



GLOBAL TRENDS IN OIL & GAS MARKETS TO 2025





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TRENDS IN GLOBAL OIL & GAS MARKETS TO 2025

The present outlook reflects LUKOIL's position regarding the global hydrocarbon market's long-term prospects. The outlook's objective is to analyze trends that will - in our view - determine the future of global oil and gas markets.

Such analyses are prepared by the Company on a regular basis in order to keep strategy up to date and to form an investment program. However, this is the first time that we are making such analyses public.

By publishing such an outlook we hope that it will help to clarify the current situation in the oil and gas market and will draw attention to the challenges that face the global oil and gas industry.

An analysis of the current problems of Russia's oil and gas industry in the context of the main trends of global oil and gas market development is an especially important part of this outlook.

Key conclusions of this outlook:

- **Global demand for liquid hydrocarbons will continue to grow.** The growth of population and the consumer class in Asia will support oil demand increase. The main increase in consumption will come from transportation sectors in developing countries.

- **Increase of oil production in North America won't lead to a global oil price collapse.** Modern methods of evaluation of shale oil reserves allow considerable uncertainty therefore we are cautious in our estimates of the US production potential. A number of factors

including the growing cost of reserve replacement, the balancing role of OPEC and the depreciation of the US dollar will help to support the current levels of oil prices in the long term.

- **The European oil refining industry is experiencing a systemic crisis.** Ongoing trends such as the decrease in US gasoline imports and the commissioning of new highly effective oil refineries in the Middle East and Asia will continue to have a long-term negative effect on European producers.

- **Gas consumption will grow faster than oil consumption.** The greatest potential for gas consumption growth is in China, while the European markets - Russia's traditional clients - will continue to remain stagnant.

- **Maintaining oil production in Russia requires large-scale use of new technologies.** Projects currently planned are unable to compensate the production decline of brownfields. Without large-scale use of new technologies, oil production in Russia will begin to fall in 2016-2017.

- **The Russian oil refining industry will undergo significant modernization but risks of gasoline deficits remain.** Measures taken by the Russian government will promote modernization of domestic oil refineries but the situation concerning the automotive gasoline market will remain quite tense until 2016-2017.

- **The main challenge for the Russian gas industry is accessing new markets.** Competition for the global gas markets will continue to rise. To develop gas production in Russia, Russian companies have to gain access to growing markets.

GLOBAL OIL MARKET OUTLOOK



GROWTH FACTORS AND CHALLENGES FOR THE OIL MARKET

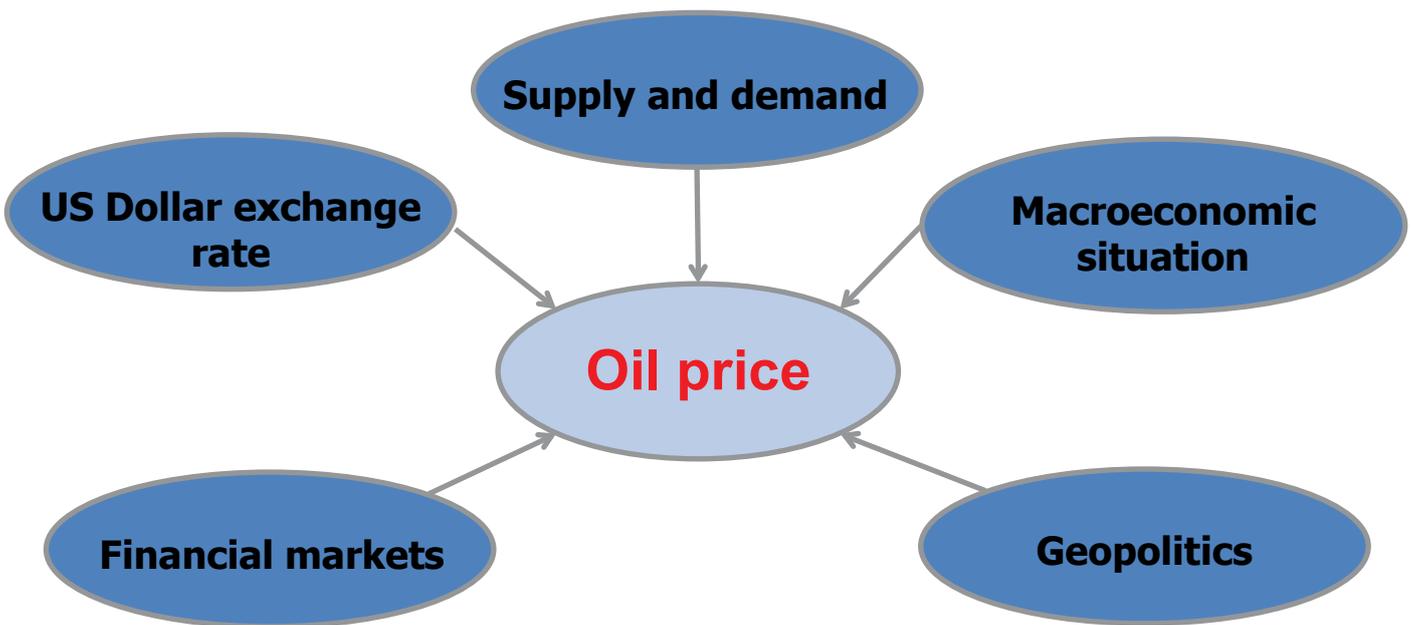
Global oil price dynamics are subject to many factors, principally the balance of supply and demand, the macroeconomic and geopolitical situation, the dynamics of the US dollar exchange rate and conditions of the global financial markets.

Technological breakthroughs make it possible to develop huge resources. The increase in unconventional oil and gas production in the US serves as a good example. Taking into account the US oil production progress many analytical agencies lower their long-term oil price forecasts.

At the same time a number of trends will support oil prices in the medium term.

In this outlook we would like to specify these trends and critically analyze a number of challenges that the oil industry face nowadays.

Growth factors:
<ul style="list-style-type: none">• Population growth, urbanization• Motorization in Asia• Growing costs of exploration and production• OPEC policy• Dollar depreciation
Principal challenges:
<ul style="list-style-type: none">• Increase of unconventional oil production in North America• Increase of oil production in Iraq• Deepwater shelf production• Biofuels production growth• Gas to liquids (GTL) expansion



DEMOGRAPHIC FACTORS

Our planet's population will continue to grow rapidly. Between 2010 and 2025 global population will grow by more than 1.1 bln people.

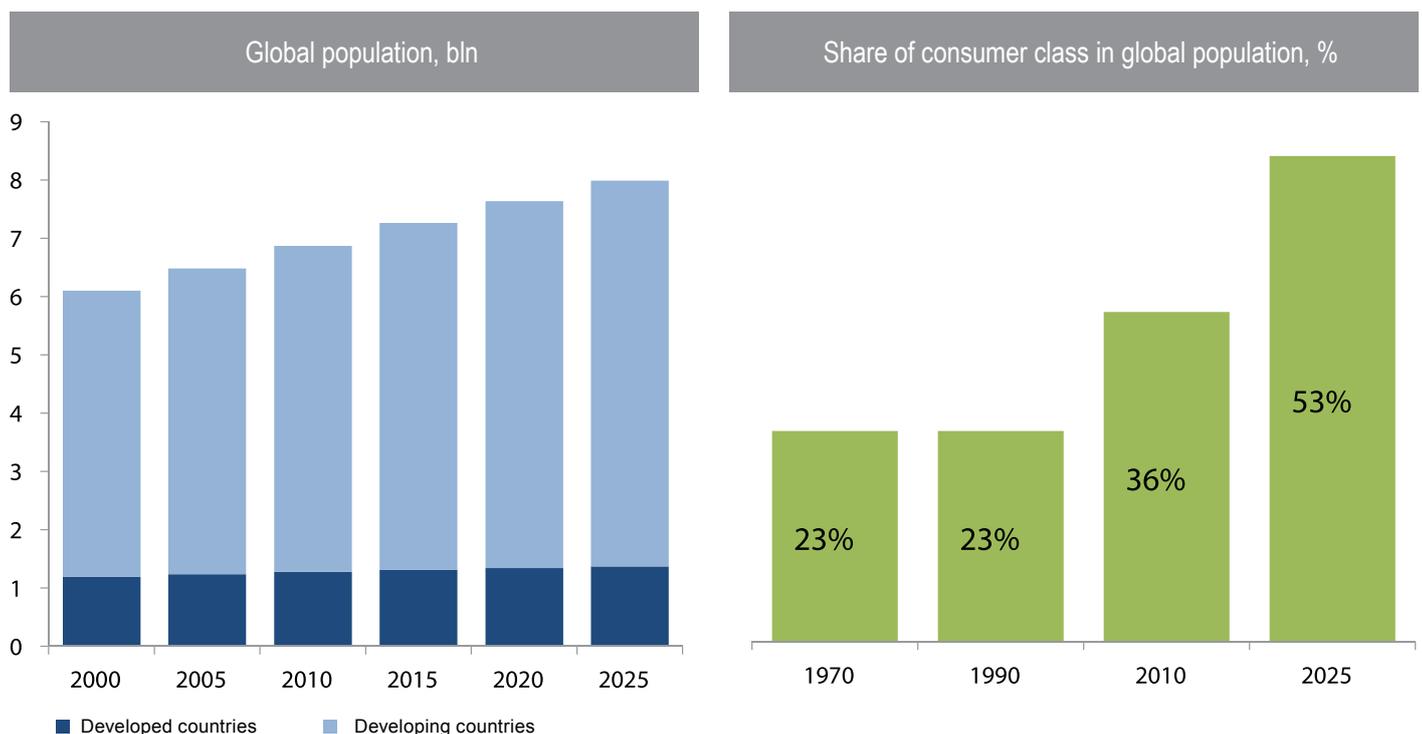
The greatest population growth will be registered in developing countries, while in the developed countries population will remain relatively stable.

High rates of population growth are expected, first of all, in India, which will become the world's most populous country by 2020. Explosive population growth is also forecasted for the African countries where it will be the result of improvement in socio-economic conditions and quality of medical services.

Along with population growth, developing countries will experience the movement of the rural population to the cities, known as urbanization. According to the estimates of Mckinsey Global Institute, by 2025 440 cities in developing countries will contribute up to half of the global GDP growth.

At the same time the levels of consumption will grow. It is expected that by 2025 the size of the urban consumer class will grow by 1 bln people and the overall middle class will amount to more than 50% of the total global population. The main growth will come from developing Asian countries.

Urbanization and growth of the consumer class in developing countries will, in turn, promote demand for real estate, infrastructure, cars, hi-tech goods and, as a result, energy resources.



Source: UN, IHS CERA, Mckinsey Global Institute

OIL DEMAND

Demand for liquid hydrocarbons will continue to grow. **Global demand for liquid hydrocarbons will continue to grow annually by 1.2% on average and will, in our estimate, reach 105 mb/d by 2025.**

The greatest surge in oil demand will come from the transportation sector, for which oil is the principal energy source (over 90%).

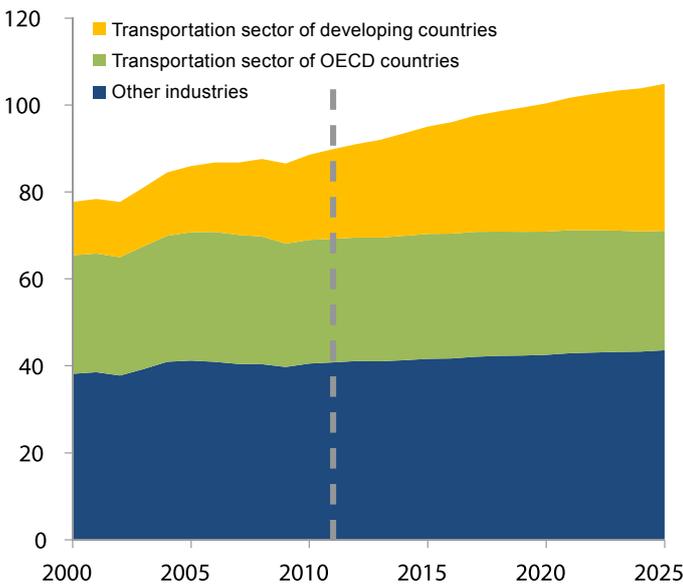
Consumption of liquid hydrocarbons will increase in developing countries where the transportation industry is undergoing rapid growth. Analysts expect to see significant growth in the number of cars as well as the development of sea, air and railway transportation.

In addition to this, growth in demand for oil in developing countries will be further encouraged by the industrial sector, in particular, the petrochemical industry.

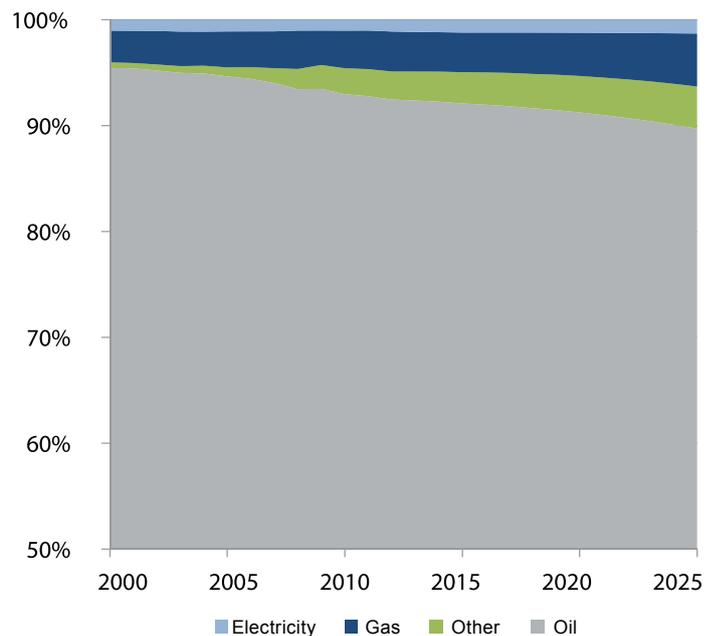
At the same time, consumption of liquid hydrocarbons in developed countries will remain relatively stable due to low rates of economic growth and further improvements in fuel economy.

Despite stable growth rates, oil's share in the global consumption of energy resources will gradually decrease, because of substitution for other energy sources in such sectors as power generation and housing.

Forecast for consumption of liquid hydrocarbons, mb/d



Pattern of energy resource consumption in the transportation sector, %



Sources: IEA, IHS CERA, LUKOIL estimates

MOTORIZATION IN ASIAN COUNTRIES

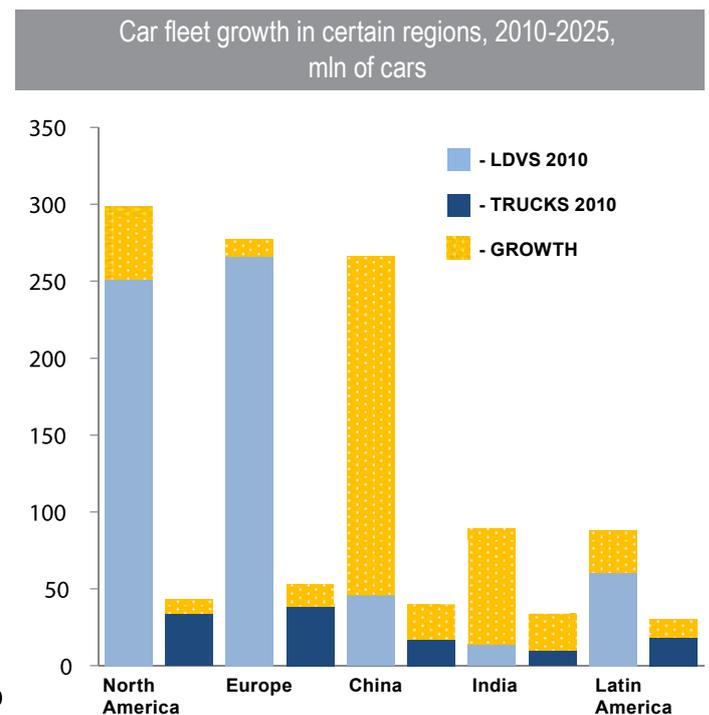
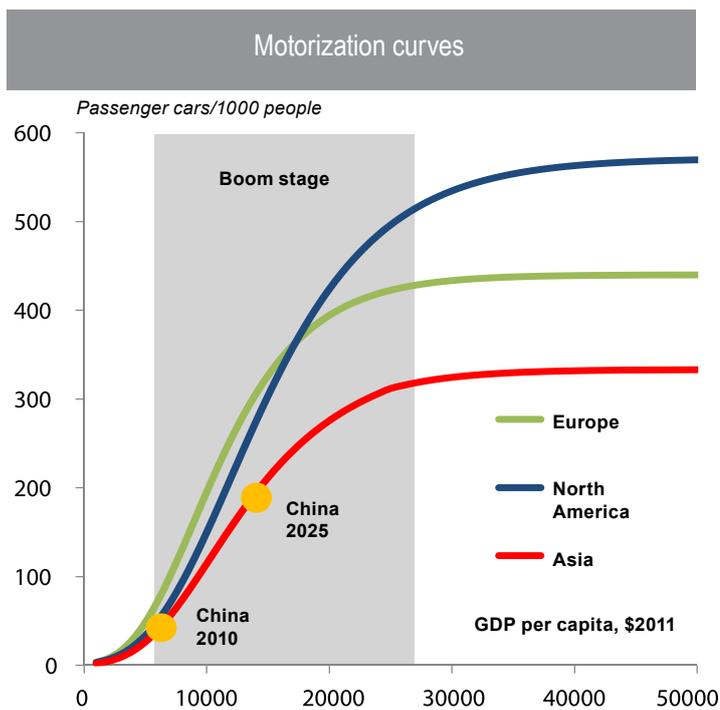
The motorization of the population in developing countries is one of the principal factors behind the future growth in demand for oil. Today developing countries are severely lagging behind developed nations in terms of the number of cars per 1,000 people, thus creating conditions for significant growth in the size of global car ownership.

In the forecast period, the most noticeable increase in car ownership will take place in China, whose car market has already entered an intensive growth stage. In today's China the number of cars per 1,000 people is 40. By 2025 this figure will be close to 200, which will mean an increase of 220 million cars for the period of 2010-2025.

Significant growth in car ownership will also be registered in India and other developing Asian countries. By 2025 large-scale growth of car ownership will begin in Africa.

Freight cars and trucks will make a strong contribution to the growth in consumption of motor fuels. The total number of such cars is expected to grow by 140 mln by 2025.

According to our estimates, the aggregate global car fleet will grow by 670 mln during the period 2010-2025. **This will lead to an increase in fuel consumption of 9 mb/d.**



FUEL ECONOMY IMPROVEMENT

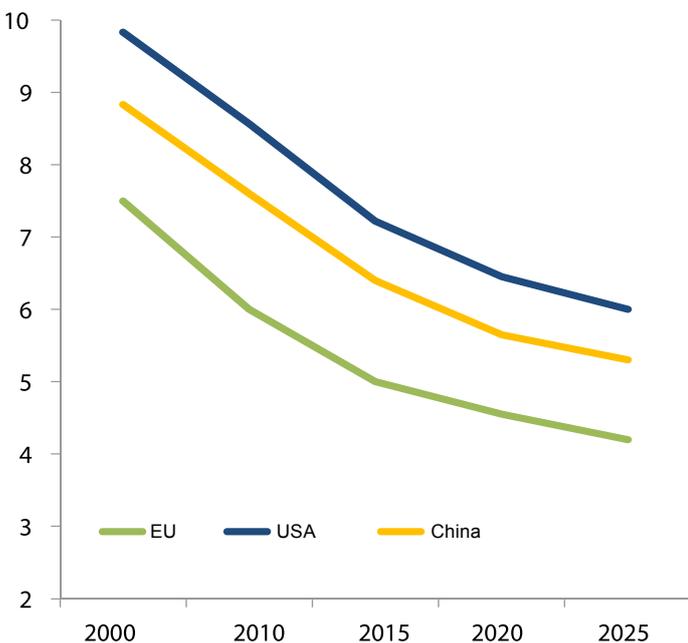
We are currently observing a sustained trend towards decrease of fuel consumption in passenger cars. This is happening for a number of reasons: the designs of car bodies and engines are improving, the quality of engine fuel is getting better and hybrid technologies are being implemented more often.

Growth in the size of the car fleet will be accompanied by changes in its structure. However, **over the course of the whole forecast, internal combustion engines will preserve their dominant position.** Their share in the total car fleet will amount to more than 80%. At the same time the share of cars with diesel engines will slightly increase.

The decreased rate in fuel consumption over the last 20 years was due to the improvement in its quality. Engines that consume RON-95 gasoline became an industry standard. **The further decrease in fuel consumption rate will be evolutionary, not revolutionary.**

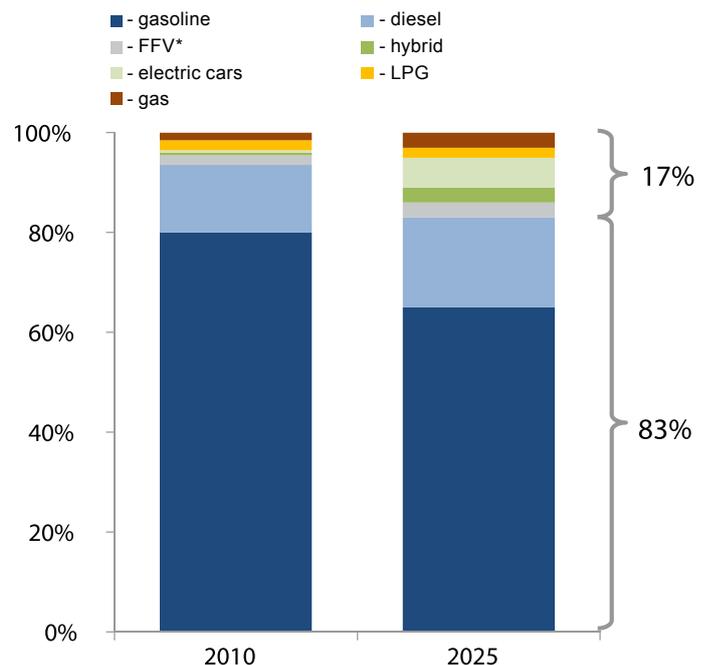
Promising trends in car improvement, such as the hybrid engines, reduced rolling resistance tires, decreased weight and improved aerodynamics, will help to reduce the consumption of fuel in passenger cars by 30% by 2025.

Consumption of fuel by new cars, l/100 km



Sources: IEA, PFC Energy, LUKOIL estimates

Structure of car fleet, %



*Flexible fuel vehicle - cars with flexible choice of fuel (the car can use either gasoline or a mixture of gasoline and ethanol in flexible proportions)

UPSTREAM COSTS INCREASE

The last decade was characterized by unprecedented growth in exploration and production costs. According to current estimates, oil companies' expenditure on geological exploration, development and production have more than tripled since the beginning of the century.

In many ways the increase in costs is tied to the depletion of the conventional oil resource base. The growing demand for hydrocarbons forces companies to develop unconventional and highly costly reserves. The companies are producing oil from deepwater shelves, operating high viscosity oil fields and extracting oil from tight reservoirs.

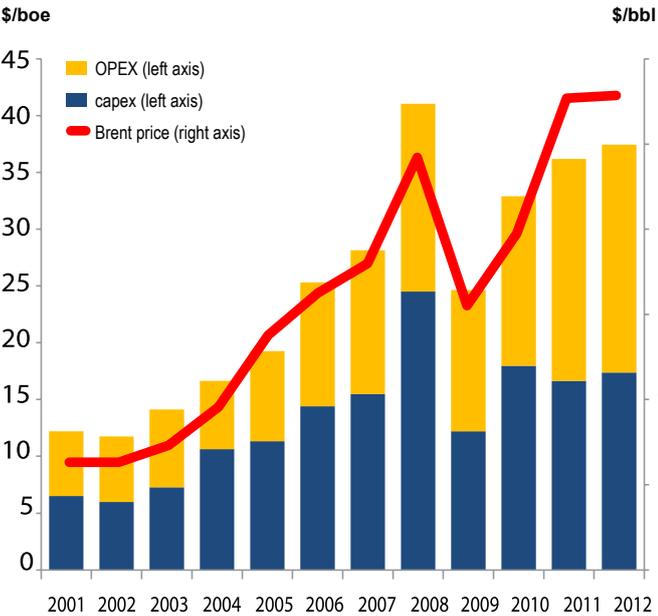
In today's market about 15 mb/d have commercial production costs above \$70/bbl. for example, shale oil projects in the US on average are profitable at \$80/bbl cost of oil.

Therefore, even if demand for oil falls significantly, its equilibrium price is unlikely to stay below \$70-80/bbl for long.

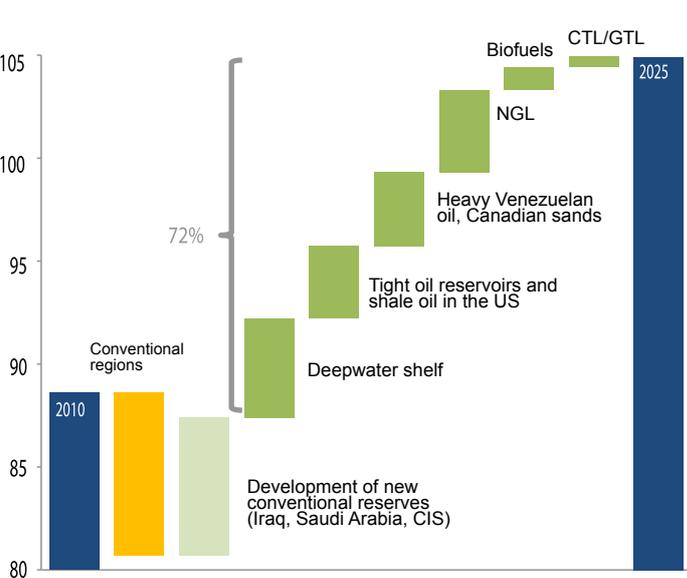
Future growth in production will primarily come from the development and operation of unconventional reserves. From 2010-2025 over 70% of the increase in the supply of liquid hydrocarbons will come from the use of hi-tech production methods and alternative fuels such as natural gas liquids (NGL), GTL/CTL and biofuel.

The greatest increase in production will come from the deepwater shelf, tight oil reservoirs in the US and heavy crude from Canada and Venezuela. We also expect an increase in the production of NGL, primarily in the Middle East and in the US.

Dynamics of capital and operating costs in exploration and production



Forecast for changes in supply of liquid hydrocarbons in 2010-2025, by sources, mb/d



Sources: IEA, IHS CERA, IHS Herold, LUKOIL estimates

US SHALE OIL PRODUCTION OUTLOOK

The development of horizontal drilling and hydraulic fracturing technologies have made profitable a significant amount of unconventional hydrocarbon reserves in the United States. This began with the active production of shale gas which led to the collapse of spot gas prices.

