Weather Sensitivity Adjustment: Examples

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Key Points

- A CSP may elect to have a resource approved as weather sensitive for selected season(s) prior to when the capacity registration is submitted
- A CBL model confirmed by PJM, will be used for the weather sensitive adjustment and will be set for the selected season(s) to be used during a compliance event
- Zonal weather is used in all analysis
- These examples rely on two distinct concepts: explanatory and predictive
  - Determining weather sensitive requires a strong explanatory variable
  - Determining the weather sensitive adjustment requires a strong predictive model

Determining Weather Sensitivity for a LM or PRD Capacity Resource

- For each resource, the CSP performs linear regressions to produce t-statistics for each hour of the season(s) it would like to use a weather sensitive adjustment
- PJM confirms whether the t-statistics for the sets of regressions meet established criteria (t-stat >1.96)
- The CSP indicates the resource is weather sensitive by checking a box on the capacity registration for the resource
- Regression data must be from the most recent full season(s) (e.g., prior Delivery Year)
- Regression data is from June – September or December – March
- Only non-holiday weekdays are included in the regression analysis
- A customer is deemed to be weather sensitive if 75% of all hourly regressions have a t-statistic greater than 1.96 (the 95% confidence level)

BGE Weather Sensitive Resource Example (summer season)

- Resource: residential customers on BGE distribution node
- Period of Regression: 2021 summer weekdays (for 22/23 registration)
- Regression model: hourly load = a + b*WTHI
- t-stat Results for WTHI Variable:

Hour	t-stat	Hour	t-stat	Hour	t-stat
1	16.8	9	11.1	17	21.4
2	15.7	10	13.4	18	20.1
3	15.8	11	14.1	19	18.5
4	14.5	12	16.2	20	19.7
5	13.0	13	19.0	21	20.1
6	12.3	14	19.9	22	20.4
7	9.0	15	20.9	23	20.1
8	8.6	16	21.9	24	19.8

- Conclusion: At least 75% of the hourly t-statistics are above 1.96 [95% confidence level], therefore the resource is considered weather sensitive

Determining Weather Sensitivity Adjustment for Capacity Compliance Event

- A CSP selects a CBL model, similar to the one used for economic LM settlements, to estimate what a resource's load would have been absent the event
  - **NOTE**: this model could be the same or different from the results from the hourly regressions used to determine whether the resource is weather sensitive
- Regression data must be from the most recent full seasons (e.g., prior Delivery Year)
- Regression data uses PJM's hourly seasonal normal weather, for each season and for each zone
  - NOTE: PJM will need to prepare this hourly seasonal weather data (similar to PLC but hourly)
- PJM confirms whether CBL model is appropriate based on PJM's RRMSE criteria

Calculating a Weather Sensitivity Adjustment for a Capacity Compliance Event

- A CSP uses the CBL model to estimate the resource's hourly loads for all hours of the capacity compliance event
  - Estimate the loads using event weather
  - Estimate the loads using normal seasonal hourly weather
- The CSP calculates a ratio of estimated loads using normal seasonal weather divided by estimate of load using event weather
  - Separate ratios are calculated for each hour of the capacity compliance event
- The CSP applies this ratio to the actual metered loads for each hour of the capacity compliance event to calculate a weather sensitive adjusted metered load
- Capacity compliance is calculated using this weather sensitive adjusted metered load and the FSL from the resource's capacity registration
- The CSP submits the actual metered hourly loads and the weather sensitive adjusted metered loads to PJM for compliance verification

BGE Weather Sensitive Adjustment Compliance Example

Event Weather, WTHI	Seasonal Normal Weather	Compliance Period, HE	Metered Load, kW	Event Weather CBL, kW	Load Reduction Commitment, kW	PLC, kW	FSL, kW	Legacy Compliance Load Below FSL
			A	*B*	*C*	*D*	*E = (D - C)*	*F = (E - A)*
83.8	82.3	15	3,190	4,160	970	3,967	2,997	(193)
84.9	82.7	16	3,225	4,195	970	3,967	2,997	(228)
84.2	82.6	17	3,650	4,620	970	3,967	2,997	(653)
84.6	82.4	18	3,730	4,700	970	3,967	2,997	(733)

Event Weather, WTHI	Seasonal Normal Weather	Compliance Period, HE		Weather Adjusted CBL, kW	Ratio CBL Adjusted to CBL, kW	Weather Adjusted Metered Load, kW	FSL, kW	Weather Adjusted Compliance Load Below FSL
				G	*H = (G/B)*	*I = (H*A)*	*J = (D - C)*	*K = (E - I)*
83.8	82.3	15		3,590	0.86	2,753	2,997	244
84.9	82.7	16		3,785	0.90	2,909	2,997	88
84.2	82.6	17		4,058	0.88	3,206	2,997	(209)
84.6	82.4	18		4,208	0.90	3,339	2,997	(343)

Addbacks

- Addbacks are calculated to restore a resource's load to what it would have been absent the event
- PJM calculates the addbacks based on the resource's loss-adjusted PLC and the actual metered load
  - If PLC minus metered load > 0, Addback = PLC minus metered load
  - If PLC minus metered load <= 0, Addback = 0
- PJM sends the addbacks to the EDCs for the EDCs to add to the resource's metered load
- Exelon/BGE proposes no change to this process

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