

# PHARMACEUTICAL COMPANY EXCEEDS Carbon Reduction

and Energy Savings Goals

**TRANSFORM PHARMACEUTICALS** (a Johnson & Johnson company in Lexington, Massachusetts) has a corporate mandate to reduce its energy costs and greenhouse emissions by seven percent in 2010. And it's well on the way to doing just that.

In fact, the company's 250kW solar thermal-assisted trigeneration system exceeds this goal.

The system was designed for Transform Pharmaceuticals and installed by Aircogen CHP Solutions (a Dresser-Rand strategic business unit, or SBU) in August 2008. At that time, Massachusetts Governor Deval Patrick commended Johnson & Johnson on its commitment to saving energy and contributing to the local economy, and to the project partners for supporting the state's green energy initiative.

More recently (May 2009), Transform Pharmaceuticals was one of 10 organizations honored as a "Northeast Business Leader for Energy Efficiency" by Northeast Energy Efficiency Partnerships (NEEP). It was nominated by National Grid and was selected for recognition based upon several factors: its commitment to achieving energy savings through cost-effective energy efficiency investments; addressing comprehensive changes in major energy systems; improving energy performance through operational practices and management level support; and demonstrating leadership to advance energy efficiency.

In combination with the renewable solar thermal energy, the system is generating approximately \$220,000 in energy savings each year. Operating at approximately 80 percent efficiency, the system compares favorably to grid power that can be as low as 35 percent efficient at the generation point, with an additional efficiency loss of seven to nine percent in the transmission and distribution system.

This past August, the trigeneration system completed its first full year of operation. The sys-

tem achieved an operational availability of 97 percent at full load with an average operating efficiency of 78 percent, delivering 2098 MWhrs of electricity and recovering 5280 MWhrs of useful thermal energy.

"This project demonstrates how the correct application of a packaged trigeneration system can help corporate America deliver on its carbon reduction promises while delivering energy savings and improving competitiveness," said Ian Hopkins, general manager of the Aircogen SBU operations based in the United States.

"Now more than ever it's important that industrial energy users maximize their fuel efficiency," he said. "One way to do this is through this type of distributed generation."

A CHP, or cogeneration system, offers an environmentally friendly option for providing power and energy where it's needed through the simultaneous generation of usable heat and electricity.

As opposed to cogeneration, which deals only with power and heat, trigeneration is the simultaneous production of power, heat and cooling. The chiller is assembled with all necessary pumps, heat exchangers and controls in an engineered package of the same construction as the matched CHP unit. Cooling of the absorption chiller package and engine system is provided by a separate, closed circuit cooling water system controlled by the integrated trigeneration control system.

Aircogen's trigeneration systems are designed to precisely match client requirements for electricity, heating and cooling. At Transform



*This Aircogen combined heat and power system has reduced the company's energy costs and greenhouse gas emissions.*

Pharmaceuticals the performance of the tri-generation system was further supplemented by a solar thermal array delivering additional heat to the systems primary hot water circuit for transfer to either the heating or cooling demand of the facility.

Transform's 250kW unit provides continuous, on-site-generated electricity, heating and cooling to its manufacturing facility from a single, natural gas fuel source. The unit is capable of delivering 1.3 million BTUs of hot water at 180 degrees Fahrenheit or up to 75 tons of chilled water via an absorption chiller. These outputs provide approximately 29 percent of the site's cooling demand and 38 percent of its hot water demand on a typical design day.

During a one-year period, it is estimated that it will reduce the site's carbon footprint by nearly 1000 tons. The unit is fuelled by clean natural gas and, by using a catalytic converter system, achieves emission levels well within EPA guidelines ((NOx <0.1 g/bhp.hr CO <0.6g/bhp.hr).

The Aircogen SBU recently secured an order to supply a 555kWe solar thermal trigeneration system to Boston Scientific in Marlborough, Massachusetts, USA. The unit is scheduled for delivery in the second quarter of 2010. ■



*and power system reduces on-site  
as emissions.*

FLEXIBILITY OF

# HOS and HOSS

Compressors Beneficial in EOR Applications

## RECOVERY OF CRUDE OIL FROM

U.S. domestic oil reservoirs typically involves three well-defined stages: primary, secondary and tertiary (or "enhanced"). In primary recovery, the natural pressure of the oil reservoir drives oil into the wellbore where, assisted by pumping equipment, the oil is brought to the surface. On average, approximately 10 percent of a reservoir's oil is delivered in primary recovery while secondary recovery, which involves gas injection, water injection, gas lift, or in situ combustion, results in the recovery of another 20 to 40 percent.

Today, with much of the oil already recovered in older U.S. fields by primary and secondary methods, oil producers are concentrating their efforts on tertiary or enhanced oil recovery (EOR) techniques. And why not? The U.S. Energy Information Administration estimates that nearly 400 billion barrels of domestic oil is still recoverable.

One of the more notable, and most rapidly growing EOR techniques involves what are known as carbon dioxide "floods" – injecting carbon dioxide (CO<sub>2</sub>) that expands in the oil reservoir, mixes with and thins the trapped oil and pushes it to a production wellbore.

According to the Western Research Institute, the overall U.S. crude oil production that could be recovered using CO<sub>2</sub> is estimated at 234,000 barrels a day, or five percent of domestic production. The U.S. Department of Energy's National Energy Technology Laboratory estimates that the potential exists to double CO<sub>2</sub>-enhanced oil production by 2015, and quadruple it by 2025.

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