

What's In Store:

Key steps for companies considering on-site energy storage.

BY BRIAN CAREY AND CATHERINE POTTER

From the passage in California of Assembly Bill 2514, which required the state Public Utilities Commission to set procurement targets for energy storage for the state's three major investor-owned electric utilities, to the recent landmark action by a major utility to purchase more than 250 MW of energy storage resources through an RFP solicitation (marking the largest-ever purchase of grid-connected energy storage in U.S. history), the energy storage market is gaining momentum. Among the various drivers of this new market are 1) a growing penetration of renewable energy in the resource mix, 2) an increasing focus on climate change and resource scarcity, 3) the growing prevalence of demand charges for commercial and industrial energy users, and 4) various other regulatory changes. In addition to utility-scale storage projects, companies with sophisticated or intensive energy needs are increasingly considering energy storage for siting at their own facilities, as part of a broader trend toward a mixture of centralized and decentralized power.

Energy storage can be used by companies for a wide range of applications, including emergency backup, power quality management, reduced risk of power outages, performance optimization of intermittent energy assets like distributed solar, energy cost reduction, and revenue generation through services demand response. Given the extensive number of energy storage options on the market, how can companies assess and prioritize what's best for their needs?

To help organizations with this decision, we've assembled a list of key steps to take when considering on-site energy storage:

1. Understand how storage is likely to be used.
2. Prioritize your business objectives.
3. Acknowledge differences across the company.
4. Develop an initial options list.
5. Identify vendors.

The next frontier will be to think about storage not in isolation, but as part of a broader, integrated system.

6. Develop the operational plan.
7. Plan the financing.
8. Establish a plan for operations and maintenance.
9. Capture lessons learned.

The Nine-Step Plan

First, identify the specific use cases or applications that are most important for your company's operations. Some companies may only have a need for reducing their risk of power outages. Other companies may have a combination of

different use cases and desired applications for energy storage.

Second, consider your broader business goals. These may include cost reduction, return on investment, energy security, continuity of operations, carbon emissions reduction, risk reduction, or enhanced reputation. Engage colleagues across functions in your organization, including operations, finance, marketing, risk management, and other groups to identify the right set of goals, being sure not to miss key business benefits that are important outside of operations.

Third, consider how your needs differ across facility types and geographies. If needed, group facilities into logical clusters. Develop a short list of key project requirements for your facilities overall or for particular clusters of facilities.

Fourth, develop your initial options list. Identify the range of appropriate storage technologies that are likely to meet your use cases and project requirements. From thermal storage to batteries to flywheels to supercapacitors, different technologies have different strengths and weaknesses, such as total capacity, number of cycles, flexibility, interoperability, speed of response, and required maintenance. Prioritize the top options based on those that might create the greatest potential value relative to your energy storage needs and business goals.

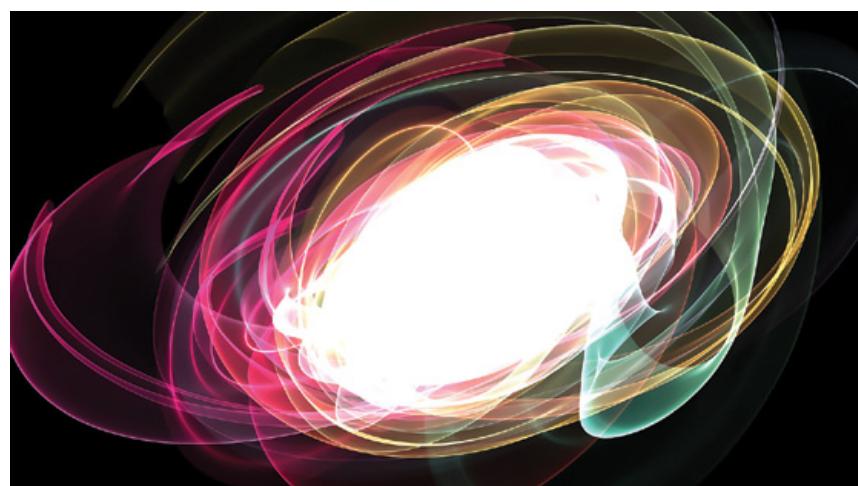
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Fifth, identify vendors. Energy storage is an evolving technology and the market is quite dynamic right now. Given the range of vendors currently in the marketplace, their different maturity levels, and the pace of change in the industry, companies should carefully vet potential vendors. Consider using Requests for Information or informal initial discussions to understand the current option set available in the market. By having vendors focus on your specific business requirements and needs, you can get to insights faster. Especially for earlier stage technologies, talk to references, ask for return on investment data, and visit sites where the technology is already installed. If needed, initiate a formal Request for Proposal process to ultimately select the right partners with which to work.

