

batteries

In the face of rising energy costs, battery storage can make retailers more resilient, more sustainable and more profitable.

BY MATT ALDERTON



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Faced with increased operating costs and pressure from environmentally conscious consumers, retailers have spent the better part of two decades trying to reduce their energy footprints. They've replaced traditional lighting with LEDs, installed energy management systems and spent millions updating HVAC systems. And yet, utility costs still constitute 35 percent of the typical retailer's

operating costs, according to the Connex 2018 Dynamic Benchmarking Report.

Clearly, energy efficiency is not enough. To impact their bottom line, retailers must expand their energy aperture to focus on not only on decreasing energy consumption, but also on increasing energy storage — capturing energy from the grid when it's cheap, storing it in onsite batteries, then using it when energy is expensive.



“We see energy storage growing to a point where it is equivalent to 7 percent of the total installed power capacity globally in 2040,” said Logan Goldie-Scot, Head of Energy Storage at Bloomberg NEF, which predicts energy storage will attract \$620 billion in investment over the next two decades.

One reason analysts are so bullish on energy storage is “faster-than-expected falls in storage system costs,” according to Bloomberg NEF, which said prices for one popular battery type, lithium-ion, fell by 18 percent in 2018 alone. That has made battery storage an affordable and intriguing new option for retailers that need to shed some extra energy weight.

Strategic Storage

The typical battery storage system consists of a refrigerator-sized inverter that converts raw power

into usable electricity, a microwave-sized controller that regulates the battery-charging process and a 10-foot-by-4-foot battery that can be supplemented with additional batteries in a modular fashion to generate incrementally more power for facilities that need it.

“A starter system is very small but can grow significantly depending on your needs,” explained Jay Frankhouser, Senior Director of Product Management and Marketing for Energy Storage at EnerSys, a stored energy solutions provider based in Reading, Pennsylvania. He said battery storage systems can be installed inside, on the roof or even in parking lots, where retailers sometimes store them inside 20- or 40-foot shipping containers.

Regardless of their size or locations, systems work the same. “In simple terms, they capture energy

from the grid when energy costs are low and they store it in a battery,” Frankhouser said. “Then, the control system can use that stored energy either when there’s a power outage or when energy costs are high.”

Users who rely on battery storage during power outages use it as an alternative or a complement to traditional generators, ensuring resiliency in case of blackouts or brownouts. Those who use it to manage energy costs, on the other hand, count on battery storage for flexibility. In both cases, batteries typically provide enough electricity to power a facility for two to four hours.

“It allows you to decide when you want to purchase energy from the utility or when you want to provide your own energy,” Frankhouser continued. “A lot of areas now charge \$1 per kilowatt hour or more at



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certain times of day when demand is high. With battery storage, you can decide during those times not to buy energy from the utility.”

That’s good not only for energy customers, but also for energy providers. To ensure service during peak hours, the latter must increase their generating capacity; often, this means bringing older, more expensive power generation equipment online. Because that increases operating expenses, utilities often offer incentives to customers who reduce energy consumption during peak hours.

“It’s called demand response,” Frankhouser explained. “A utility can call on customers to curtail usage in exchange for an incentive. And if you have an energy storage system, your usage could drop to zero, in which case your utility might actually pay you to use your stored energy instead of the grid.”

It’s a triple win: Energy customers avoid peak charges, receive an incentive when they participate in demand response programs and, finally, could be eligible for yet another incentive if they use battery storage alongside solar panels.

“Many areas are adding additional incentives for solar,” Frankhouser said. “So if you can pair solar with storage, in many cases the incentives can be even better.”

The result is as good for the environment as it is for the bottom line, which yields returns for companies with financial as well as social objectives.

Retailers Get ‘Charged’

Many retailers experimenting with battery storage have seen promising results. As of 2018, for example, grocer Whole Foods had 60 stores and facilities with rooftop solar installations, some of which also have battery storage systems. A case study from Millbrae, California-based energy storage provider, Stem, cites seven such stores.



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Located in California and Hawaii, they collectively will save Whole Foods \$513,970 in energy costs over the next 10 years, according to Stem.

“I would say [energy storage] is probably the single biggest game changer in terms of new technology coming to distributed energy management,” Whole Foods Global Director, Energy Management, Aaron Daly told Stem. “It’s going to have a profound impact on our business, and even more so, on the energy industry at large in the utility space. It’s going to completely change the economics of power production and procurement.”

Another Stem customer is Bed Bath & Beyond, which has been using battery storage since 2015, according to Stem. The retailer, it said, has four stores with battery storage that are expected to save it \$143,910 in energy costs over the next 10 years.

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How much savings any one retailer can expect depends upon the size of their system and the cost of energy in their footprint. But returns can be as high as 50 percent, according to EnerSys.

A third Stem case study features JCPenney, which as of 2017 had 26 California stores with battery storage installations, according to the company. JCPenney initially installed battery storage in 2015 at nine of those stores, which in their first year saved the company over \$40,000. When they installed battery storage in 2016, the 17 additional stores were expected to save the company another \$60,500 per year, bringing the company's total annual energy savings to \$103,000. Over a 10-year period, that's over \$1 million.

"[JCPenney] has engineered what industry analysts have called a

'remarkable turnaround,'" Stem reported in its case study. "Faced with relentless online- and discount-driven market pressures that are challenging most retailers, JCPenney ... has aggressively cut its selling, general and administrative expenses, which includes controllable store costs such as energy."

Powering Up

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The initial cost varies dramatically

depending on the building type and how large the system is, but round numbers typically are \$500 to \$1,000 per kilowatt,” Frankhouser explained. He pointed out that battery storage systems have virtually no operating costs after installation — except for periodic battery replacement, which could take place every five, 10 or 15 years, depending on usage. “Systems typically pay for themselves within two to five years.”

According to Stem, JCPenney’s systems vary in size from 54 to 108 kilowatts, while Bed Bath & Beyond’s and Whole Foods’ systems are 72 kilowatts and 306 kilowatts, respectively.

To determine their stores’ unique requirements, Frankhouser said retailers should consult their local utility and/or an energy storage provider. EnerSys, for example, has a proprietary tool that calculates a customer’s needs based on their electric bill. Many utilities, meanwhile, offer consulting services to help customers analyze and optimize their energy profile.

Although battery prices may decline further, Frankhouser suggested now is a good time to invest. “At this time, a lot of the potential efficiencies have been realized. So the slope of that pricing curve has really flattened,” he said. “Plus, these are razor-blade systems. If a better razor blade comes along, you can plug that in or add it on in parallel; the base of the equipment stays the same no matter what battery technology you put in.”

Systems typically use either traditional lead-acid batteries or the newer lithium-ion variety. The former are cheaper and more stable while the latter are smaller, lighter and longer-lasting. For now at least, Frankhouser remains a traditionalist. “We’ve been deploying mostly lead-acid batteries because code officials in some cities are concerned about lithium-ion technology, since its chemistry tends to be a little



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for Energy Storage, EnerSys

more volatile,” he said. “Those code officials are probably the biggest challenge we’ve seen with these systems; whatever battery you use, you’re going to have to work with your code officials to make sure they understand what you’re installing since these systems are quite new in most areas.”

Ultimately, the long-term payoff justifies the short-term effort.

“You can save money on electricity, you can add to the resiliency of your operation and in some cases you can add a green element to your operation, as well,” Frankhouser concluded. His final piece of advice is: Crawl first, run later. “Start small. You’ll get knowledge, spend less money and gain a lot of confidence. Then, you can always grow your system from there.” ✕



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