

Ventura, California



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Ventura

CASE STUDY

**SOLAR
OUTREACH**



PARTNERSHIP

County of Ventura, California: Solar Installation at Todd Road Jail

Situated along the southern California coast, the County of Ventura (population 850,000) lies between Santa Barbara and Los Angeles, and includes ten incorporated cities. Ventura is a general-law county, which means that it has not adopted a charter, and is instead organized under state law. Ventura is administered by a county executive, who oversees an annual budget of \$1.9 billion, twenty-seven agencies, and more than 8,500 employees; its legislative body is a five-member board of supervisors. Other elected officials include the auditor-controller, assessor, county clerk, county recorder, district attorney, treasurer-tax collector, and sheriff.

In January 2011, the Ventura County Board of Supervisors committed to a goal of reducing greenhouse gas (GHG) emissions in the county by 15 percent, in comparison to 2005 levels, by 2020.¹ The baseline was established following a 2010 emissions inventory that relied on reporting protocols adopted by the [California Air Resources Board](#) and the [Climate Registry](#), a nonprofit North American collaborative that sets standards for the calculation, verification, and public reporting of GHG emissions.² According to the inventory, electricity use accounted for more than half of county GHG emissions.

Meeting the board's goal would require the county to eliminate 11 megawatts (MW) of current energy consumption and create offsets to all future increases in consumption. The target was particularly challeng-

ing because, prior to 2005, the county had already upgraded lighting and air conditioning systems. These investments, and the associated energy savings, thus eliminated the opportunity to reduce consumption and emissions by going after “low-hanging fruit.”

Recognizing that large-scale renewable energy projects—solar in particular—offered the best means of achieving the offsets required by the targets, the Board of Supervisors, the Public Works Agency, the General Services Agency (GSA), and the Sheriff's Department set out to identify appropriate locations.

Site Selection and Considerations

The Todd Road Jail site—which is located on 160 rural acres, between the cities of Ventura and Santa Paula—appealed to the board of supervisors and the cooperating agencies for two reasons: first, the site offered sufficient land for a ground-mounted system; second, the facility had the capacity to support a 1 MW array. The sheriff's office, in particular, responded favorably to the idea of a solar array at the site, viewing it as an expansion of its existing sustainability commitments: since 2010, the facility had been investing in strategies to reduce waste and improve energy efficiency, including interior and exterior lighting upgrades and the installation of a variable-speed cooling tower. The GSA, managing the maintenance of the facility



Installing the solar array at Todd Road Jail.

for the Sheriff, hired a local engineering firm to develop a master plan that would guide future upgrades to the facility's heating, ventilation, and air conditioning systems.

Advantages of Ground Mounting

One of the attractive elements of the Todd Road Jail site was the availability of land suitable for a ground-mounted solar array. According to the project team, ground-mounted systems are preferable to roof-mounted panels for two reasons: first, the roof of any structure may need to be replaced or repaired during the lifetime of the solar panels (approximately twenty years). Removing the panels to perform this work not only adds an extra expense, but also disrupts the power source. Second, installers are reluctant to install solar panels on new roofs because of the risk of causing even minor damage, which may create leaks and lead to future structural repairs and associated costs.

Despite the advantages of size and location, however, the project presented unique challenges. First, because the facility is a jail (housing as many as eight hundred inmates at any given time), security was of the utmost importance, and the active involvement of the sheriff's office was critical. To ensure that security concerns were addressed throughout the design and installation process, Rick Barber, a retired sergeant who had formerly worked at the jail, was asked to join the project on behalf of the sheriff's office. Barber's experience and unique perspective as a local law enforcement official were highly valuable in identifying and avoiding potential security risks. For example, Barber worked with the team to determine the choice of fencing materials (chain link) and the positioning of the array; the goal was to ensure maximum visibility throughout the system and to eliminate potential opportunities to hide or avoid detection.

The second challenge was ensuring that the power supply to the facility would never be interrupted. The resulting array feeds power directly into the facility and remains tied into the power grid, supported by backup generators.

The final challenge involved modifying a conditional land use agreement pertaining to the agricultural land surrounding the facility. Under the original plans for the jail, seventy-eight acres were to be set aside for future expansion. To make it possible to build a ground-mounted array, the agreement had to be changed, both to allow the new land use and to designate five acres for the final installation.

Financing Strategies

A significant portion (\$1 million) of the total project funding (\$4.6 million) came from the GSA, which manages all functions—including maintenance, security, and groundskeeping—for select county facilities. One of the GSA's responsibilities is to pay utilities (approximately \$10.5 million annually) for an estimated 3.5 million square feet of county buildings. To support this expense, the GSA estimates annual costs per building and charges each department a flat fee on a monthly basis.

