
Storage as a Distributed Option for Grid Operations



Introduction to Ice Energy

- Thermal energy storage company
- Founded in 2003
- Our primary market is utilities
- Most recent win was an award of 16 long term, PPA-type contracts from Southern California Edison under their LCR RFO, totaling 25.6 MWs

Introduction to the Ice Bear



Storage Option Pre-Mandate

- **Distributed storage was considered something for utilities to study, not grid capacity**
- **Questions about cost-effectiveness and reliability, especially batteries**
- **The most successful distributed energy storage technologies for the grid, including ours, were limited to single digit MW pilot projects**

California Mandate

- In 2013 California mandated that the IOUs procure not less than 1325 MWs of storage over the next 5 years
- While a surprise to most, this was foreshadowed by the CPUC approving a So Cal Edison LCR with the condition that they include a minimum of 50 MWs of storage
- After the State mandate, municipal utilities have been filing their own storage plans and appear to moving toward their own mandate, similar to what happened with RPS

SCE LCR

- Most expected SCE to procure exactly the mandated amount of storage and not a kW more
- Most expected SCE to spread the procurement over a large number of major storage (Battery) companies so that even the 50 MWs would end up looking more like a bundle of pilots rather than any grid scale storage project
- Most were wrong
- SCE procured 5X the mandate, making storage more than 10% of the total capacity purchased under their all resources RFO
- Only 4 storage companies were selected and 3 of us had major grid scale awards
- The big names were noticeably absent

Post Mandate/SCE LCR

- **The mandate and SCE have established distributed storage as a part of the grid in California**
- **Based on SCE, storage for the grid will far exceed the mandate**
- **The PPA contracts offered/required by SCE give storage companies the financeable vehicles traditional and renewable generation have enjoyed and that will enable scaling**

Issues

- **Some of the storage winners in the SCE LCR bid not what they had but what they projected they would have 2-3 years from now, with aggressive cost reduction assumptions – that may give storage a black eye if these assumptions don't pan out**
- **Will California pull other parts of the country like they did with renewables – whether states follow the California model or develop their own, the future of renewable energy depends on grid scale storage**