Shale Gas

By some estimate today, the amount of recoverable shale gas around the world could be larger than the conventional gas discovered to date – upto 16 tcf. Shale gas is not new, but the technology to produce it economically has only developed over the last two decades – first production occurred in Fort Worth Basin (Barnett Shale) in 1981.

Shale gas accumulations are different than conventional gas sources. Conventional gas is usually found in sandstone or limestone reservoirs and often occurs in multiple discrete accumulations. Shale gas is stranded in the shale rock, which has much lower permeability, and must be fractured to open the channels for gas to flow. But shale gas is found in broad, continuous layers across a basin.

Shale gas wells are expensive to drill because of depths, horizontal nature and need for fracturing. Shale gas wells can cost $2 to $3 million. However, once several successful well are drilled, subsequent wells can cost 40 – 50 % less. Hydro – fracturing, or frocking involves injecting water or drilling fluids into the well under high pressure to break the shale.

Although it took about 20 years for the North American shale gas industry to reach the current levels of production, experts estimate that it will only take half as long for the rest of the world to develop their own shale gas industries.

The biggest challenges to developing these resources outside of the US include:

- Access to acreage / resource
- Availability of rigs and skilled workforce
- Access to water and environmental concerns about waste water
- Finances, due to high cost of wells
- Necessary infrastructure to transport the gas once in production

Shale Gas Production and Development

US

Principal US Shale gas plays are Antrim Shale. Michigan, Barnett Shale, Texas, Caney shale, Oklahoma, Conesauga Shale, Alabama, Fayetteville Shale, Arkansas, Floyd Shale, Alabama, Gothic Shale, Colorado, Haynesville Shale, Louisiana, New Albany Shale, Illinois Basin, Pearsall Shale, Texas, Devonian Shale, Appalachian Basin, Chattanooga and Ohio Shale, Marcellus Shale, Utica Shale, New York, and Woodford Shale, Oklahoma US Shale productions in 2008 for the lower 48 states reached 2,022 billion ft, up over 70% from 2007. US Shale reserves in the lower 48 states were estimated to be 32,825 billion ft, 51% higher than 2007 estimates.

Canada

Principal Canadian shale gas plays are the Horn River Basin and Montney shale in northeast British Columbia, the Colorado Group of Alberta and Saskatchewan, the Utica Shale of Quebec, and the Horton Bluff Shale of New Brunswick and Nova Scotia. Strongest play is Horn River Basin which is expected to produce 3 bcf/d by 2030.

Currently there is no major shale gas production underway in Canada, due primarily to very low prices of natural gas. Utica shale holds and estimated 5 to 25 tcf. Horn River Basin and Montney shale are estimated at 250 tcf (10 – 20% recoverable).

South America

The Society of Petroleum Engineers estimates 2,116 tcf of shale gas in South America.

- Argentina – Neuquen Basin, Austral Basin.
- Colombia – "Cretaceous organic – rich shale source rocks are present in both the Maracaibo and Middle Magdalena basin of Colombia and Venezuela. Correlative with the Haynesville shale (Turonian – Cenomanian), this shale is 300 ft thick and has a TOC >10% in Places, though Ro appears to be mostly less than 1."
- Peru – Ucayali Basin

Europe

Shale gas development in Europe is just getting started. Many European companies are joint – venturing with US companies, or evaluating acquiring companies to obtain the expertise in shale gas. Statoil joint ventured with Chesapeake Energy to produce Marcellus Formation shale gas. Gazprom has indicated that it may buy a US shale – gas producing company to gain expertise to apply to Russian shale gas prospects. Total SA joint ventured with Chesapeake in Barnett Shale in Texas.

Shale gas exploration is occurring in a number of European countries: Austria, Denmark, France, Germany, Hungary, the Netherlands, Poland, Spain, Sweden, Switzerland and the United Kingdom. ExxonMobil has acreage in Germany where it plans to drill for shale gas, and in Hungary, where it has already begun drilling. Shell is evaluating potential plays in Sweden and is partnering with ExxonMobil and Marathon have plans to explore for shale gas in Poland. OMV is exploring for shale gas in Austria. Devon Energy is exploring Denmark.

There a number of niche players in Europe including 3Legs, AJ Lucas, BNK, Cuadrilla Resources, EruEnergy Resources, RAG, San Leon Energy, Schuepbach Energy and Sorgenia E&P, who have interests in Europe as well.

Australia

Currently, Cooper Basin in South Australia is being investigated by Beach Petroleum for shale gas opportunities. New Standard Energy has begun shale gas exploration in Western Australia Canning. Santos Ltd. is also looking at the Cooper Basin and estimates that it may hold 7 tcf of unconventional gas.

China

China's goal is to develop 20 to 30 large – scale mining blocks with a combined proven shale gas reserve of 1 trillion cu m by 2020. November 2009, US President Barack Obama and Chinese President Hu Jintao announced the launch of a new U.S. – China Shale Gas Resource Initiative. The Initiative will use experience gained in US to assess China's shale gas potential and promote environmentally sustainable development of shale gas resources. Through Initiative, US and China will conduct joint technical studies to support accelerated development of shale gas resources in China. Initiative will promote shale gas investment in China through the U.S. – China Oil and Gas Industry Forum, study tours and workshops focused on shale gas development.

Royal Dutch Shell and PetroChina signed agreement to development shale gas resources in southwestern China – will explore the Fushun – Yongchuan block. Sinopec is in talks with BP over a possible venture – Sinopec has classified 2,000 km in kaili, Guizhou province, and 1,000sq km in Huanggio, Jiangsu province, as possible areas for co – operation between two companies.

India

The first Indian company to enter the shale gas business is RIL with two deals in quick succession in US. RIL picked up 40% stake in Atlas Energy's Marcellus Shale acreage position for $1.69 billion and a 45% stake in Pioneer Resources's Eagle Ford Shale acreage position for $1.35 billion.

In northeast of India it is estimated that there are 15 billion tonnes of recoverable shale oil and gas reserves. Shale deposits are also expected in Assam Shelf, the Naga Schuppen Shelf, and the Assam – Arakan Fold belt in Assam and Nagaland.

Africa

Experts estimate about 200 tcf of shale gas reserves in the sub – Saharan Africa region.

- South Africa – Karoo Basin. Joint venture formed to explore for shale gas with Sasol Petroleum International (a subsidiary of JSE – listed Sasol), Statoil ASA and Chesapeake Energy Corporation (reported November 2009). Anglo American and Shell have both applied to explore for shale gas.
- North Africa – Total SA has reportedly bought a shale gas position in North Africa.