Storage Charging Energy M&V and Settlement Proposal

DERSTF

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FERC Order 841

Order 841 specified that:

> The sale of electric energy from an independent system operator or regional transmission organization market to an electric storage resource *that the resource then resells back to that marke*t must be at the wholesale locational marginal price. (CFR 35.28(g)(9)(ii), Order 841 at 224, emph. added)

and

> …this Final Rule applies…irrespective of where the resource is interconnected. (at 300)

and

> …the charging energy lost to conversion inefficiencies should also be settled at the wholesale LMP (at 302)

and

> Developing new accounting practices…in response to this requirement will be complex… (at 324)

Retail/Wholesale

This rule changes energy purchases that would ordinarily be retail into wholesale, based on the ultimate use of the energy.

Q: At 2:00pm, a battery behind a retail meter purchases 1MWh of energy. Is this a retail or wholesale sale?

A: It depends.

Retail/Wholesale

Q: At 2:00pm, a battery behind a retail meter purchases 1MWh of energy. Is this a retail or wholesale sale.

A: It depends.

At 4:00pm, the battery goes on to discharge to…

Serve onsite load	Inject power or provide ancillary services
Transaction at 2:00pm was a retail sale	Transaction at 2:00pm was a wholesale sale

The heart of this proposal is a procedure to make this determination.

Proposal

Applies to:

- Storage behind a retail meter that may inject as part of providing wholesale services.

Does not apply to:

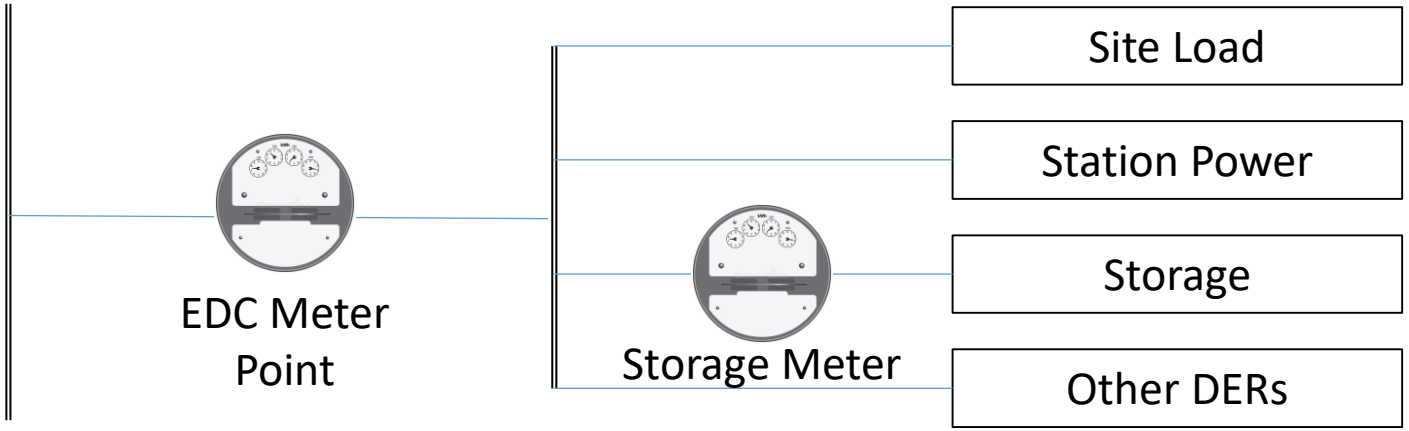
- Storage behind a retail meter that never injects. Purchases are always retail.
- Interconnected storage that never serves load. Purchases are always wholesale

Four sections:

1. Metering
2. Determining energy resold back to the market
3. Assigning that energy to purchases
4. Settlement

Metering

Storage Behind a Retail Meter



- A site may opt not to install a storage meter. If no storage meter is installed, the site becomes ineligible for wholesale energy settlements. All energy will be purchased at retail.

Step 1: Determining Wholesale Resales

FERC specified:

- Energy purchased by storage for later resale into energy or ancillary services must be at wholesale.
- This applies only to resources capable of injecting power.
- This includes energy lost to "unavoidable" inefficiencies.

The Icetec GIR proposal treats storage that sometimes injects and sometimes offsets load as a single resource. This situation is not clearly addressed in Order 841. In this context, we propose:

Wholesale Use

All energy injected for any wholesale market, grossed up for losses.

Losses only for energy used to offset load to provide ancillary services

Not Wholesale Use

All energy and losses used to offset load in the energy market or pursuant to a capacity obligation.

Energy used to offset load as part of providing ancillary services.

Determine Wholesale Resales

For each settlement interval, wholesale resales from storage are:

Injections from Storage + Losses on Injections + Losses on BTM A/S

Injections from Storage= Lesser of net injections measured at EDC and Storage Meter

Losses on Injections = Injections from Storage * RTL

Losses on BTM A/S = (Gross output at storage meter as measured for A/S compliance – Injections from Storage)* RTL

Where:

RTL = Round Trip Losses, percent of energy unavoidably lost in a charge/discharge cycle. Includes transformer, inverter, and losses intrinsic to the storage device.

Gross output = sum of energy out of storage, not offset by energy flowing in. e.g., a regulation resource asked to move up and down many times during the settlement interval will have a high gross output but low net injections.

All other energy from storage is treated as Retail Reuse:

Retail Reuse = Injections measured at storage meter * RTL – Wholesale sales

Step 2: Assign to Purchases

Each unit of energy resold converts a prior retail sale to a wholesale sale.

- This must be done interval-by-interval to preserve price signals. Using an average or pro-rated approach creates arbitrage opportunities.
- PJM has requested we use a “First in first out” approach.
- Timing is set to match current EDC/LSE energy settlement and resettlement process.

Step 2: Assign to Purchases

- For each settlement interval, Storage Purchases are energy flowing into the storage, as measured at the storage meter.
- Wholesale Resales assigns Storage Purchases to wholesale on a MWh-for-MWh basis.
- Retail Reuse assigns Storage Purchases as retail, also MWh-for-MWh.
- This process begins with the first settlement interval a resource is in the market.
- Each day, PJM brings assignments up to date using latest available meter data, beginning with the oldest unassigned Storage Purchase.
- Wholesale purchase assignments posted for EDCs and LSEs two hours before the InSchedule submission deadline for each operating day (InSchedule deadline is 4:00pm on the second following business day).
- Assignments for each month finalized at the end of the energy market reconciliation window, which is the last day of the second month after the original billing month.

Step 3: Settlement

The purpose of the settlement step is to properly allocate energy obligations between LSEs and GIRs. How this is done depends on the EDC:

1. **EDC Allocates Charges.** PJM's role is informational.
   - Wholesale Resales reported to EDC
   - EDC adjusts InSchedule data to transfer energy obligation from LSE to GIR.
   - EDC adjusts retail billing data to prevent double charge.
   - Additional steps may be necessary to preserve five-minute settlements.
2. **EDC Does Not Allocate Charges.** PJM settles the wholesale purchase and backs out retail energy charges.
   - PJM adjusts InSchedule data to transfer THEO from LSE to GIR.
   - GIR receives "charging retail adjustment" credit on charging purchases at energy ("G") component of retail rate for each interval.
   - LSE receives opposite offsetting charge.