Sixth, develop the operational plan. Working with your vendor, develop a plan for an initial pilot project or set of projects. In addition to optimizing the performance of the storage asset itself, don't forget to consider how the technology will integrate with other energy and related assets on site. Work with vendors to explore the extent of configuration and customization available. Be sure to understand performance guarantees, warranties, and other aspects that relate to how the proposed technology will operate in a predictable, safe, and optimal way.

Seventh, plan the financing. And in carrying out this step, you'll first want to consider structural options.

This means you will want to explore how to structure the project to meet your financial objectives, whether it is reducing upfront capital costs, stabilizing energy costs, creating future revenue stream opportunities, or satisfying other needs. Consider a power purchase agreement (PPA) or other structures to minimize risk and maximize value. Some system providers,



for example, provide no-money-down financing. The installation is free, and customers pay off the cost through utility bill savings.

Your financing plan must also consider potential partners and opportunities for funding assistance. For example, explore incentives and investment partners, as appropriate, to improve the project economics. Identify available tax incentives, subsidies, and other programs that can improve the economics of the project. For example, energy storage solutions that are part of broader renewable energy installations can potentially qualify for federal tax credits. Programs featured in states like California and New

York offer rebates for the installation of clean and efficient distributed generation technologies, including advanced energy storage systems. In addition, as utilities pursue microgrids, some are prioritizing customer-sited storage over other types of investments.

And your financing plan ought also to include consideration of your business case. Because storage often straddles multiple use cases and business benefits, developing the business case may involve treading new territory for your company. Be sure to educate key internal stakeholders on the full range of project benefits in order to build a strong business case to move forward.

FIG. 1

THE TREND TOWARD DISTRIBUTED ENERGY

Distributed energy is a growing trend among leading corporations nationwide. Such solutions can help companies improve their reputation, cut costs, create jobs, and generate additional opportunities. Over the last couple of years, corporate solar deployments in the U.S. have risen dramatically and the technology is entering the mainstream.

Other forms of distributed energy include fuel cells, cogeneration, wind, diesel backup generators, and other technologies. Companies often choose these alternative energy sources because they reduce emissions and/or costs. Energy storage will likely follow the trend of renewable and distributed energy and may also be distributed to some extent.

As indicated in PwC's 2013 Annual Global Power & Utilities Survey, 90% of North America utility executives believe that they cannot ignore the impact of distributed energy resources on their business.

Percentage of utility executives that say it is likely or highly likely that increasing levels of distributed generation will force utilities to significantly change their business models



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Eighth, establish a plan for O&M. Depending on the structure of the project, your company may own and operate the asset once it's installed or it may have a service agreement with a vendor to handle that for you. Either way, be sure to establish a plan for ongoing operations and maintenance, including integrating any new steps required for proactive risk management and asset optimization.

Ninth, capture all lessons learned. For larger companies, one of the most common pitfalls is for one part of the organization to explore the deployment of a new technology and forget to share lessons learned from that deployment with other parts of the organization. Identify a simple way to capture lessons learned so that with each deployment your company realizes greater benefits.

From batteries to flywheels to supercapacitors, different technologies have different strengths and weaknesses.

Not Just a Fad

Brian Janous, Director of Energy Strategy at Microsoft, states, "Energy storage is already widely used in data centers for power quality management and for transitioning to generators during a grid outage. However, we are interested in how these systems can be more intelligently integrated into grid operations."

Tim Derrick, Energy Storage Leader

at SunEdison states, "We're seeing an uptick in distributed generation customers asking about storage. They're motivated by the long-term asset value of the solar installation as well as short-term benefits like demand charge reduction and energy reliability."

Energy storage is not just a fad – it's an important part of the evolution of energy and it will have far-reaching implications for both the electricity grid as well as distributed energy. It will not be appropriate for all companies or all situations, but is an important option to explore. The next frontier will be to think about energy storage as part of a broader, integrated energy system rather than in isolation. Companies that view energy storage as one piece of the puzzle will achieve optimal results in managing energy costs while meeting their other business objectives. ■