BURNS McDONNELL

CASE STUDY / **GAINESVILLE REGIONAL UTILITIES SOUTH ENERGY CENTER**

WHEN WEATHER IS THE ENEMY, A BETTER CONCEPT PREVENTS CATASTROPHE

In hurricane-prone Florida, utility infrastructure to generate efficient and resilient energy in the face of catastrophic events is a concern for mission-critical facilities. The University of Florida Shands Hospital solved this concern with a CHP system that can perform independently during a storm.

GENERATING A RELIABLE SYSTEM

A multiphase solution delivers an efficient, clean energy source to maintain operations during power outages.

CHALLENGE

To provide the University of Florida Shands Hospital with independent, resilient power, Gainesville Regional Utilities (GRU) — a municipal utility in Florida — set out to deliver an on-site combined heat and power (CHP) solution. GRU turned to Burns & McDonnell to incorporate an expandable, hurricane-resistant design to both accommodate the hospital's plans for future growth and to withstand the region's high rate of lightning strikes, thunderstorms and hurricanes.

SOLUTION

Our team performed a comprehensive life cycle analysis of various CHP configurations aligned with thermal needs. We developed an hourly dispatch simulation to evaluate the operating profile and resulting costs of new technology combinations. In addition, we performed an electrical stability study to analyze the response times and resiliency of the CHP system when in island mode — disconnecting to safeguard its independent power generation in the event of a grid power outage.

The resulting solution, the South Energy Center (SEC), included a 4.3-megawatt gas turbine CHP system and a 7.4-megawatt reciprocating engine generator with a heat recovery steam generator (HRSG). To mitigate disruption of service, the two independent grid feeds can automatically transfer to island mode, providing continuous operation for up to 96 hours in the event of a prolonged grid outage. The resilient design of the 40,500-square-foot SEC building incorporated a steel frame and precast concrete.

An on-site control room was designed and built to operate and manage the SEC. Through a graphic interface with real-time information from thousands of data points, operators can monitor the site continuously. The interface also boasts remote access so operators can still access the system and control all breakers and switchgear in the event of a natural disaster.

RESULTS

The SEC was completed on time and on budget and is now successfully providing the hospital with 100% of its thermal and electric service. The CHP system is also 45% more efficient than the hospital's previous central utility plant, thanks to the SEC's conversion of waste exhaust into steam with the HRSG.

The effectiveness of the resilient design was tested in 2017 during Hurricane Irma. While other hospitals in Florida were forced to evacuate, the University of Florida Shands Hospital remained open for its patients and fared well during the storm.

PROJECT STATS

CLIENT/OWNER
Gainesville Regional Utilities/ University of Florida Shands Hospital

LOCATION
Gainesville, Florida

CERTIFICATION
LEED Gold

DELIVERED
Resiliency with 100% islanding

SUCCESS
Shands Hospital remained open throughout Hurricane Irma

45%

MORE EFFICIENT THAN TRADITIONAL CENTRAL UTILITY PLANT

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AWARDS WON

FICE GRAND AWARD FOR ENGINEERING EXCELLENCE

DBIA MID-AMERICA REGION BEST PROJECT AWARD

U.S. EPA ENERGY STAR CHP AWARD

ACEC NATIONAL AWARD RECOGNITION

10039-GRU-1120