

Settlement of Capacity Based DR Changes to Market Manual

Demand Response Public Session
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- Settlement of Capacity Based DR
- Measurement & Verification Plan
- Demand Response Measurement Data
- Capacity Based Demand Response Baseline Methodology
- Settlement and Payment
- Performance Set-Offs
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- Appendix: Equations for Payment & Performance Set-Offs

New Section in Settlements Market Manual 5, Part 5.5 “Settlement of Capacity Based Demand Response”

The Capacity Based Demand Response (CBDR) program is designed to bridge the time from the Ontario Power Authority’s Demand Response 3 contract expiration to the delivery date of the next available Demand Response Auction. This section sets out how the IESO settles the CBDR Program.

M & V Plans may be submitted for our review for one or more of the following reasons:

- New Participants applying to Capacity Based Demand Response;
 - A proposed Project amendment;
 - A new Program Schedule is added;
 - Any proposed amendments or modifications to a Project's M&V Plan
 - Change to the specifications of a Project such as the addition, deletion or substitution of any Contributor during the Schedule Term
 - For Aggregators: When a Contributor Loss is invoked
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- Overview, Submission & Approval, and Plan Information Requirements will be consistent with DR3 Program Rules and will be contained in Market Manual 5, Part 5.5
 - The IESO will review new or amended M&V Plans within 10 business days of receiving them from the DRMP
 - If the Plan is completed satisfactorily, the IESO will approve and notify the DRMP
 - No proposed amendment or modification to an M&V Plan is effective without written acceptance of the IESO

Weekly DR Measurement Data Submission Requirements

For CBDR participants that do not have a revenue meter registered with the IESO we require:

- weekly retail revenue *measurement* data submitted by 15:00 EST on the **first business day of the second week** following the settlement week (V1 measurement data); and
- revisions to the weekly data received by 15:00 EST on the last *business day* of the month following the month to which the data relates. (V2 measurement data)

If V1 measurement data is received by the IESO past the 15:00 EST deadline, the participant will receive a 20% set-off to their Availability Payment prorated for the week (this increases each week the data remains undelivered – see slide 22).

The IESO has 3 business days from the V1 submission deadline to process the data file(s) and notify the participant **if and only if** there are data file discrepancies or errors found.

If there are data file errors found:

- DRMP will be notified and will receive a 20% measurement data set-off to their availability payment prorated for the week
- DRMP will then have until 15:00 EST two business days later to resubmit error free data to avoid facing an increased measurement data setoff of 33%
- DR Measurement Data Set-Off Factor is an increasing factor for every week that the full data remains undelivered. The set-off calculation is detailed on slide 22.

- Data File Submission Format is as follows:
 - The CSV file shall contain 2 channels of 5 minute engineering unit values.
 - The unit of measurement is kWh delivered for channel 1 and kWh received for channel 2.
 - The CSV file shall adhere to the following format: “YYYY/MM/DD, HH:MM, kWh, kWh”.

“YYYY/MM/DD”	“HH:MM”	“kWh”	“kWh”
2009/03/28	00:20	749.30	0
2009/03/28	00:25	748.45	0
2009/03/28	00:30	745.45	0

CBDR Baseline:

- For each hour of a DR Activation the CBDR Baseline will be derived as follows:

$$\text{CBDR Baseline} = \text{Standard Baseline} \times \text{In-Day Adjustment Factor}$$

- A single CBDR Baseline is calculated per DR Account based on the aggregate measurement data for all Contributor(s) to that DR Account and is subject to the In-Day Adjustment
- Curtailment will be calculated for each hour of a DR Activation as the difference between the DR Account's calculated CBDR Baseline and its measured consumption (or net production) of electricity

Suitable Business Days (SBD):

- The Standard Baseline and the In-Day Adjustment calculation will go back to a maximum of **35 Business Days** prior to the day of the Activation to establish **20 Suitable Business Days**
- If there are insufficient Suitable Business Days within the previous 35 Business Days, then we may elect to utilize only available Suitable Business Days within the previous 35 Business Days

Standard Baseline: High 15 of 20

- For any Confirmed Hour of a DR Activation it is the average of the highest fifteen 15 values for the same hour as those of the Activation, in the last twenty 20 Suitable Business Days prior to the Activation.
- Behind the Meter Generator's: 'highest' is replaced with 'lowest' in CBDR Baseline calculations

In-Day Adjustment

- Adjustment Window is the 3 hr window occurring 1 hr before an Activation event
- Calculates a DR Account's average actual consumption during the historical adjustment window and compares it to the average actual consumption during the DR event day adjustment window to determine an Adjustment Factor
 - **"A-Value"** = Avg. actual consumption during the Adjustment Window hrs in the past highest 15 of 20 SBD prior to the Activation.
 - **"B-Value"** = Avg. actual consumption during the Adjustment Window hours on the actual Activation day.

