

IMPACT OF NATURAL GAS PRICE ON GAS TURBINE POWER PLANTS

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SCNG REPORT

**The Economics of Gas
Turbines in the PJM Region**

WEB LINK:

[www.netl.doe.gov/scng/policy/
planning/policy_refshelf.html](http://www.netl.doe.gov/scng/policy/planning/policy_refshelf.html)

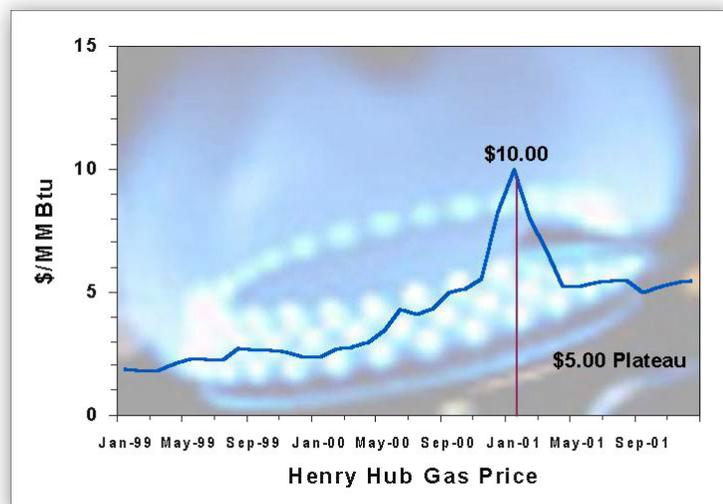


Description

The Energy Information Administration (EIA) estimates that 355 gigawatts of new generating capacity are expected to be needed in the United States by 2020 to meet growing demand and to replace retiring power generating units. This translates into more than 1100 new plants (average capacity of 300 megawatts). EIA predicts that 88 percent of these new power plants will be fueled by natural gas turbines and combined cycle units. In this assessment, the SCNG determined how important the price of natural gas is in the decision to purchase gas turbines or combined cycles, and at what threshold price generating company owners would seek other types of generation fuels.

Background

Natural gas has been the fuel of choice recently for new capacity additions due to its clean-burning properties, domestic abundance, and low construction costs. However, the events of the past year have shown that tight supplies and weather conditions can send gas prices soaring.



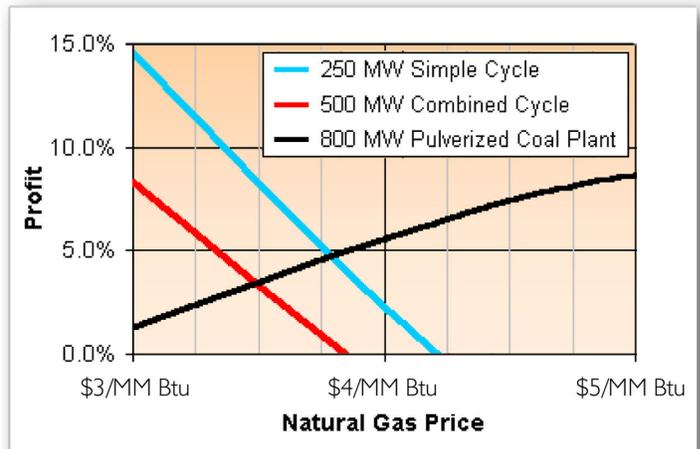
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Last winter, for example, gas prices reached record highs of \$10.00 per million British thermal units (MMBtu). Now the rising inventories of gas and the downturn in the U.S. economy have pushed gas prices below \$2.50 MMBtu. But many analysts believe that the market will tighten again with economic recovery and as natural gas demand grows to fuel new gas-fired power generating units. Volatile gas prices make it difficult for electric generators to manage costs, control risk, and plan for the future.

Significance/Potential Impacts

Because natural gas fuel cost is the largest component of operating costs for natural gas-fueled plants, unpredictable natural gas prices have a significant affect on the viability of these plants. Volatile fuel costs can result in financial failure for an existing plant or cancellation of planned new plants. The result is inadequate generation to meet demand growth in a region, and consequently, electric power shortages and skyrocketing electric price to consumers during peak demand periods.

This study evaluated the economics of natural-gas-fueled gas turbines and combined cycles under a range of possible fuel price scenarios in the largest competitive market region in the United States – the Pennsylvania, New Jersey, Maryland (PJM) interconnect¹. As this figure illustrates, as long as natural gas prices persist below about \$4.00/MMBtu, investors in PJM will continue to find it profitable to invest in new gas turbine simple cycle and combined cycle electric generation projects. If fuel prices had been sustained above this level in the PJM region without a corresponding increase in electric price, this evaluation predicts that many of the planned gas generating capacity would have been cancelled or postponed. Power generation companies would likely consider alternate fuel sources and flexible power generating units, despite the fact that these units have higher initial costs and require longer construction lead-times.



How SCNG is Addressing the Issue

The SCNG has designed a research portfolio and is performing analyses of policies and regulations that will encourage the use of natural gas by improving gas turbine performance and reliability, increasing supplies of natural gas, and ensuring continued deliverability of this fuel source to the power generation mix.

Specifically, SCNG:

- Funds research to improve the performance of emerging gas-based power systems such as advanced combined cycle gas turbines, fuel cells, and hybrids in its quest to develop the most efficient, affordable, and clean power systems in the world.
- Develops technologies to ensure the future supply of our most environmentally friendly fossil fuel by extending the reach and reducing the costs and risks of drilling gas wells, maximizing recovery, and solving key problems blocking the production from low-permeability gas resources.
- Fosters the technologies needed to ensure the reliability, efficiency, and safety of the nation's critical gas distribution network as it adapts to rapidly changing natural gas markets.
- Identifies technical and political constraints and evaluates alternative technology and policy solutions to ensure the timely deployment of natural gas technologies to reliably and affordably meet America's energy needs while also preserving the environment and guaranteeing national energy security.

¹ The Economics of Gas Turbines in the PJM Region, Parsons Report No. 2001-05 EJ, August 2001.