

Vast new gas stocks appear within reach

By CLIFFORD KRAUSS

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A new technique that tapped previously inaccessible supplies of natural gas in the United States is spreading to the rest of the world, raising hopes of a huge expansion in global reserves of the cleanest fossil fuel.

Italian and Norwegian oil engineers and geologists have arrived in Texas, Oklahoma and Pennsylvania to learn how to extract natural gas from layers of a black rock called shale. Companies are leasing huge tracts of land across Europe for exploration and oil executives are gathering rocks and scrutinizing Asian and North African geological maps in search of other fields.

The global drilling rush is still in its early stages. But energy analysts are already predicting that shale could reduce Europe's dependence on Russian natural gas, and they believe many countries could see a jump in their natural gas reserves over the next two decades comparable to the 40 percent increase seen in the United States in recent years.

"It's a breakout play that is going to identify gigantic resources around the world," said Amy Myers Jaffe, an energy expert at Rice University in Houston.

"That will change the geopolitics of natural gas." More extensive use of natural gas could aid in reducing global warming, since natural gas produces fewer emissions of greenhouse gases than either oil or coal. China and India, which have growing economies that rely heavily on coal for electricity, appear to have large potential for production of shale gas.

Larger reserves of natural gas would encourage developing countries to convert more of their transportation fleets to use natural gas rather than gasoline.

Shale is a sedimentary rock rich in organic material that is found in many parts of the world. It was of little use as a source of natural gas until about a decade ago, when American companies developed new techniques for fracturing the rock and drilling horizontally. Since so little drilling has been done in shale fields outside of the United States and Canada, natural gas analysts have made a wide array of estimates for how much shale gas could be tapped globally.

Even the most conservative estimates are enormous, projecting an increase of at least 20 percent in the world's known reserves of natural gas.

One recent study by IHS Cambridge Energy Research Associates, a consulting group, calculated that the recoverable shale gas outside of North America could turn out to be equivalent to 211 years' worth of natural gas consumption in the United States alone at the present level of demand, and maybe as much as 690 years. The low figure would represent a 50 percent increase in the world's known natural gas reserves.

The projections suggest that the new method of producing natural gas "is the biggest energy innovation of the decade," said Daniel Yergin, chairman of the Cambridge consultancy. "And the amazing thing is, there was no grand opening ceremony for it. It just snuck up." Over the past five years, production of natural gas from shale has spread across areas of Texas, Louisiana and Pennsylvania. All the new production has produced a glut of natural gas in the United States, helping to drive down prices and utility costs.

Now American companies are looking abroad for shale plays in countries hungry for more energy. They are focusing particularly on Europe, where prices for natural gas are sometimes twice as high as in the United States and large shale beds are located close to some cities.

Exxon Mobil, of Texas, has drilled a few exploratory wells in Germany in recent months. Devon Energy, of Oklahoma, is teaming up with Total, the French oil company, seeking approval to drill in France. ConocoPhillips, of Texas, announced recently that it had signed an agreement with a subsidiary of a small British company to explore the Baltic Basin of Poland.

Early estimates of recoverable European shale gas resources range as high as 400 trillion cubic feet, or 11.3 trillion cubic meters, less than half the industry's estimates of what is recoverable in the United States. But European energy executives say they are excited about the prospects because the Continent's conventional reserves are too small to meet demand.

"It is obvious to everybody that it has huge potential," said Oivind Reinertsen, president of StatoilHydro USA & Mexico, a Norwegian company with growing shale interests. "You see a lot of land-grabbing by different companies in Europe, potentially spreading to the Far East, China and India."