

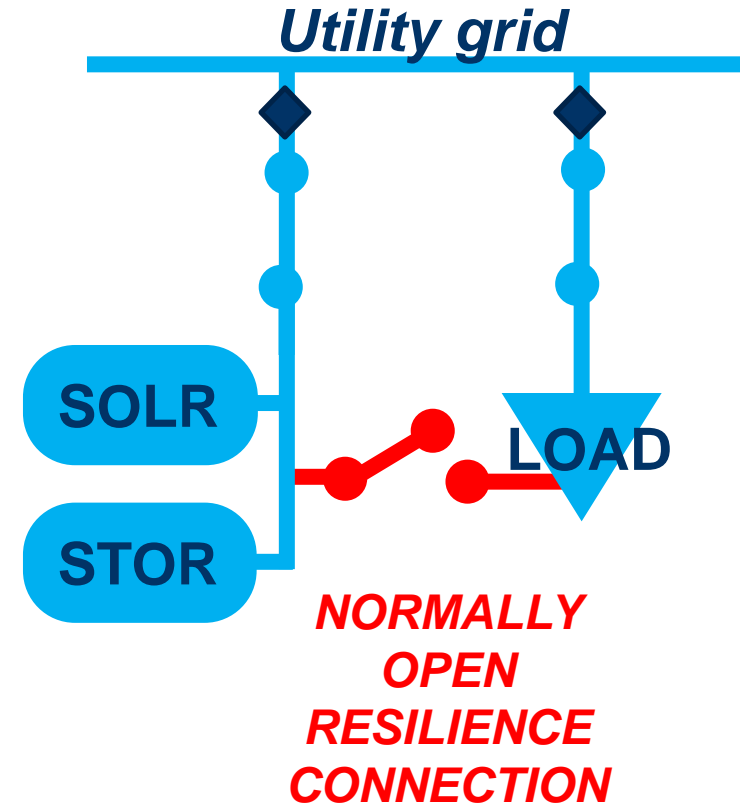
Possible Method to Measure Wholesale Stored Energy for Front Of Meter Battery with Resilience Connection to Adjacent Load

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- Some generators connect directly to adjacent or on-site loads.
- No federal right to such an arrangement.
- Proposal: the present method available when the direct connection exclusively used for stand-by generation during loss of distribution supply.
- With storage: what's the method to measure wholesale stored energy vs. retail stored energy?

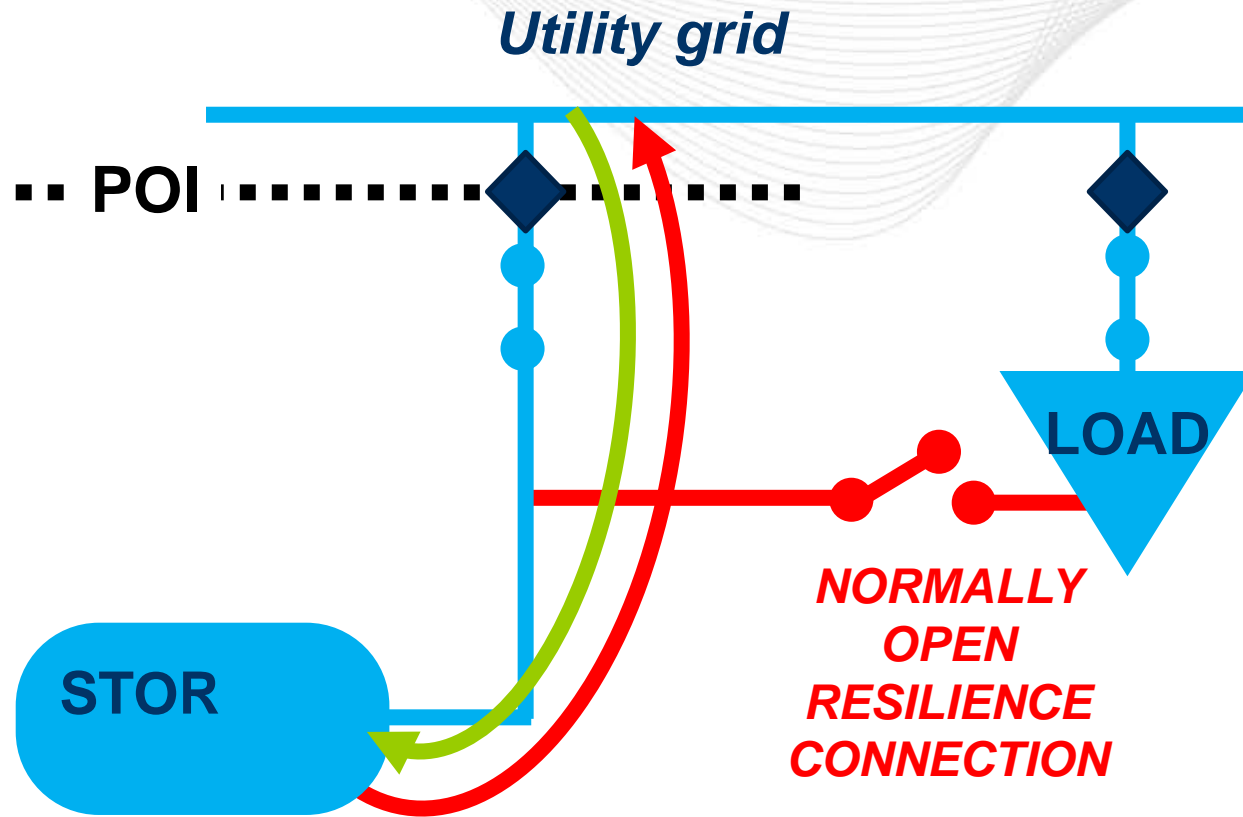



For current discussion, “Wholesale Stored Energy” is energy that is both:


