



COUNTY OF VENTURA
GENERAL SERVICES AGENCY
MAINTENANCE DIVISION

2007-2008 ENERGY ACTION PLAN
SEPTEMBER 2007

Policy

The following Energy Action Policy is proposed specific to GSA maintained buildings. GSA shall strive to:

1. Identify and implement opportunities to minimize the energy intensity in GSA maintained buildings through the implementation of energy efficiency projects;
2. Promote behavioral changes within the organization that enhance energy conservation;
3. Pursue green buildings programs such as the United States Green Building Council (USGBC) Leadership in Energy and Environmental Design (LEED);
4. Identify opportunities for self generation of electricity from renewable sources;
5. Minimize electricity expenditures through management of utility rate structure and incentives

GSA is embarking on a comprehensive energy action plan (GSA EAP) to implement the energy action policy defined above. The GSA EAP includes a range of measures that will be implemented by GSA staff, GSA contractors, and county employees. The implementation of the GSA EAP will require financial commitment from the CEO's office and leadership by the individual department heads within the County government. Many programs defined below will span several years and require investments in the short term to reduce the utility expenditures over the longer term. Based on increases in utility rates, measures to reduce our energy consumption are financially prudent and will pay for itself through a reduction of electricity and gas expenditures.

The State of California is in the process of developing regulations that will control the emissions of greenhouse gas emissions (GHG). The Ventura County Board of Supervisors has requested that the County government prepare a plan to reduce the GHG footprint from our operations. The GSA EAP addresses these issues for our existing GSA maintained buildings.



Energy Conservation Projects

GSA is responsible for maintaining approximately 130 buildings with a range of tenants including the County Administration, Courts, Probation, Sheriff, Human Services, and Fire.

Specific Projects identified for FY 07-08 include:

System Wide Projects

1. Benchmark Existing Electricity Expenditures

Currently, the accounting department within GSA pays utility bills for GSA maintained buildings. These bills are logged into an MS Access database for tracking. In addition, electricity usage within specific areas in the Hall of Administration at the County Government Center is sub-metered. In order to better understand the energy usage patterns of our largest buildings, we need appropriate metrics to benchmark the electricity consumption of the building and compare these metrics with other buildings in our portfolio or external benchmarks available from the US EPA Energy Star program or State of California Title 24 program. By calculating the energy intensity (KWH per employee or KWH per square foot) of our buildings, we can more effectively target specific conservation efforts.

2. Monitor Equipment Operations and Schedules

The operations of the HVAC and lighting in the Government Center and some of our larger offsite buildings are on energy management software (EMS). The software enables the setting of times for the HVAC and lighting to operate throughout the day. Overrides and specific start-stops have been programmed into the system. It would be useful to systematically review the operating schedules from the EMS to ensure they are optimized and that inappropriate or one-time only overrides have been removed. Subsequently, every quarter, we should evaluate the equipment on and off times to ensure that they are as originally programmed and have not been changed.

3. Program Management of HVAC Contractors

Maintenance of the HVAC at our buildings is subcontracted to a contractor, EMCOR. This contract includes routine maintenance tasks that enhance system energy efficiency such as cooling coils cleaning, filter replacements, etc. We need to ensure that our existing systems and equipment are operating at their peak efficiency.

Metrics should be developed to evaluate the condition of the cooling towers, thermal energy storage tanks and filters to ensure they are being properly maintained. The completion of mandatory performance enhancing maintenance tasks for each major piece of equipment must be periodically audited by GSA maintenance staff. A specific target of five percent (5%) of the equipment being maintained should be audited.



The duties of the EMCOR Building Management System Operator should be reviewed to ensure the focus remains on high value tasks related to equipment operation. Routine scheduling of maintenance should be undertaken by an EMCOR field supervisor which will allow the System Operator to pursue re-commissioning efforts.

4. *Building Tune-Ups and Retro-commissioning*

Many of the larger HVAC systems in the County buildings are old and equipment has been modified over the years. A program to audit each building for energy efficiency and systematically retro-commission equipment should be developed. Retro-commissioning may be done by EMCOR or other third party contracts with the costs offset by incentives offered by the Southern California Edison and the Gas Company. Retro-commissioning will likely uncover areas where the efficiency of equipment can be repaired or upgraded.

Building Specific Energy Conservation Projects

Specific energy conservation projects identified include:

5. *Energy Use at East County Court House*

It is reported that the energy use at the East County Court House has increased dramatically over the previous year with no change in occupancy. We need to check the equipment start/stop schedules and room temperature settings to look for abnormalities. In addition, the HVAC system operation should be reviewed. The building energy intensity can also be benchmarked against other similar buildings.

6. *Hall Of Administration Chiller, Dirty Evaporator*

Dirt is infiltrating into tank and fouling the chiller evaporator tubes in the HOA. This reduces the efficiency of the chiller. Quantum Consulting states that the chiller runs too long to charge the tank.

In the long run, the reliability of the TES system should be reviewed and a plan for the re-commissioning of the system or its replacement should be developed.

