une entente d'intégration éolienne deviendra importante avec la mise en service des parcs éoliens du second bloc d'énergie éolienne."

Questions :

- 2.1 Does item (ii) through "at all times" mean all year?
 - 2.2 If response to 2.1 is yes, please explain why the historical average monthly capacity factor which varies from month to month was not used instead as it would match against the HQD load better and reduce the potential compensation required under item (iii).
 - 2.3 If response to 2.1 is yes, please explain why HQD requires uniform deliveries and returns when the Régie questioned this characteristic in the current wind integration agreement. How are the Régie's concerns addressed.
 - 2.4 In your opinion, are there legal provisions rendering uniform deliveries mandatory.
 - 2.4.1. If so, what are they?
 - 2.4.2. If not, what is the rationale for choosing uniform deliveries?
 - 2.5 What are the "additional penalties" referred to in reference (i)?
 - 2.6 Explain in detail the penalty mechanism with prices that will be applied to a delivery shortfall in the Winter Period. Please provide an example calculation.
3. Reference : **File R-3843-2013, HQD-1, Document 1 (translation), p. 7, l. 14 to 15 :**

Preamble:

"Each integration service supplier is responsible for mobilizing a load capable of absorbing the wind power generation..."

Questions :

- 3.1 Does the load have to be located inside the Quebec balancing area? If yes, please explain if this is specifically required in each Order in Council.
- 3.2 If yes, explain why interconnection exports could not be used.
4. Reference : **The table below was taken from an HQD report filed with the Regie showing the annual settlement costs for the services under the EIE for 2012. This report and reports for previous years may be found at**

http://www.regie-energie.qc.ca/audiences/Suivis/Suivi_HQD_D-2006-027.html

Preamble:

**TABLEAU 1
 COÛT DE L'ENTENTE – 1^{ER} JANVIER AU 31 DÉCEMBRE 2012**

	Trimestre 1	Trimestre 2	Trimestre 3	Trimestre 4	Total T1-T4
Service d'équilibrage (art. 7.1)					
Coût des écarts de prévision (\$)	71 264	63 238	50 004	76 234	260 739
Puissance complémentaire (art 7.2)					
Coût de la puissance garantie (\$)	3 209 425	3 806 880	3 806 880	4 531 911	15 355 096
Énergie (art. 7.3)					
Énergie livrée par les parcs éoliens (MWh)	574 768	479 068	443 208	797 370	2 294 415
Énergie livrée par HQP (MWh)	544 458	645 994	653 093	777 769	2 621 315
écart (MWh)	30 310	-166 926	-209 885	19 601	-326 901
Coût de l'énergie (\$)	(2 702 184)	14 881 728	18 711 549	(1 750 331)	29 140 763
Coût total (\$)	578 505	18 751 845	22 568 433	2 857 815	44 756 598

Notes: Pour 2012, la "quantité contributive" (associée à la puissance garantie, ligne 2 du tableau) est établie à 15 %.
 Les données de mars à septembre ont été corrigées pour prendre en compte les taux de pertes entre le point de mesurage et le point de livraison au parc Le Plateau.

Questions :

- 4.1 Please provide monthly settlement data similar to the table for the five years from January 2008 to December 2012.
- 4.2 Please provide the monthly total energy deviation from forecast for the *Service d'équilibrage* for the same five years.

- 4.3 Please provide the monthly totals of variation of energy between the wind forecast and the proposed returns of energy corresponding to the 35 % of the contract quantity for the same five years.
- 4.4 Please provide the contract quantity for each month for the same five years.
5. Reference : **File R-3848-2013, HQD-1, Document 1 (translation) Appendix B, Section 1 :**

Preamble:

"The implementation of the new service must allow all impacts from wind power generation to be absorbed, such that the supply of the ancillary services associated with native-load is not affected by wind power generation."

Questions :

- 5.1 Does this mean that native load variations will be balanced with its ancillary services and that the wind generation variations are required to be balanced separately with the new wind integration service? If not, please explain.
- 5.2 If the response to 5.1 is yes, is this the normal balancing practice followed in other balancing areas that have wind generation.
- 5.3 If the response to 5.1 is yes, please name other balancing areas that balance wind separately from load.
6. Reference : **File R-3848-2013, HQD-1, Document 1 (translation), Appendix B Section 1, p. 1 :**

Preamble:

"Regardless of the supplier or its facilities, all must contribute over a time step that ensures an equivalent level of service."

