CBL Certification Process

The CBL Certification process will identify variable load customers. All customers must use a CBL with an error (RRMSE) no greater than 20% unless otherwise approved by PJM.

- If a customer's CBL error is greater than 20% then the customer is considered to be a variable load customer and another CBL must be used.
- If an alternate CBL with an error less than 20% (unless otherwise approved by PJM) cannot be found then the registration will be terminated by PJM.
- All new Economic DR registrations require CBL Certification.
- Registration extensions will not require CBL Certification.

  Exception
  - CSPs shall inform PJM of any significant operational changes that affect the load which in turn require an evaluation of the existing CBL.
  - Registrations with significant operation changes require CBL Certification.
  - PJM may review and request accuracy of registration CBL on a periodic basis

CBL Certification Process – Short Term Implementation

CBL Certification is performed after submitting the registration.

1) CSP creates and saves new registration. The default CBL will be high 4 of 5 with Symmetric Additive Adjustment (SAA) (no other CBL may be selected).
2) CSP submits enough hourly interval meter data such that 30 CBL test days can be calculated. The excluded event days are defined as previous submitted non-denied submitted settlements.
   a) Load Data must be contiguous where most current date of load data is <= current date minus 60.
3) CSP selects CBL method to calculate the RRMSE.
   i) Standard CBL with the Symmetrical Additive Adjustment (SAA) must be calculated for all registrations
   ii) 7 Day Types CBL with SAA
   iii) Other alternative CBL(s) as selected by the CSP.

4) CSP submits registration – CSP will not be permitted to submit registration unless RRMSE has been calculated.

5) If the Standard CBL with SAA has an RRMSE greater than 20% then CSP should request alternate CBL with RRMSE <=20%. This currently gets done while registration is in pending status.

6) All **Confirmed** registrations that have an RRMSE > 20% will be terminated by PJM **unless** the Alternate CBL was requested.

CBL Certification Process – Mid Term Implementation

CBL Certification is performed prior to submitting the registration. This process eliminates current alternative CBL process and focus on getting CBL correct on registration.

1) Create Registration & save registration (New status)

2) Input Load Data

3) CSP should run RRMSE

    a. Standard CBL with SAA must be run

    b. CSP may run other alternative CBLs

4) CSP can select any CBL from drop down on registration if CBL has RRMSE in successful status

    a. if registration has "successful" RRMSE <=20% for CBL selected on registration with 30 CBL test days AND RRMSE is lower than Standard CBL THEN CSP may submit and PJM does not need to approve.

        i. Load Data used must be contiguous where most current date of load data is <= current date minus 60.

    b. Otherwise, CSP can initiate a "CBL Review Task" for PJM to review CBL exception for one of the following reasons and then be able to submit the registration for approval:

        i. RRMSE >20%

        ii. Alternative CBL RRMSE > Default RRMSE

        iii. Insufficient load data (not able to get 30 CBL Test Days)

        iv. Outdated load data (most current load data is older than 60 days from current date)

        v. Use of Manual CBL.

c. Once CSP submits CBL Review Task or submits registration the CSP cannot change the CBL on the registration.

d. PJM CBL Review Task will use same logic and timeline today embedded in alternative CBL process (including settlement hold process).

e. Registration goes through normal Registration approval process

Maximum Base Load CBL (MBL)

The MBL CBL for weekdays shall be the average of the daily minimum loads during the event hours over the 5 most recent weekdays preceding the load reduction event within the 45 calendar day period preceding the load reduction event. It is expected that this alternative CBL may be used for variable loads where other CBLs are not accurate.

The daily minimum load calculation must be based on a minimum of three hours. If the number of event hours is less than three, then the daily minimum load calculation will use the following hours:

1. The hour prior to the first hour of the event
2. The hour(s) of the event
3. The hour after the event

For the purpose of calculating the MBL CBL for weekdays, weekdays shall not include:

1. NERC holidays
2. Weekend days
3. Event Days defined as previous submitted non-denied submitted settlements.
4. Any weekday where the average daily event period usage is less than 25% of the average event period for the five days.

If a 45-day period does not include 5 weekdays, provided that there are 4 weekdays within the 45-day period, the MBL CBL shall be based on the average of the daily minimum loads using hours defined above.

If a 45-day period does not include 4 weekdays, the most recent prior event days will be used as necessary to meet the 4 day requirement to calculate the MBL CBL.

