Section 10: Overview of the Demand Resource Participation

Welcome to the Overview of the Demand Resource Participation section of the **PJM Manual Energy & Ancillary Services Market Operations**. In this section you will find the following information:

- An overview description of the Demand Resource Participation in the PJM Energy Market (see "Demand Resource Participation").
- A list of the Demand Resource Registration Requirements (see "*Demand Resource Registration Requirements*").
- A list of the Demand Resource Energy Market Participation (see "*Demand Resource Energy Market Participation"*).
- A list of the Demand Resource Metering and Settlement Data Requirements ("*Demand Resource Metering and Settlement Data Requirements"*).

10.1 Overview of Demand Resource Participation

The integration of Demand Response into the PJM Markets recognizes the importance of load response to a fully functioning market as well as the affect of load response on the reliability of the grid. The purpose of these rules is to enable Demand Resources under the direction and control of Curtailment Service Providers to participate in the various PJM markets. Curtailment Service Providers (CSPs) are Members or Special Members of PJM that participate in the PJM Markets by causing Demand Resources to reduce demand.

PJM Emergency Load Response enables Demand Resources that reduce load during emergency conditions to receive payment for those reductions.

- Demand Resources in the Energy Only Option of Emergency Load Response are defined as Demand Resources that receive only an energy payment for reductions.
- Demand Resources in Full Emergency Load Response are defined as Demand Resources that receive both an energy payment for reductions and a capacity payment.
- Demand Resources in Capacity Only Option of Emergency Load Response are defined as Demand Resources that receive only a capacity payment for reduction.

PJM Economic Load Response enables Demand Resources to respond to PJM energy, synchronized reserve, and/or day-ahead scheduling reserve prices by reducing consumption and receiving a payment for the reduction or following PJM signal to reduce or increase load if providing regulation services.

- The **Day-ahead Option** will provide a mechanism by which any qualified market participant may offer Demand Resources the opportunity to reduce the load they draw from the PJM system in advance of real-time operations and receive payments based on day-ahead LMP for the reductions

- The **Real-time Option** will provide a mechanism by which any qualified market participant may offer Demand Resources the opportunity to commit to a reduction and receive payments based on real-time LMP for the reductions.

Energy Settlements shall be limited to demand reductions executed in response to the real-time and/or day-ahead LMP or as dispatched by PJM. Reductions that do not meet these requirements will not be eligible for settlement. Examples of ineligible settlements include, but are not limited to the following:

- Settlements based on variable demand where the timing of the demand reduction supporting the settlement did not change in direct response to the real-time and/or day-ahead LMP
- Consecutive daily settlements that are the result of a change in normal demand patterns that are submitted to maintain a CBL that no longer reflects the relevant end-use customer's demand.
- Settlements based on On-Site Generator data if the On-Site Generation is not supporting demand reductions executed in response to the real-time and/or day-ahead LMP
- Settlements based on demand reductions that are the result of operational changes between multiple end-use customer sites in the PJM footprint except that settlements based on such demand reduction shall be allowed if the demand reduction alleviates congestion.

PJM shall disallow settlements for demand reductions that do not meet the requirements set forth above. If the CSP continues to submit settlements for demand reductions that do not meet the requirements set forth above then PJM shall suspend the CSP's Energy Market activity and refer the matter to the FERC Office of Enforcement.

10.1.1 Economic Load Response Participant Review Process

PJM shall review the participation of a CSP, EDC and/or LSE in the Energy Market under the following circumstances:

- The CSPs registrations are disputed more than 10% of the time by the relevant EDC or LSE.
- The CSP's settlements are disputed more than 10% of the time by the relevant EDC or LSE.
- The CSP's settlements are denied by PJM more than 10% of the time.

PJM shall have 30 days to conduct the required review. PJM may refer the matter to the PJM MMU and/or the FERC Office of Enforcement if the review indicates the relevant CSP and/or EDC or LSE is engaging in activity that is inconsistent with the Economic Load Response rules.

10.2 Demand Resource Registration Requirements

Curtailment Service Providers shall register Demand Resources that choose to participate in the PJM Energy, Capacity, Synchronized Reserve, Day-Ahead Scheduling Reserve or Regulation Market according to the rules and requirements set forth below. A CSP is required to have effective agreement with a customer to register a location.

10.2.1 Registration combinations

One or more CSPs may register the same location (EDC account number) to one or more registrations based on the following conditions:

Scenario	Economic (Energy, SR, DASR, Reg)	Economic (Energy Only)	Economic Regulation Only	Emergency Capacity Only	Emergency Full (Capacity and Energy)	Emergency Energy Only
CSP1	Yes	na	na	No	Yes	No
CSP1	Yes	na	na	Yes	No	Yes
CSP1 CSP2	Yes No	Na na	Na na	No Yes	No No	Yes No
CSP1 CSP2	No No	No Yes	Yes No	No No	No Yes	No No
CSP1 CSP2	No No	Yes No	Yes No	No Yes	No No	Yes No
CSP1 CSP2 CSP3	No No No	No Yes No	Yes No No	No No Yes	No No No	No Yes No

Economic (Energy, SR, DASR, Reg) – registration will allow participation in the energy market and ancillary service market(s) if certified and approved by PJM.

Economic (Energy Only) – an economic registration that only allows participation in the Energy market. This is normally used when 1 economic CSP has an Economic Regulation

Only registration and the second economic CSP has the Economic (Energy Only) registration.

Economic Regulation Only – registration that only allows participation in the regulation market.

Emergency Capacity Only – registration that only allows participation in capacity market as an RPM or FRR capacity resource. If the registration is dispatched for emergency conditions the resource will not receive an energy payment.

Emergency Full (Capacity and Energy) – same as Capacity Only registration but receives emergency energy compensation when dispatched for emergency conditions.

Location that registers with one CSP for Emergency Full can register with second CSP only for Economic Regulation-Only

Location that registers with one CSP for Emergency Capacity Only can register with second CSP for:

- Economic (Energy, SR, DASR, Reg) or;
- Economic (Energy Only) and/or,
- Economic Regulation Only

Location that registers with one CSP for Emergency Capacity Only, and with second CSP for Economic Regulation Only, can also register with third CSP for Economic (Energy Only).

