Detailed Design: Energy Efficiency Auction Pilot

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Contents

1.1 Introduction

This draft detailed design explains the purpose and outlines the proposed process and participation requirements for the IESO's Energy Efficiency (EE) Auction Pilot. The document aims to provide potential auction participants with the information required to understand the auction and how to participate.

The detailed design builds upon the high-level design to:

- Present further information on auction mechanics;
- Share the agreement by which successful auction participants will assume an obligation to deliver *EE capacity*;
- Provide Measurement & Verification procedures;
- Establish detailed requirements for submitting *EE resources* for capacity enrolment and verifying eligibility to participate in the auction;
- Communicate comprehensive instructions for submitting offers to the auction; and
- Confirm dates for the auction, capacity enrolment and delivery, and reporting obligations.

Please note that certain terms in this document are italicized to indicate that they are key terms and defined in the glossary. Please also note that the detailed design sometimes refers to general concepts concerning capacity auctions, such as "capacity" and "enrolment." The use of these terms my not reflect those terms set out in the IESO Market Rules, the final terms in the EE Auction Pilot participant agreement, or the IESO's general interpretation of these terms in relation to other programs or aspects of the Market Rules.

1.2 PILOT AUCTION CONTEXT AND OBJECTIVES

In the last decade a number of jurisdictions in the U.S. and Europe have made the transition from the use of traditional programs to secure EE to market-based approaches, such as auctions or tenders, to meet some or all of their EE needs. These mechanisms have reduced the cost of procuring EE echoing the IESO's experience transitioning the procurement of demand response from programs to the Demand Response Auction.

Concurrently, a number of independent system operators and regional transmission operators (ISO/RTOs), including ISO New England (ISO-NE), PJM Interconnection (PJM), and the Midcontinent Independent System Operator (MISO), have enabled EE to participate in their forward capacity auctions.

Leveraging the IESO's Grid Innovation Fund, the IESO will pilot an EE auction to inform long-term discussions about enabling this resource to compete to meet system needs through an appropriate market-based mechanism. In particular, the IESO is seeking to understand the receptivity of this market to participating in auction-style procurements, as well as the associated benefits to the system of acquiring EE through this type of competitive mechanism. For clarity, the pilot auction will only run **once.**

Among other objectives, the pilot aims to:

- Assess the interest and ability of different sectors (e.g., local distribution companies, sophisticated large or multi-site customers, energy service companies) to compete to provide *EE capacity* through an auction mechanism;
- Discover the price of *EE capacity* when competition for delivery enabled;
- Evaluate the strengths and weaknesses of Measurement & Verification (M&V) procedures for confirming capacity contributions from these resources; and
- Assess the unique characteristics of *EE resources* (e.g., implementation timeline, deliverability, savings persistence) versus traditional supply resources.

The IESO is currently responsible for the design and delivery of a suite of EE programs for businesses, Indigenous communities, and low-income consumers through the 2019-2020 Ontario Interim EE Framework. At the same time, the IESO is working with government to determine how EE can continue to meet system needs, as well as other policy objectives beyond 2020. The EE Auction Pilot is intended to complement other potential post-2020 initiatives and inform IESO options for enabling EE to compete to meet projected reliability needs in the mid-2020s time frame.

The IESO appreciates that the pilot's exclusive focus on demand reduction and load shifting during specific time periods may make some *EE measures* historically incented through IESO-administered programs uncompetitive. In keeping with the IESO's focus on enabling competition and meeting system requirements, the pilot seeks to more closely align procurement of EE with the anticipated needs of the bulk electricity system.

Among other considerations, the design features a number of decisions that reflect the:

- Intent to execute a single auction on a pilot basis rather than create an enduring mechanism;
- Desire to facilitate broad participation in what is a novel procurement mechanism for this market; and
- Practical need to contain the administrative obligations placed on the IESO.

If, in the future, the IESO implements a recurring auction specifically for EE or enables participation in the primary capacity auction, there would inevitably be a number of significant design differences between the pilot and the enduring auction mechanism.

2. Pilot Auction Overview

2.1 THE EE CAPACITY PRODUCT

The auction will procure capacity in the form of verified reductions in electricity demand from *EE resources* during specific hours of the day – the *demand reduction window* – during winter and summer *obligation periods* over the one-year *commitment period*.

For the purposes of the pilot, the verified demand reduction delivered by *EE resources* will be referred to as *EE capacity* and expressed in units of kW_{WINTER} and kW_{SUMMER}. Demand reductions will be measured as the average reduction during the *demand reduction window* hours in a given *obligation period* in accordance with the *EE Auction Pilot M&V Procedures* (please refer to Appendix B EE Auction Pilot M&V Procedures).

2.1.1 Demand Reduction Window

The timing of the *demand reduction windows* varies by *obligation period (*winter or summer). Auction participants may compete to provide *EE capacity* for one or both of the seasonal *obligation periods* over the one-year *commitment period*.

Table 1: Timing of obligation periods and demand reduction windows

Obligation period	Demand reduction window
Winter – November 1, 2022 to February 28,2023	Non-holiday weekdays, hour ending (HE) 17-21 (4 p.m. – 9 p.m. Eastern Standard Time)
Summer – June 1, 2023 to August 31, 2023	Non-holiday weekdays, hour ending (HE) 13-21 (12 p.m. – 9 p.m. Eastern Standard Time) [1]

The use of seasonal obligation periods reflects different demand characteristics and supply capabilities during the two seasons when Ontario experiences the greatest electricity demand. It also enables participation by resources that may be seasonal in nature (such as many heating and cooling measures). The timing of the *demand reduction windows* aligns with the timing of the availability windows of the IESO's existing capacity auction designs. The timing of the *obligation periods* represents a balance of the existing months considered in the IESO's current *Evaluation, Measurement and Verification Protocols and Requirements* and expectations regarding when risk to resource adequacy is greatest during the 2020s.

2.1.2 Commitment Period

EE resources successful in the auction will receive an obligation to deliver *EE capacity* during the summer and/or winter *obligation period(s)* they clear during the one-year period known as the *commitment period.*

[1]Note that in accordance with IESO standard practice, summer hours do not reflect Daylight Saving Time. The summer *demand reduction window* is 1 p.m. – 10 p.m. Eastern Daylight Time.

