Grid Integrated Resources

An approach for market integration of DERs co-located with retail loads

DERSTF

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Scope and Goals

- This proposal addresses market rules for retail customers who are capable of injecting power.
- Overarching goal is integration of injection and load-modification abilities into a single resource.
- Covers energy and A/S. Capacity is presented to further discussion.
- Expanded version of Icetec August 2017 proposal.

Scope and Approach

- This presentation does not address interconnection. It begins with a site that has an approved interconnection. Nothing in this presentation should be read as allowing a site to exceed the conditions of that interconnection.
- Proposal aims for as much consistency as possible with existing PJM rules.
  - Avoids need to revisit market rules that have been developed for other resource types.
  - Reduces risk of different treatment for similar resources.

Motivation

Our goal is that advanced energy consumers using multiple strategies to manage energy costs can participate in markets without unnecessary administrative barriers.

- Many sites that host DERs also actively manage load.
- For DERs co-located with load, load variability affects injections.
  - Energy injected can vary minute-to-minute based on load, even for a constant DER output.
  - DERs will typically offset load in the summer but inject in the winter. CP rules make it very difficult for these resources to qualify as an annual capacity resource, despite their year-round capability.
- Breaking sites into multiple separate resources unnecessarily complicates offers and M&V.
- Realizing capability currently left on the table should not require giving up existing capacity.
- Rules should handle novel site configurations or innovative energy management approaches without extensive special-case provisions.

Definitions

DER refers to individual energy assets, e.g., CHP, batteries, solar.

A **Grid Integrated Resource (GIR)** is the total integrated capability behind a single EDC account, possibly including multiple DERs and load management capability.

Market Participation Overview

A GIR is treated as a single resource for market purposes.

- Capacity commitments, energy offers, and A/S offers are made on behalf of the entire GIR.
- Injections are measured as a generator.
- Load offsets are measured as demand response.
- Delivered product is the sum of the injection and load offset components.
- Only envisioned exception is for frequency regulation.

Metering

- GIRs are metered at the retail metering point (or points, for submetered EDC accounts)
- GIRs will at a minimum meet PJM metering requirements. Differences between PJM and EDC requirements will be resolved during interconnection and are not discussed here.
- PJM metering requirements follow existing rules:
  - Manual 1 Section 5 and Manual 14D Section 4.2.2 – 4.2.3 requirements apply. Where rules reference a unit size, requirements will be based on the amount approved for injection in the interconnection agreement.
  - Stricter of generator rules based on injection rights or DR rules apply.
  - Generally, telemetry is required for GIRs injecting 10MW or more and all capacity GIRs that have CIRs or Winter CIRs. PJM may make exceptions to telemetry requirements just as they currently may for generators.

Energy Cost Based Offers

- GIRs shall submit cost policies.
- At a minimum, such policies will identify load modification and DER energy offer segments—e.g., site has 2MW of load modification and 3MW of dispatchable CHP generation.
- If no further information is provided, default cost based offer caps shall be:
  - DER segments may only offer at zero and not set price.
  - Load modification segments may offer at up to $1,000/MWh.
- DER segments that wish to make non-zero cost based offers must follow same cost policy rules as generators.
- Load modification segments that wish to offer above $1,000/MWh must follow same cost policy rules as demand response.

Energy Settlement

GIRs delivered energy will be the sum of the load modification (LM) contribution and the injection contribution.

- LM contribution delivered energy is:
  {CBL - MAX(0, metered load)} * (Loss factors as M28 section11)
- Injection contribution is simply metered injection.
- Injection contribution settled at LMP.
- No payment made for LM contribution when LMP < Net Benefits Threshold.
- LM contribution settled at LMP when LMP >= NBT.
- Deviations greater than 20% of LM contribution + 10% of injection contribution, or 5MW, shall be subject to BOR charges.