Since these fees are based on estimates, final operating costs may differ from projections. When actual costs exceed projected costs, the GSA has to cover the difference—but when actual costs are lower than the fee that has been charged, the GSA realizes a surplus. The retained earnings are kept in a reserve to cover losses, but are sometimes used to support projects that reduce overall operating costs, primarily through investments in energy efficiency and renewables. It was this retained earnings fund that enabled the GSA to contribute to the cost of the jail's solar installation.

This level of upfront support demonstrated local government commitment and was advantageous in securing the \$3.6 million in low-interest bonds required to finance the remainder of the project. The project would not have moved forward, however, without the approval of the California Solar Initiative (CSI), a California Public Utility Commission program that provides five years of post-installation financial incentives to the owners of solar installations of up to 1 MW. According to GSA deputy director Greg Bergman, the project would not have been financially viable without CSI support. The GSA anticipates receiving approximately \$1.2 million from the CSI during the five-year incentive period.

Projecting Utility Rate Increases

One of the challenges that Ventura County identified early on is that standard return on investment (ROI) projections are often based on a five- to six-percent annual increase in utility rates. An analysis of regional utility rates showed, however, that increases had historically been between two and three percent—a significant finding, as a lower annual increase would yield lower annual savings, and thereby extend the payback period for the project. On the basis of this analysis, the county applied a conservative annual increase of three percent to its ROI calculations, which brought the expected payback period to twenty years. However, the system has so far been producing more energy than expected, bringing the payback period to approximately eighteen years.

Process and Implementation

The project was led by the Public Works Agency, in close collaboration with the GSA and the sheriff's office. The entire process took approximately eighteen months, with the array coming online June 1, 2013.

One of the first steps was to develop a request for a qualifications (RFQ) and a request for proposals (RFP) for a design-build contractor. The public works department hired a private consultant to develop the RFQ and RFP, and to assist county staff in making the final selection. Approximately twenty companies submitted qualifications statements, of which seven companies were then selected to bid on the project. REC Solar, a design-build contractor and panel manufacturer that had previously completed successful solar installations for the county, was selected.

Representatives from public works, the sheriff's office, the GSA, REC Solar, and Southern California Edison (SCE, the regional utility) met weekly throughout the entire process, to ensure clear and timely communication of project details and status. The meetings also allowed for quick resolution of concerns, such as the security issues associated with the fencing materials.

SCE was an important and supportive partner; in retrospect, however, the project team acknowledged that the utility should have been more actively involved in the process from the outset. During the final inspection, SCE determined that the array was actually capable of generating more than the 1 MW of power that had been identified in the CSI application. Unfortunately, at that point, the utility could not support a connection that would bring more than 1 MW of power

into the grid. To ensure that the power produced did not exceed 1 MW, approximately 100 of the 4,600 panels had to be disconnected.

Current Operations

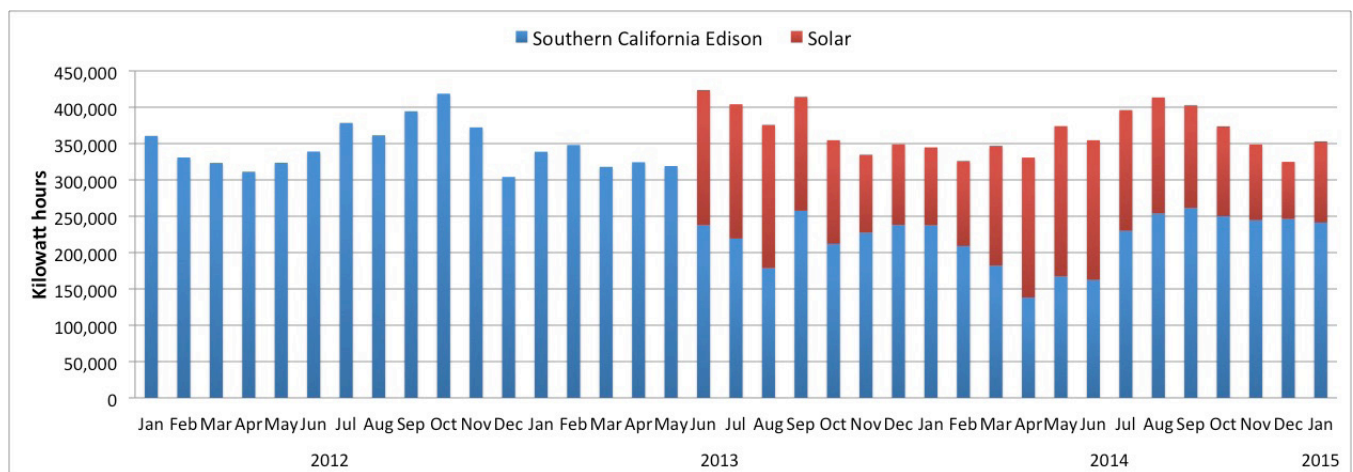
Since coming online, the system has provided approximately 40 percent of the jail's electrical needs (see figure 1). During times of peak production, any excess energy feeds back into the grid—and, through a net-metering arrangement, the county receives a credit on its monthly utility bill, which is factored into the utility fees that the GSA charges the facilities under its purview. Including the savings within the overall cost estimates ensures that the benefits of solar are shared across all agencies under the GSA purview, rather than being limited to those that are able to support solar.

