New York ISO
Independent System Operator

Manual ##

Aggregation Manual: ECBL

WG/SUBCOMMITTEE DRAFT – NOT FOR COMMITTEE ACTION

8.5. Economic Customer Baseline Load (ECBL)

This section details the calculation of the Economic Customer Baseline Load (ECBL) for individual Demand Side Resources participating in an Aggregation when dispatched for Energy and Operating Reserves only.

The ECBL represents the Load of a DER facility and is used to determine a DER facility's Demand Reduction. The ECBL uses a combination of historical data from the same time on similar days and a near-term adjustment used to incorporate the conditions of the specific operating day (as described below).

The ECBL is calculated for a DER facility for a given NYISO 5-minute interval. NYISO RTD intervals are typically 5 minutes in duration. For example, when a DER facility provides energy as part of an Aggregation's response to a NYISO dispatch at 11:00, an ECBL is calculated for the DER facility from 11:00-11:05. A new ECBL is calculated for the next 5-minute interval, typically 11:05-11:10. All ECBL calculations will be on the 5-minute interval.

There are two components of the ECBL calculation: the unadjusted ECBL and the in-day adjustment. The unadjusted ECBL calculates a value for the DER facility's baseline using the Load of the DER facility at the same time interval during a window of similar days. For example, when a DER facility provides energy as part of an Aggregation's response to a NYISO dispatch at 11:00, the unadjusted ECBL reviews the load of the DER facility at 11:00 on similar days before the dispatch day.

The in-day adjustment modifies the unadjusted ECBL based on the in-day conditions one hour before the Aggregation's dispatch. For example, when a DER facility provides energy as part of an Aggregation's response to a NYISO dispatch at 11:00, the in-day adjustment reviews the load of the DER facility at 10:00 on the dispatch day. The in-day adjustment is limited to ±20% of the unadjusted ECBL.

The adjusted ECBL is calculated as the sum of the in-day adjustment and the unadjusted ECBL and represents the baseline load used to determine the DER facility's demand reduction.

8.5.1.   Unadjusted ECBL Calculation

The unadjusted ECBL calculation is dependent on whether the day of dispatch is a weekday or a weekend/NERC designated holiday. All "NERC Additional Off-Peak Holidays" for the Eastern Interconnection may be found on NERCs public website.

8.5.1.1. Weekday Unadjusted ECBL Calculation

8.5.1.1.1. Weekday Unadjusted ECBL Window

The Aggregator or its designee shall select the 10 previous like weekdays to calculate the weekday unadjusted ECBL. NERC designated holidays are skipped. Please refer to **Figure 1** for an example of selecting the 10 previous weekdays.

Figure 1: Example of selecting the 10 previous weekdays for the Weekday Unadjusted ECBL Window.

July 2023

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
25-Jun	26-Jun	27-Jun	28-Jun	29-Jun	30-Jun Day 1	1
2	3 Day 2	4 Holiday	5 Day 3	6 Day 4	7 Day 5	8
9	10 Day 6	11 Day 7	12 Day 8	13 Day 9	14 Day 10	15
16	17 Dispatch Day	18	19	20	21	22
23	24	25	26	27	28	29
30	31					

Key	Normal Day	Dispatch Day	Day Used in Calculation	Holiday		

Once the days are selected, the aggregator or its designee will take the average of the 6-second telemetry values of the 5-minute interval on each day. For example, for the 11:00-11:05

interval the aggregator or its designee will average the 6-second telemetry values on each day of the weekday unadjusted ECBL window from 11:00-11:05. If the DER facility had been dispatched as part of an Aggregation in response to a NYISO dispatch, the proxy load shall be used in accordance with Section 8.5.4 of this Aggregation Manual.

The Aggregator or its designee will sort the 10, 5-minute intervals as calculated above in MW value order from lowest to highest. The unadjusted weekday ECBL is then calculated as the average of the 5th and 6th values. For an example, please refer to **Figure 2** below.

Figure 2: Example calculating the unadjusted weekday ECBL.