1. Withdrawn from the grid.
2. Later released to the grid as part of a wholesale transaction.

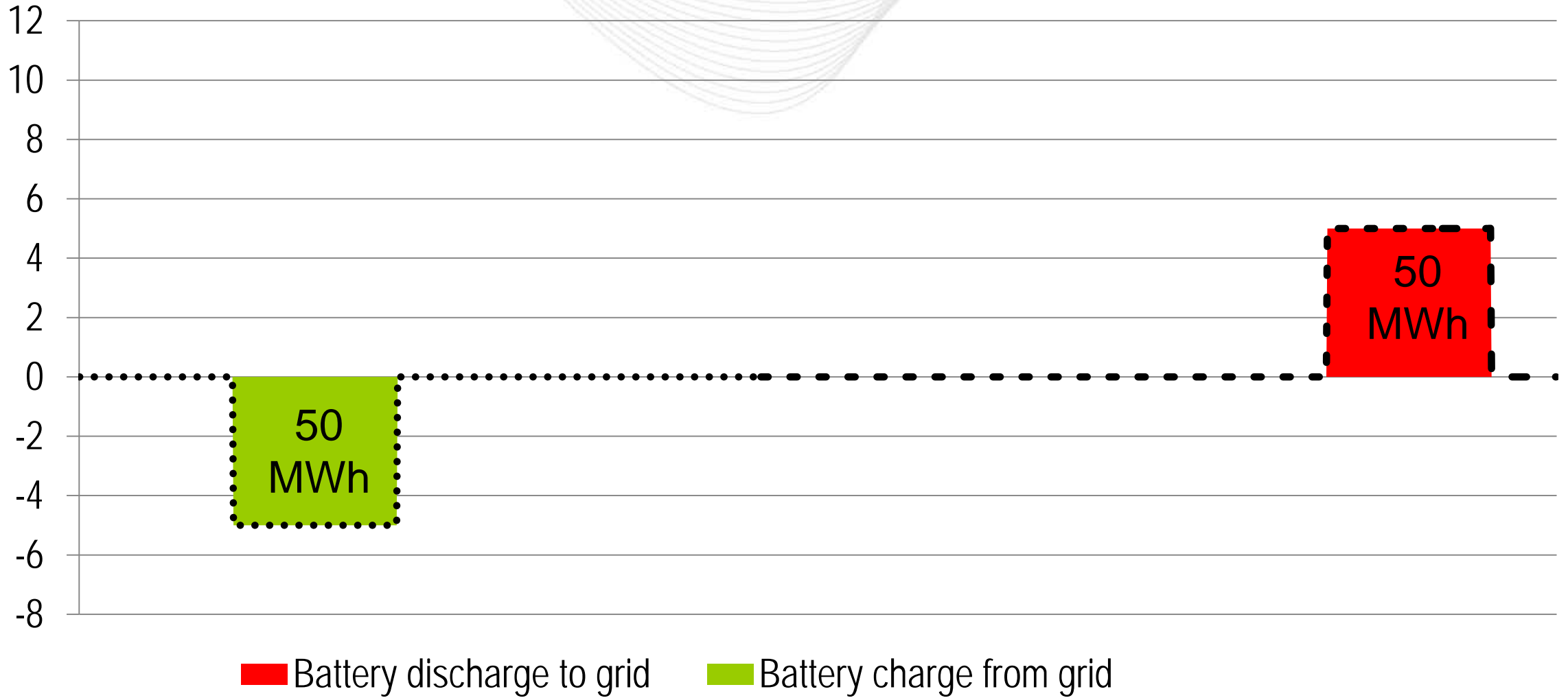
“Losses” is energy lost in the storage conversion process.