2.1.3 Zonal Constraints

Given the limited scale of the pilot and the static nature of *EE resources*, the auction will procure *EE capacity* on a provincial basis (i.e., there are no zonal constraints).

2.2 AUCTION PROCESS

The process for the pilot is described at a high-level below, and in greater detail in Sections 6-10 and 13 of this document.

1. Pre-Auction Period
    - Prospective auction participants submit *EE resource plans* and information to verify auction eligibility and resource capacity, and submit agreement to fulfil *EE capacity* obligation if successful in auction
    - The IESO confirms auction eligibility, M&V feasibility, and capacity that can be offered into the auction
2. Auction Period
    - Auction participants submit offers during offer submission window
    - The IESO validates received offers align with *EE resource plans*, clears auction, and posts auction results
3. Forward Period
    - Agreements with successful auction participants updated to reflect cleared *EE capacity*
    - Successful auction participants confirm resource implementation and provide *M&V plans*
    - The IESO validates *M&V plans* meet requirements
4. Commitment Period
    - Successful auction participants deliver capacity during summer and/or winter obligation period(s)
    - Successful auction participants provide *M&V reports* confirming *EE capacity* delivery after each applicable obligation period
    - The IESO settles capacity payments after each obligation period
5. Evaluation Period
    - The IESO evaluates *EE resources*

3. Resource Eligibility

3.1 EE RESOURCE DEFINITION

An *EE resource* is one or more **new** *measures* installed or implemented at one or more **existing** facilities that deliver a reduction in electricity demand during the defined *demand reduction windows*.

3.2 MEASURE ELIGIBILITY

A *measure* refers to:

- The behind-the-meter installation of more efficient equipment or implementation of more efficient processes and systems, exceeding current building codes, appliance standards, or other relevant standards; or
- The installation of equipment or implementation of processes and systems shifting load outside of the defined *demand reduction windows*.

Once installed/implemented and commissioned, measures must provide sustained demand reduction – i.e., delivered in all hours that the *measure* is operational, or scheduled to operate, over the *demand reduction window* for the duration of *measure's* useful life as described in the *EE Resource Plan*. Measures must not require any notice, dynamic price signal, or dispatch to provide demand reductions. Measures must maintain a comparable quality of service to the baseline equipment, system or process.

To qualify as new, the *measure* must not already be installed or implemented, and there must be no binding commitment (e.g. contract, purchase order) to acquire the measure or services required to install or implement the measure prior to the publication of the post-auction report.[2]

For clarity, the following are not considered eligible measures:

- The displacement of load through behind-the-meter generation, including combined heat and power (CHP) and renewable energy generation sources, such as solar photovoltaic, wind, and biomass;
- The removal of equipment, processes, or systems, also referred to as load destruction;
- Improvements to the efficiency of the transmission and distribution of electricity, such as volt/VAR optimization (VVO) and conservation voltage regulation (CVR) projects, or initiatives related to reducing electricity theft;
- The installation of electrical energy storage, or thermal storage dispatchable on an hourly or sub-hourly basis; and

[2] For clarity, the existence of a long-term facilities management or maintenance service contract will not impact measure eligibility.

- Consistent with current IESO EE programs, switching the input fuel source for equipment, process, or system to natural gas, diesel, or other carbon-emitting fuel source (note the use of geothermal energy, solar-thermal energy, and deep lake cooling are eligible).

3.2.1 Other Funding Sources

Measures receiving incentives through current or future ratepayer-funded electricity EE programs, such as those offered by Save on Energy, are ineligible. *Measures* may receive funding from other sources, such as natural gas utility demand-side management incentive programs and government greenhouse gas reduction incentive programs, to deliver other non-electricity ratepayer or broader public value without compromising eligibility.

3.2.2 Minimum Measure Persistence

Measures constituting an *EE resource* must have a minimum effective useful life of two years (as confirmed by the IESO during the *EE capacity* enrolment process).

3.2.3 Interaction with Other Load Flexibility Initiatives

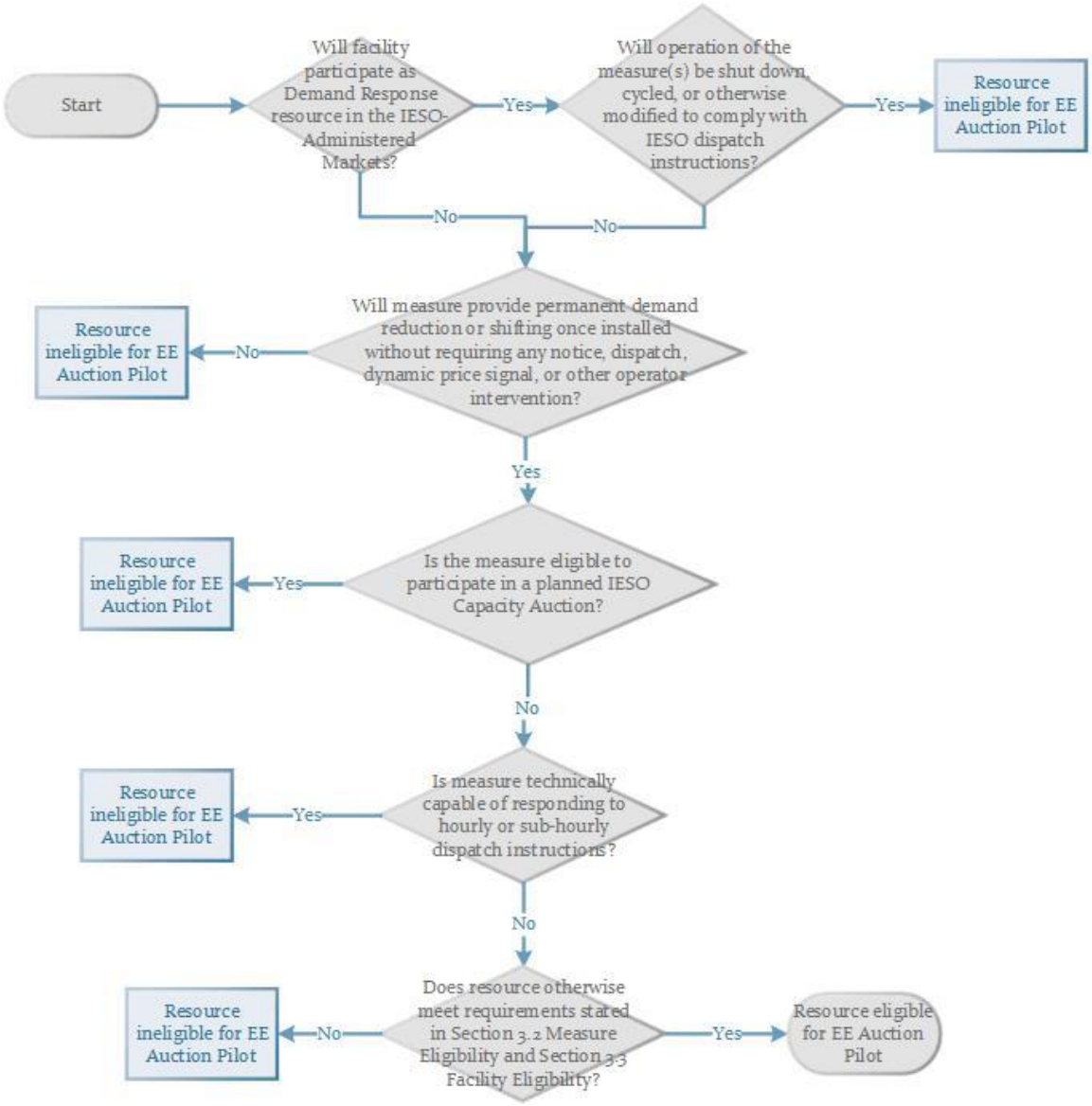
Additionally, any eligible *measure* that will be used to simultaneously provide a sustained demand reduction, in accordance with the definition of EE *measure*, while also providing a demand reduction in response to a demand-response (DR) activation or other dispatch instruction, must ensure that the *EE capacity* provided by that *measure* is incremental to the DR or dispatch obligations associated with that resource.