Week Day	Load 11:00-11:05 Interval
30-Jun	1.2
3-Jul	1.8
5-Jul	1.2
6-Jul	2.5
7-Jul	2.4
10-Jul	3.3
11-Jul	4.8
12-Jul	1
13-Jul	1
14-Jul	1.1

Value	Sort
1	1
2	1
3	1.1
4	1.2
5	**1.2**
6	**1.8**
7	2.4
8	2.5
9	3.3
10	4.8

Unadjusted ECBL	
	1.5

8.5.1.2. Weekend/Holiday Unadjusted ECBL Calculation

8.5.1.2.1. Weekend/Holiday Unadjusted ECBL Window

The Aggregator or its designee shall select the previous three weekend days of the same type (Saturdays will be used for dispatches on a Saturday and Sundays will be used for dispatches on a Sunday) to calculate the weekend unadjusted ECBL. For example, the weekend window for a NYISO dispatch on a Saturday shall include data from the previous three Saturdays. The window for a weekday that is a NERC holiday will consist of the previous three Sundays.

Please refer to **Figure 3** for an example of selecting the three previous weekend days.

Figure 3: Example selecting the three previous weekend days for the unadjusted weekend ECBL window.

July 2023

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
25-Jun	**26-Jun**	**27-Jun**	**28-Jun**	**29-Jun**	**30-Jun**	**1** **Day 1**
2	**3**	**4** **Holiday**	**5**	**6**	**7**	**8** **Day 2**
9	**10**	**11**	**12**	**13**	**14**	**15** **Day 3**
16	**17**	**18**	**19**	**20**	**21**	**22** **Dispatch Day**
23	**24**	**25**	**26**	**27**	**28**	**29**
30	**31**					

Key	Normal Day	Dispatch Day	Day Used in Calculation	Holiday

Once the days are selected, the aggregator or its designee will take the average of the 6-second telemetry values of the 5-minute interval on each day. For example, for the 11:00-11:05 interval the aggregator or its designee will average the 6-second telemetry values on each day of the weekend/holiday unadjusted ECBL window from 11:00-11:05. If the DER facility had been dispatched as part of an Aggregation in response to a NYISO dispatch, the Proxy Load shall be used

in accordance with section 8.5.4 of this Aggregation Manual.

The unadjusted weekend/Holiday ECBL is then calculated as the average of the three values. For an example, please refer to **Figure 4** below.

Figure 4: Example calculating the unadjusted weekend ECBL.

