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# Science News

# Sunshine-to-Petrol Project Seeks Fuel From Thin Air

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ScienceDaily (Dec. 10, 2007) - Using concentrated solar energy to reverse combustion, a research team from Sandia National Laboratories is building a prototype device intended to chemically "reenergize" carbon dioxide into carbon monoxide using concentrated solar power. The carbon monoxide could then be used to make hydrogen or serve as a building block to synthesize a liquid combustible fuel, such as methanol or even gasoline, diesel and jet fuel.

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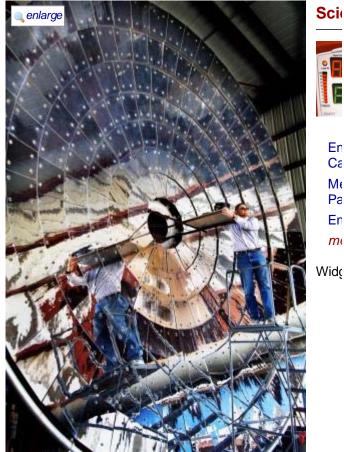
The prototype device, called the Counter Rotating Ring Receiver Reactor Recuperator (CR5, for short), will break a carbon-oxygen bond in the carbon dioxide to form carbon monoxide and oxygen in two distinct steps. It is a major piece of an approach to converting carbon dioxide into fuel from sunlight.

The Sandia research team calls this approach "Sunshine to Petrol" (S2P). "Liquid Solar Fuel" is the end product — the methanol, gasoline, or other liquid fuel made from water and the carbon monoxide produced using solar energy.

CR5 inventor Rich Diver says the original idea for the device was to break down water into hydrogen and oxygen. The hydrogen could then fuel a potential hydrogen economy.

The Sandia researchers came up with the idea to use the CR5 to break down carbon dioxide, just as it would water. Over the past year they have shown proof of concept and are completing a prototype device that will use concentrated solar energy to reenergize carbon dioxide or water, the products of combustion. This will form carbon monoxide, hydrogen, and oxygen, which ultimately could be used to synthesize liquid fuels in an integrated S2P system.

Coresearchers on the project are Jim E. Miller and Nathan Siegel. Project champion is Ellen B. Stechel, manager of



Sandia researcher Rich Diver checks out the solar furnace which will be the initial source of concentrated solar heat for the CR5 prototype. Eventually parabolic dishes will provide the thermal energy. (Credit: Photo by Randy Montoya)

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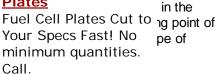
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the current gasoline and oil intrastructure. After the synthesized fuel is made from the carbon monoxide, it could be transported through on pipeline or sput in astruck and hauled to a gas station, just like gasoline refined from petroleum is now. Plus it would work in ordinary gasoline and diesel engine √Ence Subscriptions ... from ScienceDaily

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Miller, says, that while the first step would be to capture the Get the latest science news with our free email carbon diers, updated out was where it is concentrated — e.g., newsier plants, smokestacks, and breweries der the ultimate goal would be to snatch it out of the air. A S2P system that includes almospheric carbon dioxide capture could produce care 66 neutral dentid fuels.

"Pur overall objective with this prototype is to demonstrate the practicality of the CR5 concept and to determine how test

results from small-scale testing can be expanded to work in Tell us what, you think of the new ScienceDaily ---real devices, "Miller says." The design is conservative we welcome both positive and negative comments. compared to what might eventually be developed." Have any problems using the site? Questions?

Diver says the prototype should be completed by early next Your Name. year. He hand-built the precision device in a shop at Sandia's NationEhSolar Thermal Test Facility and is now waiting on a few parts to finalize it. Initial tests will break down water into Comments:

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