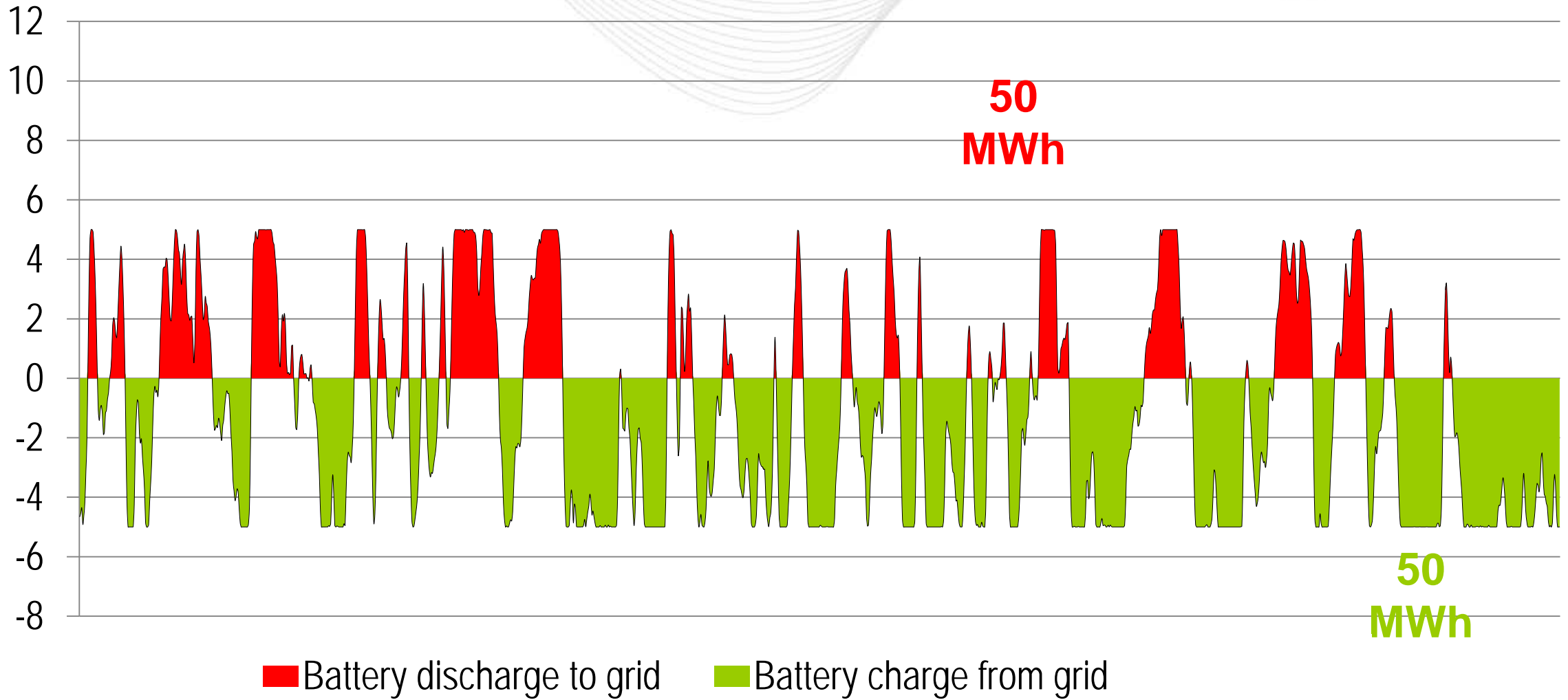
Use Case: Storage Alone



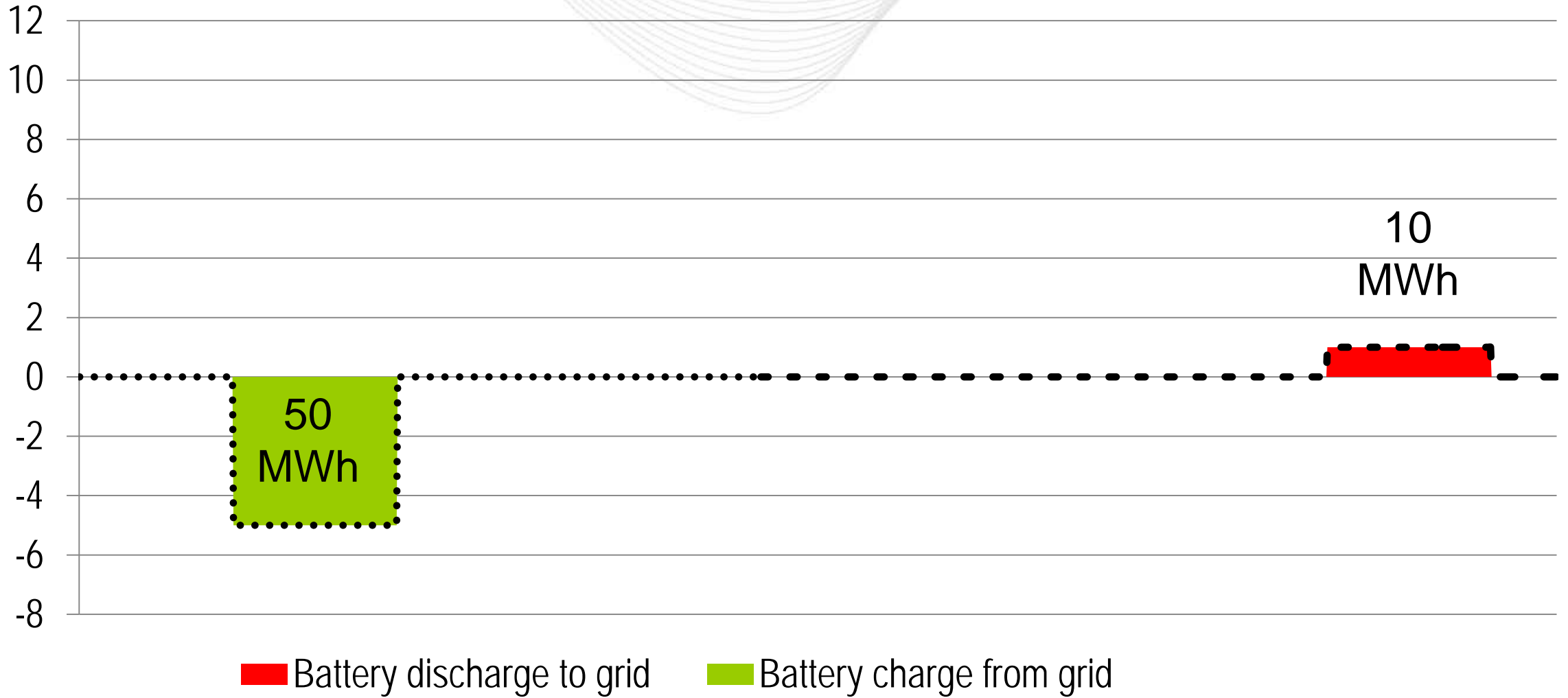
 Battery discharge to grid

 Battery charge from grid

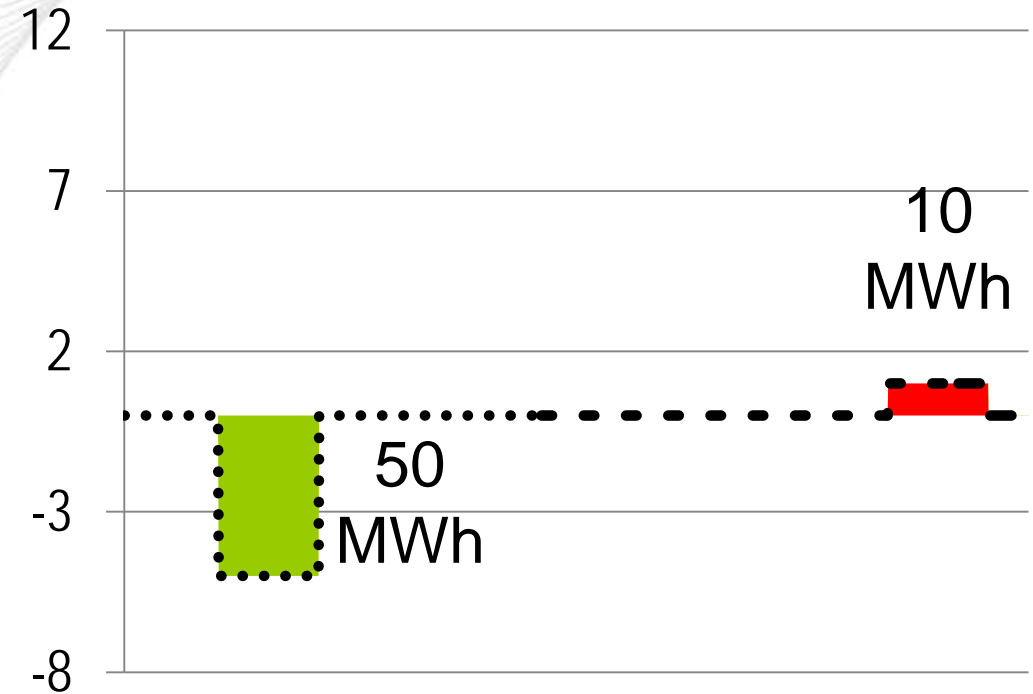




40MWh of Energy That's Not "Wholesale Stored Energy"



- General principle: Energy that the battery takes off the grid and later returns to the grid is “Wholesale Stored Energy” (Order 841).
- Losses are also wholesale (Order 841).
- The remaining energy is “Neither Wholesale Stored Energy nor Losses” and should be accounted for accordingly.
- Monthly net of (battery charge from grid) and (battery discharge to grid) = “Not Wholesale Stored Energy” = (losses + other).
- Losses are integrated value of battery submeter.
- The remaining withdrawals are “Wholesale Stored Energy”.