10.2.2 Curtailment Service Providers

The following business rules apply to Curtailment Service Providers:

- Prior to participating in the PJM Markets, Curtailment Service Providers must complete a registration in the appropriate PJM eSuite application which identifies the specific location(s) based on the unique EDC account number that will participate and their associated load reduction capability. Curtailment Service Providers shall maintain the accuracy of the registration information provided to PJM for each demand resource and each time the CSP registers the location or extends the registration, the CSP will review all information to ensure it is reasonably accurate and update as necessary. On a periodic basis, PJM may request supporting information from the CSP to verify that the information provided by the CSP is reasonably accurate.
- In order to register demand resources all specific information as defined in the eLRS User Guide shall be provided including the following:
    - Business Segment - CSPs shall classify locations according to the location's primary purpose or business use. CSP should first determine if the location's business use falls under one of the following primary categories: Hospitals, Industrial / Manufacturing, Office Building, Residential, Retail Service, Correctional Facilities or Schools. In cases where the location does not fit into one of the primary categories the CSP shall select from one of the following

categories: “Agriculture, Forestry and Fishing”, “Mining”, “Transportation, Communications, Electric, Gas and Sanitary Services” or “Services”. A description of each category will be included in the appropriate PJM system user guide.

- Load Reduction Method and associated Capability - The CSPs shall provide for each location the load reduction method and the associated load reduction kilowatts capability. Load reduction methods indicate the type of electrical equipment that will be controlled to provide the demand response activity and include: Heating, Ventilation and Air Conditioning (HVAC), Lighting, Refrigeration, Manufacturing, Water Heaters, Batteries, Plug Load and Generation. In cases, where multiple on-site generators are behind the meter, CSPs should report aggregate load reduction capabilities for all generation units.

A Plug Load represents an electronic device that’s plugged into a socket, which is not already represented by the methods described above. Examples of Plug Load include IT Peripherals, such as large computers, monitors, printers, routers, copiers and scanners or appliances such as washers, dryers or dishwashers.

The CSP shall provide the load reduction kilowatt capability for each method which represents a reasonable estimate of the location’s expected hourly energy load reduction (at the retail meter) that will be performed during a system emergency when wholesale energy prices are high and the resource participates in the wholesale market. The load reduction kilowatts capability may be significantly different than the capacity commitment or the economic energy offered into wholesale market on a daily basis. The load reduction capability should not reflect the entire load for the location unless the location expects to reduce all loads during a PJM emergency when participating in the wholesale capacity and/or energy market. If Generation will be used to reduce all of the load at the location and the location will reduce load with other load reduction methods then the Generation load reduction capability should reflect the expected load after the other load reduction methods have been deployed (this will allow the sum of each load reduction method capability to reflect the total load reduction capability for the location).

The CSP shall report the following generation attributes for each generation unit at the location:

On-Site Generator Type - CSPs shall provide PJM with the type of on-site generation used for load reduction. On-Site Generator types are: Internal Combustion Engine, Combustion Turbines, Steam Engines and Cogeneration units (this also include Central Heat and Power units).

Generator Fuel Type - Locations that use generators, in whole or in part as a load reduction method shall provide PJM with the primary fuel type used for each generator which includes: Coal, Diesel, Natural Gas, Oil, Gasoline, Kerosene, Propane, Wood, Landfill Gases and Waste products. In cases where the on-site generator has a mixed fuel type, CSPs should report on the primary fuel source as the on-site generator fuel type.

Generator Vintage - The year the generator was built (included on nameplate). If you do not know the exact year the CSP should use reasonable estimate.

Generator Retrofit Year - If the generator was retrofit for pollution control equipment please include the year of the retrofit or a reasonable estimate of year if specific year is not available

Nameplate Capacity - MW rated capacity for the generator

Permit Status - The current status of environmental permits for the generator where:

- "Available" - indicates that the CSP represents to PJM that the end-use customer generator has all the Local, State and Federal permits required to operate in the PJM Market as a demand response resource. Unless notified otherwise, the Office of the Interconnection shall deem such representation applies to each time the On-Site Generator is used to reduce demand to participate in the PJM markets and that the On-Site Generator is being operated consistent with all applicable permits.
- "Not Available" - indicates that the CSP represents to PJM that the end-use customer generator does not have the required Local, State and Federal permits required to operate in the PJM Market as a demand response resource. The CSP shall enter a load reduction value of zero, until all required permits become available.
- "Permit Application in Progress" - indicates that the CSP represents to PJM that one or more of the required Local, State and/or Federal permits for the end-use customer generator are pending and are expected to be received prior to the effective date of registration. CSP will terminate the registration, if the on-site generator is the only source for the demand response activity, and update the status if necessary permits are not received prior to such end-use customer generator's registration effective date.
- "Not Applicable" – indicates that the CSP represents to PJM that one or more of the Local, State and/or Federal permits for the end-use customer generator are not required for generator to participate as a demand resource and all other necessary permission from appropriate Local, State and Federal environmental agencies has been received.

- Permit Type – The permit type indicates whether on-site generators can run during emergency or non-emergency conditions.
  - "Emergency Only" – An "Emergency Only" permit type indicates that the on-site Generator has the Local, State and Federal permits required to operate in the PJM Market as a demand response resource during grid emergency conditions.
  - "Non-Emergency" – A "Non-Emergency" permit type indicates that the on-site Generator has the Local, State and Federal permits required to operate in the

PJM Market as a demand response resource during emergency and non-emergency grid conditions.

- Economic ~~and Emergency~~ registration must have the same EDC, LSE, Transmission zone and Pricing point where each location is defined as a unique EDC account number and may be included on the registration subject to aggregation rules in this manual. Emergency registration and Economic Regulation Only registration must have the same EDC and Transmission zone.
- If CSP has Economic Regulation Only registration then Economic registration will only allow same location(s) to participate in energy market ("Economic (Energy Only)" in chart above) and they will not be permitted to participate in the SR or DASR market.
- If CSP has Economic registration with any certified ancillary service (SR, DASR or Reg) then Economic Regulation Only registration may not be submitted.
- Econ Regulation Only CSP must be able to manage regulation for location whether or not the location has been called to provide capacity during an emergency situation or is providing a load reduction as an economic resource in the energy market.
- Economic demand resource registration may be associated with a dispatch group. The dispatch group will allow the Curtailment Service Provider to have one real time or Day-Ahead energy market bid for the entire dispatch group.
- The dispatch group must have the registrations with the same Transmission Zone and energy market pricing point.
- Registrations that participate in ancillary service markets will not be permitted to use a dispatch group unless approved by PJM.
- Registration cannot be in a dispatch group and as a standalone registration. This will ensure that each registration is only available to bid once in the market and avoid duplications.
- Registrations must be confirmed before they may be added to a dispatch group.
- Registration that clears in Day-Ahead market is not allowed to be assigned to dispatch group on same day it cleared in Day-Ahead market. If CSP does try to assign to dispatch group on such day then PJM will remove (because this may create conflict between single registration that cleared in Day-Ahead market and dispatch group that may be dispatched in real time market for same Operating Day).
- The CSP is responsible for ensuring that at least 1 registration is in a dispatch group when bid in the Day-Ahead or Real Time energy market through the appropriate PJM system.
- Demand resources may be registered simultaneously as Economic Load Response Resources and Emergency Load Response Resources.
- Demand resources may switch CSPs. The CSP registering the switching Demand resource shall provide PJM with the registration information of the resource. Registrations may only be submitted when there is an effective contract with the customer for the term and product on the registration. CSP will check their records to ensure they have an effective contract to support the registration and contact

