Peninsula Advanced Energy Community (PAEC)

Task 2.8: Final Report of Interviews with Public Agencies, Installers, and Vendors

Prepared for
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About the Authors

Sovereign Energy Storage

Sovereign Energy provides utilities with intelligent and cost effective solutions for integrating renewables, improving system reliability and power quality, and lowering operating costs. Our success will accelerate the adoption and penetration of renewable energy, while modernizing and improving the stability of the grid.

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Clean Coalition

The Clean Coalition is a nonprofit organization whose mission is to accelerate the transition to renewable energy and a modern grid through technical, policy, and project development expertise.

The Clean Coalition drives policy innovation to remove barriers to procurement and interconnection of distributed energy resources (DER)—such as local renewables, advanced inverters, demand response, and energy storage—and we establish market mechanisms that realize the full potential of integrating these solutions. The Clean Coalition also collaborates with utilities and municipalities to create near-term deployment opportunities that prove the technical and financial viability of local renewables and other DER.

Visit us online at www.clean-coalition.org.

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I. Introduction

This section provides a synopsis of the current permitting process for behind the meter energy storage in California from multiple prospective.

Sovereign Energy Storage conducted interviews with seven California counties, focused on building and fire departments, to understand the process, costs, and timelines for permitting lithium ion energy storage projects. We found that there is currently no standardized process in or between jurisdictions. Projects are evaluated on a one-off basis.

However, based on additional interactions with project developers, installers, integrators, financiers, and original equipment manufacturers, the current permitting regime is both predicable and workable. Most sites are permitable; the permit submission package, fees and timelines to achieve permitting are generally reasonable ($2,000/1 month).

A following section will outline our suggestions to improve the permitting process.

II. Interviews with Permitting Agencies on Energy Storage Permitting Process

Review existing energy storage permitting processes in Counties that have energy storage installations:

Sovereign Storage has interviewed permitting agencies in the following Counties: San Francisco, Los Angeles, Santa Clara, Contra Costa, San Mateo, and Alameda counties to determine the process for permitting behind the meter, battery energy storage.

Overall, there are many recurring themes and processes across the various planning end electrical permit departments. For distributed energy storage systems the process will take one to six weeks for permit approval, with the timeline dependent on:

1. The workload of the permitting agencies
2. Their ability to process forms within their department
3. If they need to solicit outside assistance

Additionally, the cost of the permit will be twenty to thirty dollars for processing, plus the cost of the specific permit type per California building code, which is a specific percentage of project costs. Projects should be submitted with as much information as possible, but at a minimum: single line diagrams, site plans, and engineered drawings if the project will be built in a seismic zone. The permit will be reviewed by the building, electrical, fire and public works departments within each county.

Listed below are the results of each interview with the pertinent building permit official:

Has [County] permitted battery energy storage for a commercial or industrially zoned location in the last year?	Yes, multiple projects have been permitted.
Does the footprint of the system or energy rating (kWh) effect the permit; does any system size (from closet sized to 40ft container) fit under the same type of zoning and permit requirements?	No, but projects are subject to fire plan review also (read fire code, section 608). 1 or 2 hour rated firewall required (a table in building code requires separation of occupancy).
What zoning classification does stand-alone battery energy storage currently fall under?	Don't know (planning department - (415-558-6377), (electrical 415-558-6570)
What permits are currently required to install energy storage as a stand-alone, or at an existing commercial or industrially zoned location?	Building department, electrical department, fire department.
What project documentation is required to be submitted in a permit application? MSDS, drawings, electrical single line diagrams, etc.?	2 sets of 11/17 minimum size plans, engineer drawings for a structure, application form (in person 3a for retrofit), if lighting then title 24 also.

Which departments or entities within the city and county must review the project documentation in order to receive a permit (building, fire, etc.)?	DoB inspection, fire at minimum
Are there plans to create a standardized application process (similar to roof top solar PV) for behind the meter energy storage?	No
Is there any advice you would give an applicant seeking a permit for battery energy storage?	If existing smoke control systems, plans need to be signed and stamped by a CA registered engineer (electrical, structural, mechanical), include non-infringement statement (SFDBI AB047)
What fire suppression systems are required to be in place at sites at which energy storage is installed? Do the requirements vary based on the battery chemistry type (li-ion vs. lead acid)?	No, ask SF Fire
What NEMA-rating is required for enclosures for energy storage system sited outdoors?	NEMA 3-R. If you are in a marine environment NEMA 4X.
What seismic rating is required for outdoor or indoor systems?	Structural review (if are than 400lbs needs structure)
What is the minimum time required for review before issuing a permit?	2-3 weeks
What is the maximum allowable time for review before issuing a permit?	Depends on workload and complexity of system (6 weeks)
What is the duration that a permit to build an energy storage project lasts?	Check with administrative portion
What is the cost of a permit to build an energy storage project?	Based on value of the work

III. Interviews with Energy Storage Manufacturers, Integrators, Developers, and Project Financiers

Interview developers of energy storage projects and vendors of energy storage systems:

Sovereign Energy has discussed the distributed energy storage development process with multiple stakeholders across the development value chain including manufacturers, integrators, developers, and project financiers. Below is a discussion of the sentiment across each player in the value chain, for the education and benefit of Peninsula Advanced Energy Community (PAEC).

