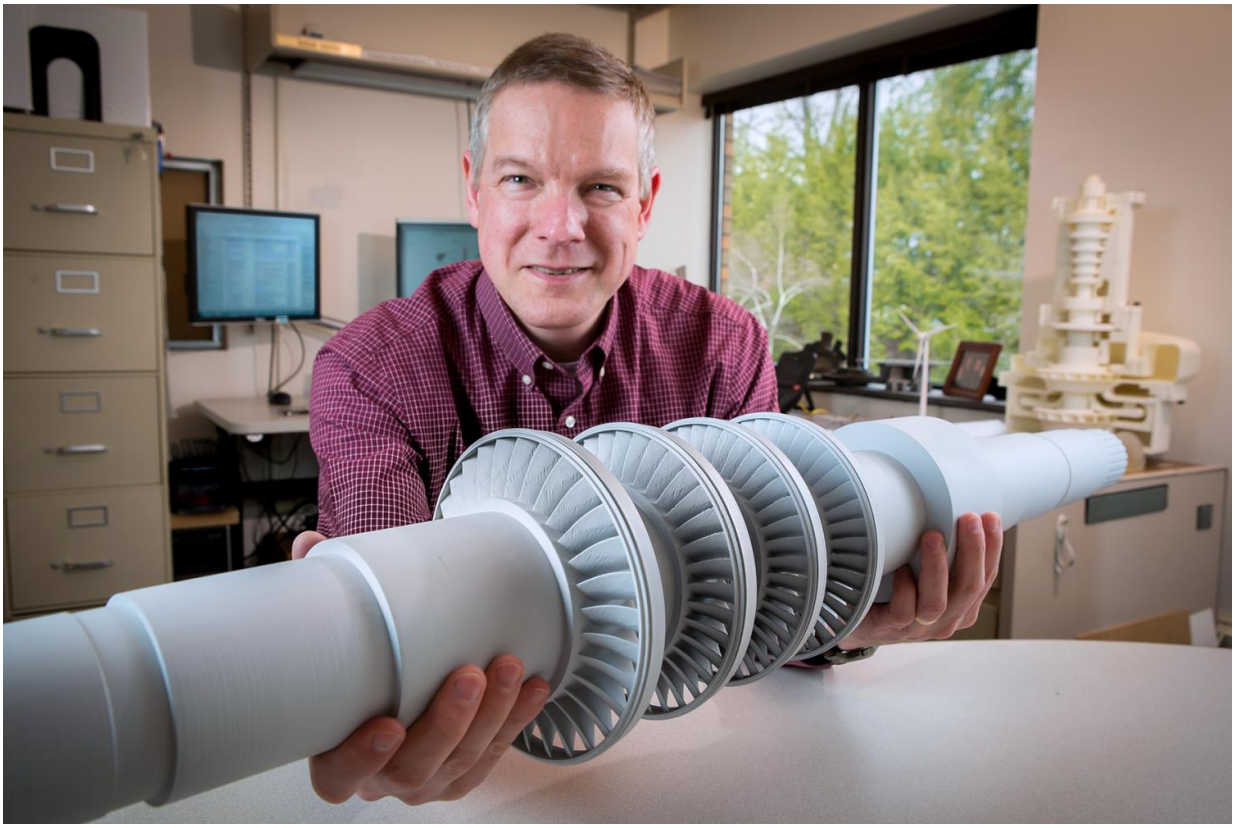
May carbon dioxide turbine help address clean power generation?

April 13 2016, by Nancy Owano



GRC's Hofer says his "minirotor" could power a small town. Image credit: GE Global Research

(Tech Xplore)—"Desk size turbine could power a town"—wishful thinking turned into a headline? Not really. *MIT Technology Review*'s

header belongs to a report earlier this week by Senior Writer David Talbot.

He was talking about GE Global Research and how it is testing a desk-size turbine that could power about 10,000 homes.

What makes this turbine work is not steam but carbon dioxide. "The unit is driven by "supercritical carbon dioxide," which is in a state that at very high pressure and up to 700 °C exists as neither a liquid nor a gas. After the carbon dioxide passes through the turbine, it's cooled and then repressurized before returning for another pass."

The unit is about one-tenth the size of a steam turbine of comparable output, said *MIT Technology Review*.

Eric Limer in *Popular Mechanics* said, "Instead of being pushed by steam, like most power plant turbines, the 'minirotor' as Hofer calls it is pushed by CO2. Not gaseous CO2, or liquid CO2, but CO2 so hot and pressurized that it forms what is called a supercritical fluid, a state of heat and pressure so extreme that the distinctions between liquid and gas basically cease to exist."

The *Daily Mail* showed a 3D-printed prototype of the turbine. This was a model that was 3D-printed from plastic, but the real version of the turbine is made from high-strength metal, said *GE Reports*.

GE Reports explained what the concept is all about: "The medium spinning this turbine isn't steam but carbon dioxide, squeezed and heated so high that it forms a supercritical fluid. At that level, the difference between gas and liquid basically disappears and gives the CO2 marvelous properties that the turbine harnesses for superefficient power generation."

This machine in size would be a significant departure from machines weighing several tons. "This compact machine will allow us to do amazing things," said Doug Hofer, steam turbine specialist at GE Global Research.

Hofer said in *GE Reports* that the technology is in its early stages of development and Hofer and team plan "to take it for a spin later this year."

What kind of impact could their turbine project have on energy challenges down the road? *GE Reports* said that "Hofer and his team are gathering insights that could allow them to scale the technology to the 500 megawatt range—enough to power a large city. The research could lead to smaller 'large' turbines that are more efficient in the future. "

More information: www.gereports.com/this-scienti … -plant-in-his-hands/

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