Question :

- 6.1 What is the time step?
7. Reference : **File R-3848-2013, HQD-1, Document 1 (translation) Appendix B Section 2, p. 1 :**

Preamble:

"The quantity of generation resources or the quantity of the supplier's load made available to the Transmission Provider must be sufficient to offset or absorb variable wind power"

generation and thus provide the returns of energy requested by the Distributor at all times. To this end, each supplier must make available to the Transmission Provider a variation range whose magnitude will depend on the contract quantity."

Question :

7.1 Please explain the term "*variation range*" and illustrate its relation to the *Contract quantity* with a numerical example.

8. Reference : **File R-3848-2013, HQD-1, Document 1, Appendix B Section 4, p. 3 :**

Preamble:

"To ensure transmission system reliability and balancing, the Distributor shall implement a mechanism for handling any divergences with respect to SCC instructions. This mechanism shall include penalties for any non-compliance with minute-by-minute instructions as well as for total hourly values."

Questions :

8.1 What is the penalty mechanism regarding minute-by-minute divergences from CCR instructions? Explain in detail with numerical examples.

8.2 Since HQD does not have generation capacity, who will offer this minute-by-minute and hourly balancing mechanisms referred to in the preamble?

8.3 Why would hourly deviations be handled by HQD?

8.4 Given that the supplier (and HQT) must comply with the HQT Open Access Transmission Tariff (OATT), why would hourly deviations not fall under the load and generation balancing provisions in the OATT?

8.5 Is a double penalty mechanism being considered for hourly deviations, one by HQD and one as per the OATT.

9. Reference : **Dossier R-3848-2013, HQD-2, Document 1, p. 2, l. 8 to 11:**

Preamble:

"In all jurisdictions researched, wind integration services as defined in tariffs only cover intra-hour services (usually to assess intra-hourly wind integration costs incurred by wind power exports to the wind power off-takers, which take care of the remaining, longer-term issues)."

Questions :

9.1 By wind off-taker, do you mean a marketer, a load serving entity, both or some other entity? Please explain.

9.2 What are the remaining longer term issues that each of the wind off-taker entities considered in (a) must address?

10. Reference : **File R-3848-2013, HQD-2, Document 1, p. 2, l. 14 to 16 :**

Preamble:

"Moreover, as a load serving entity, HQD has specific reliability obligations and, thus, must deal with wind impacts in all timeframes, not just intra-hourly, but also well beyond the hour."

Questions :

10.1 What are the specific reliability obligations of HQD? Explain in detail with reference to not just the intra-hourly, but also hourly, day ahead, week ahead, month ahead and long term.

10.2 Explain how these specific reliability obligations are different than those of a load serving utility in other North American jurisdictions.

10.3 Is HQD responsible for intra-hour products (e.g.: AGC)?

11. Reference : **File R-3848-2013, HQD-2, Document 1, p. 6, l. 19 to 21 and p. 7-8, l. 25 to l. 2 :**

Preamble:

"It FERC Orders 888 and 890] also requires the unbundling of ancillary services and requires transmission operators to allow transmission customers the possibility to self-supply ancillary services"

(...)

"Variable Energy Resource Balancing Service ("VERBS") utilizes balancing reserve capacity for wind and solar resources to meet: (1) the moment-to-moment variations in generation (regulation), (2) the longer timeframe variations over 10 minutes (following), and (3) the total hourly deviation between actual and scheduled output (imbalance)."

Questions :

11.1 Is the VERBS service provided through BPA's OATT?

11.2 Are wind generators located in the BPA service area required to subscribe to VERBS or do they have the option to subscribe to the three services (Regulation, Following and Imbalance) separately?

11.3 Do wind generators in the BPA service area have the opportunity to self supply one or two of the services referenced and subscribe to the others?

