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News Release

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MTU ONSITE ENERGY COGENERATION SYSTEM FROM ROLLS-ROYCE PROVIDES SUBSTANTIAL SAVINGS TO OHIO HIGH SCHOOL AND COMMUNITY CENTER

- Natural gas-powered system offers 90 percent efficiency and more than $80,000 in annual savings in electricity costs during first year of operation in Medina, Ohio

MANKATO, MINN., U.S.A. – Last year, MTU Onsite Energy, a Rolls-Royce Power Systems brand within the Land & Sea division of Rolls-Royce, was chosen to update Ohio's Medina High School and the adjacent Medina Community Recreation Center with a Series 400 combined heat and power (CHP) system. Since its installation, the CHP unit has offset more than one million kWh of purchased electricity with measured savings of more than $80,000 in utility costs by capturing normally wasted heat while also generating electricity. When natural gas fuel costs and periodic service of the unit are considered, net savings exceed $61,000 based on utility bills from the facility, yielding a payback term of less than seven years.

Medina High School, the district's only high school and one of northern Ohio's largest high schools with a student body of 2,500, also houses the Medina Community Recreation Center. The state-of-the-art 110,000-square-foot multi-purpose complex offers area residents everything needed for a healthy and active lifestyle, including an Olympic-sized competition lap pool and educational nutrition programs facilitated in collaboration with Cleveland Clinic.

After the recreation center was added to the high school in 2003, the school district shifted its focus to the campus interior. In accordance with Ohio's Energy Conservation Program (House Bill 264), which allows districts to make efficiency improvements based on the savings generated by the replacement technology, a plan to improve overall energy and efficiency as part of a district-wide initiative rolled out in 2008.

In 2009, the Medina City School District conducted an energy-efficiency survey to find opportunities to make improvements. Working in partnership with leading energy conservation company, The Brewer-Garrett Company, the district made several energy-saving improvements resulting in an annual savings of $400,000 across ten schools.

DRIVEN BY SUCCESS

With momentum from the energy survey's success, Medina City School District sought out additional options to expand its efficiency program while reducing costs. Wind and solar power options were quickly ruled out when the district learned the technologies were not only costly, but could also take up to 20 years for the investment to reach a break-even point. It was then that Brewer-Garrett introduced them to the advantages of a CHP system. Together, it was determined a cogeneration solution for Medina High School would cost significantly less, offer a shorter break-even point than other technologies and provide the dramatic savings on utility costs that the district sought.

In April 2014, the MTU Onsite Energy Series 400 CHP system was installed in Medina High School's existing mechanical room to replace the boiler system that had recently failed.

"Wind and solar power seem like obvious choices when looking for renewable energy solutions. When we dug deeper, we learned that combined heat and power systems have been a proven technology for more than 100 years and are often more cost-effective and long lasting than wind and solar power," said John Burkhart, director of business affairs, Medina City School District.

The CHP process, also known as cogeneration, is one way businesses and large facilities like Medina High School and Medina Community Recreation Center can control the cost of heating, cooling and electricity. The CHP plant uses an exchanger to extract multiple forms of usable energy from a single fuel source, in this case natural gas, capturing heat from the water jacket in the cooling system to harness electric power that can then be used to power some or all of the electricity needed by a facility. Over the long term, a CHP plant can significantly reduce lifecycle costs, including expenditures for operations, installation and maintenance.

WASTE NOT, WANT NOT

The compact natural gas-powered Series 400 CHP produces 128 kWe and recovers 747,000 Btu of heat per hour, which is used to heat the facility's aquatic center and HVAC systems for the entire complex. By capturing normally wasted heat, the CHP unit has offset more than one million kWh of purchased electricity. The system also came equipped with sound dampening panels to drop the system's noise down to less than 75 dBA, a level at which one could have a conversation next to the unit while it's in operation.

"We've essentially put an electrical power plant on-site at Medina High School," said Tom Drake, gas and power system sales for MTU Onsite Energy distributor, W.W. Williams. "With the MTU Onsite Energy CHP, the school is able to use nearly 90 percent of the power generated."

Because schools don't need heat year round, municipalities do not often use CHP systems. However, Medina High School's community recreational center contains two swimming pools, making it a perfect application for the technology. The CHP preheats the aquatic center's water before it goes into the boilers. The constant heat load supplied by the pools and the facility allows the unit to absorb 125 kW of the heat energy through its exhaust and jacket water system on a continuous basis. Without the CHP unit, the energy used to heat the two pools at the recreation center would be wasted.