Weekend Day	Load 11:00-11:05 Interval
1-Jul	1.5
8-Jul	1.4
15-Jul	1.9

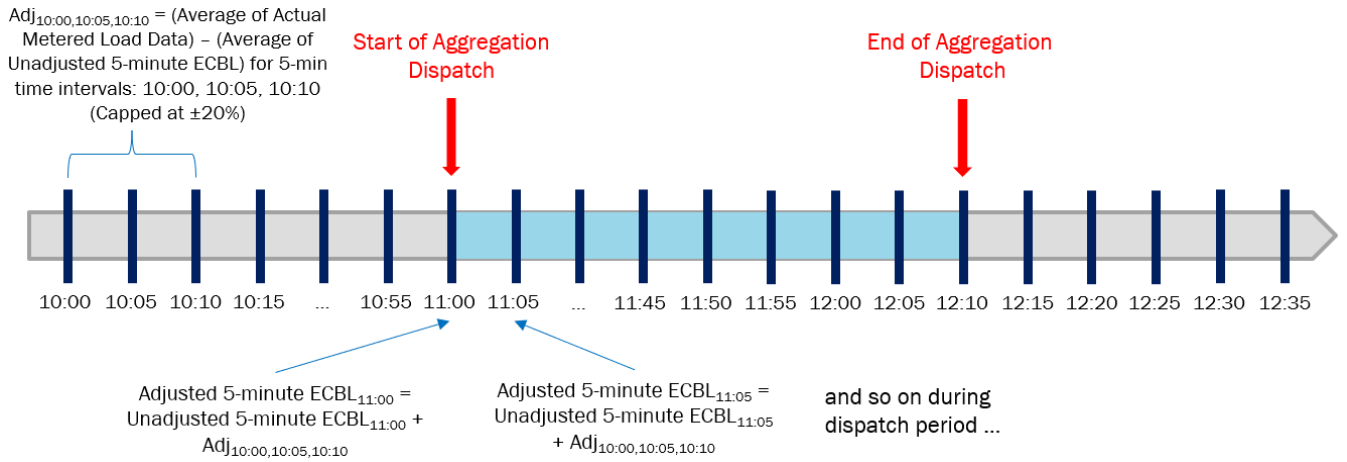| Unadjusted ECBL	
	1.6

8.5.2. ECBL In-Day Adjustment

8.5.2.1. In-Day Adjustment Window

The in-day adjustment window begins one hour prior to the beginning of the five-minute dispatch interval . The intervals used in the in-day adjustment window shall be the three consecutive five-minute intervals starting 60 minutes prior to the first operating interval of dispatch and ending with the five-minute interval ending 45 minutes prior to the operating interval of dispatch. For example, if the beginning of the Aggregation's dispatch is at 11:00 the in-day adjustment window shall be the meter data from the intervals beginning at 10:00, 10:05, and 10:10.

Once the intervals are selected, the Aggregator or its designee will calculate the average of the 6-second telemetry values for the three separate 5-minute intervals.

The in-day adjustment is then calculated as the difference between (i) the average of the three intervals metered values of the in-day adjustment window and (ii) the average of the three intervals unadjusted ECBLs of the in-day adjustment window. For example, when a DER facility provides energy as part of an Aggregation's response to a NYISO dispatch at 11:00 the Aggregator or its designee will subtract (i) the average of the three unadjusted ECBLs at 10:00, 10:05, and 10:10 from (ii) the average of the 6-second telemetry values of the intervals starting 10:00, 10:05, and 10:10. Please refer to **Figure 5** below as an example. The in-day adjustment is capped as ±20% of the unadjusted ECBL as calculated above in section 8.5.1.

Figure 5: Example calculating the ECBL in-day adjustment.

$Adj_{10:00,10:05,10:10}$ = (Average of Actual Metered Load Data) – (Average of Unadjusted 5-minute ECBL) for 5-min time intervals: 10:00, 10:05, 10:10 (Capped at ±20%)

Start of Aggregation Dispatch

End of Aggregation Dispatch

10:00 10:05 10:10 10:15 ... 10:55 11:00 11:05 ... 11:45 11:50 11:55 12:00 12:05 12:10 12:15 12:20 12:25 12:30 12:35

Adjusted 5-minute $ECBL_{11:00}$ = Unadjusted 5-minute $ECBL_{11:00}$ + $Adj_{10:00,10:05,10:10}$

Adjusted 5-minute $ECBL_{11:05}$ = Unadjusted 5-minute $ECBL_{11:05}$ + $Adj_{10:00,10:05,10:10}$

and so on during dispatch period ...

Time	July 17 10:00-10:05	July 17 10:05-10:10	July 17 10:10-10:15	Average
Load	1.2	1.1	1	1.1
ECBL	1.95	1.1	1.6	1.55

Average Load	Average ECBL	Difference	Unadjusted ECBL July 17 11:00-11:05	In-Day Adjustment for Duration of Dispatch*
1.1	1.55	-0.45	1.5	-0.3

*(Capped at ±20% Unadjusted ECBL)

The in-day adjustment window shall be recalculated for every interval of dispatch which is preceded by an interval of at least two hours of non-dispatch. The same in-day adjustment will be used for each interval until it needs to be recalculated after two hours of no dispatches from the NYISO.

8.5.3. Adjusted ECBL Calculation

The adjusted ECBL calculation is calculated as the sum of the unadjusted ECBL and the in-day adjustment. Please refer to **Figure 6** below as an example. For use in settlements, the hourly ECBL is calculated as the weighted average of all 5-minute intervals' adjusted ECBL for the length of the hour. The 1-hour ECBL is used for calculating the hourly Demand Reduction of a DER facility.

Figure 6: Adjusted ECBL Calculation.

