LOW-COST SOLAR AND WIND POWER SPURS INTEREST IN

# Energy Storage

## To Reduce Emissions

**ONE MIGHT THINK** that storing energy by compressing air into underground caverns is pure science fiction. But it's a reality in McIntosh, Alabama, where the PowerSouth Energy Cooperative has been successfully operating its compressed air energy storage (CAES) plant for nearly two decades.

It works this way: during nighttime periods of low electric usage when electric power cost is significantly reduced, the CAES plant compresses and stores air in a salt cavern. Later, during periods of peak energy consumption, the air is released and heated with natural gas, then used to drive turbines that generate electricity. Dresser-Rand has refined this process and provides its clients with a unique and very flexible power generation option that is very complimentary to their overall system portfolio of electric generation.

Depending on the storage capacity, Dresser-Rand's CAES solution can supply up to 135 megawatts of electric power per train for several hours, and, in emergencies, up to several days. The required geological formations (*e.g.,* abandoned mines, salt caverns, aquifers) can be found around the world. This makes CAES a viable alternative for electric utility owners, developers with expertise in below-ground storage, developers of solar and wind energy projects, and large industrial power consumers.

Aside from the economic advantages of using off-peak power to meet peak demand, CAES presents an attractive alternative to the costly revisions needed to update coal-burning plants to conform to increasingly stricter fossil fuel emissions requirements. It's clean and renewable. CAES combustors typically use one-third the fuel used by conventional gas turbines.

"Interest in CAES has dramatically increased in recent years," says James Heid, Dresser-Rand's vice president for Global Business Solutions. "As utilities add new generation, CAES offers a green, flexible option no other solution can now fill." Dresser-Rand has experience with providing total demand management and power generation using CAES solutions, having designed and supplied the turbomachinery and controls for the McIntosh plant.

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"With the experience of nearly two decades of successful operation in McIntosh," says Heid, "we have unique, flexible CAES solutions to offer clients." The company believes it has the only viable CAES technology that can be applied immediately. Today, Dresser-Rand is the only domestic designer and manufacturer of CAES solutions with operating CAES units in the Americas.

### FUTURE OPPORTUNITIES FOR CAES SOLUTIONS

Ever alert to workable solutions, Dresser-Rand engineers recently secured a patent for a sub-

sea CAES concept that combines a conventional CAES facility with a sub-sea piping and compressed air storage system. Such a structure could bring CAES technology to a wide range of coastal locations that represent nearly 80 percent of the world's demand for electricity.

Furthermore, the growing interest in wind and solar energy has spurred interest in CAES technology. Wind farms typically generate more electricity at night when there already is a surplus of electricity. The ability to "bottle" this electric energy for daytime use (when it is most valuable) is an attractive consideration. Likewise, electricity from photo-voltaic farms in "sunny" regions could be sent through high-voltage DC transmission lines to CAES facilities elsewhere, where turbines would generate electricity year-round.

CAES technology gives utility operators the means to operate their base load plants more efficiently and provides a solution for balancing the grid. And it enables green technologies such as solar cells and wind turbines to be matched with daily and weekly demand requirements for electricity.

"We believe CAES represents a viable solution where large-scale power storage is needed for load and generation management, and we're prepared to support prospective clients with proposals for CAES–related equipment and services," said Heid. ■

*Solar power plant.*