

NEWS

From GEORGIA TECH'S ENGINEERING EXPERIMENT STATION

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SOLAR-POWERED STIRLING ENGINE
GENERATES POWER IN TECH TESTS

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ATLANTA, GA -- Electricity rates probably will continue to rise steeply for the rest of this century. However, innovative solar energy systems, like one currently under development at Georgia Tech, should help to offset some of this cost increase.

Georgia Tech researchers recently produced directly usable electricity with a Swedish-built engine. The tests were funded by United Stirling of Sweden and conducted at a large Department of Energy solar test facility on the Tech campus.

"It was the first time ever that a Stirling engine powered by solar energy produced electricity which could be fed directly into power company lines," said Doug Neale, a senior research engineer at Tech's Engineering Experiment Station.

The engine brought to Tech for testing was a 20 kilowatt model developed by United Stirling. It is an external combustion engine whose pistons are driven by heated helium or hydrogen gases. In the Georgia Tech testing program, helium was run through a set of tubes outside the engine and heated with concentrated solar energy reflected from a large mirror field.

"Probably the best use of solar energy will be to generate electricity, and on paper the Stirling approach is one of the most promising technologies we've seen," said Neale, who directed the tests. "With development, the Stirling engine will be three times more efficient than photovoltaic panels in converting sunlight to energy."

(More)

Photovoltaic panels contain clusters of small silicon and glass solar cells, which convert sunlight to electricity. However, the power they produce is direct instead of alternating current and must be modified for use in conventional power lines.

The Georgia Tech tests, undertaken last August and October, proved that a large solar receiver could be mated efficiently with a small Stirling engine. However, further research will be necessary to refine the system and make it optimally efficient.

Neale emphasized that the solar-powered Stirling engine probably won't replace the power company for anyone, but thinks that this technology could help some large electricity consumers to save money on their utility bills.

A solar-powered Stirling engine would have greatest impact if it were in use when high levels of electricity were needed. In Georgia, power utility rates are set according to the single period during the summer when customers use the most power. Linked to a field of solar parabolic dishes, the Stirling engine could help reduce power peaks, but only if those periods of heavy electrical demand occurred on sunny days.

Georgia Tech's solar experimentation site, the Advanced Components Test Facility, is available for use by outside contractors for a variety of solar testing programs. Tech's Engineering Experiment Station also uses the facility for its own programs of research and development. The Station recently was selected by the Department of Energy to operate a major R&D center in solar thermal energy.