Energy Storage

Opportunities, Challenges and Solutions

By Les Sherman
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As our nation pursues ambitious goals towards substantially increased renewable energy resources and reduced greenhouse gas emissions, new energy storage projects will play a major role in achieving these goals.

Indeed, California Public Utilities Commission (CPUC) Commissioners have said that “energy storage has the potential to be a ‘game changer’ for our electric grid,”[1] and the U.S. Department of Energy in its December 2013 comprehensive study of Grid Energy Storage noted that the “energy storage business could grow from $200 million in 2012 to a $19 billion industry by 2017.”[2]

Augmenting this general trend, the three branches of the U.S. military (which are already committed to purchasing over $20 billion in renewable energy by 2025) have officially communicated their desire for increased energy security for U.S. military installations, in the form of both micro-grid and energy storage solutions. Therefore, developers bidding on military renewable energy procurements are increasingly proposing energy storage options to offer more attractive bid packages.

While energy storage presents tremendous opportunity, successful project development presents significant barriers, risks and other challenges. Long term industry challenges include proving the cost competitiveness of energy storage relative to alternative grid solutions, and validating the reliability and performance of storage technologies. In the short term, two key challenges for project developers include the need to structure workable and financeable commercial and contractual arrangements to carry out individual projects, and the need to optimize project tax benefits.

As we seek solutions to these challenges, the California market presents instructive insights. Given the tremendous growth in intermittent renewable energy projects in California, particularly photovoltaic solar, California has among the greatest needs of any major grid system for energy storage. Moreover, California has led the nation in enacting energy storage related legislation and the issuance of utility RFOs to promote energy storage projects.

This paper examines certain aspects of the current status of energy storage in California in order to provide insights into some of the key challenges to the successful development of energy storage projects.

An Industry Poised for Take-Off

At the end of 2010, the California legislature enacted Assembly Bill (AB) 2514, directing the CPUC to set energy storage procurement targets for California investor owned utilities (IOUs) and other load serving entities.

Thereafter, in February, 2013, the CPUC issued a decision requiring Southern California Edison Company (SCE) to seek proposals to procure at least 50 MW of energy storage resources to meet local capacity requirements (LCR) in the Los Angeles basin. Bids to provide LCR storage to SCE were due this past December, 2013. More significantly, in October, 2013, the CPUC issued its critical Decision (13-10-040) (the CPUC Energy Storage Decision) requiring the three California IOUs to procure an aggregate of 1,325 MWs of energy storage by the end of 2020, with installations by the end of 2024. The CPUC's specific procurement target breakdown is as follows:

Energy Storage Procurement Targets (in MW)

Storage Grid Domain (Point of Interconnection)	**2014**	**2016**	**2018**	**2020**	**Total**
Southern California Edison					
Transmission	50	65	85	110	310
Distribution	30	40	50	65	185
Customer	10	15	25	35	85
Subtotal SCE	**90**	**120**	**160**	**210**	**580**
Pacific Gas and Electric					
Transmission	50	65	85	110	310
Distribution	30	40	50	65	185
Customer	10	15	25	35	85
Subtotal PG&E	**90**	**120**	**160**	**210**	**580**
San Diego Gas & Electric					
Transmission	10	15	22	33	80
Distribution	7	10	15	23	55
Customer	3	5	8	14	30
Subtotal SDG&E	20	30	45	70	165
Total – all 3 utilities	**200**	**270**	**365**	**490**	**1,325**

The CPUC Energy Storage Decision also establishes a target for community choice aggregators and electric service providers to procure energy storage equal to one percent of their annual 2020 peak load by 2020, with installation by 2024. The Decision directs the IOUs to file separate procurement applications containing proposals for their first energy storage procurement period by March 1, 2014, and to launch their first solicitations no later than December 1, 2014.

