

# **On-Site Generator (DER) participation as Economic DR resource**

- CSP must accurately complete DR Hub information (see following slides) for On-Site Generator
  - This information is captured for each location before it is registered as Economic DR or Emergency/Pre-emergency DR
  - Only load reductions from generator output that would not have otherwise been operating are eligible for Economic DR energy settlements.
- CSP may only submit registration if CSP has all appropriate environmental permits. By virtue of submitting a registration, CSP represents that CSP has validated that customer has all appropriate environmental permits.
  - Necessary permits must be in place before effective date on registration – if the CSP has not received the necessary permits prior to indicated effective date, then CSP must terminate such registration before effective date.

RRMSE score below 20% does not mean location may participate

	DR Source	Example	Permitted Participation as Economic DR energy Resource
1.	Generation	On-site backup generation – does not run except for emergency to supply power or for normal routine testing. Historic output shows only used during routine test .	Yes. Normal operational generator test do not qualify. Only time test would qualify is if test is NOT scheduled and then unit is used to support RT or DA instructions.
2.	Generation	Cogen/CH&P (Central Heat and Power). Unit runs as part of normal production process and output will remain comparable whether or not there is participation in PJM economic DR .	No.
3.	Generation	Cogen/CH&P or unit that operates historically to reduce electricity cost but will operate for more hours or higher MW per hour because of PJM economic DR revenue.	Maybe – can only participate if PJM can quantify the incremental load reductions.
4.	Generation	Cogen/CH&P or unit that operates to shaves peak each month.	No unless there is incremental MW or MWh that will occur.
5.	Generation	Unit(s) that have interconnection agreement (ISA/WMPA) to inject power.	Maybe – must also consider whether or not unit would operate just for injection.

- PJM will need to evaluate each registration to determine if feasible to quantify incremental output.
- CSPs must accurately designate Load Reduction method and associated Generator parameters in DR Hub:
  - Back up only = Yes, generator has not run historically and will only run if PJM dispatches or clears in the market.
  - Back up only = No, generator does typically operate and therefore PJM needs to determine if incremental output because of Economic DR energy revenue can be quantified.
    - CSP should send PJM 1 year historic generation output and associated marginal costs
    - CSP may propose method to quantify incremental output.
    - Historic on-site generation output variability will determine if incremental output is predictable.



# Process to administer On-Site Generation PJM approval

Click "i" button to input Generator attributes

**Load Reduction Method**

Manufacturing (kW)	<input type="text" value="0.000"/>	HVAC (kW)	<input type="text" value="0.000"/>	Generator (kW)	<input type="text" value="0.00"/>	Number of Generators	<input type="text" value=""/>	<input type="button" value="i"/>	Batteries (kW)	<input type="text" value=""/>	<input type="button" value="i"/>
Lighting (kW)	<input type="text" value="0.000"/>	Water Heaters (kW)	<input type="text" value="0.000"/>	Refrigeration (kW)	<input type="text" value="0.000"/>	Plug Load (kW)	<input type="text" value="0.000"/>				

Select "Add Generator" button

**Generator Attributes**

Actions	ID	Name	Non-Retail BTMG	Max Output (kW)	Nameplate (kW)	Backup Generator Only	Generator Type	Fuel Type	Vintage	Retrofit Year	Permit Status	Permit Type	EIA 860 Plant Code	EIA 860 Generator ID	Note
No records found.															

# Process to administer On-Site Generator PJM approval

- Fill out Generator Dialog box, especially note the 'Backup Generator Only' selection:

Add Generator

Name \* TestGen1

Non-Retail BTMG \* No

Max Output (kW) \* 500.000

Nameplate (kW) 500.000

Backup Generator Only \* Select One

Generator Type \* Internal Combustion Engine

Fuel Type \* Diesel

Vintage \* 2017

Retrofit Year Select Year

Permit Status \* Available

Permit Type \* Non Emergency

EIA 860 Plant Code

EIA 860 Generator ID

Note

500 characters remaining

Save Cancel

- Select 'Yes' for 'PJM Only' generator, or 'No' for 'Incremental' generator – then click Save:

