



## Vacaville Medical Facility

### SOLAR PV & ENERGY STORAGE

#### Business Needs

Kaiser-Permanente has a corporate mandate for its medical facilities to meet as much of their energy needs as possible through a mix of onsite renewable energy systems, including solar PV, energy storage, and fuel cells. The Vacaville Medical Facility in Vacaville, CA, is one of over 40 projects for Kaiser's facilities that McCalmont Engineering has designed over several years. The Vacaville Kaiser facility started with a large solar system to offset daytime energy usage. This system was designed as approximately 35 large solar canopies covering significant portions of Kaiser's parking lots at the facility. This large solar system delivers over 3,000 megawatt-hours (MWh) of energy annually, supplying a significant portion of the facility's annual electricity requirements.

The solar system was augmented with a large battery energy storage system (BESS) to reduce Kaiser's demand charges. Demand, or instantaneous power delivery, is not fully mitigated by solar alone since demand spikes occur in response to instantaneous consumptions of load on site, which may occur day or night. The BESS serves to reduce or eliminate these spikes by quickly injecting power from the battery when a surge in load occurs, followed by a recovery period to recharge the battery once the load surge has subsided. This averages demand to a lower figure, resulting in significant electric bill savings.

#### Solution

McCalmont designed a large PV system with a nameplate power rating of 2.1 megawatts (MW), consisting of approx. 6,000 solar panels configured in 34 solar canopies. Because there were two main utility services on campus, the solar system was electrically interconnected to two separate utility meters, offsetting a significant portion of the daily load flowing through each of them.

This system was augmented with a 750 kW / 1500 kWh battery energy storage system (BESS). The 750 kW instantaneous power rating of the BESS is sufficient to reduce instantaneous demand spikes of up to that power rating. The 2-hour, 1500 kWh capacity of the battery assures that it can mitigate subsequent demand surges throughout the day, until the battery can be recharged during low load periods at night or during off-hours.

#### Benefits

This project involved a complex electrical interconnection involving two utility meters, a new NGOM meter to separately track the energy production of the solar system, an interconnection design at medium voltage (12.47 kV), and appropriate utility protections to assure reliable operation in the mission critical environment of a hospital conducting daily surgeries during which power cannot be lost. The resulting system has eliminated most of Kaiser's annual electric bills at the facility while simultaneously improving operational stability and reliability.

#### Project Specifications

Location:	Vacaville, CA
Size:	2.1 MW Solar Canopies 750 kW / 1.5 MWh Storage
Completed:	2018/2019
Type:	Canopies + Storage
Scope:	Full Design & Engineering
Inverters:	CPS 36kW + Sungrow 250kW
Modules:	LG Neon 360W