customer as appropriate before they submit the registration. PJM will treat the switching as a new registration. If the current registration is a full emergency registration and the Delivery Year has begun, the new registration will be denied. Both new and current CSPs will be notified by PJM of the switch and will be given 5 business days to affirm they have a valid contract with the end-use customer for the term and product as included on their registration and notify PJM through the appropriate system that the customer has affirmed the contract. After 5 business days, if only one CSP has affirmed their registration in the appropriate PJM system, that CSP's registration will continue and the other registration will be terminated as soon as possible. If both CSPs have affirmed their registration, both registrations will be terminated as soon as possible. In order to accommodate day-ahead load response the switch or termination will become effective at 12:01 a.m. of the third business day after the previous registration is terminated or deemed terminated by PJM. The previous registration will remain active for the sole purpose of settlement of load reductions that occurred before the switch became effective.

- Demand Resource intending to run an On-Site Generator in support of local load represents to PJM that it holds all applicable environmental and use permits for running those generators by submitting a registration. Continuing participation will be deemed as a continuing representation by the owner that each time its On-Site Generator is run it complies with all applicable permits, including any emissions, run-time limit or other constraint on plant operations that may be imposed by such permits.
- To assist CSPs in obtaining the electric usage information of the end-use customer the following Customer Usage Information Authorization form has been developed.

Customer Usage Information Authorization

for PJM Load Response Programs ("Authorization")

_____ , the end-use customer, ("Customer") hereby authorizes _____, and _____, its electric distribution company(ies) ("EDCs"), to release its electric usage information, including hourly or sub-hourly usage history (kWh/kW), EDC loss factors, and peak load contribution assignments for the current delivery year and the upcoming delivery year, if known, to _____, the curtail service provider ("CSP"), which has been or may be retained by Customer to act on its behalf in the PJM Load Response Programs. Customer's EDCs and end-use sites are identified on Attachment A-1 and A-2 hereto, which are incorporated herein by reference.

1. Customer's contact information for purposes of its participation in the PJM Load Response Programs is as follows:

Customer Name: _____

Contact Person: _____

Mailing Address: _____

_____

City State Zip Code

Telephone Number: _____

Fax Number: _____

Contact Person's Email Address: _____

2. Customer hereby advises CSP that it deems the information obtained pursuant to this Authorization to be confidential and therefore requests that such information not be divulged to any third party, except as required to participate in the PJM Load Response Programs.

3. This Authorization shall terminate as follows (mark ONE of the options below):

____ This Authorization shall be perpetual and shall not terminate unless written notice is provided to CSP at least ____ days in advance.

____ This Authorization shall automatically terminate on _____, with no further notice to CSP being required.

4. I understand that termination of this Authorization will not affect any action that CSP took in reliance on this Authorization before it automatically terminated or before CSP received Customer's written notice of termination.

5. The undersigned affirms that he/she has authority to execute this Authorization on behalf of Customer.

IN WITNESS WHEREOF, Customer executes this Authorization to be effective as of the date written below.

Customer: _____

By: _____

Print Name

_____

Title

_____

Signature

_____

Date

ATTACHMENT A–1

LIST OF SITES FOR WHICH EDC, _____, HAS AUTHORIZATION TO PROVIDE ELECTRIC USAGE INFORMATION TO CSP

Account Number(s):

Service Address:

Account Number(s):

Service Address:

Account Number(s):

Service Address:

Account Number(s):

Service Address:

10.2.3 PJM Activities

The following business rules apply to PJM activities:

- PJM will, as necessary, propose or determine an alternative CBL calculation together with supporting analysis. The process for determining an alternative CBL is set forth below.
- PJM will confirm with the appropriate Load Serving Entity (LSE) and Electric Distribution Company (EDC) whether the load reduction is under other contractual obligations. (The EDC and LSE have ten (10) business days to respond or PJM assumes acceptance.)
- Other contractual obligations may not preclude participation, but may require special consideration by PJM such that appropriate settlements are made within the confines of the existing contract.
- PJM will inform the CSP, EDC and LSE of the demand resource's acceptance into the program as appropriate.
- PJM will create LSE negative DEC bids for DR that clears in DA market for dispatch group based on registration DR load reduction capability. PJM will create LSE negative DEC bids for DR that clears in DA market for registrations based on amount that cleared in DA market.

10.2.4 Electric Distribution Company ("EDC") and Load Serving Entity ("LSE") activities

- EDC will have 10 business days to review the all registrations and verify the EDC account number, Zone, Pricing point, Line losses, existence of EDC interval meter if applicable, accuracy of peak load contribution (PLC), and whether or not the customer may or may not participate based on the Relevant Electric Retail Regulatory Authority orders, ordinances or resolutions. If the information provided by the CSP is incorrect the EDC may deny the registration. Once the registration is denied the CSP may correct the inaccurate information and resubmit the registration only to the EDC, as appropriate.
- LSE will have 10 business days to review registrations except the Emergency registration and Economic Regulation Only registration and verify whether or not the customer may or may not participate based on the Relevant Electric Retail Regulatory Authority orders, ordinances or resolutions. LSE will also review registration to determine if the load reductions for the location(s) are subject to an LSE contractual obligation. If the information provided by the CSP is incorrect the LSE may deny the registration. Once the registration is denied the CSP may correct the inaccurate information and resubmit the registration only to the LSE, as appropriate.

