



People and Nature: Our Future is in the Balance

National Wildlife Federation

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**University of Maryland
College Park, Maryland
Spring 2003, Energy**

BACKGROUND

Campus Profile

The University of Maryland College Park is a land-grant institution offering a wide array of bachelor, masters and doctorate degrees. The campus consists of over 1,200 acres, 30,000 students and 11,000 faculty and staff. Facilities include over 300 buildings, the majority of which are heated by the central steam plant.

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GOALS & ACCOMPLISHMENTS

Goals

The central steam plant was originally constructed in the early 1930s and burned coal to heat a small heating district. Following World War II, the campus experienced significant growth and the Central steam plant was expanded from two to four boilers all of which burned natural gas and No. 6 fuel oil. Continued campus growth and aging of the plant and distribution system during the intervening years led to a facility study in the mid-1990s. The study concluded that much of the system had exceeded its lifespan and required significant improvements. Due to the lack of funding from the State of Maryland and the University System of Maryland, the university sought a private company to upgrade and operate the system over 20 years via a ground lease. Cogeneration was identified as a cost-effective technology that would meet the university's growing heat, electrical and chilled-water needs while generating enough cost savings to pay for the capital improvements. Trigen Cinergy Solutions was the selected contractor and the university teamed with the Maryland Economic Development Corporation to arrange funding.



Accomplishments

The university executed a contract with Maryland Economic Development Corporation (MEDCO), which went out to bid for a firm to construct and run the combined heat and power plant for 20 years. MEDCO floated \$73 million in bonds as the project's owner and operator of record. The bonds are being repaid through the energy efficiencies realized over a 20-year payback period, thus allowing the university system to show the project as off-balance sheet financing. The project cost included not only plant construction but also improvement of existing

electrical distribution, steam distribution systems and construction of a chilled-water plant and a chilled-water distribution system. After 40 years, the plant becomes the property of the university.

Trigen Cinergy Corporation, Inc. was the successful bidder. Final commissioning is now under way for the construction of a \$70 million Combined Heat and Power (CHP) plant to upgrade the campus central steam plant. The plant has two sets of heat-recovery steam generators, two combustion turbines and a back pressure steam turbine to generate electricity and steam. Two existing boilers also have been upgraded. The plant will provide power for the campus except when marketplace prices are more advantageous. The CHP drives a chiller plant, produces steam heat and cools water for 16 buildings that are high demand users, such as labs and other classrooms. When at full capacity, the turbines meet 90 % or more of the campus's wintertime electric demand; when electric generation is maximum; the plant produces close to 100 % of the campus steam requirement.

Challenges and Responses

The upgrade of the central steam plant faced numerous financial, contractual and technical challenges. The project involved three parties including the university, MEDCO and Trigen Cinergy Corporation thereby requiring several complex contractual agreements. In addition, construction was subject to the approval of several regulatory agencies including the Maryland Public Service Commission and the Maryland Department of the Environment. Permitting required one year. Finally, the project involved reconstruction of the existing central steam plant building. Two boilers had to be removed, an addition to the building constructed to accommodate the new turbines and miles of high voltage, steam and condensate return lines had to be constructed throughout the campus. This had to be accomplished while keeping the facility fully operational through two heating seasons and in a manner that did not endanger pedestrians or cause excessive traffic congestion. These implementation problems were managed through regular planning meetings among university, Trigen and contractor personnel.



ENGAGEMENT & SUPPORT

Leaders and Supporters

Mr. Frank Brewer, Assistant Vice President of Facilities Management, and key Trigen personnel provided leadership for the project. Environmental permitting and reporting support was provided by the university's Department of Environmental Safety.

Funding

Please see the description provided above. Funding was provided through bonds floated by MEDCO.

CLOSING COMMENT

The upgraded central steam plant project has been a multi-year undertaking that was critical to meeting continued utility demands on the campus. Cogeneration was selected for its cost efficiency and environmental benefits.