



COMMERCIAL AND INDUSTRIAL BATTERY STORAGE

Battery storage systems in commercial and industrial facilities share many of the benefits of those in residential settings. They allow a business to save money by navigating demand charges and time-of-use rates, maintain operations during an outage and capture energy generated by a solar photovoltaic (PV) array.

COMMERCIAL AND INDUSTRIAL MEMBER BENEFITS

Demand Charges - Commercial and industrial members must often pay demand charges, which are fees incurred when businesses draw large quantities of power in short periods of time. These charges can represent a large portion of a facility's energy bill. Installing a battery storage system can help lower these expensive surges in power demand and save businesses money.

Load Shifting - Controllers for your battery storage system are available that can learn your business's power usage patterns and automatically shift consumption from the grid to lower demand and lower cost times when using time-of-use and related rate structures.

Reduced Downtime - Outages can cause commercial and industrial companies to lose a large amount of money due to production delays. A battery storage system can ensure that your shop, factory or service center remains open, and this added resilience can make you more attractive to customers.

Power Quality Management - For manufacturing and services that require high quality power, a battery storage system can help reduce or eliminate frequency changes, voltage sag and power factor issues.

Solar Integration - One of the biggest issues for solar power is that its production peaks at midday, while demand for electricity peaks in the morning and evening. Battery storage can help mitigate this mismatch by storing the power generated by solar for later use.

HOW BATTERY STORAGE WORKS

Charge Controller, Inverter, Batteries - The three essential components of any battery storage system are the batteries that store energy as direct current electricity, an inverter that converts the direct current to alternating current that can be used by electronics and appliances in your business, and a charge controller to direct the system.

Lithium-ion vs. Lead Acid - The most common chemistries used in battery storage are lithium-ion and lead acid. Lithium-ion batteries can accommodate varying daily charge levels, while lead acid should be brought back to 100% every day. Though generally more expensive, lithium-ion batteries are also available in simpler and more attractive all-in-one wall-mountable packages. Lead acid batteries require more maintenance, safety and venting considerations.

Controller Functionality - Controllers for your battery storage system are available with different features and capabilities, but most can operate in some form of these three modes:

- **Emergency Backup Only** - The system will always keep the batteries charged, for use during an outage.
- **Self-Powered** - The system will focus on using as little grid power as possible by balancing the power generated from a solar array, the charging/discharging of the batteries and the power used in your business.
- **Time-of-Use Load Shifting** - In markets where time-of-use pricing is available, the system can charge the batteries when power is cheaper and discharge them when it is more expensive.

HOW BATTERY STORAGE IS INSTALLED

Assessment by Contractor - Many solar installation companies have the expertise and experience to properly assess your business's needs and design an appropriate battery storage system. A key factor in deciding your system size will be whether you want battery storage primarily to save money, back up your business during an outage, mitigate power quality problems or some combination. Your contractor should also be familiar with your co-op's permitting and interconnection requirements for battery storage installations as well as any tax incentives or rebates available in your area.

AC vs. DC Coupling - One of the first decisions you and your contractor will have to make is whether to install an AC or DC coupled system. An AC coupled system uses an inverter to convert the DC from your solar array to AC, and a separate inverter to charge and discharge your batteries. A DC coupled system uses a charge controller to directly charge the batteries from the solar array and only one inverter to connect to your business and the grid. DC coupled systems are generally more efficient but also more complicated to install, especially when integrating with an existing PV installation.

Retrofitting an Existing PV System - While it is easier and more cost-effective to install a battery storage system while installing solar PV, it is never too late to add storage. Your contractor will likely recommend an AC coupled system, which will require less retrofitting. A new subpanel and other equipment will also need to be installed to enable your solar PV to power your business and charge the batteries while the grid is down.

Equipment Size, Shape, Location - Depending on the size and features that you and your contractor choose, the system could range from something small that can hang on the wall in a utility room to a larger outdoor unit similar to an air conditioning compressor.

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