- Battery charge from grid
- Battery discharge to grid

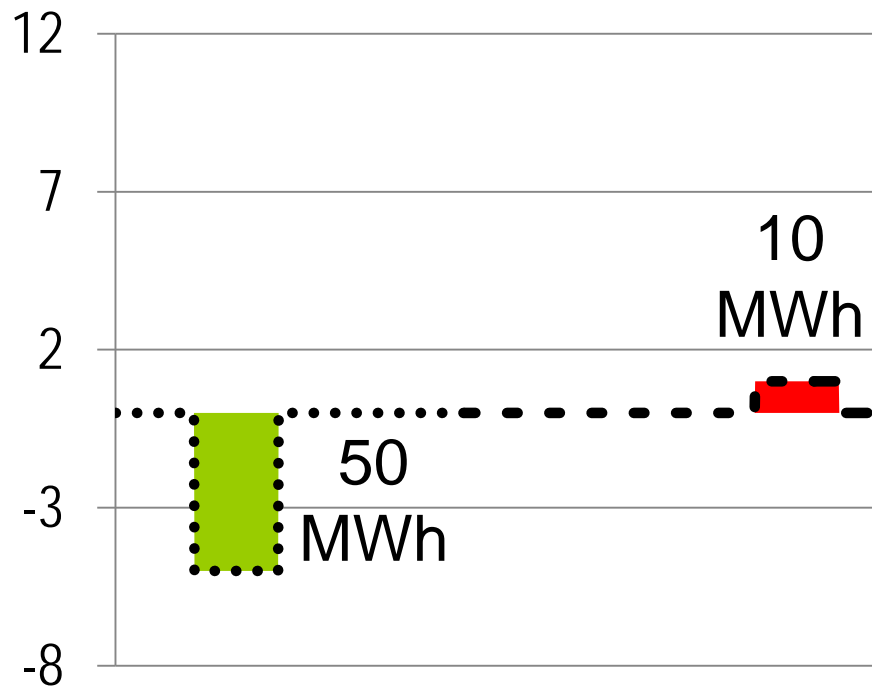
PJM to perform these calculations:

$$(\text{battery charge from grid}) - (\text{battery discharge to grid}) = (\text{losses} + \text{other}).$$

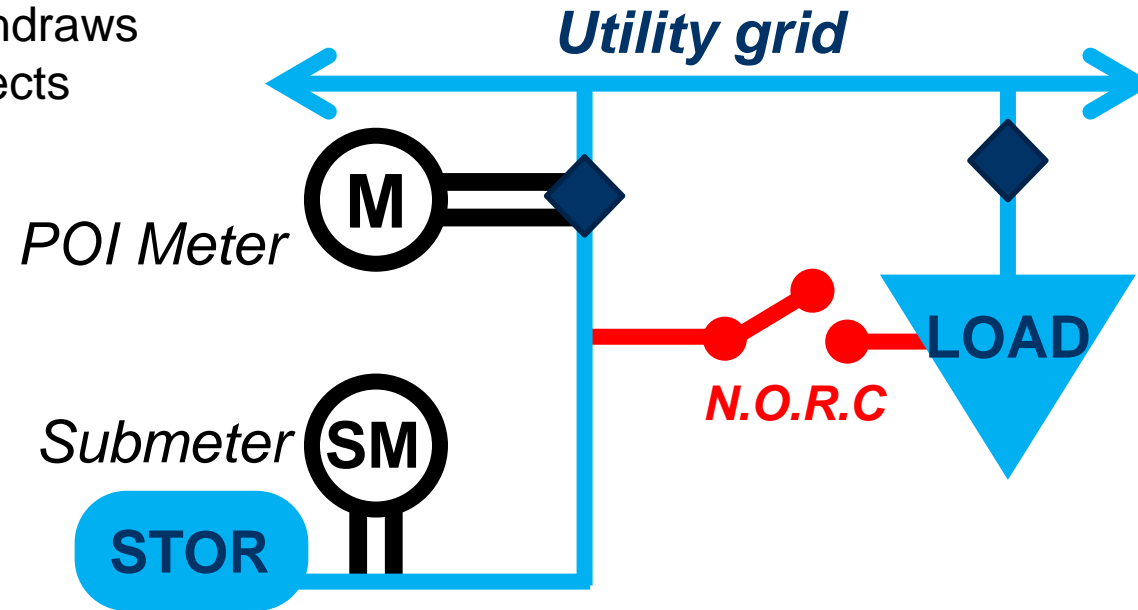
Battery charge from grid = integrated POI value when POI withdraws

