NC West Virginia Schools

Berkeley County Energy Savings Performance Contract

Results

CO

Total Project Cost: \$28,276,000 Total Project Size (ft²): 2,525,000 Cost Per ft2: \$11.20 12.5 year projected payback (originally 15 years)

Project Overview

Berkeley County is located in the eastern panhandle of West Virginia, which is home to the second largest, and the fastest growing, school district in the state. The county's school buildings were characterized as aging with inefficient lighting systems, building envelopes, and HVAC equipment. Recognizing the potential negative impacts of increased student populations and aging school building infrastructure, the school system needed to act swiftly to upgrade 29 of 35 HVAC systems that were at or reaching their end-of-service lives by 2020. Furthermore, Berkeley

County, like many other school districts across the region, had no funds to pay for these upgrades. They required a budget-neutral approach to a major, county-wide, building upgrade project.

The county contracted with CMTA Energy Solutions in 2015 to embark upon a \$28,276,000 project paid for primarily through the use of a Guaranteed Energy Savings Performance Contract (approximately 80 percent of the project) and state grants (approximately 20 percent of the project). In this instance, the school enters into an agreement with an ESCO (CMTA Energy Solutions, in this example) who performs an assessment of buildings and identifies improvement measures. The school system then pays for the project over time with the savings generated by the implemented energy projects.

The Berkeley County school system is a great example of a GESC that yielded exceptional results and actually exceeded expectations. The project was guaranteed to save \$1,750,000 over the first two years (i.e. the planned project payments) and ultimately saved \$3,100,000. This means that the district generated a savings of \$1,350,000 that it could use for other purposes. A Guaranteed Energy Savings Performance Contract (GESC) is a mechanism that building owners can take advantage of to pay for facility upgrades without significant upfront costs.

Energy Efficiency and Indoor Environmental Quality

This large scale project covered a combined 2,525,000 ft2 across 35 sites in the school district where the average age of school buildings is approximately 50 years old. In total, seven schools received complete HVAC system replacements utilizing water source geothermal systems with dedicated outdoor air systems (DOAS). These systems are not only more efficient, but they also help introduce adequate levels of fresh, outdoor air into classrooms to support student learning and health. Buildings were also equipped with bi-polar ionization units which allow facilities to exceed the indoor air quality requirements set forth by ASHRAE 62.1. Thermal comfort was also maximized in these seven major renovations by utilizing multiple geothermal heat pumps to adequately condition occupied areas. See below for additional energy efficiency measures implemented through this project.

Additional Energy Efficiency Measures

- Geothermal HVAC Replacements at seven sites
- Central Plan Upgrades including three boilers and two chillers at various sites
- Spray Foam Insulation installed at four sites
- Envelope Improvements including 157 doors weather-stripped and 596 window replacements or caulking
- LED Lighting upgrades at all 35 sites totaling 23,436 fixtures (interior and exterior)
- Power Management installed on 12,100 computers throughout the district
- HVAC Controls installed at all 35 sites.

In the older buildings, many classrooms were controlled by one breaker which did not allow teachers to independently control their lighting levels, an important feature in today's educational world to properly view projectors and smartboards. New wiring and switching was installed, allowing educators to select from multiple levels of light at any given time within their own classroom. Lighting improvements met the Illuminating Engineering Society standard for lighting in classrooms, ensuring an improved indoor learning environment for all.

Berkeley County Major HVAC Renovations - Energy Results						
School Name	Project Size (ft2)	Baseline EUI	Year 2 EUI	Year 4 EUI	%Energy Reduction (baseline to Year 2)	%Energy Reduction (baseline to Year 4)
Mill Creek Intermediate	62,200	73	24	18	67	76
Opequon Elementary	44,500	126	25	21	80	84
Tuscarora Elementary	43,600	117	26	21	78	82
Valley View Elementary	44,500	139	27	20	81	86
Berkeley Heights Elementary	5 <mark>0,</mark> 980	127	36	25	72	81
Rosemont Elementary	41,982	96	38	27	60	72
Gerrardstown Elementary	16,400	123	42	35	66	72

A Commitment to Operations and Maintenance

The success of this project enabled the county to hire a full-time energy manager who is funded with savings generated by this project. The energy manager utilizes a robust digital HVAC control system to monitor the system, identify problems, and alert the maintenance department before issues become too problematic. This approach helps the county maintain high-levels of indoor air quality and cut down on complaints from occupants.

Additionally, the school system initially only had three HVAC technicians to cover 35 sites in the county. Extra consideration was given to making these systems low-maintenance, accessible, and redundant in case of a power failure. For instance, each building contains only one filter size for all heat pumps, minimizing the challenge associated with filter replacements and making it easier to keep filter replacements in stock.



Shown above are the two pumps, which are 100% redundant, that move water from and through the geothermal well, into the building.

Want to Know More?

For more information about energy savings performance contracts, check out NEEP's <u>Operations and</u> <u>Maintenance Guide.</u>

You can also reach out to NEEP for assistance with school building projects and other community related energy initiatives. Please contact John Balfe at <u>jbalfe@neep.org</u>.









This exemplar was created by NEEP with information supplied by CMTA Energy Solutions. All photos credit to CMTA.