ELECTRICITY STORAGE TECHNOLOGY

A WAKE-UP CALL FOR UTILITIES TO INTEGRATE NEW TECHNOLOGIES

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Although solar power has been ballyhooed as the reigning threat to the traditional utility revenue model, there is a stealth disruptor lurking in the wings: electricity storage. New and more economically priced technology can store enough electricity to power a home or business for a few hours. That's long enough to disrupt the peak demand charges business model many utilities rely on for their cash flows.

Alarm bells should be going off for traditional utilities. This is not just about a few wealthy homeowners making better use of their solar panels. This is about a fundamental change to the way electricity is generated, sold and used as customers use batteries to reduce their peak demand and the hefty demand charges that go along with it. This is about power plants potentially sitting idle, power lines moving less electricity and commercial customers, big and small, gaining a powerful tool to cut their electricity bills.

So what should utilities do? Rather than resist new technology, forward-thinking utility executives are drawing on their traditional strengths. They are using long-standing customer relationships to understand power requirements and system operations to integrate new technologies in a way that benefits both the customer and the utility. Failing to do so could potentially put billions of dollars of annual revenue at risk for the utility sector.

DEMAND CHARGES

Many commercial customers pay a significant fee, called a demand charge, based on the amount of electricity they draw from the grid during their time of peak usage. Demand charges can represent as much as 80 percent of a commercial customer's monthly bill.

For example, if a manufacturer runs all of its equipment, air conditioners and lights during the afternoon, that peak usage period determines the demand charge for the month. That's because utilities must keep adequate power generation and power line capacity available on reserve to meet the potential surge in demand.

If battery storage becomes more popular and more effective, it could put billions of dollars at risk for utilities

Some utilities charge a flat fee, others charge based on the time of day and season of the year that the customer uses electricity, while some utilities have a tiered system, with higher demand fees for customers with higher usage.

Lowering consumption during peak usage times can significantly reduce the demand charge for small commercial and industrial customers, even if they use the same total amount of electricity. This is where battery storage could offer a compelling business case for a customer. By using an electricity storage solution to switch to battery power during the peak usage hours, a customer can considerably reduce, or even eliminate, demand charges.

As an example, we studied the potential impact of electricity storage technology on the peak demand of a hypothetical office building over the course of a year. (See Exhibit 1.)

We assumed the customer is located in a large Southern California utility's service territory and falls under the utility's time of use rate class, since its annual peak of 1,285 kilowatts is greater than 500 kilowatts. Assuming a 50 kilovolt or greater power factor, the facility would be charged a $6.56-per-kilowatt monthly demand charge. Different utilities may employ slightly different methods for

calculating demand, but a review of several utility tariffs shows that this demand charge appears to be within the normal range.

Based on the monthly load profile in our example, the customer would pay between $6,000 and $8,500 per month in demand charges. A further examination of the facility's peak day for the period identifies the underlying energy usage that drove the demand charge payment for the month of January 2014.

SWITCHING TO STORED ENERGY

If this customer were to install electricity storage technology at this facility, the facility could meet its peak demand with stored energy as opposed to power from the grid. Assuming a relatively consistent day-to-day usage profile, any peak usage reductions would directly result in lower demand charges.