For example, if a water pumping system in an industrial facility consumes 1 MW on average over the *demand reduction window* under its original baseline conditions and the water pumps can be upgraded with high-efficiency motors to consume 900 kW on average over the *demand reduction window*, the maximum resulting *EE capacity* from this upgrade that could be bid into the EE Auction Pilot would be 100 kW. If the industrial facility participates in the IESO's Capacity Auction as a demand response resource, the pilot auction participant could then shut down, cycle or modify the remaining load to respond to DR activations. The bid demand response capacity would need to reflect the new 900 kW baseline.

Please see 3.3.2 and 3.3.3 for further discussion regarding facility participation in other IESO load flexibility initiatives.

Figure 2 is provided as a reference to communicate resource eligibility in the EE Auction Pilot as it relates to other IESO load flexibility initiatives.

Figure 2: EE resource eligibility with regards to load flexibility initiatives



3.3 FACILITY ELIGIBILITY

Facilities must be connected to, or behind the meter of another electricity customer connected to the *IESO-Controlled Grid* or a *Distribution System* (i.e., projects at islanded facilities are not eligible).

3.3.1 Facility Participation in the Industrial Conservation Initiative

Participation in the Industrial Conservation Initiative (ICI) will not impact facility eligibility.

3.3.2 Facility Participation as an Hourly Demand Response Resource in the IESO-Administered Markets

Non-dispatchable loads are currently able to participate in the IESO's energy market as Hourly Demand Response (HDR) resources, either directly or as a contributor to an aggregated resource. When activated, the performance of HDR resources is measured and verified by comparing energy consumption during the activation period against a baseline, an approximation of a resource's consumption profile that is used to estimate what the resource would have been consuming had a DR activation not taken place.

The baseline-setting process varies for residential HDR resources and industrial, commercial and institutional (C&I) HDR resources. The former uses a randomized control trial methodology. The latter uses a "high 15 of 20" approach, which considers the highest 15 energy measurements for the activation hour during the previous 20 business days without a DR activation, with an in-day adjustment.

The use of a randomized control trial methodology means there is little risk that simultaneous residential HDR contributor participation as an *EE resource* would compromise measurement and verification of DR activation performance. Consequently, participating as a contributor to a residential HDR resource will not impact residential facility eligibility in the pilot.

However, the simultaneous participation of C&I HDR resource contributors in the pilot may impact measurement and verification of DR activation performance where the activation takes place within 20 days of the implementation of the EE *measures*. However, the use of a rolling average of the highest 15 energy measurements diminishes the potential impact quickly. Furthermore, this risk of EE *measure* implementation (incented through existing IESO or LDC EE programs or non-incented) impacting measurement and verification of C&I HDR resources is not unique to the pilot and is currently uncontrolled. As a result, participation directly or as a contributor to a C&I HDR resource will not impact facility eligibility.

3.3.3 Facility Participation as a Dispatchable Load in the IESO-Administered Markets

Participation as a dispatchable load in the IESO-administered markets will not impact *facility* eligibility in the pilot. However, these *facilities* may face challenges concerning measurement and verification of *EE capacity* delivery that will need to be accounted for in the *EE resource plan* and *M&V plans* (e.g., installation of supplementary submetering may be required).

3.4 MINIMUM AND MAXIMUM EE RESOURCE SIZE

An *EE resource*, which could be an aggregation of multiple *measures* at multiple *facilities*, must be confirmed to deliver at least 100 kW of *EE capacity* to participate in the pilot auction.

The maximum *EE resource* size is the lesser of 3.25 MW (representing 25% of the *maximum auction capacity limit*), or the $1.25M divided by the resource's offer price. The latter limit precludes a single resource from securing more than 50% of the budget in each *obligation period*.

4. Pilot Auction Participant Eligibility

4.1 PILOT AUCTION PARTICIPANT ELIGIBILITY

As the pilot aims to increase competition for the provision of energy efficiency, there are few restrictions on the types of organizations that can participate. A *pilot auction participant* must be a solvent, incorporated entity and may be a for-profit or not-for-profit organization. Individuals, even if incorporated, are ineligible.

