Opower Response to the IESO DRWG Consultation on Expanding Participation in the DR Auction

April 20, 2016

Opower is supportive of the efforts of the reformed DR Working Group (DRWG) to expand participation in the DR Auction to additional DR technologies and sectors, including the residential sector. As a provider of behavioral demand response (BDR) for residential customers, we think it's important that the DR Auction be open to all resources capable of providing Hourly Demand Response (HDR) services to the grid. The successes of the peaksaverPLUS® program and the Opower BDR pilot at Hydro Ottawa demonstrate the significant potential for residential DR to provide reliable curtailment services.

These comments identify barriers to residential DR participation in the current auction structure and propose solutions to remove these barriers. Opower welcomes constructive discussion with IESO staff and DRWG stakeholders to further refine these barriers and identify the best path forward for incorporating residential DR into the December 2016 DR Auction.

Allow for Alternative Baseline Methodologies

The IESO diverges from other ISOs--including PJM, ISO-NE, and MISO--in that it does not have a defined process to approve alternative baseline methodologies for DR resources. These processes are an acknowledgement that no single baseline methodology is appropriate for all resources and that market settlements are improved when DR resources are evaluated against the best available baseline for that particular resource. The IESO should follow the example of successful market-based DR programs at other ISOs, each of which have a process for registering alternative baselines. The relevant language from other ISOs that allows for alternative baselines is included as Appendix 1 of this document.

The IESO DR auction has the potential to attract DR resources that employ a variety of technologies and target a variety of sectors and loads. Residential DR is one sector with great potential to participate in the DR auction mechanism. Achieving this diversity of DR technologies requires flexibility around the techniques used to evaluate load reduction because the standard baseline methodology is not appropriate for all resources.

The customer baseline methodology was developed be predictive of commercial, industrial, and institutional loads during DR events and therefore may not work as well for residential loads. A distinctive characteristic of residential loads is that they are highly

weather-sensitive. Indeed, the summer peak in the IESO region is driven to a large extent by these weather-sensitive residential loads – specifically residential air conditioning that peaks during hot summer afternoons. The weather sensitivity of residential loads means that baseline methodologies that predict usage based on non-dispatch days can significantly underestimate the load curtailment from residential DR.

The logic for why nearly all baselines are downwardly biased for residential loads is intuitive. DR events are scheduled on days when a shortage in capacity causes wholesale energy rates to peak. These days, tend to be much hotter than the average day. Because of increases in the use of air conditioning, most customers use much more electricity on these event days than they do ordinarily (hence the shortage in capacity). However, the days used to calculate the baseline cannot include DR event days. Customers tend to use less electricity on non-event days. When comparing a baseline calculated using relatively cool, low-load non-event days to the actual load on a hot, high-load event day, it is logical that the baseline would be lower on the event day, and that it would be biased downward. This downward bias leads to a baseline that consistently underestimates the load curtailment from residential DR resources.

The in-day adjustment mechanism may also lead to biased estimates of load reduction for certain residential DR programs. For example, a residential air conditioning cycling program that pre-cools participant households prior to activation will report a higher-than-typical load in the hours leading up to the DR event. The Day-of adjustment would pick up this pre-cooling load and result in a load baseline with a positive bias, which overestimate the load curtailment from that program during the DR event. Another example would be a behavioral demand response (BDR) program in which customers begin load curtailment in the hours prior to the activation period by taking actions such as raising their thermostat setpoints in the morning prior to leaving for work. These behaviors result in a reduction in customer usage in the hours preceding the activation period and result in a load baseline with a negative bias, which underestimates the load curtailment from that program during the DR event. Both pre-cooling and pre-curtailment are perfectly legitimate curtailment behaviors but mean that the main assumption regarding the validity of the in-day adjustment – that residential customers do not change their behavior before an event – is violated.

The DR auction rules should include a process through which DR market participants can work with IESO staff to define an alternative baseline methodology that is likely to produce more accurate estimates of load reduction. These rules should allow for alternative baseline methodologies, such as randomized controlled trials, regression baselines, and statistical sampling.

Opower is sensitive to the limited resources of IESO staff to assess and implement alternative baselines. However, we believe that a solution can be reached that would not be overly burdensome for IESO staff and that would greatly improve the quality and diversity of DR resources in the market. Indeed, the process for approving alternative baselines will necessarily require IESO staff and demand response market participants to collaborate on solutions that improve load reduction estimates.