Ancillary Services

- Synchronized Reserves and DASR use the same approach as for energy:
  - GIR offers as a single resource.
  - Delivered quantity is sum of injection and load management components, determined using existing generation and demand response rules, respectively.
- Regulation may be provided either at the individual DER level using submeters, or by the entire GIR.
- Black start rules deferred to a future problem statement, assuming stakeholder interest.

Net Metering

Double payment of net-metered resources are prevented by an offset charge that returns net metering credits to the EDC:

- GIRs at a net metered location must provide PJM with a metering configuration that allows PJM to determine the MW quantity of net metered injections.
- Net metered GIRs supply PJM with their Net Metering Credit Rate, expressing the $/MWh value of bill offsets.
- Net metered GIRs may submit monthly net metering adjustments to account for, e.g., caps on net metering credits. Monthly net metered quantity will be the metered amount minus adjustments.
- GIRs will be charged a Net Metering Offset Charge equal to their net metering quantity times their Retail Net Metering Rate.
- EDCs will receive a credit equal to all the Net Metering Offset Charges collected from all GIRs on their net metering tariffs.

The result of these charges is to pay net metered injections at (LMP – Net Metering Retail Credit Rate) and return the net metering credit to the EDC. We envision it as a stopgap until states adjust net metering tariffs to consider treatment resources selling to wholesale markets.

Station and Charging Power

For simplicity:

- GIRs are not eligible for station power accounting.
- Power for charging GIR storage shall be purchased at retail.

We suggest that these issues are best addressed separately under possible future problem statements.

Capacity

This section is intended to further discussion, and is not yet a formal proposal.

Capacity Offers

The capacity value of a GIR is both what it can inject and what it is paying for but committing to not consume.

- GIRs may offer capacity up to the sum of their PLC and their CIRs.
- As today:
  - Sites that pay for capacity may offset those charges.
  - Sits that avoid capacity charges through PLC management reduce their opportunity to earn capacity revenue.
- GIRs are eligible to participate as seasonal CP resources, and may offer both summer CP based on load reduction and winter CP based on winter CIRs.

Capacity Obligations

- Loads that could provide capacity as DR should not face additional requirements by becoming a GIR.
- Generators that could be traditionally interconnected should not avoid requirements by becoming a GIR.
- Rules should not create opportunities for market power, but should also recognize that energy consumers have little or no incentive to increase prices.
- A capacity must-offer obligations is usually part-and-parcel of obtaining CIRs, though there are exceptions for intermit tents.
- Energy must-offer requirements for capacity GIRs need discussion:
  - Existing rules suggest the generation component have an energy must-offer, but
  - The load portion of a GIR is free to consume as much capacity as it likes.

Capacity Compliance

Same basic approach of treating a GIR as the sum of its load modifications and injection.

- Expected Performance for a GIR during a PAH shall be:

  (MIN(CIRs, Obligation) * Balancing Ratio) + MAX(0, Obligation – CIRs)

  e.g., the balancing ratio applies to the "gen-like" part of the obligation.

- Actual Performance for an GIR during a PAH shall be the sum of the LM contribution, injection contribution, and reserve/regulation assignments:

  LM Contribution = (PLC (summer) or WBL (non-summer)) – MAX(0, metered load)

  Injection Contribution = metered injections.

Capacity Load Obligations

- Add-backs for GIRs apply up to the GIRs capacity commitment.
  - During a PAH, add-back equals the sum of LM contribution and Injection Contribution.
  - During a non-PAH, add-back equals delivered energy if the GIR was dispatched by PJM or self-scheduled.
  - Add-backs capped at capacity commitment.
- Note that PLC should be calculated based on actual meter reading, which may be negative. Flooring meter reads at zero for PLC purposes would result in a "double add-back" of capacity from injections.
- These rules maintain the existing framework that end-user associated capacity either offsets costs or earns revenue, but not both.
- However, rules must allow end-user capacity to play one role or the other. Rules that entire exclude end user load from wholesale markets result in a "zero counting" problem that leads to excess capacity purchases.

Capacity Open Issues

- What are GIRs rights to take outages and obligations to report them?
- Should GIRs have an EFORd?
- Testing requirements.