10.2.5 CBL Certification Process

- All Economic registrations, except Economic Regulation Only registrations, should go through the CBL certification process to ensure that the CBL used to predict the customer load and therefore determine the quantity of each hourly load reduction is

reasonably accurate and non-biased. All registrations should use a CBL with a relative root mean square error ("RRMSE") no greater than 20% unless otherwise approved by PJM. Registrations with a RRMSE greater than 20% based on hourly load data provided in the registration process are considered variable load customers.

- CBL certification is performed by the CSP prior to registration submission. CSP should always calculate an RRMSE for the standard CBL defined in the tariff. An alternative CBL may be requested if the alternative CBL is more accurate than the standard CBL and has an RRMSE less than or equal to 20%.
- The RRMSE will be based on 60 most recent days of contiguous hourly load data where the most current load data should be 60 days or less than the date the RRMSE is calculated unless otherwise approved by PJM.
- PJM and CSP shall have 30 days from the day the alternative CBL proposal is received by the other party to agree on a proposed alternative CBL calculation. If the parties agree on an alternative CBL calculation, then the agreed upon CBL calculation shall be effective from the date of the registration.
- If PJM and CSP do not agree on an alternative CBL calculation within 30 days, then PJM shall determine the CBL calculation within 20 days of the expiration of the prior 30 day period. The CBL established by PJM shall be binding on the parties unless agreement on an alternative CBL is reached before the end of the 20 day period.
- The process for determining the appropriate CBL shall not delay the registration, provided that the alternative CBL established shall be used for all applicable energy settlements.
- PJM shall periodically publish herein alternative CBL calculations established through this process.
- Relative Root Mean Squared ERROR (RRMSE) calculation is performed as follows unless otherwise approved by PJM:
    - To perform the RRMSE calculation, daily CBL calculations are first performed for the CBL method using hours ending 14 through hours ending 19 unless otherwise approved by PJM as the simulated event hours for each of the 60 non-event days according to the CBL method rules.
    - 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.
    - The Mean Squared Error (MSE) is calculated by summing the squared actual hourly errors and dividing by the number of simulated event hours.
    - The Average Actual Hourly Load is the average of the actual hourly load for each of the simulated event hours.
    - The Relative Root Mean Squared Error (RRMSE) is calculated by taking the square root of the MSE then divide that quantity by the average of the actual load.

10.3 Economic Energy Market Participation

Qualified Curtailment Service Providers may offer the load reductions of demand resources into the Day-ahead and/or Real-time Energy Market pursuant to the PJM Manuals, eMKT User Guide, and the following rules and requirements.

Curtailment Service Provider that would like to participate in the Energy market shall submit a bid for each demand resource (registration or dispatch group) which includes:

- Transmission zone and pricing point based on where the demand resource is located and the associate pricing point used to settle the load in the retail market and as defined by PJM.
- Demand resource market type which determines how the bid will be utilized by the Energy Market:
    - Day-Ahead Market – If hour clears in Day-Ahead market then demand resource should respond with associated MWs. PJM will not dispatch in Real Time for hours that clear in Day-Ahead market.
    - Real Time Market (Balancing) – demand resource should follow the Real Time dispatch signal for the MW that have been dispatched
    - Both:
        - If specific hour clears in Day-Ahead market then demand resource should respond with associated MWs. PJM will not dispatch in Real Time market for hours that clear in Day-Ahead market.
        - If hour does not clear in Day-Ahead market then hour is eligible to be dispatched in Real Time market.
- Incremental Offer curve (minimum increments of 0.1MW) that represents up to 10 combinations of MW load reduction and offer price. This determines the price offered into the Day-Ahead market for respective MW amount in each hour and the price offered for dispatch in the Real Time market.
- Hourly availability which determines the specific hours when the demand resource may be cleared in the Day-Ahead Market and the associated MW volume that is available to clear for each hour. This also determines the specific hours when the demand resource may be dispatched in the Real Time market and the associated MW volume that may be dispatched for each hour.
- Economic Min and Max MW used to determine the dispatch of demand resources in the Real Time Energy Market can be changed up to 3 hours before the operating hour by the CSP. For example, hourly updates for HE 15 which starts at 2pm can be changed up to 10:59am during the same day.
- Shut down costs, for each period. The default will be zero if not submitted. Shutdown cost will be expressed in dollars, and represents the fixed cost associated with

committing a load response resource. Shutdown costs will be changeable only every six months, corresponding to the six-month periods during which price-based start-up costs may be changed for generators. The six month periods for shutdown costs are defined as follows: Period 1 is defined as April 1 – September 30 and Period 2 is defined as October 1 - March 30.

- Minimum down times for which the load reduction must be committed. The default will be zero if not submitted. Minimum down time will be expressed as a number of hours, and represents the minimum number of contiguous hours for which a load response bid must be committed in the Day-ahead Market or dispatched in Real Time Market.
- Load Response bids in the Day-Ahead market or hourly MW availability in the RealTime market should exclude losses (transmission zone losses and share of 500 kV losses). This means bids should be based on expected retail metered load reductions grossed up for line losses.
- Day-Ahead Energy Market bids and associated information must be submitted based on overall Energy Market rules and associated time line as described in this manual.
- Shutdown cost will be expressed in dollars, and represents the fixed cost associated with committing a load response resource.
- Demand resources will be eligible to set Day-Ahead and Real Time Energy market prices if selected as the marginal resource.

10.3.1 Net Benefits Test to determine Net Benefits Threshold

The Net Benefits Threshold is the point on the aggregate supply curve at which the participation of Demand Response Resources results in a greater overall savings to the load on the system compared to the Demand Response Resources remaining on the system as load. PJM shall compute the Net Benefits Threshold monthly as described below. PJM shall post the Net Benefits Threshold and associated supporting information for each month by the 15th of the prior month on pjm.com. CSP will only receive compensation for demand resources cleared in Day-Ahead market or dispatch by PJM in the Real Time market if the applicable LMP is greater than or equal to the monthly NBT.

The Net Benefits Test is executed using the following steps:

Step 1: Retrieve generation offers from the same calendar month of the prior calendar year for which the calculation is being performed. These generation offers will use market-based price offers to the extent available, and cost-based offers to the extent market-based price offers are not available.

Note: To the extent that generation offers are unavailable from historical data due to the addition of a Zone to the PJM Region, PJM shall use the most recent generation offers that best correspond to the characteristics of the calendar month for which the calculation is being performed, provided that at least 30 days of such data is available. If less than 30 days of data is available for a resource or group of resources, such resource[s] shall not be considered in the Net Benefits Test calculation.

