

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 or Pre-Emergency Capacity Only	Emergency or Pre-Emergency Full (Capacity and Energy)	Emergency Energy Only
CSP1	Yes	No	No	No	Yes	No
CSP1	Yes	No	No	Yes	No	Yes
CSP1	Yes	No	No	No	No	Yes
CSP2	No	No	No	Yes	No	No
CSP1	No	No	Yes	No	No	No
CSP2	No	Yes	No	No	Yes	No
CSP1	No	Yes	Yes	No	No	Yes
CSP2	No	No	No	Yes	No	No
CSP1	No	No	Yes	No	No	No
CSP2	No	Yes	No	No	No	Yes
CSP3	No	No	No	Yes	No	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. Only resources that rely on on-site generation to fulfill its load reduction obligations and have environmental restrictions as defined and required by applicable local, state or federal law, ordinances and regulations, on when it can operate

such that it is only permitted to operate if PJM is in emergency conditions may register as Emergency Capacity Only resource.

Pre-Emergency Capacity Only – registration that only allows participation in capacity market as an RPM or FRR capacity resource. If the registration is dispatched for Pre-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. . Only resources that rely on on-site generation to fulfill its load reduction obligations and have environmental restrictions on when it can operate such that it is only permitted to operate if PJM is in emergency conditions may register as Emergency Full resource.

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

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

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

A single location may only register as either Pre-Emergency or Emergency resource for the Delivery Year.

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 DR Hub User Guide shall be provided including the following:
 - o 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.
- o 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. Only locations with on-site generation that will be used to provide the load reduction and have environmental restrictions as defined and required by applicable local, state or federal law, ordinances and regulations that require emergency conditions to operate may qualify as an Emergency Demand Resource.

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:
 - o "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. This also indicates that such location may qualify as Emergency resource instead of being a Pre-Emergency resource.
 - o "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.

Interconnection Type – The CSP will indicate if the generator is interconnected to allow injections onto the transmission and distribution system. The CSP will designate as: "none", "ISA", "WMPA", "NEM", "PURPA QF" or other category as necessary. If ISA, WMPA, or PURPA QF then CSP will also provide the appropriate PJM reference to the generator and the associated amount of injection rights.

- Economic 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 registrations, Economic Regulation Only registrations, and Economic registrations for Residential customers that do not participate in the Day-Ahead Market 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 or pre-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 or Pre-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 or full Pre-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 0001 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.
- CSPs with an On-Site Generator with interconnection rights to participate in the wholesale markets with injections onto the grid through an ISA or WMPA shall:
 - o inform PJM that the On-Site Generator will participate as DR to offset load through existing DR market rules and participate as generation resource with injections as defined by generation market rules.
 - o Install and maintain telemetry at the point of interconnection and the On-Site Generator, and as outlined in Manual 14D.
 - o Request CBL review if generator will participate as an Economic DR resource in the energy market. This is to ensure the load reductions from the On-Site Generator can be quantified separately from generator injections onto the grid. Load reductions done in order to inject power onto the grid are considered part of normal operations and therefore not eligible for Economic DR settlements.
 - o Manage the DR offers to reduce load and/or Generation offers to inject power in the wholesale markets based on the actual generator capability. CSP will make sure that the total offer amount for the modelled resources will not exceed the capability for the generator. All regulation offers will be made through the DR modelled resource or as otherwise approved by PJM.
- To assist CSPs in obtaining the electric usage information of the end-use customer the following Customer Usage Information Authorization form has been developed.
- A Curtailment Service Provider shall not submit a request to be an Emergency resource (instead of Pre-Emergency) unless it has done its due diligence to confirm that the Demand Resource meets the requirements and has obtained from the end-use customer documentation supporting the exception request. The Curtailment Service Provider shall provide the Office of the Interconnection with a copy of such supporting documentation within three (3) business days of a request therefor. Failure to provide such supporting

documentation by the deadline shall result in the Demand Resource being classified as a Pre-Emergency resource.



**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.