



## SHOWCASE PROJECT: CITY OF ROANOKE: THE BERGLUND CENTER

### SOLUTION OVERVIEW

Nestled in the Blue Ridge Mountains, the Berglund Center is an entertainment and convention center with a performing arts theater, coliseum, exhibit hall, special events center, and office space. The 390,000 square foot facility is owned by the City of Roanoke and is managed by Global Spectrum. In April 2011, the City Manager's office requested a comprehensive assessment of all the mechanical systems, operations, and maintenance associated with the facility.

This comprehensive assessment revealed that the equipment was outdated, performed poorly, and often lacked regular maintenance, resulting in high energy costs and uncomfortable event and working conditions for patrons and employees. Based on these findings, the City of Roanoke allocated \$750,000 of bond proceeds to further evaluate and retrofit/replace HVAC systems, lighting, and other capital repairs as needed.

The retrofit project began in December 2011 and is expected to be completed by July 2014. Preliminary estimates indicate the result of this project will be a 30% reduction in the total building consumption of electricity and natural gas. Cost savings are expected to exceed \$180,000 annually.

### SECTOR TYPE

Local Government

### LOCATION

Roanoke, Virginia

### PROJECT SIZE

390,000 Square Feet

### FINANCIAL OVERVIEW

Project Cost \$750,000

### SOLUTIONS

The Berglund Center retrofit project's dual strategy includes a systematic preventive maintenance program and capital repair program. To maximize results, a licensed Heating, Ventilation and Air Conditioning (HVAC) technician and full-time assistant were hired by the facility manager to oversee the retrofit and maintain the operations of the mechanical systems.

Initially, staff developed a revised, system wide operations and maintenance (O&M) schedule that specifies actions to be taken throughout the year. These scheduled actions will ensure that

mechanical systems will operate at designed industry standard performance year round, thus reducing utility and facility expenses by eliminating unplanned equipment repairs.

With the preventive maintenance plan underway, capital repairs and improvements were initiated. First and foremost was the need to replace the largest of the chillers. After research and life cycle cost analysis by City of Roanoke staff and an outside consultant, the team chose to install a highly efficient, magnetic bearing chiller. Additional retrofit improvements included: ongoing lighting retrofits, replacement of smaller chillers, system-wide repair of existing HVAC equipment, replacement of exterior doors, and assessment, repair and improvement of building controls.

A summary of the progress from December 2011 to September 2012 includes:

- **Dedicated HVAC Team** – The facility manager hired a team of skilled professionals to staff the City's energy management team and perform all retrofit activities and building maintenance. This in-house team will save thousands of dollars in sub-contractor fees and also allow for a comprehensive understanding of the energy performance for all of the buildings in the City's portfolio.
- **Lighting** - A substantial re-evaluation of the lighting in the original 25,000 square foot exhibit hall resulted in a total retrofit. Previously, this area included few controls for specific lighting needs, so exhibit hall lights were either on or off with few options in between causing excessive energy use. Along with replacing magnetic ballasts with high efficiency electronic ballasts, T-12 lamps were replaced with T-8's, and the area was divided into zones that allow for much tighter control of the lighting systems.
- **Exterior Door Replacement** - High efficiency doors will be replacing existing doors on the coliseum, the exhibit hall, and the performing arts theater.
- **Magnetic Bear Chiller Installed** - A magnetic bearing chiller or a frictionless centrifugal chiller is a highly efficient, low maintenance, environmentally friendly, and cost-effective technology that replaces traditional centrifugal chiller units. The direct drive magnetic bearing compressor eliminates friction found in traditional centrifugal compressors, which often results in a loss of power. The improved energy performance achieves a 50% reduction in energy use over traditional models and gives additional value with the low cost of maintenance and performance.

## **OTHER BENEFITS**

The City of Roanoke has committed to reducing the community's greenhouse gas emissions by 12.5% by December 31, 2013. The Berglund Center is the flagship project to implement this strategy; its success will significantly impact the funding for future retrofits and to achieve the 20% reduction goal for all City facilities by 2020.

## Annual Energy Use

(Source EUI)

Baseline(2011)

269 kBtu/sq. ft.

Expected(2015)

188 kBtu/sq. ft.

Actual()

Coming in 2019

## Energy Savings

30%

## Annual Energy Cost

Baseline(2011)

\$658,000

Expected(2015)

\$478,000

Actual()

Coming in 2019

## Cost Savings

\$180,000



Exterior view of the Berglund Center



Interior view of the Berglund Center