Step 2: Adjust a portion of each prior-year offer representing the typical share of fuel costs in energy offers in the PJM Region for changes in fuel prices based on the ratio of the reference month spot price to the study month forward price. To accomplish this adjustment, spot fuel prices for the reference month will be compared to forward prices for the study month. First, the spot prices for representative PJM fuels will be averaged together for the reference month.

For natural gas, the Henry Hub price is used, since natural gas prices tend to move in concert with Henry Hub. For oil, the New York Harbor price for No. 2 fuel oil is used. For coal adjustments, PJM has determined a mix of 20% Powder River Basin, 50% Northern Appalachia, and 30% Central Appalachia coal to be representative of the fuel used by PJM resources. Representative coal prices will be combined in a weighted average to form a representative RTO coal price for the reference month.

Forward prices will be used to determine a similar representative price for the study month. These two values will be used as a ratio. If the representative price from June 2010 was $4.10, and the forward price for June 2011 was $4.51, then the ratio would be 1.1 (prices were up 10%, or June 2011's price is 110% of June 2010's price.)

The offers of generation units will then be adjusted by this scaling factor. The price of fuel typically represents 80 to 90 percent of a generator's offer with the remainder being variable operations and maintenance costs and other uncertainties. As such, 85 percent of each generator's offer will be scaled by the fuel scalar.

Where generators offer multiple points on a curve, each point on the curve is adjusted in this manner.

Step 3: Combine the offers to create daily supply curves for each day in the period.

Step 4: Average the daily curves for each day in the month to form an average supply curve for the study month.

Step 5: Use a non-linear least squares estimation technique to determine an equation that reasonably approximates and smoothes the average supply curve. PJM shall publish the details of the equation and parameters each month along with the Net Benefit Threshold results.

Step 6: Determine the net benefit level as the point at which the price elasticity of supply is equal to 1 for the estimated supply curve equation established in Step 5.

10.4 Demand Resource Metering and Settlement Data Requirements

The settlements submitted to PJM by Curtailment Service Providers must conform to the following requirements for data, including metered data, and Customer Baseline Load (CBL) calculations. All settlement related calculations for economic and emergency demand resources are provided in Manual 28.

10.4.1 Metered Data

- For load reduction that is not metered directly by PJM, Curtailment Service Providers are responsible for forwarding the appropriate meter data (as defined in this Manual) to PJM within 60 days of the reduction. Participants submitting a settlement for an energy payment when load reduction complies with a synchronized reserve event or regulation assignment must use data provided by the load meter. This data shall be forwarded through the appropriate PJM system.
- If the meter data files are not received within 60 days, no payment for participation is provided.
- Load data must be provided for all hours of the day and for all days necessary for PJM to calculate the CBL for settlements or to measure compliance as necessary.
- When on-site generation is used solely to enable the Participant to provide demand reductions then the CSP may provide qualified meter generation output data, upon approval by PJM, from the on-site generation for each hour of the event day instead of actual load metered data. Provision of hourly meter data from the on-site generation will be deemed a certification by the CSP that the on-site generation was not used for any purpose other than to support the load reduction during the event day. If the On-Site Generator is used on a regular basis for normal operations then the CSP may provide qualified meter data from the On-Site Generator for each hour of the event provided the amount of generation run to provide Economic Load Response can be quantified in a manner that is acceptable to PJM. For example, if a 5 MW On-Site Generator that normally provides 3 MW boosts its output to 5 MW in response to LMPs the CSP will be eligible to receive a demand response energy settlement for the additional 2 MW of output.
- Meter data will be forwarded to the EDC and LSE upon receipt, and these parties will then have ten (10) business days to review accuracy and provide feedback to PJM.
- Objection by the EDC or the LSE to the Meter Data shall be clearly set forth in the Comments related to the Settlement Data. The CSP shall correct and re-submit the Settlement Data within 2 business days. The objecting EDC and/or LSE shall have 5 business days to review the re-submitted Settlement Data or PJM will assume acceptance.
- All load reduction data are subject to PJM Market Monitoring Unit audit.

10.4.2 Customer Base Line (CBL)

The following tables list all available CBLs and represent the different parameters used for each calculation. The 3 Day Type with SAA (symmetric additive adjustment) represents the standard, tariff defined CBL which is utilized for most Non-Variable economic demand resources and is set forth in section 3.3A.2 of the PJM tariff. The alternative CBLs on the list have been created over time to provide options, especially for Variable Load customers that have an RRMSE above 20%.

PJM will make available the Customer Baseline (CBL) calculations to the appropriate EDC and LSE for optional review.

The CSP shall inform PJM, of any significant change to the demand resource's operations that increases or decreases the demand resource's CBL. A significant incremental change is defined as any operational or physical change to the demand resource's facilities that will adjust more than half the hours in the demand resource's CBL by at least 20% for more than twenty consecutive days. PJM may require and approve such adjustments to the CBL as are necessary to reflect the significant incremental change.

Parameter/CBLs	3 DayTypes		3 Day Types with SAA (Tariff Default)		3 Day Types with WSA	
DayType	Weekdays,	Sat ,Sun/Hol	Weekdays	Sat,Sun/Hol	Weekdays	Sat, Sun/Hol
Calculation[1]	Average	Average	Average	Average	Average	Average
CBL Basis Window[2]	5	3	5	3	5	3
CBL Basis Window Limit[3]	45	45	45	45	45	45
Start Selection From Days Prior to Event[4]	1	1	1	1	1	1
Exclude Previous Curtailment Days[5]	Y	Y	Y	Y	Y	Y
Exclude Long/Short DST Days[6]	N/A	Y	N/A	Y	N/A	Y
Exclude Avg. Event Period Usage Less than Threshold[7]	25%	25%	25%	25%	25%	25%
Exclude # of Low Usage Days[8]	1	1	1	1	1	1
Use Previous Curtailment if CBL Basis Window incomplete[9]	Yes	Yes	Yes	Yes	Yes	Yes
Use Highest or Recent Previous Curtailment Day[10]	Highest	Highest	Highest	Highest	Highest	Highest
Adjustments[11]	None	None	Symmetric Additive	Symmetric Additive	Weather Sensitive	Weather Sensitive
Allow Negative Adjustments[12]	N/A	N/A	Yes	Yes	Yes	Yes
Adjustments Start (HE0-x)[13]	N/A	N/A	4	4	0	0
Adjustment Basis Hours[14]	N/A	N/A	3	3	Event Hours	Event Hours