The MBL CBL for Saturdays and Sundays/NERC holidays shall be the average of the daily minimum loads during the event hours over the 3 most recent Saturdays or Sundays/NERC holidays within the 45 calendar period preceding the load reduction event

The daily minimum load calculation must be based on a minimum of three hours. If the number of event hours is less than three, then the daily minimum load calculation will use the following hours:

1. The hour prior to the first hour of the event

2. The hour(s) of the event

3. The hour after the event

For the purpose of calculating the MBL CBL for a Saturday or Sunday/NERC holiday, the following days shall not be used to calculate a Saturday or Sunday/NERC holiday MBL CBL:

1. Weekend event days defined as previous submitted non-denied submitted settlements.

2. Any Saturday or Sunday/NERC holiday where the average daily event period usage is less than 25% of the average event period usage level for the three days.

3. Any Saturday or Sunday/NERC holiday where that corresponds to the beginning of end of daylight savings.

If a 45-day period does not include 3 Saturdays or Sundays/NERC holidays, provided that there are 2 Saturdays or Sundays/NERC holidays within the 45-day period, the MBL CBL shall be based on the average of the daily minimum loads of those 2 Saturdays or 2 Sundays/NERC holidays.

If a 45-day period does not include 2 Saturdays or Sundays/NERC holidays, the most recent prior event days will be used as necessary to meet the 2 day requirement to calculate the MBL CBL.

Relative Root Mean Squared ERROR (RRMSE)

1) To perform the RRMSE calculation, daily CBL calculations are first performed for each CBL method using hours ending 14 through hours ending 19 as the simulated event hours for each of the 60 non-event days according to each CBL method rules.

2) Actual Hourly errors are calculated by subtracting the CBL hourly load from the actual hourly load for each of the simulated event hours of the non-event day.

3) The Mean Squared Error (MSE) is calculated by summing the squared actual hourly errors and dividing by the number of simulated event hours.

4) The Average Actual Hourly Load is the average of the actual hourly load for each of the simulated event hours.

5) The Relative Root Mean Squared Error (RRMSE) is calculated by taking the square root of the quantity (MSE/Average Actual Load).

Example of RRMSE calculated over 10 day period

1) Daily CBL calculations are first performed for each CBL method using hours ending 14 through hours ending 19 as the simulated event hours for each of the 60 non-event days according to each CBL method rules.

		Baseline Hourly Loads (kW)						Actual Hourly Loads (kW)					
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
customer	Date	1-2PM	2-3PM	3-4PM	4-5PM	5-6PM	6-7PM	1-2PM	2-3PM	3-4PM	4-5PM	5-6PM	6-7PM
R2001	18-Aug-11	508	520	517	506	488	461	492	494	500	502	502	481
R2001	19-Aug-11	83	82	72	53	47	35	64	59	38	47	5	5
R2001	20-Aug-11	349	342	287	267	237	196	326	322	313	301	294	222
R2001	21-Aug-11	3,482	3,468	3,843	3,606	3,556	3,445	3,771	3,761	3,730	4,023	3,487	3,361
R2001	22-Aug-11	439	445	446	416	425	404	383	382	383	381	387	391
R2001	23-Aug-11	386	397	394	370	229	194	353	386	375	312	235	178
R2001	24-Aug-11	92	92	92	93	92	92	82	85	83	85	84	86
R2001	25-Aug-11	3,204	3,229	3,257	3,208	3,185	3,115	2,964	2,964	2,961	2,386	2,833	2,770
R2001	26-Aug-11	660	625	568	532	493	482	613	583	566	551	535	499
R2001	27-Aug-11	6,397	6,377	6,322	6,308	6,411	6,343	7,165	7,098	7,047	6,918	6,799	6,820

2) Actual Hourly errors are calculated by subtracting the CBL hourly load from the actual hourly load for each of the simulated event hours of the non-event day.

3) The Mean Squared Error (MSE) is calculated by summing the squared actual hourly errors and dividing by the number of simulated event hours.

4) The Average Actual Hourly Load is the average of the actual hourly load for each of the simulated event hours.

5) The Relative Root Mean Squared Error (RRMSE) is calculated by taking the square root of the MSE/Average Actual Load.

		Actual Hourly Error (kW)						MSE	Average Actual kW	Relative RMSE
		(u)	(v)	(w)	(x)	(y)	(z)	(s)	(n)	(t)
								$\Sigma e^2/n$	= average(g:l)	=SQRT(s)/(n)
customer	**Date**	**1-2PM**	**2-3PM**	**3-4PM**	**4-5PM**	**5-6PM**	**6-7PM**	65,443	1,564	16%
R2001	18-Aug-11	16	26	17	4	(14)	(20)			
R2001	19-Aug-11	19	23	34	6	42	30			
R2001	20-Aug-11	23	20	(26)	(34)	(57)	(26)			
R2001	21-Aug-11	(289)	(293)	113	(417)	69	84			
R2001	22-Aug-11	56	63	63	35	38	13			
R2001	23-Aug-11	33	11	19	58	(6)	16			
R2001	24-Aug-11	10	7	9	8	8	6			
R2001	25-Aug-11	240	265	296	822	352	345			
R2001	26-Aug-11	47	42	2	(19)	(42)	(17)			
R2001	27-Aug-11	(768)	(721)	(725)	(610)	(388)	(477)			