Unadjusted ECBL July 17 11:00-11:05	In-Day Adjustment for Duration of Dispatch	Adjusted ECBL July 17 11:00-11:05
1.5	-0.3	1.2

8.5.4. ECBL Proxy Load

During an interval in which a DER is curtailing Load in response to its Aggregation being dispatched by the NYISO, and when the LBMP is greater than or equal to the Monthly Net Benefit Threshold (MNBT), the Proxy Load shall be used instead of the DER's telemetered Load. The applicable MNBT is posted on the NYISO website at the following link: https://www.nyiso.com/demand-response. The Proxy Load is the telemetered Load plus measured Demand Reductions of a DER facility. During intervals when the LBMP is less than the MNBT the load reduction is not added back. Please refer to **Figure 7** below as an example.

Figure 7: Proxy Load Calculation.

Week Day	Load 11:00-11:05 Interval	Prior Measured Demand Reductions	LBMP≥MNBT?	Proxy Load/Load		Value	Sort
30-Jun	1.2			1.2		1	1
3-Jul	1.3	0.5	YES	1.8		2	1
5-Jul	1.2			1.2		3	1.1
6-Jul	2.5			2.5		4	1.2
7-Jul	2.4			2.4		5	1.2
10-Jul	2.8	0.5	YES	3.3		6	1.8
11-Jul	4.8			4.8		7	2.4
12-Jul	1	1.5	NO	1		8	2.5
13-Jul	1	2	NO	1		9	3.3
14-Jul	1.1			1.1		10	4.8

Unadjusted ECBL	1.5

8.6. Baseline for DER providing Regulation

The baseline is calculated differently for DER facilities that operate when the Aggregation is dispatched for Regulation Service. The baseline for DER facility Demand Reductions providing Regulation Service as part of a DER Aggregation is calculated as the Load of the DER facility six

seconds prior to the Aggregation receiving a Regulation dispatch. If the DER had been dispatched for Energy prior to a Regulation dispatch, the baseline is calculated as the sum of the measured Demand Reduction and the load six seconds prior to the Aggregation receiving a Regulation dispatch. The baseline calculated for the six seconds prior to receiving a Regulation Service Dispatch is the baseline that will be used for duration of the Regulation Service dispatch. All Demand Reduction measured for the applicable DER facility is calculated as the difference between the Regulation baseline and the metered Load of the DER facility for each six second interval. For example, for a Regulation dispatch beginning at 11:05:00 the baseline is calculated as the Load of the DER facility at 11:04:54. Please refer to **Figure 8** and **Figure 9** below as an example.

Figure 8: Response Calculation for DER within an Aggregation – Regulation Only Example

	10:59:48	10:59:54	11:00:00	11:00:06	11:00:12
Aggregation Scheduled for Energy	N	N	N	N	N
Aggregation Scheduled for Regulation	N	N	Y	Y	Y
DER Facility Load	1.3	1.1	1	1.1	0.5
DER Facility Load Prior to Regulation Dispatch*			1.1	1.1	1.1
Unadjusted 5-min ECBL	2	2	1.5	1.5	1.5
In-Day Adjustment			-0.3	-0.3	-0.3
Adjusted 5-min ECBL			1.2	1.2	1.2
Demand Reduction Response	0	0	0.1	0	0.6

*This value is the baseline value and is persisted for the duration of the DER facility providing Regulation Service as part of the Aggregation's Regulation Service response.

Figure 9: Response Calculation for DER within an Aggregation – Regulation and Energy Example

	11:04:48	11:04:54	11:05:00	11:05:06	11:05:12
Aggregation Scheduled for Energy	Y	Y	Y	Y	Y
Aggregation Scheduled for Regulation	N	N	Y	Y	Y
DER Facility Load	1	0.8	0.9	0.5	1
DER Facility Load Prior to Regulation Dispatch*			1.2	1.2	1.2
Unadjusted 5-min ECBL	1.5	1.5	1.8	1.8	1.8
In-Day Adjustment	-0.3	-0.3	-0.3	-0.3	-0.3
Adjusted 5-min ECBL	1.2	1.2	1.5	1.5	1.5
Demand Reduction Response	0.2	0.4	0.3	0.7	0.2

*This value is the baseline value and is persisted for the duration of the DER facility providing Regulation Service as part of the Aggregation's Regulation Service response.