One other boost to the nascent energy storage industry occurred just this past month (January, 2014), when the consulting firm Energy and Environmental Economics, Inc. (E3) issued a detailed study (funded in part by the IOUs, SMUD and LADWP), exploring the challenges of integrating renewable resources into the California grid.[3] E3 identified overgeneration as the most important challenge. E3 concluded that overgeneration will be "pervasive" at RPS levels above 33%, particularly when renewables production is dominated by solar resources.[4] Among other suggestions, the study highlighted energy storage as a key solution. The E3 study, now widely publicized, further validates the importance of energy storage, and should encourage development of energy storage projects.

Storage Contract Structures and Issues

Although the energy storage industry is poised for growth, few large independent projects have actually been contracted, and there is little guidance or precedent on the likely structuring of commercial contracts for energy storage transactions. The CPUC Energy Storage Decision provided little direction to the IOUs on preferred or recommended structures, other than to limit the amount of IOU-owned energy storage projects to 50 percent of the total procurement targets. However, for its recent solicitation of 50 MWs of energy storage resources to meet LCR requirements, SCE developed and proposed a new pro-forma Energy Storage Agreement (ESA). SCE's pro-forma ESA will likely evolve, but is expected to become the basis for other SCE storage solicitations, as well as an example for other IOUs, and even potentially utilities in other jurisdictions. Therefore, it is worth taking time to analyze both the structure of the ESA and to identify key contract issues that, if not managed, might limit the potential pool of capital available for financing storage projects.

SCE's ESA form was created based upon SCE's standard power purchase tolling agreement, and essentially is an energy storage tolling agreement. The fundamental commercial structure of the SCE form is as follows: (i) Seller (i.e., the project developer/owner) is fully responsible at its own cost to develop, permit, finance, install, own and interconnect the storage project according to mutually agreed schedule milestones; (ii) Seller is responsible for the full operation, maintenance and repair of the project; (iii) SCE is designated as the project's Scheduling Coordinator and is responsible to schedule and pay for all energy deliveries into the project necessary to charge the project, SCE is authorized to send dispatch notices to Seller for the discharge of energy back to the grid, and SCE is entitled to all CASIO revenues arising from dispatches; and (iv) SCE compensates Seller each month through a fixed capacity payment and a variable O&M payment, which payments are subject to various reductions, including for lower than expected project availability, capacity and efficiency.

A number of issues need to be addressed in SCE's ESA form, both to protect the Seller, as well as to ensure financeabilty. These issues are also certain to come up in other IOU and other utility energy storage contract forms. A few of the key issues include the following:

- <u>Applicable Standards</u>. In recognition that the CAISO Tariff and most industry standards applicable to energy "storage" facilities have not yet been developed with substantial specificity, the parties should agree to cooperate in good faith to apply new rules in a manner that attempts to maintain the fundamental commercial deal and economic benefits and burdens as set forth in the ESA.

- <u>Termination Dynamics</u>. Notably, the SCE ESA has numerous circumstances in which SCE has termination rights and/or approval rights, in certain cases based on subjective SCE determinations. Given the likelihood that pricing for storage contracts may decrease (potentially substantially) in the near term, it is in Seller's interest to limit or eliminate all such bases for termination. Doing so will minimize Seller's risk of an ESA termination exercised by SCE (or other counterparty) primarily to replace the ESA with a lower priced ESA, a phenomenon that has plagued the solar industry for the past few years as solar PPA prices have dropped and utilities have tried -- successfully, at times -- to find creative ways to terminate existing (older, higher priced) solar PPAs and replace them with new less expensive contracts.

- Pre-COD Damages. As has become common in a number of recent utility pro-forma PPAs, the SCE ESA limits Seller's pre-commercial operation date right to damages from SCE upon a termination due to an SCE event of default to a fixed amount based upon Seller's costs incurred, rather than the more traditional mark-to-market forward settlement value calculation. These provisions may need substantial modification to protect Seller and to ensure financeability.

