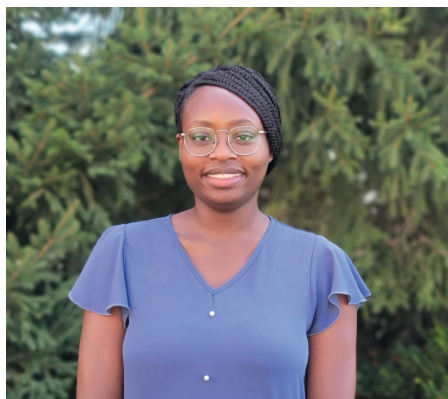




Clearway Energy



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Company Background

The Minneapolis Energy Center (MEC), a part of Clearway Community Energy, has been serving downtown Minneapolis for nearly 50 years. It is one of Clearway Community Energy's largest and longest-running district energy systems, employing 50 people. The MEC has been operating since 1972, while maintaining a 99.99% reliability rating. The MEC serves commercial and industrial customers, higher education, hotels, residential developments, municipal, county, state, and federal government buildings, and ballparks.



"It has been a privilege to be a part of the MnTAP program for the second time! I had the opportunity to gain more experience in the field of sustainability and efficiency. Starting this internship at the Minneapolis Energy Center, I got a lot of support from the managers, supervisors, and other staff members at the plant, and I am thankful for all their help. The MnTAP staff also served as great resources during the completion of my projects. This experience has prepared me for my career in energy efficiency and I am excited to see what comes next!" ~ OA

Project Background

The MEC has made great strides over the decades to improve the environmental performance of its nine plants in the downtown area. Various projects and studies involving water conservation and energy efficiency have been previously carried out in the facility. The goal for the main plant was to continue this work by completing a facility wide evaluation of water use and identifying opportunities for conservation and improvement.

Incentives To Change

As a district energy company, the MEC feels a responsibility to be a good steward of the environment. Consequently, minimizing resource use is a top priority. One way they do this is by reducing, reusing, or recycling water whenever possible. Decreasing water use is not only good for the environment but also decreases operating costs, the benefits of which can be passed along to their customers.

SOLUTIONS

Reuse Cooling Tower Water in Boiler Blowdown Quench Process

Boiler blowdown water is typically over 220°F. However, the maximum allowable sewer discharge temperature in Minneapolis is 140°F. Currently, city water is mixed with blowdown water to quench it to an appropriate temperature. The water discharged from the cooling towers could be recycled to cool the blowdown water instead. This would reduce city water use by 5,370,000 gallons per year, saving \$62,400 annually.

Clean Chiller Tubes Mid-Cycle

Chillers are kept in operation for the entire cooling season before the tubes are cleaned. During this time, the well water that runs through them causes a buildup of fouling that impedes heat transfer. Mid-cycle cleaning could reduce the fouling and improve chiller efficiency. An automatic cleaning system could be trialed on two of the five chillers. The energy savings from this recommendation would be about 94,000 kWh and \$21,600 per year.

Solutions

Install Air-Compressor with a VFD

The air-compressor on site functions on a load/unload cycle. When it is loaded, it operates at full capacity regardless of compressed air use, and when it is unloaded, it still uses energy while not performing any useful work. Installing an air-compressor with a VFD would allow the energy use of the compressor to match the compressed air demand and eliminate energy wasted during the unload phase. This solution would save 144,000 kWh and \$10,700 annually.

Install VFD on Boiler Fan Motors

Variable inlet vanes are currently used to control the air flow into the boilers. Although they are the most efficient type of mechanical damper, installing variable frequency drives on the boiler fan motors would increase efficiency by matching the power of the motor to the amount of air flowing into the boilers. If implemented on four boilers, this could save 1,270,000 kWh and \$114,500 per year.



“The MnTAP staff were well organized and had a schedule laid out for the summer that helped make the projects successful. Jumobi did a wonderful job jumping right into the projects and getting familiar with new topics. She utilized her past experience along with onsite expertise to ensure project deliverables were accurate and complete. The MnTAP staff also provided support and/or contacts whenever Jumobi needed help.”

-Chris Rheineck, Production Manager
Clearway Energy

Recommendation	Annual Reduction	Annual Savings	Status
Reuse cooling tower water	5,370,000 gal water	\$62,400	Recommended
Clean chiller tubes mid-cycle	94,000 kWh	\$21,600	Investigating
Install air compressor with VFD	144,000 kWh	\$10,700	Recommended
Install VFD on boiler fan motors	1,270,000 kWh	\$114,500	Recommended

MnTAP Advisor: Gabrielle Martin, Associate Engineer