Pilot auction participants will be required to provide articles of incorporation and the most recent audited financial statements (no older than three years). Registered participants in the IESO-Administered Markets are exempt from the requirement to provide financial statements.[3]

Participants may include, but are not limited to, large single-site customers, multi-site customers, local distribution companies, private energy service companies, and non-profits serving specific sectors.

Auction participants may be an:

- *Individual pilot auction participant* – offering *EE resources* located at *facilities* owned and/or operated by the participant
- *Aggregator pilot auction participant*– offering *EE resources* from a portfolio of *facilities* not owned and operated by the *pilot auction participant* but for which it has secured capacity rights.

[3] List of registered market participants

Table 4: Examples of pilot auction participant types

Auction participant	Proposed resource	Obligation period	Auction participant type
Municipal government	Chiller recommissioning at 12 municipal office buildings	Summer	Individual
Large manufacturer	Retrofit of eight large pump motors with more efficient motors equipped with variable speed drives at factory	Summer and winter	Individual
Energy services company	Refrigeration upgrades at client's portfolio of grocery stores	Summer and winter	Aggregator
Local distribution company	Commercial lighting retrofit targeting customer warehouses and other facilities with significant continuous lighting needs	Summer and winter	Aggregator

Participants will not be required to have identified all constituent *facilities* of an *EE resource* at the time of the auction, but will be required to submit an *EE resource plan* as part of the enrolment process. See 6.1.1 EE Capacity Enrolment, for further information.

For clarity, *pilot auction participants* will not need to be registered participants in the IESO-Administered Markets.

5. Auction Design

5.1 AUCTION FORMAT

The pilot auction will use a pay-as-offer price, single-round, sealed-offer format, which means:

- Successful participants will be paid their offer price;
- Participants will submit their offers during a single round and will be able to submit multiple offers with different prices for different quantities of *EE capacity*;
- The IESO will clear the auction based on the offers submitted during the single round;
- Offer information will not be visible to other participants during the auction (the IESO will publish some offer information following the auction as described in Section 7.3 Post-Auction Reporting)

The design is intended to facilitate broad participation and yield economically efficient outcomes, while minimizing complexity and enabling fast, affordable administration.

This format aligns with that of the IESO's existing capacity auction designs (and the majority of forward capacity auctions held by other North American system operators) with the exception of using pay-as-offer, rather than pay-as-clear pricing.

With pay-as-clear pricing, all successful auction participants receive the price of the last accepted (i.e., highest accepted) or first-rejected offer. In recurring auctions, this design achieves the most efficient long-run outcome, as it incentivizes participants to bid/offer at their lowest acceptable price to maximize their chances of clearing the auction rather than strategize the highest bid/offer that will still clear the auction.[4] For the purposes of a new one-time auction, the IESO will use a pay-as-offer design. The absence of historical auction results to inform the offering strategy should encourage *pilot auction participants* to offer close to their lowest acceptable price. This design also minimizes the risk that limited participation in the pilot could produce a steep supply curve, where the IESO pays at or near the *auction price cap* for all successful participants, significantly restricting both the quantity of *EE capacity* procured and pilot learnings.

Different measures vary significantly in the length of time they remain in place and deliver demand reduction. This length of time is referred to as effective useful life (or persistence). To enable equitable evaluation of offers for each of the seasonal obligation periods, offers will be evaluated based on **annualized** price per unit of *EE capacity*. For example, a $400/kW offer for a resource that delivers capacity during the winter obligation period with four-year persistence would have an annualized capacity cost of $100/$kW_{WINTERr}$. Where the annualized price for a resource is a non-integer value, IESO will round to the fifth decimal place. The *capacity annualization period* is capped at 10 years.

This maximum 10-year *capacity annualization period* balances the benefits of considering the differing persistence of different measures, while containing the risk that changes to the timing of system needs reduces the value to the bulk electricity system of *EE capacity* delivered during the defined *demand reduction windows* and seasonal *obligation periods*.

5.2 OFFER FORMAT

Pilot auction participants will have the opportunity to submit offers to deliver *EE capacity* during one or both seasonal *obligation periods.* Each offer will indicate:

[4] Please refer to Section 8.4 of the *Incremental Capacity Auction High-Level Design* for discussion of auction design options and the merits of the pay-as-clear, single-round, closed-bid/offer design in recurring auctions.

- The enrolled *EE resource* delivering the *EE capacity;*
- The quantity of *EE capacity* available for a seasonal *obligation period* (minimum 100 kW) as confirmed by the IESO during the *capacity enrolment process;*
- The offer price for a seasonal *obligation period*;
- The annualized offer price for a seasonal *obligation period*; and
- The *capacity annualization period*, as confirmed by the IESO during the *EE capacity enrolment process.*
- Whether the offer for an *obligation period* is contingent on the acceptance of an offer for the opposite *obligation period* (i.e., an offer for summer capacity is only valid if a paired offer for winter capacity is also accepted [or vice versa]).

Pilot auction participants will be able to submit up to twenty offers with different price and quantity information for a single *EE resource*. For example, a participant may offer to deliver 200 kW of capacity at $325/kW, 250 kW at $300/kW, or 300 kW at $275/kW. This allows participants to better reflect non-linear costs for delivering incremental *EE capacity* and the auction to clear with improved efficiency and price signals. The auction engine is programmed to accept no more than one offer for a single *EE resource*. Offers with respect to a single resource must vary in *EE capacity* quantity by at least 10 kW.

Price ($/kW) and quantity values (kW) must be whole numbers.

Pilot auction participants will be able to submit contingent offers. That means they will be able to indicate whether an offer for summer *EE capacity* is only valid if a paired offer for winter *EE capacity* also clears (and vice versa).

Please refer to Appendix G Auction Offer template for the prescribed form of the auction offer.

The maximum quantity of *EE capacity* and the *capacity annualization period* will be confirmed for each offered *EE resource* prior to the auction during the *EE capacity enrolment process* – see Section 6.1.1 EE Capacity Enrolment. *Pilot auction participants* may choose to offer less than their confirmed *EE capacity* for a given *EE resource* to reduce risk of underperformance.

5.3 AUCTION CLEARING

The IESO has allocated a budget of $5M for the auction pilot revenue pool, which will be evenly distributed between the winter and summer *obligation periods* (i.e., $2.5M each).