- Testing and Operations. Particularly given the infancy of the energy storage industry, ESA provisions addressing testing protocols, project operating parameters and related technical matters require substantial consideration and revision for each individual storage project based upon the project's unique technology and operating characteristics.

- Defaults. The Seller defaults in the ESA do not include customary cure and notice periods, carve-outs and other qualifications, much less the longer cure periods and greater carve-outs that might be required for new storage technologies.

- Capacity Payment Reductions. Provisions resulting in reductions to monthly capacity and O&M charges need significant clarification, including to eliminate potential double counting of penalties.

- Project Financing Provisions. The lender financing collateral assignment and consent provisions in the pro forma agreement are not market and either need to be clarified before ESA execution or specified that they will be revised later to accommodate lender requests.

- Resource Adequacy Covenants. Storage projects can provide Resource Adequacy benefits, but, because they have different operating characteristics than other RA resources, a number of provisions related to Seller's continuing obligations with respect to Resource Adequacy benefits require clarification.

The foregoing are just a few of the key issues in the SCE form of ESA that are also bound to arise in other IOU and utility storage contract forms. Some of the issues are challenging, but with careful negotiation the issues all should be manageable.

Storage Transaction Tax Issues

Energy storage projects present critical tax issues, including a few unique to California. Additionally, projects that incorporate structures that allow the federal Investment Tax Credit (ITC) to be applied to the project's energy storage equipment capital cost may prove more competitive than storage projects that are not ITC eligible. Set forth below is a summary of a few of the key tax issues applicable to energy storage projects:

- Service Contract Issues. As with power sales and other similar energy services contracts, it may be critical that an energy storage contract be structured in a manner that it is considered a "service contract," and not recharacterized as a lease, under federal tax rules. If recharacterized as a lease and the service recipient is governmental or another tax exempt entity (e.g., a municipal utility), then any ITC or accelerated depreciation benefits otherwise available to the project owner will be lost.

- General ITC Eligibility for Solar Energy Storage Facilities. ITC for an energy storage component of a solar project is generally available if the non-solar energy (if any) used to charge the storage over the one-year period beginning with the project's placed-in-service date does not exceed 25 percent of its total energy inputs during that period. Moreover, the tax basis of the storage related equipment eligible for ITC includes only the cost of the total equipment that is proportionate to the solar energy inputs. For example, a $100 storage facility where 90% of the electricity it stores during the first year of operation is from solar sources would be eligible for ITC (as 75% or more of the inputs are from solar), but the amount of tax basis eligible for ITC would be limited to $90.[5] If the percentage of input from renewable energy falls below the one-year amount in subsequent years, all or a portion of the ITC may be "recaptured" (required to be repaid to the government), as provided below[6].

- Location and Ownership of Solar Energy Storage Facilities. The location and ownership arrangements of a solar energy storage facility may impact its eligibility for ITC as follows:

    - A storage facility owned by the owner of solar generation assets and located on the same site as the generation assets would qualify for ITC as a part of the solar generation assets, assuming the 75% threshold is satisfied.

    - A storage facility that is not located at the same site as the generation assets or that is owned by a different taxpayer than the taxpayer that owns the generation assets, but that is "integral" to the operation of specific generation assets, may qualify for ITC, assuming the 75% threshold is satisfied. The "integral" to operation requirement may mean that placing the generation asset into service is dependent on placing the storage component into service. However, federal tax guidelines are not clear regarding whether a particular facility would be regarded as integral to the operation of a solar project, and it may be advisable to obtain a private letter ruling from the IRS for such a structure. Sponsors should expect that it will take anywhere from 6 months to a year to obtain such a ruling, even if the IRS agrees to issue one.

    - A stand-alone storage facility that is not dedicated to a particular solar generation asset could possibly qualify for ITC, but this situation presents unique issues and may require the tracing of solar-generated electricity to the particular facility. In practice, it may be very difficult to pursue such a project without further IRS guidance.

