

Outstanding CBL changes

DRS

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- Other items
 - The measurement of reductions in the energy market should be done on a consistent basis.
 - Emergency energy settlements should be based on CBL methodology.
 - CSP to identify specific load reduction activity
 - Today many simply designate as “Other”
- Order 745 compliance filing & additional implementation details

- If economic and emergency registration then use economic CBL
- If only emergency registration then:
 - Same as economic registration process (details provided later in presentation)

- PJM needs better understanding of type of DR activity to help with CBL determination process

Site Profile Contacts Registration **Data History**

Registration Defaults

Energy Loss Factor	<input type="text" value="1.05308"/>
Capacity Loss Factor	<input type="text" value="1.05308"/>
Retail Rate	<input type="text" value="5.22"/> cents/kW
Peak Load Contribution	<input type="text" value="1724.8"/> kW
Load Reduction	<input type="text" value="350.0"/> kW

Other

Backup Generation Fuel Type	<input type="text" value="None"/>
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Load Reduction Method	kW Reduction (per site)
HVAC	<input type="text" value="0.0"/>
Backup Gen	<input type="text" value="0.0"/>
Lighting	<input type="text" value="0.0"/>
Refrigeration	<input type="text" value="0.0"/>
Manufacturing	<input type="text" value="0.0"/>
Water heating	<input type="text" value="0.0"/>
Other	<input type="text" value="350.0"/>
Total Per Site	350.0
# of Sites Multiplier	<input type="text" value="1.0"/>
Total Load Reduction	350.0

All new and existing registrations that can receive an energy payment must be certified to use a CBL method. The CBL certification process applies to the following registrations:

1. Economic
2. Emergency DR Full (Starting in the 2012/2013 Delivery Year)
3. Emergency Energy Only
 - Because of FERC ORDER 745, full LMP compensation is accomplished with Economic registrations. Emergency Energy Only registrations may no longer be needed.

CBL Certification is performed prior to submitting the registration. The CSP creates the new registration and submits 60 non-event days of hourly interval meter data. The excluded event days are defined as days where there was economic participation or a called Load Management event.

The eLRS calculates the Relative Root Mean Squared (RRMSE) for two CBL methods:

1. Standard Economic CBL with SAA
2. 7 Day Types CBL with SAA

If the RRMSE is less than 20%, then the CBL method with the lowest RRMSE is selected by eLRS as the CBL method.

If the RRMSE is greater than 20% for both of the CBL methods, then the Maximum Baseline Load (MBL) method is selected by eLRS as the CBL method. The MBL method is calculated by averaging the daily minimum loads using hours ending 12 through hours ending 20.

The CSP submits the registration with the eLRS selected CBL method. Alternate CBLs may be requested using the normal Alternate CBL process.

New Registration without prior event history

1. The CSP creates new registrations in eLRS. Each registration consists of one or more locations.
2. Before the registration is submitted, the CSP must press the CBL Pre-Certification button and submit 60 contiguous days of hourly interval meter data for each location.
3. The eLRS calculates the RRMSE for both the Standard Economic CBL with SAA method and the 7 Day Types CBL with SAA method.
4. The eLRS displays the RRMSE for both CBL methods on the registration and selects the CBL method with the lowest RRMSE as the default CBL method. If both of the CBL methods have an RRMSE greater than 20%, then the MBL method is selected as the default CBL.
5. The eLRS generates daily CBL reports for each of the two CBL methods.
6. The CSP may submit the registration for approval after the eLRS selects a default CBL method.
7. The CSP, EDC or PJM may request an alternate CBL while the registration is in the pending status.

New Registration with prior event history with another CSP

Potential Issue

Currently, event data cannot be shared between CSPs. Therefore prior events cannot be excluded. Event days are defined as days where there was either economic participation or Load Management events.

If an end use customer was previously with another CSP and there were prior events within the previous 60 days, then the CSP needs to submit 60 days of meter data starting the day after the last event from the previous CSP. This could delay the customer participation until 60 contiguous days of non-event data is obtained.

Potential Solution

Allow eLRS to share **event and meter** data between CSPs for CBL Certification process. The eLRS would indicate the amount of additional meter data needed to calculate daily CBLs over the previous 60 non-event days.