Parameter/CBLs	7 DayTypes	7 Day Types with SAA	MBL(Max Base Load)[A]		Metered Generation[B]
DayType	Mon,Tue,Wed,Thu,Fri,Sat, Sun/Hol	Mon,Tue,Wed,Thu,Fri,Sat, Sun/Hol	Weekdays	Sat,Sun/Hol	N/A
Calculation[1]	Average	Average	Average	Average	N/A
CBL Basis Window[2]	3	3	5	3	N/A
CBL Basis Window Limit[3]	60	60	45	45	N/A
Start Selection From Days Prior to Event[4]	1	1	1	1	N/A
Exclude Previous Curtailment Days[5]	Y	Y	Y	Y	N/A
Exclude Long/Short DST Days[6]	Y	Y	N/A	Y	N/A
Exclude Avg. Event Period Usage Less than Threshold[7]	25%	25%	25%	25%	N/A
Exclude # of Low Usage Days[8]	0	0	0	0	N/A
Use Previous Curtailment if CBL Basis Window incomplete[9]	Yes	Yes	Yes	Yes	N/A
Use Highest or Recent Previous Curtailment Day[10]	Highest	Highest	Recent	Recent	N/A
Adjustments[11]	None	Symmetric Additive	None	None	N/A
Allow Negative Adjustments[12]	N/A	Yes	N/A	N/A	N/A
Adjustments Start (HE0-x)[13]	N/A	4	N/A	N/A	N/A
Adjustment Basis Hours[14]	N/A	3	N/A	N/A	N/A

Parameter/CBLs	Same Day (3+2)[D]	Match Day (3 Day Average)[E]
DayType	N/A	N/A
Calculation[1]	Average	Average
CBL Basis Days[2]	N/A	3
CBL Basis Day Limit[3]	N/A	45
Start Selection From Days Prior to Event[4]	N/A	1
Exclude Previous Curtailment Days[5]	N/A	Y
Exclude Long/Short DST Days[6]	N/A	Y
Exclude Avg. Event Period Usage Less than Threshold[7]	N/A	N
Exclude # of Low Usage Days[8]	N/A	0
Use Previous Curtailment if CBL Basis Window incomplete[9]	N/A	Y
Use Highest or Recent Previous Curtailment Day[10]	N/A	Recent
Adjustments[11]	None	None
Allow Negative Adjustments[12]	N/A	N/A
Adjustments Start (HE0-x)[13]	N/A	N/A
Adjustment Basis Hours[14]	N/A	N/A

Notes:

A) MBL(Max Base Load). The MBL CBL for weekdays shall be the average of the daily minimum hourly 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. 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 of the same calendar day: hour prior to event, event hour(s), hour after event, in that order until three hours are attained. Exceptions: use only event hours in same calendar day if start of event is sometime between 9pm and midnight OR if end of event is sometime before 3am.

B) Metered Generation. The use of this methodology must be approved by PJM. Historical data will be required showing that the unit does not normally run or is not normally active. If the data indicates that the unit runs normally, is active, or if the unit is a cogen operation

then another CBL methodology may be required to ensure economic dispatch activity is isolated from normal operations.

D) Same Day (3+2). Average of 3 hours prior to event (after skipping first hour before the event) and 2 hours after the event (after skipping first hour after the event) to determine CBL that will be used for all event hours. If there are multiple non-contiguous events during same day PJM will use earliest 3 hours and last 2 hours from same day. PJM will use hours available on the operating day to calculate the CBL, where at least 3 hours will be used. Resource may not participate in HE 1, 2, 3, 23, 24 to ensure there are enough hours to calculate the CBL. CSP will ensure there is no significant pre-event or post-event change in operations during the operating day that will increase the load in the hours selected for the CBL beyond what would have normally occurred. If the load will be shifted to one of the 3 + 2 hours and therefore significantly increase the CBL, the CSP may not use this CBL for such resource.~~.~~

E) Match Day (3 Day Average). Determine event day non-event hours or "comparison hours". Comparison hours are all hours in operating day except for the hour before the earliest event hour through the hour after the last event hour. For example, if economic DR resource is dispatch HE12 – HE14 and then re-dispatched in HE17-HE20 the comparison hours are HE1- HE10 and HE22-HE24 (13 comparison hours in total). For each non-event day within the CBL Basis Day limit:

(1) Take the difference between each comparison hour from the event day and the same hour in each day in the CBL Basis Day Limit to determine the hourly difference for each comparison hour for each day.

(2) Square all the hourly differences for each day and then sum the squared differences to determine the daily differences.

Select the 3 days from the CBL Basis Day Limit with the smallest daily differences to determine the CBL Days. Average each of the event hours across the three CBL Days to determine the CBL

1) Calculation. Whether to use median or average to calculate the CBL after the CBL Basis Window has been defined and high and low usage days have been excluded.

2) CBL Basis Days. This is the set of days that will serve as representative of end-use customer's typical usage. If the number of days specified is 5, then after all exclusions (e.g.: before excluding event days and Low Usage Days), the set will contain 5 days.

3) CBL Basis Day Limit. Limit on number of historical calendar days used to select the CBL Basis Days (e.g.: If 45 this means CBL days must be selected from prior 45 calendar days). This ensures recent information is used to predict future consumption.

4) Start Selection from Days before Event Day. Determines most recent historic CBL day to select (e.g. if 1 then select most recent day with same daytype, if 2 then skip most recent day with same daytype and select next day with same daytype).

5) Exclude Previous Curtailment Days. If this is set to “Y”, exclude all previous curtailment days. Previous Curtailment Days are previous economic settlements days that include at least 1 hour in pending or confirmed status.

6) Exclude Long/Short DST Days. If this is set to "Y", then any long/short DST day is excluded from the CBL Basis Window.

7) Exclude Avg. Daily Event Period Usage Less than Threshold. If the Average Daily Event Period Usage for the CBL day selected is less than the threshold indicated, then that day will be excluded from the CBL Basis Window.

8) Exclude # of Low Usage Days. If the CBL Basis Days is set to 5 and this switch is set to 1, then the 1 day with the lowest Average Daily Event Period Usage will be excluded from the CBL calculation.

