



Appendix D – Demand Response Baseline Calculation Methodology

PON EM-014-2023

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Section 1: DEFINITIONS

Curtailement Service Providers (CSP): CSPs, as determined under Section 4.1 of PON EM-014-2023.

Customer Base Load (CBL): Average hourly energy consumption as calculated in Section 3, used to determine the level of load curtailment provided.

Section 2: INTRODUCTION

Appendix D will serve as the reference document for CSPs calculating the top 5-in-10 baseline necessary to assess a customer's performance in the Efficiency Maine Demand Response Initiative (DRI). In its evaluation of claimed savings, the Trust will calculate the CBLs as outlined in [Section 3.1](#) and [Section 3.3](#), using the baselining methodology selected by the customer and bid into a CSP's portfolio in Appendix E.

Section 3: BASELINE CALCULATION METHODOLOGY

3.1 The Average Day CBL for Weekdays

Step 1. Establish the CBL Window. Establish a set of days that will serve as representative of participants typical usage.

1. Determine the peak hourly load during the event window over the past 30 days or the period covered by the load data file, whichever is lower. This value becomes the initial seed value for the average event period usage level.
2. Beginning with the weekday that is two days prior to the event:
 - a. Eliminate any holidays as specified by Efficiency Maine.
 - b. Eliminate any days with a Demand Response event for which the participant was eligible for payment for a curtailment.
 - c. Eliminate any days when ISO-NE declared a SCR or EDRP event for which the participant was eligible for payment for a curtailment.
 - d. Eliminate the day prior to any day with a Demand Response event for which the participant was eligible for payment for a curtailment.
 - e. Create the average daily event period usage for that day, defined as the simple average of the participant's actual usage over the hours that define the event for which the CBL is being developed.
 - f. Eliminate low usage days. If the average daily event period usage is less than 25% of the average event period usage level, eliminate that day.
 - g. If the day has not been eliminated, update the average event period usage level by including the average daily event period usage for this day. If this is the first day added to the CBL Window, replace the average event period usage level (which was the initial seed value) with the average daily event period usage. Add this day to the CBL Window. Viii. Move back one day and loop to step 1.2.a above.
 - h. Final Weekday CBL Window must contain 10 weekdays. Figure 1 below shows CBL window selection for a single weekday event. The calendar view illustrates the reverse

order selection of the 10 days of the CBL window. The table view shows the dates of the CBL window for the event.

Figure 1 below shows CBL window selection for a single weekday event. The calendar view illustrates the reverse order selection of the 10 days of the CBL window. The table view shows the dates of the CBL window for the event. **Figure 2** below shows the CBL windows when multiple weekday events occur. The calendar view illustrates the reverse order selection of the 10 days of the CBL window for each event.

SUN	MON	TUE	WED	THU	FRI	SAT
June 12	June 13	June 14	June 15	June 16	June 17	June 18
June 19	June 20	June 21	CBL Day 10 For 7/8 Event	CBL Day 9 For 7/8 Event	CBL Day 8 For 7/8 Event	June 25
June 26	CBL Day 7 For 7/8 Event	CBL Day 6 For 7/8 Event	CBL Day 5 For 7/8 Event	CBL Day 4 For 7/8 Event	CBL Day 3 For 7/8 Event	July 2
July 3	INELIGIBLE - HOLIDAY	CBL Day 2 For 7/8 Event	CBL Day 1 For 7/8 Event	INELIGIBLE - DAY BEFORE EVENT	DR Event Called	July 9
July 10	July 11	July 12	July 13	July 14	July 15	July 16

CBL WINDOW FOR SINGLE WEEKDAY EVENT (7/8) EXAMPLE											
EVENT DATE	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10	EXCLUSIONS
7/8	7/6	7/5	7/1	6/30	6/29	6/28	6/27	6/24	6/23	6/22	7/4, 7/7

