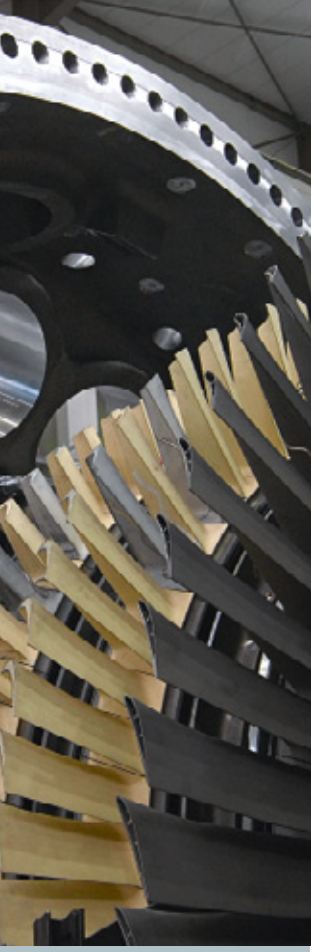

Official Launch of Siemens' 375 MW Gas Turbine

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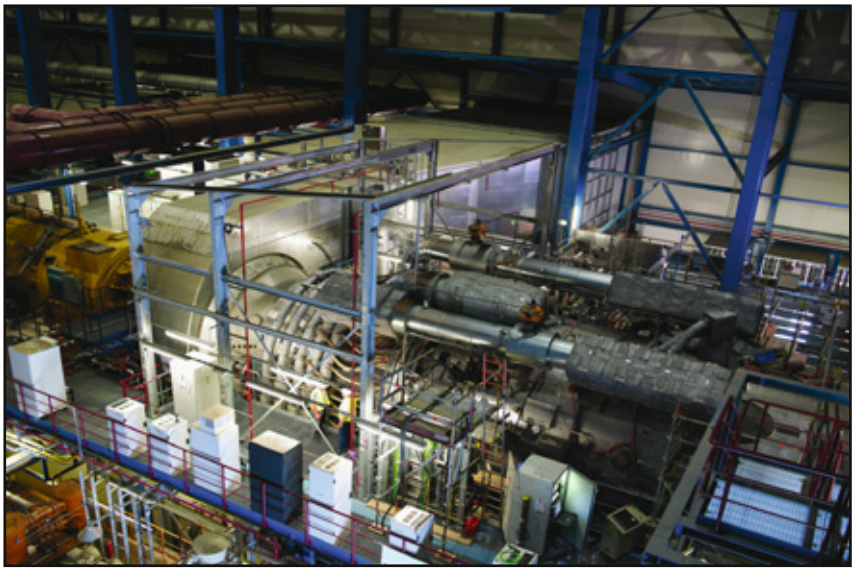
Author:
Staff report

Answers for energy.

SIEMENS



Shown here is the SGT5-8000H gas turbine installed at the Irshing 4 plant. The Irsching test center is property of Siemens and will remain so until the end of the combined-cycle test, when the whole plant will be handed over to E.ON, which will run it as a regular power generation section of the Irsching power plant.

Official Launch of Siemens' 375 MW Gas Turbine

The June 2008 issue of *Diesel & Gas Turbine Worldwide* reported the start of the full-load test program of the SGT5-8000H gas turbine. Rated at 340 MW, this marked the beginning of the validation test at the Irsching 4 test center.

After 1500 fired hours and 174 starts, Siemens officially launched the new product, rated 375 MW in simple-cycle and 570 MW in a single-shaft combined-cycle configuration.

These figures are substantially higher than the ones announced by the company at the start of the program. "No surprise for us," said Willibald J. Fischer, project manager for the SGT5-8000H. "These are the design figures confirmed by the validation test. In the past, we indicated lower figures to have some margin, just in case, but now that the turbine has been running up to around 400 MW for testing purposes, the 375 MW output is our official introduction figure."

The H class gas turbine is the first frame developed since the merger of Siemens and Westinghouse, combining features of the two established product lines for 50 and 60 Hz grids. This turbine was developed in strict compliance with the company's product developing process using "Design for Six Sigma" tools. The target was set to deliver a competitive product focused on low life-cycle cost, high performance in combined cycle, good serviceability, high flexibility, reliability and low emissions.

The air cooling system of the hot gas path was selected to better respond to cycling operation of the plant as required by power providers to better adapt operation to the variable energy rates (night or weekend rates).

Testing of large machines at the production shop is difficult, if not impossible, due to the infrastructure available at the site and the prohibitive cost of fuel.