High oil prices in 2011-2012 forced many companies to start active drilling in unconventional reservoirs containing liquid hydrocarbons. In 2011 the number of drilling oil rigs in the US exceeded the number of gas rigs.

The growth in shale oil production in 2011-2012 was very impressive. Oil production at the Bakken formation in North Dakota increased more than 7.5 times and amounted to 589,000 b/d in 2012.

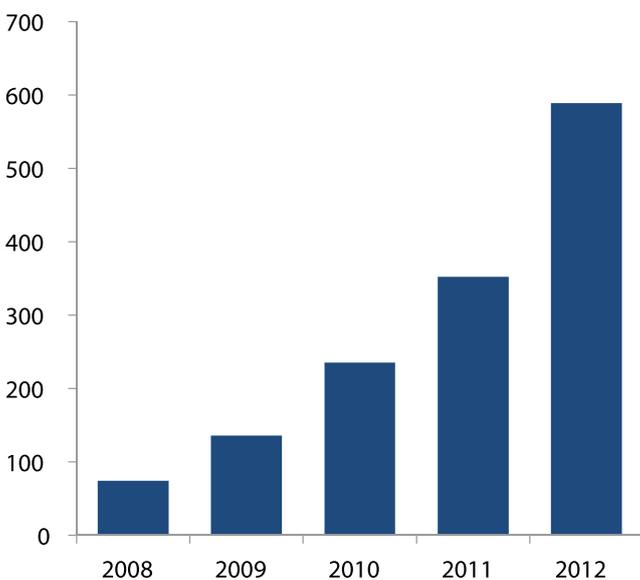
Eagle ford play in Texas also became a site of explosive growth in liquid hydrocarbon production.

In 2012 the aggregate volume of oil production from unconventional reservoirs in the US is estimated to have equaled 1.2 mb/dy.

The transportation and refining infrastructure was unprepared for such production growth and that led to a decrease in US oil prices. The average spread between Brent and WTI oil amounted to \$17/bbl in 2011-2012, while several years before WTI sold at a premium in comparison to Brent.

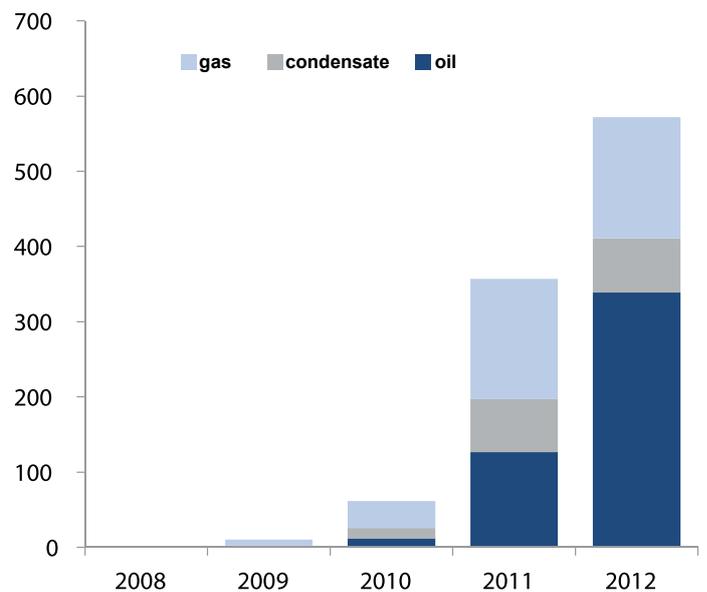


Average oil production at Bakken*, kb/d



* For counties in North Dakota

Hydrocarbon output at Eagle Ford, kboe/d



Sources: IEA, IHS CERA, IHS Herold, LUKOIL estimates

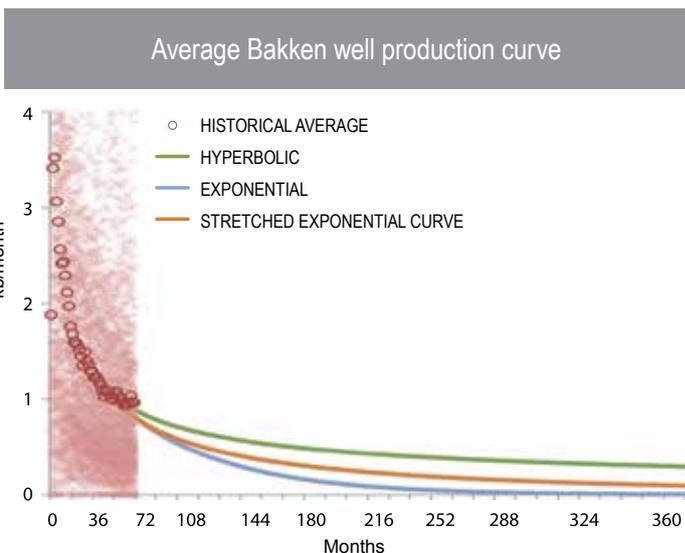
US SHALE OIL PRODUCTION OUTLOOK UNCERTAINTY IN RESERVE ESTIMATION

Shale oil reserves are characterized by low permeability. Hydraulic fracturing technology is used to improve the oil inflow. Well flow rates in shale formations are characterized by high decline rates in the first year of production - generally they amount to 60-70% of the maximum flow rate.

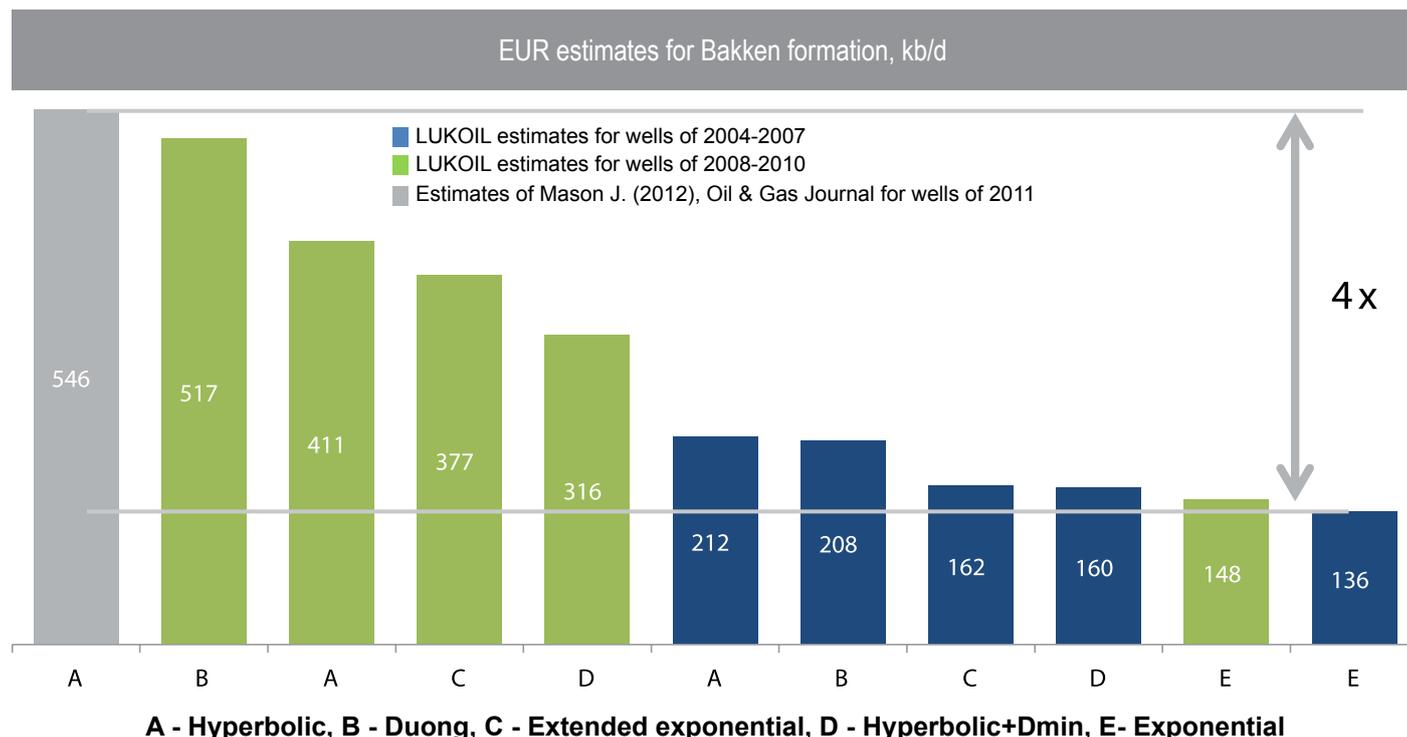
Shale oil reserves in the US have undergone several revisions in the last few years. In 2008 the US Geological survey (USGS) estimated recoverable oil reserves at 3,65 bln. In 2013 the USGS increased the reserves estimate to 7,4 bln bbl. In 2011 Continental Resources valued recoverable reserves at 20 bln bbl.

The principal instrument of reserve estimation is production curve analysis, where production curves are derived from the actual data of approximate well flow rates. When the period of a well's operation is small, forecasts for different production curves may vary significantly.

The majority of wells in the Bakken formation currently only have data for 3-4 years of actual operations, leading to significant discrepancies in existing estimates.



The value of the estimated ultimate recovery (EUR) depends on the chosen method of calculation and data available. Estimates may significantly vary for different groups of wells, depending on the quality of formation, hydraulic fracturing technology and other factors. Hence, an overestimation of shale formation reserves is possible.



US SHALE OIL PRODUCTION OUTLOOK POTENTIAL FOR WELL DRILLING

When forecasting shale oil production, it is necessary to take into account the potential for well drilling. The maximum number of wells will depend on the productive area of land suitable for drilling and on well spacing. According to the current estimates, the maximum number of wells that can be drilled at the Bakken formation in North Dakota is 33,000-39,000.

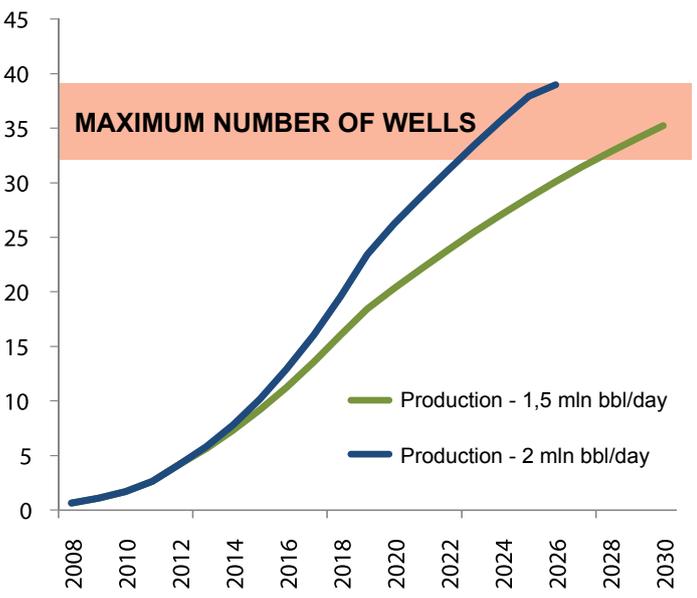
As the density of well spacing grows, EUR decreases, and this should also be taken into account when forecasting future production.

Intensifying shale oil production by increasing rates of drilling will lead to fast reserve depletion.

According to our estimates, daily oil production of 2 mb at the Bakken formation is unlikely to be sustainable, because in this case the drilling potential will be depleted by 2022-2025. The most likely scenario of Bakken formation development is that it reaches a production level not higher than 1.5 mb/d by 2020.

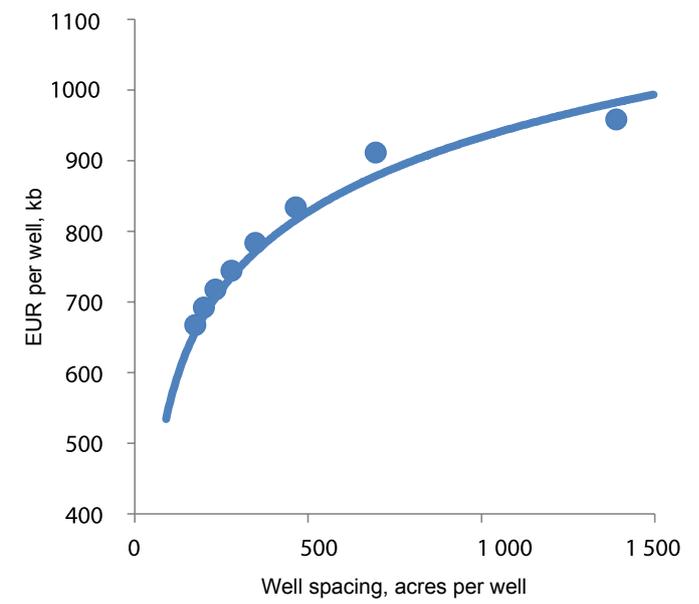
To support consistently high levels of production companies will have to continue increasing the number of active drilling rigs, leading to the need to hire more drilling crews. According to the 2012 poll conducted by National Oilwell Varco, the availability of qualified drilling crews is one of the principal challenges for US drilling companies. It is possible that another substantial constraint to the growth in shale oil production in the US will be a shortage of hydraulic fracturing crews.

Forecast for number of wells in Bakken formation*



* For counties in North Dakota

Influence of well spacing on recoverable reserves per well



Sources: Mason J. (2012), Oil & Gas Journal, LUKOIL estimates

OTHER CONSTRAINTS

Shale oil production requires the use of large quantities of water. Hydraulic fracturing requires 5-19 mln liters of water. This may become an impediment in certain production regions.

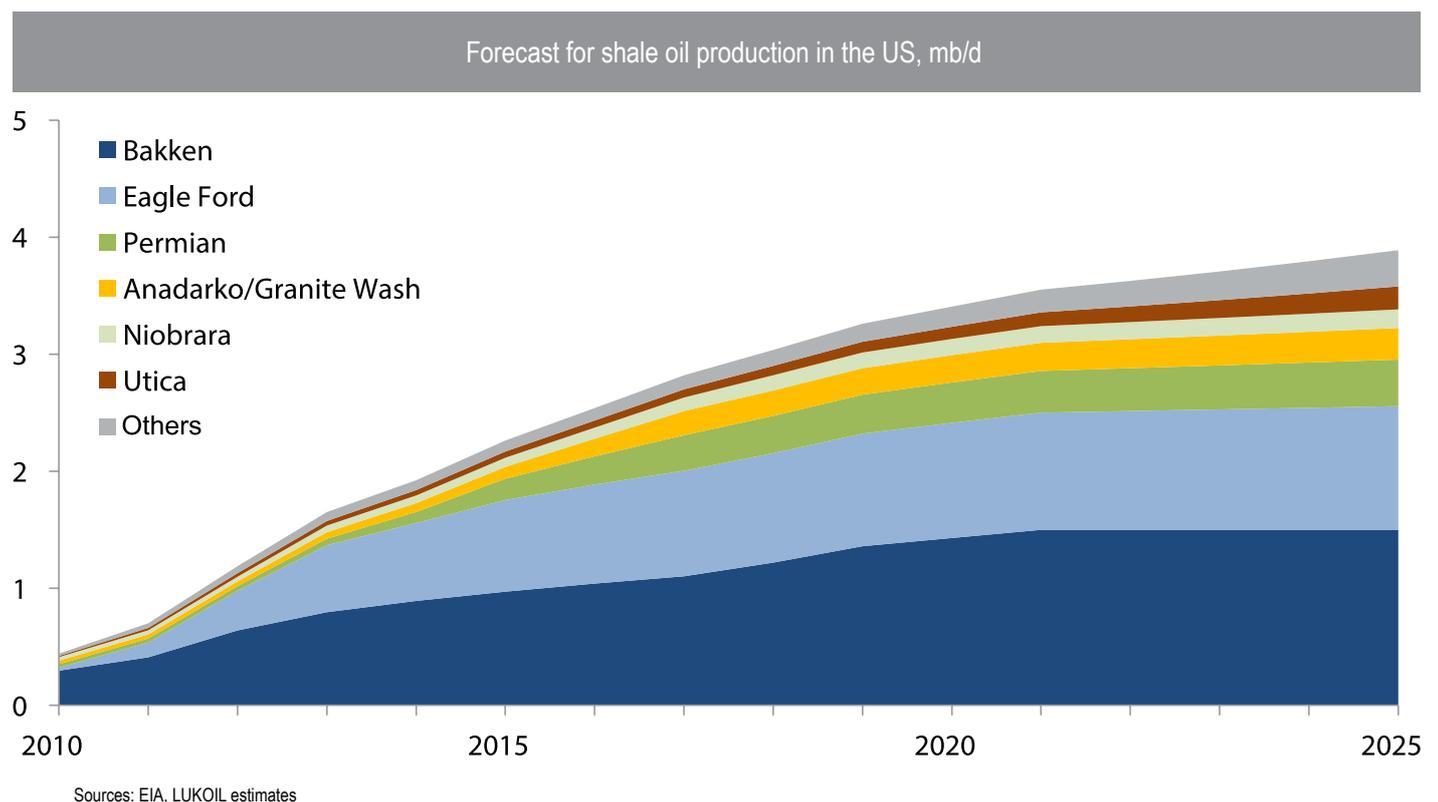
There are also certain concerns regarding the environmental safety of shale oil production. When hydraulic fracturing is underway at a shallow depth, companies may inject chemical reagents into the ground waters. There may also be problems with the disposal of used chemical solutions.

In addition, experts note that shale oil production is associated with the emission of methane and other dangerous compounds into the atmosphere.

Some experts express concern that the use of hydraulic fracturing may lead to rock movement and deformation, and this, in turn, can provoke landslides and restrict construction.

Considering this list of constraints, we forecast that shale oil production in the US will amount to 3.9 mb/d by 2025. Shale oil production growth is expected primarily at the most developed formations in Bakken and Eagle ford.

Taking into account well flow rates, the pace of drilling and the productive area, the most intensive growth in shale oil production in the US will take place in the next 5-10 years. After that production will stabilize.



NORTH AMERICA BECOMES THE LEADER IN PRODUCTION GROWTH

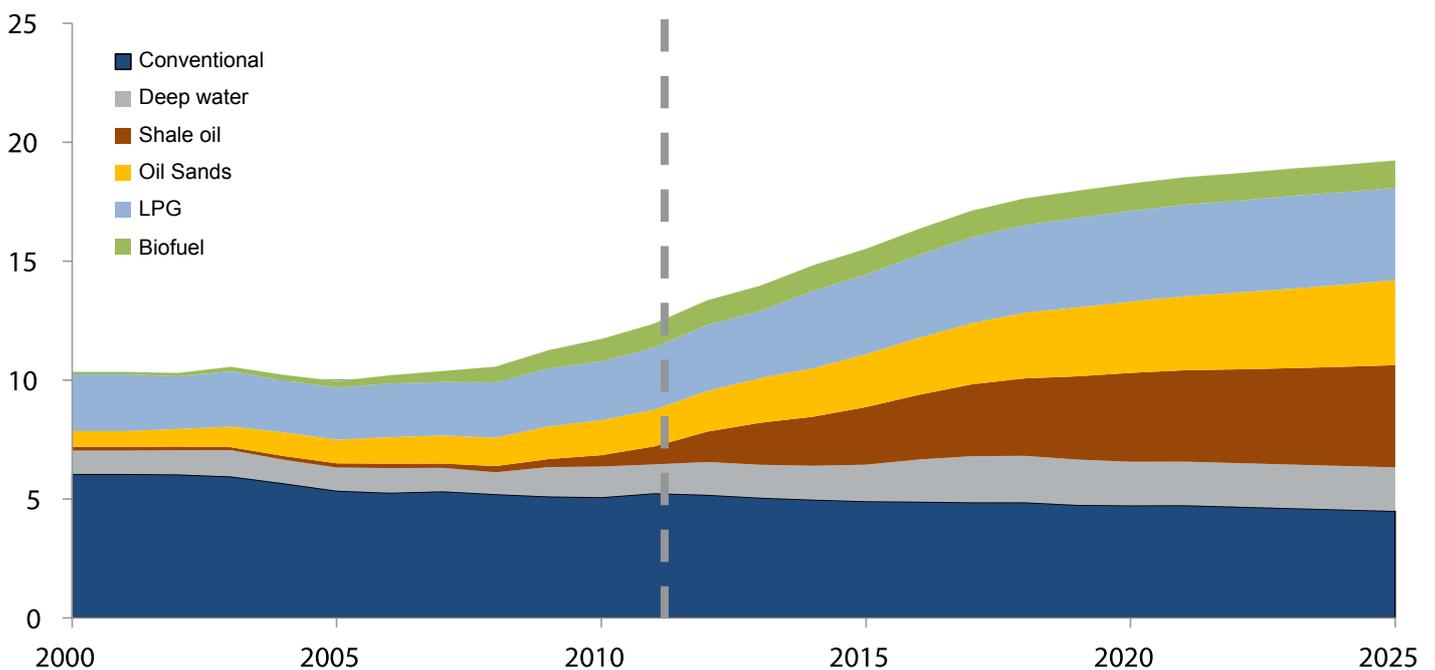
For the next decade North America will remain the leader in terms of growth of production of liquid hydrocarbons. **By 2025 the aggregate volume of liquid hydrocarbon and biofuel production in the US and Canada will amount to 19 mb/d**, thus significantly reducing the region's dependency on oil imports.

Just several years ago few believed that such growth would be possible in a region with consistently declining production at brownfields. But large-scale deployment of innovative technologies has forced many to review their evaluations.

The United States will continue to increase liquid hydrocarbon production with the help of shale oil, the development of deepwater shelf and growth in NGL production

In Canada production growth will primarily depend on the oil sands. By 2025 production of high-viscosity oil in Canada will reach 3.6 mb/d, which is 1.7 mb/d more than this year. Production growth in Canada may be significantly constrained by logistics and environmental concerns.

Forecast for production of liquid hydrocarbons in North America*, mb/d



Sources: EIA, IHS CERA, LUKOIL estimates

*Excluding Mexico

According to our estimates, the rapid growth in biofuel consumption that the world has been experiencing since the mid-2000s is unlikely to be repeated.

European biofuels have high production the cost and until recently have been developed with the help of subsidies. In Germany, for example, the cost of biodiesel production is almost two times higher than the cost of production of regular diesel fuel. The crisis, however, is forcing the European governments to cut biofuel subsidy programs and, as a result, many European producers are experiencing losses.

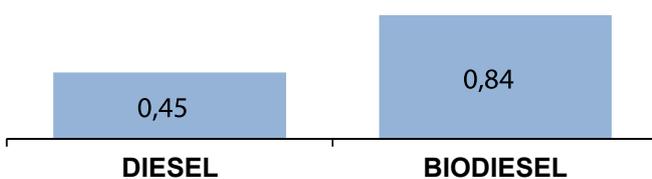
In addition to this, the European Commission has proposed to lower the target level of 1st generation biofuel consumption to 5% of the total volume of motor fuel consumption, while the current target level is 10%. If this suggestion is passed, it will have a negative effect on the consumption of biofuels in Europe.

The United States is the world's largest biofuel producer, but the situation there is also far from optimistic. It was believed earlier that the development of biofuels is a strategic necessity capable of decreasing American dependency on imported oil. But the growth in production of unconventional hydrocarbons has reduced the role that biofuels were meant to play in the provision of American energy security.

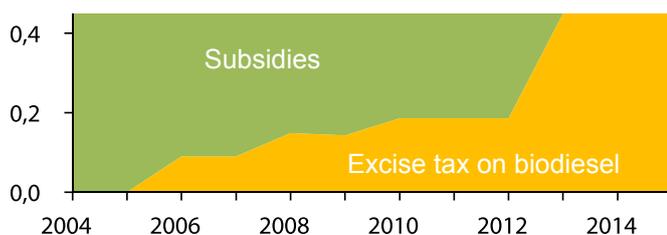
Many experts doubt whether biofuel production is justifiable from an environmental point of view, since, as a rule, production of fuel from crops requires fossil fuels.

Taking the stated circumstances into account, we have a rather conservative view of future biofuel prospects.

Self cost of fuel production in 2010*, euros/l

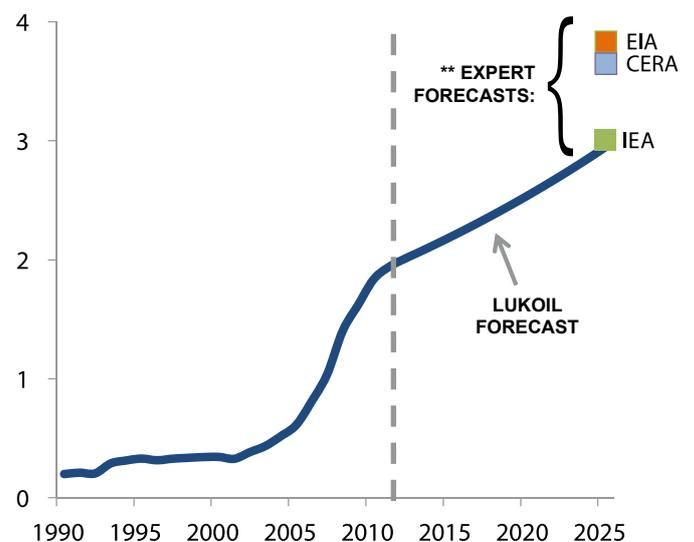


Cuts in subsidies*, euros/l



* Germany case

Forecast for global biofuel production, mln bbl/day



** As of the end of 2012

DEEPWATER PRODUCTION

As traditional onshore reserves are depleted, offshore resources are playing a greater role in supplying the growing demand. The growing interest in shelf resources is illustrated by the fact that over the last 20 years the number of large shelf discoveries has been greater than the number of big onshore discoveries.

Today, proven offshore reserves are valued at 280 bln bbl, while shelf production amounts to 30% of the global production.

Technological development helps oil companies to increase the depth of offshore fields. About 27% of shelf production is currently at a depth of 300 m and more and with time this share is set to grow. Today, technology allows producers to drill at depths that exceed 3,000 m. However, development of such reserves requires multimillion-dollar investments.

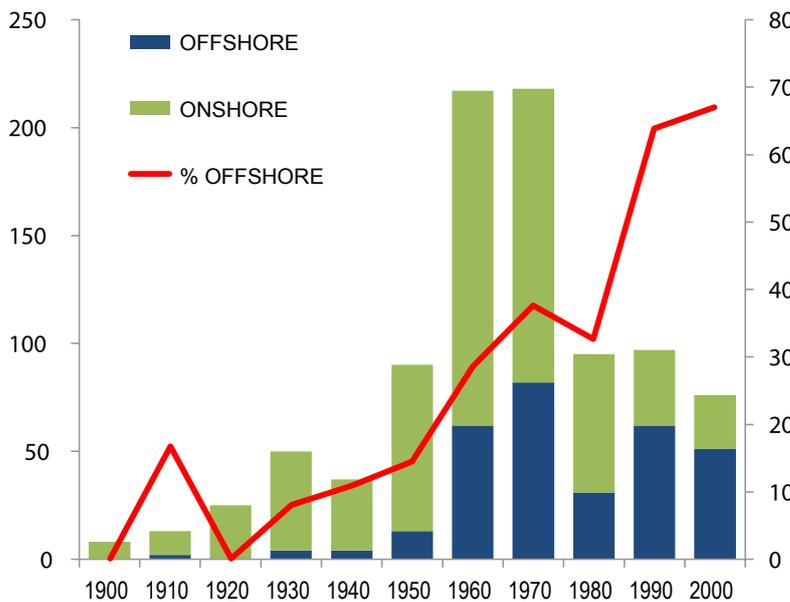
The accident at the Deep Water Horizon drilling platform in the Gulf of Mexico has forced many companies to review their approach to safety measures during shelf drilling. This will lead to growing operating costs for offshore projects.