9) Use Previous Curtailment Day if CBL Incomplete. If this is set to “Y”, and if the CBL is unable to attain the minimum number of days required to calculate the CBL, then Previous Curtailment Days will be used as CBL Basis Days until such minimum is attained. If this is set to “Y”, then Exclude Previous Curtailment Days must also be set to “Y”.

10) Use Highest or Recent Previous Curtailment Day. Required if the Use Previous Curtailment Day if CBL Incomplete is set to “Y”. "Highest" means that the model will rank Previous Curtailment Days based on event period usage within the CBL Basis Day Limit and add them to the CBL Basis Days in descending order until the CBL Basis Days contains the minimum number of days required to calculate CBL. "Recent" means that the model will start adding days to the CBL Basis Days starting with the Most Recent Curtailment Day that was excluded until the CBL Basis Days contains the minimum number of days required to calculate CBL.

11) Adjustments. Symmetric Additive Adjustment is CBL average usage for Event Day divided by Adjustment Basis Hours for same hours. Weather Sensitivity Adjustment compares difference is average weather over CBL days to weather on event day and then calculates adjustment based on weather sensitivity as described in this manual.

12) Allow Negative Adjustments. If this is set to “Y”, then the Adjustments may be positive or negative. Otherwise, Adjustments will always be greater than zero.

13) Adjustment Start (HE0-x). The starting point for the hour(s) to be used in calculating the Adjustments. If the event starts with HE13 and Adjustment Start is 4, then HE9 will be the first hour used to calculate Adjustments.

14) Adjustment Basis Hours. Determines total number of hours to use in the adjustment from the Adjustment Start. If the event is on HE13, Adjustment Start is 4, and Adjustment Basis Hours is 3, then the adjustment will be based on the load from HE9-HE11.

Weather Sensitive Adjustment

The WSA Factor Method adjusts the hourly CBL (up or down) to compensate for the average hourly temperature differences between the CBL basis days and the temperature of the event hour.

The WSA Factor represents the kW change in load for each degree of temperature change within a specified temperature range. The WSA factor is the slope of the line that describes the load and temperature relationship at the customer site between two temperature set points. The WSA Factor or slope of the line is obtained by performing a linear or piecewise linear regression analysis on the load and temperature data from the customer site. There should be at least two years of data used in the linear regression analysis to indicate the normal operation of the facility. Exceptions may be granted by PJM to use less data in cases where the normal operations have changed significantly between years. The analysis data should only include the day types and hours where load reductions are expected. For example, if the customer is only expected to respond during the hours of 8am to 6pm from Monday through Friday during non-holidays, then such historic hours should be used in the regression model.

The hourly CBL Adjustment is obtained by multiplying the WSA Factor by the temperature of the event hour minus the hourly average temperature of the CBL. The hourly average temperature of the CBL is the hourly average of the basis days used for the CBL.

Example 1:

Hourly average temperature of the CBL for hour ending 12 = 86°

Event temperature for Hour Ending 12 = 81°

WSA Factor = 688 kW/°F

CBL Adjustment for Hour Ending 12 = Temperature Delta * WSA Factor = (81° - 86°) * 688 kW/°F = -3440 kW

The CBL is adjusted down because the temperature of the event day is lower than the average hourly temperature of the CBL basis days.

A simple linear regression analysis fits a straight line through the set of points (load and temperature data) in such a way that makes the sum of squared residuals as small as possible. The first and last points of the estimated line are known as the Temperature Set Points. The Slope of the line between the two Temperature Set points is the WSA factor.

A piecewise linear regression analysis fits multiple contiguous straight lines through the set of data points (load and temperature data) in such a way that makes each of the sum of

squared residuals as small as possible. The piecewise linear regression analysis results in multiple lines with multiple slopes that estimate the load and temperature relationship of the customer site data. The end points of each of the estimated lines are known as the Temperature Set Points. Determining the number Temperature Set Points can be accomplished by using a Piecewise Linear Regression Break Point algorithm or by data observation at points where the slope of the data appears to change significantly. Either methodology should result in minimizing the sum of squared residuals for each of the estimated lines.

The following table represents the weather station used for each Transmission Zone

Zone	Weather Station Short Name	Weather Station
AECO	ACY	Atlantic City International
AEP	CMH	Port Columbus International
APS	PIT	Pittsburgh International
ATSI	CAK	Akron Canton International
BGE	BWI	Baltimore Washington International
COMED	ORD	Chicago O'Hare International
DAY	DAY	Cox-Dayton International
DEOK	CVG	Cincinnati/Northern Kentucky International
DOM	RIC	Richmond International
DPL	PHL	Philadelphia International
DUQ	PIT	Pittsburgh International
EKPC	SDF	Louisville International-Standiford
JCPL	EWR	Newark International
METED	PHL	Philadelphia International
PECO	PHL	Philadelphia International
PENELEC	JST	Johnstown Airport
PEPCO	DCA	Washington Reagan National
PPL	ABE	Allentown Lehigh Valley International
PSEG	EWR	Newark International
RECO	EWR	Newark International

10.4.3 Economic Energy Settlements

The CSP is responsible for providing all necessary information for each EDC account number unless otherwise approved by PJM for settlement and compliance calculations. 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 and in accordance with Manual 28.

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.

All Registrations or dispatch groups are eligible for Make Whole payments subject to performance. Make Whole is hourly and based on lesser of bid volume and actual volume delivered:

- Make whole is only eligible for hour if load reductions is within +/- 20% of dispatch amount
- Make whole compensation is based on bid if bid => NBT
- Shutdown cost will not be paid if any hour in segment is outside 20% volume deviation
- Shutdown cost is paid once for all contiguous hours
- Segment make whole is sum of hourly make whole (i.e.: negative make whole will offset positive make whole)

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.

DR resources may submit bids that are less than the Net Benefits price but will only be paid if appropriate LMP is greater than or equal to NBT.

All settlements that are not submitted within 60 days of the economic event will settled by PJM with 0 kW hourly reductions. BOR will be assessed based on the deviations of the stand alone settlement or Dispatch Group settlement.

All settlements that are still pending, denied or withdrawn after 75 days from the economic event will be settled by PJM with 0 kW hourly reductions. BOR will be assessed based on the deviations of the registration settlement or Dispatch Group settlement, as appropriate.

Dispatch Group Settlements

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

- The CBL needs to be calculated in order to calculate the reductions for the individual registrations.
- The Dispatch Group economic event will be de-aggregated to the registration level settlements based on the registrations in the Dispatch Group early in morning the

day after the operating day. The individual settlements are submitted by the CSP based on the normal registration level settlement process.

