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MIT: Natural gas to become more entwined in US economy

By Bryan Schutt

Forget the idea that the age of fossil fuels may be nearing an end. A newly completed [report](#) from the Massachusetts Institute of Technology predicts that natural gas will play an increasingly important role in the U.S. economy as the nation capitalizes on abundant and affordable supplies of the relatively clean fuel.

The report, "The Future of Natural Gas," said the fuel is finding its place at the heart of the national energy discussion: Coal-to-gas switching has taken off, natural gas vehicles appear to be on the rise, and manufacturing uses of gas are expected to revitalize the sector. And despite the maturity of U.S. natural gas supplies, the resource base [continues to grow](#).

"The newly realized abundance of low cost gas provides an enormous potential benefit to the nation, providing a cost effective bridge to a secure and low carbon future," the report concluded. "It is critical that the additional time created by this new resource is spent wisely, in creating lower cost technology options for the longer term, and thereby ensuring that the natural gas bridge has a safe landing place in a low carbon future."

The study updated an interim report issued in June 2010. At the time, MIT researchers [emphasized](#) the role that natural gas would play in a carbon-constrained world as long as it is given a level playing field.

In the final report, which took about three years to complete, MIT again set the stage for natural gas to become more of a foundational fuel. "It is an enormous gift to North America to have this resource. Don't squander it," Anthony Meggs, co-chair of the MIT Energy Initiative, said during a briefing on the report.

Meggs said the U.S. would be well-advised to ramp up research on shale gas development. If researchers could help companies improve their understanding of the subsurface and how to maximize production, the industry could maximize results and minimize impacts while also improving economics. Research could limit the considerable uncertainty on the future of the shales, Meggs said. "I would caution that in the current period of supply exuberance, there's a lot of future uncertainty about development of the shales," he said.

However, Meggs said the environmental impacts, which have been widely discussed and hotly debated, "are challenging but manageable," adding that there is "no reason why this cannot be done well."

Supply picture

Industry has pioneered a shale gas revolution, MIT said, with the mean projection of recoverable shale gas resource placed at about 650 Tcf. Of that, 400 Tcf is estimated to be economically developable at or below \$6/MMBtu at the wellhead, according to the report.

To ensure that shale gas development meets its potential scale and scope, MIT encouraged government-supported research to help refine the process. "Support should be put in place for a comprehensive and integrated research program to build a system-wide understanding of all subsurface aspects of the U.S. shale resource," the report found. "In addition, research should be pursued to reduce water usage in fracturing and to develop cost-effective water recycling technology."

The report said a concerted and coordinated effort by all stakeholders would minimize development problems: "It is essential that both large and small companies follow industry best practices; that water supply and disposal are coordinated on a regional basis and that improved methods are developed for recycling of returned fracture fluids."

Gregory Staple, CEO of the American Clean Skies Foundation, said the study showed that gas will continue to be a valuable resource.

"Three years ago, American Clean Skies Foundation joined MIT in underwriting 'The Future of Gas' study. MIT has now pegged the recoverable resource at 850 Tcf and asserts that the environmental issues are 'challenging but manageable,'" Staple said. "Given that outlook, the emission profile of natural gas suggests that gas will continue to become the fossil fuel of choice because of its reduced levels of greenhouse gases, particulate matter and mercury."

Demand outlook

Henry Jacoby, professor of management at MIT and co-chair of the MIT Energy Initiative, said that with or without climate policy in the U.S., gas use generally increases as a result of shale resources. "Gas is going to be a substantially larger part of the U.S. energy future than we thought before," Jacoby said. "A carbon price drives coal out of the future, and gas is the dominant feature in this kind of policy."

While no-carbon sources of power generation will be vital to the long-term future of the nation, MIT said, low-carbon technologies will play an important role in a carbon-constrained world in the near term.

The best opportunity for an increase in natural gas demand is in the power sector, according to the report. "The displacement of coal generation with [natural gas combined-cycle] generation should be pursued as the most practical near-term option for significantly reducing CO2 emissions from power generation," the report said.

A significant amount of underused natural gas combined-cycle generation already exists, MIT said. Replacing inefficient coal plants with the existing capacity would require little in capital expenditures but would cut emissions dramatically. "In 2009, 23% of the total power generated was from natural gas, while natural gas plants represented over 40% of the total generating capacity," according to the report.

Assuming that renewable generation increases, natural gas generation will be vital to ensure system reliability and efficiency, according to the report, which urges the U.S. to pursue policies that lead to an integrated global gas market. Transparent, integrated markets will serve U.S. national security interests, said MIT, which called for such initiatives to be integrated into foreign policy.