The high tax burden in certain countries, such as Angola and Nigeria, will also lead to growth in production costs.

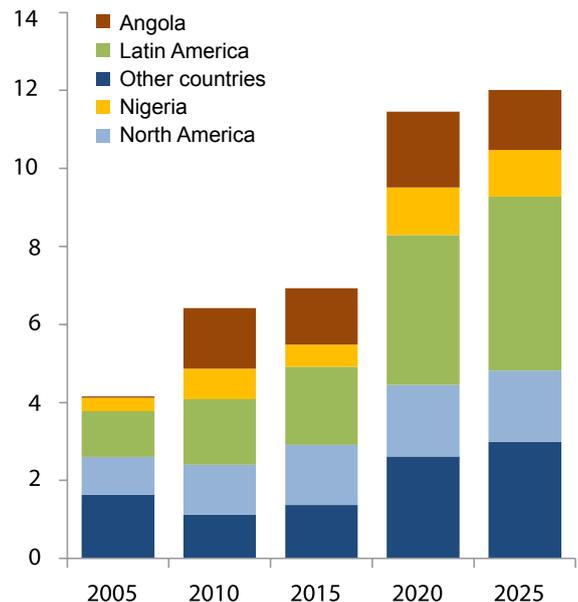
We estimate the oil price for profitable development of deep water reserves should be at the level of \$50-90/bbl depending on the region of production and water depth.

Despite the high cost of production and operating risks, deepwater production will continue to grow. **After 2015, when a number of new large fields will be put in operation, we expect to see significant production growth.**

Number of large discoveries



Deepwater production forecast, mb/d



Sources: IHS CERA, Statoil presentation to the IEF, LUKOIL estimates

IRAQI PRODUCTION GROWTH PROSPECTS

Iraq remains the most promising region in terms of conventional oil production growth. Despite the country's impressive proven reserves that amount to 143 bln bbl, production levels remain relatively low - and in 2012 amounted to 3.1 mb/d.

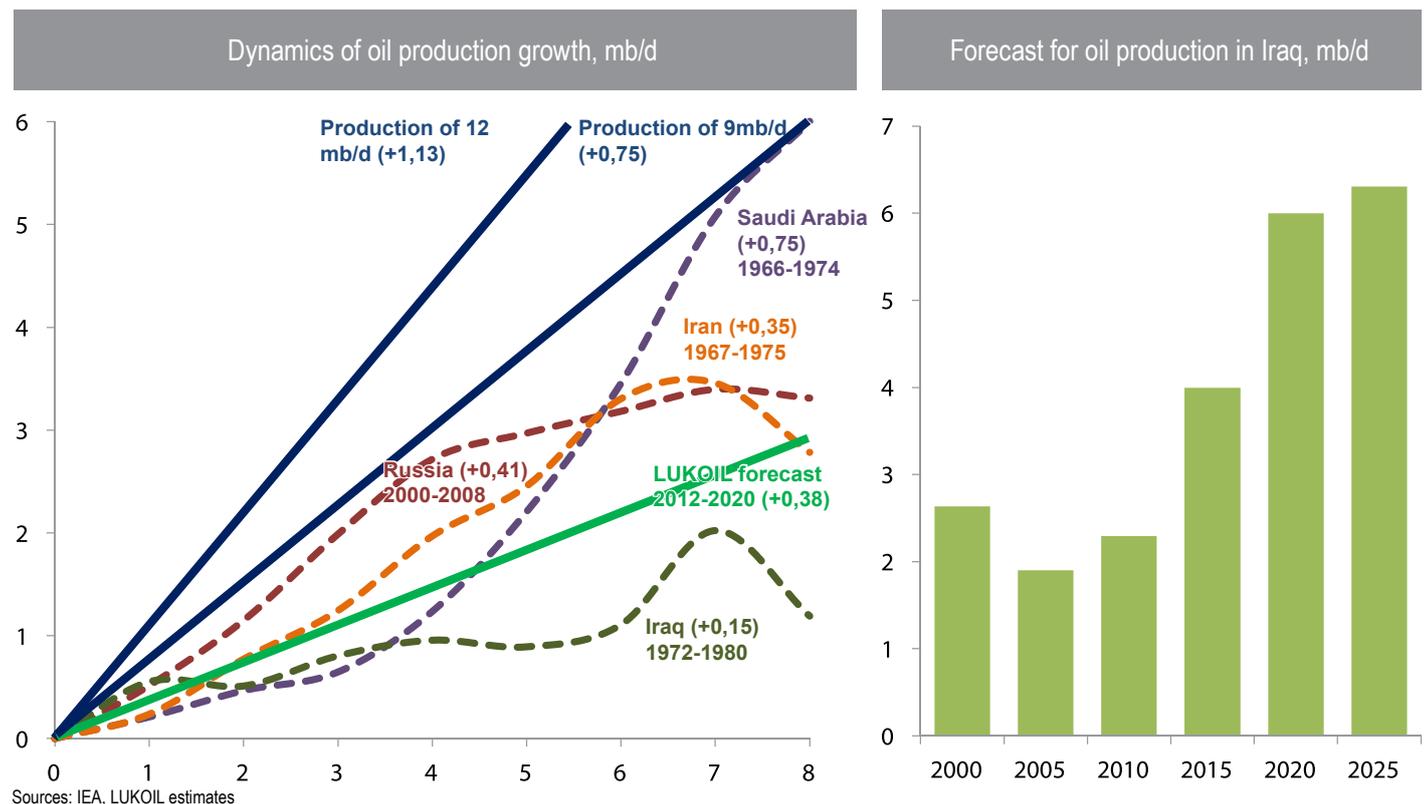
In the process of distributing licenses in 2009 the government of Iraq announced its goal of achieving daily production levels of 12 mb by 2020. Later the target level of production was lowered to 9-10 mb/d, but today even this level seems overly optimistic.

Existing oil pipeline infrastructure is barely managing the volume of oil exports and development plans show that the hopes for resolution of the existing logistical bottlenecks in the near future are futile.

In addition to the deficit of export capacities, operating companies have to deal with a shortage of drilling rigs, deficit of water resources for the maintenance of reservoir pressure and lack of developed transportation infrastructure for the delivery of goods and equipment.

To reach at 9 mb/d production level by 2020 Iraq has to increase production at the rate that Saudi Arabia did at the end of 1960s-beginning of 1970s, or twice as fast as Russia in 2000s. Taking existing limitations into account, such growth rates are unlikely.

We forecast that by 2020 oil production in Iraq will reach 6 mb/d.



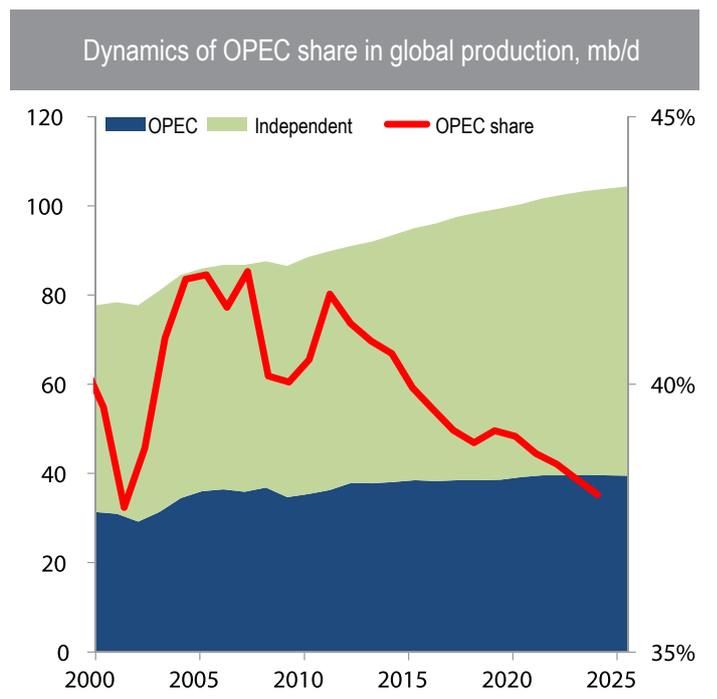
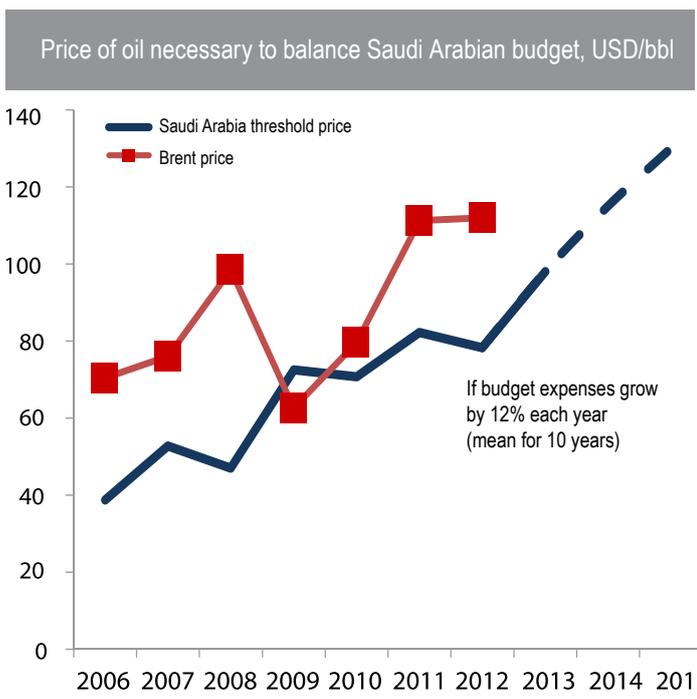
OPEC'S BALANCING ROLE

Today OPEC countries control about 42% of global oil production. Thanks to their coordinated actions, cartel members are capable of rapidly reacting to changes in the market situation by introducing production quotas. Such actions helped to stabilize oil prices rather quickly during the global financial crisis of 2008.

Oil prices act as a decisive factor for the budget revenue planning of OPEC countries. As a result of the Arab Spring, the budgetary obligations of certain cartel members have grown significantly. According to existing estimates, the breakeven price that allows Saudi Arabia to balance its budget was about \$78/bbl in 2012.

The probability of further budget expenditure needed to stimulate the economy and implement infrastructure projects is quite high for the next 2-3 years. For example, Saudi Arabia's budget for 2013 envisions an increase of 19%. Therefore it should come as no surprise that Saudi representatives regularly voice a price of \$100/bbl as the target level.

In the medium term, as production by independent producers, especially the US and Canada, grows, **OPEC members will limit the growth of their own production, thus supporting the global oil prices at necessary levels.**



Sources: Deutsche Bank, PIRA, LUKOIL estimates

GTL – CHALLENGE FOR THE OIL MARKET AFTER 2020

One of the most promising alternatives to oil fuels is GTL technology. This technology, based on the synthesis of liquid fuels from coal or methane, had been used back in the 1940s in Germany, which experienced a shortage of oil during World War II.

GTL technology makes it possible to refine methane from natural gas into a wide spectrum of products, the most important of which are diesel fuel and kerosene with improved environmental credentials.

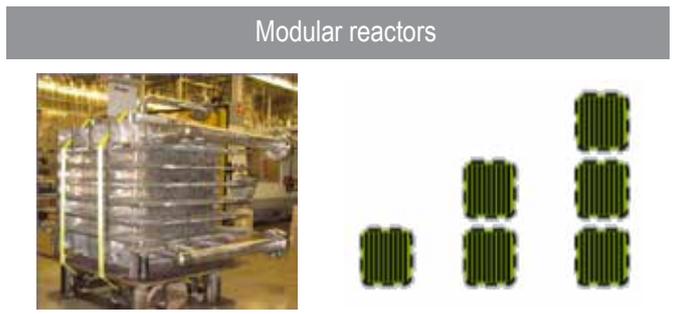
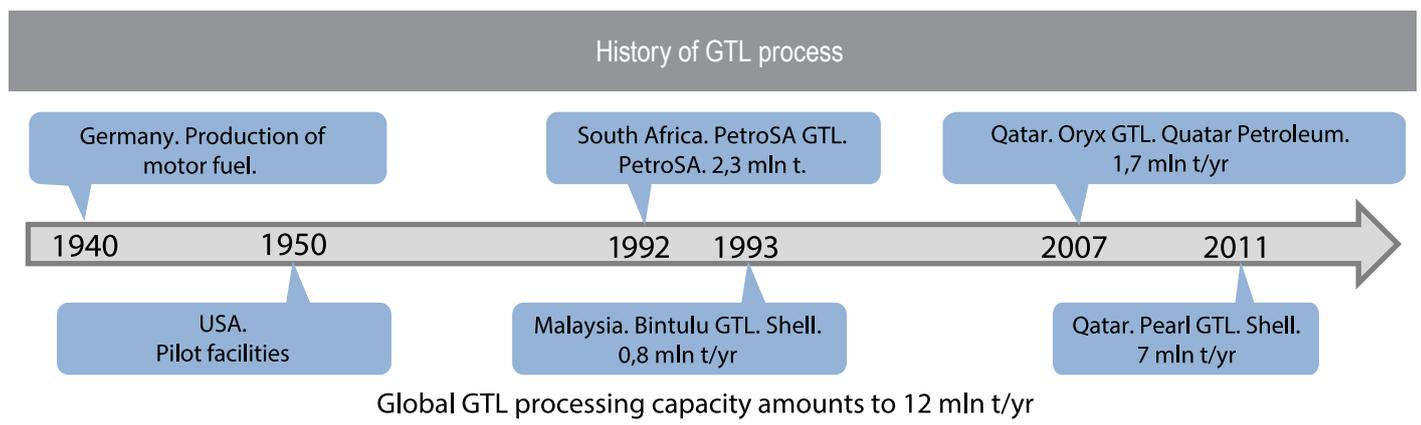
Today, revival of interest in this technology is a result both of the stricter environmental requirements for motor fuels and of the possibility of operating gas fields in regions lacking gas transportation infrastructure.

The largest active GTL project today is Pearl GTL. Current market prices make it profitable.

The only project currently under construction is the Escravos GTL in Nigeria. The relatively small number of active and planned projects is a result of the high costs of building GTL refineries.

Over the next few years GTL technology won't present a serious challenge to the oil industry. But beyond this time the situation may radically change due to further development of methane conversion methods. Among the promising methods is the micro channel technology that makes it possible to substantially reduce the physical size of reactors, leading to a reduction in capital investments in construction.

We believe that development of GTL technology may have a significant influence on the oil market after 2020. Should GTL technology gain large-scale circulation, it's possible we'll see the spread between oil and gas prices narrowing.



INFLUENCE OF THE DOLLAR EXCHANGE RATE

Since oil prices are denominated in USD, the dynamics of the American currency's exchange rate will influence global oil prices. As a rule dollar depreciation leads to growth in oil prices, while dollar appreciation does the opposite.

The influence of the dollar exchange rate on oil prices can be illustrated by comparing the dynamics of oil prices in USD with oil prices, denominated in Swiss francs and gold. Over the period of 2000-2012, the price of oil denominated in USD increased 3.9 times, while the price of barrel denominated in Swiss francs only grew 2.2 times, while the price of oil denominated in gold actually fell.

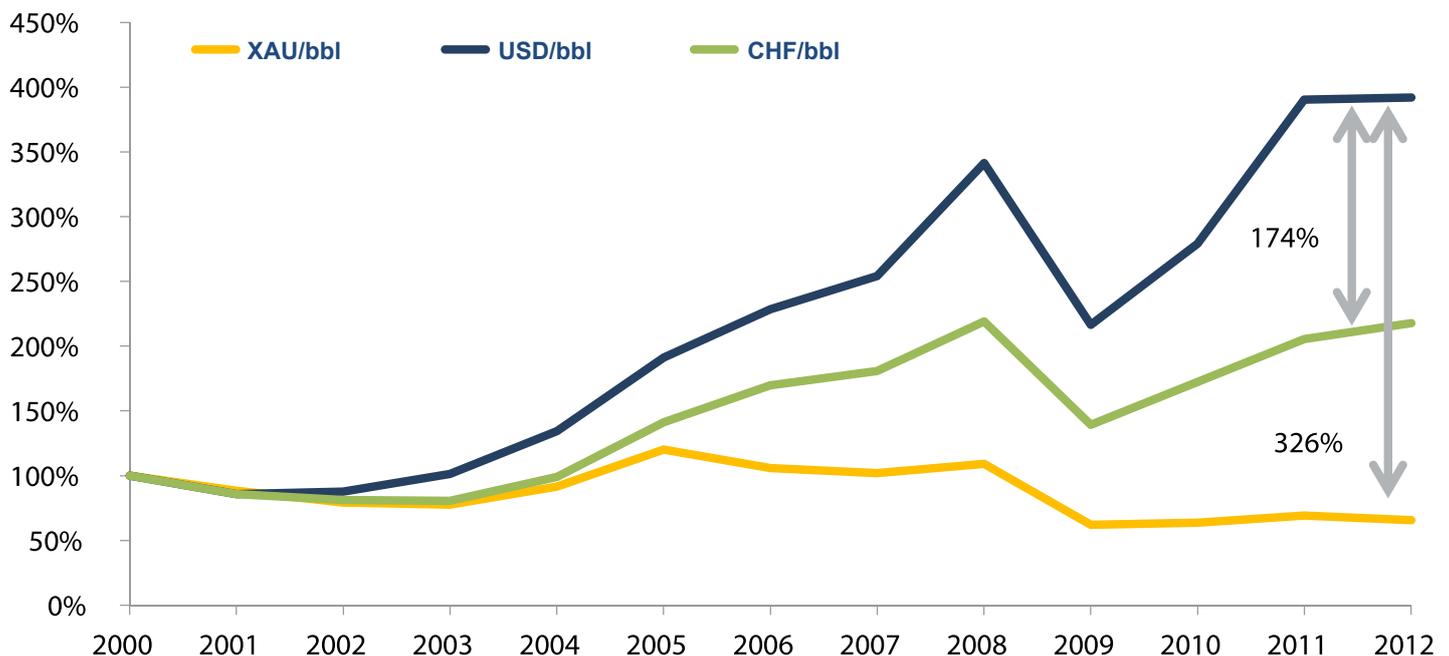
If the dollar was tightly tied to the gold standard, the price of oil over the last decade would be practically unchanged.

Over the last decade we have been seeing a trend towards dollar depreciation against other global currencies. In many ways this is a result of US monetary policy.

Depreciation of the dollar stimulates the US economy by having a positive influence on exports. Along with economic growth, the currencies of developing countries, especially the ones from the Asia Pacific region, are appreciating.

Most likely this trend will continue in the medium term, encouraging growth in oil prices.

Dynamics of Brent oil prices in USD, Swiss francs and gold, %



Sources: Platts, LUKOIL estimates

OIL PRICES FORECAST

Population growth and high rates of automotive growth in Asia will encourage an increase in oil consumption in the medium term. Growing demand and the natural decline of production from conventional oil fields will require the development of new reserves.

Recently there has been a steady trend towards an escalation in E&P costs which can be explained by the depletion of conventional fields. As the increase in production will be from high cost sources such as deepwater fields, high-viscosity oil and oil from tight reservoirs, the production costs will continue to grow.

Taking into account the high cost and technological achievements in oil production, biofuels will not have serious stimulus for growth in production.

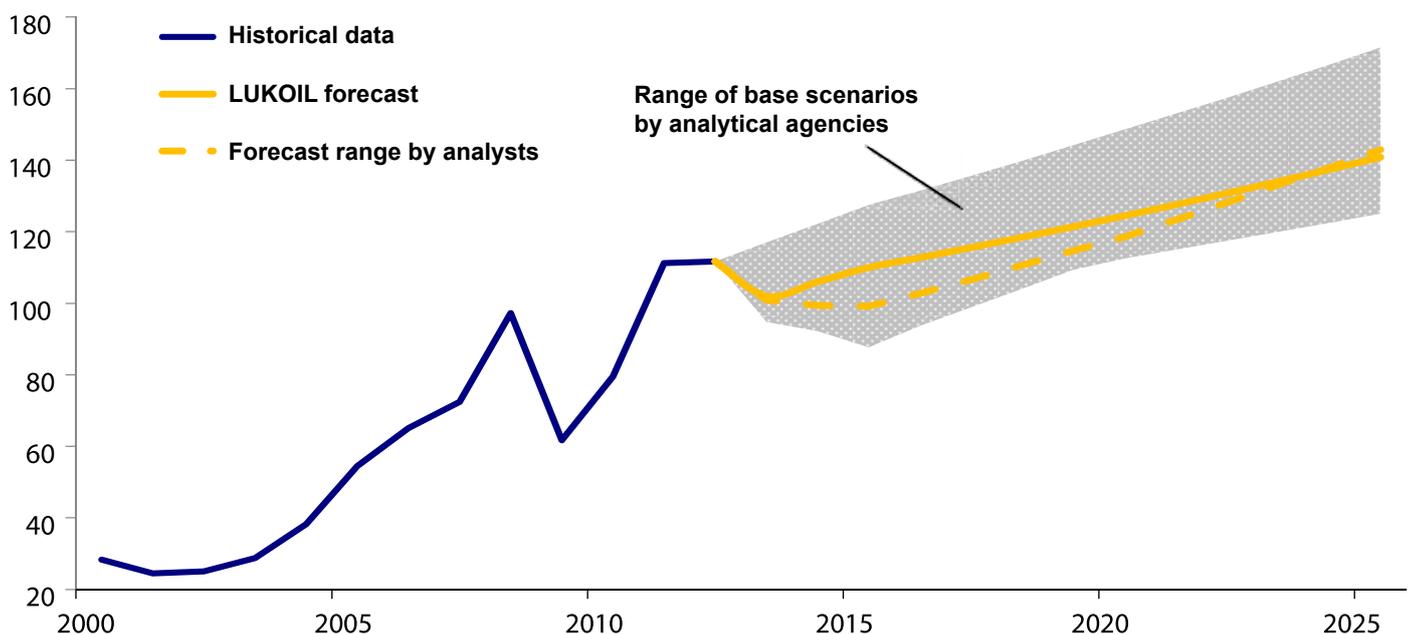
The increase in oil production in North America will be gradual which will allow market players to adjust to changes. Medium-paced increase in oil production is expected in Iraq where the planned production probably won't be reached due to technological and infrastructural shortage.

OPEC will strive to keep prices above \$100/bbl to meet its budget commitments as the independent producers increase their production.

Above all, the trend towards US dollar depreciation is one of the important factors that influence oil price increases.

According to our estimates, it's unlikely that the price of oil will fall below \$100/bbl in the medium term.

Brent price forecast, USD/bbl



Sources: Platts, LUKOIL estimates

GLOBAL TRENDS IN REFINING



STRUCTURE OF DEMAND FOR OIL PRODUCTS

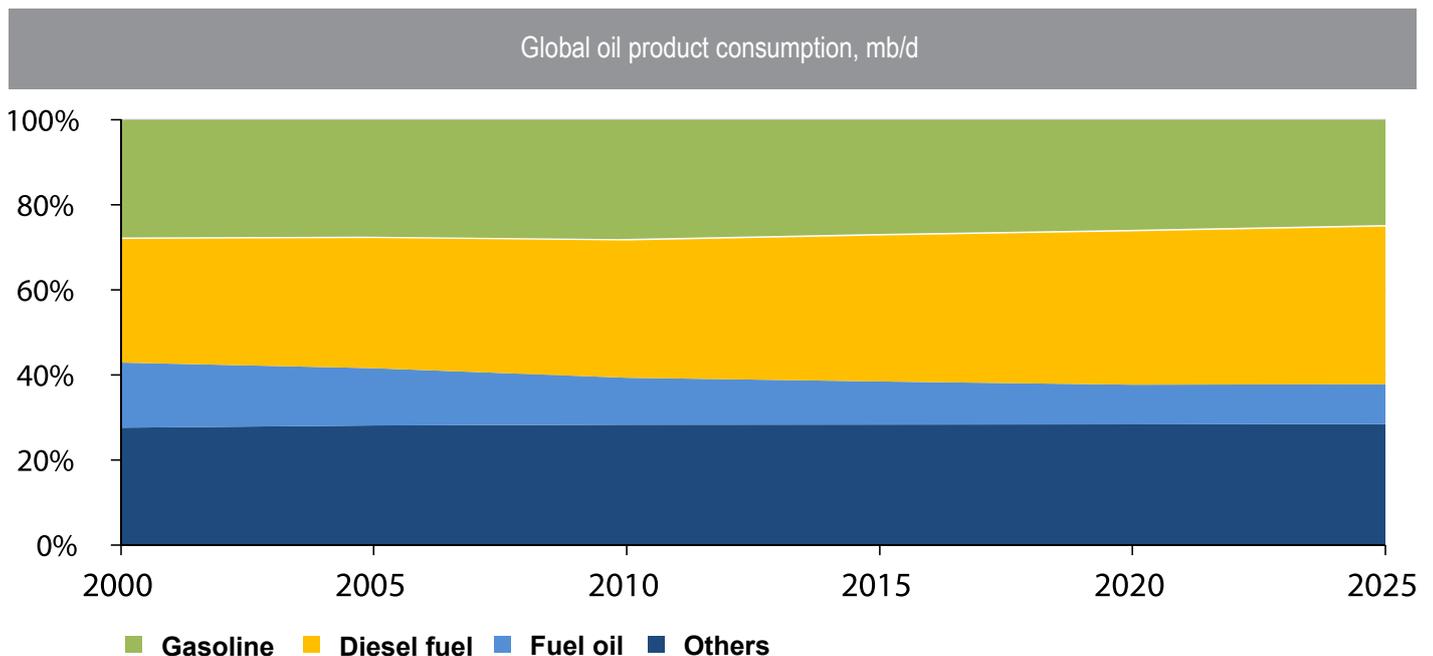
Over the course of 2012-2025, global oil product consumption will grow by an average annual rate of 1.2%. In the medium term, the transportation sector in developing countries will remain the main driver of oil product demand growth. China is already the world's largest market for new passenger cars. Analysts expect high growth rates in Chinese car ownership and forecast that by 2025 the total number of cars in China will reach 266 mln. The growth of the Asian car fleet will spur growth in demand for gasoline, while the commercial transport sector will contribute to the growth in demand for distilled products.

