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Power Generation

Cogeneration

Case History

Columbus Water Works

Where:
Columbus, Georgia, United States

Supply:
Two 1.75 MW C1750 N6C lean-burn generator sets with dual fuel gas supply trains, DMC300 management system, remote monitoring and switchgear

Application:
Converting waste gas generated as a byproduct of waste water treatment into electrical and useful thermal energy

Cummins ESB North America combines renewable fuel and cogeneration at Georgia plant

Columbus Water Works (CWW) supplies drinking water and provides waste water treatment for over 230,000 residents of Columbus, Georgia, United States. CWW takes its responsibilities as a Municipal Utility Authority seriously, ensuring environmental stewardship of the Chattahoochie River watershed while treating more than 67 million gallons of waste water per day. Using innovative technology has always been high on CWW's agenda. In fact, the waste water plant has won national awards for its own, patented, Columbus Biosolids Flow-Through Thermophilic Treatment (CBFT3) technology, an advanced anaerobic digestion system.

CWW was looking for a solution for its South Plant that would couple renewable fuel with cogeneration. CWW aimed to convert waste gas generated as a byproduct of waste water treatment into electrical and useful thermal energy. Cummins Energy Systems Business North America (ESB NA)

A pair of 1,750 kWe Cummins C1750 N6C generator sets run on either biogas or pipeline natural gas as required

Cummins switchgear allows the system to deliver both base-load renewable cogeneration and island-mode “emergency” power

was picked out as the technology leader in this field, thanks in part to its involvement in the Advanced Natural Gas Reciprocating Engines program (ARES).

After extensive evaluation, Cummins ESB NA was deemed to have the best technical fit for the application, supported by a world-class parts and service network. CWW was also reassured by the Cummins factory-led approach, since maintenance and performance events are contracted through ESB NA.

The general contractor for the project was Heavy Constructors Inc., assisted by consultants Brown & Caldwell and electrical contractors Smith Gray Electric. Cummins ESB NA provided the generator sets, switchgear and waste heat recovery systems along with supporting equipment. Cummins ESB NA also played a role in the design of the generator set room, and provided engineering value in the specific areas of rejected heat and utility mains switching.

CWW’s original specification had called for a rebuild of the existing service entrance switchgear. This would have placed a considerable amount of cost and risk on CWW and on the company undertaking the work. Cummins ESB came up with an alternative – an innovative utility mains switching solution that saved its customer literally hundreds of thousands of dollars.

The total power requirement for the site, including grid supply, is up to 5 MW. Cummins ESB installed two 1.75 MW C1750 N6C lean-burn gas generator sets supplying a total of 3.5 MW, managed by a DMC300 digital control system, along with remote monitoring and switchgear. The generator sets are dual fuel and have the ability to run on either digester or natural gas. There are no restrictions on how many hours a day or year the system can operate. However, since CWW has gas storage capabilities it operates the system at the base load rating for around 12 hours a day. In total the system operates for 4,000 hours a year.

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The project is a significant one for Cummins ESB North America, being its first large-scale renewably-fueled cogeneration plant in the United States. The project shows that Cummins ESB North America, through its involvement in the ARES program and its long-established support infrastructure, is the ideal supplier for a system designed to harness the energy potential of gas produced by waste water treatment plants. CWW, a leader and an innovator among the US municipal water utilities, is seeing the benefit – in the form of electrical and usable thermal energy.

For more information about renewable fuel, cogeneration or other energy solutions, contact your local Cummins Power Generation Energy Solutions Business or visit www.cumminspower.com/energysolutions.

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