DOE FACT SHEET: CLIMATE ACTION CHAMPION TECHNICAL ASSISTANCE

Blue Lake Rancheria Energy Performance Assessment

Overview

The Blue Lake Rancheria Tribe (BLR) was recognized as a Climate Action Champion (CAC) by The White House and the Department of Energy (DOE) in December 2014. In 2015, DOE released a Notice of Technical Assistance (NOTA) to provide CACs with additional opportunities for financial and technical assistance to support and advance their greenhouse gas emissions reduction and climate resilience objectives. DOE's Office of Energy Efficiency and Renewable Energy (EERE) released this NOTA with the goal of strengthening Champions' resilience to extreme weather and prepare for other effects of climate change.

BLR applied for and was awarded technical assistance from Lawrence Berkeley National Laboratory and Loisos and Ubbelohde (L+U) to conduct an energy audit for several buildings at BLR, which included short term energy and comfort monitoring, utility documentation reviews, a site walkthrough and interviews with current staff.

What is Blue Lake Rancheria?

Blue Lake Rancheria is a federally recognized Native American Tribal Government in Northern California comprised of 100 acres of trust land. The building portfolio includes a tribal government administration building, hotel, fuel station and travel mart, casino, and a sprung structure event space. BLR is working towards its GHG emissions reduction goal of 40% by 2018 by implementing energy efficient and sustainability programs and retrofits to include: LED lighting, high efficiency appliances, the CasinoGreen program, on-demand hot water heating, upgraded insulation, fan and motor upgrades, and low-flow plumbing.

Study Objectives

The goals of the study included:

- Characterization of the current energy use profile utilizing short-term measurement and verification of power and comfort conditions.
- Identification of new technologies that may have longer operational lives.
- Generation of a prioritized list of capital, low- and no-cost energy efficiency measures to enable BLR to make informed, decisions on next steps in energy improvements across the building portfolio.

The Blue Lake Rancheria Hotel and Casino

Energy Audit Results	
Current Use	In 2014-2015, the current energy use across the portfolio was ~4,300,000 kWh of electricity and ~123,000 therms of natural gas, for a total of ~7,917,500 kWh annually.
Energy Savings	Recommended measures would provide a savings range from ~2,960,000 to ~3,900,000 kWh per year of combined natural gas and electricity
Utility Savings	Reduction of base load is recommended in order to achieve utility savings.
Overall Performance	Several energy efficiency measures are already in place, so the greatest energy savings opportunity would be in updating the casino building's current equipment and mechanical systems.

Study Design: The Existing Facility

The study was divided into two parts: an energy audit and a short-term measurement and verification study. The energy audit entailed a review of one year of energy utility data, a site walkthrough and employee interviews, identification of inefficient equipment and analysis of energy consumed, and reviews of utility pricing structure to inform optimal times to utilize equipment.

The short-term measurement and verification study included two weeks of power and comfort data collection. Distributed power monitors were installed for select circuits, along with 45 temperature and occupancy sensors. The costs of the electrical contracting and additional equipment required were contributed by the Tribe.

Results

The audit, short-term measurement and verification study resulted in 14 energy efficiency measure recommendations (EEMS). Of these EEMS, the five with the greatest energy savings potential are:

- Mechanical System Redesign
- Displacement Ventilation
- Plant Equipment Upgrades
- HVAC setpoint management
- Gaming Machine Energy Use Reduction

Mechanical system redesign would allow for an improvement in occupant comfort, indoor air quality, and result in energy savings averaging between 570,000 and 900,000 kWh per year. A multi-zone system with properly selected components, for example, the installation of a heat exchanger would help manage the high ventilation energy required to maintain air quality.

Mechanical system redesign would make displacement ventilation a viable option to reduce HVAC energy by about 490,000 kWh per year. This would consist of introducing low velocity air at floor level and extracting it at high levels with intentional stratification, which would allow for removal of airborne pollutants from occupied zones. Proposed plant equipment options include replacing existing equipment with specific components or installing a ground-source heat pump system, which the Tribe will look into further. While the initial cost is high for both options, component systems offer longer life expectancy, lower maintenance, and improved efficiency with energy savings ranging from 646,000 kWh to 931,000 kWh. Implementing deadband control, occupancy, and seasonal adjustments for HVAC setpoints would potentially save 680,000 kWh per year.

As proposed by the Tribe, preliminary review of potential energy savings related to gaming machine energy consumption suggests by replacing fluorescent lamps with LED lights, high-energy screens with EnergyStar panel displays, selecting energy efficient components, and providing a low-power stand-by mode could be substantial A further comprehensive study is recommended. Reducing energy use on the gaming floor has the double-benefit of also reducing cooling load. A 50% energy reduction would result in an annual energy savings of 240,000 kWh.

Conclusions

Reduction of base load at the Blue Lake Rancheria and re-envisioning of the mechanical system design are critical to achieving overall energy and GHG reduction goals. Opportunities for reduction in energy consumption and occupant comfort improvement include installation of low energy HVAC systems, such as displacement ventilation, ground-source heat pumps, and increasing the efficiency of gaming machines.

Learn More

Climate Action Champions Initiative:
http://energy.gov/epsa/climate-action-champions

Blue Lake Rancheria Tribe:
http://www.bluelakerancheria-nsn.gov/