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To: IESO, attn Stakeholder Engagement

cc: Bruce Campbell, IESO
Darren Finkbeiner, IESO
JoAnne Butler, OPA
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**Subject: SE 91, Renewable Integration
Floor Price Focus Group
Comments on behalf of RES contract holder group:
IESO discussion paper “Dispatch Order for Baseload Generation”.**

I am writing to the IESO on behalf of all holders of RES I & RES II contracts for wind generation projects, a number of whom also hold RES III contracts. The group comprises Brookfield Renewable Power, Capital Power, Capstone Infrastructure Corporation, Enbridge, Kruger Energy, Suncor Energy, and TransAlta, collectively referred to herein as the “RES group”.

The RES group and its members are fully engaged in this IESO-led stakeholder consultation process, and seek to provide inputs that will help to optimise the renewables integration process. We do this in the expectation of OPA engagement in the process, and the assumption of concurrent amendment of RES contracts to provide appropriate protections from the impact of these rule changes and to support continued participation. These comments on the dispatch order discussion paper are thus made on a constructive basis without prejudice to our position absent such concurrent contract amendments. Our comments are informed by the IESO’s discussion paper and by the discussion that took place at the initial meeting of the Floor Price Focus Group on 21st November.

Our comments are grouped under four main headings:

- Economic efficiency, alignment of incentives, and alternatives to floor prices
- Coordination with OPA contract amendments
- Quantification of the SBG problem and other dispatch benefits
- Questions and concerns with the IESO's present proposal
 - Timing and duration issues
 - Technology issues: hydroelectric
 - Technology issues: wind
 - Technology issues: nuclear
 - Loss penalty factors and intra-technology equity
 - Impact of floor prices on imports

1. Economic efficiency, alignment of incentives, and alternatives to floor prices.

a) Economic efficiency and contract compensation

The IESO has noted¹ that *“even when looking at a full compensation contract, the proposed floor price remains more efficient.”* This should not be surprising. Given that overall economic efficiency would be related to the level of total production and the use of the most efficient resources for that production, then the transfers inherent in contract payments for foregone energy would not in themselves enter into the economic efficiency. The productive element of economic efficiency will indeed be enhanced by the selection of production resources with the lowest marginal costs. The implementation of a *“full compensation contract”*, which we take to mean a contract in which the OPA fully compensates the Supplier for foregone energy, would not in any sense be expected to reduce the efficiency of the market. To the extent that *“full compensation contracts”* align incentives, as discussed below, they would tend to enhance efficiency. This should be an agreed basis with respect to the coordination of market and contract amendments.

b) Market incentive structures

The market rules have been developed in accordance with the principle that they should incent (rather than seek to compel) market participant behaviour that will result in overall economic efficiency. IESO objects are thus served by the voluntary actions of market participants that result in overall market efficiency. This principle underlies many features of the Ontario market and other pool based electricity markets such as in the North East US. In Ontario these features include: constrained dispatch with uniform price and CMSC; day ahead commitment processes introduced under the EDAC project; import scheduling and IOG. All OPA contracts for facilities that were expected to be subject to dispatch (ie gas-fired facilities) have sought to avoid

¹ Dec 6 minutes of PFFG meeting of Nov 21, page 4, item 1.

distortion of these market incentive structures in order that voluntary self-interest by suppliers will result in market optimisation.

The floor price framework now being proposed is a complete departure from this fundamental principle of incentive framework rather than compulsion. The proposal introduces a level of restriction whereby market participants would be compelled to offer production in a way that (absent full OPA contract compensation for foregone energy revenues) would conflict with their proper economic interests. We do not consider that the fundamental nature of this change has been fully or properly considered to this point. We also believe that this fundamental change of principle can be avoided. We set out in the following few paragraphs some options for further consideration.

The floor price framework also introduces other changes to the operation of the market as a whole. We have not yet seen any analysis by the IESO of these impacts. A common floor price for a large quantity of generation will mostly preclude price excursions below that floor price. Unrestricted generators will be sheltered from the risk of such negative price excursions, so that their offer price strategies may become even less sensitive to SBG exposures.

c) Options

We are pleased that the IESO has indicated² that it would welcome stakeholders' suggestions of alternatives that would still ensure efficient dispatches during SBG. We are pleased to make two such suggestions:

- Contract compensation without floor prices; and
- Curtailment ancillary service.