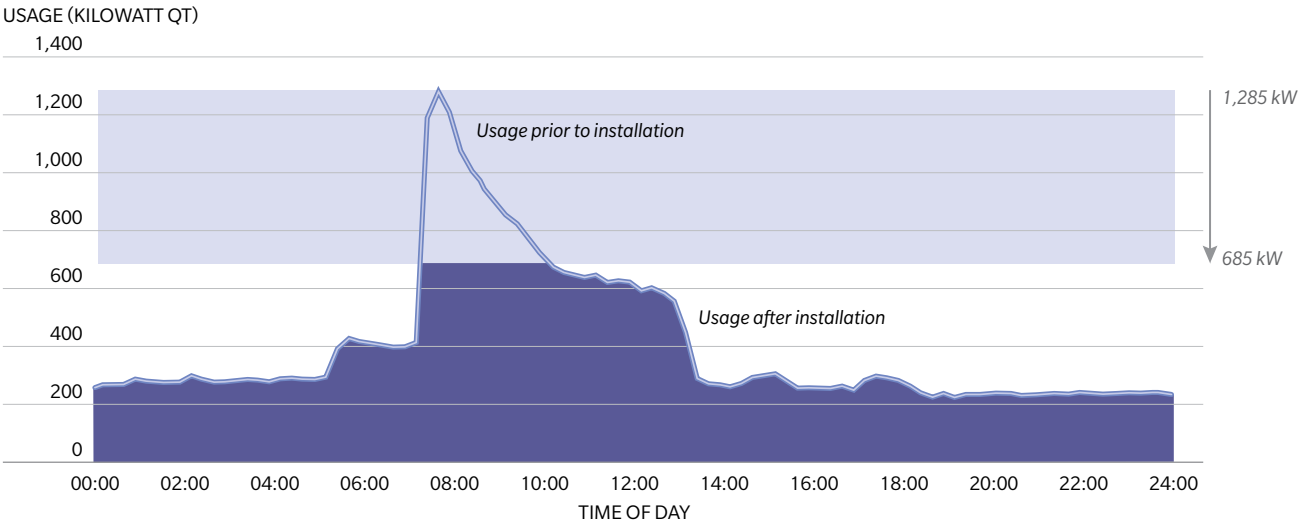
According to the U.S. Energy Information Administration, there are 18,000 similarly-sized buildings in the Pacific region. The utility selected for our analysis covers a quarter of that region, so let's assume it serves 4,500 such buildings. The state of California is considered to have progressive jurisdiction in terms of energy storage legislation, so even a small number of customer storage installations could have serious revenue implications for the utility. If one in five of these facilities installs battery storage and is able to cut demand charges by one half, based on the annual savings illustrated in the example above, the utility could see its revenue decline by $45 million a year.

This analysis only represents one utility's service territory and one building size within that

EXHIBIT 1: SHAVING PEAKS WITH ENERGY STORAGE TECHNOLOGY

Emerging energy storage technologies can enable building owners to reduce their daily peak demand and significantly cut their electric bills

OFFICE BUILDING DAILY LOAD PROFILE BEFORE AND AFTER INSTALLING ELECTRICITY STORAGE



Sources: Innowatts, Oliver Wyman analysis

territory, with potential opportunities for peak demand reduction varying greatly depending on each individual facility's load profile. If battery storage becomes more popular and more effective, the potential loss to utility companies could balloon, just through lower demand charges. Apply the above methodology to the 190,000 similar-sized buildings nationwide and the annual revenue loss for the utility industry could approach $2 billion.

Of course, regulators vary by state. Some public utility commissions would allow utilities to recoup their costs by boosting demand charges for those customers who still incur them or by finding alternative recovery mechanisms. In that case, the utility's shareholders would see a temporary dip in revenue, until rates could be adjusted to cover the total costs for a utility to manage peak demand.

However, the regulatory changes would result in higher rates for the remaining demand charge customers, incentivizing them to cut their peak demand and improving the economic viability of alternative solutions. In the long-term, this could result in more customer installation of electricity storage technology and could increase customer defection from the grid.

A WAKE-UP CALL

At the beginning of 2015, 43 companies offered battery storage systems. Since then, big names such as Tesla have entered the industry, drawing attention to the sector. This should serve as a wake-up call for utilities. As some utilities wrestle with regulators over investment in utility-grade battery arrays and pass the cost along to customers, advances in technology are allowing customers to make their own decisions and undermine the utility's traditional rate-setting process.

Utilities still have advantages over upstart technology companies. The old power-and-light companies possess financial and operational skills, and they've built relationships with their customers over the years. Now they have the opportunity to draw on those skills and strengths to transform themselves into utilities of the future.

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