

LOWER FUEL COSTS SOMETIMES BEAT HIGHER OUTPUT

With rising and volatile natural gas costs impacting the performance and economics of what were once low-cost generating facilities, many gas turbine owners and operators are more interested in reducing fuel costs than increasing power output of existing assets.

One way to do it is through humid air injection (HAI) technology — used not just as a way to augment power output, but also as a strategy to take advantage of improved heat rate to reduce fuel costs.

“Power augmentation methods have long been used to enable gas turbine owners to recover some of the power that is lost as ambient air temperatures rise,” notes Russell Blades, vice president of Hill Energy, a license holder that markets HAI technology. “However, in today’s market, many asset owners are more focused on reducing operating costs than producing more power.”

HAI is one technology that can help reduce operating costs by improving heat rates, thus reducing natural gas consumption. Because natural gas represents the largest single cost of running a gas-fired power plant, an increase of 1% efficiency — improvement in the fuel-to-power ratio — can reduce operating costs by \$15-20 million over the typical life of a power plant.

Blades cites his company’s analysis on a baseloaded GE7EA with gas contracts at \$4/MMBtu showing that HAI

could reduce operating costs by \$2.8 million annually (figure). “The analysis, operating in a simple-cycle configuration, shows it is possible to generate the same amount of power that the gas turbine normally produces, but take advantage of the heat rate improvements to reduce natural gas consumption by about 90 MMBtu/hr over the full operating range of 25 F to 95 F.”

Blades notes that in addition to being a fuel savings strategy, users and power marketers are looking at HAI as a physical hedging strategy. While financial hedging strategies are well known within the power industry, physical hedging strategies other than gas storage are seldom deployed.

“A savvy power plant owner or power marketer can take advantage of HAI’s performance-based improvements,” says Blades. “When power prices are high, HAI can be used to provide additional power at incremental heat rates better than today’s best combined-cycle plants.”

Using HAI, a GE7EA could provide an additional 27 MW at an incremental heat rate of only 5574 Btu/kWh when ambient air temperatures are 95 F. When power prices are low, the same technology with simple changes in set points could continue to meet power output obligations, but reduce fuel by 90 MMBtu/hr. That would result in what, in effect, is excess natural gas that could be sold on the spot market for additional gains. 

