State-of-the-Art Gas Engine Technology Leaves Room for Customer-Specific Innovation

Though you can't see it from the outside, the indoor swimming pool in the picturesque town of Bad Oldesloe in Schleswig-Holstein is supplied by cutting-edge energy technology. The plant is operated by Vereinigte Stadtwerke, a municipal operator that runs a total of five district heat networks in the Stormarn/Herzogtum Lauenburg region. Originally designed to supply the swimming pool with heat, the state-of-the-art cogeneration technology now benefits a close-by youth hostel, a hospital, various schools in the city center, and numerous private and commercial customers via the heat network.
Since late 2016, the new-generation gas engine MWM TCG 3016 of Caterpillar Energy Solutions (CES) from Mannheim has been running in the cogeneration power plant at the swimming pool, providing power and heat energy.
"The new TCG 3016 is still something like a 'development mule' among the gas engines", says Holger Herzberg, responsible for heat at Vereinigte Stadtwerke. He is pleased to be one of two operators who have been given the opportunity to thoroughly test the brand-new genset. According to Herzberg, the new genset boasts a number of improvements over its predecessors.

The latest MWM TCG 3016 gas genset runs as a field-test plant in Bad Oldesloe.

"The gas engine is extremely robust, which translates to longer service life. Moreover, the new TCG 3016 is maintenance-friendly, and the lubricant consumption has been reduced significantly, making the genset even more efficient." The TPEM (Total Plant & Energy Management) – the new control software for the TCG 3016 – also comes directly from Caterpillar Energy Solutions and fully controls the generator switch as well as the dry coolers, pumps, and other auxiliary drives. With the engine and control software originating from one source, the communication for the integrated power plant control with all its components works even better. "Our project presented a challenge for the MWM engineers, as the genset had to be installed in an existing cogeneration plant. That is more complicated than installing an entirely new plant", says Herzberg, commenting on the planning and construction phase. The conversion had to take place while the heat supply went on. The conversion phase in late 2016 took about eight weeks from the removal of the old genset to the connection of the new one. The TCG 3016 has run smoothly since November 2016. Holger Herzberg has upgraded it with a number of additional features, such as highly efficient, speed-controlled pumps for hot water, engine cooling water, and mixed cooling water circuits. Herzberg proudly explains: "In this way, we save about 25,000 kWh of pump energy a year." MWM/CES plants excel in terms of their adaptability to specific customer needs, by means of which the plants can be made even more efficient. This is a key reason why Herzberg appreciates the new TCG 3016. The reduced lubricant consumption of less than 0.1 g/kWh is another positive aspect. "Compared to the previous oil change interval of about 2,000 to 3,000 operating hours, the TCG 3016 only needs an oil change once every 5,000 operating hours, i.e. about once a year."
The generation of heat and especially its effective power production make the new engine an extremely efficient product for cogeneration plant operators. The investment has truly paid for Vereinigte Stadtwerke, as Herzberg has taken care of the entire project engineering and the new German Combined Heat and Power Act (KWK) paves the way to attractive state incentives. The second TCG 3016 has already been ordered!

Holger Herzberg, project manager
Vereinigte Stadtwerke GmbH, Bad Oldesloe

Tailored to Customer Needs

Vereinigte Stadtwerke GmbH

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Cogeneration Plant Specifications

Go-live	November 2016
Engine type	MWM TCG 3016 V16
Control	TPEM
Electrical output	800 kW
Thermal output	826 kW
Electrical efficiency	43.4%
Thermal efficiency	44.7%
Overall efficiency	88.1%

Increased Efficiency

As a special treat, Herzberg has implemented the inflow of the low-temperature mixed cooling water circuit of the cogeneration plant (47°C) for the return flow increase in the adjacent swimming pool. "Normally, this energy is emitted directly to the outside air via the dry coolers. With this modification, we now use the entire heat energy and thus achieve a higher thermal efficiency (+5 percent) compared to conventional applications."

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