

District Energy System for Nashville

Nashville records efficiency and reliability increases through investment in state-of-the-art energy system



Challenge

World famous today as Music City, USA, and home to the Grand Ole Opry, Nashville is a vibrant city of 685,000 people. Because it is one of the fastest growing cities in the U.S., the City of Nashville has been focused on smart growth strategies, which include plans to improve energy efficiency and decrease energy costs for both the city government and local businesses.

In particular, in 2003, Nashville needed to address the dilapidated District Energy System (DES) it had been operating for over 30 years. To create steam and chilled water to be piped underground to buildings for heating and cooling, the DES was generating power via an aging trash-burning plant. Due to excessive maintenance costs and concerns about pollution, Nashville embarked upon a plan for a new DES capable of providing lower operating costs and more efficient heating and cooling for downtown businesses and government.

Solution

Nashville Metro Council turned to Constellation to design, develop and operate a new state-of-the-art \$46 million District Energy System. Constellation worked to increase the interim efficiency of the old plant, while at the same time constructing the new one, which resulted in a seamless transition for all downtown customers. Completed seven months ahead of schedule, the DES began operation in December 2003 and was hailed by

Nashville's then-mayor as "a true catalyst for downtown economic development."

The DES facility has the capacity to provide 23,400 tons of cooling for air conditioning and 260,000 lbs/hr of steam for heating and hot water. It services the heating and cooling needs of 42 downtown buildings, and was projected to save Nashville approximately \$66.9 million. The project was financed entirely with municipal bonds, with the City of Nashville retaining ownership of the facility. Constellation operates and maintains the facility under a 15-year agreement.

Buildings that use the DES are connected to the system by only four pipes: a chilled water supply and chilled water return line, as well as a high-pressure steam supply and condensate return line. Apart from operating more efficiently, a DES system can save about 10% in avoided costs—such as space for housing boilers and chillers, expensive structural steel needed for building the cooling towers, and equipment maintenance and repair—compared to owning a heating and cooling system. Furthermore, through Constellation's managed energy procurement program, the city can purchase natural gas and electricity at a lower cost than can Nashville's businesses and government personnel can.

Nashville's new DES provides the city with heating and cooling more efficiently and with less environmental impact and lower costs than before, helping to meet multiple smart strategy goals.



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Highlights

Project

- Central chilled water and steam plant
- 15-year operations contract with three 5-year renewal options
- Expected savings of \$66.9 million for contract term
- Serving 42 downtown buildings

Technical

Chilled Water Plant

- 23,400-ton installed capacity
- Nine 2,600-ton dual compressor chillers
- Eighteen 1,300-ton cooling towers
- Six 550 hp variable primary CHW pumping system
- Five 350 hp constant-speed CW pumping system

Steam Plant

- 260,000 lbs/hr of 150 psig saturated steam capacity
- Four 65,000 lbs/hr dual-fuel water tube packaged boilers
- Fully redundant feedwater system

Work With a Trusted Energy Solutions Provider

At Constellation, we tailor our integrated energy solutions to your unique needs, providing you with the flexibility to choose how to cost-effectively buy, manage and use energy to meet your business goals. Along with our expertise, we offer a wide range of innovative and integrated distributed energy products—including solar, energy efficiency, cogeneration, backup generation, fuel cells and battery storage—as well as the reach of one of the nation's leading competitive suppliers of power, natural gas, renewable energy and energy management products. With more than 30 years of experience and over \$2 billion in energy-related projects financed and built, we help business, nonprofit and public sector customers achieve sustainability goals, develop energy resiliency, manage costs and capital needs, and mitigate risk.

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