

Category: 5 – Best Building Project – Specialty Contractor (\$2-\$6 Million)

Contractor: LONG Building Technologies

Project Name: Buena Vista Correctional Facility

Saving taxpayers money is always a positive and welcomed reality. With extensive knowledge, innovation and dedication, LONG Building Technologies did just that through the implementation of money saving energy efficiency measures at Buena Vista Correctional Facility. The enormous size of the facility combined with the nature of housing several hundred offenders makes it a huge energy consumer. This challenged energy engineers and project managers to come up with and execute the most advanced energy efficiency measures all while maintaining the Colorado Department of Corrections' strict schedule and security standards. Completing a large scale energy retrofit contract in a fully operational prison facility like Buena Vista is no easy task. Normal scheduling and methodology had to be modified based on security and operational protocols for the prison. Each crew working within the facility had to be escorted at all times by a Department of Corrections officer and scheduling work with subcontractors was dictated by the availability of these escorts. The LONG team also had to remain highly cognizant of work spaces making sure to check out and check in each tool every day and secure any exits used during shifts.

Despite scheduling modifications and security measures, the LONG team was able to excel at project execution by diligently determining an accurate baseline for energy usage, studying, testing and analyzing a variety of energy measures then choosing to execute only those measures that provided both significant energy savings and a short payback period averaging 10 to 15 years for the facility.

LONG used a master project schedule to keep subcontractor work running smoothly and conducted regular progress meetings including four week look ahead projections to keep the Department of Corrections Facilities Management service team, including the warden, in the loop at all times. Communications with the team were key to ensure safety and maintain buy-in especially for the bigger, more involved energy measure implementations.

Some of those larger scale energy measures implementations included a feed water system upgrade, unique kitchen and laundry room updates as well as an innovative twist on an old classic – steam powered cogeneration.

The feed water system upgrade was created by placing economizers on the facility's boilers, which capture the heat from exhaust gases that would have otherwise been wasted and use it to raise the temperature of the feed water that goes into the boiler. The water then enters the system at a higher temperature, so less gas is used to heat up the water and generate steam, lowering utility bills.

With the massive amount of laundry the facility housing units produce, the laundry room also needed some help. The efficiency of the facility's clothing dryers was increased in a similar fashion to the feed water system by harnessing and recycling the high temperature exhaust air through the use of an air heat exchanger. Washing machines received an update with the addition of an Ozone Laundry System, which pumps O₃ molecules into the water used to wash clothing and linens causing material fibers to open up and release dirt easier. This allows the washers to use less water at lower temperatures as well as less detergent while cleaning the clothing effectively.

In the facility's kitchen, energy efficiency was achieved through demand controlled ventilation. Before remediation, kitchen hood exhausts were kept running at all times on high speed even when they were not in use or such vigorous ventilation was not necessary. Optical sensors placed across the hoods in conjunction with variable frequency drives now allow the exhaust fans to run at a lower speed, then ramp up automatically when necessary such as when flames or excess smoke are present.

Perhaps the most innovative of the energy measures implemented at Buena Vista is the steam powered cogeneration system. While steam power has been used successfully for hundreds of years, LONG's application of steam powered cogeneration at this facility gave this old tried and true method a high tech twist.

While most cogeneration systems are used to generate electricity via natural gas, in this case, a steam turbine generator was used to reduce the pressure of the steam produced at the boilers from 125 psi to 35 psi, which is then used for cooking, heating and laundry at the facility. The steam turbine generator also allows the power generated by reducing the steam pressure to be

recovered, resulting in lower utility bills for the facility. This energy is normally lost with the use of a pressure reducing valve.

Here's the high tech twist: The turbine's operation is managed by a touchscreen interface and is integrated into the entire building controls management system, which allows it to be monitored from anywhere in the Colorado Department of Corrections network. LONG's energy engineers can also gather real time information from this system via an Internet connection. It looks like steam power has definitely evolved.

Of course, before innovative energy efficiency comes safety. The LONG team including all subcontractors followed an Accident Prevention Plan including weekly overall safety meetings as well as regular Toolbox Talks to discuss safety measures specifically related to tasks laid out for the week. In addition, the Department of Corrections employs a Life Safety Officer that must consider the safety of everybody in the facility from officers and inmates to visitors and contractors. All permits were also reviewed closely to ensure safety was a number one priority. During the 18 month project, only one recordable injury occurred.

As with all energy performance contracts, LONG takes a risk by determining and guaranteeing a certain amount of energy savings before starting the implementation phase and if those calculations don't pan out, LONG pays the client the difference. So far, the customer has been happy with the more than \$482,000 in annual energy savings. That's a lot of tax payer dollars saved! Along with the happy customer and large savings, LONG also made it a point to use local labor when available, helping to support local businesses in the small, remote town of Buena Vista, Colorado. In turn, LONG was retained for energy efficiency improvements at two other Colorado Department of Corrections facilities. LONG plans to make these energy performance contract projects just as innovative and successful as Buena Vista.