Dispatch Implementation

- All Economic Load Response participation is defined as:
    1) Clearing in the Day-Ahead Market
    2) Dispatched by PJM in the Real-Time Market
- All registrations and Dispatch Groups will be eligible to set LMP
- Self Scheduling will be eliminated with the PJM implementation of FERC Order 745
- Consolidation of eMKT screens – cut the number of tabs in half.
- Economic Min and Max MW on the DSR Hourly Updates can be changed up to 3 hours before the operating hour.
- DR bids will be handled as follows:
    a. Day-Ahead Market – If hour clears in DA market then DR should respond with associated MWs. PJM will not dispatch in RT for hours that clear in DA market.
    b. Balancing Market – DR should follow RT dispatch signal
    c. Both
        i. If hour clears in DA market then DR should respond with associated MWs. PJM will not dispatch in RT for hours that clear in DA market.
        ii. If hour does not clear then hour is eligible to be dispatched in RT.

Dispatch Groups

Dispatch Groups can be created in eLRS for Economic participation in eMKT.

The Dispatch Groups allows the CSP to create a single offer for a group of registrations for economic participation.

- Day-Ahead Market
- Balancing Market
- Both

Rules for creating Dispatch Groups in eLRS:

1. Same CSP, Zone and Pricing Point
2. Registrations participating in SR may be in Dispatch Group provided that all registration are in SR zone.
3. Registration cannot be in a Dispatch Group and as a stand alone registration.

4. PJM will create LSE negative DEC bids for DR that clears in DA market for Dispatch Group based on registration DR load reduction capability.

Dispatch Groups are bridged from eLRS to eMKT

1. Dispatch Groups must still be assign to Portfolios
2. Use a single Schedule and all associated Schedule parameters to represent the Dispatch Group
3. DSR Schedules cannot be changed when the Market is closed **(Same as today)**
4. Use a single DSR Hourly Updates and all associated DSR Detail to represent the Dispatch Group

Dispatch Group Reductions

To calculate the reductions achieved by the Dispatch Group after an economic event, individual settlements need to be created in eLRS

1. The CBL needs to be calculated in order to calculate the reductions for the individual registrations.
2. The individual settlements are submitted and the meter data is verified by the EDC.
    a. The LSE is no longer in the approval process.
3. Once all of the settlements in the Dispatch Group reach their final state, the total reduction for the Dispatch Group is calculated as the sum of all the reductions of the confirmed settlements. The Dispatch Group Reduction is bridged to Market Settlements for billing.
4. Market Settlements will only provide settlement report based on Dispatch Group(s) and not by registrations

Electronic Notifications

The PJM Real-Time Dispatch of Registrations and Dispatch Groups will use an Electronic Notification.

1. CSPs will get (pull) the Real-Time Dispatch instructions from PJM using web services over https with Heartbeat and functional acknowledgement.

2. The Dispatch instructions will include all relevant data.

3. CSP will need to confirm that dispatch instructions were received.

Settlements

Settlement Revenue

CSPs are eligible to be paid full LMP for the Registration's or Dispatch Group's reductions, provided that the LMP at the pricing point is at or above the Net Benefits Price.

1. All Registrations or Dispatch Groups must either clear in the Day-Ahead Market or be Dispatch by PJM in order to be eligible for settlement revenue.

2. All Registrations or Dispatch Groups are eligible for Make Whole payments.

3. All Registrations or Dispatch Groups are subject to Balancing Operating Reserve (BOR) charges for deviations greater than 20% from the PJM Day-Ahead or Real-Time Dispatch instructions.

4. The processing of the settlements will be consistent with the economic participation of the Registrations or Dispatch Groups.

5. Registrations that are cleared or dispatched will be evaluated at the registration level when evaluating BOR

6. Dispatch Groups that are cleared or dispatched will be evaluated at the Dispatch Group level when evaluating BOR.

Settlement Cost Allocation

The cost of Economic Demand Response settlements will be allocated to all of the Market participants with real-time exports from PJM and LSE's within a zone that has an LMP greater than the Net Benefits Price.

1. Market Participant with real-time exports
    - ratio-share basis based on their real-time exports
2. LSEs
    - ratio-share basis based on their real-time loads in the zone