The IESO will assess offers based on annualized capacity cost ($/kW$_{YEAR - WINTER/SUMMER}$) for each seasonal *obligation period* and optimize where participants have submitted contingent offers.

For each of the two seasonal *obligation* periods, the IESO will accept the most optimal set of offers to minimize the cost of *EE capacity* procurement, while respecting the constraints of the $2.5M seasonal budget, 13 MW seasonal *maximum capacity limit*, and limit of accepting maximum one offer per resource.

In the event that multiple auction participants submit offers at the same price for the last available quantity, the auction engine will select the last accepted offer randomly.

5.3.1 Auction Engine and Objective Function

The auction engine will seek to minimize the sum of the weighted average of seasonal annualized offer price subject to a constraint on the minimum quantity of *EE capacity* years procured and other noted fixed constraints (e.g. budget for each seasonal obligation period, maximum capacity limit, maximum of one accepted offer per resource). The auction engine will initially be constrained to procuring a minimum of 260 MW-years of capacity while not exceeding 13 MW for each obligation period. If no feasible solution is reached, the constraint will be iteratively relaxed in 100 kW-years increments until a feasible solution is reached. This approach – minimizing for annualized offer price subject to a minimum capacity years constraint – was selected after careful evaluation of other optimization approaches to achieve the overarching objective of the pilot (securing as much persisting EE capacity as possible with the available budget).

The objective function is described below:

$$\min_{x \in \{0,1\}} f(x) = \sum_{i=1}^{N} x_i \left(\frac{\beta_{s_i}}{\beta_{s_i} + \beta_{w_i}} \gamma_{s_i} + \frac{\beta_{w_i}}{\beta_{s_i} + \beta_{w_i}} \gamma_{w_i} \right)$$

Table 5: Auction engine objective function notation

Notation	Variable Type	Variable Name in Auction Offer Template	Description
γ_w	Parameter	Annualized_Offer_Price_Winter ($/kW/y)	Winter offer price per kW-year of EE capacity

γ_s	Parameter	Annualized_Offer_Price_Summer ($/kW/y)	Summer offer price per kW-year of EE capacity
β_w	Parameter	Enrolled_Winter_Capacity (kW)	Winter offer capacity (kW)
β_s	Parameter	Enrolled_Summer_Capacity (kW)	Summer offer capacity (kW)
N	Count	N/A	Total number of offers
x	Decision	N/A	Offer selector

5.3.2 Auction Price Cap

Similar to the process used historically to set maximum clearing prices in the IESO's Demand Response Auction, the *auction price cap* will be set at 1.25 times the reference price. The reference price will be the historic $800/kW incentive rate offered for peak demand reductions from custom non-lighting projects through the Save on Energy Retrofit program for industrial, commercial, and institutional customers. Consequently, the cap will be $1,000/kW.

5.3.3 Minimum and Maximum Capacity Limits

The minimum and maximum *EE capacity* the auction will procure for the two *obligation periods* is 0 MW and 13 MW.

5.3.4 EE Resource Capacity Obligation Limits

As described in Section 3.4 Minimum and Maximum EE Resource Size, limits regarding resource size will be imposed to support achievement of the pilot's learning objectives. No single *EE resource* may offer more than the lesser of 3.25 MW of *EE capacity* or a quantity equivalent to $1.25M divided by the resource's offer price.

6. Pre-Auction Requirements

6.1 PRE-AUCTION PERIOD

To participate in the auction, prospective participants will need to confirm they meet the *pilot auction participant* eligibility criteria, confirm *EE capacity* with respect to at least one *EE resource*, and enter into a standard, non-negotiable agreement committing to deliver their offered *EE capacity* if successful in the auction.

Please refer to Section 4.1 Pilot Auction Participant Eligibility for further information on *pilot auction participant* eligibility requirements and the form of the participant agreement attached as Appendix A Auction Pilot Participant Agreement.

6.1.1 EE Capacity Enrollment

To be eligible to compete in the auction, an *EE resource* must first be reviewed and confirmed by the IESO. This process is known as *EE capacity enrolment*. Potential participants will be required to submit information regarding proposed *EE resources* in the form of a prescribed Excel template, the *EE resource plan*.

The *EE resource plan* enables the IESO to confirm the eligibility of the prospective auction participants and their resource(s), and assure the viability of measuring and verifying demand reductions from the resources, as well as the feasibility and persistence of the proposed *EE capacity* contribution. This will support the integrity of the auction process. Prospective *pilot auction participants* will not be required to identify specific *facilities* contributing to a resource during the enrolment process. However, they will need to describe target customer segments if applicable, end uses, *measures*, estimated effective useful life and M&V approach. Please refer to Appendix D EE Resource Plan Template for the form of the *EE resource plan*.

Where a potential participant seeks to use a deemed savings M&V approach for a *measure* not listed in the EE Auction Pilot Measure Reference Manual, they must submit a complete measure substantiation sheet as described in Appendix B EE Auction Pilot M&V Procedures with the *EE resource plan*.

Full *M&V plans* as described in the M&V Procedures are only required for resources successful in the auction during the *forward period* after the auction is run. However, prospective auction participants may choose to submit full *M&V plans* with their *EE resource plans* for IESO review prior to the auction.

After reviewing, the IESO will confirm the maximum quantity of *EE capacity* that the *pilot auction participants* may offer into the auction from each specific resource for each seasonal *obligation period*. IESO will also provide a unique resource identifier for each resource. To manage the risk of underperformance, *pilot auction participants* may select to offer in less than the confirmed *EE capacity* from a particular resource. The IESO will also confirm the *capacity annualization period* that will be used to assess the annualized cost of each offered *EE resource*. Where the resource is composed of multiple *measures*, the *capacity annualization period* will be calculated as a weighted average (based on the kW quantity of each *measure* relative to the resource's total *EE capacity*). This enrolment process will enable the IESO to administer the auction in a consistent, efficient and transparent manner.