Web-based monitoring software allows for continuous assessment of panel productivity. A drop in productivity may indicate that panels need to be cleaned. To further reduce energy consumption and maximize efficiency, several buildings within the jail facility have their own, separate meters, so that particularly high consumption can be identified and addressed.

Future Plans

As noted earlier, reducing countywide emissions by 15 percent by 2020 will require eliminating 11 MW of energy use. The Todd Road Jail installation contributes 1 MW toward that goal, but much work remains.

In 2012, the county installed a second 1 MW



Source: Ventura County General Services Agency.

Figure 1. Monthly electrical consumption at Todd Road Jail January 2012 - 2015. Red indicates the contribution of solar, beginning in June 2013.



Solar panels ready for installation.

solar array at the Moorpark Water Reclamation Facility, which provides approximately 80 percent of the facility’s annual energy needs. The county has also received approval of incentive funding (CSI) for two additional solar arrays: one 1 MW carport canopy at the County Government Center, the county’s single largest energy user, and another 1 MW ground-mounted array at the County’s Juvenile Justice Complex.

Because the complex includes a pretrial detention facility, it shares security considerations with the Todd Road Jail, including lighting requirements and the need for emergency backup generators.

Despite the success of the Todd Road Jail and Moorpark Water Reclamation Facility projects, there remains some concern among members of the board of supervisors that the payback period for solar investments may be too long, and that other alternatives should be considered. The GSA continues to explore additional means of achieving large-scale emissions reductions, including the purchase of alternative-fuel vehicles within the GSA fleet.

Lessons Learned

Ventura County’s experience with solar offers a number of lessons for other local governments considering undertaking similar projects:

- Involve the local utility from the beginning.
- Hire seasoned design-build contractors, and consider experience and reputation, as well as cost.
- Establish a central point of contact and a project manager to coordinate communication and project implementation.



Completed solar installation at Todd Road Jail.

- Ensure that long-term concerns (e.g., routine maintenance) are clearly addressed during the planning phases, and that responsibility for such concerns is assigned from the beginning.
- In the case of a facility that has security issues, ensure that law enforcement is closely involved throughout the process.

With respect to developing financing strategies for solar technologies, local governments are encouraged to consider the following factors:

- Depreciation of panel productivity. Ventura County estimates that the panels will lose approximately 0.5 percent of their productivity (generation capacity) per year.
- Annual increases in regional utility rates. Although there is no way to fully predict how rates will change from year to year, local data may be more helpful than national averages (see sidebar).
- Interest rates on bonds. Ventura County was able to finance \$3.6million of this project through low-interest and tax-exempt bonds.
- Ongoing maintenance (e.g., cleaning the panels, controlling weed growth, inspecting and/or replacing wires).
- Inverter replacement (approximately every fifteen years).

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ICMA would like to acknowledge and thank Bruce Fischer for his significant contributions to the development of this case study and commitment to the advancement of solar technologies in Ventura County.

Endnotes

1. County of Ventura, Climate Protection Plan for Government Operations: A Community Commitment. Available at http://www.ventura.org/sustain/downloads/climate_protection_plan.pdf
2. Even before the 2011 adoption of GHG reduction goals, the county had demonstrated a commitment to responsible energy use, including investments in solar technologies. Between 2005 and 2010, solar projects in the county had produced approximately 700 megawatt hours, and thereby avoided 206 tons of GHG emissions. In March 2010, the county had established power purchase agreements on three buildings, generating a combined total of 742,469 kilowatt hours annually.
3. Tenants within the GSA's purview include county administration, human services, courts administration and courtrooms, probation administration and detention, sheriff's administration and detention, and fire administration and fire stations.

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SunShot Solar Outreach Partnership Case Studies are based upon work supported by the U.S. Department of Energy under Award Number DE-EE0003526. The U.S. Department of Energy (DOE) SunShot Initiative is a collaborative national effort to dramatically reduce the cost of solar energy before the end of the decade. The SunShot Solar Outreach Partnership (SolarOPs) is a U.S. DOE program providing outreach, training, and technical assistance to local governments to help them address key barriers to installing solar energy systems in their communities. The International City/County Management Association (ICMA), American Planning Association (APA), and National Association of Regional Councils (NARC), along with ICLEI-Local Governments for Sustainability and its partners, were competitively selected by the U.S. DOE to conduct outreach to local governments across the United States, enabling them to replicate successful solar practices and quickly expand local adoption of solar energy. For more information visit the SolarOPs website (solaroutreach.org) or contact Emily Dodson (edodson@icma.org).

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