

Uncharted territory

Reduction in oil and gas output from existing resources has forced major industry players to focus on alternatives such as shale gas to sustain production. Market analysis specialist **GlobalData** reports on the top oil and gas investment destinations in 2011.

Oil and gas production from established and known reserves is declining across the world, and the rate of new exploration has slowed down in conventional areas. Oil and gas fields in the UK reached peak production in 1999 and output has been declining steadily since then. Oil and gas companies are exploring new areas for conventional and unconventional oil and gas reserves in order to maintain current production levels.

There has been increased emphasis on identifying and developing oil and gas resources in Africa, Latin America and the Middle East and the Asia-Pacific region. In Africa, the search has begun for new reserves of oil and

gas in Uganda, Mozambique and Madagascar. China is a promising region in the Asia-Pacific region, with significant efforts being made to promote exploration in Western China while maintaining production in the east of the country. Oil and gas storage and transportation infrastructure in China is also being expanded.

Oil and gas companies are increasingly shifting their focus to the Arctic, which is estimated to hold approximately 22% of the undiscovered but technically recoverable oil and gas resources globally. The region accounts for about 30% of the undiscovered natural gas, 13% of the undiscovered oil and 20% of the undiscovered natural gas liquids in the world.

Unconventional alternatives to traditional reserves

The discovery and rapid development of unconventional oil and gas resources like shale gas, coal-bed methane, tight gas and oil sands have made them key alternatives to conventional oil and gas resources. Technological advancements have helped to make the development and exploitation of unconventional resources more economical, and these sources are likely to contribute significantly to global oil and gas demand in the medium to long term. Canada's oil sands in Alberta have the potential to produce significant amounts of oil as new technology is now making recovery economical on an increasing scale.

In line with the forecast of the US Energy Information Administration (EIA), the annual growth rate of unconventional production is set to exceed the annual growth rate of conventional production. According to the EIA's forecast, by 2035 the world's total conventional production will be around 97.1 million barrels per day (bpd), compared to unconventional production of around 14.6 million bpd.

The development of the unconventional gas market in North America and the Asia-Pacific region has changed the market dynamics of the global natural gas industry. The success of unconventional gas has spurred huge interest in the industry, and is set to make a significant contribution to global natural gas supplies.

Shale gas E&P

The manner in which shale gas has transformed the US energy sector has motivated companies from European and Asian nations to promote shale gas exploration. If their efforts are successful, shale gas development

Table 1. Major planned refineries, Asia-Pacific, Middle East and Africa, 2011

Refinery	Country	Latest operator	Start year	Refining capacity (million tons)
Jubail Refinery	Saudi Arabia	Saudi Aramco Total Refining & Petrochemical Company	2013	19.91
Bandar Abbas Refinery 1	Iran	National Iranian Oil Refining & Distribution Company	2011	17.92
Paradip Refinery	India	Indian Oil Corporation	2012	15
Zhanjiang New Refinery	China	China Petroleum & Chemical Corporation	2013	15
Pare Pare Refinery	Indonesia	PT Kilang Minyak Nusantara	2013	14.95
Bandar Abbas Refinery 2	Iran	National Iranian Oil Refining & Distribution Company	2012	14.94
Caspian Refinery	Iran	National Iranian Oil Refining & Distribution Company	2013	14.94
Khalifa Refinery	Pakistan	Pak-Arab Refinery	2012	13
Quanzhou Refinery	China	Sinochem Corporation	2013	12
Sichuan Refinery	China	Petrochina	2012	10
Yunnan Refinery	China	China Petroleum & Chemical Corporation	2013	10
Nghi Son Refinery	Vietnam	Nghi Son Refinery & Petrochemical	2013	10
Hijaz Refinery	Malaysia	Hijaz Refinery	2013	10