In the case of the SGT5-8000H built by Siemens in Berlin, Germany, the natural gas pipeline reaching the shop allows testing of gas turbines with powers up to 220 MW. If the pipeline flow is increased, the bottleneck becomes the resistance needed to dissipate the power from the water brake. The cost of the fuel would then be so high that it would limit the number of testing hours.

For reasons stated above, Siemens asked E.ON Energie, one of its largest customers, to host their test center at the Irsching power station, where fuel gas supply is available and the power produced during the tests is not dissipated but fed to the grid. The rate paid is very low because it is based more on the test requirements than the grid needs, however, it is still a great contribution to cover a large share of the fuel costs.

This arrangement has allowed Siemens to validate the gas turbine after 1500 running hours —1200 of which are at full load — equivalent to 3000 operating hours, and 174 starts equivalent to 200 service start-ups.

The Irsching test center is property of Siemens and will remain so until the end of the combined-cycle test, which is now in the setup stage. After conclusion of this test, currently planned for 2011, the whole plant will be handed over to E.On, which will run it as a regular power generation section of the Irsching power plant.

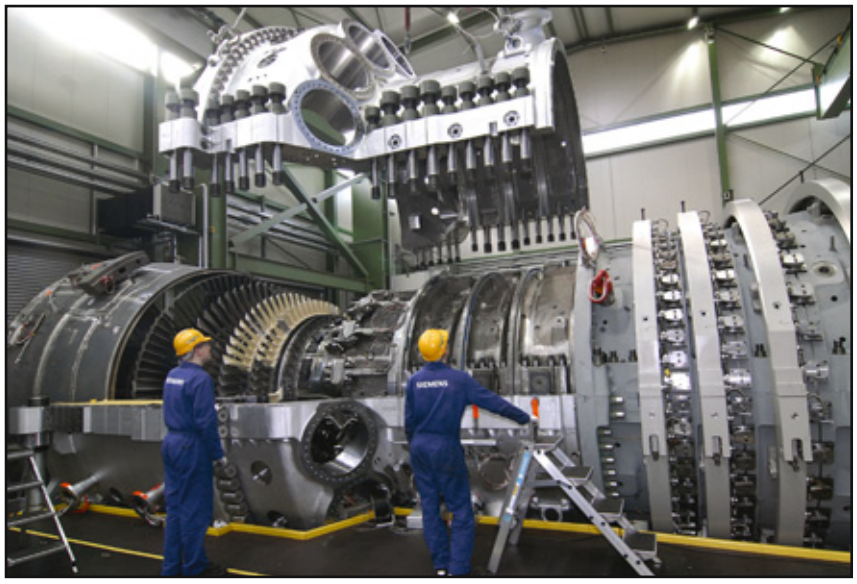
Wider details on the test centers were provided in a previous issue of this publication (see *D&GTW*, June 2008), however, a few of them warrant review at this time. The test center building (Block 4) has been sized from the beginning to host the gas turbine in the single-shaft combined-cycle configuration (SCC5-8000H 1S). Until now, only the gas turbine and the generator are installed, but space and foundation block are available to install the steam section of the plant.

After conclusion of the first part of the program that has validated the SGT5-8000H in the simple-cycle mode, the plant has been shut down and erection works are presently being performed to install the Benson-type HRSG in the place of the stack, on the

axial exhaust line of the gas turbine, and the steam turbine on the free end of the generator.

The gas turbine itself, being a prototype, has been provided from the assembly stage with over 2800 additional sensors in and on the engine. In addition to the instrumentation of the standard instrumentation and control system (I&C), these sensors measure temperatures, pressures, strains, flows, acceleration and vibrations encountered during part-load and base-load operation. In addition to the standard data acquisition system (DAS) of the plant, a second DAS was set up in containers located just outside the main building. This allowed the test center to link with the engineering headquarters of Muelheim, Germany, and Orlando, Florida, U.S.A., so that 100 engineers could view the tests in Irsching in real time.

Willibald J. Fischer, program manager for the SGT5-8000H, standing in front of the newly launched gas turbine.



The SGT5-8000H gas turbine in the Berlin, Germany, factory.

The system is still in place and will serve the same scope when testing the combined-cycle configuration of the plant. Once the testing program is completed, all the supplementary instrumentation and the DAS containers will be removed and the plant handed over to E.ON as a turnkey power plant.

The test program phase, which concluded at the end of August 2009, confirmed the design output of the gas turbine at 570 MW and also the 40% efficiency, which should allow a combined-cycle efficiency of over 60%.

This power rating has been selected with the background not only to offer new unit performance, but also a 12-year service program to the operators.

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