Current Registrations

1. All existing registrations will need to be terminated and re-registered using the CBL Certification process. All existing Economic registrations without CBL Certification will need to be terminated by future transition date (e.g.: 10/2/2011). The CSP can change the registration termination dates to any future date less than or equal to transition date.
2. The CSP creates new registrations in eLRS by copying the original registration that is set to be terminated at a future date. The Effective date can be future dated and set to be the day after the old registration's termination date.
3. Before the registration is submitted, the CSP must press the CBL Pre-Certification button and submit the appropriate amount of hourly interval meter data for each location. The eLRS will indicate the amount of additional meter data needed to calculate daily CBLs over the previous 60 non-event days.

Current Registrations

4. The eLRS calculates the RRMSE for both the Standard Economic CBL with SAA method and the 7 Day Types CBL with SAA method.
5. The eLRS displays the RRMSE for both CBL methods on the registration and selects the CBL method with the lowest RRMSE as the default CBL method. If both of the CBL methods have an RRMSE greater than 20%, then the MBL method is selected as the default CBL.
6. The eLRS generates daily CBL reports for each of the two CBL methods.
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Relative Root Mean Square Error (RRMSE)

The statistic chosen to measure the CBL accuracy at PJM is the relative root mean squared error (RRMSE). This RRMSE expresses the baseline's average hourly accuracy as a fraction of average hourly load for the registration. The RRMSE will also be used during the CBL Certification Process to ensure that accuracy of the certified CBL method does not exceed 20%.

The RRMSE is calculated for each CBL method by comparing the forecasted load to the actual load for each hour during the CBL Certification date range.

The RRMSE is calculated over the CBL Certification date range using hours ending 11 through hours ending 19.

Example of RRMSE calculated over a 1 day period

- The actual locational hourly meter data is summed for each registration.
- The average of the hourly forecasted load is calculated over the forecast period.
 - The hourly loads are forecasted for each CBL method.
- The average of the hourly actual load is calculated over the forecast period

		Baseline Hourly Loads (kW)						Actual Hourly Loads (kW)						Average Baseline kW	Average Actual kW
		(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)	(m)	(n)
														= average(a:f)	= average(g:l)
Reg_ID	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		
1	18-Aug-11	508	520	517	506	488	461	492	494	500	502	502	481	500	495
2	18-Aug-11	83	82	72	53	47	35	64	59	38	47	5	5	62	36
3	18-Aug-11	349	342	287	267	237	196	326	322	313	301	294	222	280	296
4	18-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	3,567	3,689
5	18-Aug-11	439	445	446	416	425	404	383	382	383	381	387	391	429	385
6	18-Aug-11	386	397	394	370	229	194	353	386	375	312	235	178	328	307
7	18-Aug-11	92	92	92	93	92	92	82	85	83	85	84	86	92	84
8	18-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	3,200	2,813
9	18-Aug-11	660	625	568	532	493	482	613	583	566	551	535	499	560	558
10	18-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	6,360	6,975

Sample RRMSE Calculation for single day

1. Calculate the Actual Hourly error between forecast and actual loads.
 - a) average actual load – average forecast
2. Calculate the Mean Squared Error (MSE) by taking the sum of the hourly squared errors divided by the number of forecasted hours.
3. Calculate the average actual hourly load for the forecast period.
4. Calculate the RRMSE 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)
								$\Sigma e^2/n$ (see note)	= average(g:l)	=SQRT(s)/(n)
Reg ID	Date	1-2PM	2-3PM	3-4PM	4-5PM	5-6PM	6-7PM			
1	18-Aug-11	(16)	(26)	(17)	(4)	14	20	306	495	0.04
2	18-Aug-11	(19)	(23)	(34)	(6)	(42)	(30)	791	36	0.77
3	18-Aug-11	(23)	(20)	26	34	57	26	1,114	296	0.11
4	18-Aug-11	289	293	(113)	417	(69)	(84)	61,308	3,689	0.07
5	18-Aug-11	(56)	(63)	(63)	(35)	(38)	(13)	2,319	385	0.13
6	18-Aug-11	(33)	(11)	(19)	(58)	6	(16)	871	307	0.10
7	18-Aug-11	(10)	(7)	(9)	(8)	(8)	(6)	66	84	0.10
8	18-Aug-11	(240)	(265)	(296)	(822)	(352)	(345)	189,009	2,813	0.15
9	18-Aug-11	(47)	(42)	(2)	19	42	17	1,065	558	0.06
10	18-Aug-11	768	721	725	610	388	477	397,577	6,975	0.09

Note: $(s) = (u)^2 + (v)^2 + (w)^2 + (x)^2 + (y)^2 + (z)^2 / (\text{count of hours})$