Session 1 (Morning)

Identified participation in the group by technology type and market participant interest

Segment representation

- Distributed Gen Renewables developer
- Competitive supplier
- Fuel cell developer
- Microgrid developers
- CHP developers
- Community aggregation
- research

Types of storage represented in the breakout session

- Lith Ion Battery
- Building thermal peak load management
- Electric hot water
- Thermal storage heating & cooling
- ReDox flow battery
- Vehicle to Grid
- Flywheels

A. Topic 1 Identify Challenges/System Needs

The group then set about brainstorming identifying CURRENT ISSUES that could be mitigated with energy storage. The raw listing of issues

- Demand charge management / peak flattening
- Renewable integration
- System wide load factor improvement
- Grid resiliency
- Price volatility mitigation
- Enabling the “Prosumer” model
- Solar balancing relative to rate design / net metering (potential loss of net metering)
- Facility & microgrid scale energy surety / power quality
• Local/distribution level congestion relief and mitigation; transmission & distribution investment avoidance or deferral
• Optimization of the value of renewable resources
• Energy price arbitrage
• Seasonal misalignment of renewable production with consumption
• Permitting and interconnection processes
• Financing and creditworthiness of projects and counterparties
• Siting in urban areas
• Mobile applications
  o Vehicle to grid
  o Vehicle to building
  o Transportation resiliency
• Time of use rates
• Winter reliability issue
• Regional rate basing of transmission projects
• Net metering participation for storage
• End use customer needs/desires
  o Flexibility to participate in energy market / smart home technology
  o Cost versus benefit
  o Convenience
  o Invasiveness
• Capacity plc management
• Rate stability and predictability ; lower overall cost of electricity

A clear trend started emerging that the ideas being offered where generally falling into one of two broad categories that the group defined as either Grid Facing or Customer Facing. Recognizing that, the group set about categorizing and consolidating the ideas offered for the purpose of prioritization.

Results of consolidating and categorizing the above brainstormed list

**Customer Facing Issues**

• Distribution charge management / peak shaving
• Capacity PLC management
• Energy price arbitrage
• Net metering participation
• Enabling the Prosumer model
  o Control/management
  o Flexibility
  o Convenience
  o Reliability / predictability
• Reliability / resiliency (off grid operation)
• Microgrid management and operations
• Optimization of the value of renewable resources
• Solar balancing in the absence of net metering
**Grid Facing Issues**

- Renewables integration
- System wide load factor improvement / Installed Capacity Requirement reduction / T&D investment deferral or avoidance / PLC reduction
- Local reliability / loading issues (distribution investment deferral)
- Regional rate basing of transmission projects
- Winter reliability issues
- (Seasonal) Misalignment of renewable production with consumption
- Inability to site conventional resources
- Electrification of the transport sector
- Leveling the impact of EV penetration
- Grid resiliency

The group then voted (dot voting) to prioritize the issues. Each member had three votes for top, second and third priority.

**Results of the prioritization voting**

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In order of priority:

1. Distribution Charge management
2. System load factor improvement / ICR reduction
3. Enabling the Prosumer model
4. Renewable resource value optimization

Enabling the Prosumer model and renewable resource value optimization each had the same overall score but the Prosumer model garnered more top priority votes.

**Session 2 Afternoon**

In the afternoon session the group focused on identifying barriers to storage participation in the markets and potential solutions to remove those barriers. The group again brainstormed ideas which are listed in raw form here.
A. **Barriers and Challenges for Energy Storage Participation**

- Financability...need better understanding of the value proposition and revenue streams in order to take to a bank at reasonable cost of money versus Wall St. and pay risk adjusted interest rates; referenced CA REMATS program
- Reliability of the revenue streams
- Administrative costs of putting a loan on a project are the same regardless of the size of the project...so smaller projects are more difficult; standardization and simplification of the projects will streamline financing and lower admin costs
- Standardization will streamline implementation as well, particularly the interconnection process
- Contributing to the standardization and simplification of the project is guarantees and warranties
- Certainty of revenue streams
- Utility transparency of distribution system needs both long and short term and a structure to monetize it
- Net metering rules/clarification
- Demand response participation rules / clarification
- (Code Standard Regulation) Fire / building codes and standards not keeping up with technology—lack of suitability to support and lack of understanding of the implications of implementation; arbitrary siloing
- Lack of enforcement of interconnection process...slow reviews
- Free rider problem:
  - Beneficiaries are not the same of the investors
- Metering inadequacy ➔ lack of meter data
- Standardization of CSR across localities
- Policy restrictions on ability of storage to participate in all available markets; avoidance of regulatory “lock in”
- Utilities not incentivized to consider NTA
- Supreme court decision on retail vs wholesale jurisdiction ; FERC 745
- Accessing compartmentalized revenue stream, e.g., storage can be generation, transmission, distribution and ancillary service asset all at the same time and current planning processes do not allow participation in all
- Lack of understanding technology performance in immature technology market (lack of independent verification)
- Methodology for quantification of system benefit of load factor improvement
- Coordination amongst states
- Complexity of aggregation process; high market threshold for reg market participation
- Net metering...tension between net metering and storage opportunities
- Time of use rate availability
- Lack of value of storage
- Procurement issues for cities and towns
- End of life / retirement / disposal issues
B. **Solutions / Mitigation Strategies**

- **Financing**
  - Leverage private capital through credit enhancements
    - Loan guarantees
    - Buy down interest rates
  - Focus incentives on the true new technology
  - CA REMAT type program market responsive incentive structure

- **Require utilities to consider non-wires market based solutions to transmission and distribution needs**

- **Well designed and documented demo projects / field studies**

- **Base incentives on combined value of all available revenue streams**

- **Modernize ISO market to allow aggregation / participation in wholesale markets and allow for provision of both retail and wholesale services**

- **Establish modern CSR to be adopted at the state and local level**

- **National best practices study for ISO / EDC adoption of energy storage**

- **Clear and understandable rules for interconnection**

- **Simple, specific, accessible deployment incentives (e.g., solar ITC)**

- **Don’t ignore municipal utilities need specific incentives for adoption different from investor owned utility**

- **Protect against bad market players**
  - Qualified / approved contractor list
  - Limits on market share
  - CSR requirement adequacy and enforcement

- **Limitations on interconnection request wrt turnaround time**

- **Public procurement policies/regulations to facilitate energy storage adoption**

- **Provide for consumer education of energy storage adoption**
  - Questions and answers
  - Checklists
  - Model contracts
  - Technologies/applications/case studies

- **Solar lessons learned**

- **Education programs for fire inspectors, building inspectors, etc.**

- **Data mining on market response, make it public**

- **Coordination with grid modernization proceeding**

- **Partnerships with utilities and third party providers a al NY REV**

- **Ask EDC’s what their barriers are**

- **Give EDC’s appropriate incentives to adopt storage technologies as alternative to T&D solutions**

- **Identify situations in which utility ownership or control will advance policy objectives**

- **End of life issues**
  - Design for energy storage recycling
  - Take back provisions in EPC contracts
- Encourage standardization of end of life provisions and inclusion in contracts
- Allow use of second life batteries

Time ran out in the afternoon session as the ideas were easily forthcoming to prioritize. A follow on line survey was planned to perform the prioritization.

Session adjourned.