



An AEP Company

CUSTOMER INSIGHTS

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Market Overview – AEP Energy Trading

Natural Gas

- During the month of August 2018, natural gas and power were mostly higher on supportive weather and liquidations.
- Prompt month (September 2018) natural gas at Henry Hub rose \$0.135/MMBtu to \$2.917/MMBtu.
- Balance of the year (October – December 2018) pushed up \$0.099/MMBtu to \$2.964/MMBtu.
- Beyond that, Calendar 2019 was up \$0.043/MMBtu to \$2.786/MMBtu, while Calendar 2020 was marginally lower by \$0.002/MMBtu to \$2.629/MMBtu.

Power PJM – Ohio:

- October 2018 on-peak power at AEP – Dayton Hub increased \$0.50/MWh to \$36.35/MWh.
- The balance of the year (November – December 2018) increased \$0.43/MWh to \$35.50/MWh.
- In the calendar years, 2019 was up \$0.48/MWh to \$36.10/MWh and 2020 rose \$0.45/MWh to \$34.46MWh.

Power Illinois:

- PJM ComEd zone August 2018 day-ahead on-peak power dropped by \$1.39/MWh closing the month at \$36.23/MWh.
- MISO Illinois.Hub August 2018 day-ahead on-peak power fell by \$0.52/MWh to close at \$36.64/MWh.

Any references made to prompt month natural gas will normally be associated with a range starting the first day of the month through the final settlement of the respective prompt month natural gas contract. Other references to forward natural gas prices and all power prices will be based on a range starting the first day of the month through the final day of the month. This report made by AEP Energy contains projections and future expectations that are based on reasonable assumptions, such statements may be influenced by innumerable factors that could cause actual outcomes and results to be materially different from those anticipated, including (without limitation) changes in utility regulation and the allocation of costs within regional transmission organizations, including ERCOT, PJM, MISO and SPP.

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Energy Storage: What is it and why is it important for my business?

Energy storage is many things to many different people. For commercial and industrial companies, energy storage is a versatile tool that offers more control over energy costs. Specifically, battery energy storage systems (BESS) have the ability to target specific demand-based charges and reduce these charges without impacting business operations.

What is Energy Storage?

In many ways, large-scale BESS share many of the same characteristics of batteries in your cell phone or consumer electronics. The major differences are in the scale of the systems and the added control systems that are required to run the battery efficiently and reduce safety issues.

Like the batteries in your smart phones or electric vehicles, the most widely used BESS are lithium-ion based. Lithium-ion batteries are versatile, high in energy density and come in various designs optimized for its intended use. Lithium-ion batteries make up most of the batteries currently deployed to date.

In the U.S., the use of batteries has grown dramatically. According to the U.S. Energy Information Administration (EIA), over 80% of the energy storage in the U.S. was made up of batteries at the end of 2017, and 40% of that capacity is located in the PJM interconnection territory. You can find more in-depth information on battery storage in [EIA's U.S. Battery Storage Market Trends](#).

For example, imagine these batteries are similar to smartphones. On your smartphone, you can have multiple applications (apps) - the same is true about batteries. Each battery contains applications that fall into two distinct categories: power (kW) applications, which help you reduce demand costs \$/kW, and energy (kWh) applications, which help you reduce energy supply costs \$/kWh. Energy applications require a battery to be scaled for longer run times the longer the run times - the more expensive and cost prohibitive the battery becomes. In some markets outside of PJM, energy batteries in the six to eight-hour range have strong paybacks, however, there are limited

opportunities for energy applications in PJM. With that said, there are several power applications that require limited, full discharge events over the course of the year and can result in significant savings in PJM.

Getting Value from Battery Energy Storage Systems

Combined with a peak prediction tool, such as AEP Energy's PowerPerksSM, a properly designed and sited BESS can be deployed to reduce the following demand-based charges in PJM and produce significant savings, reducing your bill by five to ten percent, depending on the size of the system.

- **Peak Load Contribution (PLC):** A business can reduce its PLC charges by utilizing the battery energy storage system during times when a peak hour is likely to be set by the utility. Since the battery can be charged anytime, the opportunity to hit such peaks is high and significant savings can be realized. AEP Energy offers PeakAdvisorySM, a PLC management program that alerts customers when peak hours are likely to occur. Annual demand obligation for capacity is based on a business' Peak Load Contribution (PLC). The PLC for a planning year (June 1 through May 31) is determined by the local utility.

The local utility takes the organization's average demand level during the five highest demand hours, called Coincident Peak (CP), for the entire PJM system during the summer months. Capacity charges make up about 16 percent of energy supply cost charges, so reducing these costs can have a significant impact on your energy bill.

- **Network Service Peak Load (NSPL):** Similar to reducing your PLC, NSPL charges can be lowered by operating the battery energy storage system during times when a peak hour is likely to be set by the utility. AEP Energy's PeakAdvisorySM program also helps customers manage their NSPL by alerting them when peak hours are likely to occur. With the knowledge that a peak is likely to occur, the BESS can be dispatched to offset that hour, eliminating an associated cost for the next year. Transmission costs differ by local utility and are set depending on the methodology

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adopted by each transmission zone. A business' NSPL becomes effective each calendar year starting January 1 and ending December 31. The NSPL could be a measure of demand level from one to five CP hours for that particular zone and are determined either over a period of a few months to an entire year.

BESS for Resiliency

Many customers think of batteries as a tool for riding through power outages. While energy batteries can act as back-up power, this particular application is costly and may not be the best resource for your organization's particular need.

Applications that require more than eight to ten hours of run time, typically would be better suited for a back-up generator, rather than a BESS. However, if the battery is being used for demand reductions for PLC and NSPL reduction over one to two hours, the battery could be on standby for critical loads during remaining hours of the day. The smaller the critical load, the longer the battery will be able to maintain it.

Siting and Selecting a Vendor

Current BESS systems are modular and can be sized to fit any application. A typical 2MW/2MWh system, or a system that can output 2 MW for one hour, is fairly large and can fit inside an average 40 ft. shipping container. These systems will be tied directly into the low side of a customer's transformer, or behind the customer's meter and will be installed in parallel operation to eliminate risk of interruption with day-to-day operations. The systems can be operated either on-site or through remote monitoring using a low cost cellular connection.

BESS can be owned directly or by a third party. Each has their advantages, however, unlike solar, the operation of a battery is critical to extracting the value streams discussed in this edition. Third parties are available who specialize in BESS applications. Whether you own the system directly, or it is owned by a third party, partnering with an experienced vendor will be important to maximizing the value of the project.

Interested in Learning More?

AEP OnSite Partners, along with AEP Energy, is uniquely suited to own, operate and dispatch BESS, to maximize the benefit to our customers. If you are interested in learning more about how a BESS can benefit your organization, reach out to Peter Protopappas, Business Development Lead for AEP OnSite Partners, at pprotopappas@aepes.com or contact your AEP Energy sales representative to find out if an opportunity is right for your organization.



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