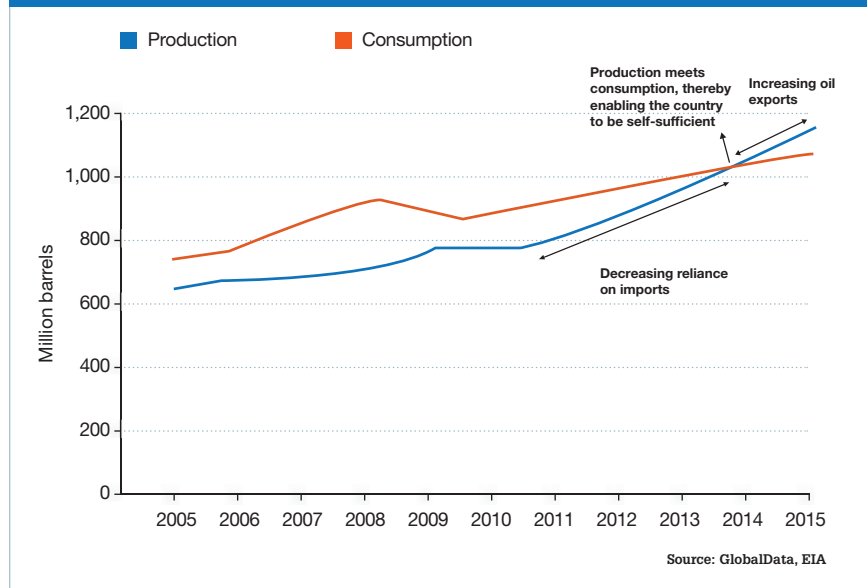
Source: GlobalData

could be the answer to long-term energy demand globally. Its development could help to diversify the sources of energy. Building on the success of the US gas shales, companies are now starting to pursue overseas gas shale exploration in prospective areas such as Europe, Australia and India.

Shale gas development has changed the overall dynamics of the natural gas industry in the US, leading to a substantial increase in supply. The unconventional gas production in the US is expected to increase at an average annual growth rate (AAGR) of 2% – a major share of this increase is expected to be from shale gas plays in the country.

Asia has vast deposits of shale gas stored in basins across India, China and Indonesia. Exploration is already underway to find out where the key shale areas are located and how much gas is available. Oil and gas E&P companies and governments from these countries are making efforts to determine the domestic resource potential and market for shale gas

Figure 1. Brazil's increasing oil exports (thousand of barrels per day), 2005-2015



giant Tupi oil field was discovered in the offshore Santos Basin in 2007. Brazil will hold its first auction of pre-salt oil and gas blocks in 2011 under the new production-sharing regime. The auction is expected to include some of the reserves discovered in Brazil's huge Libra field, which have been estimated by Brazil's Oil Regulatory Agency ANP

the Middle East have been investing in refining capacity additions to meet their domestic demands as well as strengthening their shares in the global refining market.

In the Asia-Pacific region, China and India are witnessing major capacity expansions. New refineries in these countries have been equipped to

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production and how they can adapt cost-competitive technologies to exploit these resources. India's Oil and Natural Gas Corporation has recently discovered shale gas at a pilot project in the state of West Bengal. The discovery is significant – although the well is still under assessment, India is the first Asian country to discover shale gas.

Brazil's bounty

Huge discoveries made in Brazil's subsalt basins have attracted the interest of oil and gas players from around the world. Brazil's offshore pre-salt area has generated huge interest across the global oil and gas industry since the announcement of the

as holding recoverable reserves of between 3.7 billion and 15 billion barrels of oil equivalent.

The country's oil production is expected to reach approximately 3.1 million bpd by 2015; which would pave the way for the country to become one of the key oil exporters globally. A large part of this production increase is expected to come from the subsalt basins.

Emerging refining hubs

For a long time, developing countries in the Asia-Pacific region and crude oil exporting countries in the Middle East have imported refined petroleum products from Europe and the US. However, China, India and countries in

produce light and middle distillates that meet US and European specifications, which is helping refining companies from these countries to increase market penetration in these areas.

China is expected to witness refining capacity additions of 112.9 million tons a year from 2010-2015 at an AAGR of 4.6%, while India will add 80.5 million tons a year at an AAGR of 6.9% during the same period.

Refining capacity growth in the Middle East and Africa is expected to be at an AAGR of around 10% during this period, and would add capacity of 373 million tons a year. By 2015, the Asia-Pacific region, the Middle East and Africa will account for 48.6% of the global refining capacity. ■