



## SHOWCASE PROJECT: ARLINGTON CENTRAL LIBRARY

### SOLUTION OVERVIEW

The Arlington Central Library is one of the County's energy performance success stories. Since 2000, investments in lighting efficiency retrofits and energy management practices have reduced electricity use at the site by over 40%. The Central Library is visited by some 900,000 people each year and includes public meeting spaces including an auditorium that seats 180, an archival center, research services, and extensive computer access and e-resources. It also serves as the administrative headquarters of the Arlington Public Library system.

The occupied building is 91,000 square feet, with an attached (underground) 46,000 square foot parking garage. Central Library is open to the public 66 hours a week, and staffed about 80 hours a week. This site also serves as the home of the Library's administrative offices and hosts community events in its auditorium that may go outside of the public operating hours. Outside the building, volunteers and organizations maintain several gardens that serve as the basis for educational talks and workshops.

### SECTOR TYPE

Local Government

### LOCATION

Arlington, Virginia

### PROJECT SIZE

137,000 Square Feet

### FINANCIAL OVERVIEW

Project Cost \$565,000

### SOLUTIONS

Since 2008, the County has invested in substantial lighting retrofits throughout the facility. In 2011, using Energy Efficiency and Conservation Block Grant (EECBG) funds, the County installed a 60 kW solar photovoltaic system on the Library's roof. Several years ago, chiller replacement at the site was identified as a priority need in the County's Pay-As-You-Go (PAYG) maintenance capital program. This project was completed in early 2013.

Specific lighting retrofits included replacement of all T12 lamps with T8 lamps with electronic ballasts, replacement of high-wattage HID indirect pendants with T8 fluorescent pendants, replacement of all incandescent lamps with either compact fluorescent or LEDs, and upgrading auditorium lighting to dimmable LED downlights. The lighting improvements made since 2008 cost about \$100,000 and save the County \$35,000 per year, a payback of less than three years.

The 60 kW photovoltaic system was installed at a cost of \$290,000, and is shaving about \$6,000 from the annual power bill. While the solar system only provides about 5% of the building's electricity on an annual basis, it does shave about 15% from peak electric demand during the day.

The old chiller dated back to 1992 and had been a source of frequent maintenance issues. Energy efficiency is a guiding principle in Arlington's PAYG management for long-term lifecycle cost savings. Rather than replacing the chiller plant with similar equipment, staff sought to maximize efficiency. Consulting engineers identified a high-efficiency, variable-speed modular chiller with a heat recovery feature that would also provide domestic hot water.

Savings from the heat recovery chillers (compared to previous equipment) are approximately 100,000 kWh and 1,000 therms per year. Cost savings from the chiller replacement are approximately \$10,000 per year for energy, plus an additional \$15,000 in annual maintenance cost savings. The chiller replacement is considered a maintenance capital item; the decision to use premium efficiency, innovative heat recovery equipment has a ~15% ROI. The cost premium for using this new high-efficiency equipment was about \$175,000. The location of the chiller plant made this replacement more expensive than might have otherwise been expected. The overall cost of the project was approximately \$1.1 million, with the chiller replacement beginning in November of 2012 and becoming operational in April of 2013.

## **OTHER BENEFITS**

Just as Central Library's gardens serve as an additional educational arm of the library, so have the solar panels. There is a kiosk in the library that shows real time information on how much power the panels are producing, and has an interactive interface that allows visitors to pull up historical information on electricity production.

Savings from projects like these have allowed the Central Library to offset all of its remaining power needs from the grid by purchasing 100% Green-e certified renewable energy certificates (RECs).

## Annual Energy Use

Baseline(2008)  
 288 kBtu/sq. ft.

Actual(2014)  
 207 kBtu/sq. ft.

**Energy Savings**

**28%**

## Annual Energy Cost

Baseline(2008)  
 \$209,000

Actual(2014)  
 \$153,000

**Cost Savings**

**\$56,000**



Entrance, Arlington Central Library



Two chillers to be replaced