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September 30, 2014

To Whom It May Concern,

RE: Stakeholder Feedback on Demand Response Pilot Projects

Enbala Power Networks (Enbala) is pleased to submit our comments on the Demand Response (DR) Pilots to the IESO, as detailed in the Public Session on September 12, 2014.

As a newcomer to the DR Pilots working group, we'd like to commend the IESO for its vision in developing this innovative plan for advanced DR in Ontario. We recognize that an around the clock, 5-minute, real-time dispatch is an industry-leading application with tremendous potential to transform grid operations, continuing the province's industry leadership in modelling and developing the power system of the future.

We understand the importance of developing a well-defined pilot scope, with objectives and deliverables that will ensure the full capability of DR is demonstrated in the pilot and made rapidly available at scale in the IESO markets.

To that end, we encourage the IESO to consider the additional potential technical requirements listed here, which could help solve a number of common DR implementation and response challenges caused by a short timeframe, continuous 5-minute service. These technical elements will support a successful and effective DR response and overall pilot, fully enabling and maximizing load participation.

There are significant differences and accompanying factors to consider when enabling loads for a 5-minute, dispatch service when compared to a traditional DR program with roughly 10 events per year. A shift to real-time grid operations is what our evolving system will need; however, short notice and high number of notifications can be challenging to recruit for, to implement, and to receive the best possible response from participating load. In spite of this, the IESO's proposed "faster DR" approach is not without successful precedent, so it is important to consider the valuable lessons learned from previous similar pilots and projects – including load control for Regulation (2-second dispatch) and for Wind Firming (15-minute dispatch) – when designing the pilot.

For loads to successfully participate in more in-depth DR programs, industry experience has shown that additional enabling elements such as real-time load capability forecasting, aggregation, optimization, and constraint-based automation are paramount. To implement these elements, gain a valuable and effective DR response, and increase diversity of participating facilities, a much deeper connection with the load is required. Considering the needs of load first can help solve initial load fatigue and customer engagement challenges.

Technical Requirements

The IESO has correctly identified two important technical requirements:

- 1. Telemetry for control room visibility of the resources and formulation of dispatch**
- 2. A dispatch workstation**

We agree with these requirements and recommend four more as described here.

- 3. Real-time forecasting of capacity availability**

When implementing any DR pilot or program, it crucial to understand the available capacity of participating load in order to achieve a successful response. At certain types of facilities, this availability varies from moment-to-moment, and potential response depends on changing process operating conditions, including environmental factors such as weather. This variability complicates both capacity forecasts and dispatch execution. Many facilities cannot easily determine the capacity that will be available for curtailment at a certain point in time hours or even a day ahead. This is particularly challenging when the dispatch is in real-time and with a 5-minute response timeframe. To solve this forecasting and dispatch execution problem, a detailed forecasting model that estimates the operational flexibility of each individual participating loads needed. This forecast should cover multiple time scales to accurately estimate the real-time and forward-looking capacity availability. This is key for resources to be able to participate reliably in real-time, understand their behaviour over time, and provide the response that the grid requires.

- 4. Operations automation and customer-defined participation**

The proposed DR pilot contemplates real-time, 5-minute dispatch in order to access DR with the flexibility to offer energy into real-time markets. The challenge with this faster DR approach is that the notification time for a real-time dispatch curtailment event will be too short for most facilities to make manual, on-the-spot decisions and take action to follow through with the response. To ensure effective load participation, a predetermined automated process needs to be in place at each participating facility. Enabling automation is a key element in allowing facilities to participate with zero to minimal operations disruption.

Even with an automated curtailment procedure, many facilities can be faced with an opportunity cost that is too high to cost-effectively participate in a real-time dispatch market. In many cases, preliminary measures must be taken up to a day in advance and cannot easily be adjusted in real-time. This is another challenge that can be dealt with in implementing this pilot; by taking a constraints-based approach to implementation, a facility's lost opportunity cost can be significantly reduced or eliminated. Facilities will be more inclined to participate in a DR pilot if the process is automated and steps are taken before the pilot begins to define their participation parameters. This type of "non-disruptive" DR enables a smoother transition to 5-minute dispatch, and as the IESO continues its shift to real-time operations, enables a deeper connection with the customer and more flexible demand control.

