

New Jersey hospital saves with trigeneration

One of the largest healthcare systems in New Jersey was facing financial challenges due to uncertainty around the Affordable Care Act and Medicare payments averaging 10% less than cost of care. It looked to reduce energy costs in order to increase revenues for patient care.



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Saving 35% annually on our electricity costs directly impacts our mission to deliver high-quality, safe, affordable patient care.”

Director, Construction and Facilities Management

35%
SAVINGS

Slashed total spend
on energy bills

110%
AVAILABILITY

Electricity on
standby for
emergencies

20%
REDUCTION

Reductions on
carbon footprint

Electricity supply with free, efficient byproducts

Three Joint Commission-accredited medical centers, which make up this New Jersey healthcare system, provide a wide range of services to the residents of New Jersey.

Facing frequent cost uncertainties, one of the hospitals decided to reduce its electricity costs in order to release additional revenue for patient care.

After reviewing solar and turbine-based generating equipment, the decision was made to partner with Centrica Business Solutions to build a trigeneration system based on natural gas reciprocating engines. The vision was to use a natural gas generator set to produce electricity for the hospital, while using the free byproducts of the system (heat) to simultaneously produce steam, chilled water, and hot water – the hallmark of cogeneration and trigeneration.

Starting with Centrica Business Solutions' industry leading 41.5% efficient Mitsubishi engine, and appropriately utilizing the waste heat, the total efficiency of the trigeneration plant was designed to exceed 80% and reduce utility costs by 35%.

The results

After the detailed design was completed, two 1,000 kW generators (for a total of 2 MW) were installed and the hospital now generates 60% of its electricity on-site. In addition, the hospital uses the heat produced by the engines to generate steam, which allows it to decrease the firing rate of its existing boilers. The resulting engine coolant also removes high grade heat from the engine, and by flowing this through an absorption chiller, produces chilled water. This directly reduces the demand within the hospital's grid on the existing electric chillers and provides additional capacity for summer chilled water needs.

These free byproducts of the new installation allowed the hospital to reduce its utility bills by 35% or about \$2M per year.

System description

- Two 1,000 kW generators
- Natural gas reciprocating engines
- Generates free by-products like steam, hot and chilled water

System size

- 2 MW output

System production

- 110% emergency electric capacity
- \$2 million annual savings

Environmental benefits

- 10,000 ton reduction of carbon footprint

Moreover, the trigeneration system also provides the hospital with energy reliability. During emergencies or extended utility outages, the trigeneration system can provide 110% of the hospital's electricity needs, meaning it can stay fully operational even during the worst situations.

"The ability to remain fully capable during disaster periods allows us to provide for our community when they need it the most," said Manager of Facilities, Construction, and Clinical Engineering.

Finally, the trigeneration system helps the hospital to reduce its carbon footprint. The hospital group is continuously looking for ways to help the environment, and this system shows how far it is willing to go to help. The system reduces emissions of carbon dioxide by more than ten thousand tons per year and will be doing so for the next 15+ years.

In the end, the trigeneration system from Centrica Business Solutions allows the hospital group to take advantage of lower natural gas prices to reduce its energy costs, trigger additional energy reliability, and reduce the hospital's carbon footprint.