Does Energy Storage Fit in RPS?
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

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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
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
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