An increase in consumption both in light and fuel oil products will be registered in Middle East countries that have traditionally been big consumers of fuel oil. Persian Gulf countries use fuel oil in electricity generation, industrial production, water desalination and as a fuel for refineries.

Developed countries have reached their peak in oil product consumption. Both Europe and North America are at the stage where their car market is nearing saturation. Improvements in fuel economy will limit growth in oil product consumption.

Consumption of gasoline in developed countries will continue to fall, while demand for distillates will increase due to stricter environmental requirements for bunker fuel and an increase in demand from the commercial transport sector.

Global demand for diesel fuel will grow fastest among all the oil products. By 2025 the share of diesel fuel in the global oil product consumption will increase from the current 32% to 37%. This will require changes in the configuration of existing refineries.



AMERICAN MARKET TRENDS

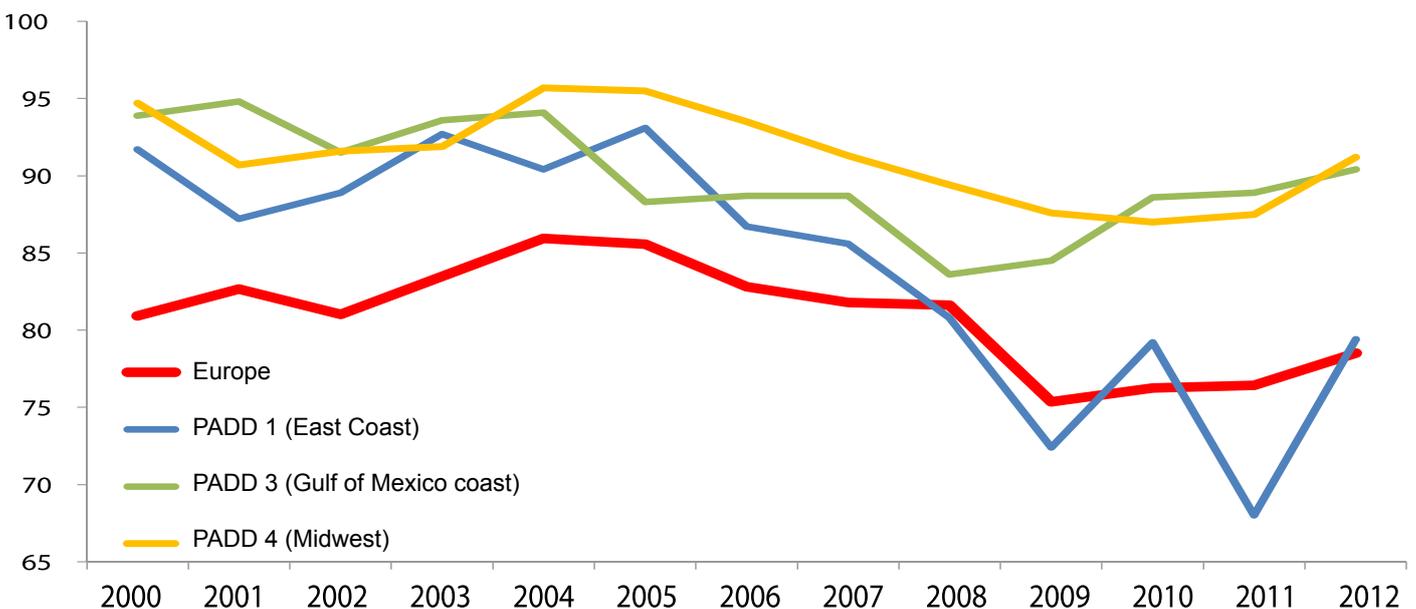
Over the last several years we've been observing significant changes taking place in the US oil product market. **Growth in production of light shale oil has led to increase in throughput at US oil refineries and growth in production of oil products.**

This has primarily led to profitability in continental oil refineries that use light oil from the Bakken province as their crude. Infrastructure limitations created a situation where significant oil volumes began accumulating in the oil storage terminals in the town of Cushing, Oklahoma. This has significantly reduced the price of crude oil in the region. After the implementation of such infrastructure projects as the Seaway Pipeline expansion and Keystone XL, the advantage that continental oil refineries currently have in terms of crude costs will be significantly reduced.

Simultaneously the US oil refining industry is undergoing a process of rationalization. Smaller oil refineries are gradually exiting the market. In the period 2009-2012 7 oil refineries with an output capacity of less than 100,000 b/d were closed on the US East coast and along the Gulf of Mexico.

Low demand for oil products in the Atlantic basin has led to the closure of some offshore giants. Hovensa oil refinery located in the Virgin Islands with a capacity of 350,000 b/d was closed in 2012. That same year the Valero company transformed its 235 kb/d oil refinery in Aruba into a terminal.

Dynamics of oil refinery capacity utilization in the US and Europe, %



Sources: EIA, IHS Purvin & Gertz

The US government is actively pursuing a policy towards a reduction in the consumption of motor fuels. The CAFE (Corporate Average Fuel Economy) system has been active since 1975. The system sets limits on fuel consumption rates for the producers of passenger cars.

Nowadays, the standard of fuel consumption depends on car type and size. According to existing standards the average fuel consumption for cars produced in 2016 will be 31.1 miles/gallon (equivalent to 6,9 l/100 km). Under those standards the fuel consumption by new cars will decrease by 20% by 2016. Besides, measures taken in the USA to boost the consumption of biofuels will encourage a decrease in oil demand.

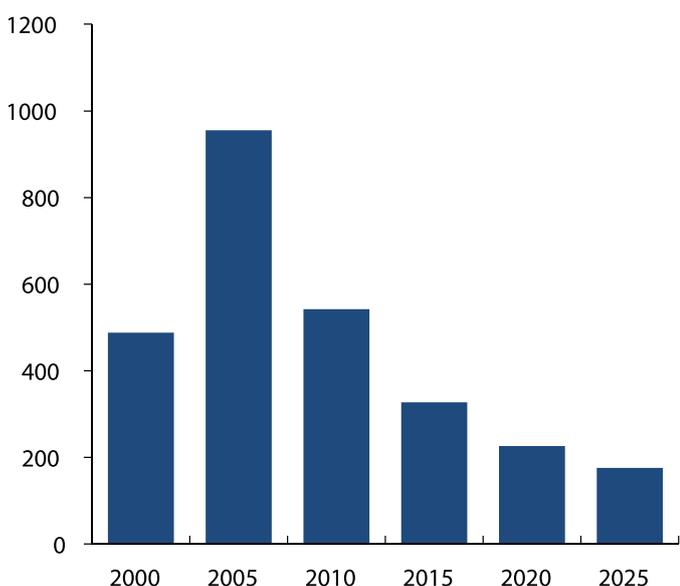
Until the mid-2000s the United States was the world's largest gasoline importer, but today the country's dependency on import is falling. At the same time the export of diesel fuel is growing.

The United States are becoming a net exporter of oil products. Excess diesel fuel will be sent to Europe, while gasoline will be exported to the Latin American countries.

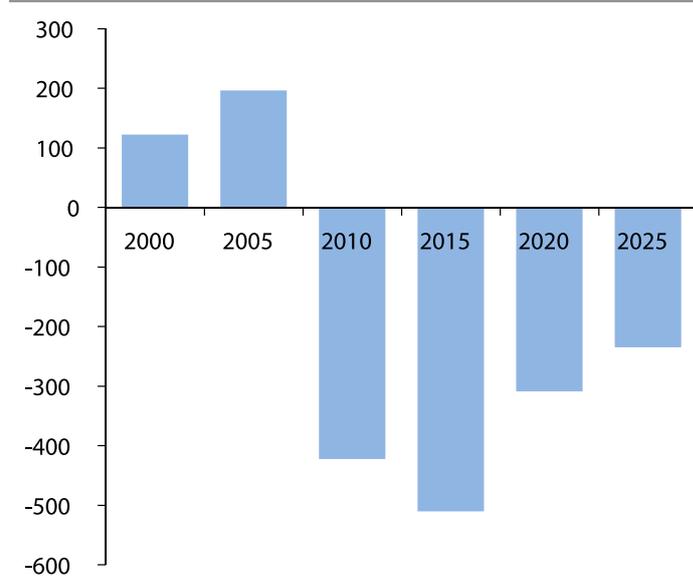
Changes on the US oil products market will have a long-term negative effect on the European oil refineries.

Many European oil refineries were designed for arbitrage operations and the delivery of car gasoline to North America. The trend towards reduction in gasoline imports in the US is making the economic model of such arbitrage oil refineries no longer feasible.

Net import of gasoline in the US, kb/d



Net import of diesel fuel in the US, thousands kb/d



Source: IHS Purvin & Gertz, LUKOIL estimates

EUROPEAN OIL REFINING IS EXPERIENCING SYSTEMIC CRISIS

The period of 2004-2008 was the “golden age” of European oil refineries. Stable demand for oil products and the deficit in conversion capacities made the oil refineries highly profitable. But after the global financial crisis of 2008 the situation in the European oil refining industry changed significantly.

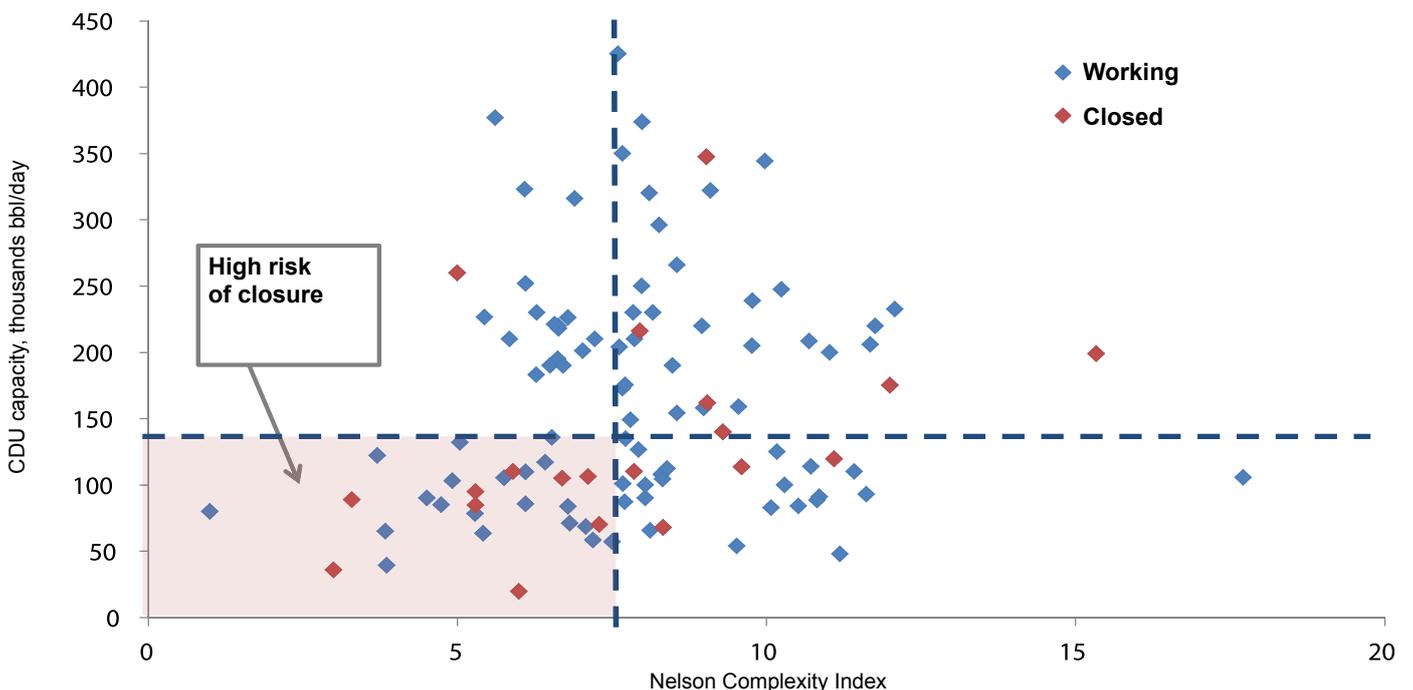
The decrease in demand for oil products that hit Europe in 2009 led to a reduction in the throughput of European oil refineries. This coincided with the construction of several conversion projects, which meant that the spread between dark and light oil products narrowed further. Moreover, the largest gasoline consumer - the United States - reduced import volumes. All of these events had a negative effect on the economics of the European producers. As a result, the European oil processing industry is undergoing a deep crisis.

Since 2009 producers have shut down a number of oil refineries with an aggregate output capacity of 3.7 mb/d in the Atlantic Basin region. However, this seems to be insufficient as many European oil refineries have low profitability, while their utilization remains rather low.

Quite a few low-efficiency oil refineries continue to function. Oil companies are unable to radically cut operations due to the pressure from local authorities and labor unions. A high risk of shutdown is especially imminent for small oil refineries with low level of complexity because such oil refineries have high per unit operating costs.

To overcome the European oil refining crisis, the companies have to shut down an additional 1-1.5 mb/d of refining capacities.

Comparison of European oil refineries in capacity and complexity



Sources: Wood Mackenzie, LUKOIL estimates

GLOBAL OIL REFINING CAPACITIES

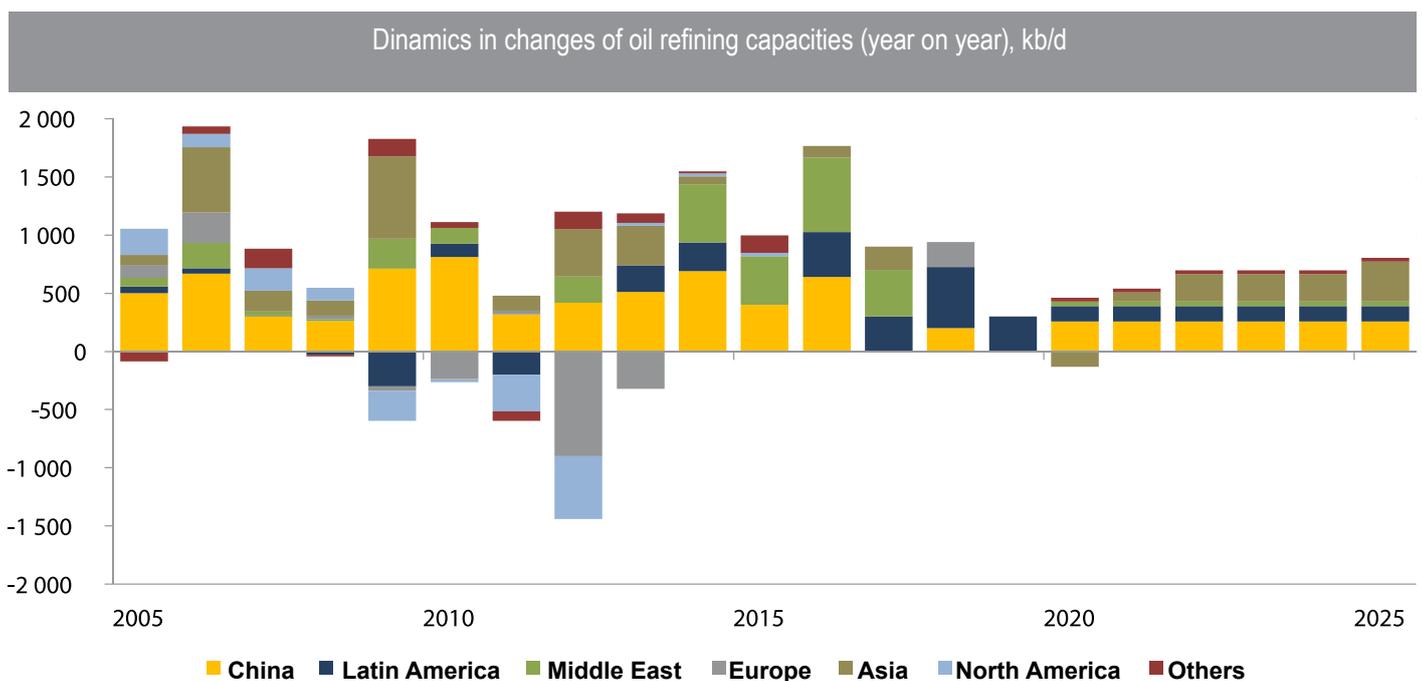
It's expected that in 2012-2020 the annual net increase in global oil refining capacities will amount to 1 mb/d.

The greatest increase in refining capacities is forecasted for the Middle East and the Asia Pacific region, where demand for oil products will grow the fastest.

Scheduled projects have high capacity and complexity, challenging the European oil refiners. Moreover, the oil refineries under construction have advantages in terms of logistics, providing them with an opportunity to make profit from arbitrage.

China, the largest oil product consumer in the Asia Pacific region, is forced to import part of its fuel. In order to reduce its dependency on oil product imports, the country plans to increase its own oil refining capacities by 2.4 mb/d by 2018.

One of the world's leading refiners - Sinopec - plans to build several new oil refineries. In particular, Sinopec is building an oil refinery with a capacity of 300,000 b/d in the southern province of Guandun in partnership with KPC (Kuwait Petroleum Company). Together with PdVSA, CNPC is implementing the Jieyang project with an output capacity of a 400,000 b/d. In addition to this CNPC is building 400,000 b/d oil refinery in the Zhejiang (Taizhou) province.



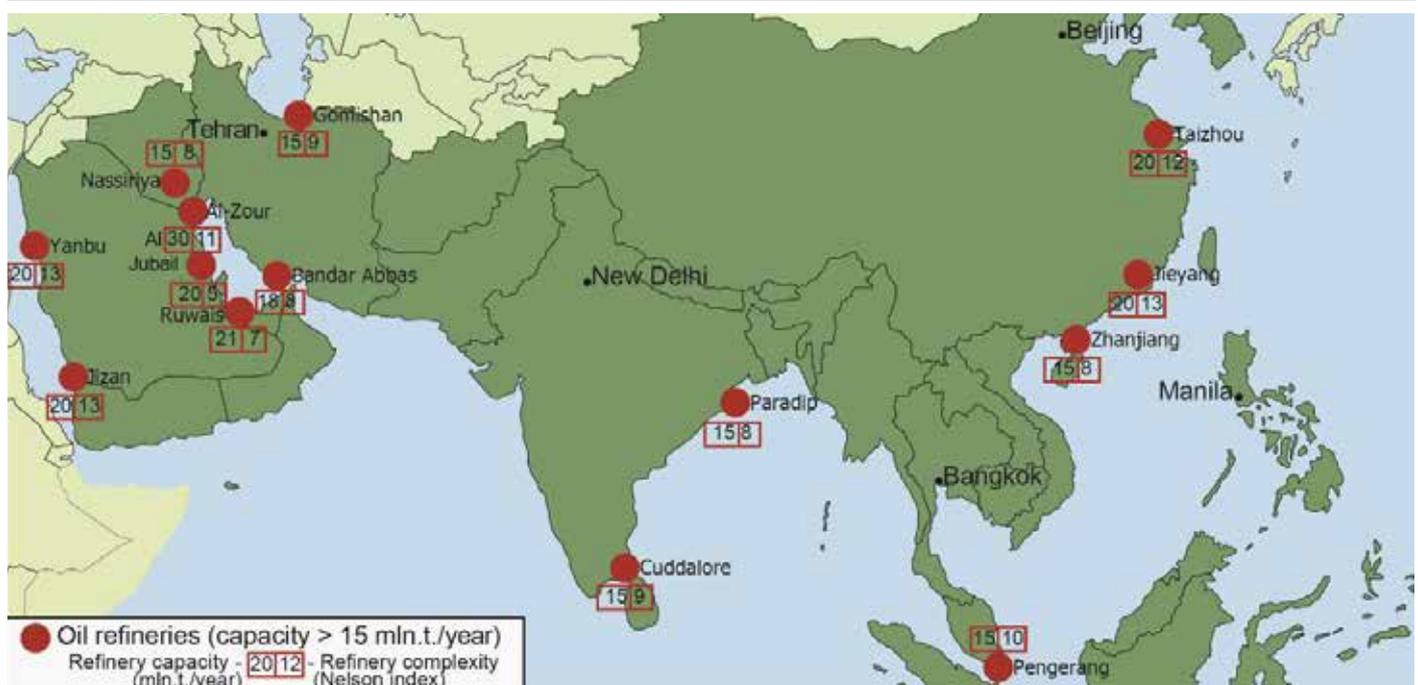
The Middle Eastern countries are also planning significant investments in the construction of additional refineries in order to satisfy the growing domestic and global demand. Saudi Arabia plans to build three new oil refineries with an output capacity of 400,000 b/d each and an aggregate capacity of 1.2 mb/d. The Al-Jubail facility located on the Persian Gulf coast will be put into operation in 2013, while two others - Yanbu and Jizan - will be built on the Red Sea coast by 2016-2017.

Commissioning new capacities in Asia and the Middle East will lead to the reallocation of oil product flows. The export of gasoline from Europe to the Middle East will decrease, while competition within the European diesel fuel market will grow.

Growth of global primary crude oil processing will be accompanied by the construction of new conversion facilities. New oil refineries in the Middle East and China have high Nelson complexity Indices and this implies that they have extensive conversion capacities. For European oil refineries the average Nelson Index equals 7 units, but for the new capacities in the Middle East and Asia this figure amounts on average to 10 units.

Construction of new conversion capacities will continue to take place in developing countries. The most popular production processes will include hydro cracking units used for production of diesel fuel and high quality motor oils, catalytic cracking units used for production of high octane gasoline and the coking unit that allows heavy residues to be refined into petroleum coke with production of additional light oil products.

Largest new oil refinery projects in the Middle East, South Asia and Asia Pacific



Sources: D-maps, Global data, Purvin & Gertz, LUKOIL estimates

STRICTER STANDARDS FOR BUNKER FUEL

Authorities of coastal states have become concerned with the worsening environmental situation and have set new limits on the maximum allowed sulphur content in bunker fuels.

Starting in January 2010, the territory of the Emission Control Area (ECA, the water zones of Northern Europe, the US and Canada) is closed off to usage of any types of bunker fuels with a sulphur content above 1%.

Even stricter regulations will come in force in the ECA zone after 2015. Sulphur content in fuels will have to be below 0.1%. According to existing estimates, this will increase distillate consumption by 450,000 b/d.

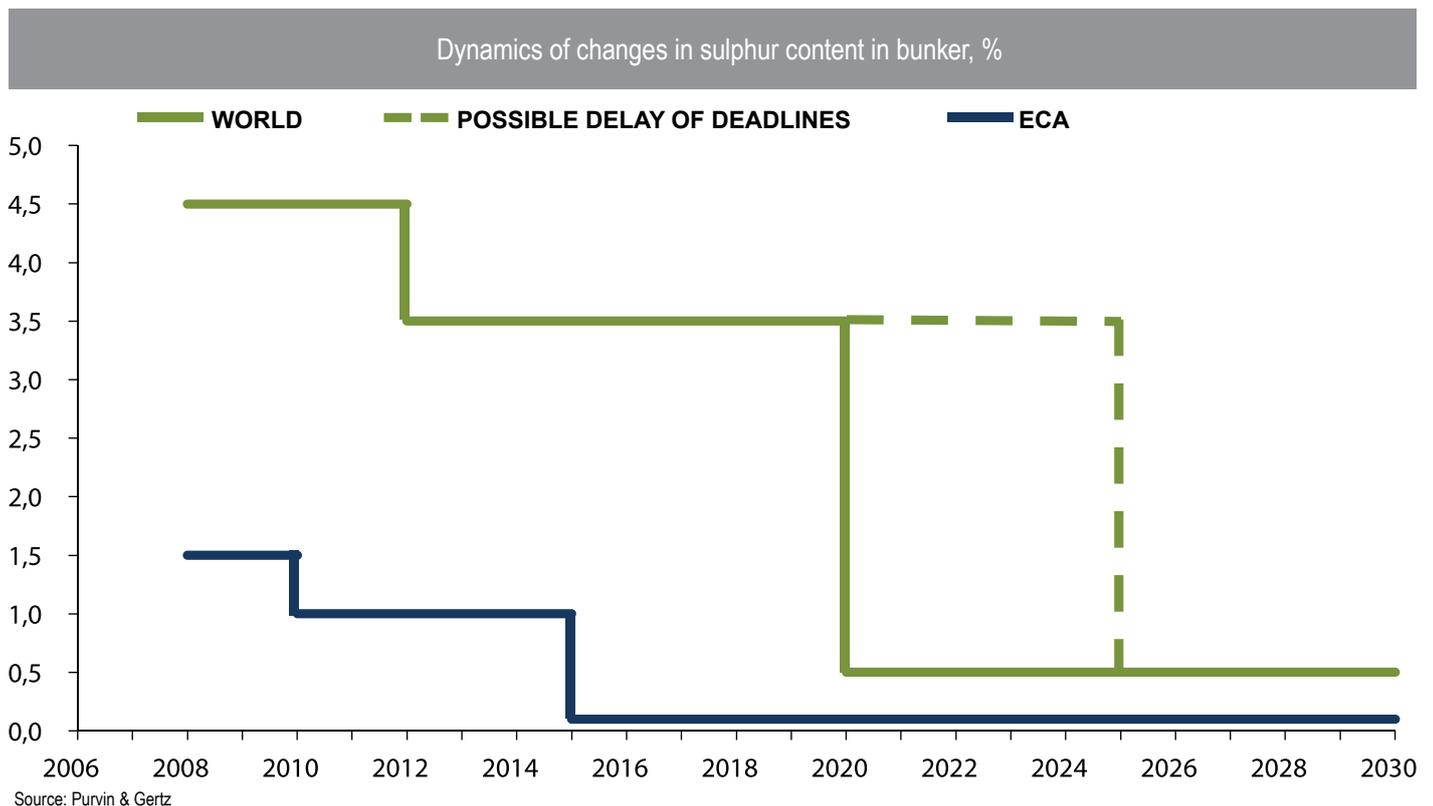
The global trend towards the restriction of sulphur content in bunker fuels is not so tough. Starting in January 2012 bunker fuels are supposed to contain no more than 3.5% sulphur.

After 2020, usage of fuels containing more than 0.5% of sulphur in international bunkering will be prohibited. However, many experts say that this deadline may be moved to 2025.

The industry may respond to this challenge by using scrubber filters on tankers to purify exhaust gases without changing the type of bunker fuel. Such approach can be used on large vessels that consume 80% of all bunker fuel.

Another method of meeting environmental requirements is to change the vessels' fueling system to use liquefied natural gas (LNG).

Taking into account the trend towards less production of dark oil products and further technological progress, we expect that the industry will be able to gradually adapt to the introduction of new standards.



GLOBAL NATURAL GAS MARKET OUTLOOK



GLOBAL GAS MARKET SHIFTS TO A BUYER'S MARKET

In the beginning of the century, the three principal markets (United States, South-East Asia and Europe) faced stagnating domestic production alongside growth in local demand for gas.

