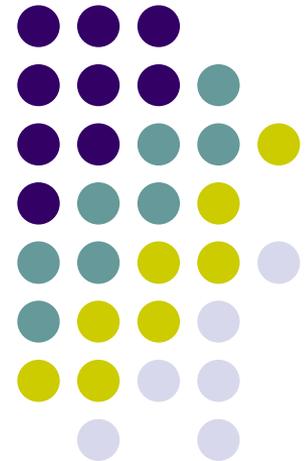
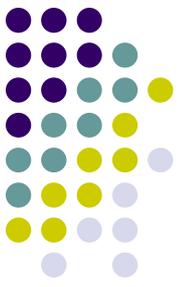


Energy Storage Enhancements Initiative Recommended In-Scope Issues

LSA and SEIA
July 26, 2021

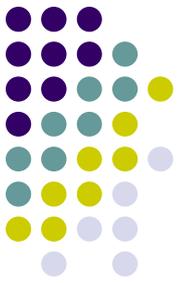




Agenda

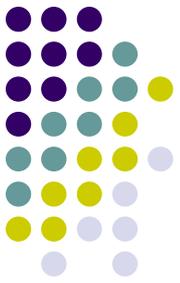
- **Grid-charging issues for Mixed-Fuel Resource (MFR) Co-located Resources (CLR)s:**
 - Investment Tax Credit (ITC) applicability
 - Grid-charging tools that could, may be, and should be available
- **Aggregate Capability Constraint (ACC) applicability to MFR Pseudo-Tie (PT) Resources**
- **Hybrid Resource Initiative (HRI) clean-up issues**

Why MFR CLR Grid-Charging Issues Should be In-Scope

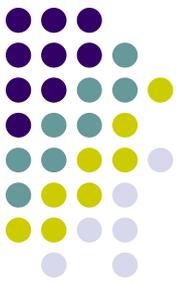


- ITC is a federal policy, so CAISO rules should support compliance, not frustrate it
- Market Participants are turning to potentially suboptimal practices that could undermine the usefulness of energy storage
- Further work is needed to:
 - Clarify available tools to control grid charging
 - Consider additional tools to control grid charging

ITC Features



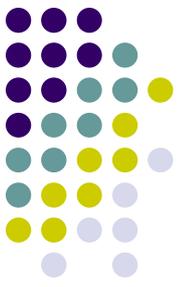
- Critical element for financing storage today
- Covers up to 30% of capital costs
- Full credit requires 100% renewables charging
 - Grid energy does not qualify, even at times when it may come largely from renewables
 - 1% of ITC lost for each 1% of grid charging, to 25%
 - Complete ITC loss if grid charging exceeds 25%



ITC Implementation Details

- **Common ITC interpretation:** Storage charging must be below VER output, on a 5-minute basis
- **Complicating factors**
 - ITC compliance may be a financing condition
 - Tax benefits may have been sold in advance
 - Property taxes are also a factor – projects that do not grid charge qualify for exemption
 - Annual calculation – hard to know for any given market bid whether limits will be reached

CAISO Positions Allowing Explicit Grid-Charging Controls



- **CAISO Technical Bulletin (2016):** Projects with multiple Resource IDs could have “all options,” including charging “from on-site generation only.” (p.12) (Table also included in HRI Revised Straw Proposal.)

Translation: Limiting grid charging with multiple RIDs is possible.

- **HRI Straw Proposal/Rev Straw Proposal:** “Metering” sections included info for facilities configured as CLR charging only from on-site generation, saying “A limiting scheme must be in place to prevent charging from the grid.”

Translation: Limiting schemes can prevent grid charging.

CAISO Positions Against Explicit Grid-Charging Controls



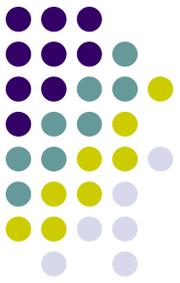
- **HRI Revised Straw Proposal (p.11):**

The CAISO notes the ITC as a business driver for hybrid and co-located resources because it reduces the costs associated with developing new resources that contain solar and storage combinations. The CAISO believes that this ITC eligibility issue should not drive market design proposals because the ITC is an out-of-market incentive.

Translation: This is your problem, market rules will not be designed to help.

