RPS Summit

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Does Energy Storage Fit in RPS?

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Introduction

- Interest in energy storage is growing
  - Frequent announcement about new projects
  - Proposed federal legislation (S.1030) to encourage storage
- States may look to storage to increase the value of renewable energy
- Many states may think of including storage in their RPS
- But is storage a good fit in an RPS?

- Lots of examples of RPS being used to promote goals other than maximizing total energy generation
  - Credit multipliers for certain technologies, in-state location, or local manufacture
  - Set-asides for solar or distributed generation
- So, is storage a service consistent with RPS goals?

Here are some questions to ask yourselves

What's the Purpose of Storage?

- Specify the policy purpose(s) that storage should serve, or what service(s) must be provided
- Examples:
  - Serve critical infrastructure?
  - Shift renewable generation to more closely match peak loads?
  - Help meet reliability needs?
  - Integrate intermittent renewable energy?
  - Defer T&D upgrade investments?
  - Store electricity for use during power outages?
  - Reduce greenhouse gas emissions?

Eligible Storage Technologies?

- If defining technologies, consider:
  - batteries, compressed air, flywheels, hydrogen, pumped hydro, thermal
- Alternatively, eligibility could just focus on performance characteristics
  - Minimum capacity
  - Minimum duration (e.g. hours or days)
  - Dispatchability controls
- Specify whether storage must be integrated / co-located with specific generation, or stand-alone
  - Otherwise storage may not be charged by RE
  - Must it support RE, or is energy source irrelevant?

Is Storage Mandated?

- States could establish mandatory targets, or encourage storage with financial incentives
  - Mandate: California
  - Incentive: New Jersey
- Mandate is more compatible with most RPS policies, but…
  - Depends on purpose, e.g. gain experience, work with grid operators, help create markets for valuation, deploy in quantity

Is Storage a Source or a Sink?

- If a source, storage could compete:
  - Within a special storage set-aside
  - Within an existing customer-sited resource set-aside
  - With other resources in a main tier
- If a sink, states might consider:
  - Storage as a device that adds value but produces no new energy
  - Storage as a consumer of energy

How to Evaluate Progress?

- Track energy (MWh) or capacity (MW)?
  - Most RPS targets are in energy
  - A few states have capacity targets
    - TX converts to energy requirements
    - KS calculates capacity credit for RECs
- If storage is part of RPS goals, tracking energy would be more compatible
  - But tracking capacity might be simpler
- Alternative metrics:
  - Producing energy coincident with peak loads?
  - Hours or days energy can be stored?
  - Capacity as a percent of peak load?

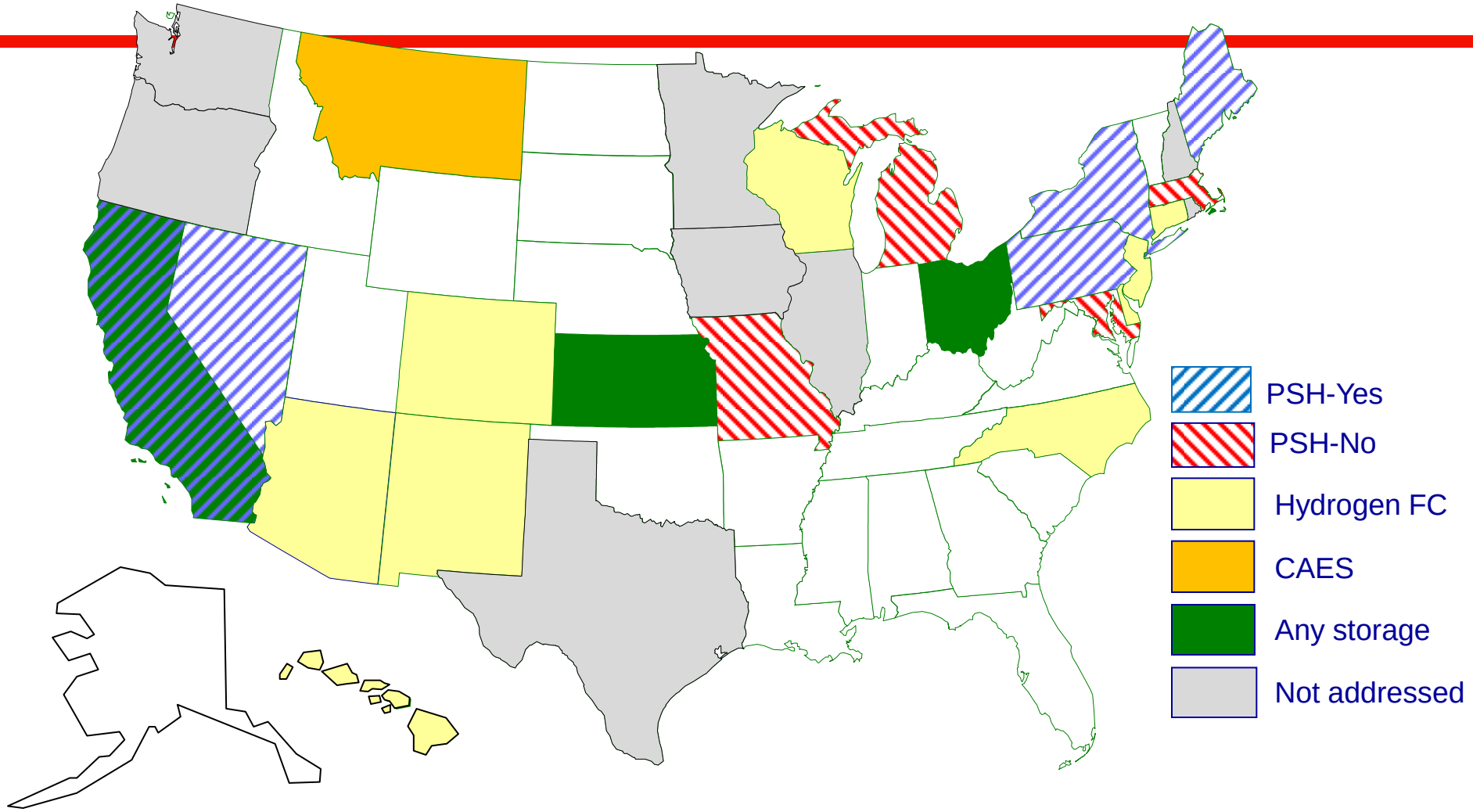
Issue RECs for Storage?