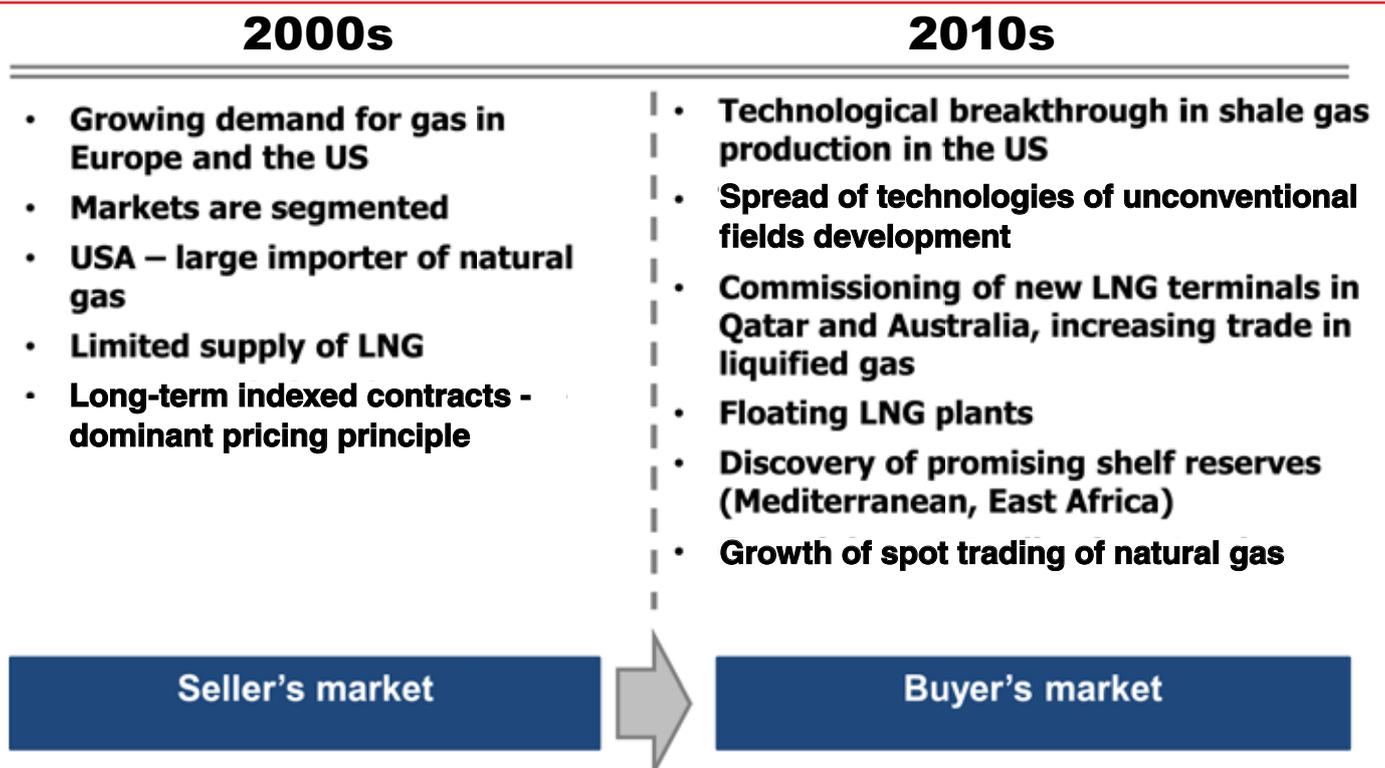
Growing demand for imports favored suppliers allowing them to set their terms. The main pricing principle was long-term indexed contracts where the price of gas was set based on the cost of alternative fuel, such as oil products. The long-term contracts and take-or-pay obligations were explained by the need to make large investments upstream.

The gas supplies were mainly delivered via pipelines as LNG capacities were limited.

But by the end of the 2000s the situation has changed. Technological breakthroughs in the US added to the reserves available for the production of large deposits of shale gas. Intensified exploration around the world led to discoveries of new prospective regions with large reserves.

Over a 10 year period, LNG-liquefaction capacities more than doubled. Falling demand, as a result of the global economic downturn and increasing supply, made European gas hubs modeled after the US Henry Hub much more liquid.

As a result, customers started to set terms on the international gas market.



GAS DEMAND GROWS FASTER THAN OIL DEMAND

Key growth factors in the demand for gas, which initially was considered a by-product of oil production, were its environmental credentials and low costs in comparison with other types of fossil fuels.

To address the threat of global warming they are to reduce CO₂ emissions into the atmosphere. Natural gas has lower emissions of CO₂, as well as other dangerous substances (sulphur and nitrogen compounds).

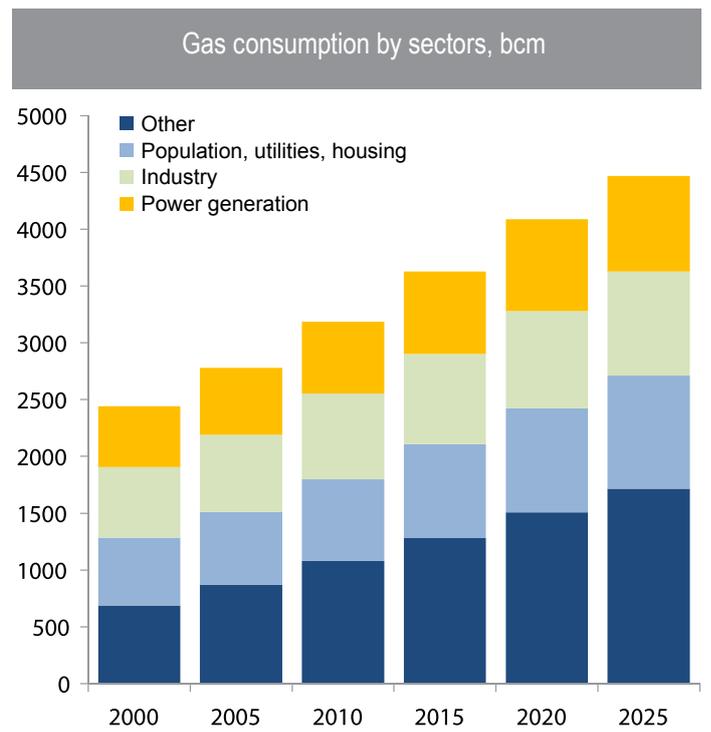
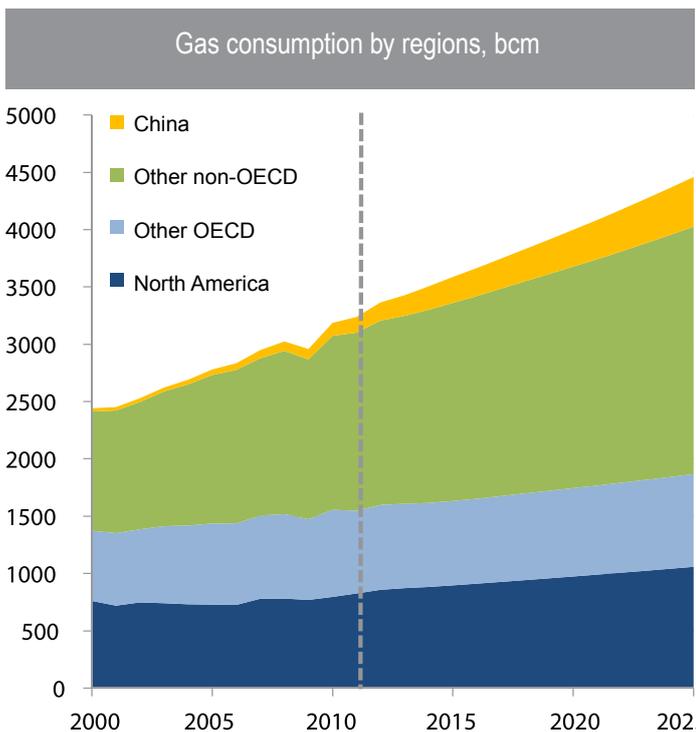
In Asia and the Middle East gas-fired electricity generation will replace coal and oil-powered plants respectively. Gas consumption will also continue to grow in North America.

Another growth driver for gas-fired generation is the worldwide concern about the safety and reliability of the nuclear power.

In addition to power generation, population growth will also contribute to the growth in gas consumption in the residential and industrial sectors.

China will be the major region for gas consumption growth and by 2020 will become one of the world's largest consumers and importers of gas.

We estimate, that until 2025 global gas consumption will continue to grow at an annual rate of 2.2%. Therefore **gas consumption will have the highest rate of growth among other types of fossil fuels.**



Sources: IHS CERA, LUKOIL estimates

SHALE GAS WILL ALLOW THE US TO BECOME A GAS EXPORTER

For decades the North American oil and gas industry was trying to master the production of unconventional gas resources. The price surge of the mid-2000s aptly coincided with technological breakthroughs in the areas of hydraulic fracturing and directional drilling.

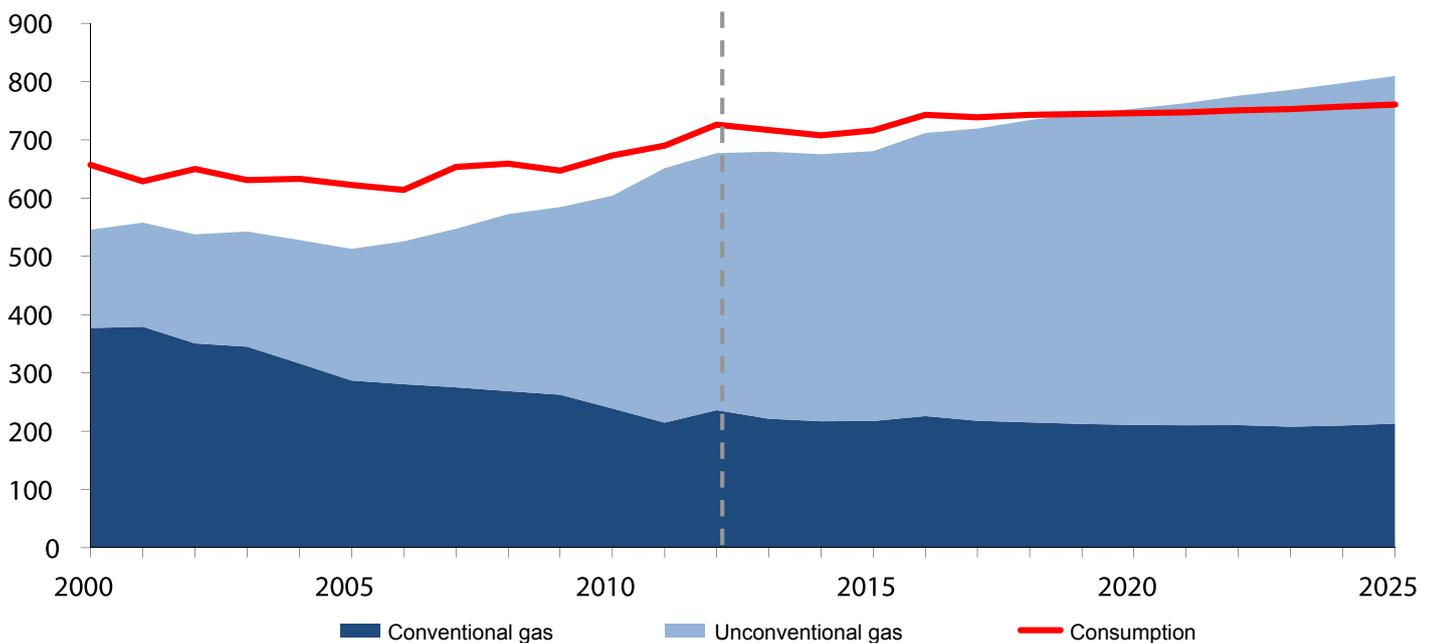
In addition to the experience that the industry had already accumulated, an important contribution in the overall success was the low population density in production regions and availability of water resources.

The growth in production of unconventional gas will allow the US to start exporting gas by the middle of the current decade, and, according to various estimates, to become a net exporter of gas by 2020.

A major advantage of American LNG projects is the relatively low level of capital expenditure due to a significant number of existing LNG import facilities that can be quickly converted for LNG exports.

As of today, only Sabine Pass terminal has acquired the permission of the US authorities to export 16 mln t of LNG a year (about 22 bcm). The start of exports is scheduled for the end of 2015. The total export capacity of the proposed projects is 200 mmpta, but there is an influential lobby inside the country that seeks to limit exports due to concerns over domestic gas price growth.

Forecast for production and consumption of gas in the US, bcm



Source: EIA

GLOBAL PROSPECTS OF UNCONVENTIONAL GAS

Taking into account the amount of time required to develop the necessary expertise, as well as to upgrade the rig fleet and master the required technologies, shale gas will start to play a serious role outside of North America after 2020.

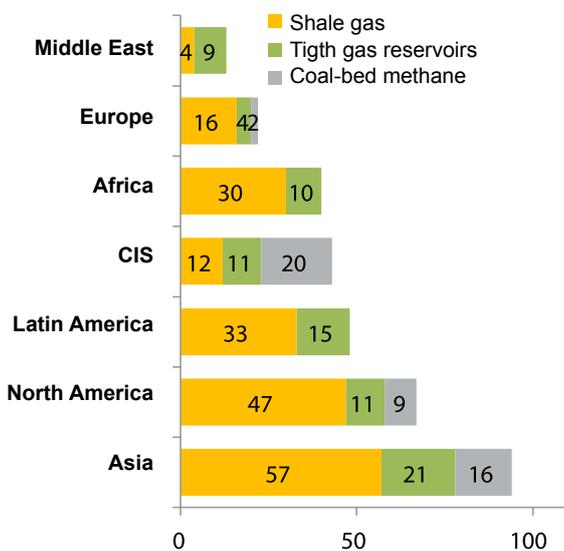
There are considerable reserves of unconventional gas both in Asia and Latin America. China has the most favorable conditions to establish shale gas production and has already begun to import the relevant technologies.

It should be noted that the lack of gas infrastructure and strictly limited water resources won't allow China, in short-term, to make the cost of unconventional gas production as low and production growth as fast as in the US.

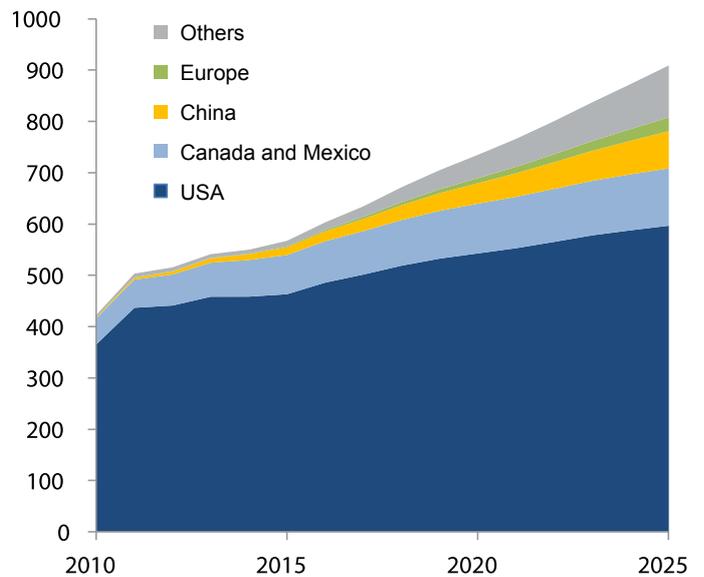
To increase shale gas production, one needs a large number of modern drilling rigs. At present the appropriate fleet is available only in North America, where it is fully utilized. Global capacity to manufacture such drilling rigs is estimated at 300 rigs per year.

Lack of qualified personnel, as well as a lack of capacity for the water injection necessary for hydraulic fracturing will also constrain unconventional gas production around the world.

Recoverable reserves of unconventional gas, tcm



Unconventional gas* production forecast, bcm



*shale gas, tight gas reservoir reserves, coal-bed methane

Sources: IEA, EIA, LUKOIL estimates

NEW REGIONS OF CONVENTIONAL GAS

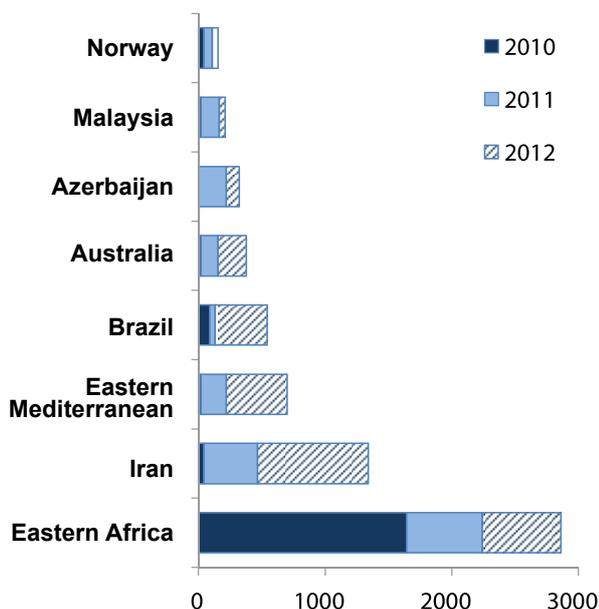
Along with the progress in development of unconventional resources, new, large conventional gas reserves are being discovered in new regions of the world. **Very soon South-East Africa and the Eastern Mediterranean will become global sources of gas supply.**

By the end of the current decade appreciable liquefying capacities (around 20 mmpta) will have been commissioned to supply the recently discovered significant gas reserves of Mozambique and Tanzania. Total annual export capability of the region is estimated around 70 mmpta, putting the region's export potential on par with the US.

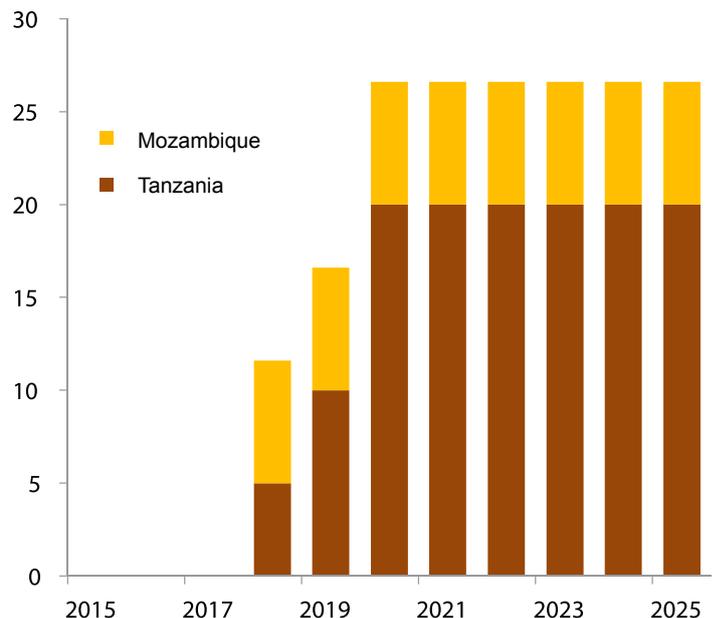
South-East Africa has a good location for LNG deliveries to the Asia Pacific region. Taking into account growing interdependence between markets, competition in Europe will improve. To minimize costs, Chinese and Indian oil and gas companies are acquiring stakes in production projects around the region.

In Europe, the shelf of the Eastern Mediterranean may become a new global source of LNG by the beginning of the next decade. According to various estimates, aggregate recoverable offshore reserves of Israel, Cyprus, Lebanon and Egypt amount to several tcm of gas. Considering the clouded international relations in the region as well as low domestic consumption, these countries will choose LNG as a way of exporting their gas surplus. The first liquefying capacities are scheduled to become operational by 2020.

Largest natural gas field discoveries in 2010-2012, bcm



Forecast of commissioned LNG capacities, mmpta



LNG MARKET OUTLOOK

The large-scale commissioning of new LNG capacities creates a good footing for the development of the global natural gas market.

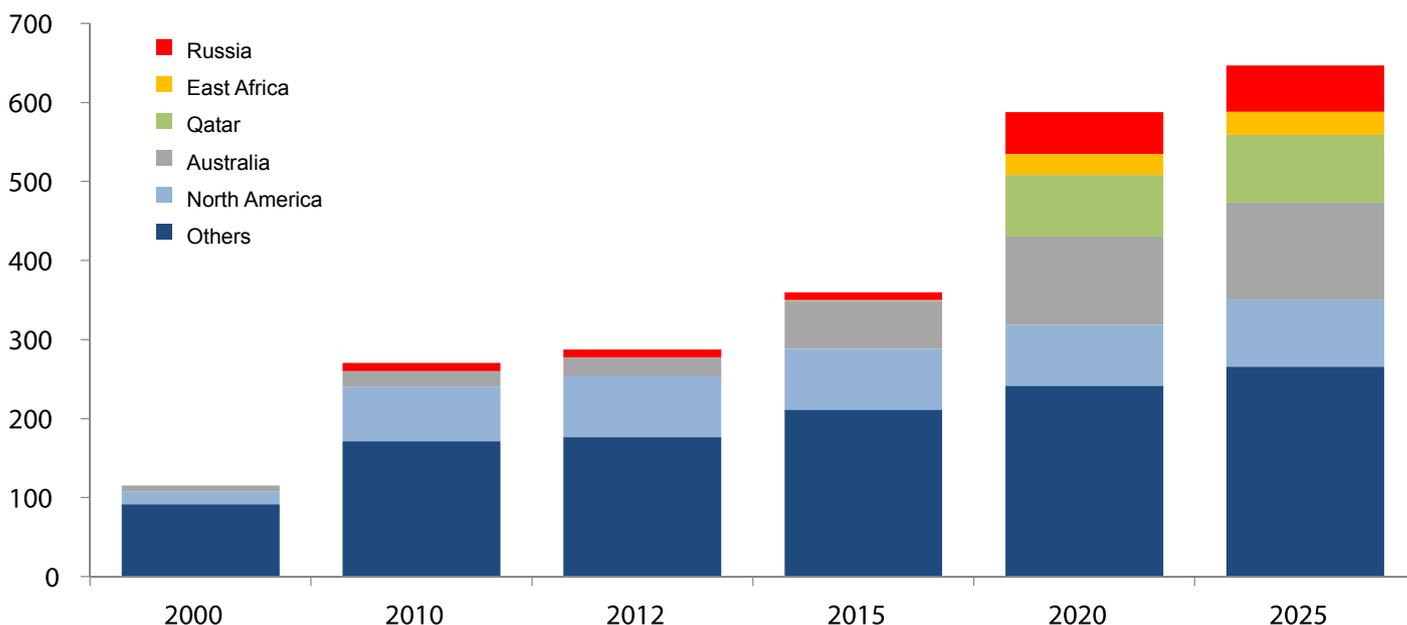
The previous decade was characterized by the growth in LNG trading volumes and construction of LNG facilities all around the world - aggregate liquefying capacity increased by 2.5 times and reached 270 mmtpa (over 360 bcm). In particular, Qatar commissioned a number of large-scale LNG projects (QatarGas, RasGas) with an aggregate capacity of 61 mmtpa.

Regasification capacities were mostly constructed in Europe and North America. LNG supply contracts were based on oil-indexation.

In the course of the current decade we expect implementation of even greater-scale plans, primarily in Australia. By 2020 new LNG facilities are planned in North America, Africa and Russia.

As LNG supply grows, price differentials between major gas markets will narrow to the costs of LNG transportation. It's possible that significant part of LNG deliveries will be supplied under spot pricing. Therefore, development of LNG will make the global gas markets more interdependent.

Global liquefying capacities development forecast, mmtpa



Sources: PFC Energy, LUKOIL estimates

Despite the forecasted high growth rate of global gas consumption, demand for gas in Europe is unlikely to grow significantly in the next 5-10 years.

The shale gas revolution resulted in a decline of coal consumption in power generation in the US. Therefore European coal market prices have fallen due to the glut. As a result, coal became more economically efficient than natural gas for power generation in Europe. The low cost of CO₂ emission quotas also promotes replacement gas with coal.

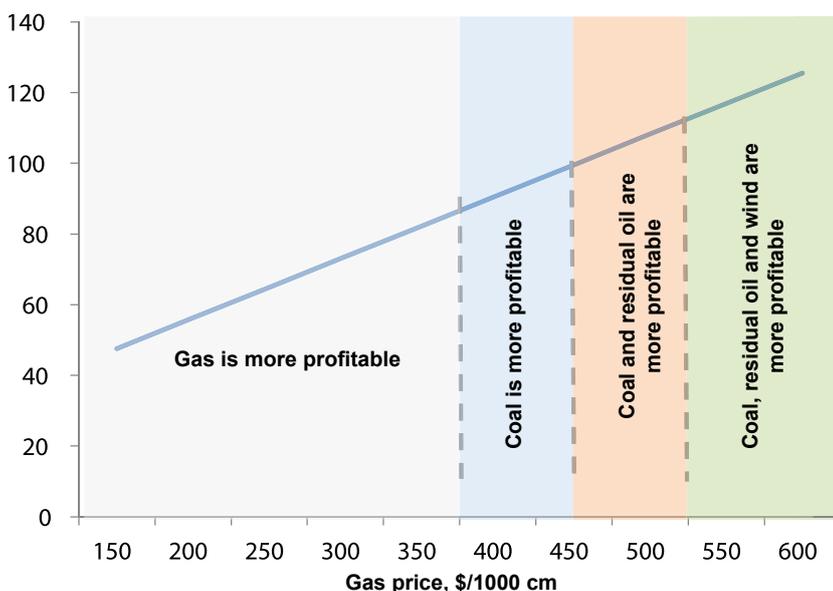
Low rates of economic growth do not favor growth in European gas consumption unlike the fast-growing gas markets of Asia and the Middle East.

At the same time EU authorities are seeking every opportunity to stimulate development of LNG infrastructure and to diversify gas supply to Europe.

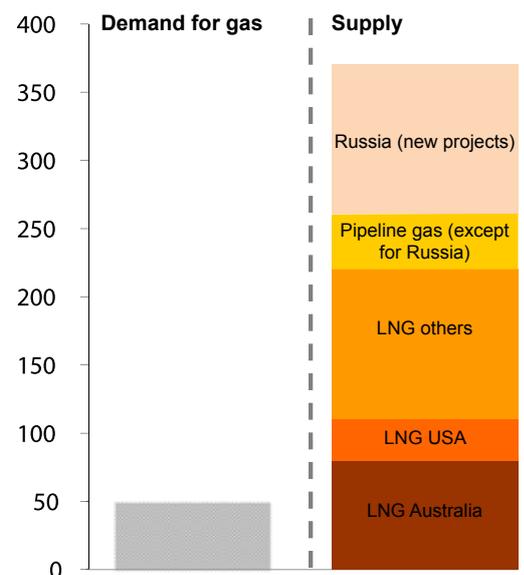
Under the Third Energy Package gas transmission and storage is separated from commercial activities. Intensive development of midstream infrastructure will allow the establishment of a single trading hub for the whole of Europe and eliminate significant differences in gas prices across Europe.