7. Auction Period Requirements

7.1 OFFER SUBMISSION AND VALIDATION

During the auction, participants will submit offers using a prescribed Excel template. The form of the template is attached as Appendix G EE Auction Pilot Offer template. *Pilot auction participants* will complete an Auction Offer for each enrolled resources they intend to offer into the auction and send the completed file(s) as an email attachment to eeauctionpilot@ieso.ca between 12:00:00 AM on March 22, 2020 and 11:59:59 PM on March 23, 2021 (EST).

For each offer, the IESO will validate that the offer is with respect to an enrolled *EE resource* and that the offered *EE capacity* and claimed *capacity annualization period* do not exceed what was confirmed during the capacity enrolment process. The IESO will also perform QA/QC checks to confirm that the offers respect the stated auction design requirements (e.g., minimum and maximum resource size, auction price cap, limit on number of offers with respect to a single enrolled resource, etc.).

7.2 AUCTION CLEARING

After offer submission and validation, the IESO will enter offers into the auction engine platform and clear the auction. Please refer to 5.3 Auction Clearing for description of auction clearing.

7.3 POST AUCTION REPORTING

Once the auction has been cleared, the IESO will publish a public report that includes the:

- Quantity of *EE capacity* cleared for each seasonal *obligation period*;
- Number of *pilot auction participants* in each *obligation period*;
- Lowest, highest, and weighted average accepted annualized offer price by *obligation period*; and
- List of *pilot auction participants* that secured *EE capacity* obligations, including quantity of cleared *EE capacity* by *obligation period* and high-level description of their *EE resource* (to be provided by the participant).

8. Forward Period Requirements

A *pilot auction participant* that secures an *EE capacity* obligation becomes an *EE capacity provider*.

The period between the auction and the start of an *EE capacity provider*'s first *obligation period* is referred to as the *forward period*. The length of the *forward period* may vary between

providers, depending on whether they have secured an obligation for one or both seasonal *obligation periods*.

8.1 AUCTION PARTICIPANT AGREEMENT UPDATE

The agreements that *EE capacity providers* submitted prior to the auction committing to deliver any cleared *EE capacity* will be updated to reflect the actual quantity of cleared *EE capacity*, the relevant *EE resource(s),* accepted offer price and applicable *obligation periods* (i.e., winter, summer, or both).

8.2 ONLINE IESO REGISTRATION

EE capacity providers, who are not already registered market participants or program participants, will be required to register in *Online IESO* as program participants with the role "EE Delivery Agent."

8.3 EE RESOURCE PLAN UPDATE

EE capacity providers will be required to provide the IESO with a brief *EE resource plan update* at the approximate midpoint of the *forward period,* describing the state of resource development and identifying any major risks to the delivery of their *EE capacity* obligation. The *EE resource plan update* will take the form of a prescribed Excel template. Please see Appendix E EE Resource Plan Update Template for the requirements and form of the *EE resource plan update*.

The IESO may waive the requirement to submit an *EE resource plan update* when the *EE capacity provider* has provided an *EE resource report* as described in Section 8.5 *EE resource report* and *M&V plan*, before the midpoint of the *forward period*.

8.4 AMENDMENTS TO EE RESOURCE PLAN

No later than 90 calendar days before their first *obligation period* begins, *EE capacity providers* may request to replace the *measure(s)* stated in a resource's *EE resource plan* or add additional *measure(s).*

Replacement *measures* must have an effective useful life equal to or greater than the effective useful life of the original *measures* stated in the *EE resource plan* or 10 years*.* Additional *measures* must have an effective useful life equal to or greater than the weighted average effective useful life of the original measure stated in the *EE resource plan* or 10 years.

8.5 EE RESOURCE REPORT AND M&V PLAN

No later than 60 calendar days before their first *obligation period* begins, *EE capacity providers* will be required to submit an *EE resource report* and *M&V plan* confirming the composition of each *EE resource* for the *commitment period* and describing how *EE capacity* delivery will be rigorously measured and verified in alignment with Appendix B EE Auction Pilot M&V Procedures. IESO will waive the requirement to provide a *M&V plan* where a *M&V plan* was submitted during *EE capacity enrollment* process and accepted by the IESO and no material changes have been made to *EE resource*.

8.5.1 EE Resource Report

The *EE resource report* will take the form of a prescribed Excel template. Please see Appendix F EE Resource Report Template for the form of the *EE resource report*. The IESO will consider the reports confidential.

8.5.2 M&V Plan

Along with the *EE resource report*, *EE capacity providers* will also be required to submit an *M&V plan* in alignment with the *EE Auction Pilot M&V Procedures*. The M&V procedures are attached as Appendix B EE Auction Pilot M&V Procedures (and related Appendix C EE Auction Pilot Measure Reference Manual). The M&V procedures build on existing International Performance Measurement and Verification Protocol (IPMVP)-compliant IESO M&V procedures for current EE programs leveraging additional non-IESO M&V resources. The procedures include a deemed *EE capacity* option for certain measures (leveraging existing IESO technical references) and describe the requirements for seeking IESO to recognize deemed *EE capacity* values for measures not listed in the EE Auction Pilot Measure Reference Manual.

The IESO will review each *M&V plan* to confirm it aligns with the *EE Auction Pilot M&V Procedures.*

9. Commitment Period Requirements

9.1 EE CAPACITY DELIVERY

The *measures* constituting an *EE resource* must be fully installed/implemented on the first day of the first *obligation period* or the capacity provider risks non-performance charges, which are described further in Section 10 Settlement.

The timing of the seasonal *obligation periods* is described in Section 12 Timelines.

9.1.1 Measurement & Verification (M&V) Reporting

EE capacity providers will be required to provide *M&V reports* that align with the approved *M&V plan* for each resource after each *obligation period* during the *commitment period*. These reports enable the IESO to confirm resources are delivering their full *EE capacity* obligation. *EE capacity providers* have up to 60 calendar days after the end of the *obligation period* to submit *M&V reports*.

For settlement purposes, the IESO will review the results of *M&V reports* within 60 calendar days after they are received.

10. Settlement

10.1 EE CAPACITY PAYMENT CALCULATION

As noted above, *EE resources* must deliver their seasonal *EE capacity* obligation over the *commitment period*. *EE capacity providers* will receive a payment following the completion of each seasonal *obligation period* for which they have an *EE capacity* obligation (i.e., a provider with both winter and summer *EE capacity* obligations will receive two payments in total, while a provider with an *EE capacity* obligation for only one season will receive one payment).