$$\text{In-Day Adjustment Factor} = \text{"B-Value"} / \text{"A-Value"}$$

- **The Adjustment is a +/-20% multiplicative capped factor:**
 - If it is calculated as less than 0.8 it will be taken as 0.8
 - If it is calculated as greater than 1.2 it will be taken as 1.2
- **CBDR Baseline** = Standard Baseline X In-Day Adjustment Factor
- **Curtailment** = CBDR Baseline – Metered Consumption

Calculating the Monthly Payment:



Availability Payment

- Each month, you will receive an Availability Payment for each DR Account based on the Hours of Availability, Monthly Registered MW and the Adjusted Availability Rate.
- **Availability Premiums and Discounts:** IESO may apply an adjustment to the Availability Rate, in relation to certain Designated Settlement Areas
 - Program Participation Zones and Applicable Rate Determination will be embedded in Market Manual 5, Part 5.5:

Availability Over-Delivery Payment

- For an Open Standby Notification, you may deliver more MWs or reduce load for a longer period than agreed to in your Program Schedule.

Utilization Payments

- You are paid for the amount of load reduction you actually provide for a DR Activation for each Demand Response Account based on the Actual Activated MWh and the Utilization Rate.
 - Actual Activated MW (AAM):** metered reduction, can be positive or negative and will be taken 'as is' when zonal performance aggregation is done to check for compliance.

Rate Schedule (to be located in Settlements MM):

Resource Type	Early	Late
Schedule Term (years)	5 years	5 years
Availability Rate (Standard) (\$/MW)	62.00	65.00
Adjusted Availability Rate (Discount) (\$/MW)	31.00	32.50
Availability Over-Delivery Rate (\$/MW)	10.00	10.00
Consecutive Hour of Utilization	Utilization Rate (\$/MWh)	Utilization Rate (\$/MWh)
1	200.00	200.00
2	200.00	200.00
3	200.00	200.00
4	200.00	200.00
5	300.00	300.00
6	300.00	300.00
7	300.00	300.00
8	300.00	300.00
9	300.00	300.00

- All Payments are calculated once a month in the month following the month to which the payment relates and are applied as manual line item's on the last trading day of that month's settlement statement.
- New charge type numbers/names will be created based on the equations in these slides and will apply to DRMP's in the CBDR Program
- Cost Recovery of CBDR will be done monthly through the an uplift which will be designed to recover the monthly cost, of the CBDR program

Availability Set-Off

- DRMP's are required to maintain a Reliability Rate of at least 85% for each and every interval of an Activation Hour for each DR Account, and fulfil other requirements in order to avoid Performance Set-Offs.
- Availability Set-Off applied will be the greatest of: the Availability Set-Off (Reliability), Availability Set-Off (Timely Confirmation), and Availability Set-Off (Low Confirmation) for a given DR Activation.
 - If Availability Set-Off exceeds the Availability Payment, then the excess is considered owed by the DRMP to the IESO.

Availability Set-Off (Reliability)

- Where the Reliability Rate for a given DR Account is less than 85% during any Interval of a DR Activation hour, or where the DR Account is Not Fully Available for Curtailment, an Availability Set-Off (Reliability) for each such Activation Hour in the Activation Period

Availability Set-Off (Timely Confirmation)

- If the DRMP, fails or delivers late, one or more required Confirmations in the month , then an Availability Set-Off (Timely Confirmation) will be calculated.

Availability Set-Off (Low Confirmation)

- This applies when the Confirmed MW are less than 95% of the Monthly Registered MW for a Confirmed Hour of the Dispatch Period.

Planned Non-Performance Availability Set-Off

- Applies for any day for which you have requested a Non-Performance Event as part of either a Single Day Non-Performance Event or an Extended Period Planned Non-Performance Event.

DR Measurement Data Availability Set-Off

- A DR Measurement Data Availability Set-Off will be applied against the Availability Payment for a DR Account if a complete set of weekly measurement data and proof of any Forced Outage(s) for that DR Account is not received by the IESO by 15:00 EST on the first business day of the second week following the week for which the data relates

Utilization Set-Offs

- The Utilization Set-Off will be the greatest of any of the Utilization Set-Off (Reliability), Utilization Set-Off (Timely Confirmation), and Utilization Set-Off (Low Confirmation) for each DR Activation Event as calculated below.
- Similar to the criteria for Availability Set-Off (Reliability, Timely, Low) respectively except they offset Utilization Payment's

- The number of Performance Breaches for a DR Account will be set to zero upon successful registration for CBDR.
- A DRMP's compliance with DR Activation instruction is evaluated at the zonal level using a Zonal Dispatch Aggregation model when calculating Performance Breaches.
 - Each participant will be assigned to a zonal resource for the zones and window (early/late) in which they have contributors or directly participate
- “Zonal Dispatch Aggregation” means the collection of Demand Response Accounts within the IESO defined regional zone model sharing the same Activation Period during any given Demand Response Activation.