Add Generator

Name \* TestGen1

Non-Retail BTMG \* No

Max Output (kW) \* 500.000

Nameplate (kW) 500.000

Backup Generator Only \* Select One

Generator Type \* Internal Combustion Engine

Fuel Type \* Diesel

Vintage \* 2017

Retrofit Year Select Year

Permit Status \* Available

Permit Type \* Non Emergency

EIA 860 Plant Code

EIA 860 Generator ID

Note

500 characters remaining

Save Cancel

Yes = PJM Only  
No = Incremental



# DER with injection capability registration process requirements

## Load reductions operate as a DR, Injections operate as a generator

- At the time of registration CSP will notify PJM 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.
- If the existing (registered) DR generator gets interconnected, the CSP will notify PJM as soon as possible and will request CBL review if generator will participate as an Economic DR resource in the energy market
  - Load reductions done in order to inject power onto the grid are typically (but not always) considered part of normal operations and therefore not eligible for Economic DR settlements
- If On-Site Generator has ISA, WMPA then CSP will also provide:
  - the PJM reference to the generator and the amount of injection rights;
  - Ensure appropriate telemetry is in place at the point of interconnection and the On-Site Generator, and as outlined in Manual 14D;
  - 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.
    - Technically, 2 different members may manage but this requires close coordination.

Currently CSP should use [dsr\\_ops@pjm.com](mailto:dsr_ops@pjm.com) email to notify PJM of above.  
PJM will add new fields in DRHUB to capture this information in the future.



# Process to administer On-Site Generator PJM approval

- DR Hub | Registration
  - CSP to Select CBL and conduct RRMSE test
  - If On-Site Generator will be solely used for economic DR and would not have otherwise operated then it can participate as economic (you do not need to do anything else)
  - For “Incremental Generator” (Backup Only = No, in DR Hub), CSP must Submit CBL review (even if CBL passes RRMSE test)
    - Select “Other” for reason and include comment **“On-Site Generator = Incremental Generation ”**
    - CSP should email [dsm\\_ops@pjm.com](mailto:dsm_ops@pjm.com) 1 year of historic generator output and marginal cost for unit. Please see following slides for details.
    - If multiple generators, we will need to discuss best way to provide the historic data
  - PJM will review the registration and approve if incremental load reductions can be quantified, otherwise registration will be denied

Please email [dsm\\_ops@pjm.com](mailto:dsm_ops@pjm.com) if you have questions or would like to discuss associated details.





# Incremental Generator supporting information

## Simple example

RegID	Date	HE	Gen Ouput (MW)	A Fuel Cost (\$/mwh)	B Maintenance Adder (\$/mwh)	A+B Cost (\$/mwh)
R410098	11/1/2011	1	-	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	2	-	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	3	-	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	4	-	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	5	-	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	6	-	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	7	-	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	8	-	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	9	-	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	10	3.200	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	11	3.200	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	12	4.000	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	13	4.000	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	14	5.200	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	15	5.200	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	16	5.200	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	17	5.200	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	18	5.200	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	19	5.200	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	20	4.000	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	21	4.000	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	22	3.200	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	23	-	\$49.00	\$2.00	\$51.00
R410098	11/1/2011	24	-	\$49.00	\$2.00	\$51.00



# Incremental Generator supporting information CHP example

For CHP, 2 cost points are required.

Cost to run CHP with heat utilization is intended to show cost when the heat produced by the unit is being utilized for a facility needs.

Cost to ramp up CHP with heat wasted is intended to show cost of running the unit at higher output after heating needs are satisfied and excess steam is being wasted.

