ENERGY to care

Greater efficiency supports patient care.

Peak Shaving and Load Shifting

All ECM content was independently developed and reviewed to be vendor, product and service provider-neutral.

Description

Hospitals and other large commercial customers are often charged based on peak electrical load demand (sometimes for several months in the past) rather than simply for usage. Strategies such as peak shaving and load shifting can result in huge energy cost savings.

Project Talking Points

- Learning how your facility is being charged for electricity can lead to implementation of strategies that will shift loads to non-peak times.
- Some large commercial customers are charged a time of day/time of use (TOU) rate or even for peak loads from months in arrears, called a "demand ratchet."
- Power quality can be improved by using energy storage methods.
- Behavioral changes can be implemented to reduce energy during peak times or days.
- Check with your regional transmission organization to find the peak load days, as your peak charge for the year can be based on those peaks for the grid.
- Due to the way utilities calculate demand charges, you may not see rate reductions until many months after you have implemented peak shaving and load shifting.

Benefits

- **Cost benefits:** Lowering a facility's peak load or shifting the time of day that loads occur will result in savings, oftentimes not only for the month of the peak but for many months to follow.

  Environmental benefits: Reducing the facility's peak load or shifting the time of day that loads occur will result in lowering the overall peak for the utility and will lower the demand on the overall electric grid. It could even result in fewer power plants being built, lowering the overall cost of electricity.

- **Social benefits**: Lower energy costs at the hospital can increase the amount available for patient care upgrades and/or lower the overall cost of health care.

Purchasing Considerations

Ask for references to ensure that the commissioning agent has experience in the strategy or technology you adopt.

ASHE AHA Data & Insights

How-To

1. Engage relevant stakeholders. This will likely include facilities staff, a building automation system (BAS) expert, trusted contractors, staff in potentially affected areas and purchasing.

2. Gather 36 months of utility bills (and preferably interval data) to learn how the facility is being charged for electricity. Analyze trends to determine if peak shaving and/or load shifting would be beneficial strategies (See utility bill audit ECM). Trends to look for will include:
    - When peak loads occur
    - How much energy is being used during peak charge times

3. Check with your regional transmission organization and set up alerts to find the overall peak for the grid, so the facility can plan ahead for its peak day.
    - Some utilities offer "demand response programs" with incentives for participation. Not only will you be alerted ahead of peak days, but you may receive financial benefits for reducing your load at these times.

4. If the facility decides to reduce the peak loads, consider technologies that will shift loads to lower cost times of the day or de-load the grid, such as:
    - Photovoltaics (PV)
    - On-site generation, such as combined heat and power
    - Battery storage
    - Ice storage

    - Consider behavioral changes that will reduce peak loads, such as:
        - Lowering or shutting off lighting in non-critical areas
        - Shutting down on-site laundry during peak times
        - Scheduling sterilization during non-peak times
        - Generator testing (only recommended once or twice per year)
        - Slightly increasing temperature setpoints or reducing flow to minimum allowable amounts in non-critical areas

Case Studies

- Federal Energy Management Program
    - Fort Carson Battery Energy Storage System

Resources

- Ask if your regional transmission organization has an alert system for peak days.
- CSE Magazine: Implementing energy storage for peak-load shifting
- Great Plans Institute: Shave, Shift, Shimmy: How Demand Response Can Unlock Value on the Electric Grid
- Ohio Water Environment Association: "Zero and Low" Cost Strategies to Reduce Electric Energy Costs through Demand Management

Regulations, Codes and Standards, Policies

- Institute of Electrical and Electronics Engineers (IEEE) 484-2002: Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications

- IEEE 485-1997: Recommended Practice for Sizing Vented Lead-Acid Storage Batteries for Stationary Applications
- IEEE 1145-1999: Recommended Practice for Installation and Maintenance of Nickel-Cadmium Batteries for Photovoltaic (PV) Systems
- IEEE 1187-2002: Recommended Practice for Installation Design, and Installation of Valve-Regulated Lead-Acid Batteries for Stationary Applications
- IEEE 1375-1998 (Rev. 2003): IEEE Guide for the Protection of Stationary Battery Systems
- IEEE 1578-2007: Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management
- IEEE/American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) 1635-2012: Guide for the Ventilation and Thermal Management of Stationary Battery Installations.
- National Electric Code (NEC)
    - 2011 NEC, Article 480
    - 2011 NEC, Article 690.71
    - 2014 NEC, Article 690.71(H)

ECM Synergies

- Energy procurement
- Establish a baseline for current energy consumption
- Evaluate opportunities to use alternative and renewable energy sources
- Evaluate setback of temperature and airflow
- Reevaluate heating, ventilation and air conditioning (HVAC) equipment scheduling
- Measure and benchmark energy purchases

ECM Descriptors

Energy, Supply Chain

Category List:
- Energy

Improvement Type:
- Energy

Department:
- Engineering/facilities management