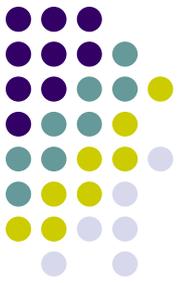
- **Later proposals:** Dropped mention of any limiting scheme.
- **Later CAISO statements at stakeholder meetings:** Indicated that the Master File can only reflect “physical” and not software, financial, or contract limitations.

MFR CLR Grid-Charge Management Tools



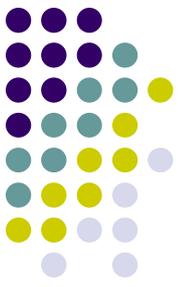
- Tools we know are available
- Tools that may be available
- Consequences of current situation
- Some additional tools that should be considered

Tools We Know Are Available



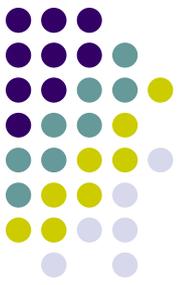
- **Basically limited to careful bidding**
 - Must-Offer Obligations for each Resource ID
 - Bids must be structured so Storage RID charging schedules/dispatch \leq VER RID production
- **RT issues can still confound bidding strategy**
 - VER gen < schedule while storage is scheduled to charge causes “inadvertent” grid charging, since storage schedule must be met
 - Some mitigation possible w/RT market bids to reduce storage charging if prices rise, but a blunt instrument.

Tool That Might Be Available (Clarification Needed)



- **Storage charging software limiting schemes**
 - Mentioned in early CAISO documents implies that this might be allowed
 - Lack of explicit mention in later HRI documents calls this into question
- **Master File settings**
 - **“Disable” charging:** Set Storage CLR Pmin = 0.
 - Allowed if the resource can still physically charge from the grid?
 - Will this prevent the Resource ID from bidding/receiving any charging schedules (i.e., disable storage completely)?
 - **Use ACC:** Set Storage CLR Pmin at negative limit but set Aggregate Capability Constraint (ACC) minimum = zero.

Potential Consequences of Current Situation



- **Charging concerns → suboptimal measures**
 - Storage sizing & scheduling based on very conservative VER forecasts – less SOC built and/or otherwise available
 - Numerous executed PPAs prohibit grid charging
 - Various other schemes are under consideration, e.g., physically disabling ability to charge from the grid
- **Some measures could prevent any grid charging, even where economic or in System Emergencies**
- **Possible large-scale conversions to Hybrid Resource configuration (less-preferred by CAISO) if grid charging can't be managed w/CLRs**

Additional Possible Actions

(just examples)



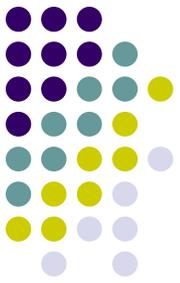
- **Clarify whether Master File entries described above are allowed**
- **Expand Storage CLR flexibility conditions:**
Use Minimum State of Charge (MSOC) feature (which ensures availability for subsequent hourly schedules) to allow Storage CLR to:
 - Lower RT charging if VER output < schedule
 - Exercise storage flexibility in intervals when providing A/S
- **Supplemental compensation mechanisms for lost ITC from grid charging**

ACC Applicability to Pseudo Ties



- Prohibition against Pseudo Tie ACC use included in tariff-filing cover note to FERC – never discussed in stakeholder process
- Lack of ACC availability will prevent PT MFRs from CAISO market participation, same as internal (or EIM) resources
- PT firm-transmission requirement:
 - Applies to maximum output at POI, not installed capacity
 - Thus, is not incompatible with ACC applicability

Other Unresolved HRI Issues Could Be Addressed here



- **Recovery of lost ITC through market bids**
 - The HRI2 Draft Final/Final Proposals:
 - Said bidding could recover “lost” ITC recovery w/grid charging, included example.
 - Deferred the question of whether the bid-price floor is too low for ITC recovery.
 - LSA/SEIA commented that the issue is more complex and offered to explore these issues w/CAISO. That could be done in this initiative.
- **Other market issues:** Unexplained HRI2 Draft Final/Final proposal statements here:
 - **Market bids generally:** “If a resource is unable to bid costs associated with generation from the grid into the market, the ISO may make special allowances for these resources to not show that capacity in the market.”
 - **Default Energy Bids:** “ITC resources may receive special modeling considerations in DEB...These will only be granted for resources that cannot recover costs from economically bidding into the market”¹⁴