Figure 1. Example of CBL Window Selection – Single Weekday Event

SUN	MON	TUE	WED	THU	FRI	SAT
June 12	June 13 CBL DAY 10 FOR 6/28	June 14 CBL DAY 9 FOR 6/28	June 15 CBL DAY 8 FOR 6/28; CBL DAY 10 FOR 7/1	June 16 CBL DAY 7 FOR 6/28; CBL DAY 9 FOR 7/1	June 17 CBL DAY 6 FOR 6/28; CBL DAY 8 FOR 7/1	June 18
June 19	June 20 CBL DAY 5 FOR 6/28; CBL DAY 7 FOR 7/1	June 21 CBL DAY 4 FOR 6/28; CBL DAY 6 FOR 7/1	June 22 CBL DAY 3 FOR 6/28; CBL DAY 5 FOR 7/1	June 23 CBL DAY 2 FOR 6/28; CBL DAY 4 FOR 7/1	June 24 CBL DAY 1 FOR 6/28; CBL DAY 3 FOR 7/1	June 25
June 26	June 27 DR EVENT CALLED	June 28 CBL DAY 2 FOR 7/1	June 29 CBL DAY 1 FOR 7/1	June 30 INELIGIBLE - DAY BEFORE EVENT	July 1 DR EVENT CALLED	July 2
July 3	July 4	July 5	July 6	July 7	July 8	July 9
July 10	July 11	July 12	July 13	July 14	July 15	July 16

CBL WINDOW FOR MULTIPLE WEEKDAY EXAMPLE											
EVENT DATE	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10	EXCLUSIONS
6/27	6/13	6/14	6/15	6/16	6/17	6/20	6/21	6/22	6/23	6/24	N/A
7/1	6/15	6/16	6/17	6/20	6/21	6/22	6/23	6/24	6/28	6/29	6/30

Figure 2. Example of CBL Window Selection Multiple Weekday Events

Step 2. Establish the CBL Basis. Identify the five days from the 10-day CBL Window to be used to develop CBL values for each hour of the event.

1. Order the 10 days in the CBL Window according to their average daily event period usage level and eliminate the five days with the lowest average daily event period usage.
2. The remaining five days constitute the CBL Basis.

Step 3. Calculate Average Day CBL values for the event.

1. For each hour of the event, the CBL is the average of the n that hour in the five days that comprise the CBL basis.

3.2 The Average Day CBL for Weekends

Efficiency Maine will not be offering incentives for weekend dispatches in the CY2022 summer demand response season.

3.3 Weather Sensitive CBL

For elective Weather-Sensitive CBL Formulation

Step 1. Calculate the Average Day CBL values for each hour of the event period described above.

Step 2. Calculate the Event Final Adjustment Factor. This factor is applied to each of the individual hourly values of the Average Day CBL.

1. Calculate the Adjustment Basis Average CBL
 - a. Establish the adjustment period, the two-hour period beginning with the start of the hour that is four hours prior to the commencement of the event through the end of the hour, three hours prior to the event.
2. Calculate the Adjustment Basis Average CBL.
 - a. Apply the Average Day CBL formula as described in 5.0 The Average Day CBL, to the adjustment period hours as though it were an event period two hours in duration but using the five days selected for use in the Average CBL Basis (i.e., average the ten hours).
3. Calculate the average of the two usage values derived in (2.a), which is the Adjustment Basis Average CBL.
4. Calculate the Adjustment Basis Average Usage
 - a. The adjustment basis average usage is the simple average of the usage over the two-hour adjustment period on the event day.
5. Calculate the gross adjustment factor
 - a. The gross adjustment factor is equal to the Adjustment Basis Average Usage divided by the Adjustment Basis Average CBL
6. Determine the Final adjustment factor. The final adjustment factor is as follows:
 - a. If the gross adjustment factor is greater than 1.00, then the final adjustment factor is the smaller of the gross adjustment factor or 1.20
 - b. If the gross adjustment factor is less than 1.00, the final adjustment factors are the greater of the gross adjustment factor or 0.80.

If the gross adjustment factor is equal to 1.00, the final adjustment factor is equal to the gross adjustment factor.

Step 3. Calculate the Adjusted CBL values.

1. The Event Adjusted CBL value for each hour of an event is the product of the Final Adjustment Factor and the Average CBL value for that hour.