7. *Pre-Trial Detention Facility (PTDF) Emergency Operations Center (EOC) CO2 sensor and operation*

As of April 18, 2006, the Sheriff's 911 operation moved out of the PTDF and into the Service Building. We need to verify the proper operation of the carbon dioxide sensor in the PTDF EOC area and ensure it is functioning as designed and is not allowing too much outside air into the building.



8. *Service Building, Sheriff's 911 Operation*

All air conditioning equipment associated with the Sheriff's 911 operation in the Service Building has to operate 24 hours a day. We need to ensure that the equipment is the most energy efficient, properly maintained and operating at peak efficiency.

9. *Hall of Administration and Hall of Justice, Daily custodial service*

The custodians work five (5) days a week, Sunday night through Thursday night, from 12:00 midnight to 6:30 AM. In addition security patrols each floor during the night and manually turns on floor lighting. The energy use during the nighttime custodial and security operations should be investigated to ensure maximum efficiency of energy usage.

We also need to determine the costs associate with the provision of ventilation to the buildings during the night time activities.

10. *Service Building New Air Conditioning Units*

Air conditioning units have recently been replaced at the Service building. Variable frequency drives are installed on the fans in the new air conditioning units. As the Service Building is unique in that it has large open spaces for warehousing coupled with offices, we need to establish a minimum ventilation rate, based on minimum occupant load and/or carbon dioxide sensors and control the drives off the return air temperature.

11. *Install a High Efficiency Chiller at the East County Court House*

The Mueller ice harvester system does not provide any air conditioning redundancy for this building. The high efficiency chiller will provide an alternative for mechanical cooling. We estimate the installation will be less than \$250,000 and will qualify for a VCREA incentive. The incentive will be based on a comparison of the existing screw chiller KW/ton and the new Turbo Core Chiller KW/ton. The incentive will be for choosing a more efficient piece of equipment.

12. *Hall of Administration and Hall of Justice Variable Frequency Drives*

GSA is in the process of replacing the larger motors at the chiller plant in HOA with VFDs. Following commissioning of the VFDs on HOA, a demonstration of the savings should be reviewed. Some VFDs have also been installed on the motors at the HOJ. The optimization of the VFDs should be pursued based on sound engineering. The KW/ton of cooling for the existing systems should be calculated to establish a baseline for the existing systems.

13. *Hall of Administration, Hartman Loop Control System*

The installation of variable frequency drives requires a control scheme to optimize their energy savings. The Hartman Loop Control System integrates all the variable frequency drives to



ensure the system is operating at its optimum efficiency and the County is able to realize the maximum energy savings. The County is in the process of establishing the performance improvements and cost justifications for the implementation of the Hartman Loop Controls.

14. Todd Road Jail, Kitchen Steam Plant Retrofit

The kitchen was built with steam boilers to provide steam for the kitchen kettles and hot water for the kitchen and laundry. These steam boilers require a lot of maintenance, present a safety hazard, and are regulated by an APCD permit. We are evaluating options to address this issue. One alternative is to convert the kitchen kettles to direct, gas fired kettles, eliminate the steam boilers and install a bank of up to ten(10) tankless water heaters to provide the hot water requirement. A second alternative would be to use a series of higher efficiency closed tank water heaters. Both options will be pursued in the feasibility evaluation.

15. HOJ Underground Parking Structure Ventilation

Currently the underground parking structure in HOJ is ventilated continuously. However, the actual requirement to ventilate the parking structure should be based on the carbon monoxide (CO) levels in the structure. Hence, a project is being evaluated to monitor the CO levels at various locations in the structure and to operate the fans based on a pre-set CO trigger level. This project could be replicated at other parking structures based on an evaluation of its effectiveness.

16. Lighting Upgrades and Re-lamping

The County has an ongoing need to replace lamps with more efficient alternatives as they fail. In addition, period relamping is undertaken for energy conservation. As technology has evolved, options for enhanced lighting control through the use of motion/occupancy, and photo sensors, timers, and building automation programs have increased. GSA has been utilizing the services of a contractor to conduct free lighting surveys at our facilities to identify opportunities to implement lighting conservation projects. Specific lighting projects for energy conservation are listed below.

- ✓ PTFD Jail Lighting Retrofit
- ✓ Vanguard Building Lighting Retrofit
- ✓ East Valley Sheriffs Station Lighting Retrofit for Parking Lot
- ✓ 669 County Square Drive Lighting Retrofit.
- ✓ 646 County Square Drive Lighting Retrofit.
- ✓ Fire Stations Lighting and Fire Station Maintenance Buildings Retrofit.
- ✓ Service Building and PTFD Annex Relamping.
- ✓ Government Center Parking Lot Lighting, High/Low controls
- ✓ Service Building Relamping.
- ✓ Service Building T-5 Hi Bay Fluorescent fixtures Lighting Retrofit
- ✓ Juvenile Facility, T-5 Hi Bay Fluorescent fixtures, Lighting Retrofit
- ✓ Service Building, Skylight Installation
- ✓ Camarillo Animal Shelter