12. Reference : **Dossier R-3848-2013, HQD-1, Document 2, p. 8, l. 5 -11 :**

Preamble:

“FERC Order 764 was passed in 2012 to define the integration of variable energy resources. It sets the basic requirements to improve the operational procedures to facilitate variable energy resource integration. Under Order 764 each transmission provider must offer intra-hourly transmission scheduling, and interconnection customers with Variable Energy Resources (“VER”), such as wind plants, must provide meteorological and forced outage data to the transmission provider for the purpose of power production forecasting.”

(Our underlining)

Questions:

- 12.1 Does the NYISO comply with Order 764 in its OATT and provide the opportunity for intra-hourly transmission scheduling?
- 12.2 At what interval is transmission scheduling available in NYISO, 15 minutes, 30 minutes, some other interval or only hourly?
- 12.3 Is intra-hourly transmission scheduling available at the interconnection point between NYISO and HQT?
- 12.4 Does HQT provide the opportunity for intra-hourly transmission scheduling to and/or from NYISO?
- 12.5 If the reply to 12.3 and/or 12.4 is no, please indicate if HQT is planning to implement intra-hourly scheduling with NYISO and if so when.
- 12.6 Please answer questions 12.1 through 12.5 for ISO-NE rather than NYISO.
- 12.7 Please answer questions 12.1 through 12.5 for Ontario rather than NYISO.
- 12.8 Please answer questions 12.1 through 12.5 for New Brunswick rather than NYISO.

13. Reference : **File R-3848-2013, HQD-2, Document 1, p. 11, l. 1 to 4 :**

Preamble:

“The significant addition of VERs to the markets (specifically in the Electric Reliability Council of Texas (“ERCOT”) and the California Independent System Operator (“CAISO”) markets) is driving the need to increase the Ancillary Services requirements as well as efforts to consider the definition of new Ancillary Services, such as ramping.”

Question :

13.1 Is this need for increasing ancillary services requirements limited to organized markets or is there an increasing requirement in non-market areas where there are significant increases in wind penetration?

14. Reference : **File R-3848-2013, HQD-2, Document 1, p. 13 to 22 :**

Questions :

14.1 For each of the six systems analysed in the CASE STUDIES section of the document, please provide a table indicating, the Peak Load, the Average load, the Installed Wind capacity, the average wind capacity factor and the per cent wind penetration by energy. If detailed numbers are not readily available provide estimated numbers where necessary.

14.2 Please provide a detailed illustration of the methodology employed to develop VER-specific ancillary services by each of the six systems analysed. In particular identify how much, and at what cost, the total pool of regulation, load following and balancing resources in each system, are allocated to VERs rather than load.

14.3 For each of the six systems, indicate if the VER-specific ancillary services are detailed in their respective Open Access Transmission Tariffs.

14.4 For each of the six systems, indicate if the VER-specific ancillary services have been approved by FERC.

15. Reference : **File R-3848-2013, HQD-2, Document 1, p. 24., l. 12 to 16 and p. 25, l. 5 to 8 :**

Preamble:

“Besides the power purchase agreements with wind plants mentioned previously, HQD has long-term supply contracts with Hydro Québec Production (“HQP”), including the Heritage Pool of resources and additional baseload and cycling contracts, a long-term contract with TransCanada Energy, and a series of contracts with biomass and small hydro projects.”

(...)

“HQD has an agreement with HQP to provide the appropriate ancillary services needed to ensure the reliability and security of the Heritage Pool supply, at no additional costs.⁶⁸ Any additional energy, capacity and ancillary services needed by HQD must be purchased from other sources”

Questions :

- 15.1 Where does HQD get the ancillary services to cover the non-heritage pool (or “post-patrimonial”) resources?
 - 15.2 Does HQD contract ancillary services for all non-heritage resources as a whole, or are ancillary services requested by HQD on a resource by resource basis (i.e. specific ancillary services for biomass, for small hydro, etc.)? For clarity purposes, we would like to know if HQD’s request to obtain specific ancillary services for wind power is unique or if it is also the case for other non-heritage resources.
 - 15.3 What amounts of each type of ancillary service does HQD obtain to cover the non-heritage pool resources, and what price does HQD pay for each of these ancillary services?
 - 15.3.1. If applicable (see question 15.2), please answer specifically for each resource (biomass, etc.).
 - 15.4 Are there wind generation assets currently in operation in Quebec that are not under contract with HQD?
 - 15.5 If the answer to question 15.4 is yes, please provide the following information: name of each wind park, name plate capacity for each wind park, name of the operator for each wind park.
 - 15.6 If the answer to question 15.4 is yes, please explain what are HQT ancillary services requirements to integrate these assets on its grid.
 - 15.7 If the answer to question 15.4 is yes, please confirm that wind integration of wind assets not under contract with HQD will be treated separately from wind generation assets subject to the proposed wind integration service proposed in the current case (R-3848). Please explain in what manner this is being addressed.
16. Reference : **File R-3848-2013, HQD-2, Document 1, p. 29, I. to 6 :**

