

# Efficiency record of combined cycle power plant

May 24 2011

---



A new Siemens gas turbine operated in a combined cycle with a steam turbine in Irsching, Bavaria, has set a world record for efficiency, making it an outstanding example of green technology. The net efficiency of 60.75 percent achieved during the test run even surpassed the target value of 60 percent; the previous generation of the turbine had an efficiency of 58.5 percent. The new turbine is designed to generate 400 megawatts (MW) alone and 600 MW when combined with a steam turbine.

Siemens has thus broken all previous records for output, efficiency, and operational flexibility. In tests conducted under everyday conditions the facility was able to supply more than 500 MW within just one half hour.

With the rise of a fluctuating [electricity supply](#) from [wind turbines](#) and solar power systems, maintaining the [power grid](#)'s stability is a job to be handled by large power plants that can quickly respond and offset changing loads.

The new facility is also much more economical than previous plants. The new generation of Siemens combined cycle power plants consumes one-third less natural gas per generated kilowatt-hour than what is used on average by other such facilities currently in use worldwide. And their CO<sub>2</sub> emissions are also one-third lower.

This outstanding performance is made possible by the perfect interplay of innovative [gas turbine](#) technology and the plant's key components, which are optimized for high temperatures and pressures. Each turbine consists of more than 7,000 individual parts. The 50-hertz version weighs 440 tons, as much as a fully fueled Airbus A380. Temperatures within the combustion chamber can be as high as 1,500 degrees Celsius, and the turbine blade tips can rotate at over 1,700 kilometers per hour (km/h), which is much faster than the speed of sound.

More than 750 Siemens employees, including 250 engineers, were involved in the development of the turbine and the new combined cycle power plant. The company invested over €500 million in the development, construction, and operation of the prototype facility in Irsching. Siemens thoroughly tested the gas turbine over a period of one and a half years, and in mid-2009 it began retrofitting the facility for steam turbine operation. After the testing stage is completed, E.ON will begin commercial operation sometime this summer.

Provided by Siemens AG

Citation: Efficiency record of combined cycle power plant (2011, May 24) retrieved 26 April

2024 from <https://phys.org/news/2011-05-efficiency-combined-power.html>

This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.