

ENERGY PERFORMANCE CONTRACTING IN ACTION

Shenandoah Public School District



Overview

The Shenandoah Public School District is located in Shenandoah County, Virginia. It includes 10 schools: Ashby Lee Elementary School, Sandy Hook Elementary School, W.W. Robinson Elementary School, North Fork Middle School, Peter Muhlenberg Middle School, Signal Knob Middle School, Central High School, Stonewall Jackson High School, Strasburg High School, Triplett Technical & Business Institute, as well as a bus garage and maintenance facility. Seventy percent of the facilities were built between 1959

and 1976, all having undergone 2 to 3 renovations since construction. The remaining 30%, all elementary schools, were constructed in the early 1990s. The District is committed to excellence and has high expectations for all students in Kindergarten through Grade 12. The curriculum provides for continuous progress and focuses on how students learn and develop.

PROJECT AT A GLANCE

ESCO:	Ameresco, Inc.
Project Size:	1,056,023 square feet / 12 buildings
Project Cost:	\$7.07 million
Annual Energy Savings:	
Electricity (kWh):	33% reduction (3,415,699 kWh)
Electricity (kW):	21% reduction (10,059 kW)
Natural Gas:	19% reduction (51,320 therms)
#2 Fuel Oil:	31% reduction (31,365 gallons)
Water (kGals):	36% reduction (3,711 kGallons)
Annual Energy and Maintenance:	
Cost Savings:	\$475,782
Annual Emissions Reductions:	Not calculated
Simple Payback:	15.27 years (financed over 15.5 years)
Construction Duration:	15 months

Initial Engagement

To continue the high expectations of student excellence, the District recognized the need to offset an ever-increasing lack of capital improvement funds to keep the facilities operating at a high level of service. Some heating and cooling equipment was 40 years old and no longer reliable. The climate control necessary to maintain an optimum learning environment was lacking in many classrooms. To meet these needs, the District contacted the Virginia Department of Mines, Minerals and Energy (DMME) for technical assistance to help it explore the possibility of entering into an Energy Performance Contract (EPC) with one of the Energy Services Companies (ESCOs) pre-qualified under the Commonwealth of Virginia EPC program.

An EPC provides services for the turnkey installation of efficient energy (and water) equipment, along with a guarantee that the savings will pay for the financed cost of the improvements. Services typically include energy auditing, equipment specification and engineering, installation of improvements, appropriate operations and maintenance procedures and monitoring and verification of energy savings.

ESCO Selection

The District issued a request for proposals to pre-qualified ESCOs and awarded the contract to Ameresco, Inc., of Framingham, Massachusetts. A “Back of Envelope” walkthrough assessment was completed which allowed Ameresco to provide an initial assessment of the project potential. With the parties convinced that a viable project could be implemented, an Investment Grade Audit (IGA) was begun in May 2010.

The IGA, which involves an intensive inspection and analysis of facility structures and equipment, current energy use and operations and maintenance plans, produced the Energy Conservation Measure (ECM) recommendations.

ENERGY CONSERVATION MEASURES AND CONTRIBUTION TO TOTAL SAVINGS

• Lighting fixtures/bulbs and Lighting controls	33.8%
• Water conserving fixtures	11.5%
• Space conditioning controls upgrade and expansion	34.5%
• Unit Ventilator replacement and Direct Digital Controls	2.5%
• Multizone unit conversion	6.2%
• Boiler replacements	1.0%
• Variable speed pumping strategies for both hot and chilled water	5.2%
• Transformer replacements	4.2%
• Garage Doors	0.5%
• Vending Machine Controls	0.6%

An M&V Plan was created to determine if the savings guarantee had been satisfied on an annual basis. Ameresco developed the Plan to comply with the widely accepted International Performance Measurement and Verification Protocol (IPMVP), Options A and D. Option A is based upon pre- and post-metering of electric power draw, water flow rates, etc. of lighting, motors and water equipment. Option D (“Calibrated Simulation”) is based on modeling the facility to account for energy consumption changes due to more sophisticated improvements to controls and HVAC systems.

The District saw over \$100K in reduced costs during the construction phase, as new equipment was gradually brought into service. No functional or design problems have occurred with the newly installed equipment.

The project will produce environmental benefits including significant carbon dioxide emission reductions, but these were not calculated as part of the project. In addition, the heating system at one elementary school was converted from fuel oil to natural gas.

The District anticipates a dramatic change to even, consistent space heat and cooling and better air quality and lighting conditions for faculty and students, which will allow for continued delivery of high quality education to families in the District.

Financing Solution

To pay for the improvements, DMME and Ameresco identified the Qualified School Construction Bond program (QSCB), which provided 0% interest financing for the 15-year term of the loan. The 0% interest allowed the District to maximize the work scope as the lower debt payment allowed the energy savings to pay for a larger total contract amount.

All of the EPC costs, savings, financing terms, savings guarantee and pre- and post-installation services were spelled out in an EPC signed in 2011. The work was completed and commissioned by June 2013.

The EPC included a savings estimate and guarantee, engineered design, assistance in arranging of financing, equipment specification and installation, construction management of subcontractors, equipment commissioning, and monitoring and verification (M&V) of energy and water savings. Ameresco subcontracted most of the work to many qualified local companies.

Of the total \$7.3 million QSCB Bond, \$7,070,187 was actually spent on the work, with the difference (balance remaining in the project contingency account) being used for additional work also performed by Ameresco.

Project Challenges

The most significant challenge faced by the District was lack of knowledge regarding Energy Performance Contracting, both on the part of District officials and also the school board regarding the financial advantages of performance contracting and the attractiveness of the QSCB bond program. DMME was instrumental in helping school officials understand the process and in direct contract negotiations with Ameresco. Ameresco was also instrumental in getting the board to understand the value of the project. The District is willing to share what it has learned about EPC with other Districts contemplating a similar project.

DMME Role

DMME:

- Validated the expected savings from the ECMs
- Helped school officials understand the EPC process
- Provided direct EPC contract negotiation assistance to the district.

Key Contacts:

FOR MORE INFORMATION ABOUT THIS CASE STUDY, PLEASE CONTACT:

DR. B. KEITH ROWLAND
SUPERINTENDENT OF SHENANDOAH PUBLIC SCHOOL DISTRICT
540-481-0108
BKROWLAND22@GMAIL.COM

Or Charles Barksdale, Utilities & Performance Contracting Manager
Department of Mines, Minerals & Energy
Cell [804-840-1689](tel:804-840-1689)
charlie.barksdale@dmme.virginia.gov