Performance Breach occurs:

- For an Activation Event per Zone:
 - Actual Activated MWh / Activation MW < 80%
 - Confirmed MW / Monthly Committed MW < 80%
- Participant fails to provide a complete set of weekly measurement data for a DR account by the fourth week after the deadline
- Performance Breach is evaluated per DRMP using the most up-to-date settlement data (V1 or V2) aggregated by DR Account by Zone (*in accordance with IESO zonal DR dispatch model*)

Performance Breach Events:

- **1st PB:** Availability Payment for all of the DRMP's DR Accounts within the non-compliant zone will be withheld for the month in which the PB occurred.
- **2nd PB:** Withholding the Availability Payment (as stated above) plus, the IESO has the right to terminate all of those DR schedules and will determine the need to do this on a case by case basis.
- **3rd PB:** Withholding the Availability Payment (as stated above) plus, the DRMP may be terminated from the CBDR program and/or may be subject to compliance actions in accordance with section 6 of chapter 3 of the Market Rules as the IESO sees fit.

Preliminary Settlement Statements (PSS)

- A PSS for each month will be made available on the IESO Market Participant report site 10 business days after the last day of the month immediately following the month to which the statement relates.
- It will describe all payments and applicable set-offs for the previous month.
- An invoice for amounts owed to or by the DRMP as per the PSS will be made available to the DRMP at the same time on the same reports site.

CBDR Performance Report – *details still to be determined*

- A monthly report for DRMP's located on the reports site along with PSS
- Details are still being determined - report similar to the one Participants receive from the OPA for DR3.
- The goal is to provide DRMP's with more detailed information relevant to their Settlement Statement (*baseline days, outage days, activation MW, AAM are being considered for the report*)

Notice Of Disagreements

- If the DRMP has a discrepancy with their PSS they will have 4 business days to file a Notice of Disagreement as per Market Manual 5, Part 5.5, section 1.3.5 'Submitting a Notice of Disagreement'.
- All Market Participants are expected to adhere to the IESO's Notice of Disagreement Process
- DRMPs will also have access to the IESO Dispute Resolution Process
- The dispute resolution process for NOD's will commence between the DRMP and the IESO if the IESO determines the NOD submitted is legitimate

Final Settlement Statement (FSS)

- A FSS for the settlement month will be made available on the IESO Market Participant report site 20 business days after the last day of the month immediately following the month to which the statement relates.
- It will contain any adjustments to the preliminary settlement statement (if applicable).
- Payment for those adjustments appearing on the final settlement statement (if any) will be included in the next invoice.

- Performance Exemptions,
- Planned Non-Performance Events, and
- Buy-Downs

These topics will all be consistent with DR3 Program Rules and will be detailed in Market Manual 5, Part 5.5 in the CBDR Settlement Section.

- Please send feedback to Stakeholder.Engagement@ieso.ca

Payment Calculations

$$\text{Availability Payment} = HA_H \times MRMW_h \times AAR$$

Where:

- 'HA' (Hours of Availability)
- 'MRMW' (Monthly Registered MW)
- 'AAR' (Adjusted Availability Rate), an amount equal to the Availability Rate*, expressed in /MWh, as increased by the Availability Premium or as decreased by the Availability Discount
- 'H' is the total hours a Participant is available in a month

$$\text{Availability Over-Delivery Payment} = \sum_H (CMW_h - MRMW_h) \times AODR_h$$

Where:

- 'CMW' (Confirmed MW), means the number of MW available for curtailment by the DRMP. CMW is limited to the lesser of the Monthly Registered MW plus 15 MW and 130% of the Monthly Registered MW.
- 'MRMW' (Monthly Registered MW)
- 'AODR' (Availability Over-Delivery Rate*), means the over delivery rate as specified in the rate schedule.
- 'H' is the set of all hours 'h' in the month where the 'CMW' exceeded the 'MRMW'

$$\text{Utilization Payment} = \left[\sum_H (\text{Curt}_h \times \text{UR}_h) \right] - \left[\sum_H (\text{NG}_h \times \text{MIN}(\text{HOEP}, \text{UR}_h)) \right]$$

Where:

- ‘**Curt**’ (Curtailment), the number of MWh Curtailed by a DRMP when requested by the IESO, can not exceed the product of the Activation MW and the activation period requested by the IESO, plus the lesser of an additional 15% of the Activation MW per hour of the activation period, OR 15 MWh per hour of the activation period.
- ‘**UR**’ (Utilization Rate*), expressed in \$/MWh, as specified in the rate schedule
- ‘**NG**’ (Net Generation), means the MWh of net electricity generated by any contributor that is a behind the meter generator.
- ‘**H**’ is the total hours ‘h’ a Participant is activated in a month.

