

# Demand Side Management Use Case Summaries

## Permanent Load Shifting

PLS is defined as “routine shifting from one time period to another during the course of a day to help meet peak loads during periods when energy use is typically high and improve grid operations in doing so (economics, efficiency, and/or reliability).” In addition, this use case provides some solutions to the barriers that exist for implementation of storage performing PLS on the grid.

Energy storage is an excellent way to achieve permanent load shifting, allowing energy to be stored, in the form in which it will be used, during off-peak periods and used during peak periods. ES systems allow building owners to run their buildings’ air conditioning during the peak periods using energy created and stored during off-peak energy periods , often times resulting in megawatts of energy shifted.

### Subcategories

- Permanent Load Shifting - Battery Based
- Permanent Load Shifting - Building Thermal Management

## EV Charging

Energy storage supporting an Electric Vehicle (EV) charging station by performing real-time energy balancing, time of use energy management, and load shifting. The energy storage system may provide frequency regulation as a secondary benefit. When deployed with renewable energy systems, energy storage devices may firm renewable energy supply. Public and Fleet charging stations support a faster charging service that can recharge the EV in 30 minutes or less, but will require a high voltage Direct Current (DC) or three-phase Alternating Current (AC) connection. Private stations support a slower level service (SAE level 1 or 2) that can recharge an EV in a few hours at night with an AC connection.

### Subcategories

- EV Charging, Public Charging
- EV Charging, Commercial and Municipal Fleets
- EV Charging, Residential Home

## Customer Sited Distributed Energy Storage: Customer Bill Management

Energy Storage located on a utility customer’s site operating primarily in order to reduce that customer’s electric bill. The storage device is used for peak load reduction in order to reduce demand charges. When coupled with renewables, the system may provide firming of the

renewable output. The storage device may also mitigate grid outages and/or supply backup power to the customer.

#### **Subcategories**

- Business Customer, Peak/Max Demand Mgt.
- Residential Customer, Renewable Integration
- Multi-family Residential, Solar and Demand Mgt.

### **Customer Sited Distributed Energy Storage: Customer Bill Management + Market Participation**

This end use is similar to Bill Management, but with the addition of wholesale market participation by the storage device. The storage device optimizes operation to provide maximum benefit to the grid and the utility customer by reducing peak load, firming renewable output, and selling ancillary services into the CAISO market when possible. Optimal operation will depend upon the storage device, the utility, the customer, and the location of the system. When selling into ancillary services markets, the storage device will generally participate in only one market at a time.

#### **Subcategories**

- Business Customer, Bill Management + Market Participation
- Residential Customer, Bill Management + Market Participation

### **Customer Sited Distributed Energy Storage: Behind the Meter Utility Controlled**

Energy storage located on a utility customer's site, operated by the utility for the benefit of the grid. Energy storage is used to provide benefits to the distribution system while participating in CAISO markets such as Frequency Regulation. Storage devices may be operated by the utility to provide the same benefits as Community Energy Storage, but incorporate additional benefits for the end customer. When selling services into wholesale markets, the storage device will generally participate in only one market at a time. Benefits may be shared with the customer through a cooperative ownership agreement with the utility, or they may be aggregated through a third party; those two cases have been separated because the rules and interconnection processes are likely to vary widely.

#### **Subcategories**

- Cooperative Ownership, Grid Operation Benefits
- 3rd Party Aggregator, Grid Operation Benefits