Considering significant rates of decline in domestic gas production, import of gas to Europe will continue to grow, even if overall gas demand stagnates. But forecasts show that after 2015 there will be a sharp increase in the number of potential global sources of gas supply.

Comparison of European power generation's cost, \$/MWh



Non-contracted demand for gas in 2020 and volumes of supply*, bcm



* Contractually unassured gas with European cost of delivery lower 320\$/1000 cm

Supply will primarily grow thanks to large-scale commissioning of new LNG facilities. Export from Australia will grow after 2015, and by 2025 the United States, East Africa and Russia may become large LNG suppliers.

Asia remains the most attractive market for LNG, but in the second half of the decade due to the growth of global LNG supply, gas prices in Asia will gradually decline.

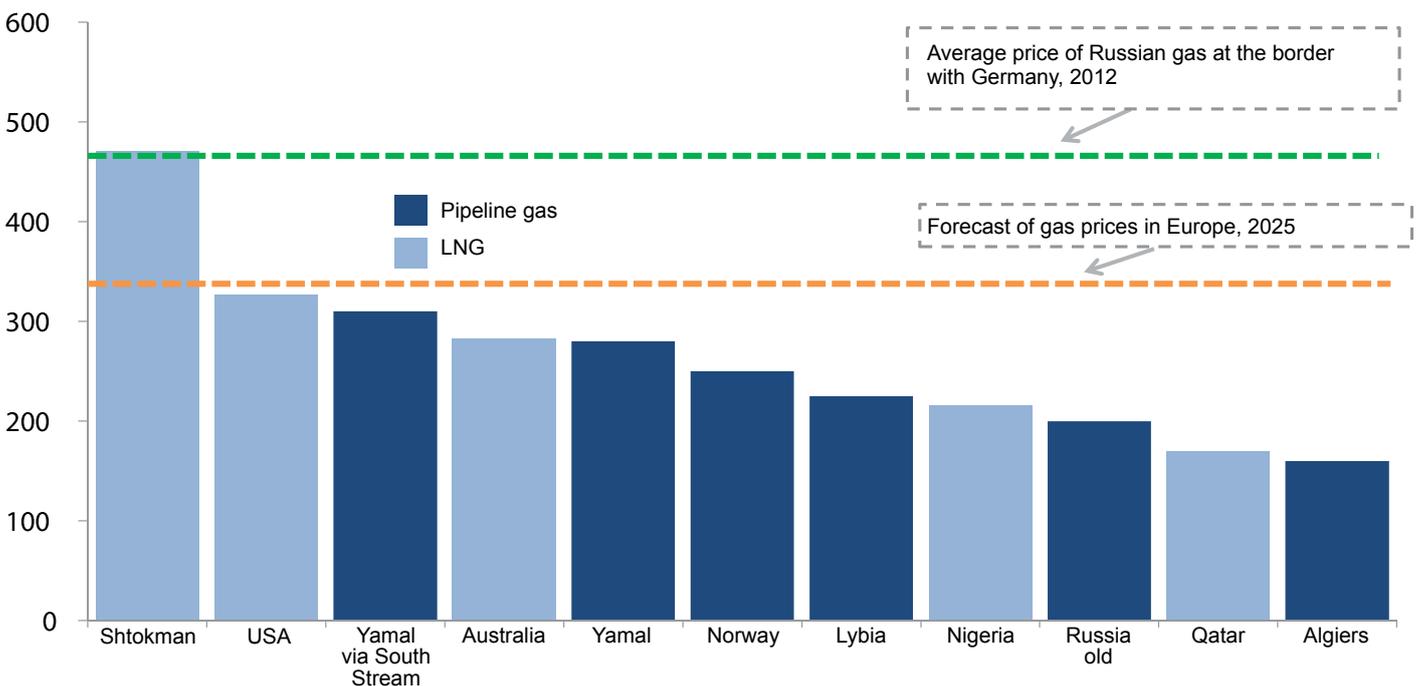
In addition to LNG, there is some potential for increasing pipeline gas deliveries to Europe.

By the end of the decade, when many long-term import contracts will gradually expire, there will be a significant volume of demand to be satisfied under new contracts.

Nonetheless, the volume of potential supply will be much higher than contractually unassured demand, leading to improvement of competition in Europe. By 2020, Europe's demand for gas above the existing contracts will amount to 50 bcm, while Russia's competitors will be capable of supplying the market with additional 250 bcm. Competition will force suppliers to lower long-term contract prices in order to maintain their market share.

In the long run, the rise of share of hub pricing will considerably challenge Russian gas in Europe. Growing costs of production and depletion of the traditional resource base in West Siberia will undermine the competitiveness of Russia on the European market.

Comparison of costs of gas deliveries to Europe, \$(2012)/1000 cm



Sources: PFC Energy, SKOLKOVO Energy Center, Argus

GAS POTENTIAL OF CHINA

Gas consumption in China is set to grow significantly. Around 3% of power supply is produced from gas. This is way below both the OECD countries and the developing Asian states.

The skyrocketing industrial-production growth of 2000s quickly made China the world leader in terms of CO₂ emissions. Environmental concerns will promote substitution of coal with gas. The Chinese government set ambitious goals for gas consumption growth in their 12th five-year plan. Should they all be realized, Chinese gas consumption may reach 200-250 bcm as early as 2015.

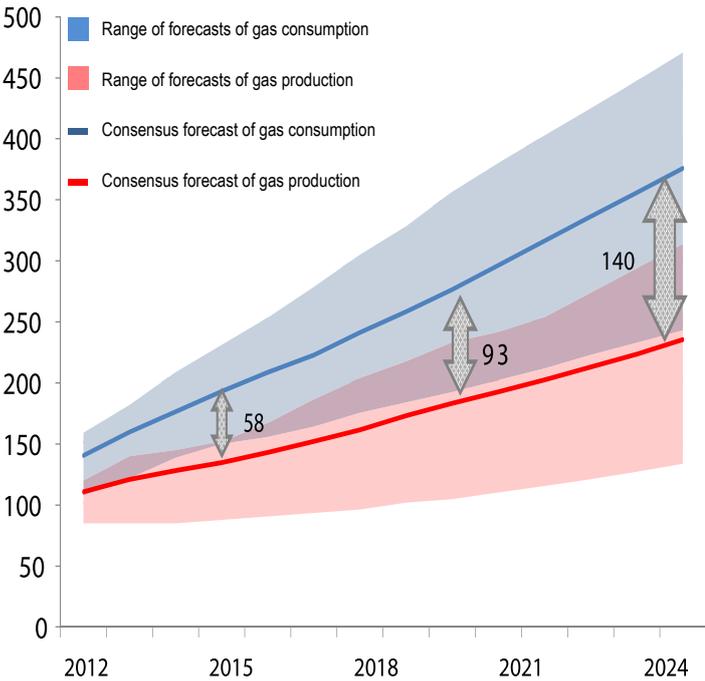
The growth of gas consumption in China will considerably exceed domestic production, thus creating opportunities for export to this country.

Targets of China's twelfth 5-yr plan		
	Fact 2010	Goal 2015
Emissions per GDP unit, kg CO ₂ /\$2005	1,79	1,49
Gas share in primary energy sources	3,8%	7,5%
Overall gas-fired power output	28	60



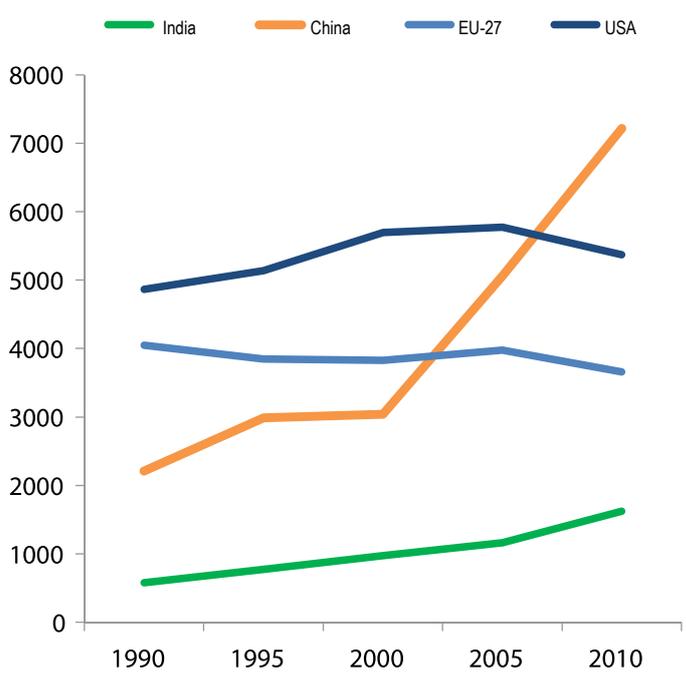
Should the plans be implemented, gas consumption in 2015 will equal 200-250 bcm

Chinese gas production and consumption forecast, bcm



Sources: IEA, EIA, PFC Energy, CreditSuisse, IHS CERA, LUKOIL estimates

Dynamics of CO₂ emissions, mln t

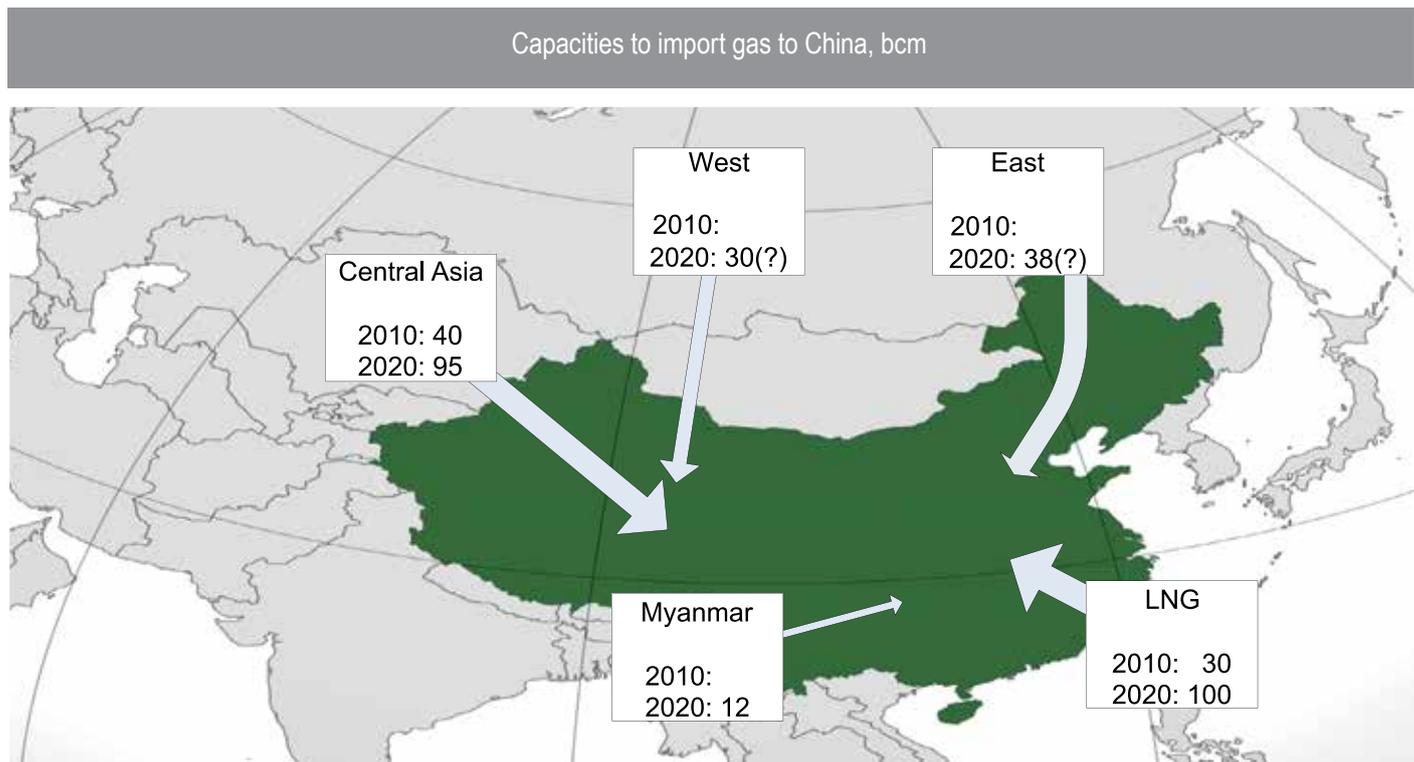


Nowadays the main sources of import are Central Asian gas (in western parts of the country) and LNG (in the East). In the near future a gas pipeline from Myanmar will be commissioned.

Gas pipelines “Central Asia-China” and “West-East” deliver the gas to China’s eastern provinces where demand is concentrated. By 2020 the pipeline system’s aggregate throughput capacity may reach 100 bcm, which corresponds to the aggregate export capacity of Turkmenistan, Kazakhstan and Uzbekistan.

The Chinese are also actively building regasification LNG facilities that will be capable of receiving over 60 mmpta of LNG by 2020. Today up to 80% of supplies are coming from Australia, Qatar, Indonesia and Malaysia. Russia’s share amounts to approximately 2% under spot sales of Sakhalin gas.

Negotiations for deliveries of pipeline gas from Russia have been taking place for a long time. Dialogue is complicated by the fact that the two sides have different views both on the price of fuel and on the direction of supply. Two principal alternatives are the Altay project, with a capacity of 30 bcm, going to China’s Western provinces, where Russian gas will compete with deliveries from Central Asia, and a branch of the “Power of Siberia” pipeline with throughput capacity of 38 bcm in the far East, where Russian gas will mainly compete with LNG.



COMPETITIVE PRICE OF RUSSIAN GAS IN CHINA

Russia may secure a large share on the Asia Pacific gas markets, especially in China.

Domestic gas prices in China are regulated and kept low by authorities. At the same time prices of imported gas are much higher.

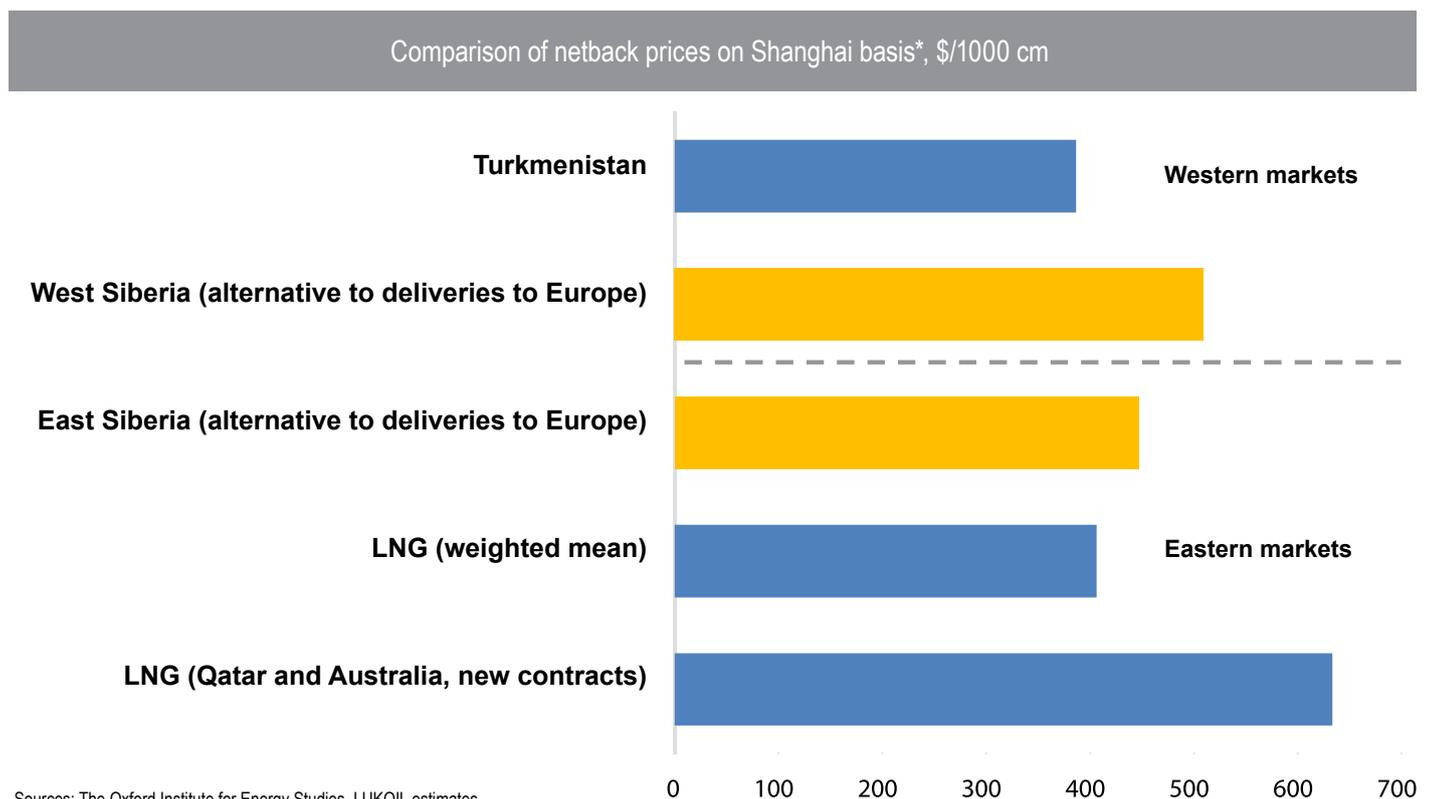
Implementation of the Altay project would mean that the main competitor of Russian gas will be the Central Asian one. In the far East Russian gas will compete against LNG from Qatar and Australia.

Using the principle of equal profitability levels with gas deliveries to Europe, Russian gas seems relatively

expensive, both via either Eastern or Western routes. However, should the gas prices in Europe go down, the situation will change.

On the whole, gas deliveries via the Eastern route seem preferable, both in terms of price competition, and in terms of infrastructure constraints that exist for the transportation of gas from China's western provinces to the East coast.

The Russian side still has some unresolved issues with the pricing. **If the current approach to pricing persists, the competitiveness of Russian gas on China's market seems doubtful.**



CHALLENGES FOR RUSSIAN OIL AND GAS INDUSTRY



RUSSIA HAS CONSIDERABLE RESOURCE POTENTIAL

Russia is one of the global oil production leaders and has the world's eighth largest proven reserves.

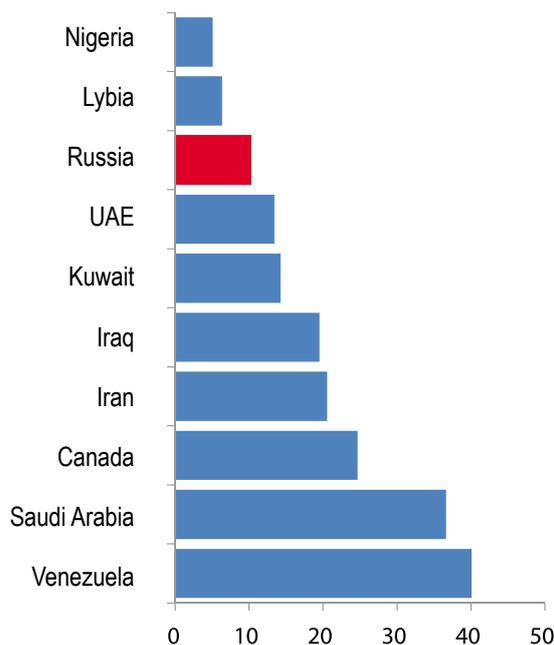
The data on the size of Russian reserves is still confidential. This is a legacy of the Soviet period. But the situation is gradually changing. Government officials are beginning to reveal reserve data in their speeches.

According to the Russian Ministry of Energy, the country's oil in place amounts to 74.3 bln t, while resources equal to 157.1 bln t. In light of technical production capabilities, Russia's recoverable reserves are valued at 22 bln t.

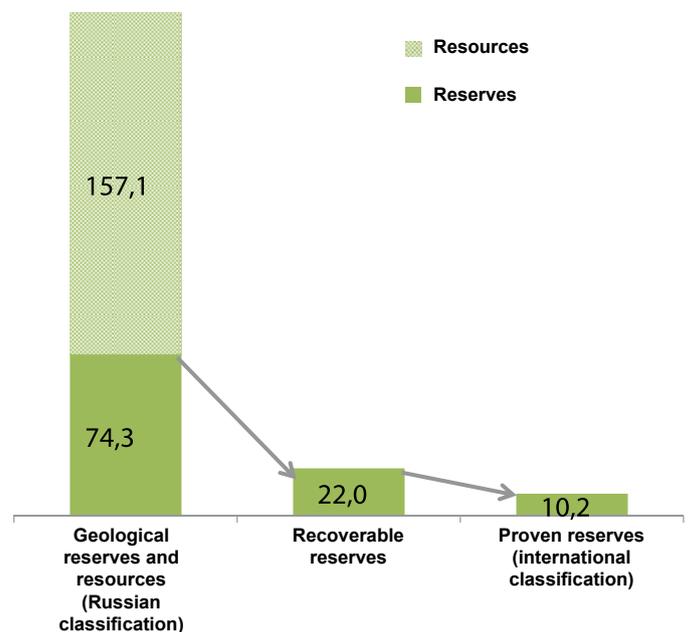
Evaluation of oil reserves using international classification is approximately twice as low as the Russian one. This happens, because the system of reserve evaluation used in Russia is primarily based on geological and technical attributes, while the economics of new fields' development are almost disregarded.

Russia has significant potential to increase its reserves according to international classification if it creates economic stimuli to develop fields that are currently unviable.

Proven oil reserves, bln t



Reserves and resources of oil in Russia, bln t



Sources: Oil & Gas Journal, Ministry of Energy of the Russian Federation

MAJOR APPROACHES TO THE EVALUATION OF HYDROCARBON RESERVES

Estimation of reserves is used to determine the quantity of hydrocarbons that can be extracted from subsoils, taking into account current technological, economic and other restrictions. In addition to reserves, such estimations also earmark resources with very little available geological information.

There are many methods to calculate reserves that are based on various criteria of classification. Below are brief descriptions of several of these methods.

RUSSIAN SYSTEM OF RESERVE CLASSIFICATION

Russia currently uses a temporary system of reserve classification that was introduced in 2001. This system inherited approaches that were proposed back in Soviet times and the primary classification criteria that it uses takes into account geological and technical features of reserves. At the same time this method pays almost no attention to the economics of developing the fields.

According to the Russian system of classification, reserves are divided into categories according to available information:

- A, B, C1 – proven reserves
- C2 – preliminary estimated reserves
- C3 – potential reserves
- D1, D2 – forecasted resources

categories A, B, C1, C2 are considered reserves, while C3, D1, D2 – resources.

SPE-PRMS

The most widely used PRMS classification of reserves was developed by the Society of Petroleum Engineers (SPE).

According to this classification, reserves are divided into three principal categories:

- Proven - probability of extraction no less than 90%
- Probable - probability of extraction no less than 50%
- Possible - probability of extraction no less than 10%

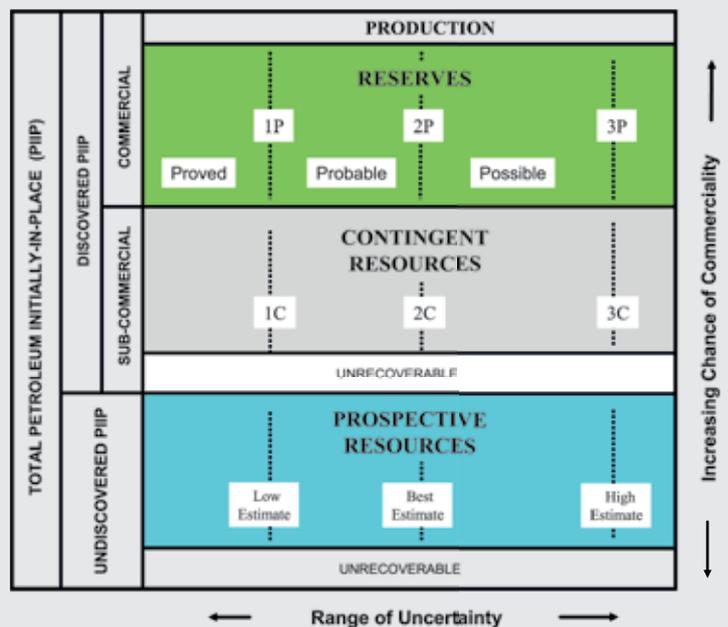
Proven reserves in turn subdivide into the following categories:

- Proven, developed, producing (PDP) - reserves that are currently being extracted from active wells
- Proven, developed, non-producing (PDNP) - reserves that can be extracted with negligible capital expenditures
- Proven undeveloped reserves (PUD) - reserves that demand capital expenditures, e.g. for drilling wells, to start production.

The classification of resources utilizes such criteria as achievement of commercial significance and probability of geological confirmation of reserves.

SEC REQUIREMENTS

SEC standards were suggested by the US Securities Exchange Commission for the companies that have a stock exchange listing. These standards have their own particular characteristics: the standards take into consideration only proven reserves and take into account the duration of licenses for field exploitation and the plans for their development.



TREND TOWARDS OIL PRODUCTION GROWTH RESUMED AFTER 2008 CRISIS

Oil production in Russia was steadily and dynamically growing throughout 2000s thanks to the intensification of production at existing fields and implementation of technologies to enhance oil recovery rate. The hydraulic fracturing technology was particularly popular, and companies implemented other new technologies and equipment.

