Load Response Programs Measurement and Verification

MIC

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Monitoring Analytics

Load Response Programs

- **All PJM Demand Side Response participation can be grouped into two programs: Economic and Emergency**
- **All participants in the Emergency Program currently are integrated into RPM through the Load Management Program**
- **Load Management products are distinguished by their measurement method:**
  - **Firm Service Level (FSL);**
  - **Guaranteed Load Drop (GLD);**
  - **Direct Load Control (DLC)**

Baseline Methods

- **Participation in the Economic Program and in the GLD option of the Emergency Program rely on a baseline for measurement and verification**
  - **Actual demand is compared to a baseline, or an estimate of what consumption would have been without demand reducing actions**
  - **Load reduction is measured as baseline less actual consumption**

Overview

- **Current baseline protocols are not consistent between PJM Load Response Programs**
- **Emergency Program participants may choose their baseline option.**
- **Some Emergency Program baseline options are less robust, less accurate and more susceptible to gaming than Economic Program baselines**
- **The default Economic Program baseline is inadequate to quantify load reductions and susceptible to gaming**
- **MMU proposes these issues be addressed with an empirical study of baseline methods with recommendations applicable to both programs**

Program Comparison

- **Baseline methods are inconsistent between PJM programs:**
  - **In the Economic Program, there is a default baseline method**
  - **In Load Management there are several options available**
  - **Two of the more subjective Emergency Program baseline methods are not allowed in the Economic Program**
  - **Economic CBL was developed with some consideration of empirical analysis**
  - **No empirical analysis was performed or considered for Emergency protocol**

Program Comparison

Emergency Load Response in Load Management	Economic Load Response
No default, participants chose from 4 options	Default CBL in place
	Alternative CBL developed if LSE/CSP/PJM reach consensus
No empirical analysis used in development of baseline methods	Empirical analysis considered in development of baseline
Mandatory curtailment up to 10 times per delivery year	Voluntary participation
Capacity resource	May be but not necessarily a capacity resource

Emergency Baseline Option Comparison

Option	Daily Observations (n)	Backtest Capable?	Economic Program Eligible?
Comparable Day	1	No	No
Same Day	1	No	No
Standard CBL	4	Yes	Yes
CBL w/ Symmetric Additive	4	Yes	Yes
Regression Analysis	30 - 65	Yes	Yes

Implications

- **If a customer is registered in both programs:**
  - **The measurement of load reducing action will differ if PJM calls an Emergency Event**
  - **Customer may have incentive to not reduce Economically if Emergency event may be called**
- **Both programs are trying to quantify what load would have been, absent any load reducing activities**
- **Baseline methods should be consistent across programs**

Comments on Load Management Protocol

- LM protocol is less empirical than Economic protocol and it does not incorporate findings of the CBL subcommittee
  - Subcommittee recommended average of days close in proximity to reduce bias and eliminate "stale" data
- For example, the comparable day baseline is a single summer day chosen by the participant
- Further, the absence of a default method or criteria for selection enables participants to choose the method that shows the highest load drop

Comments on Economic Program

- **MMU position is that standard CBL in Economic Program, while improved in 2008 and while more robust than LM protocol, is inadequate**
  - **Does not adjust for weather or other variables impacting load**
  - **CBL Subcommittee analysis showed an alternative baseline to be more accurate**
  - **Standard CBL will be biased and can be gamed if settlement is submitted after a period of high load, which was not considered in the CBL analysis**

Comments on Baseline Approaches

- **Two studies conclude regression is most accurate and least biased approach across several customer types (Ernest Orlando Berkeley National Lab; Association of Edison Illuminating Companies)**

- **Several studies also conclude that simple average baselines can be improved with prior period adjustment, consistent with findings of CBL Subcommittee**

- **Objective of both programs should be to adopt the most accurate baseline that can feasibly be implemented**

Pilot Study

- **A pilot study should be conducted by PJM with MMU access to data and stakeholder input to**
  - **Evaluate the accuracy and bias of current and proposed baseline methods for the Economic and Emergency Programs**
  - **Identify any obstacles to implementation**
  - **Identify objective criteria for choice among multiple, accurate baselines**

Pilot Study

- **An effective pilot study will:**
  - **Represent customers of various load types and sizes, including multiple CSPs, LSEs/EDCs**
  - **Analyze baseline method accuracy by customer type, to determine if multiple default methods are necessary**
  - **Quantify accuracy of all current and proposed methods by back-testing model estimates to actual load**

Pilot Study

- **An effective pilot study will:**
  - **Include the following methods: Standard CBL, CBL w/ symmetric additive adjustment, Regression Analysis**
  - **Identify and document significant obstacles or shortcomings associated with implementation of regression analysis**
  - **Provide the data and information necessary for stakeholder input on the most accurate method that can feasibly be implemented**

Regression Analysis

- **Several whitepapers conclude regression is the most accurate approach**
- **Members in LMTF have agreed it is likely the most accurate approach, but have expressed concern that it is not feasible to implement for all customers**
- **However, there has not yet been a formal PJM effort to evaluate feasibility concerns**
  - **CBL Subcommittee did not include regression in evaluation**

Proposal to MIC

- **MMU can and will perform empirical analysis of methods independently, but stakeholder process is preferred**

- **MMU requests that the MIC:**
  - **Modify the LMTF charter to include a requirement to empirically evaluate measurement and verification methods in a pilot study; or**
  - **Establish a new Task Force to address the empirical evaluation of measurement and verification methods for PJM Load Response Programs including Economic and Emergency**

LMTF Charter Draft Language

- **Current Charter:**

  "Load Management Measurement and Verification- clarify applicable Guaranteed Load Drop method and associated calculation"

- **Proposed Change:**

  "Load Management Measurement and Verification- empirically evaluate currently available baseline methods to determine most accurate default method or methods that are feasible, and objective criteria for method selection"

MMU Role

- **MMU is prepared to:**
  - **perform pilot study analysis**
  - **verify results in the proposed pilot study**
  - **verify results in actual baseline method implementation**

- **MMU role is based on tariff responsibilities as the Independent Market Monitor for PJM**

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