PJM/CSP will need to work through all the details based on the application

regID	Date	HE	Gen Output MW	Cost to run CHP with heat utilization	Cost to run CHP with heat wasted
123456	8/1/2018	1	3	\$ 30.00	\$ 90.00
123456	8/1/2018	2	3	\$ 30.00	\$ 90.00
123456	8/1/2018	3	3	\$ 30.00	\$ 90.00
123456	8/1/2018	4	3	\$ 30.00	\$ 90.00
123456	8/1/2018	5	3	\$ 30.00	\$ 90.00
123456	8/1/2018	6	3	\$ 30.00	\$ 90.00
123456	8/1/2018	7	3	\$ 30.00	\$ 90.00
123456	8/1/2018	8	4	\$ 30.00	\$ 90.00
123456	8/1/2018	9	5	\$ 30.00	\$ 90.00
123456	8/1/2018	10	5	\$ 30.00	\$ 90.00
123456	8/1/2018	11	5	\$ 30.00	\$ 90.00
123456	8/1/2018	12	5	\$ 30.00	\$ 90.00
123456	8/1/2018	13	5	\$ 30.00	\$ 90.00
123456	8/1/2018	14	5	\$ 30.00	\$ 90.00
123456	8/1/2018	15	4	\$ 30.00	\$ 90.00
123456	8/1/2018	16	3	\$ 30.00	\$ 90.00
123456	8/1/2018	17	3	\$ 30.00	\$ 90.00
123456	8/1/2018	18	3	\$ 30.00	\$ 90.00
123456	8/1/2018	19	3	\$ 30.00	\$ 90.00
123456	8/1/2018	20	3	\$ 30.00	\$ 90.00
123456	8/1/2018	21	3	\$ 30.00	\$ 90.00
123456	8/1/2018	22	3	\$ 30.00	\$ 90.00
123456	8/1/2018	23	3	\$ 30.00	\$ 90.00
123456	8/1/2018	24	3	\$ 30.00	\$ 90.00

## How to determine incremental output for On-Site Generator

- Simple – wholesale price (LMP) < marginal cost, only reason generator operates is because of Economic DR wholesale market revenue
- Cogen – need to evaluate based on steam needs, stand alone boiler capability, etc. Quantify marginal cost when steam used for facility vs marginal cost when steam is not used.
  - Eligible for additional MWs between 2 cost points (\$30 <>\$90 on prior slide)
- Generator with injection rights (WMPA, ISA) – Typically, only eligible for Economic DR energy revenue in hours when generator does not inject power unless:
  - PJM and CSP finalize below before PJM will consider Economic DR settlements in same hour as injection
  - Required gen revenue (Total Gen output \* marginal cost) – Gen Export Revenue (Gen Export output \* LMP) – implied retail savings (Gen load reduction MWs \* retail rate) < \$0
    - If Generator is also a Capacity Resource (“front of the meter”) for injection and is dispatched by PJM then Economic DR is not eligible for same interval.
- Retail Price includes all avoided retail cost (generation, transmission, distribution, based on energy and/or demand type charges)
  - Will consider use of retail price (instead of wholesale price), for Simple and Cogen described above if it can be accurately quantified.



# DER with injection capability offer process

## Day Ahead Market

1. Generator is offered to DA Market for Injection as a Unit (required if has Capacity Resource commitment or optional otherwise).
2. Generator is offered to DA Market for load reduction as DR (optional)
3. If Unit's DA offer is cleared then the Economic DR resource will not be settled for same hours or incur BOR. CSP must notify PJM of this situation and then PJM will ensure there is no settlement for such time period. If Unit's DA offer did not clear then cleared Economic DR resource will be settled.

## Real Time Market

1. If Unit cleared in DA market, then wait for PJM dispatch of gen unit. No Economic DR activity (DA or RT) for the same hours.
2. If Unit did not clear in DA market, and Economic DR did clear in DA market then perform the load reduction in RT market. Typically (but not always), Economic DR settlements are not eligible if generator exports in RT market as a Unit in the same hour.
3. If Unit resource did not clear in DA market, and Economic DR did not clear in DA market than Economic DR settlement are eligible when dispatched by PJM and typically when the generator is not dispatched in RT market as a Unit in the same hour.

# DER with injection capability - Example

Generator nameplate	10MW
Load	4MW

Cost to run generator	\$50/MW
Retail rate	\$45/MW
NBT	\$23.99