Battery discharge to grid = integrated POI value when POI injects

Losses = monthly integral of battery submeter

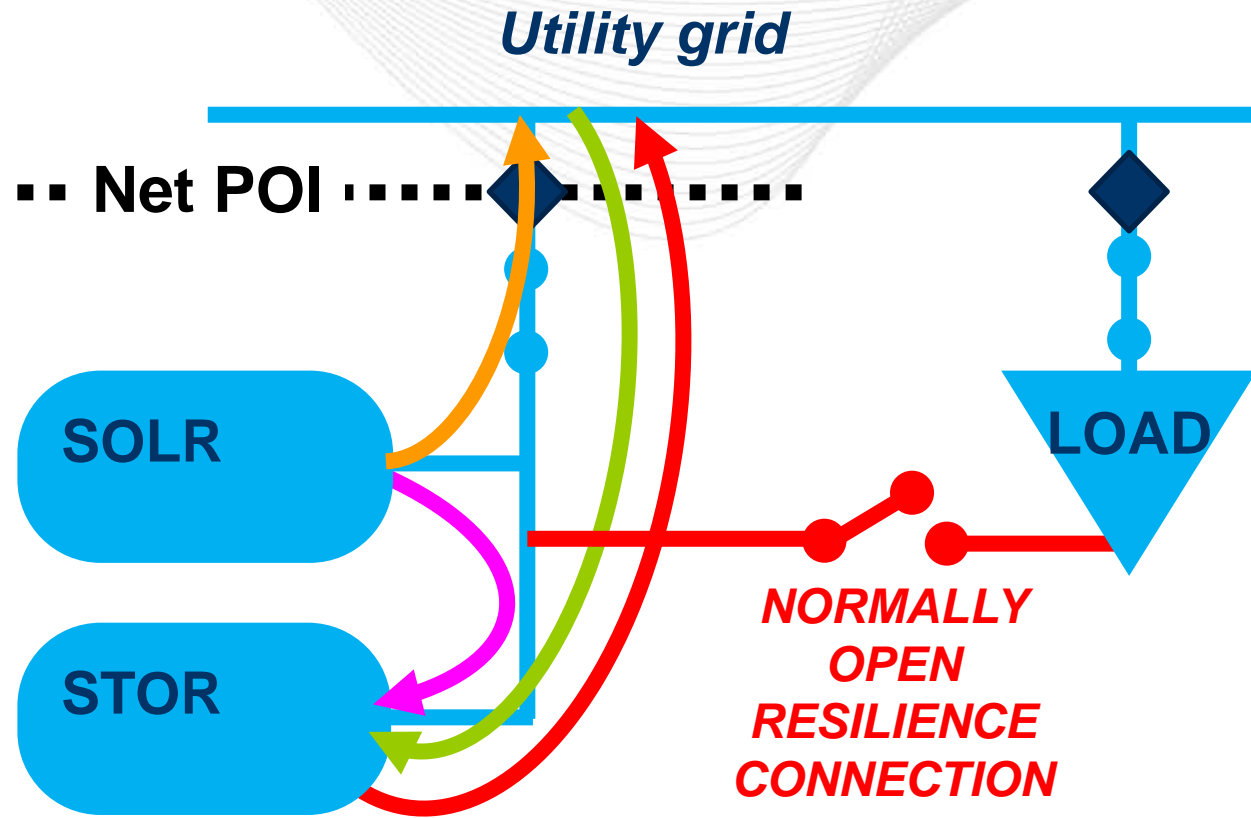


- Battery charge from grid
- Battery discharge to grid

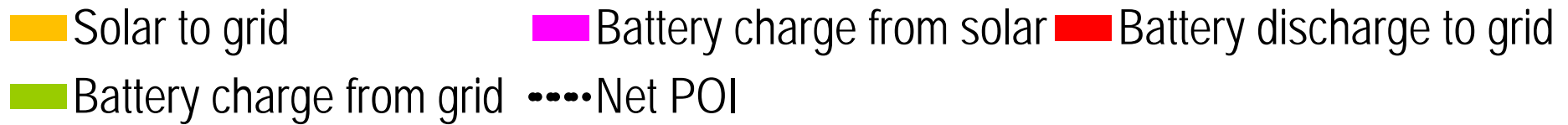
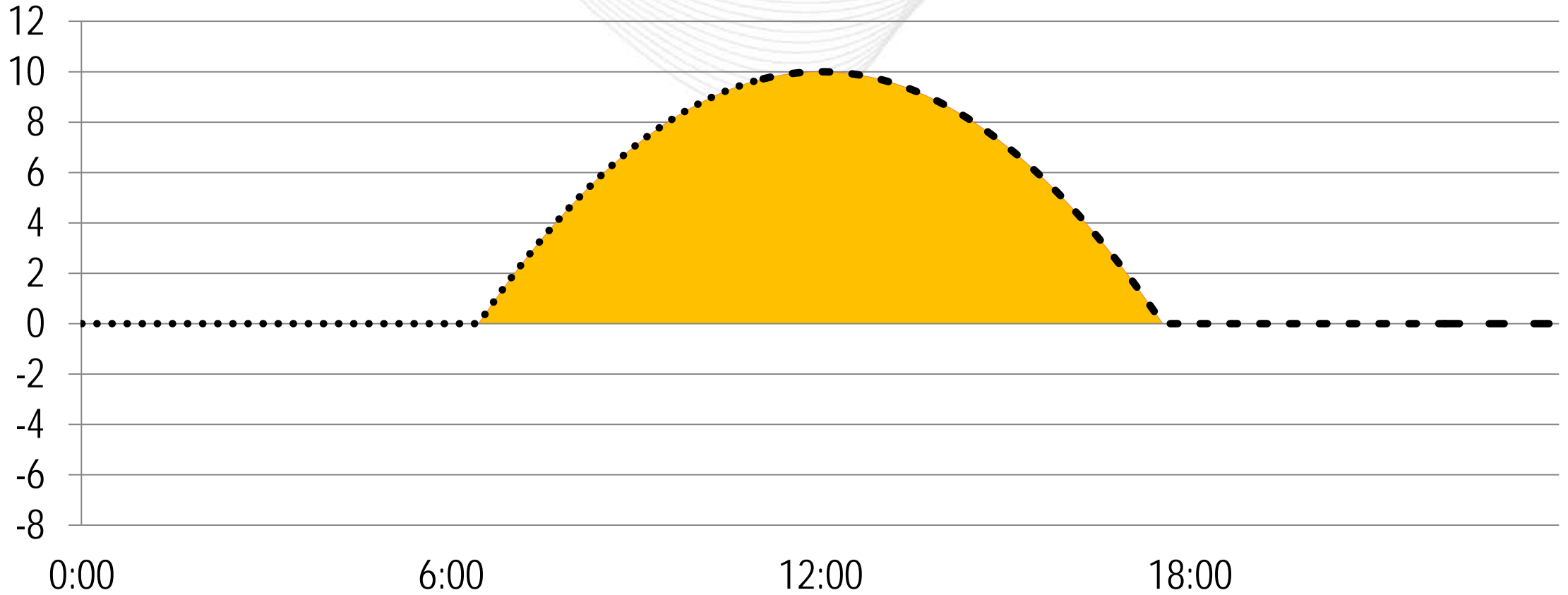


“Losses” + “Other” is net monthly negative energy position after all injections are netted against withdrawals.