“Environmental responsibility is important to us and to our students, and implementing this energy-saving solution reaffirms that commitment,” said Burkhart.

Compared to the use of separate heat and power systems, Medina’s CHP is beneficial for the environment. In the normal combustion process, at least half of the energy generated is normally wasted, as it radiates away as heat. However, the CHP process captures that heat and allows Medina to utilize almost all of the energy potential of the natural gas. Consuming less fuel significantly reduces all greenhouse gas emissions, such as carbon dioxide, as well as pollutants like nitrogen oxide. In comparison with conventional power generation, MTU Onsite Energy CHP systems reduce carbon dioxide emissions up to 50 percent.

MEASURED PERFORMANCE

At a recent Medina City Schools Board of Education meeting, John Burkhart and Brewer-Garrett reported on the first year performance of the CHP unit. During the first 12-months of operation, the CHP generated 970,553 kWh and delivered 5,736 MMBtu of recovered heat to the HVAC and aquatic center heating loop. As a result, utility bills have decreased more than estimated. The system is now projected to yield a payback term almost two years less than originally anticipated.

Facility staff has also adopted the cogeneration unit as a reliable energy source. For full optimization, the district has made changes to heating system controls to maximize the benefit of the cogeneration thermal output and during the shoulder months, the school relies only on the CHP unit for all heating needs.

“The MTU Onsite Energy CHP is a sound investment, yielding both economic, operational and environmental benefits,” touted Burkhart.

PROVEN TECHNOLOGY

MTU Onsite Energy CHP systems have been a proven technology for cost-efficient power generation for more than 35 years in Europe and Asia. MTU Onsite Energy CHP systems are now available in the United States, Canada and Mexico through a network of authorized MTU Onsite Energy distributors. In addition to natural gas, the compact Series 400 CHP system can also be fueled by biogas, landfill gas or sewage gas, producing 128 to 358 kWe. MTU Onsite Energy also offers a larger Series 4000 model fueled by natural gas and biogas, producing 763 to 2,129 kWe. Both models are in use worldwide at over 2,700 installations.

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For more information, please visit cogen.mtuonsiteenergy.com.

About Rolls-Royce Holdings plc

1. Rolls-Royce’s vision is to create better power for a changing world via two main business divisions, Aerospace and Land & Sea. These business divisions address markets with two strong technology platforms, gas turbines and reciprocating engines. Aerospace comprises Civil Aerospace and Defence Aerospace. Land & Sea comprises Marine, Nuclear and Power Systems.

2. Rolls-Royce Power Systems is headquartered in Friedrichshafen in southern Germany and employs around 11,000 people. The product portfolio includes

MTU-brand high-speed engines and propulsion systems for ships, power generation, heavy land, rail and defense vehicles and for the oil and gas industry. Under the MTU Onsite Energy brand, the company markets diesel gensets for emergency, base load and peak load applications as well as cogeneration plants using gas engines for the combined generation of heat and power. Bergen medium-speed engines power ships and power generation applications. L'Orange completes the portfolio with fuel injection systems for large engines.

3. Rolls-Royce has customers in more than 120 countries, comprising more than 380 airlines and leasing customers, 160 armed forces, 4,000 marine customers including 70 navies, and more than 5,000 power and nuclear customers.

4. Our business is focused on the 4Cs:
    - Customer – placing the customer at the heart of our business
    - Concentration – deciding where to grow and where not to
    - Cost – continually looking to increase efficiency
    - Cash – improving financial performance.

5. Annual underlying revenue was $22.6 billion in 2014, around half of which came from the provision of aftermarket services. The firm and announced order book stood at $114.4 billion at the end of 2014.

6. In 2014, Rolls-Royce invested $1.9 billion on research and development. We also support a global network of 31 University Technology Centres, which position Rolls-Royce engineers at the forefront of scientific research.

7. Rolls-Royce employs over 54,000 people in more than 50 countries. Over 15,500 of these are engineers.

8. The Group has a strong commitment to apprentice and graduate recruitment and to further developing employee skills. In 2014 we employed 354 graduates and 357 apprentices through our worldwide training programs. Globally we have over 1,000 Rolls-Royce STEM ambassadors who are actively involved in education programs and activities; we have set ourselves a target to reach 6 million people through our STEM outreach activities by 2020.

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