These two options start from the principle of aligning generator economic interests with market economic efficiency. They are discussed in sections (d) and (e) below.

d) Contract compensation without floor prices

A contract structure that (i) provides full contract compensation for properly foregone energy production, and (ii) limits contract compensation to the difference between contract strike price plus EcoEnergy / WPPI benefit and non-negative HOEP, can achieve this without the need for market or contract restrictions on offer prices. Careful definition of the criteria for properly foregone energy production would incent offer behaviour close to zero, but with a degree of offer-price diversity according to each market participant's evaluation of risks and rewards.

This framework is an expansion of the FIT contract provision for SBG-based curtailment rules in two respects. It expands the circumstances to include the non SBG-based dispatch now proposed by the IESO, such as locational oversupply or ramp management optimisation. And it expands the compensation to include any

² Dec 6 minutes of FPFG meeting of Nov 21, page 3, item 2.

EcoEnergy / WPPI benefit applicable to the project (which most projects that have been operating prior to March 2010 receive).

This framework would appear to be applicable to all OPA contracts that otherwise utilise simple energy-based payments to incent maximum energy production, including wind, solar and nuclear technologies. It would be available to the OEB in respect of OPG's prescribed asset pricing in order to provide an equivalent incentive framework.

The actual dispatch framework would appear to be the same (except for the need for floor prices) as for the IESO's present proposal. Issues of intra-technology equity and of the rational allocation of dispatch curtailments would be largely avoided. The IESO system requirements would be simplified by the exclusion of floor price management tools.

We would be pleased to meet with the OPA and IESO for the purpose of developing such a framework.

e) Curtailment ancillary service

The concept of a curtailment ancillary service has been raised by the RES group on a few occasions and by Dachis and Dewees³. It would allow generators otherwise incented to run at maximum production to offer prices at which they would reduce production to some specified level. It could be modeled as a dispatchable pseudo-load at the generation connection point. IESO settlement would be conceptually similar to that in place for existing competitive ancillary services.

We see four significant benefits of this framework:

- It is a voluntary process, not requiring restrictive rules;
- It is technology neutral, and could be available to the full range of contracted and regulated baseload and variable generation, including recognition of time and duration differences;
- We would expect contract and regulated-price changes to be relatively limited; and
- The amounts payable in respect of such curtailment are fully reflected in the economic optimisation of the market; they are not off-market contract transactions excluded from optimisation. Without detailed economic modelling, we would expect that inclusion of these costs within the market optimisation must in principle improve market efficiency beyond that obtained by mandated floor prices. The IESO would not have to make any judgments of arbitrary floor price levels.

³ Benjamin Dachis and Donald Dewees: C.D.Howe e-brief dated July 19, 2011, titled "Plugged into Savings: A New Incentive-Based Market Can Address Ontario's Power-Surplus Problem." They describe the service as a Dispatch Down Market.

We would be pleased to meet with the IESO for the purpose of developing such a framework, subject to the OPA's acknowledgement that they would implement the necessary contract waivers and assignments.

2. Coordination with OPA contract amendments

As noted extensively during the meeting on 21st November, we consider it essential that the OPA be fully, actively and transparently engaged in these discussions, and at the same time that the OPA have active discussions with their contract holders collectively or individually, to confirm willingness to provide the “*full contract compensation*” referred to by the IESO⁴.

Previously we have highlighted the market participants' need for clarity of the OPA's position. This need is undiminished. This will hopefully emerge in part from the OPA's full, active and transparent engagement in the stakeholdering process. But fundamentally, we do not consider that stakeholdering of the IESO's proposals is truly valid while participants remain ignorant of the OPA's position and have not received the OPA's commitment. This is particularly evident in the context of the discussion of floor prices.

In proposing alternatives to the floor price regime, it becomes even more clear that the optimum solution, from an electricity system perspective, requires joint consideration of contracts and rules. The OPA contracts for base load and variable generation all provide incentives that are in conflict with the IESO's needs for renewable integration in the evolving supply mix as established by government in the years since the execution of RES I & RES II contracts. Solutions that emerge absent full and transparent OPA participation, and without joint and parallel consideration of contracts and rules have a high risk of being sub-optimal.

3. Quantification of the SBG problem and other dispatch benefits

We have expressed our concern in the Dispatch Technical Working Group at the lack of information on expected frequency or depth of wind, solar, hydroelectric and nuclear curtailments under the proposed frameworks. It seems to us that meaningful estimates, with confidence bands, are essential to an understanding of the impacts on different technologies under varying floor price sequence scenarios, and that this is properly a matter for the Floor Price discussions. We urge the IESO to collate and present the best available information as a basis for decision making.

