

Ventura County, CA

Identifying Big Impact Opportunities for the Built Environment Using Energy Audits

Local government agencies can use energy audits to meet energy and climate action planning goals by identifying potential projects that will yield the best returns. Energy audits provide an assessment of the overall energy dynamic of a building, evaluating energy efficiency, health, and safety through comprehensive diagnostic methods to identify, analyze, and prioritize energy saving opportunities. Whole building audits are a great tool for local governments to provide a roadmap for projects, validate budget planning, and harmonize potential incentives and rebates.

Case study

August 2018

Project Context

Through the development and implementation of its Energy Efficiency Action Plan (EEAP) and adoption of a government operations Climate Protection Plan, the County of Ventura has set standards for facility upgrades and maintenance that achieve energy efficiency and greenhouse gas (GHG) reductions. The prioritized environmental and energy-saving strategies maximize co-benefits for the County, the community, and the environment. In addition to everyday practices that meet sustainability goals, the County of Ventura's General Services Agency (GSA) and Ventura County Public Works Agency (PWA) are taking strides to reduce greenhouse gas (GHG) emissions through energy efficiency retrofits and renewable energy projects.

The County completed a comprehensive GHG inventory that takes into account actual savings from a baseline that concentrates on County facilities, tracking savings against actual measured results. The County provides many of services within its measured facilities, including public hospitals, clinics, and jails, so the GHG reductions goals are aggressive and require continuous improvement amid steady population growth. To balance all goals, Ventura County made a commitment to reach GHG reductions goals in line with policies and practices that ensure growth is efficient and responsible.



Ventura County, CA
Population/land area
843,110 / 2,208 sq. mi

Project Profile

The County of Ventura recognized the benefits of and need for an Integrated Demand Side Management Energy Study on eligible facilities, including its Government Center Hall of Administration (HOA) building. Conducting a comprehensive, whole-building energy audit offered the County a pathway for identifying and prioritizing energy efficiency projects to support the County's energy saving goals. GSA staff collaborated with its Local Government Partnership and 2016 Beacon Program Champion, the Ventura County

Regional Energy Alliance (VCREA), to coordinate with the Southern California Edison (SCE), Southern California Gas (SCG) Company, and County facility staff at the HOA.

Recognition

- 2017 Platinum-level Beacon Spotlight Award for Sustainability Best Practices
- 2017 Gold-level Southern California Edison Energy Leader Partnership Program Partner
- 2017 Southern California Gas Company All-Star Energy Efficiency Award for VC HOA Project

Working with VCREA, the County received technical assistance from a qualified field engineer consultant to conduct a facility energy audit. The audit goal was to identify system functions, capture a snapshot of lost opportunities and deliver an analysis of recommended measures. Auditors provided an analysis of findings, the cost estimates, and energy savings for each suggested measure. The recommendations included several energy efficiency measures to be implemented over time. A first priority was process improvements for the HVAC system and to install hot deck dampers at the Government Center HOA, a project that was recognized for its significant natural gas savings.

At the HOA, conditioned air is distributed by a single fan variable-air-volume (VAV) dual-duct system. Because the supply fan speed is controlled solely by the cold deck pressure, the hot deck ducts are often over pressurized. When the building needs the most

Hall of Administration (HOA)

Measure:	HW/HVAC
EUL:	10 yrs
GMC:	\$169,411.91
Payback:	0.7 yrs
Gas Savings:	48,228 Therms/yr

cooling, the VAV boxes open, the fan speeds up, but the VAV hot deck dampers were closed at the zones, creating a back pressure in the ducts. As a result of the increased back pressure, leaks occurred in the hot deck, causing the boilers to run even if there was not a real need for heating. During the on-site audit, the boiler was running when the outside air temperature was in the mid-70s. The deck temperatures were on a reset schedule based on return air temperatures ranging from 55°F to 62°F for cooling and 90°F to 120°F for heating.

Given the age of the building (1979) and the difficulty in replacing the system without completely rebuilding the entire HOA site, the energy audit recommended process improvement and a retrofit installation of a mechanical damper at the inlet of the hot deck to reduce leakage. The damper should be controlled by a pressure sensor located in the duct so that there is a seal that closes as the hot deck pressure increases. It was also suggested that the deck temperature reset schedule should be modified to account for the changes in the deck configuration. It was recommended to reset the supply temperature based on the outside air temperature with initial set points ranging from 80°F to 120°F.