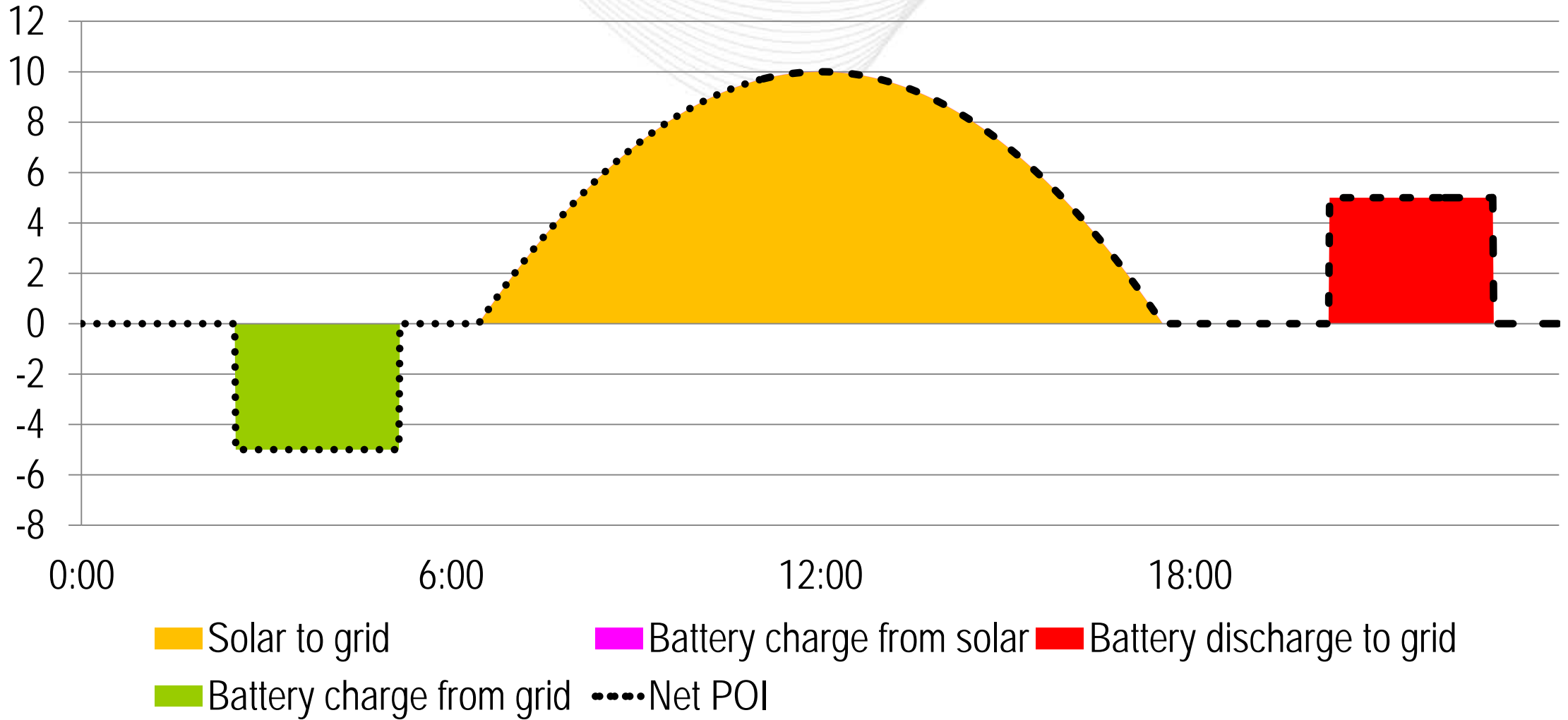
Use Case: Storage + Generator

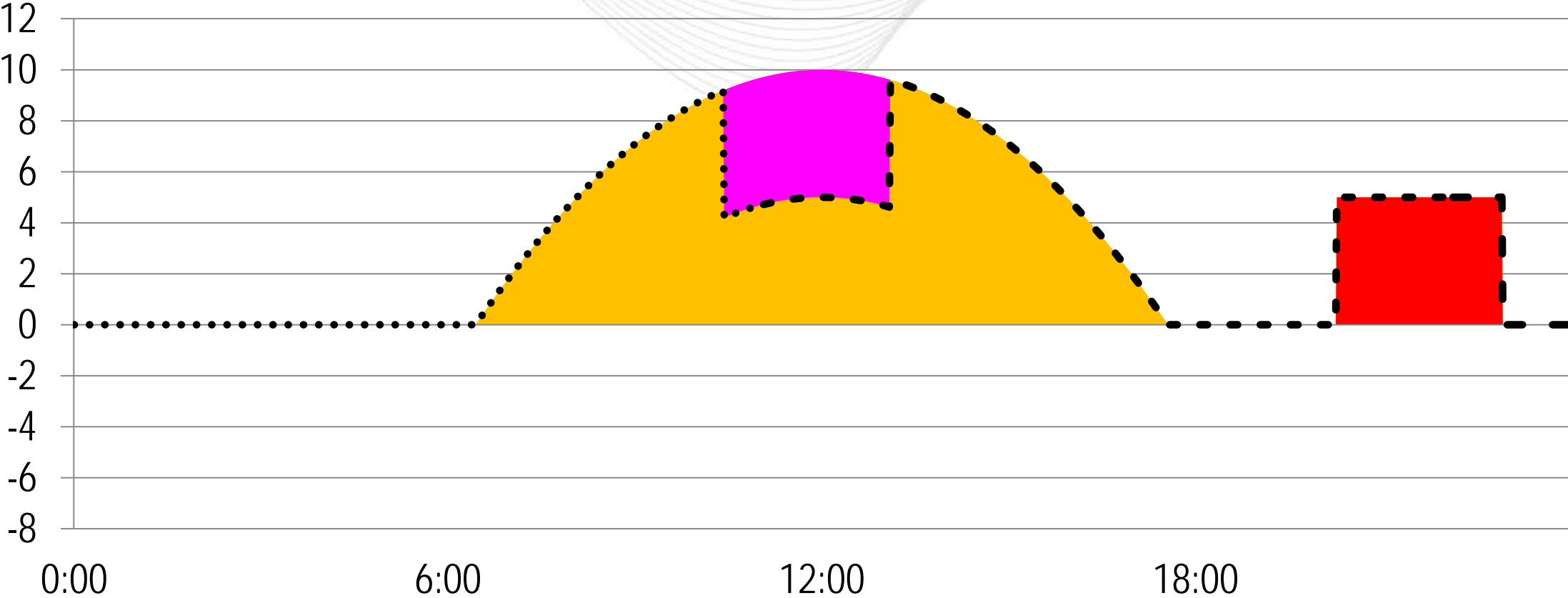


- Solar to grid
- Battery charge from grid
- Battery charge from solar
- Battery discharge to grid
- Net POI