We also seek some clarification of the quantum of market benefits expected from non-SBG curtailments. Absent some appreciation of the frequency and materiality of such events and their benefits, we find it hard to understand the basis for decision making in this area.

We therefore look to the IESO to provide its best estimates of this information at the earliest opportunity.

⁴ See footnote 1, above.

4. Questions and concerns with the IESO's present proposal

a) Timing and duration issues

The IESO is proposing that the dispatch data will be entered into the DSO, and there will be no binding scheduling or dispatch signal available to wind or solar variable generation and presumably to nuclear generation in advance of the 5 minute real time dispatch. The IESO is proposing to provide no day ahead or pre-dispatch tools for more prospective management of situations. We find this puzzling and disappointing.

From a market perspective, we would be concerned that nuclear facility ramp rates could preclude or limit response in real time. We are unaware of circumstances when nuclear facilities have been expected to operate on the margin with real time dispatch response, yet this appears to be the IESO's plan. If nuclear facilities are unable to respond within their partial curtailment range, then the IESO may turn back to curtailment of the min load portion of wind, so we would be directly impacted. If on the other hand the IESO would propose some other time frame for the activation of nuclear curtailment, please advise how this would work and to what extent it could be made available to wind and solar generation.

Day ahead and pre-dispatch commitments are available to most fossil generation and to imports and exports. Other dispatchable generation will continue to be able to manage its production, and to preclude marginal operation, by managing offer prices up to two hours ahead. Variable wind and solar generation will therefore face short term dispatch without the mitigation ability available to most other resources.

We therefore propose that, **subject always to the essential confirmation of the OPA that they would provide full contract compensation in such circumstances**, there be a window for multi-hour curtailment based on pre-dispatch. Unfortunately the negative incentive for exports to participate in day ahead commitment seems to preclude use of the day ahead commitment process as a basis for block curtailment, so we would suggest use of the three-hour-ahead pre-dispatch as an appropriate basis for block (ie multi-hour) curtailment of nuclear, baseload hydroelectric, and dispatchable wind and solar generation.

b) Technology issues: hydroelectric

We note that even as recently as 3rd Dec, hydroelectric facilities on the Niagara and St Lawrence rivers have ramped up significantly in hours of negative prices. We find this puzzling, as we cannot see spillway management as a problem at those facilities. It is not clear from the IESO's discussion paper why floor prices for such generation should be below floor prices for wind or solar generation.

c) Technology issues: wind

In general, as noted by the IESO⁵, wind facilities can be dispatched down to say 10% capacity and continue operating. Beyond that point wind facilities are likely to require

⁵ Ref DTWG meeting of 15th Dec, presentation materials

to be stopped. This always introduces some risk of delay in restarting. This is particularly significant in certain seasons and ambient conditions, when restart of a facility can take several hours⁶.

Any floor provisions applicable to wind should therefore reflect the two steps, with the first (lowest) price increment set below floor prices for hydroelectric and for nuclear steam dump.

d) Technology issues: nuclear

We note that nuclear curtailment can be implemented in any one of three ways: steam dump; reactor chemistry; and shutdown. The first two have part load capability only, but are recoverable without the 48 to 72 hour min shutdown period associated with any full unit shutdown. We would therefore expect that the capability represented by the first two steps would have a higher price floor than the unit shutdown.

We would also appreciate clarity assurance that the nuclear curtailment rules will be the same as the wind and solar curtailment rules, albeit with different floor prices.

e) Loss penalty factors and intra-technology equity

We note that this will be a very material issue, but that the IESO has not yet indicated options for its treatment. We believe that this issue may introduce some significant complexity into solutions and potentially into systems requirements. This complexity would be avoided in either of the two options proposed in sections 1(d) and 1(e) above. We will however defer comment until this becomes part of the discussion agenda.

f) Impact of floor prices on imports

The IESO has to date used non-market control actions such as the constraint down of Bruce unit production to address SBG situations. This is consistent with use of control actions to prevent imports into such surplus situations. If in the future the IESO will be relying on market dispatch with restricted offer prices to address SBG situations, will it still be in a position to use control actions to mitigate imports? Is there a potential that generators in other markets will be able to force Ontario imports, and thus force additional curtailment of Ontario wind resources, by offering to Ontario at prices lower than the known floor prices?

⁶ The IESO indicated in the DTWG meeting on 15th December, up to 24 hours.

Conclusions

We look forward to constructive engagement with IESO, with active OPA participation, to optimise solutions and to select the best among floor price or alternative mechanisms. Meanwhile, please do not hesitate to contact me or other group members if you have any queries arising from the above comments.

Yours Truly

R Cary