Results

The County of Ventura HOA upgraded to an All Variable Speed Central Plant Control System and proceeded with a damper installation. The reset schedule and system functions were monitored and modified per the measure recommendations to achieve the maximum natural gas and electricity savings. The pressure-controlled damper was installed at the inlet of the hot deck to reduce unnecessary airflow (leakage) through the hot water heating coil and, therefore, also reduce the load to the boilers. When only cooling is required, the damper can be closed and the boilers can be turned off. Additionally, the supply fan is now able to run more closely to match the required airflow from the cold deck pressure, resulting in more efficient operation. Realized annual savings are 224,000 kWh and 48,228 therms after installing the pressure-controlled damper with modified temperature reset schedule. The gross measure cost of implementation was approximately \$169,411 and the estimated incentive was \$78,964. Identifying and implementing this low-cost solution allowed for cost savings of \$51,302 annually for the next 10 years. With less than a one year payback, the project yielded GHG savings of 2,557 metric tons of carbon dioxide equivalent, or the same as switching 85,577 incandescent lamps to light emitting diodes (LEDs).

Due to the information provided in the energy audit and the resulting damper installation project success, the County initiated a series of energy efficiency projects, including lighting efficiencies, process optimizations, and equipment upgrades. GSA installed a "Hartman Loop" computer-controlled operating system for the HOA central chiller plant that integrates and optimizes the performance of chillers, water pumps, and the cooling tower, resulting in energy savings of 197,000 kWh and a 141 tons of avoided GHG annually. The County also upgraded and retrofitted agency plumbing systems and appliances with water-efficient technology and fixtures.



“The County of Ventura is pleased with the results that we have achieved and are looking forward to further gains from these efforts.”

— Paul R. Young, County of Ventura General Services Agency Chief Deputy Director of Facilities and Materials Department

The energy audit and continued monitoring of systems helped identify funding and tracking mechanisms for implementing energy efficiency projects. These projects support the County's EEAP goals of reducing electricity use at GSA maintained facilities, such as the HOA, by 10 percent and to meeting the Cities for Climate Protection (CCP) goals to reduce GHG emissions from all County operations by 15 percent.

Added to these efficiency projects, the County of Ventura GSA and PWA have taken initiatives to pursue renewable energy production projects at its facilities. Currently, installed and planned installations equate to 4.55 megawatts (MW) of solar photovoltaic (PV) systems at County facilities, including systems at the Todd Road Jail and Moorpark Wastewater Treatment Plant are 1 MW each and an additional .6 MW system at the Juvenile Justice Center.

In 2016, the County of Ventura at its Government Center also completed installation of a 1.122 MW PV system in parking Lot F, providing a minimum 10 percent of the Government Center's energy needs. The project consisted of 4,000 solar panels and provides shaded parking for more than 500 spaces. The County paid \$6 million dollars for the solar array and, like other projects installed by the County, qualified for the SCE Solar Initiative Rebate, which pays out \$776,455 over five years. The Government Center solar array Year 1 savings were



The County of Ventura Government Center photovoltaic project broke ground in late 2015 (above and right), and was supplying clean power by January 2016 (below).



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\$227,000 and has an estimated annual energy output of 1.7 million kilowatt hours (kWh) — approximately the same amount of electricity needed to power 150 homes. The photos on the previous page from the County of Ventura's PWA, show the progress of the Government Center solar panel installation. Learn more about this and other projects by visiting County of Ventura Public Works Agency's [project page](#).

In 2017, the County of Ventura Board of Supervisors approved a groundbreaking Solar Energy Services Agreement between the County and Ventura Solar, LLC (a wholly owned subsidiary of Cenergy Power) to be administered by the County's GSA and is planned to initiate construction in 2018. The project planned for installation in Fillmore, CA, will enable the County to purchase electricity generated from a planned 28,200-solar panel, 3-megawatt photovoltaic system. The Ventura Fillmore Solar Project will be located on the former Texaco Refinery/Pacific Coast Pipeline site (Fillmore Works), revitalizing and improving the site. The system design will allow for the production of approximately 6.5 million kilowatt hours of clean energy in the first year, providing nearly one-third of all the power used by GSA-managed County facilities. The system contributes to a reduced GHG footprint. Partnerships exemplified through these projects demonstrate the County's dedication and continued efforts to reduce energy consumption and take actionable steps forward on climate mitigation and preparedness.



Supporting California local governments



The County of Ventura
Government Center



The Statewide Energy Efficiency Collaborative (SEEC) is an alliance between ICLEI Local Governments for Sustainability, The Institute for Local Government, The Local Government Commission, and California's four investor-owned utilities. This program is funded by California utility customers and administered by Pacific Gas and Electric Company®, San Diego Gas & Electric Company®, Southern California Edison® and Southern California Gas Company under the auspices of the California Public Utilities Commission.