

First-of-a-kind supercritical CO₂ turbine

October 20 2014

Toshiba Corporation today announced that it will supply a first-of-a-kind supercritical CO₂ turbine to a demonstration plant being built in Texas, USA. The plant will be developed by NET Power, LLC, a U.S. venture, together with CB&I, the most complete energy infrastructure focused company in the world, Exelon Corporation, one of the leading competitive energy providers in the U.S., and 8 Rivers Capital, the inventor of the unique supercritical CO₂ power cycle that will be demonstrated by this plant. The turbine is an essential part of the system, and Toshiba will start delivering the key equipment in August 2016. The plant is expected to enter the commissioning stage later in 2016.

The new supercritical CO₂ [power](#) cycle system utilizes high temperature and high pressure gas at the [turbine](#) inlet. In order to cope with these conditions, Toshiba has utilized material specifically developed for use in high temperature steam turbines together with technology derived from its combustion and cooling technology used in gas turbines. The combustor has been designed by Toshiba to cope with a gas pressure of 300 bars, which is more than 10 times the gas pressure utilized in conventional gas turbines.

The system utilizes supercritical CO₂ as a working fluid to produce low-cost electricity while eliminating emissions of NO_x, CO₂, and other pollutants. CO₂ is collected at high-pressure without requiring additional carbon-capture equipment or processes, enabling full carbon-capture without increasing the cost of electricity.

Since 2012, Toshiba has been developing the new turbine and combustor

for the system together with NET Power, CB&I, Exelon Corporation, and 8 Rivers Capital. The five companies have now completed major agreements to build a 25MW gross electric (50MWt) demonstration plant in Texas. Through the successful completion of operating tests, the demonstration plant is intended to provide the basis for the construction of the first 295MWe full-scale commercial plant.

Toshiba and its partners will promote sales of this new power system worldwide, with a special focus on the U.S. and the Middle East, where there is strong demand for EOR. Going forward, Toshiba will continue to contribute to the global environment by supplying highly efficient and environmentally friendly power generation systems.

Provided by Toshiba Corporation

Citation: First-of-a-kind supercritical CO2 turbine (2014, October 20) retrieved 23 April 2024 from <https://phys.org/news/2014-10-first-of-a-kind-supercritical-co2-turbine.html>

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