Preamble:

“As a distribution company, HQD needs to meet both energy and capacity demands. Thus, HQD needs to procure both energy and capacity to meet the demand beyond the heritage pool requirements. Moreover, HQD does not control balancing resources. Therefore, intra-hour, hourly and longer-term integration services, including capacity firming, are required to enable HQD to use the output of its wind contracts to meet its energy and capacity demand obligation.”

Question :

- 16.1 Why do the services need to be procured as a bundled service? Explain why Capacity, Regulation, Load Following and Imbalance could not be procured separately.

17. Reference : **File R-3848-2013, HQD-2, Document 1, p. 30, l. 7 to 10 :**

Preamble:

"Q. Can some wind integration service be provided through the DC ties connecting Québec to neighboring systems?"

Potentially yes, but there are reliability, operational and regulatory issues that would need to be resolved".

Question :

17.1 What are the specific issues that need to be resolved and what would be the resolution? Please explain in detail.

18. Reference : **File R-3848-2013, HQD-2, Document 1, p. 14, l. 10 to 12 :**

Preamble:

"For the 2012-2013 and the 2014-2015 rate cases, BPA first calculated the total costs of providing integration services in the rate period, including: embedded, direct assignment, and variable costs".

Question :

18.1 How exactly did BPA determine the total wind integration costs? Provide a detailed explanation of the methodology applied.

19. Reference : **File R-3848-2013, HQD-2, Document 1, p. 18-19, l. 23 to 3 :**

Preamble:

"Westar calculates the total regulation requirement for the balancing area, allocates the requirement to different sources of regulation service need, and estimates the total costs of providing regulation service. The total regulation service requirement calculation aggregates the 10-minute schedule deviations from a 10-minute persistence forecast in the balancing area for all sources of such deviations 95% of the time, effectively assuming that the deviations follow a Gaussian probability distribution".

Question :

19.1 Please explain the meaning of total regulation requirement for the Westar balancing area. More specifically, is it the requirement to regulate load deviations separately plus the requirement to regulate VER deviations separately, or is it the requirement to regulate the combination of load and VER deviations?

20. Reference : **File R-3848-2013, HQD-2, Document 1, p. 19, l. 10 to 12 and p. 20, l. 7 to 13 and :**

Preamble:

“NWE is a Pacific Northwest utility located in Montana, Nebraska, and South Dakota. In 2011, the average load of NWE's Montana service territory was 1,227 MW and peak load was 1,673 MW”.

“NWE calculates the integration cost by doing a two-scenario analysis of regulation costs at David Gates Generating Station. In the first scenario NWE assumes no installed wind capacity and 60 MW of total regulation. In the second scenario NWE models the cost of producing an additional 25 MW of regulation for the 141 MW of wind in the supply portfolio. The 25 MW number was calculated by multiplying the installed wind capacity (141 MW) by the ratio of regulation per megawatt of wind capacity necessary to comply with reliability requirements 18%”.

Questions :

- 20.1 For the no wind case, is it correct that the 60 MW of total regulation is what is required to regulate the 1227 MW of average load in the Montana service area of NWE? If not, please explain.
- 20.2 For the with wind case, is it correct that the total regulation of 85 MW (60 MW plus the additional 25MW) is what is required to regulate the combination of the 1227 MW of average load plus the 141 MW of wind in the Montana service area of NWE? If not, please explain.
- 20.3 Is it correct that 25 MW is the incremental regulating capacity needed for 141 MW of wind? If not, please explain.
- 20.4 Is the 60MW and 25 MW regulating capacity on automatic generation control (AGC) for frequency control or is it used for other services such as load following, balancing, and/or operating reserves?

