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When a team of Ohio State students worked around the clock for nine days straight recently, they weren't pulling the typical college "all-nighters." Instead, they were reaching a milestone in clean coal technology. For 203 continuous hours, they operated a scaled-down version of a power plant combustion system with a unique experimental design--one that chemically converts coal to heat while capturing 99 percent of the carbon dioxide produced in the reaction. This new technology, called coal-direct chemical looping, was pioneered by Liang-Shih Fan, professor of chemical and bimolecular engineering and director of Ohio State's Clean Coal Research Laboratory. Fan is a Distinguished University Professor and a 2012 Innovator of the Year.

Typical coal-fired power plants burn coal to heat water to make steam, which turns the turbines that produce electricity. In chemical looping, the coal isn't burned with fire, but instead chemically combusted in a sealed chamber so that it doesn't pollute the air. A second combustion unit in the lab does the same thing with coal-derived singes, and both produce 25 thermal kilowatts of energy. "In the simplest sense, combustion is a chemical reaction that consumes oxygen and produces heat," Fan says. "Unfortunately, it also produces carbon dioxide, which is difficult to capture and bad for the environment. So we found a way to release the heat without burning."

Dawai Wang, a research associate and one of the group's team leaders, says the technology's potential benefits go beyond the environment: "The plant could really promote our energy independence. Not only can we use America's natural resources such as Ohio coal, but we can keep our air clean and spur the economy with jobs." The researchers are about to take the technology to the next level: a pilot plant is under construction at the U.S. Department of Energy's National Carbon Capture Center. Set to begin operations in late 2013, that plant will produce 250 thermal kilowatts using syngas. Tests there will set the stage for future commercial development. "At Ohio State, with a team of creative minds, we can take a technological concept closer to real commercial use," Wang says. The technology looks promising: as doctoral student Elena Chung explained, the 203-hour experiment could have continued even longer. "We voluntarily chose to stop the unit. Honestly, it was a mutual decision by Dr. Fan and the students. It was a long and tiring week where we all shared shifts," she says.

Electricity Pricing – Feb 26, 2012

	On-Peak	Off-Peak
2013	\$.03872	\$.02581
2014	\$.04086	\$.02737
2015	\$.04273	\$.02897

LMP Electric Price

Time Period	Average per Kwh
Feb, 2012	\$.02963
Mar, 2012	\$.02894
April, 2012	\$.02659
May, 2012	\$.02816
June, 2012	\$.03089
July, 2012	\$.04303
Aug, 2012	\$.03112
Sep, 2012	\$.03034
Oct, 2012	\$.02829
Nov, 2012	\$.03327
Dec, 2012	\$.03081
Jan, 2013	\$.03111
Feb 1–Feb 25, 2013	\$.03218

Extended Temperature Forecast:

Chicago Area

	Tue	Wed	Thu	Fri	Sat
High	35	36	34	31	29
Low	32	30	28	24	18