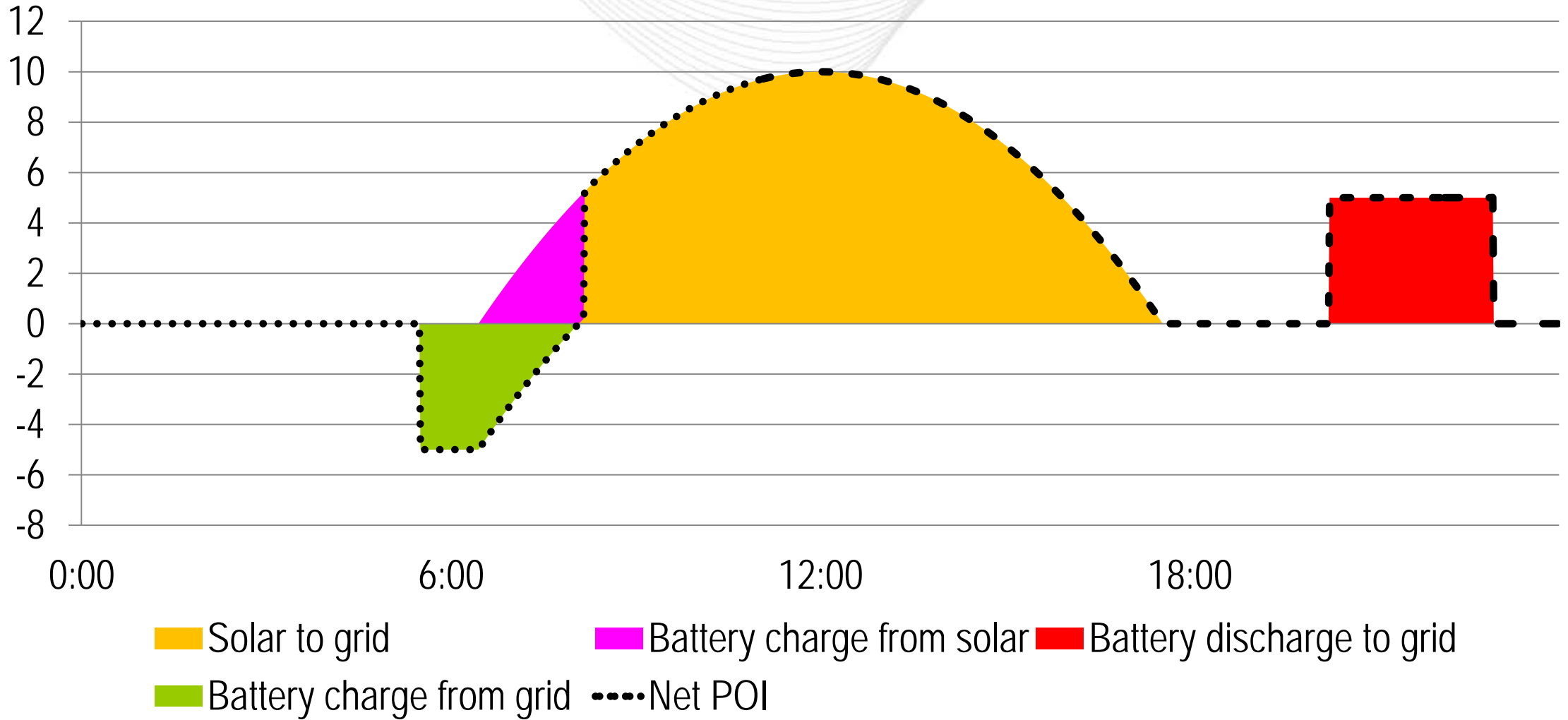
Example 2: "Battery Charge from Grid" and "Battery Discharge to Grid"