The Reliability Rate with respect to such Interval “i” shall be calculated as follows:

$$\text{Reliability Rate}_i = \frac{\text{Actual Activated MWh per Interval}}{\text{Activation MW} \times \frac{1}{12} \text{ of an hour}} \times 100$$

Availability Set-Offs

$$\text{Availability Set-Off (Reliability)} = \sum_H \text{PSOF}_h \times \text{AAR} \times \text{MRMW}_h$$

$$\text{Availability Set-Off (Timely Confirmation)} = \text{PSOF} \times \text{AAR} \times \text{MRMWh} \times \text{Dispatch Period}$$

$$\text{Availability Set-Off (Low Confirmation)} = \sum_H (\text{PSOF}_h \times \text{AAR} \times (\text{MRMW}_h - \text{CMW}))$$

Where:

- ‘PSOF’ (Performance Set-Off Factor) refers to the set of factors defined in a table in MM 5, Part 5.5
- ‘AAR’ (Adjusted Availability Rate)
- ‘MRMW’ (Monthly Registered MW)
- ‘Dispatch Period’ means the four consecutive hours. Each Dispatch Period shall occur within the Hours of Availability, and shall occur within and no more than once in accordance with the Daily Schedule
- ‘CMW’ (Confirmed MW) means the number of MW available for Curtailment by the Participant. ‘CMW’ is limited to the lesser of the Monthly Registered MW plus 15 MW and 130% of the Monthly Registered MW
- ‘H’ is the set of all confirmed hours ‘h’ when the Confirmed MW’s are less than 95% of the Monthly Registered MW for the Activation Period

Planned Non-Performance Availability Set-Off

The calculation is:

- $\text{PNPAS}_m = \text{Non-Activation Day Non-Performance Availability Set-Off} + \text{Activation Day Non-Performance Availability Set-Off}$
- **Non-Activation Day Performance Availability Set-Off** = $(\text{AAR} \times \text{MRMWh} \times \text{HANEH})$
- **Activation Day Non-Performance Availability Set-Off** = $(\text{OH} \times \text{AAR} \times \text{MRMWh} \times \text{NEWF})$

Where:

- ‘**HANE**’ (Hours of Availability for a Non-Performance Event)
- ‘**OH**’ (Opportunity Hours), means 64 if Option A is applicable to the DR Account; or 32 if Option B is applicable to the DR Account
- ‘**NEWF**’ (Non-Performance Event Weighting Factor), means 50%, if the Actual Activated MWh per interval, as averaged over all of the Intervals in the Activation Event, is greater than or equal to the product of the Monthly Registered MW and 1/12 of an hour; or 100% otherwise

DR Measurement Data Set-Off = $MDSF \times (HA_H \times MRMW_h \times AAR)$

Where:

- ‘**MDSF**’ (Measurement Data Set-Off Factor), is an increasing factor for every week that the full data remains undelivered. The factor is equal to:
 - 20% for the first week that the full data remains undelivered;
 - 33% for the second week that the full data remains undelivered;
 - 50% for the third week that the full data remains undelivered ; and
 - 100% for the fourth week that the full data remains undelivered.
- ‘**HA**’ (Hours of Availability)
- ‘**MRMW**’ (Monthly Registered MW)
- ‘**AAR**’ (Adjusted Availability Rate)
- ‘**H**’ is the total hours a DRMP is available for the applicable week

Utilization Set-Offs

Utilization Set-Off (Reliability) = $\sum_H \text{PSOF}_H \times \text{UR} \times \text{MRMW}_h$

Utilization Set-Off (Timely Confirmation) = $\text{PSOF} \times \text{UR} \times \text{MRMW}_h \times \text{Dispatch Period}$

Utilization Set-Off (Low Confirmation) = $\sum_H (\text{PSOF} \times \text{UR} \times (\text{MRMW}_h - \text{CMW}))$

Where:

- ‘**PSOF**’ (Performance Set-Off Factor) refers to the set of factors defined in a table in MM 5, Part 5.5
- ‘**UR**’ (Utilization Rate)
- ‘**MRMW**’ (Monthly Registered MW)
- ‘**Dispatch Period**’ means the four consecutive hours. Each Dispatch Period shall occur within the Hours of Availability, and shall occur within and no more than once in accordance with the Daily Schedule
- ‘**CMW**’ (Confirmed MW) means the number of MW available for Curtailment by the Participant. ‘CMW’ is limited to the lesser of the Monthly Registered MW plus 15 MW and 130% of the Monthly Registered MW
- ‘**H**’ is the set of all confirmed hours ‘h’ when the Confirmed MW’s are less than 95% of the Monthly Registered MW for the Activation Period