- ITC Recapture. ITC "vests" at a rate of 20% per year over a 5-year recapture period. If there is a disposition or disqualifying use of ITC property in the first year of operation, there is 100% recapture; dispositions or disqualifying use in the second year result in 80% recapture; and so on through the recapture period. These same rules apply in the storage context with an additional special rule. ITC recapture would apply if, during any year of the 5-year period after the in-service date, solar energy inputs as a percentage of total inputs drop below the percentage determined during the first year of operation. If the solar energy inputs for a year drop below 75%, full recapture of the unvested amount applies. For example, if solar energy inputs on a $100 storage facility were 100% in year one but drop below 75% in year two, 80% of the $30 of ITC would be recaptured. If the drop below 75% in solar energy inputs occurs in year three, 60% of the $30 of ITC would be recaptured. If there is a reduction in the percentage of solar energy inputs below the first year's percentage of solar inputs (but still at least 75% solar inputs), there would be proportionate recapture. For example, if a $100 storage facility qualifies for $30 of ITC based on 100% solar inputs in the first year after the in-service date, but the percentage of solar inputs in year two drops to 75%, then there would be $6 of recapture (25% of 80% of $30).

- ITC Eligibility for Non-Solar Energy Storage Projects. For energy storage associated with fuel cell, small wind, combined heat and power, 10% ITC geothermal and ground thermal heating/cooling facilities, the rules similar to those described above for solar energy storage would apply. Under current law, ITC is only available for energy storage associated with large wind, closed-loop biomass, open-loop biomass, 30% ITC geothermal, landfill gas, trash, hydropower and marine and hydrokinetic facilities if construction of the facility began before January 1, 2014 and production tax credits are not taken.

- Depreciation Period. If energy storage assets are eligible for ITC, they would also be eligible for 5-year MACRS depreciation. If they are not eligible for ITC, they would appear to be depreciated over 7 years for federal income tax purposes.

- California Solar Property Tax Exclusion. Generally, if an energy storage facility qualifies for ITC, it would also qualify for the California property tax exclusion in Section 73 of the California Revenue and Taxation Code. However, under sections 73(d)(2) and (d)(3) of that Code, if the energy inputs to the storage asset include any non-solar energy, it appears that only 75% of the value of the property is eligible for the property tax exclusion.

Conclusion

Energy storage technologies present important solutions for critical energy grid problems. As a result, energy storage projects present significant business opportunities for project developers, vendors, capital providers and other participants. Energy storage projects also present significant risks and challenges, not only on technical issues, but also on basic commercial, contractual and tax structuring issues. The issues are manageable, however, and those who manage the issues effectively will stand most prepared to succeed in helping to solve energy grid problems while earning a profitable return on investment.

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Mr. Sherman has been very active representing clients on solar, wind, geothermal and other renewables projects, as well as traditional gas projects. In the past year, he has advised a number of clients on multiple energy storage projects in California and Puerto Rico. Mr. Sherman is currently representing a dozen clients on the ongoing 2013 California Investor Owned Utility RPS solicitations for new renewables projects, and SCE's ongoing 2013 RFO for Local Capacity Requirements (including storage).

Mr. Sherman received his law degree from UCLA Law School in 1984, and his B.A. from U.C. Berkeley in 1981 where he graduated *phi beta kappa*.

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[1] *See* CPUC Decision 13-10-040, October 17, 2013, Concurrence of Commissioner Mark J. Ferron and President Michael R. Peevey.
[2] *See* "Grid Energy Storage", U.S. Department of Energy, December, 2013, page 9, citing to IMS Research Report "The Role of Energy Storage in the PV Industry -- World -- 2013 Edition."
[3] *See* "Investigating a Higher Renewables Portfolio Standard in California", January, 2014, Energy and Environmental Economics, Inc.
[4] *Id*, at pages 10-11.
[5] IRS Regulations section 1.48-9(d)(6).
[6] *Id*.