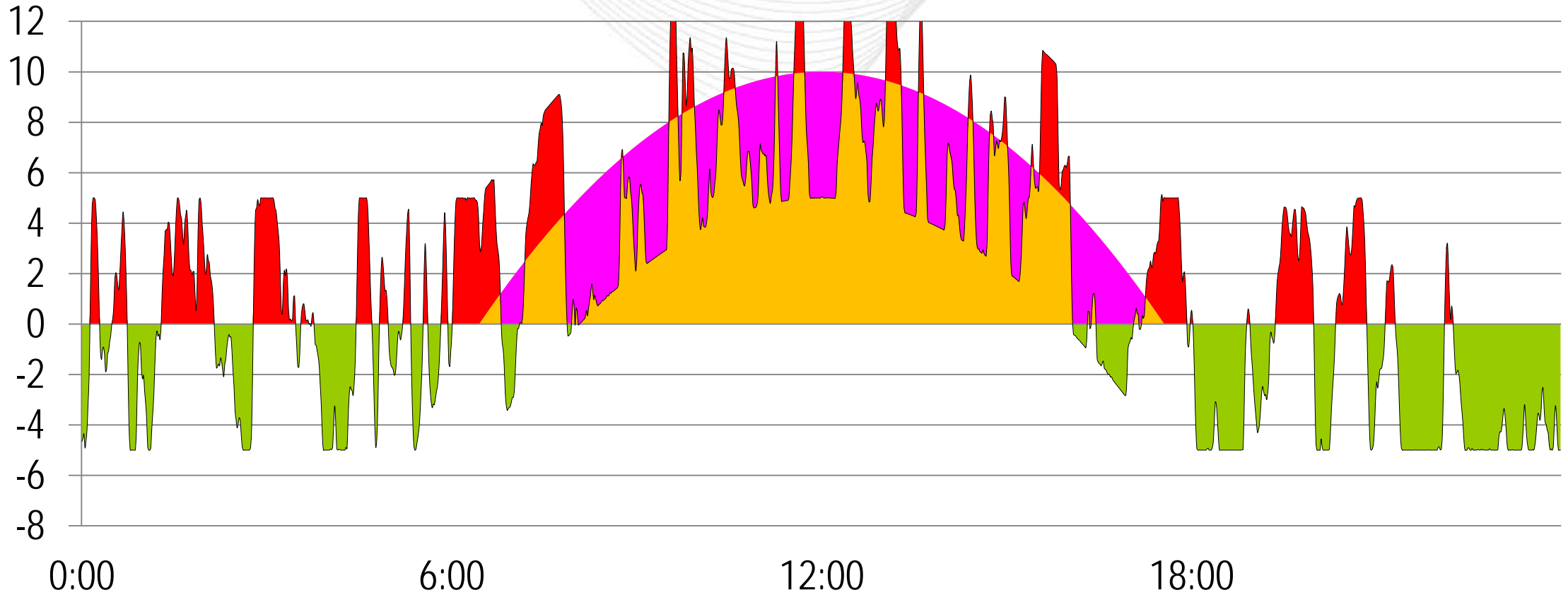




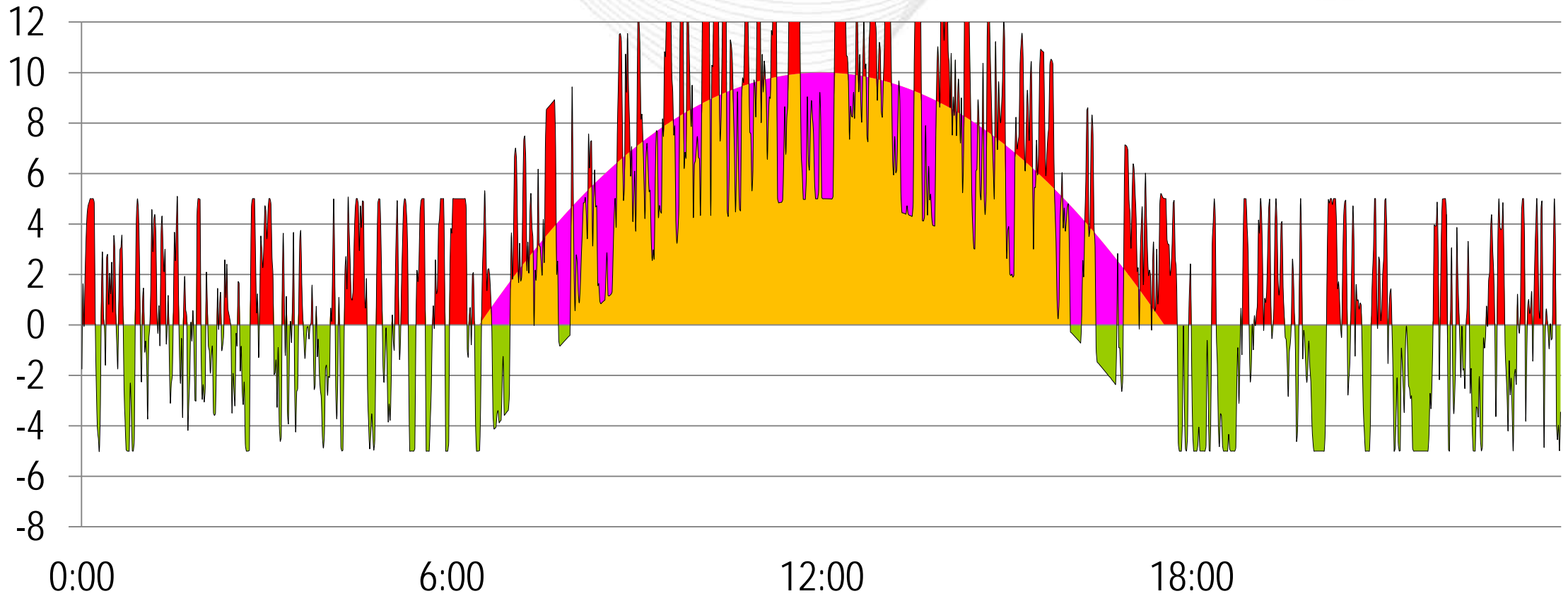
■ Solar to grid
 ■ Battery charge from solar
 ■ Battery discharge to grid
■ Battery charge from grid
 Net POI

Example 4: Battery charging from solar & grid at the same time



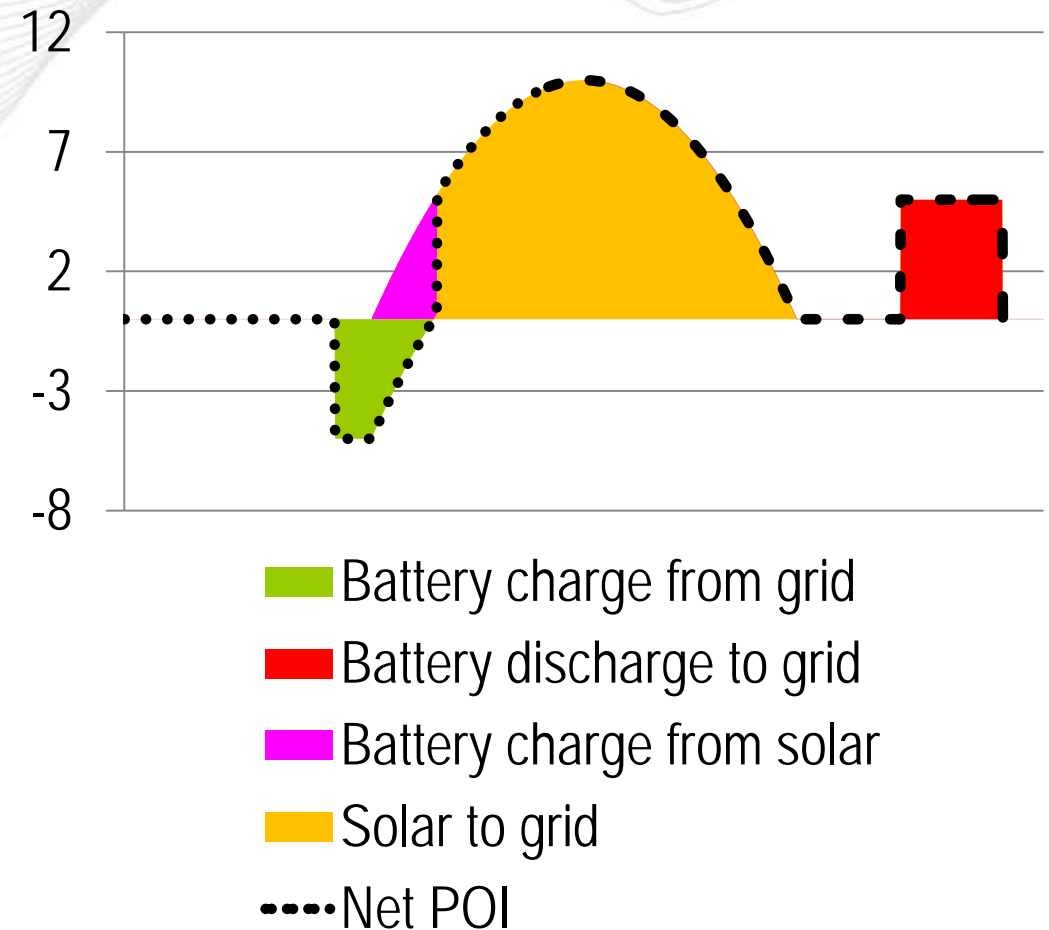


■ Solar to grid ■ Battery charge from solar ■ Battery discharge to grid
■ Battery charge from grid — Net POI



■ Solar to grid ■ Battery charge from solar ■ Battery discharge to grid
■ Battery charge from grid — Net POI

- General principle: Energy that the battery takes off the grid and later returns to the grid is “Wholesale Stored Energy”.
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- The remaining energy is “Neither Wholesale Stored Energy nor Losses” and should be accounted for accordingly.
- Monthly net of (battery charge from grid) and (battery discharge to grid) = “Not Wholesale Stored Energy” = (losses + other).
- Losses are integrated value of battery submeter.
- The remaining withdrawals are “Wholesale Stored Energy”.



PJM to perform these calculations.

$$(\text{battery charge from grid}) - (\text{battery discharge to grid}) = (\text{losses} + \text{other}).$$

Battery charge from grid = integrated POI value when POI withdraws

Battery discharge to grid = integrated battery submetered value when battery discharging and POI injects

Losses = monthly integral of battery submeter

