

Tremendous Energy and Resource Savings for NCDOT and North Carolinians



Challenge

The North Carolina Department of Transportation is one of state's largest government agencies. NCDOT is responsible for maintaining approximately 80,000 miles of roadways and 18,000 bridges and culverts, as well as implementing and managing transportation systems involving railways, aviation, ferries, public transit, bicycles, and pedestrian traffic. It is also one of state's largest public employers with more than 14,000 employees. As a result of their high work volume, NCDOT utilizes numerous facilities throughout the state.

In 2013, the NCDOT administration and facilities management teams surveyed their Raleigh area facilities and realized that many of the buildings were still using mechanical systems that were 30 years old or older. The antiquated HVAC and control systems were inefficient or even failing, wasting substantial amounts of energy and driving up operational costs. As a result, the teams created a prioritized list of six buildings that needed mechanical upgrades and repairs, including four buildings in the downtown Raleigh Transportation Complex,

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Raney Building and the Century Center Buildings A and B also in Raleigh. These buildings are primarily used for offices, thus in addition to needing better system efficiency, a consistently comfortable indoor environment is also needed for employees working in those offices. In addition, the Century Center B building houses the NCDOT Data Center, presenting special environmental needs for the high-volume electronics activity in that area of the building.

Solution

NCDOT solicited proposals from HVAC companies and awarded the project to Brady. The project is a guaranteed energy savings project, for which Brady has both the expertise and an outstanding track record. The guaranteed energy savings for the first 16 years of operation is \$8,762,869, well above the projected project cost of \$6,703,727.

Brady worked with the NCDOT project manager and the building managers to design the best system and select the best components for each building's activities. System installation was conducted from 2014 to 2016 and included the following upgrades and energy-saving measures:

- Installation of energy-efficient lighting and controls in all buildings
- Replacement of 487 windows with double-pane energy-efficient windows
- Design and installation of upgraded controls in all buildings, including Building Logix centralized control systems
- Design and installation of a condensing boiler system at the Transportation Complex, followed by a disconnect of the

facilities from the century-old central steam plant system in downtown Raleigh

- Installation of Trane Chiller Plant Manager controls at the Transportation Complex
- Replacement of a cooling tower at the Transportation Complex with a more efficient tower
- Conversion of air handing units from constant volume to variable volume at the Transportation Complex
- Weatherization of doorways and other entryways at the Century Center buildings
- Design and installation of specialized controls in the Data Center at the Century Center B building
- Installation of a 500kW diesel generator at the Century Center B building to provide backup power for the Data Center

The project included a guaranteed energy savings of \$8,762,869 over a 16-year operational period that began in 2016.

Results

The project's first operational year was August 2016 to July 2017. Looking at the results from a human standpoint, the upgraded systems are providing state-of-the-art HVAC and control systems to more than 524,000 square feet of NCDOT building space, for which the building managers and employees are grateful. From a financial standpoint, the Year 1 energy savings were guaranteed to be \$435,849. At the conclusion of Year 1, the actual energy savings was verified to be \$491,188—12.7% more savings than anticipated. Add to that the \$162,321 of savings in O&M time and costs, and total Year 1 savings is more than \$650,000. Year



1 savings for specific resources include:

- Electrical energy: 4,486,019 kWh
- Steam: 183,561 therms
- Chilled water: 19,439 therms
- Natural gas: 55,717 therms

Based on these Year 1 savings, the projected total savings for the 16-year contract period is more than \$10.4 million. This will easily cover the project installation cost \$6.7 million, providing NCDOT and the people of North Carolina with a net gain of \$3.7 million! Brady—helping fellow North Carolinians with their expertise and commitment to excellence.

