

CASE STUDY / ENWAVE BIOMEDICAL STEAM PLANT

KEEPING THE POWER ON DURING FUTURE DISASTERS

During Hurricane Katrina, the levees failed, flooding streets, homes and businesses in New Orleans. Though critical to the city's recovery, the healthcare system was not prepared for the intensity of the storm. It was time to reimagine the systems that the public depended on — replacing critical structures and equipment that could prevent incapacitation in the event of another disaster.



LESSONS FROM HURRICANE KATRINA RESULTED IN SMARTER BUILDS

New Orleans' Enwave set out to put the lessons from Katrina to work. Rebuilding critical healthcare systems meant looking closely at how to eliminate service interruptions in the future and mitigate interruptions of current operations during construction.

PROJECT STATS

CLIENT
Enwave

LOCATION
New Orleans, LA

TOTAL PROJECT COST
\$28 million

200K

POUNDS PER HOUR OF STEAM CAPACITY

150K

GALLONS OF WATER STORED

40K

GALLONS OF FUEL OIL STORED

7

DAYS OF FUEL AND WATER STORAGE

CHALLENGE

Few cities have endured what New Orleans has. After Hurricane Katrina, only three of the city's nine hospitals remained open. Enwave — which owns and operates the downtown district energy system, serving Louisiana State University Medical Center — needed to build a new 26,000-square-foot Biomedical District Steam Plant to meet the load growth of the community and replace existing equipment that had reached the end of its service life.

One of Enwave's requirements was to keep the hospital's Level 1 trauma center operable for up to seven days without electrical, natural gas and water service to the plant — even when faced with flooding and 150 mph winds from a Category 5 hurricane.

The facility's tight footprint and location near the city's busy downtown district created design and construction challenges. Detailed planning and careful construction were critical to prevent disruption of service to the facility and surrounding community, while avoiding safety issues due to proximity of adjacent power lines. Because the new facility had to be built less than 100 feet from the existing medical center, the plan also had to minimize the effect on existing medical center operations that could not be interrupted in any way.

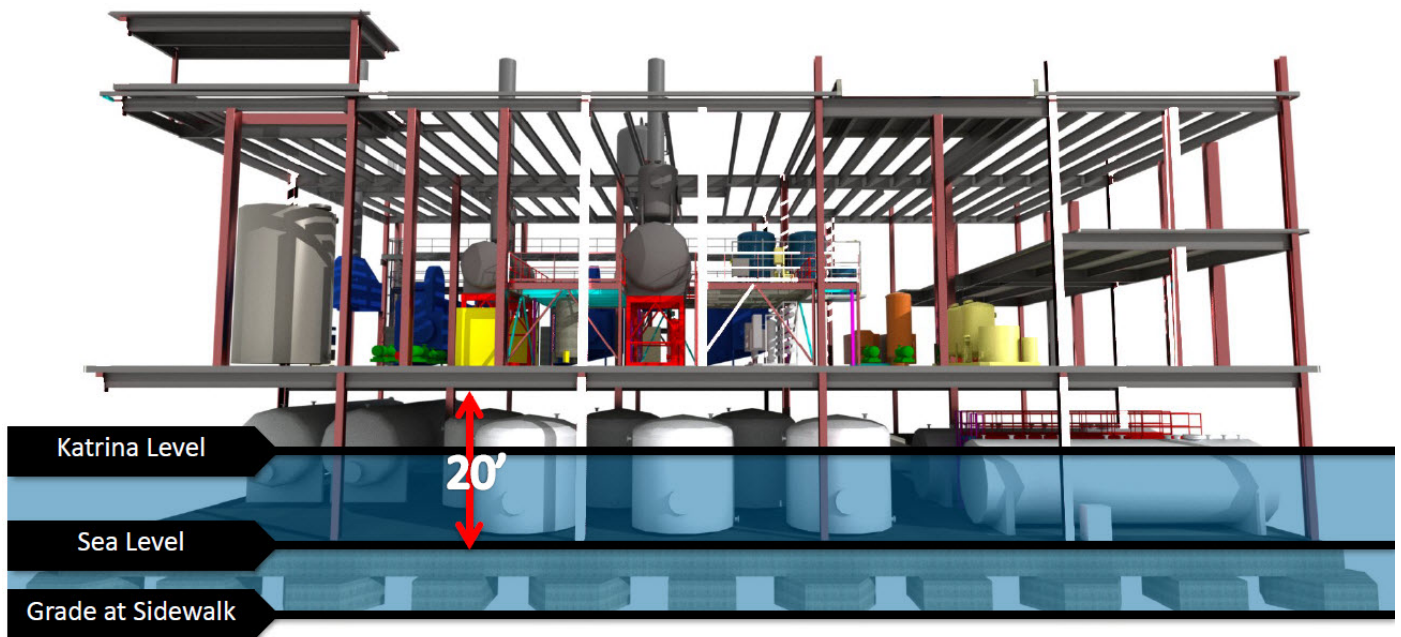
SOLUTION

Enwave's revised disaster-preparedness requirements included redundant steam-generating equipment, increased plant storage capacity that would allow for seven days of fuel oil and process water storage. Required critical equipment had to be located 20 feet above sea level, which is equal to the highest natural elevation in the city. The solution was to install this equipment on the second floor of the facility, well above the Hurricane Katrina flood plain.

To satisfy these requirements meant precision and careful planning within the building's tight urban footprint. Other equipment — emergency diesel generator and water softener salt silo — were moved to the roof, while self-priming pumps used to transfer water and fuel from storage tanks below the pump's inlets were moved above the sea level requirement.

Variable-speed drives were used on most motors to maximize the steam plant's overall efficiency, and feedwater stack economizers were selected to reduce gas consumption, with a heat-recovery heat exchanger to utilize boiler blowdown for pre-heating make-up water.

To help minimize effects of noise and movement during construction, a vibration monitoring program was used to make sure nearby



residences, businesses and healthcare facilities were not affected by pile-driving operations.

RESULTS

The effects of Hurricane Katrina on the City of New Orleans' hospitals and other healthcare operations resulted in an evolution in the approach to design and construction of facilities operating those services. Reconfiguring the location of critical equipment upgrades resulted in renewed confidence in a crucial part of the city's emergency relief system.

Construction of the \$28 million steam plant was completed on budget and two months ahead of schedule. The new plant serves 20 buildings, and stores more than 150,000 gallons of water in the event of a loss of municipal water utilities. The facility stores 40,000 gallons of fuel oil with

a leak-detection system if the walls are compromised. These increases allow for seven days of standalone operations. There is a water-treatment system and 480-volt switchgear electrical system, allowing operators to service and maintain all electrical equipment without interruption of steam service.

The project also met Enwave's goals to attain social, economic and sustainable development, while increasing capacity to meet demand. The nitrogen oxides emissions were cut in half, and though this level was not required, the decision considered the long-term environmental impacts and responsibilities of the surrounding healthcare district.

AWARDS

- DBIA National Award of Merit
- ENR Best Projects for Texas and Louisiana Award of Merit



BURNS  MCDONNELL

burnsmcd.com | Offices Worldwide