- ✓ Simi Animal Shelter
- ✓ Simi Mental Health
- ✓ County libraries

Promote Conservation through Behavioral Change

GSA is in the process of developing an outreach program that can be rolled out to the County staff to promote energy conservation measures related to building energy usage. In order to effectively implement any behavioral program, the following steps would be required:

17. Implement Behavioral Change programs including:

1. Select and prioritize specific buildings for which the behavioral change program will be directed.
2. Meet with relevant department managers and agree upon the individual conservation measures being proposed (eg, promoting use of task lights, reducing plug loads, turning off electronic devices, etc.).
3. Identify work area Energy Coordinators to support program implementations.
4. Develop training materials and present it to individual work groups.
5. Monitor progress and provide ongoing support.
6. Provide routine reminders of energy program through articles in County newsletters.

18. Implement System to Ensure Purchases Meet Energy Star

Implement system to ensure all purchases meet Energy Star and rebates are solicited. Prepare article for newsletter and develop and post policies and procedures on the intranet.

Pursue LEED Certification in Selected Buildings

19. Pursue LEED EB for Vanguard Building

Sustainable or Green Buildings use less energy and resources and have a smaller environmental footprint. The County is pursuing LEED certification for the Vanguard Building as a demonstration of the value of LEED. As this is an existing building, the LEED Existing Building certification will be sought from the U.S. Green Building Council. The process of certifying Vanguard for LEED EB will require input from various departments and will take significant time commitment from GSA staff. However, once one building is certified, many of the systems developed can be exported to other County buildings for implementation.

Currently, there are only a handful of buildings in Ventura County with LEED certification. The University of California at Santa Barbara is the closest entity with a significant LEED program. Ventura County GSA will work with UCSB to leverage its expertise. In addition, a LEED consultant will be pursued for support on the program development.



Identify Opportunities for Self Generation of Electricity from Renewable Sources

Generation of electricity from renewable sources will cut the County's GHG emissions and will potentially provide a return on investment as electric utility rates rise. The County will pursue implementation of a self generation project, possibly through solar photovoltaics or co-generation. Candidate sites for implementation of projects are shown below.

20. *Todd Road Jail Facility Cogeneration System*

GSA has been evaluating the Installation of a micro-turbine sized to the minimum electrical load and use the process heat to heat a new hot water storage tank for domestic use in the kitchen or shower. If the system works well, consider using the waste heat to fuel a new indirect fired absorption chiller. If the system generates less than 1 MW, then we can qualify for net metering from Southern California Edison. Some jurisdictions are installing internal combustion (IC) engines in lieu of micro-turbines. We need to determine the APCD permit requirements for both the micro-turbine and IC engine options. If the system has an efficiency of 70%, then we may qualify for a 20% incentive from the California Energy Commission.

Another alternative system that is being considered is a micro-steam turbine that generates electricity and hot water from the back of steam turbine. A vendor has indicated that they may be interested to implement this project following a more detailed review of the boilers and its capacities.

21. *Vanguard Building, Solar Roof Installation*

Install a building integrated photo voltaic(BIPV) solar electric roofing system on the Vanguard Building roof. The roof is in need of replacement and this type of system provides an opportunity to install a photo voltaic system on one of our roofs. Solar Integrated Technologies (SIT) manufactures a roofing system that combines lightweight rigid insulation, a gypsum fire barrier, a durable white single-ply roofing membrane, and thin-film photovoltaic membrane. This product is placed directly over the existing roof and then connected to the building electric system.

22. *Saticoy Yard Solar PV System Installation*

The land area at the Saticoy yard may be sufficient to install carports with solar panels over the roofs for supply to offset the electricity demand at these buildings. Currently a vendor is exploring this possibility and will be providing the County with input on its feasibility. If feasible, the County would consider issuing a request for proposal to solicit quotations for a PV system owned and operated by a vendor. Power would be purchased by the County on a power purchase agreement.

For self generation projects, consider if we should partner with Ventura County Regional Energy Authority (VCREA) to provide a Professional Services Contract for Self Generation Projects.



Minimize electricity expenditures through management of utility rate structure and incentives

23. *Model Utility Rate Structure to determine if there are opportunities for rate switching that can save the County money.*

Energy costs are directly related to energy consumption and the rate structures for electricity and gas. Electric rate structures are complicated and several options exist for each building. For example, time of use pricing means that the price during peak pricing hours are several times higher than pricing during off peak hours. In addition, the utility operates several interruptible power programs that offer us the opportunity to reduce our rates or receive credits based on our willingness and ability to curtail our power demand during peak demand periods. To fully take advantage of these programs, there are several actions defined in this GSA EAP.

24. *Provide Input to Specification of Building Automation System software upgrades to consider energy management requirements.*

The County is in the process of upgrading the building automation software (BAS) to ensure more effective management of building operating parameters. The BAS also has the ability to provide information relevant to the tracking and management of the metrics relevant to building energy consumption. Hence, the GSA EAP includes a task to provide input to the BAS system to ensure that the appropriate data relevant to energy management are integrated into the system specifications.