Fully performing *EE capacity providers* will receive their seasonal *EE capacity* payment following completion of each applicable *obligation period* during the *commitment period,* subject to confirmation of performance through *M&V reports*.

For clarity, payments will be made on gross peak demand reduction (as stated in IESO-accepted *M&V reports*) rather than net peak demand reduction (which will be determined through the post-*commitment period* evaluation process).

The calculation for each capacity payment for fully performing *EE resources* can be represented as:

EE capacity payment = seasonal capacity obligation X accepted seasonal offer price

Please see table six for an example of a resource fully meeting its seasonal *EE capacity* obligation.

Table 6: Illustrative example of EE capacity payments to a fully performing EE resource

Obligation period	Accepted offer price	EE capacity obligation	Delivered EE capacity	Capacity payment
Summer	$250/kW	400 kW	400 kW	$100,000

The IESO will not provide additional payment to *EE capacity providers* for delivery of capacity in excess of their accepted *EE capacity* obligation.

10.2 NON-PERFORMANCE CHARGES

Where the M&V process reveals an *EE resource* delivered less than its full *EE capacity* obligation, the IESO will reduce payment for the seasonal *obligation period* by the difference between the obligated *EE capacity* and the delivered *EE capacity*, multiplied by twice the resource's accepted offer price. The non-performance charge calculation is:

Non-performance charge= (seasonal capacity obligation – delivered capacity)
X (2 X accepted seasonal offer price)

Where non-performance charges are applicable, the calculation of each *EE capacity* payment can be represented as:

EE capacity payment = (seasonal capacity obligation X accepted seasonal offer price) –
((seasonal capacity obligation – delivered capacity)
X (2x accepted seasonal offer price))

Please see table seven for an example of a resource that under-delivers during both *obligation periods*.

Table 7: *EE capacity* payment for an underperforming *EE resource* with obligations in both seasons

Obligation period	Accepted offer price	EE capacity obligation	Delivered EE capacity	Payment reduction	Capacity payment
Summer	$250/kW	400 kW	390 kW	$4000 (2 X $400/kW X 10 kW)	$47,500
Winter	$250/kW	400 kW	390 kW	$4000 (2 X $400/kW X 10 kW)	$47,500

Under no circumstances will the non-performance charges for an *obligation period* exceed the *EE capacity* payment had the *EE resource* fully delivered (i.e., the *EE capacity provider* will never find itself obliged to pay the IESO) and non-performance charges will not roll over into the next *obligation period* (i.e., underperformance during the summer *obligation period* would not impact winter *obligation period* capacity payment if applicable).

10.3 SETTLEMENT OF EE CAPACITY PAYMENTS

EE capacity payments will be settled in *Online IESO* via the CDMIS vendor portal. Following IESO acceptance of an *M&V report* for an *EE resource* and confirmation of *EE capacity* payment value, EE *capacity providers,* using the existing participant role "EE Delivery Agent," will upload an invoice in a prescribed Excel form for the new "EE Auction Pilot" program type. The IESO will verify that the invoice matches the confirmed payment value and this amount will be settled through the physical market settlement. *EE capacity providers* will receive settlement via electronic funds transfer in accordance with the Physical Market Settlement Schedule.[5]

The IESO will make training materials available to familiarize *EE capacity providers* with the process.

11. Evaluation Period Requirements

Following the *commitment period*, the IESO, with the support of a third-party consultant, will conduct an evaluation of the EE Auction Pilot, similar to the evaluation process for the historic Save on Energy programs. The evaluation will confirm net peak demand reduction (i.e. peak demand reduction attributable to the pilot accounting for spillover and free-ridership), assess cost-effectiveness, and identify lessons learned. *EE capacity providers* will be obligated to cooperate with IESO's third-party evaluation consultant per the terms of their participant agreement. Please refer to the form of the participant agreement attached as Appendix A EE Auction Pilot Participant Agreement for details.

12. Relinquishment of EE Capacity Obligation

Mechanisms that enable the buy-out and transfer of capacity obligations, subject to certain conditions, are an existing feature of the IESO's capacity auction designs. In the interests of managing complexity for a limited-scale pilot, the auction will not feature buy-out or *EE capacity obligation* transfer mechanisms. *EE capacity providers* will have the right to relinquish their *capacity obligation* at any time with written notification to the IESO. Please refer to the form of the participant agreement attached as Appendix A EE Auction Pilot Participation Agreement.

[5] See market calendars

13. Timelines

The auction will observe the timelines listed in table eight.

Table 8: EE Auction Pilot timelines

Period	Responsibility	Activity	Timeline
Pre-auction period	IESO	Post final auction pilot design	June 2020
	Pilot auction participant	Submit information to verify *EE resource* and *pilot auction participant eligibility* and the agreement to deliver cleared capacity If seeking recognition of deemed savings for a *measure* not listed in EE Auction Pilot Measure Reference Manual, submit a complete substantiation sheet Optional: Auction participants may also submit *M&V plan* at this time for IESO review	December 1, 2020 - February 10, 2021 (last date is auction period minus 40 calendar days)
	IESO	Confirm eligibility and communicate capacity and *capacity annualization period* to auction participants If applicable, confirm acceptance or rejection substantiation sheet to recognize *measure* deemed savings	By March 12, 2021 (last date is auction period minus calendar 10 days)
	Pilot auction participant	Optional: submit draft offers for IESO to confirm complete and do not violate any auction rules	By March 15
	IESO	IESO reviews submitted draft offers to confirm completeness and do not violate auction rules	By March 19