Measurement Data Submission and 5-Minute Data Granularity

The DR Auction rules require that DR market participants submit measurement data using 5-minute usage intervals. This is problematic because most residential customers in Ontario have AMI meters that only collect usage data at 15-minute intervals. The IESO DR auction must accommodate the meter read frequency of residential AMI if the residential sector is to participate. The province has invested hundreds of millions of dollars to deploy AMI meters to mass market customers with the promise that these meters would facilitate customer participation demand response and other load management programs. It is important that this investment not be wasted due to issues with meter read frequency.

Opower recommends that the IESO accept measurement data submissions using the native read frequency of the AMI meters affiliated with the DR resources. In the case of residential AMI, this could be a 15-minute, 30-minute, or 60-minute read frequency. For the purposes of standardized data reporting, the DR market participant could report the value of a single meter read as the interval value for each 5-minute period within the meter read frequency. For example, if an aggregated DR resource is composed of residential customers with 15-minute interval data, the DR aggregator should be allowed to report a single value for each of the three 5-minute intervals within the 15-minute consumption interval.

Post-Auction Requirements: Contributor Management

The requirements for contributor management are administratively burdensome for residential DR providers that may aggregate tens of thousands or hundreds of thousands of individual participants. For example, Opower administered a behavioral demand response program with Hydro Ottawa that included over 50,000 residential participants. The Online IESO system only allows users to input a single virtual contributor at a time. Batch upload functionality is necessary to facilitate the registration of large volumes of aggregated virtual contributors. Additionally, the IESO should review the applicable requirements for contributor management to determine applicability to the residential sector.

Demand Curve Parameters Should Reflect Residential DR Capabilities

The demand curve parameters are calibrated based on legacy DR3 contracts from commercial and industrial customers, and therefore do not encompass the available capacity and price of residential DR resources. Specifically, the target capacity and reference price should be modified to reflect both legacy residential DR programs, as well as emergent DR technologies. The target capacity for each commitment period should not only include expiring DR3 contracts, but also a portion of 113 MW of residential DR capacity from the peaksaverPLUS® program.

Automated Dispatch Signal

The IESO should consider automated signals for standby notifications and activation notifications, as opposed to the current method that requires market participants to login each day to see if they have been scheduled for standby and/or activation. Signal automation would improve communication between the IESO and market participants, reduce the chance of a missed notification, and maximize the amount of time that DR market participants have to respond to standby notifications and activation notifications.

Include Activation Hours in Standby Notification

Residential DR programs would benefit if standby notifications included information about which four-hour period the DR resource could expect to be activated and the energy that that resource should deliver during that period. By including potential activation hours and energy commitments in the standby notification, the DR market participant could better prepare its resources to comply with IESO directions when and if the DR resource is activated. This certainty about activation hours would also benefit commercial and industrial DR resources by allowing for the advanced scheduling for DR curtailment activities in preparation for a potential activation.

Appendix 1: Allowances for Alternative Baselines in Other ISOs/RTOs

ISO/RTO	Allowance for Alternative Baseline
PJM	**10.2.5 CBL Certification Process** An alternative [Customer Base Line] may be requested if the alternative CBL is more accurate than the standard CBL and has [a relative root mean square error] less than or equal to 20%.
ISO-NE	**5.3 Alternative Measurement and Verification Methodologies** The Project Sponsors may propose alternative methodologies not listed in Section 5.2. Project Sponsors proposing alternative methodologies shall demonstrate that the alternative methodologies will be equivalent to one of the accepted methodologies described in Section 5.2 above, conform to Market Rule 1, and demonstrate justifiable need for deviation from the acceptable methodologies described in Section 5.2 based on unique Project requirements. Alternative measurement and verification methodologies are subject to approval by the ISO
MISO	**4.8.1.3.4 Custom Baseline** The [Market Participant] sponsoring a [Demand Response Resource] may develop a custom Consumption Baseline if none of the three standard baselines described above would produce reasonable estimates of the resource's demand reductions. MISO must approve of the specific methodology to be employed before the [Market Participant] can utilize such a baseline. For custom Consumption Baselines, the input provided becomes the Consumption Baseline that will be subtracted from metered amounts to determine performance (demand reduction).