Non-disruptive DR allows individual loads to define their own operating parameters within an aggregated network for participation in the program. For example, a municipal water utility might set upper and lower limits on their reservoir water level. An aggregator must satisfy these constraints when sending dispatch signals. As process conditions change, the dispatch must be updated in real-time to continuously satisfy these constraints while meeting the curtailment signal. The loads can participate without impacting their underlying process – the result is a more reliable response with improved customer satisfaction, helping to solve customer hesitation to participate in faster DR.

- 5. Resource diversity and an aggregated, combined DR response**

Different types of loads are best suited for different types of services and while some might be capable of responding rapidly, others might require more advanced notification but can curtail more MW and for a longer period of time. A diverse set of load resources creates a more useful product than the sum of its parts, and will help the IESO meet the customer engagement and effective response challenges that a faster DR approach can cause.

Some very large loads are able to provide valuable grid services on their own. However, many types of facilities are not able to respond to 5-minute curtailment requests consistently over long periods of time. By combining together the response from a number of diverse resources, DR actually offers benefits that increase participation. The greater diversity of resources, the more precise the operating parameters can be for individual facilities, enabling participation with low to minimal disruption to daily operations.

The operational flexibility from individual loads will vary over time, but by connecting to diverse load resources, the IESO will ensure that the aggregated response matches its 5-minute dispatch signal. This requires potential aggregators to implement some method of optimization to use the right loads at the right time while anticipating a participating facility's operational needs during future intervals.

6. Continuous Varying Consumption

While traditional, event-based load curtailment is a valuable product, the IESO may find benefits in a continuous varying consumption DR product. This type of product can also reduce the lost opportunity cost for participating facilities with operating flexibility and process/production storage. As the shift from discrete to real-time operations continues, we believe this type of service can add more value by increasing customer participation, and enabling a more precise DR response.

For this type of service, participants must be capable of responding to increasing or decreasing power consumption set points. By enabling continuous varying consumption capabilities, the IESO can demonstrate the full capability of a real-time DR product.

Many types of loads are capable of this type of response and even prefer it once they understand the implications. With a varying consumption DR service, the lost opportunity cost for many types of participating facilities is reduced since an increasing and decreasing dispatch allows a facility to maintain average rate of work/production over a period of time. Loads can continue to satisfy their primary process requirements, while simultaneously participating in IESO markets. This will enable more loads to participate and create a more accurate load following response for the IESO.

Compensation Structure

Real-time 5-minute dispatch may require a different compensation approach than traditional curtailment programs. There is a "trade-off" so-to-speak; the cost to enable faster DR involves an advanced customer interface installed up front; however, lost opportunity costs are close to, if not zero for many types of facilities throughout the program due to more effective participation and response. Traditional curtailment costs are heavily weighted on events since the lost opportunity costs are much higher.

In designing the DR pilots, we recommend that the IESO consider a more front-loaded approach for the compensation plan. The savings gained by minimizing lost opportunity costs throughout the program offset enablement costs for deeper connection, making participation economic to the loads and the IESO. Enbala will provide additional input into the compensation structure that reflects anticipated decrease/elimination of lost opportunity costs with some types of loads as well as the residual value of one-time load enablement costs.

In summary, Enbala is highly supportive of the IESO's proposed DR pilot initiative, including the 5-minute real-time dispatch. We believe that the above proposed technical requirements will encourage diversity in load participation and that the full capability of real-time DR dispatch can be teased out of the pilot. We appreciate this opportunity to provide comments and look forward to continue to work with this group in defining the requirements and conditions for the success of the DR Pilot.

Sincerely,

A handwritten signature in blue ink, appearing to read 'CS', with a period at the end.

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