21. Reference : **File R-3848-2013, HQD-2, Document 1, p. 21-22, l. 22 to 2:**

Preamble:

“The assessed integration charge for IPC is from a settlement. The original integration charge was derived through production cost simulation modeling of wind integration, with a base scenario which modeled only the balancing reserves currently necessary and scenarios where additional balancing reserves were enforced for various quantities of wind”.

Questions :

- 21.1 Please confirm that the base scenario included no wind and determined only the balancing reserves needed to balance the total system load. If not, please explain.
 - 21.2 Please confirm that each additional scenario with an amount of wind determined the balancing reserves needed to balance the total system load in combination with the added wind. If not, please explain.
 - 21.3 Were the incremental balancing reserves needed for a specific quantity of wind determined by subtracting the amount of balancing reserves for the base scenario from the amount of reserves determined for that specific wind scenario?
 - 21.4 Please explain what is meant by balancing reserves. Does it include frequency regulating reserves, load following reserves, spinning reserves, non spinning reserves, etc? If so, what would the relative quantities be?
22. Reference : **File R-3848-2013, HQD-2, Document 1, p. 23, l. 13:**

Preamble:

Table 3: Non-market Intra-Hour Wind Integration Rate Summary

	MW Installed Capacity	Published Capacity Factor	Published Rate (\$/kW-month)	Rate in \$/MWh (for published capacity factor)	Rate in \$/MWh (reference capacity factor of 35%)
BPA	4711	32%	\$1.23	\$5.27	\$4.81
PSE	430	30%	\$1.55	\$7.08	\$6.07
Westar*	614	40%	\$4.44	\$0.50	\$0.58
NorthWestern**	141	40%	\$1.58	\$5.41	\$6.18
Idaho Power	678	27%	NA***	\$6.50	\$5.01

* Rates for Westar are for regulation only, while for the four other utilities the rate includes following and imbalance services.

** Rates for NorthWestern Energy represents a Zone 1, long-term contract rate

*** The published rate for Idaho Power is already in \$/MWh

Question :

- 22.1 Please explain how Westar with a capacity rate 3 to 4 times higher than the other utilities has an equivalent energy rate that is much lower. What should the Westar capacity rate be for the nameplate capacity of wind?
23. References : i) **Dossier R-3775-2011 (EGM) , HQD-1, Document 1, p. 5, l. 20:**
 ii) **WIND ENGINEERING VOLUME 36, NO. 1, 2012, "Integration of**

Wind and Hydropower Systems: Results of IEA Wind Task 24, p.9:

Preamble:

i) « À la suite de l'examen du Plan d'approvisionnement 2008-2017, la Régie de l'énergie concluait toutefois que l'entente d'intégration éolienne ne devrait pas être renouvelée telle quelle, questionnant notamment le besoin pour le Distributeur d'obtenir des livraisons d'énergie et une puissance garantie uniformes à l'année. La Régie demandait également au Distributeur de déposer un ensemble d'études sur les impacts de la production éolienne dans le cadre de l'état d'avancement 2009. Une des études alors déposées portait sur la contribution en puissance propre à la production éolienne et les trois autres sur les services complémentaires. Plus précisément, ces dernières portaient sur :

- (i) la régulation de fréquence;
- (ii) le réglage de production (suivi de la charge);
- (iii) les provisions pour aléas ».

(ii) "Canadian case studies of Hydro-Québec's system : Three related case studies were performed by Hydro-Québec, each considering wind power energy penetration of 5% in the Québec power system (3000 MW wind), which has a peak load in the winter of approximately 37,000 MW supplied primarily by hydropower.