- The total reduction for the Dispatch Group is calculated once a day as the sum of all the reductions of the settlements. Once all of the settlements in the Dispatch Group reach their final state, the Dispatch Group load reduction is settled.
- The final state for a Dispatch Group economic settlement is achieved when all of the individual settlements within the Dispatch Group achieve the following status:
  - All settlements in Dispatch Group are confirmed.
  - Prior to the 60th day after the event, the CSP may mark the Dispatch Group ready for settlement. No further updates to any settlements may be done in the Dispatch Group.
  - On the 61st day after the event and all settlements are either confirmed, withdrawn or expired.
  - The 75th day after the event has been reached, the Dispatch Group settlement will be sent to settlements regardless of the individual status of any settlements in the group
- Dispatch Groups that are cleared or dispatched will be evaluated at the Dispatch Group level when evaluating BOR. Deviations and BOR will be assessed based on the reduction of the Dispatch Group.
- Market Settlements will provide settlement report based on Dispatch Group(s) and not by registrations.

10.4.4 Economic Energy Settlements 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 where zonal LMP is greater or equal to the appropriate Net Benefits Price and as described in Manual 28.

10.4.5 Emergency Energy Settlements

The CSP is responsible for providing all necessary information for each EDC account number unless otherwise approved by PJM for energy settlement. Locations with approved economic registration prior to emergency energy settlement submission will use the associated economic CBL to determine the energy load reduction subject to the following:

- A registration that is already responding to a PJM economic event where the economic CBL is based on SAA will use a SAA period prior to economic and emergency event.
- Locations that do not have an approved economic registration prior to submission of emergency energy settlement by the CSP will use the measured load the hour before the load reduction ("hour before CBL") as the CBL to determine the energy load reduction.
- Locations on economic registrations dispatched in the real time energy market or cleared in Day-Ahead energy market that are also included on an emergency full

registration and have been dispatched as part of an emergency event for the same hour ("overlapping dispatch hour") will be compensated for energy based on emergency energy settlement and cost allocation rules as outlined in this section, and PJM manuals. Overlapping dispatch hours will use shutdown cost-based on what was considered for the economic event and no balancing operating reserve charges will be assessed for deviations from real time dispatch amount or from cleared Day-Ahead amount. Overlapping dispatch hours for aggregate registrations (multiple locations on same registration) or Dispatch Groups where locations on emergency registration are not the same as locations on the economic registration will have hourly economic energy load reduction with associated cleared Day-Ahead or real time dispatch amount and/or hourly emergency energy load reduction prorated based on load reduction capability provided by the Curtailment Service Provider for the location to avoid duplicative energy payment and appropriate balancing operating reserve charges, as applicable.

10.4.6 Emergency Energy Settlements Cost Allocation

- See Manual 28, section 10.2 for cost allocation rules.

10.5 Aggregation for Economic and Emergency Demand Resources

The purpose for aggregation is to allow the participation of end-use customers in the energy market that can provide less than 100 kW of demand response when they currently have no alternative opportunity to participate on an individual basis or can provide less than 100 kw of demand response in the day-ahead scheduling reserve (DASR), synchronized reserve (SR) or regulation (REG) markets when they currently have no alternative opportunity to participate on an individual basis. An aggregation shall meet the following requirements:

- If the aggregation will only provide energy to the market then only 1 end use customer within the aggregation shall have the ability to reduce more than 99kw of load unless the CSP, LSE and PJM approve. If the aggregation will provide a DASR or SR to the market then only 1 end use customer within the aggregation shall have the ability to reduce more than 99kw of load unless the CSP, LSE and PJM approve. If the aggregation will provide Regulation Only through and Economic Regulation Only registration to the market then only 1 end use customer within the aggregation shall have the ability to reduce more than 99kw of load unless the CSP and PJM approve.
- All end-use customers in an aggregation, except for an Emergency registration and Economic Regulation Only registration shall be served by the same electric distribution company and Load Serving Entity (LSE) and have the same energy pricing point. All end use customers in an Emergency registration and Economic Regulation Only registration shall be served by the same electric distribution company and located in the same transmission zone. If the aggregation will provide synchronized reserves, all customers in the aggregation must also be part of the same synchronized reserve sub-zone.
- All end-use customers in an aggregation that settle at Transmission Zone, existing load Aggregate, or node prices shall be located in the same Transmission Zone,

existing load Aggregate, or at the same node except for an Economic Regulation Only registration.

- Each end-use customer site must meet the requirements for market participation by a demand resource except for the 100 kW minimum load reduction requirement for energy and ancillary services.
- An end use customer's participation in the energy and ancillary service markets shall be administered either under one economic registration or if only providing Regulation service then with and Economic Regulation Only registration and an Economic (Energy Only registration) as outlined in this manual.

10.5.1 Calculations for the weighted average line loss factor

- When all end-use customers in a Registration are not subject to the same line loss factor, the factor for the Registration shall be the registration load reduction weighted average of the factors for end-use customers in an aggregation.
- PJM shall calculate the Ratio Share for each end-use customer as the percentage share of the summation of the individual anticipated load reduction capabilities (Total kW).
- PJM shall calculate the Weighted Average line loss factor (WA LF) by multiplying the Ratio Share times the loss factor (LF) for each end-use customer and totalizing the results. The WA LF shall represent the loss factor of the Registration.
- PJM shall provide the calculation of all load weighted values and their supporting data to the LSE and CSP at the time of registration.

Customer	1	2	3	Total
kW	32.02	22.46	50.91	105.38
Ratio Share	30.38%	21.31%	48.31%	100.00%
G&T	$ 0.0500	$ 0.0660	$ 0.0890	
LF	1.0680	1.0790	1.0900	
WA G&T	$ 0.0152	$ 0.0141	$ 0.0430	$ 0.0722
WA LF	0.32448	0.22995	0.52654	1.08097

10.5.2 Settlement for Aggregation

All end-use customers in the Registration are considered to have individually participated in each curtailment event if cleared in Day-Ahead market or dispatched by PJM in Real Time market for the Registration. All supporting details as outlined below will be available to the LSE after the settlement is submitted by the CSP.

- Registration Customer Baseline (CBL) based on the sum of the each end use customer's meter data where each end use customer is defined as a unique EDC account number.
- Meter data for each end use customer in the aggregation.