



1 Background

Fort Morgan is a city of 11,000 in northeast Colorado about 80 miles from Denver. The local school district consists of eight schools that serve a total of 3000 students. In 2001, faced with high operating costs and a growing maintenance backlog, but lacking the funding required to perform needed equipment upgrades, the district chose to implement its first Energy Savings Performance Contract (ESPC). The state of Colorado encourages public entities to use performance contracting and provides technical and contracting assistance through its Rebuild Colorado program. Using this assistance, the school district developed a request for proposals and sent it out for bid. A proposal submitted by Ennovate, an ESCO in suburban Denver, was selected over two other proposals received.



Figure 1. Columbine School in Morgan County, CO.

2 The Project

Ennovate developed a list of 41 proposed ECMs with final pricing and energy cost savings. The list was placed in a spreadsheet, allowing the school district to select or reject options to customize the financial and technical performance of the project. All pricing was open-book, and the school was able to review equipment, labor, project management, engineering, and overhead costs, as well as other pricing details. The ECMs to be installed were selected based on a combination of the district's facility improvement needs, the overall cost savings, and project cash flow.

Among the conservation measures included in the project were:

- Lighting upgrades, including T-8 lamps, occupancy sensors, and new fixtures in underlit classrooms and gyms
- Variable-speed drives on hot and chilled water pumps
- Replacement of aging boilers with condensing boilers
- Replacement of single-pane, steel-frame windows with double pane, low-emissivity windows
- Instantaneous-demand hot water heaters
- Replacement of electric cooking equipment with natural-gas-fired cooking equipment
- Radiant gas heating systems in gymnasiums and workshops
- A district-wide, internet-accessible HVAC control system.



Construction began in June 2002 and was completed in June 2003. The total cost was \$2.5 million, which was financed by the district through a lease-purchase agreement with a term of 12 years. Finance charges will add about \$725,000 over that period.

3 Measurement and Verification

First-year savings from the project were estimated at \$360,000 comprising \$257,000 in gas and electricity costs, \$53,000 in operational savings, and \$50,000 in capital cost avoidance. Ennovate verifies the electric and gas savings only.

During project development, calibrated baseline formulas were developed to predict hourly gas and electricity use in each school based on occupancy and outside air temperature. To measure savings, gas and electric meters at each school are read electronically once per hour. Baseline energy use is also calculated in each hour, and energy savings is defined as the difference between the baseline and the meter readings. To calculate cost savings, year-one energy prices are assumed to escalate by 3% per year. Ennovate reports energy and cost savings to the district in monthly e-mails and makes a formal energy savings reconciliation presentation to the school board each year.

In accordance with Colorado statutes that pertain to performance contracting with local governments, if Ennovate falls short of its guaranteed savings for any given year as determined by the M&V process described above, it must pay the school district the amount of its shortfall for that year.

4 Results and Lessons Learned

According to district officials, the overall experience with the performance contract has been positive. To date, the equipment has performed as advertised, and the guaranteed savings have been delivered. Were the need to arise, the district would definitely consider another performance contract, although some thought that installing all of the equipment in 1 year (the majority during just one summer) caused too much disruption. School district officials stated that in the future they would stage the installation of the ECMs over several years.

5 References

Colorado Governor's Office of Energy Management and Conservation. *Commercial & Institutional Energy Programs*. Web page, <http://www.state.co.us/oemc/programs/commercial/index.htm>