Manufacturers

Manufacturers of battery cells, modules, and systems are experiencing a collapse in price and margin across their section of the supply chain. The major players in the lithium-ion battery value chain are LG Chem, Samsung, and Tesla, with several other players quickly emerging as 'tier-1 manufacturers': ATL, Lishen, BYD, Daimler, BMW. Each player is driving down cost through manufacturing scale across other industrial verticals (electric vehicles, handsets, or both). The weighted average $/kWh battery system price has dropped by about 40% between 2014–2016, with the largest pricing pressure has been caused by Tesla Gigafactory announcements. In response to Tesla announcements, other manufacturers are dropping their prices to stay competitive. The expectation in the market is currently that cell manufacturers will bear the majority of the brunt of cost pressure in the supply chain due to the parent company's capability to take near term losses in order to create the market and make projects economic. Battery system sales teams are incentivized to close as many deals as possible between 2018 and 2022 to develop a portfolio of commercial-scale reference projects and increase the utilization rate of manufacturing lines.

Technology Integrators

Technology integrators are a key component of the battery value chain particularly software providers who are capable of dispatching battery systems to perform the requirements of each application (on both the wholesale side and retail side). At the beginning of market animation, software providers were able to command large margins. This was due to their software being enabling piece of technology, with the largest associated performance uncertainty. As more projects are successfully completed, project developers have taken some of that software capability in-house. In response, many technology integrators have gone downstream into the development field. Two of these integrators are Greensmith Energy and Stem. Greensmith started by designing control systems for utility-scale storage projects. Stem started by developing demand charge management software for SGIP projects in California. Both companies are now developers actively bidding on utility RFOs. Stem has cleared over 100 MW of long-term contracts in

California IOU auctions. As more distributed resources are being deployed in into wholesale markets, a new brand of quasi-aggregators, quasi-back office clearing houses have been developed to handle both the dispatch and optimization of projects in the market, and the complex handling of large amounts of data required to settle wholesale market participation. There is a large amount of uncertainty in the technology integration space, currently, but it is Sovereign's belief that as more large developers and financiers get into the space, the currently disjointed software value chain will be acquired by large players who are currently operating utility grids and large generation assets, such as GE, Siemens, and Alstom.

Developers

There is a lack of deal flow in the energy storage industry, making development the highest-value part of the supply chain. Since all technology companies rely on developers to originate relationships with end-customers and put deals together, developers are able to put pressure on other actors to lower costs to create acceptable value propositions to end-customers and favorable economic returns to developers. Developers are currently focused on originating contracts with utilities in California and Arizona in utility RFOs, and are focused on behind the meter storage and solar + storage projects in California and New York. Developers are currently most concerned with making sure that projects are eligible for and receive all available incentives (SGIP, ITC, DR), and they are able to procure equipment for a price that financiers are willing to invest in projects. At this point in the development of the energy storage industry, most deal activity for behind the meter resources is focused on investment grade, multi-site, national accounts (Wal-Mart, Target, etc.).

Project Financiers

There has been healthy interest from large renewable energy investors to participate in energy storage project finance. The main players are the same entities who have developed much of California's solar portfolio: NextEra, NRG, Constellation, AES, LS, RES, and Enel Green Power. These investors are attracted to the space for 2 key reasons; 1) the capability of batteries to increase the value of their renewable energy portfolio, and 2) the potential to receive capacity payments from highly credit rated utility off-takers. The key issue facing project financiers is not having 100% of project cash flows guaranteed by the utility (projects will have merchant exposure), the risks of financing new technology. Battery systems' performance are typically wrapped by a large engineering, procurement and construction (EPC) company and battery cells are under warrantee from large suppliers, but the software responsible for dispatching units tends is sold by new startup companies. The project finance atmosphere will be driven by large infrastructure funds and banks getting comfortable with expectations around how energy, capacity, and ancillary service prices will develop over the next 20 years, and how battery projects will be able to perform and operate to achieve those revenue streams.

IV. Conclusion

Based on our interviews and research, current permitting processes in California are workable and allow behind the meter energy storage projects to achieve the necessary permits in a reasonable amount of time for a reasonable fee. Current permitting and processes have room for improvement, including standardizing required documentation, timelines, inspections, and costs.

The industry, working through non-profits, can also work to create standardized documentation and processes for local building and planning departments. Creating a 'behind the meter energy storage permitting tool kit' will save local jurisdictions time and allow them to implement streamlined processes more rapidly. Further details on specific recommendations can be found in the PAEC Task 2.9: Policy Recommendations and Guidelines for Permitting Energy Storage report.