Period	Responsibility	Activity	Timeline
Auction period	Pilot auction participant	Submit offers into auction	March 22-23, 2021
	IESO	Clear auction and publish post-auction report	March 24-April 2, 2021 (at latest)
Forward period	IESO	Return executed *EE capacity* obligation contracts with successful *pilot auction participants*	April 2021
	EE capacity provider	Register for *Online IESO*, if not currently registered	By start of first obligation period
	EE capacity provider	Submit *EE resource plan update*	January 17-21, 2022 for winter-only and biseasonal resources, May 2-6, 2022 for summer-only resources (approximate forward period midpoint)
	EE capacity provider	Optional, as applicable: submit request to amend *EE resource plan*	By August 3, 2022 for winter-only and biseasonal resources, by March 3, 2023 for summer-only resources (90 days before start of first applicable obligation period)
	EE capacity provider	Submit *EE resource report* and *M&V plan*	By September 1, 2022 for winter-only and biseasonal resources, by April 3, 2023 for summer-only resources (60 calendar days before first applicable obligation period)
	IESO	Review and accept *EE resource report* and *M&V plan*	By October 31, 2022 for winter-only and biseasonal resources, by May 31, 2023 for summer-only resources (*EE resource report* and *M&V plan* submission plus 60 calendar days)
	EE capacity provider	Cooperate with the IESO's third-party evaluation consultant per terms of auction participation agreement	

Period	Responsibility	Activity	Timeline
Commitment period	EE capacity provider	Deliver capacity during winter obligation period	November 1, 2022 to February 28, 2023
	EE capacity provider	Submit *M&V report*	April 29, 2023 (last date of obligation period plus 60 calendar days)
	IESO	Review *M&V report* and confirm *EE capacity* payment value	M*&V report* submission plus 60 calendar days
	EE capacity provider	Upload invoice through CDMIS vendor portal	Following IESO confirmation of EE capacity payment value
	IESO	Settle *EE capacity* payment invoice	Following receipt of invoice on standard Market Settlements Schedule
	EE capacity provider	Deliver capacity during summer *obligation period*	June 1, 2023 to August 31, 2023
	EE capacity provider	Submit *M&V report*	October 30, 2023 (last date is obligation period plus 60 calendar days)
	IESO	Review *M&V report* and confirm *EE capacity* payment value	*M&V report* submission plus 60 calendar days
	EE capacity provider	Upload invoice through CDMIS vendor portal	Following IESO confirmation of EE capacity payment value
	IESO	Settle *EE capacity* payment invoice	Following receipt of invoice on standard Market Settlements Schedule
Evaluation Period	IESO (third-party consultant)	Evaluate *EE resources*	TBD
	EE capacity provider	Cooperate with the IESO's third-party evaluation consultant per terms of auction participation agreement	

14. Glossary

The definitions offered in this glossary aim to assist reader comprehension of the mechanisms described in this design document. They do not necessarily reflect the terms set out in the IESO Market Rules, the final terms in the EE Auction Pilot participant agreement, or the IESO's general interpretation of these terms in relation to other programs or aspects of the Market Rules.

Term	Definition
Aggregator pilot auction participant	A *pilot auction participant* that offers *EE resources* from a portfolio of *facilities* for which the participant has secured capacity rights, but does not own or operate.
Auction period	The time period from when the IESO opens the window to accept offers from *pilot auction participants* to when it posts auction results.
Auction price cap	The maximum capacity price at which the IESO will accept offers for *EE capacity* in the auction.
Capacity annualization period	A two- to 10-year time period, confirmed by the IESO during the capacity enrolment process, that the IESO will use to determine the annualized capacity cost of an *EE resource* offer in clearing the pilot auction.
Commitment period	The time period where an *EE capacity provider* is obligated to deliver *EE capacity*, beginning on the first day of the provider's first *obligation period*.
Demand reduction window	The specific hours during which a *resource* must deliver demand reductions to meet its *EE capacity* obligation. These hours are defined in Section 2.1 The EE Capacity Product.
Distribution system	A system connected to the *IESO-controlled grid* for distributing electricity at voltages of 50 kV or less and includes any structures, equipment or other thing used for that purpose.
EE Auction Pilot M&V Procedures	Procedures for measuring and verifying demand reductions from *EE resources* for the purposes of assessing performance related to an *EE capacity* obligation.
EE capacity	Verified demand reduction delivered by *EE resources* during the defined time periods stated in Section 2.1 The EE Capacity Product.
EE capacity enrolment process	Has the meaning set out in Section 6.1.1 EE Capacity Enrolment Process.

Term	Definition
EE capacity provider	A *pilot auction participant* that secures an *EE capacity* obligation in the auction and enters into a contract with the IESO to deliver the committed capacity.
EE resource	Has the meaning set out in Section 3.1 EE Resource Definition.
EE resource report	Has the meaning set out in Section 8.5 *EE resource report* and *M&V plan*.
Facility	A building structure – a facility may be located within or upon a building but may also be a structure other than a building, such as a freestanding billboard.
Forward period	The period of time between the end of the *auction period* and the start of the *commitment period.*
IESO-controlled grid	Has the meaning set out in the IESO Market Rules.
Individual pilot auction participant	A *pilot auction participant* who offers *EE resources* located at *facilities* owned and/or operated by the participant.
EE resource plan	A document submitted by *pilot auction participants* as part of the capacity enrolment process, providing information, including *measures*, targeted customers and end uses, and marketing strategy.
EE resource plan update	Has the meaning set out in Section 8.3 EE Resource Plan Update.
Maximum capacity limit	The maximum amount of *EE capacity* that can be committed for a specific *obligation period*, which signals the point beyond which the IESO is no longer willing to secure additional capacity.
Measure	Has the meaning set out in Section 3.1 EE Resource Definition.
M&V report	Reports submitted by *EE capacity providers* upon the conclusion of each seasonal obligation period to confirm delivery of their *capacity obligation* for settlement purposes.
Obligation period	Has the meaning set out in Section 2.1 The EE Capacity Product.
Online IESO	A web-based registration system for participation in IESO-administered markets and programs.
Pilot auction participant	An incorporated entity that seeks an *EE capacity obligation* in the auction pilot, which may be either an *aggregator* or an *individual*. *Pilot auction participants*

Term	Definition
	that secure a *capacity obligation* in the pilot become *EE capacity providers*.
Pre-auction period	The period of time between the final publication of the EE Auction Pilot design and related documents and the *auction period.*

Appendix A EE Auction Pilot Participant Agreement

Appendix B EE Auction Pilot M&V Procedures

Appendix C EE Auction Pilot Measure Reference Manual

Appendix D EE Resource Plan template

Appendix E EE Resource Plan Update template

Appendix F EE Resource Report template

Appendix G Auction Offer template