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This mine in Texas provides coal for a neighboring power plant. Analysis suggests that GreatPoint build plants where coal is very cheap or where gas is very expensive, like New England.

## This plan for clean coal might settle nearby

GreatPoint hopes to begin in 2009

By Peter J. Howe  
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CAMBRIDGE — It's not every start-up technology company that has a vision quite this bold:

- Turn one of the world's dirtiest energy sources, coal, into one of the cleanest, natural gas.

- Slash gas and electric bills for millions of New Englanders and residents of other areas far from energy sources.

- Liberate the United States and European countries from depending for crucial natural gas supplies on hostile and volatile countries like Russia, Iran, and Saudi Arabia.

- And add tens of billions of dollars to the Wall Street valuation of companies sitting on reserves of cheap coal that can now be turned into higher-value natural gas.

Though they could take decades to come to fruition, those are just some of the radical implications of technology being developed by GreatPoint Energy, a Kendall Square start-up. It has already run two trials of converting coal inside a reactor device to natural gas at a plant in Illinois and is now looking at several locations, including industrial areas on the Massachusetts coast, for a site to build a full-scale demonstration plant that company president Andrew Perlman said could begin operating by 2009.

As energy prices have soared in recent years, US investors and policy makers have

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### COAL GAS

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grown increasingly interested in so-called clean-coal technologies that could exploit the country's huge coal reserves, estimated at 250 years' worth of coal at current rates of domestic usage. The 2005 Energy Policy Act is providing more than \$1 billion in tax incentives and grants for clean-coal projects, ranging from smokestack pollution reduction to systems capturing carbon dioxide to coal gasification.

For more than 100 years, scientists have known how to turn coal into vapor or liquid gas. For much of the 19th and 20th centuries, streetlights in Boston and other US cities burned coal-based town gas. During World War II, Nazi Germany — and later the South African government during apartheid sanctions — developed ways to make coal into a gasoline-like fuel.

GreatPoint's breakthrough is developing an apparently cost-effective way to turn coal into a vapor that is 99.5 percent

methane, or natural gas. Among other benefits, that means it can go straight into existing pipelines and utilities like KeySpan Energy Delivery New England and NStar Gas for home heating and cooking.

GreatPoint uses a patented catalyst, low-cost metallic compounds, that in a one-step process reacts with coal and steam inside a reactor vessel to produce natural gas and nonhazardous solid waste byproducts. The same process can be applied to turn petroleum coke, a byproduct of oil refining, into natural gas, Perlman said.

Although not yet widely publicized, GreatPoint's technology has drawn encouraging attention from some key government and industry leaders.

"If it can work on a commercial scale,

this could be one of the most interesting energy-technology companies in the Commonwealth and, indeed, the entire country," Ian A. Bowles, the Massachusetts secretary of energy and environmental affairs, said in an interview. "It has the potential to be a real game-changer for both the coal and natural gas sectors."

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Bowles said he and Governor Deval L. Patrick, who have met with key GreatPoint executives, are working to help GreatPoint expand and build a test plant in Massachusetts.

"This is the type of company that Governor Patrick sees as a key part of the emerging clean-energy cluster in the Commonwealth," Bowles said.

So far, Perlman said, Great Point has run trials converting up to 2,000 pounds a

day of coal into gas at its test plant in Des Plaines, Ill. Its challenge is "ramping up the technology" to increase those production rates by a factor of 1,000 or 10,000, he said.

GreatPoint has \$37 million in venture capital backing, including investments by Silicon Valley legends Vinod Khosla — who cofounded Sun Microsystems Inc. and later backed several telecom and Internet start-ups, including Juniper Networks Inc. — and the firm of Kleiner Perkins Caufield & Byers.

GreatPoint got a boost from a recent cost-effectiveness analysis of its technology by Nexant LLC, a San Francisco energy and technology consulting company that is a subsidiary of multinational engineering giant Bechtel Corp. Estimating the capital cost of building GreatPoint's reactor at industrial scale and current prices for coal and petroleum coke, Nexant said its system could produce natural gas for \$2.91 to \$2.98 per million

British thermal units, equal to 1,000 cubic feet of gas.

That compares to current natural gas prices in the range of \$7 per million BTUs in gas-producing areas of Louisiana and Alberta and up to \$10 in New England.

Those numbers suggest that if the technology works out, it would be most profitable for GreatPoint to build coal-to-gas plants either where coal is very cheap, at the mouth of mines in Wyoming or Appalachia, or where gas is very expensive, like New England.

The company is just starting to identify possible locations, such as waterfront industrial lots with easy access to coal barges.

But Perlman said it is clear that "Massachusetts is one of the places where it makes a lot of commercial sense to locate a project like this."

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