Example Customer Baseline Calculation

As an example, assume a 5-hour event was called from 11am to 4 pm; notice was sent out at 9a.m. The past 10 days MWh consumption for similar hours, along with the four hours prior to event initiation, was:

Time	HB 7	HB 8	HB 9	HB 10	HB 11	HB 12	HB 13	HB 14	HB 15	Avg. Event Period Usage (MW/h)	Total Event Period Usage (MW)	Rank
CBL DAY 1	4	5	5	7	8	10	11	7	5	8.20	41	4
CBL DAY 2	5	4	3	5	6	8	6	9	6	7.00	35	7
CBL DAY 3	3	4	5	6	8	9	12	9	7	9.00	45	1
CBL DAY 4	3	4	4	5	6	7	8	6	6	6.60	33	8
CBL DAY 5	3	3	4	5	7	10	11	9	7	8.80	44	2.5
CBL DAY 6	2	6	2	5	8	12	8	9	7	8.80	44	2.5
CBL DAY 7	3	2	3	4	5	5	8	8	6	6.40	32	9
CBL DAY 8	2	3	3	4	6	7	8	8	7	7.20	36	6
CBL DAY 9	2	3	2	4	6	7	6	6	5	6.00	30	10
CBL DAY 10	3	4	4	5	7	8	9	9	6	7.80	39	5

HB: Hour Beginning

Steps 1 and 2: sum the MWh for the hours 11-4 each day select the 5 highest totals:

Time	HB 7	HB 8	HB 9	HB 10	HB 11	HB 12	HB 13	HB 14	HB 15	Avg. Event Period Usage (MW/h)	Total Event Period Usage (MW)	Rank
CBL DAY 1	4	5	5	7	8	10	11	7	5	8.20	41	4
CBL DAY 3	3	4	5	6	8	9	12	9	7	9.00	45	1
CBL DAY 5	3	3	4	5	7	10	11	9	7	8.80	44	2.5
CBL DAY 6	2	6	2	5	8	12	8	9	7	8.80	44	2.5
CBL DAY 10	3	4	4	5	7	8	9	9	6	7.80	39	5

Step 3: Calculate the CBL for each hour using the five highest days selected:

Time	HB 11	HB 12	HB 13	HB 14	HB 15
Avg. Day CBL	7.6	9.8	10.2	8.6	6.4

To calculate the hourly load reduction, for each hour, subtract the actual load from the CBL.

Time	HB 11	HB 12	HB 13	HB 14	HB 15
Avg. Day CBL	7.6	9.8	10.4	8.6	6.4
EVENT DAY - Actual Load	3	2	3	3	4
Load Reduction using Average CBL	4.6	7.8	7.4	5.6	2.4

The CBL shown in Step 3 above is the non-weather adjusted value. If this customer signed up with the weather-sensitive calculation option, the CBL would be adjusted upward or downward based on the actual usage in the two hours prior to event notification. In this example, the Adjustment Basis Average CBL will be the average of the MWh for hours beginning 7 and 8 over the five days chosen for the CBL: The table below shows how the adjustment will be calculated.

Time	HB 7	HB 8	Adjustment Basis Average CBL
Avg. Day CBL - Adjustment Hours	3	4.4	3.7

On the day of the event (day N), assume the actual metered load consumption is as shown in the following table:

Time	HB 7	HB 8	HB 9	HB 10	HB 11	HB 12	HB 13	HB 14	HB 15	Adjustment Basis Average Usage
EVENT DAY - Actual Load	3	4	5	4	3	2	3	3	4	3.5

In this case, the Adjustment Basis Average Usage is the average of the MWh in hours 7 and 8, or 3.5 MWh. The Gross Adjustment Factor is the ratio of the Adjustment Basis Average Usage to the Adjustment Basis Average CBL, 3.5/3.7 or 0.95.

Adjustment Basis Average Usage	Adjustment Basis Average CBL	Gross Adjustment Factor
3.5	3.7	0.95

The CBL will therefore be adjusted downward by five percent. The following table shows the resulting weather adjusted CBL and the computed load reduction for the five hour event period.

Time	HB 11	HB 12	HB 13	HB 14	HB 15
Weather Adjusted CBL	7.22	9.31	9.88	8.17	6.08
EVENT DAY - Actual Load	3	2	3	3	4
Load Reduction Using Weather Adjusted CBL	4.22	7.31	6.88	5.17	2.08

It is important to note that if the actual usage in the two hours prior to notification was higher than the Adjustment Basis Average CBL, the CBL curve would have been shifted upward and would result in load reduction performance that was higher than would have been determined using the Average Day CBL (without weather adjustment).