- *Hydro-Québec study #1 : The first study determined the impacts of wind power on operational reserves, specifically on AGC and load following reserve (de Montigny et al. 2010, Kamwa et al. 2009). Two approaches for computing regulation were compared (statistical analysis using analytical time series and IREQ simulation, and IREQ is the Institut de recherche d'Hydro-Québec), and also two methodologies for evaluating regulation impacts (Hirst and Kirby's ORNL method (1999) based on standard deviation and the BPA method (BPA 2009) based on variance allocation). Results demonstrated that the IREQ simulator appears to be the proper tool for obtaining the most accurate analysis of the impacts due to its far more realistic system operation assumptions. In this case, the supplementary AGC and loadfollowing reserves amounted to 1% and 5%, respectively, of the wind power capacity.*

- *Hydro-Québec study #2 : The second study utilized a methodology based upon a modified loss of load probability technique for the computation of balancing reserves, based on risk criterion on the horizon of 1 to 48 hours ahead (Menemenlis et al. (2009) and Menemenlis et al. (2010)). These reserves essentially address economic aspects of short-term supply adequacy, may vary a lot depending of the season and the meteorological conditions, and consist of available generating capacity that could be deployed when needed to offset discrepancies in supply caused by errors on current forecasts. Traditionally, these reserves have covered uncertainties on load forecasts and forced outages. The results showed that with current Hydro-Québec balancing reserves being relatively high and risk levels relatively low, little additional balancing reserves are required to integrate 3,000 MW of wind power capacity. Further, since the balancing reserves come at a cost, the risk level to maintain with additional reserves is an economic decision.*

- *Hydro-Québec study #3: Finally the last study considers the impacts on the system capacity adequacy taking into account the Nordic weather conditions on the wind turbines*

availability (Bernier and Sennoun (2010) and Choisnard et al. (2010)). The study model relied on wind and load data series that were matched on an hourly time-step, over a 36 year period using real weather data combined with seven different weekday pattern. The model takes into account forecasting errors and conventional generation outages through Monte-Carlo simulator, and the capacity contribution results from the comparison of two simulations leading to the same reliability target with the loss of load expectation equaling to one day per ten years. Results showed the capacity credit was established at 30% of total wind power capacity. Results were found to be very sensitive to wind data during a limited number of extreme cold events over the 36 years period of the study”.

(Our underlines)

Questions :

- 23.1 Please provide copies of the three HQ studies that are summarized in the Results of IEA Wind Task 24 document.
- 23.2 When were these studies completed?
- 23.3 Are any of these three studies the same as those referenced in the EGM filing? If so, which ones?
24. Reference : **i) Dossier R-3689-2009, HQD-3, Document 2 Annexe 1 Réponse à la demande de renseignements no1 de l'ACEF , « Entente de Services Complémentaires », ANNEXE A, Réglage de fréquence:**
ii) Dossier R-3848-2013, HQD-1, Document 2, page 7-8

Preamble:

i) “Rendre disponible une plage réglante de 500MW a 1 500MW (sans toutefois ajouter au Producteur des obligations de fournir des quantités de réserves additionnelles a celles spécifiées au point 4 suivant) provenant de certains groupes turbines-alternateurs assujettis a l'automatisme de réglage fréquence-puissance (RFP) afin de maintenir la fréquence du réseau a 60 Hz. »

ii) BPA defines regulation, following and imbalance ancillary services ... (!) the moment to moment variations[up to 10 minutes] in generation (regulation), (2) the longer timeframe variations over 10 minutes (following) and (3) the total hourly deviation between actual and scheduled out (imbalance). Although BPA defines following, in this report we will use the term load following to refer to the same service. [up to 10 minutes added for clarification]

Questions:

- 24.1 What was the annual average amount of RFP (AGC in English) capacity employed by HQT in 2012 to meet CPS1 and CPS2 reliability standards?
- 24.2 Does the 500 MW to 1500 MW range for frequency control include capacity to meet intra-hourly *load following* as well as *regulation* under the defined time frames in reference (ii)?

- 24.3 Confirm that the capacity under RFP is a subset of the 1500 MW of operating reserves capacity set out in point 4 of the *Entente de Services Complémentaires*.
- 24.4 Confirm that the *load following* capacity is a subset of the 1500 MW of operating reserves capacity set out in point 4 of the *Entente de Services Complémentaires*.
- 24.5 Confirm that Schedule 3 in the FERC proforma OATT would include both *regulation* and *load following* under the defined time frames in reference (ii).
- 24.6 Confirm that Schedule 3 in the HQT OATT would include both *regulation* and *load following* under the defined time frames in reference (ii).
- 24.7 Confirm that *imbalance* (as defined in reference ii) is covered in the HQT OATT under Schedules 4 and 5.