Cobalt Power Systems
Oshman Family Jewish Community Center

Courtesy Cobalt Power Systems (4)

Overview

DEVELOPER: THiNKnrg, thinknrg.net

DESIGN & INSTALLATION FIRM: Cobalt Power Systems, cobaltpower.com

DATE COMMISSIONED: April 2014

INSTALLATION TIME FRAME: Four months

LOCATION: Palo Alto, CA, 37.4°N

SOLAR RESOURCE: 5.4 kWh/m²/day

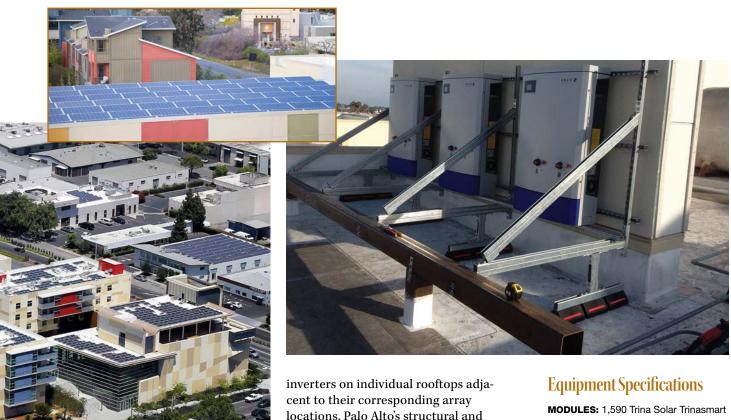**ASHRAE DESIGN TEMPERATURES:** 90°F 2% avg. high, 32°F extreme min.

ARRAY CAPACITY: 397.5 kWdc

ANNUAL AC PRODUCTION: 633,000 kWh

The LEED Silver–certified Oshman Family Jewish Community Center (OFJCC) is host to one of the largest PV installations in Palo Alto, California, and one of the largest projects to utilize Trina Solar's Trinasmart dc-optimized modules. The 397.5 kWdc PV array spreads across 12 rooftops. The installation is also one of the first to use Unirac's RM Roof Mount ballasted system, which accommodates the different layouts, variable surfaces and obstacles that each of the roofs presents. The OFJCC project has strong economic fundamentals. Its developer, THiNKnrg, worked with Conergy and its owner, Kawa Capital Management, to structure a PPA that would supply the OFJCC with solar energy for $0.04/kWh, the lowest cost for PV-generated energy on public record in California.

The Trinasmart module junction boxes fully integrate Tigo Energy's optimization technology. The combined solution features module-level MPP tracking for optimal energy yield and design flexibility, as well as module-level monitoring and disconnect. While Cobalt Power Systems installed the system under *NEC*

2011, it is compatible with *NEC 2014* Section 690.12 requirements for rapid shutdown. Tigo Energy's PV-Safe technology enables the Trinasmart modules to automatically deactivate as soon as workers disconnect ac power.

The Trinasmart modules can enable string lengths up to 30% longer than those of conventional 600 Vdc systems due to the integrated Tigo Energy optimizer's maximum voltage limiting function. Cobalt Power Systems was able to increase source circuits from 14 modules to 17- and 18-module strings, eliminating 24 source circuits, three combiner boxes, 13,500 feet of wire and the corresponding labor from the system's BOS costs, which reduced the total cost of the system by $22,000.

The system designer located the KACO new energy 3-phase 480 Vac TL3

inverters on individual rooftops adjacent to their corresponding array locations. Palo Alto's structural and seismic requirements necessitated special bracing for the rooftop-mounted inverters. Cobalt Power Systems developed custom inverter support structures to create dedicated electrical areas and secure inverter connections to the building.

To reduce the number of ac circuits exiting the 12 rooftops, the design called for aggregation of each inverter group. The installers routed the combined circuits to the main electrical service entrance located in the basement of the OFJCC's main facility, where they used a secondary ac aggregation panel to make the final parallel connections. They utilized a fused disconnect located adjacent to the main distribution panel to make a load-side connection to the system's aggregated ac power output.

"We turned to Trinasmart optimized by Tigo Energy to help us optimize this project. With this solution, we get increased production, lower BOS costs and higher returns for our customers. In the end, the project had better economics using Trinasmart, and for us that is what drives projects."

—Zach Rubin, CEO, THiNKnrg

Equipment Specifications

MODULES: 1,590 Trina Solar Trinasmart DC TSM-250-PA05.002, 250 W STC, +3/-0%, 8.27 Imp, 30.3 Vmp, 9.5 Isc, 32.5 Voc (limited by module-integrated dc optimizers)

INVERTERS: 3-phase 480/277 Vac service, six KACO new energy 32.0 TL3 (32 kW, 600 Vdc maximum input, 310–550 Vdc MPPT range), five KACO new energy 40.0 TL3 (40 kW, 1,000 Vdc maximum input, 390–850 Vdc MPPT range)

ARRAY: 18 modules per source circuit (4,500 W, 8.27 Imp, 545.4 Vmp, 9.5 Isc, 585 Voc) or 17 modules per source circuit (4,250 W, 8.27 Imp, 515.1 Vmp, 9.5 Isc, 552.5 Voc); seven source circuits per 32 kW inverter, nine source circuits per 40 kW inverter; 397.5 kWdc array capacity total

ARRAY INSTALLATION: Low-slope roof mount, TPO membrane, Unirac RM Roof Mount, ballasted, 180° azimuth, 10° tilt

SOURCE-CIRCUIT COMBINERS: Five SolarBOS CS-12/12-15-4XF, five Solar-BOS CS-8/8-15-4XF, five SolarBOS CS-6/6-15-4XF, 15 A fuses

SYSTEM MONITORING: Module-level monitoring, five Tigo Energy Module Management Units (MMUs), 27 Tigo Energy Gateways, Trinasmart/Tigo Energy monitoring service