Settlement of Load Serving Charging Energy for Energy Storage Resources that Directly Serve Load under Order 841

Andrew Levitt
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Order 841 Policy Timeline

- Order 841 Final Rule on Electric Storage Participation in Regional Markets issued February, 2018
- PJM Compliance Filing Dec 3, 2018 targeting Dec 3, 2019 implementation
- PJM submitted additional clarifying Tariff language May 1, 2019 in response to FERC Request for Clarification
- FERC acceptance of PJM compliance filing still pending (ER19-469)
- FERC discussion of Order 841 at May 16 open meeting.
Some ESR could sometimes directly serve end use load

Plain old “front of meter ESR”

“Resilience” ESR

N.C. = normally closed switch.
N.O. = normally open switch.

“Customer-side” ESR
Order 841 Compliance: categories of charging energy

Charging stored for later wholesale sale = “Direct Charging Energy” (including Non-Dispatched and Dispatched)

Charging stored for later end use = “Load Serving Charging Energy” → must be LSE

LSEs and their end use sales are subject to state/local laws and regs.
“Direct Charging Energy” shall mean the energy that an Energy Storage Resource purchases from the PJM Interchange Energy Market and (i) later resells to the PJM Interchange Energy Market; or (ii) is lost to conversion inefficiencies, provided that such inefficiencies are an unavoidable component of the conversion, storage, and discharge process that is used to resell energy back to the PJM Interchange Energy Market.


Direct Charging Energy is settled as “negative generation”
“Load Serving Charging Energy” shall mean energy that is purchased from the PJM Interchange Energy Market and stored in an Energy Storage Resource for later resale to end-use load.

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→ Only a Load Serving Entity may purchase Load Serving Charging Energy.

Load Serving Charging Energy is load. Just like all load, LSCE is settled as wholesale load for the LSE, and generally also has a retail settlement.
Outline

1. Settling Load and Direct Charging Energy Load Serving ESR

2. Metering and Method to Identify Load Serving Charging Energy at a Resilience ESR

3. Metering and Method to Identify Direct Charging Energy at a Customer-side ESR
1. Settling Load and Direct Charging Energy at Load Serving ESR
1. PJM expects ESR Power Meter submitter (either EDC, ESR owner, or other) to report initial ESR charging settlement as either 100% load or 100% negative generation.

2. Meters and arithmetic used to distinguish monthly Direct Charging Energy that was returned to PJM from the monthly Load Serving Charging Energy that was directly discharged to load.

3. EDC to use new PJM-developed ESR meter correction process and existing Load Reconciliation process to back out the relevant monthly charging quantity (pro-rated across applicable intervals at the applicable interval LMP) from the initial settlement and replace with the correct settlement.
Example: Resilience ESR

**Initial Settlement**

- **PJM Settlements**
  - Debit
  - **100% of Charging**
    - **ESR**
    - **LSE**

**Final Settlement**

- **PJM Settlements**
  - Debit
  - **90% of Charging**
    - **10%**
    - **ESR**
    - **LSE**
  - Credit
  - **10%**
  - Load reconciliation

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Example: Resilience ESR

1. Initial settlements are Direct Charging Energy (i.e., negative generation)
2. Monthly Load Serving Charging Energy quantity calculated
3. EDC to use PJM ESR Meter Correction process to net down the monthly Direct Charging Energy as a credit to the ESR Owner, in pro rata share of each withdrawal interval relative to LMP.
4. EDC to use PJM Load Reconciliation process to increase the monthly Load Serving Charging Energy for the designated Load Serving Entity for this site, e.g. in a per-interval share corresponding to Step 3
Example: Customer-Side ESR

**Initial Settlement**

PJM Settlements

![Diagram](image)

- ESR
- 100% of Charging
- LSE

**Final Settlement**

PJM Settlements

![Diagram](image)

- ESR
- 10% Debit
- 90% of Charging
- LSE
- 10% Credit
- Load reconciliation
- Meter Correction

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1. Initial settlements are wholesale sale to the LSE (“load”).
2. Site data used to derive monthly Direct Charging Energy quantity on an appropriate per-interval basis.
3. EDC to use PJM Load Reconciliation process to decrease the monthly load for the applicable Load Serving Entity for this site for the applicable intervals.
   - Only if EDC is capable of reducing the monthly retail bill purchase quantity by a corresponding amount.
4. EDC to use PJM ESR Meter Correction process to net up the monthly Direct Charging Energy in the applicable intervals as a charge to the ESR Owner.
2. Metering and Method to Identify Load Serving Charging Energy at a Resilience ESR

N.C. = normally closed switch.
N.O. = normally open switch.
• ESR can only charge from grid.
• M3 appropriately captures stored grid energy that is sent to end user → “Load Serving Charging Energy”.
• The sum of M3 over a month is the monthly Direct Charging Energy for ex-post adjustment as described above.

N.C. = normally closed switch.
N.O. = normally open switch.
• ESR can charge from grid or on-site gen.
• EDC to determine how much of the ESR inventory that was discharged to the end user consisted of energy charges from the grid → “Load Serving Charging Energy”
  – If EDC reports that ESR inventory discharged to the end user consisted only of stored self-supplied on-site generation, then no Load Serving Charging Energy was consumed.
3. Metering and Method to Identify Direct Charging Energy at a Customer-side ESR
• Net injections measured at M1 consist of previously-stored Direct Charging Energy.
  – Corresponding losses are also Direct Charging Energy. ESR can report losses to EDC through PJM, or EDC can work directly with ESR to quantify losses.
  – EDC calculates monthly Direct Charging Energy for ex-post adjustment by PJM as described above.
• M2 is required to identify which intervals the ESR was charging for ex-post adjustment.
• Net injections measured at M1 could consist of Direct Charging Energy, self-supplied charging energy, and/or on-site Generation.
  – The inventory in the ESR could also consist of a mix of grid energy and self supplied energy.
  – Losses corresponding to stored grid energy that is resold to PJM is also Direct Charging Energy.
• EDC calculates monthly Direct Charging Energy for ex-post adjustment.
• M2 is required to identify which intervals the ESR was charging for ex-post adjustment.