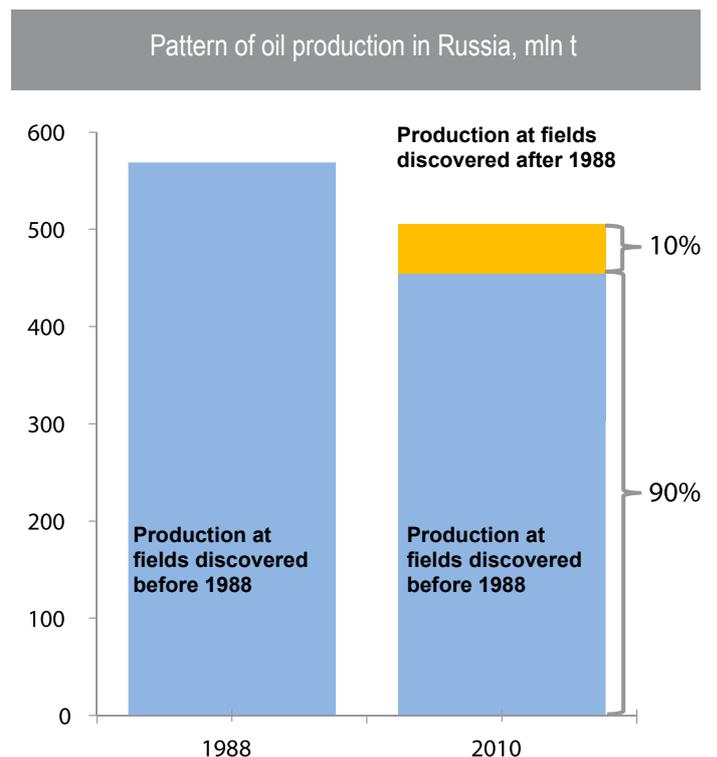
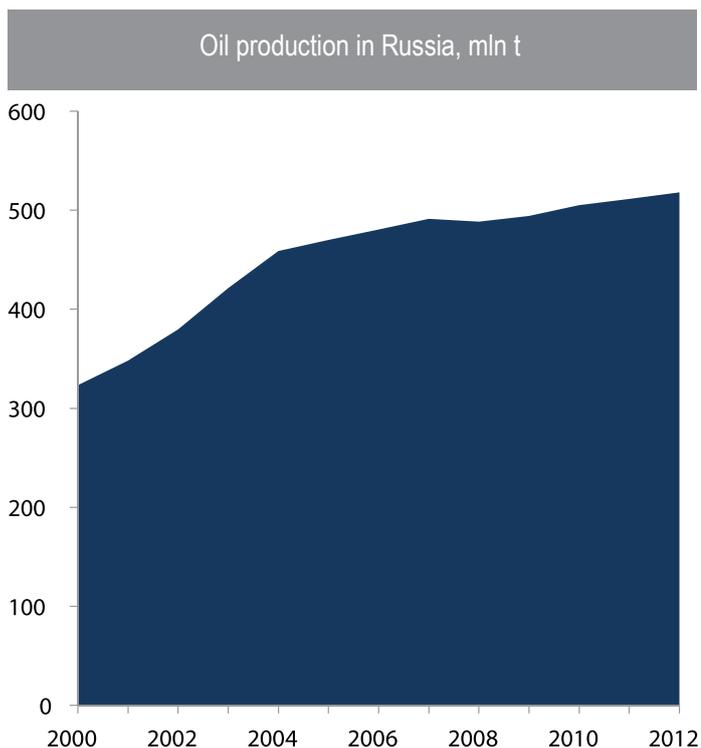
Over the period of 2000-2010 production grew more than 1.5 times, exceeding 500 mln t a year.

During the crisis of 2008-2009 there was a trend towards production decline, but timely tax cuts by the government helped to stabilize production and even promote its growth.

The greater part of Russian oil production is based on discoveries that were made in the time of the Soviet Union. **90% of oil production in Russia is done at oil fields that were discovered before 1988**, and only remaining 10% is extracted from the fields that were discovered in the 1990s and 2000s.

Such a situation has resulted from the fact that newly discovered fields are mainly located in faraway regions with difficult climates or lack of infrastructure. Their development requires considerable investment.

Future production dynamics will depend on the companies' ability to speedily commission new fields and the rates of implementation of modern technologies necessary to maintain production at existing fields.



HIGH DECLINE RATES – A CHALLENGE FOR THE RUSSIAN OIL INDUSTRY

A distinguishing feature of the majority of Russian oil fields is the natural decline rate in production due to depletion of reserves. The greater part of production takes place at the fields of West Siberia, where first large discoveries were made in 1960s.

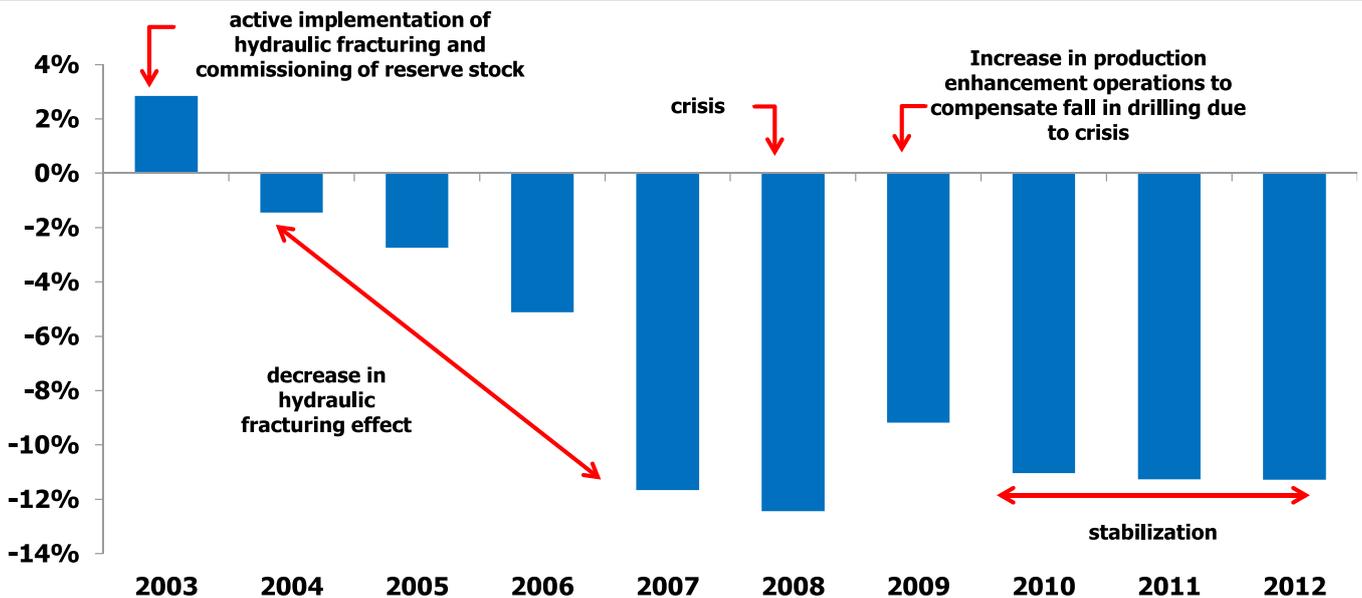
In the 2000s the rates of production decline in current declining well stock increased considerably, reaching the annual level of 11%.

An increase in the number of production enhancement operations, which began in 2009, helped to stabilize decline rates, but they remain high and present a real challenge for the Russian oil industry.

Positive production dynamics that we have been observing since 2010 are primarily a result of commissioning of new large fields. The greatest increase in production was registered in East Siberia, where oil companies began production at such fields as Vankor, Talakan and Verkhechonsk.

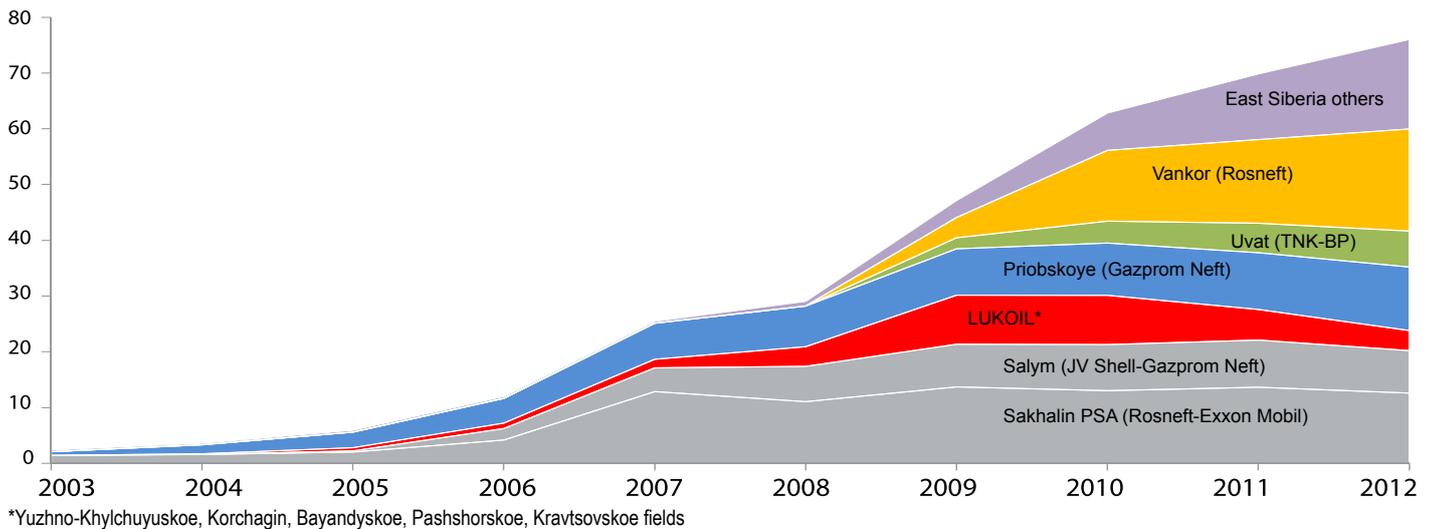
To overcome the production decline rate, Russia has to annually commission 3-4 oil fields comparable with Vankor.

Production decline rates at current declining well stock in Russia, %



Sources: Central Control Administration of the Fuel and Energy Complex, LUKOIL estimates

Production of oil at fields commissioned in 2003-2012, mln t



At the end of 2012 the government issued licenses for the development of the last remaining large lots on the books of the Federal Agency for Subsoil Use (Rosnedra). The fields are Lodochnoye in Krasnoyarsk region and Shpielman and Imilor in Khanty-Mansy region. Therefore, in the mid-term the opportunities for commissioning of new large fields will be limited.

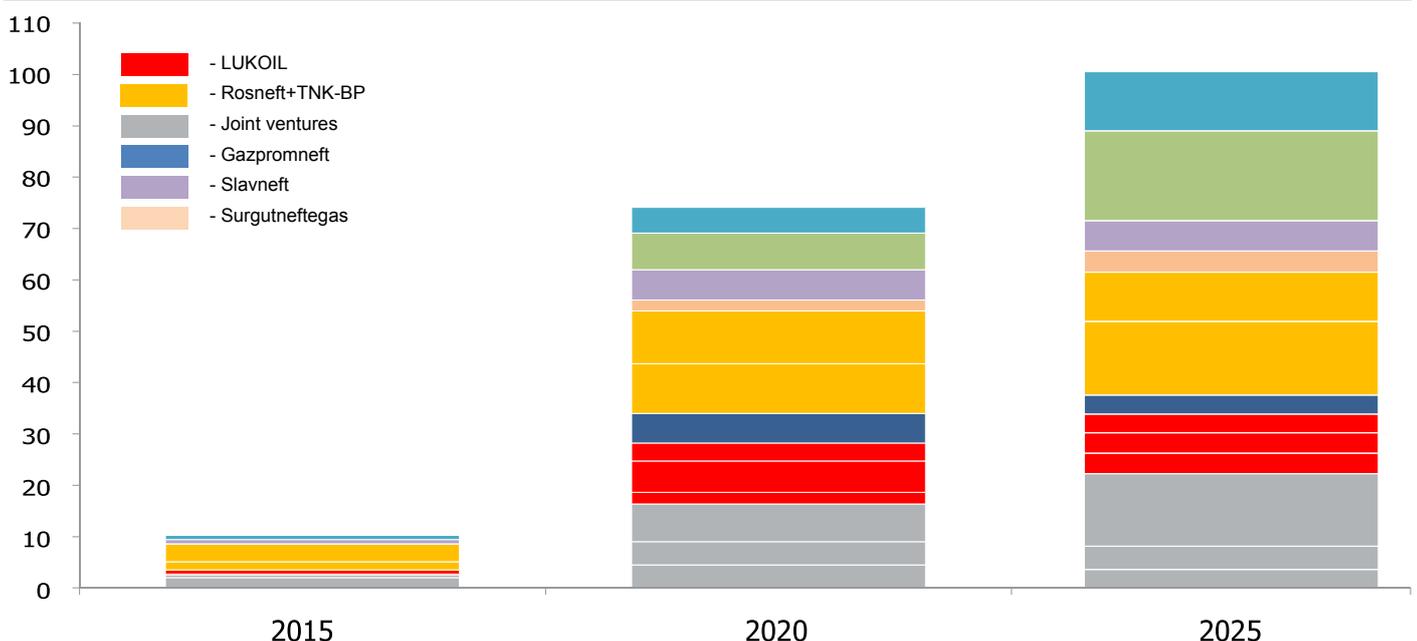
According to the oil companies' plans, by 2020 they will put in operation such fields as Yurubcheno-Tokhomskoye, Russkoye, Vostochno-Messoyakhskoye, Novoportovskoye, Kuyumbinskoye and Imilorskoye.

As a result, by 2025, the increase in annual production from commissioning of new large fields will amount to 100 mln t.

The majority of new fields will be commissioned after 2015, and until then maintaining production at stable levels will remain a very difficult task.

Forecasted production volumes for the new projects are unlikely to compensate the natural decline rate at old fields.

Forecast of oil production at large fields, mln t



Sources: Central Control Administration of the Fuel and Energy Complex, LUKOIL estimates

OIL PRODUCTION FORECASTS

Under current conditions, oil production in Russia can be maintained through development of the following areas:

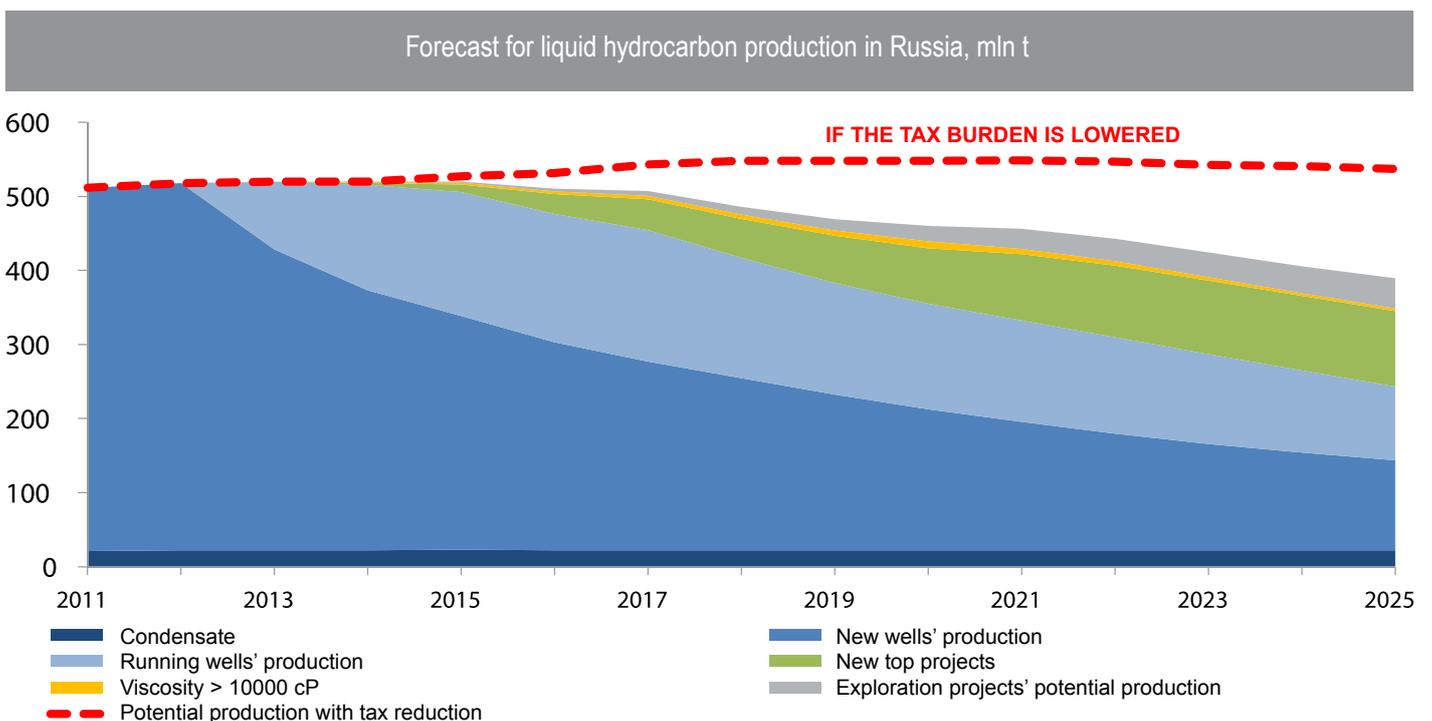
- enhanced oil recovery at existing fields
- development of unconventional reserves
- development of Arctic shelf reserves

But to develop these areas, the government has to create favorable conditions. Tertiary stimulation methods have high costs and their use under the current tax regime is economically inefficient. The same can be said for the development of the so-called unconventional oil reserves, whose extraction requires use of expensive technologies.

The government's measures to lower export duties and provide companies with targeted incentives that were taken in 2010-2011, have proven their efficiency - production has stabilized and there has even been some growth.

The government lowered the export duty, gave tax breaks on the mineral resources extraction tax, introduced preferential rates of export duty for the oil fields of East Siberia and North Caspian shelf. The authorities also introduced 10-10-10 concession system to stimulate production of super viscous oil.

Nonetheless, in order to maintain stable production in the long term the government needs to take additional steps to reform the tax regime for the oil industry. Otherwise decline in production is likely to begin as early as 2016-2017.



Sources: Central Control Administration of the Fuel and Energy Complex, LUKOIL estimates

ENHANCING OIL RECOVERY AT EXISTING FIELDS

One of the important steps towards maintaining future levels of production is to increase the oil recovery factor (ORF) at existing fields by using methods of enhanced oil recovery. Today Russia seriously lags behind such countries as the US and Norway in terms of oil recovery factor.

Increasing the oil recovery factor on Russian fields to 43% will help to engage an additional 4 bln t of reserves in development.

One of the advantages of using methods of enhanced oil recovery at old fields is the opportunity to use the existing infrastructure, thus foregoing additional capital expenditures.

At the same time, the majority of tertiary recovery methods have higher costs in comparison with traditional methods of extraction, and this prevents their mass implementation by Russian companies.

Basically, their use often turns out to be economically inefficient. Therefore, in order to stimulate the use of enhanced oil recovery methods, the government has to adjust the existing tax regime.

Classification of tertiary methods

Thermal methods

- Thermal steam reservoir stimulation
- Fire flooding
- Hot water/steam displacement
- Cyclic steam soaking

Gas methods

- Hydrocarbon gas injection
- Carbon dioxide injection
- Nitrogen injection
- Furnace gas injection
- Water-alternated-gas injection

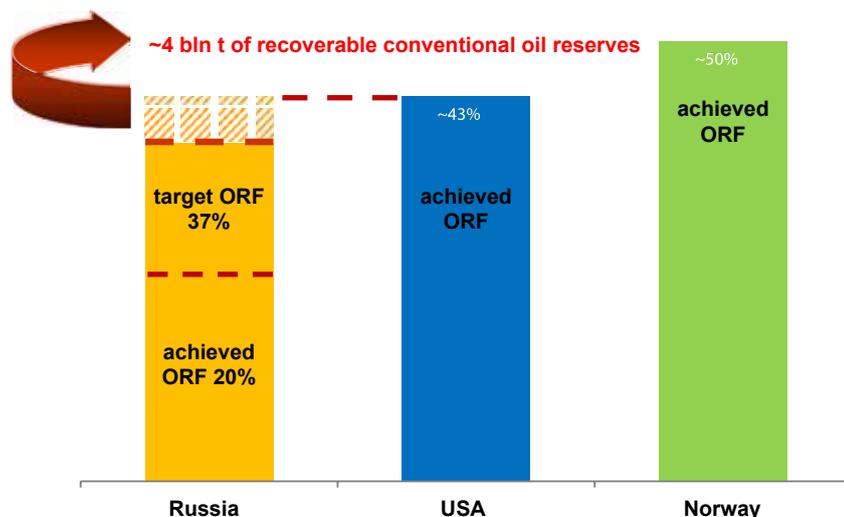
Physical and chemical methods

- Solvent flooding
- Polymer solvent flooding
- Foam oil displacement
- Alkaline oil displacement
- Acids oil displacement
- Change of filtration flows technologies

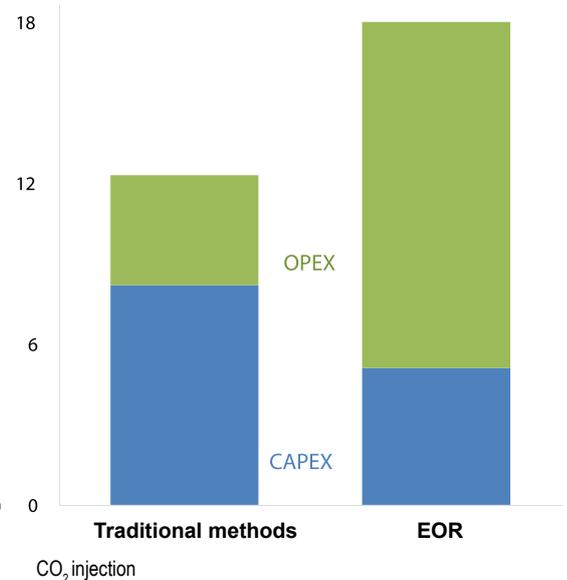
Microbiological and other methods

Source: "Drilling and Oil" magazine, February 2011

Potential for increasing ORF



Comparison of expenditures in traditional production and using EOR, \$/bbl



Sources: company materials, LUKOIL estimates, JSC "VNIIneft"

DEVELOPMENT OF UNCONVENTIONAL RESERVES

Russia has high resource potential for the development of unconventional oil. The Bazhenov rock formation in East Siberia has similar geological characteristics to the Bakken formation. The variance of appraisals of recoverable reserves is also comparable to Bakken.

According to existing estimates, American companies invested more than \$100 bln into the development of unconventional reserves. The development of unconventional oil reserves in Russia may require comparable expenditure.

Today the Bazhenov formation produces about 1 mln t of oil a year, while the oil recovery factor amounts to 2-3%. Implementation of existing technologies can increase the oil recovery factor to 35- 40%. According to Rosnedra, by 2025, oil production at Bazhenov may amount to 52 mln t a year.

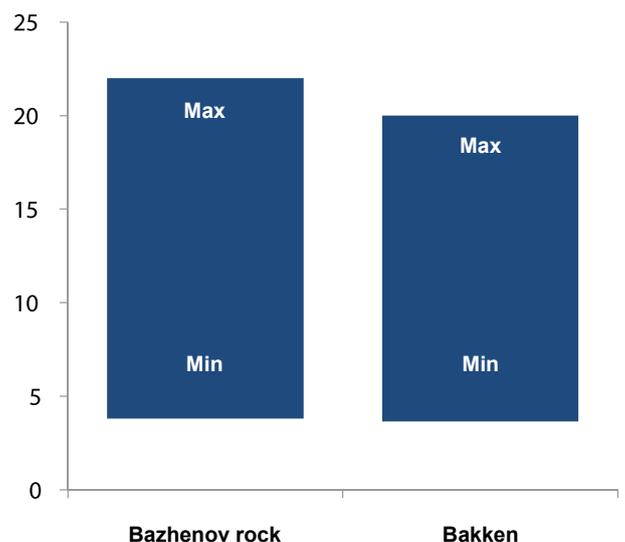
The dynamics of unconventional oil production in Russia will depend on the state's ability to create effective stimuli for the implementation of innovative technologies in oil production.

Successful development of unconventional hydrocarbons in the US is a result of several simultaneous factors such as a favorable tax regime, state backing of research programs, existence of a drilling rig fleet and qualified personnel.

Comparison of Bazhenov rock and Bakken formation

Index	Bazhenov rock	Bakken formation
Area, mln km ²	2,3	0,52
Formation thickness, m	10-30	3-45
Porosity, %	3-8	3-12
Average occurrence depth, m	2 700-3 100	2 100-3 300

Recoverable oil reserves, bln bbl



Sources: Sberbank Investment Research, Oil & Gas Journal, CERA, LUKOIL estimates

DEVELOPMENT OF ARCTIC RESOURCES

Development of the Arctic shelf may become a significant source for long term production growth.

Very little is actually known about the Arctic shelf at the moment. Exploratory drilling has only been done on the shelf of the Barents and Kara Seas.

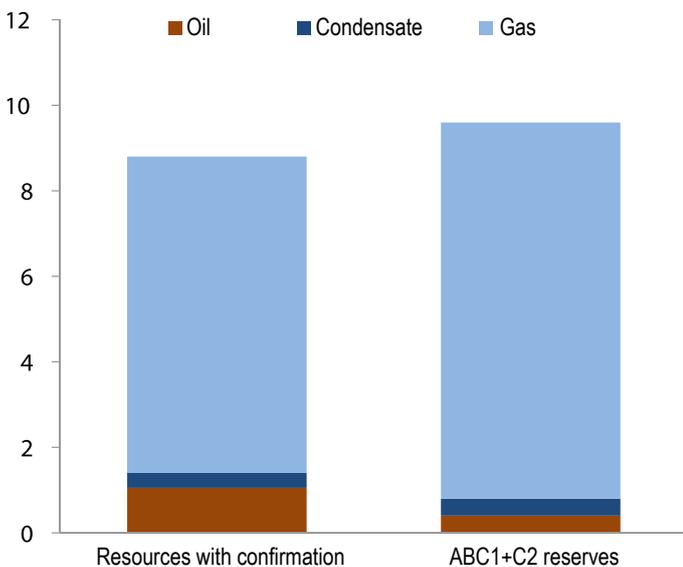
Today the aggregate hydrocarbon resources of Russia's Arctic shelf are estimated at 76.3 bln toe, while recoverable reserves are valued at 9.6 bln toe. The greater part of positive reserves is made up of natural gas.

Severe Arctic conditions - the difficult ice situation, low temperatures and lack of infrastructure - demand the exercise of unique expertise and technologies.

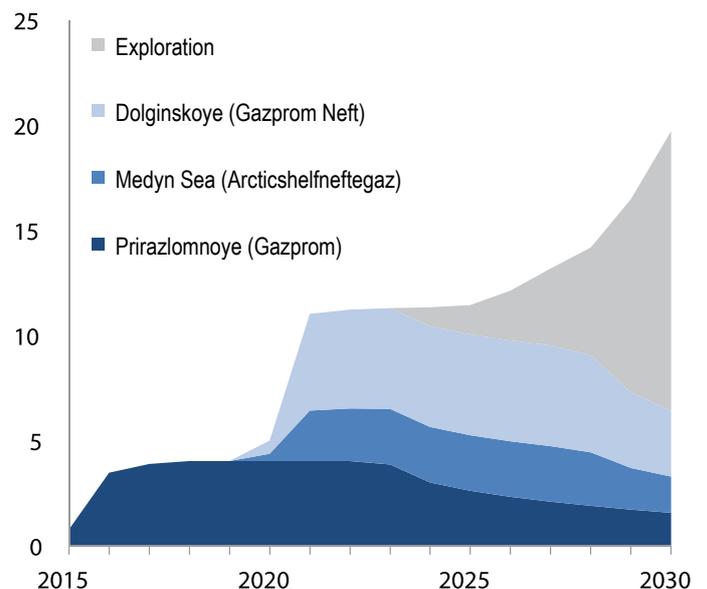
Existing legislation restricts the private companies' ability to develop of shelf fields. Removing this restriction could stimulate geological exploration in the region, promote the distribution of new technologies and allocate the risks among a large group of participants.