- Possibly, if storage goals are measured in energy output
- But storage does not create additional energy
  - It's the same MWh—it's just stored
- Issuing RECs both for energy in and for energy out would be double-counting. Example:
  - Wind gen produces 100 MWh, sent to storage
  - Storage produces 80 MWh (assume 20 MWh losses)
  - Issue 180 RECs?
  - If sold to different parties, these RECs could result in double claims on the same attributes (compliance or voluntary markets)
- Alternatives:
  - Don't issue RECs for both generation and storage—just one or the other
  - Use a credit multiplier for the output of a RE generator integrated with storage
  - Count storage compliance by capacity (MW) (no RECs)
  - Use financial incentives to stimulate storage instead of RPS

Who Plans for Energy Storage?

- Option A: Let generators “partner” with storage devices and bid total product into the market
- Option B: Transmission Planner orders strategically placed energy storage devices
- Option C: Customers use energy storage to meet their own needs and bids demand response into the market: Dispatchability
- Option D: State mandates through IRP process

Storage in State RPS



Two State Examples

- Based on state law (AB 2514) CPUC recently proposed a mandate on IOUs to integrate 1.3 GW of storage by 2020
  - Goal is market transformation
  - MW capacity targets separate from the state RPS
  - Sub-targets for storage interconnected to transmission, distribution, and customer
  - Does not include pumped storage hydro (too big)
  - ESPs and CCAs required to contract for 1% of 2020 peak load
- NJ Office of Clean Energy is developing a proposed energy storage program for recommendation to the BPU in early 2014
  - OCE has an Energy Storage Stakeholder Working Group
  - The program will be based on competitive solicitations and award of financial incentives

Tracking System Treatment

- GIS: Net energy consumed by a pumped storage facility is calculated by subtracting the energy produced by the pumped storage facility from energy used for pumping at the facility. These MWh are tracked in a non-tradable pumped storage account controlled by the Administrator. At the end of each Trading Period, Residual Mix Certificates are created for each MWh in the Pumped Storage Account.
  - GIS: For the MA AEPS, flywheel energy storage output must be verified by an independent third party and will be credited at 65% of the output
- GATS: Pumped storage treatment same as GIS
- WREGIS: Pumped storage is considered a non-renewable fuel of multi-fuel generators and is not meant for certificate creation
- MIRECS: Storage facility may be eligible to receive Incentive Credits
- ERCOT, M-RETS, NARR, NC-RETS do not address storage

Storage Measurement Scenarios

GIS and GATS Example for PSH

No Direct Connection to Storage
Unknown Resources to Storage

100 MWh generated to grid
100 MWh load into storage
- 80 MWh generation from storage
20 MWh net load

Tracking System assigns Residual Mix attributes to net load

80 MWh of generation cancels 80 MWh of load; no certificates issued

Example for Integrated Storage

Integrated / Direct Link to Storage
Known Resource to Storage

100 MWh input (no generation to grid)
80 MWh generation from storage to grid

Tracking System issues certificates for 80 MWh w/ attributes of connected resource but also a notation that it is from storage

No double-counting—certificates not issued for both primary generation and storage output

Implications

- Whether energy storage fits in RPS depends on policy goals. Is the primary purpose to serve RE, or something else?
  - If the goal is to serve RE, consider how to restrict it to RE charging
  - Program mandates or incentives outside RPS would also work well
- If storage is eligible to satisfy RPS, consider treating it as a carve-out, with capacity metrics
- If compliance measured in energy, be careful not to double count
  - Need to meter energy in and energy out and decide what to do about losses
- Even if your policy metric is not energy produced, certificate tracking systems will need to decide
  - How to measure energy
  - Whether to issue certificates for original generation only, or storage output only
  - Whether to ignore energy losses
  - What attributes to assign to the output