If the current restrictions on private companies' access to Arctic shelf are not lifted, by 2025 production at the Arctic shelf will amount to 12 mln t a year.

Resource potential of Russia's Arctic shelf, bln toe*



Arctic production volumes forecast, mln t



*1 ton of oil equivalent = 1 ton of oil = 1,000 m3 of natural gas

Sources: Ministry of Natural Resources of the Russian Federation, LUKOIL estimates

EXCESS PROFIT TAX

PREREQUISITES FOR EXCESS PROFIT TAX

The existing system of oil production taxation in Russia is based primarily on such fiscal instruments as mineral extraction the tax and export duties. The greater part of the tax burden falls on the oil production companies and the taxes are levied on these companies' sales of oil. Such a system fails to take into account individual features of oil production projects (geology, geographical location, expenditure on development) and limits implementation of new technologies. The concept of the excess profit tax envisions using the financial results of the company's activities as the principal subject of taxation. This will create new economic stimuli for implementation of oil production projects.

MAIN PRINCIPLES OF EXCESS PROFIT TAX

The first excess profit tax concept was submitted to the State Duma back in 1997, but the relevant law was never approved and no methodology for calculation of excess profit tax was confirmed. According to new open-source information, a method for the calculation of excess profit tax may be developed by the end of 2013.

The following principles of the excess profit tax can be stipulated today:

- 1) Tax base - the project's financial result. It's expected that the tax base for excess profit tax calculation will be the project's operational profit minus capital expenditures.
- 2) Redistribution of tax burden. If the excess profit tax is implemented, tax burden on revenues will fall.
- 3) Separate accounting. For the goals of calculating excess profit tax, accounting has to be done separately for each licensing plot.

If the excess profit tax is levied, the level of tax burden will depend on the stage of the oil/gas field's development. During initial development stages, when capital expenditures are the highest, the tax burden will be considerably lower than under the current tax regime. As production grows, the tax burden will increase. The tax burden will fall once again during later stages of field development, allowing the subsoil users to actively use the methods for increasing the oil recovery factor.

PROSPECTS FOR INTRODUCTION OF EXCESS PROFIT TAX

In order to introduce the excess profit tax the state has to resolve a number issues, in particular the creation, implementation and management of a clear and transparent system of separate accounting for each project. There are currently plans for the introduction of an excess profit tax in trial mode.

LUKOIL and Surgutneftegas proposed an initiative to implement the pilot excess profit tax project at Shpilman and Imilor fields. A decision on this request is expected in 2014.

CURRENT STATE OF RUSSIA'S OIL REFINING INDUSTRY

The modern-day shape of the Russian oil refining industry was formed in the Soviet times. The existence of large oil reserves, the necessity of using considerable amounts of fuel oil for heating and the Soviet Army's demand for diesel fuel determined the configuration of Russian oil refineries. As a result, the Russian oil refineries produce an excessive amount of residual oil and diesel fuel, while gasoline production is barely enough to cover national consumption.

The average conversion rate of Russian oil refineries is much smaller than the similar rate of their European and American counterparts because the methods of residue conversion are used very insufficiently. This being said, the tax system that was in place until recently created the wrong stimuli for oil refineries and prevented an inflow of investments.

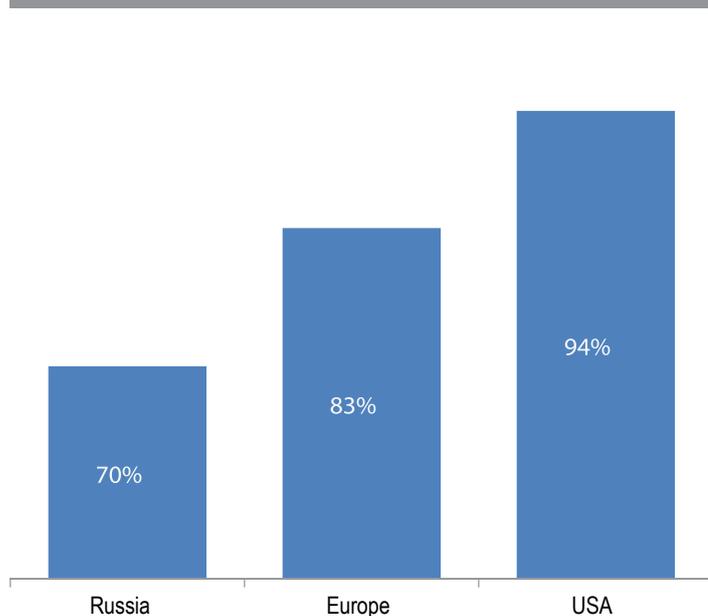
However, situation is gradually changing. In 2011 the Russian government took a number of steps to stimulate investments into the modernization of oil refineries.

First of all, it changed the tax regime for the oil refining industry, introducing the 60-66-90-100 policy. This system envisions significant growth of export duties on heavy petroleum products - starting in 2015 export duty on these products will be equal to the export duty on oil, creating stimuli for investment in the construction of conversion capacities.

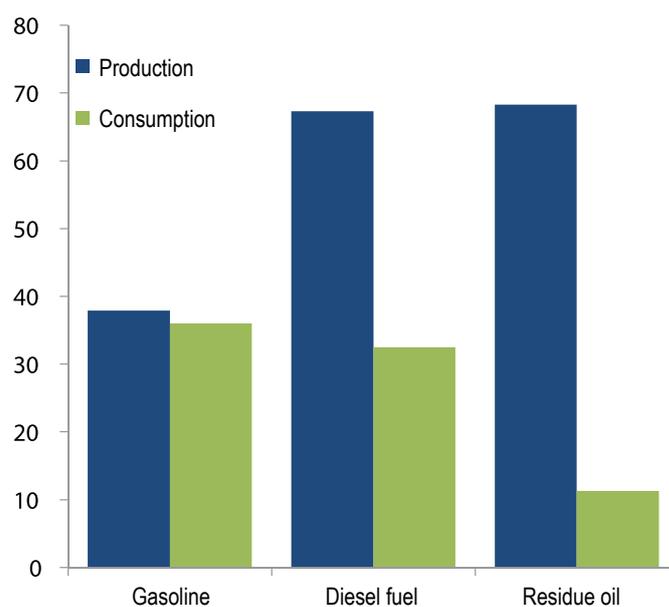
That same year the federal Anti-Monopoly service, Rostekhnadzor, Rosstandart and the Russian oil companies signed a four-way agreement documenting the companies' plans to modernize their refineries.

Thanks to these measures we expect that in the coming decade the Russian oil refining industry will undergo large-scale modernization.

Average conversion rate in 2012, %



Production and consumption of oil products in Russia in 2012, mln t/yr



GASOLINE MARKET TRENDS

Demand for gasoline in Russia will continue to grow along with growth in the number of cars. The average annual increase will amount to 1.5-2 mln cars, while consumption of gasoline will amount to 43-47 mln t a year by 2025.

As the car fleet is undergoing modernization, there will be structural changes in gasoline demand towards a growing share of high-quality Euro-5 gasoline. This will present a serious challenge to the gasoline producers.

Until 2016, when several large FCC units will be commissioned, the situation with the Russian gasoline market will remain very tense. At the same time there is a risk that not all of the companies will fulfill their obligations under the four-way agreement in time. As a result, problems with gasoline supply may extend for a longer period of time.

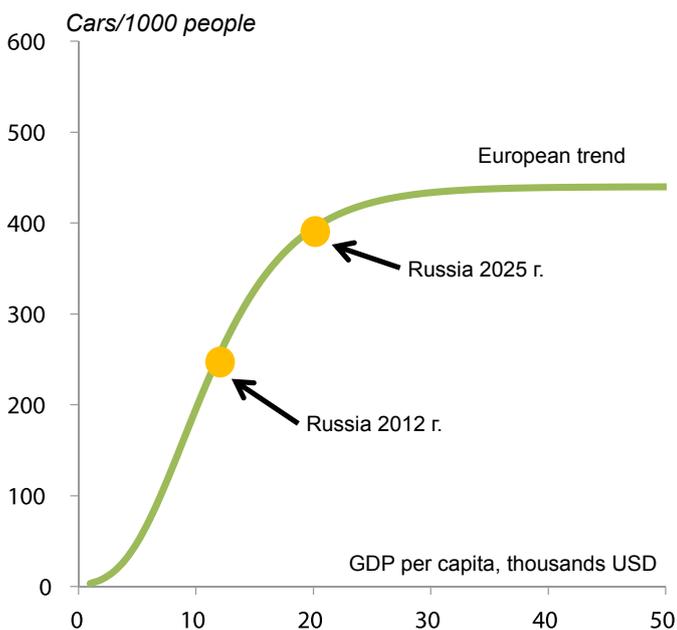
The government has taken a number of measures to increase fuel quality. In particular it has implemented a set of technical rules that specify that fuels below Euro-5 will be banned starting from 2016.

Chart: engine fuel technical requirements:

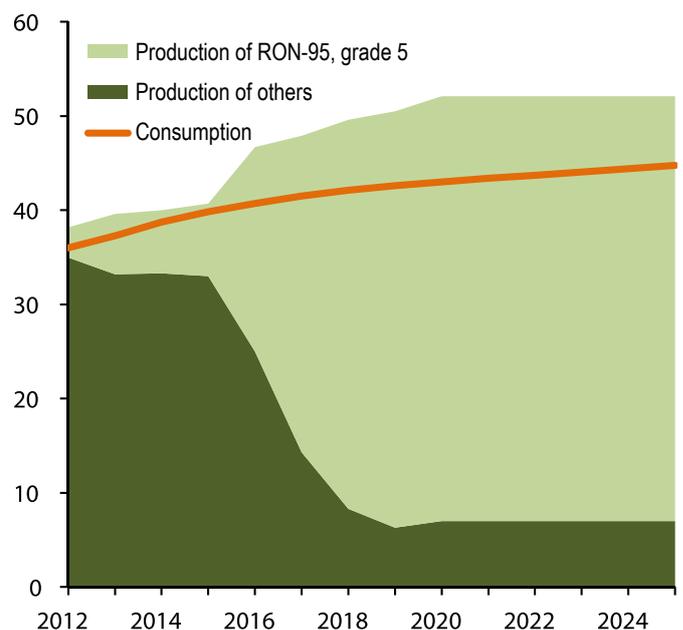
	2013	2014	2015	2016
CLASS 3				
CLASS 4				
CLASS 5				

Moreover, the government has introduced differentiated excise rates, actively stimulating producers to make a switch to production of Euro-5 gasoline. In this respect the Government's initiative to increase excise tax on Euro-4 and 5 gasoline to the level of excise on Euro-3 gasoline seems inconsistent. Increasing excise tax will lower the quality of gasoline and increase domestic prices.

Motorization in Russia forecast



Forecast for production and consumption of gasoline, mln t/yr



Sources: Petromarket, LUKOIL estimates

THE END OF THE FUEL OIL ERA

Today, production of fuel oil amounts to about 28% of Russian oil refineries' total output or 68 mln t a year. Over the next 10-15 years we expect considerable changes in the yield structure of oil refineries. Fuel oil will gradually leave the market. The execution of oil refinery modernization plans, announced by the companies, will reduce fuel oil production volumes by three times, simultaneously increasing production of light fractions.

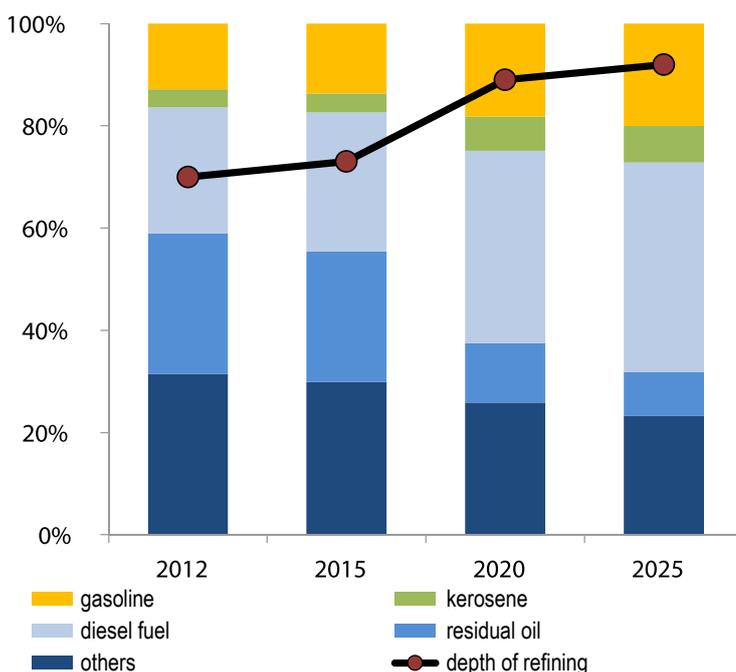
As production of commercial fuel oil declines, the conversion rate will increase by 2025 to 92%, exceeding the average European ratio.

Cuts in fuel oil production will primarily influence the European market where this product is actively used for further refining and as bunker fuel.

Since fuel oil is an export product, its price on the domestic market is heavily dependent on the changes in export duty. When in 2015 export tax for heavy petroleum products will equal the export tax for oil, domestic residue oil prices will fall significantly.

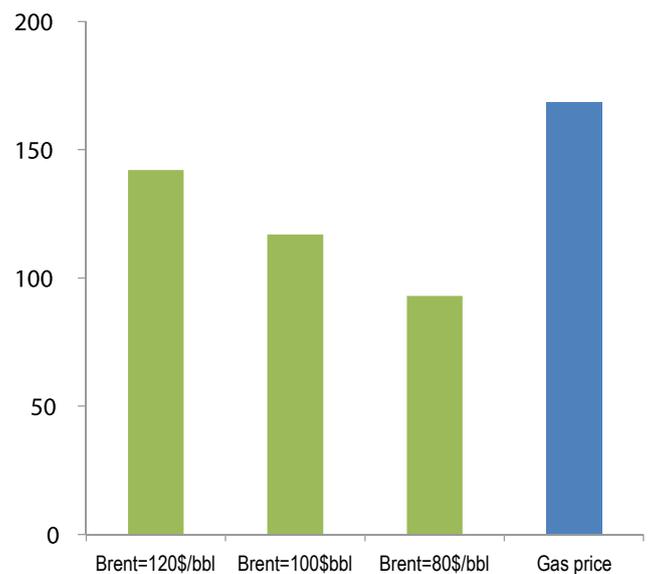
Gas prices are forecasted to rise, since in 2015 the Russian market will have all the conditions for interfuel competition between natural gas and fuel oil in heat and power generation.

Structure of oil product output in Russia and conversion rate, %



Sources: Petromarket, LUKOIL estimates

Comparison of forecast prices for natural gas and fuel oil in 2015, \$/t



* based on example of Nizhny Novgorod Region, gas price is compared with residual oil price in terms of calorific capacity

RUSSIAN GAS INDUSTRY POTENTIAL

Russia has the world's largest proven gas reserves. The majority of reserves (over 60%) are located in West Siberia. The geological and engineering conditions of this region are well-studied and the country has remaining gas reserves for almost a century.

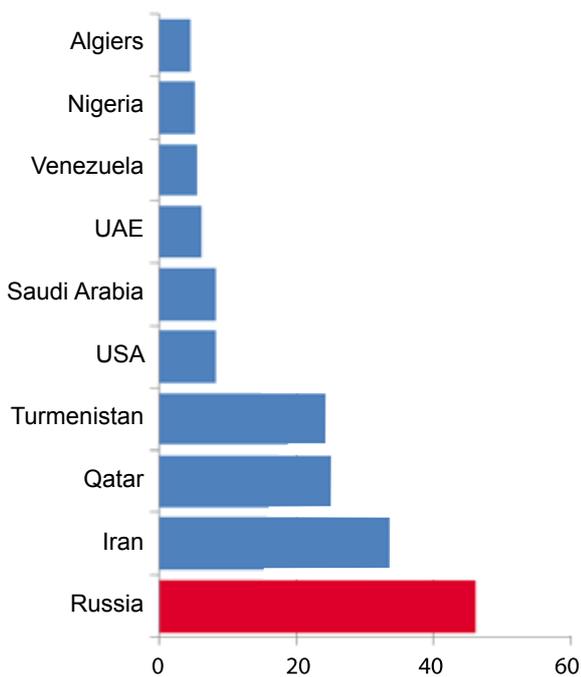
Presently the companies are gradually beginning to develop reserves located in East Siberia and on the continental shelf.

The resource potential for the production of natural gas is reliable and sufficient for guaranteeing both the domestic and export demand. There are also no doubts about the future ability to satisfy demand.

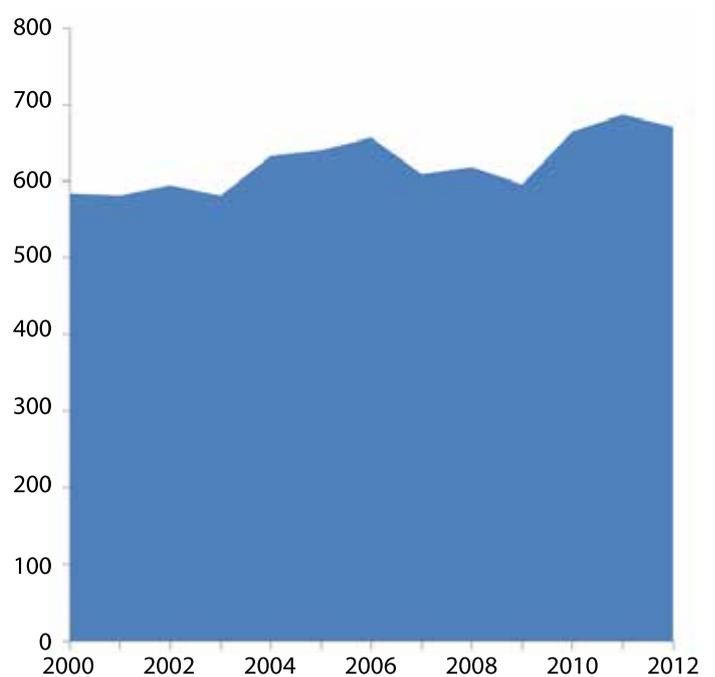
Natural gas amounts to about half of all the primary energy resources consumed in Russia. Gas plays an especially important role in power generation, which accounts for approximately 40% of all gas consumed in the country. The population consumes about 1/5 of the gas, another third is consumed by the industry, where the largest users are metallurgy and fertilizer production.

The level of gas consumption in Russia has stabilized, and in the medium term may demonstrate minimal growth. This is in many ways a result of growth in energy efficiency and slow rates of industrial growth.

Proven gas reserves, tcm



Natural and associated gas production in Russia, bcm



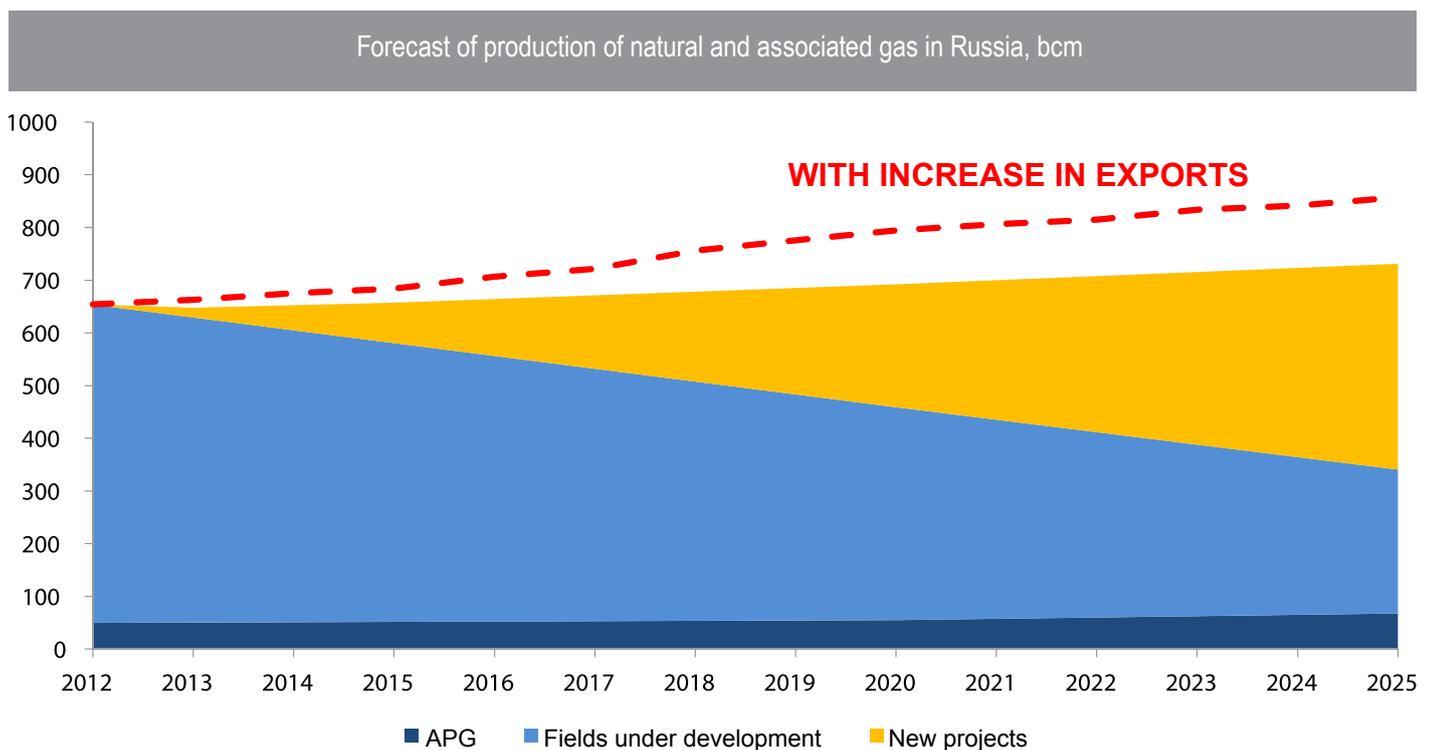
Sources: Oil & Gas Journal, OPEC, Ministry of Energy of the Russian Federation, Central Control Administration of the Fuel and Energy Complex

Gazprom, which operates the unified gas transmission system, remains the major player in Russia's gas industry. But over the last few years more flexible, independent gas producers have almost tripled their share of the Russian market, reaching 30%, and today the monopoly market is being transformed into oligopoly.

Today the Russian legislation specifies that Gazprom has an exclusive right on gas exports from Russia. The authorities and producers are actively discussing the possibility of the gradual abolishment of Gazprom's export monopoly, starting with LNG export projects. One of the conditions for the abolishment of the monopoly is the weak gas-on-gas competition among Russian gas suppliers on the global markets.

Increasing gas production in Russia is possible if the export deliveries grow, and their volume depends on external demand. In the view of the expectations that one of the world's key markets - the United States - will become self-sufficient, while the volumes of global gas supply may increase several-fold, the Asia Pacific region seems like a promising market for sales of Russian gas.

The question of how effective the monopoly structure of the Russian gas industry is in the face of global challenges demands additional analysis.



Sources: Central Control Administration of the Fuel and Energy Complex, LUKOIL estimates



Nowadays it is obvious that the implementation of new technologies has made the development of a wide range of unconventional resources possible. This has changed the balance in the oil and gas industry and inaugurated a transition to the era of the high-tech energy industry. A good example of technological breakthrough is the shale gas revolution in the US, where production of unconventional hydrocarbons has grown significantly over the last few years.

Nonetheless, we are quite conservative in our estimates of the future growth of the shale oil production due to existing uncertainty in estimations of actual reserves in shale formations.

Such long term trends as global population growth, urbanization and motorization in Asia, will promote growing oil consumption. The growing demand will be primarily satisfied from costly unconventional sources of supply, while biofuel will have less stimuli for development. Therefore we see no basis for medium term decline in oil prices below \$100/bbl. OPEC policies and dollar depreciation will also support high oil prices.

Oil production growth in North America had a large influence on the global oil refining industry. The US cut gasoline imports and became a net exporter of oil products, negatively affecting the European oil refineries. The Middle East and Asian countries plan to commission new highly efficient refining facilities and this will lead to a redistribution of international oil product flows, toughening competition on the European market. As a result, the European oil refining industry's systemic crisis is unlikely to be overcome in the next few years.

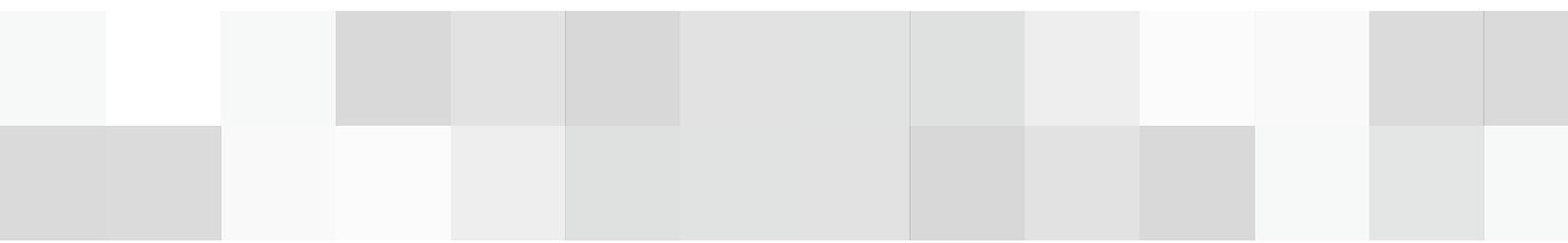
Global gas consumption will grow the fastest among all fossil fuels. Growing demand will be satisfied from a variety of sources of supply, both conventional and unconventional gas. As the LNG market and spot trading develop, the gas market will become more global and competitive. With existing pricing mechanisms Russia will face further improvement in competition on the European market. In this situation the markets of the Asia Pacific look like the most promising direction for Russian gas exports.

Despite the favorable pricing environment, there is a risk that oil production in Russia will begin to decline in 2016-2017, as long as current projects under development are unable to offset decline in production the fields which are currently producing. Stable production is possible only if the oil companies intensively employ EOR and develop unconventional resources - and this requires additional tax stimuli from the government.

The government has created conditions necessary for the modernization of the Russian oil refining industry. By 2025 production of light oil products will grow considerably, while production of fuel oil will be cut by 3 times. At the same time, the situation on the gasoline market over the next few years will remain rather tense. In order to guarantee stable development of the oil refining industry and avoid a seasonal deficit of gasoline, the government has to provide market predictability and rules for "the game".

Russia has enough reserves of natural gas to satisfy its own needs and export obligations for the long term. The potential of Russian gas production will mainly depend on the access to global gas markets.





GLOBAL TRENDS IN OIL & GAS
MARKETS TO 2025
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