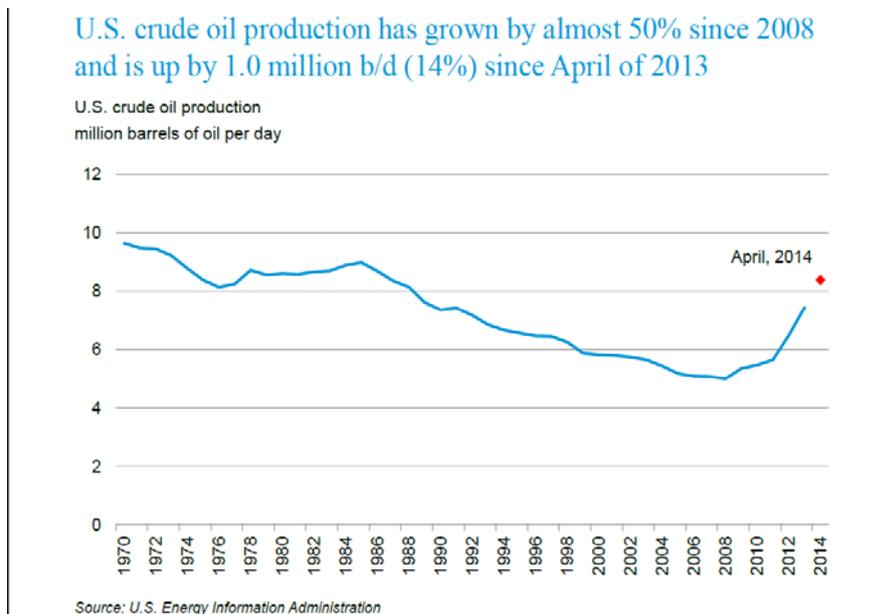


22 October 2014

Overview of points discussed

Session 1– The future of oil and gas production

The most important factor is, of course, the increase in US production.

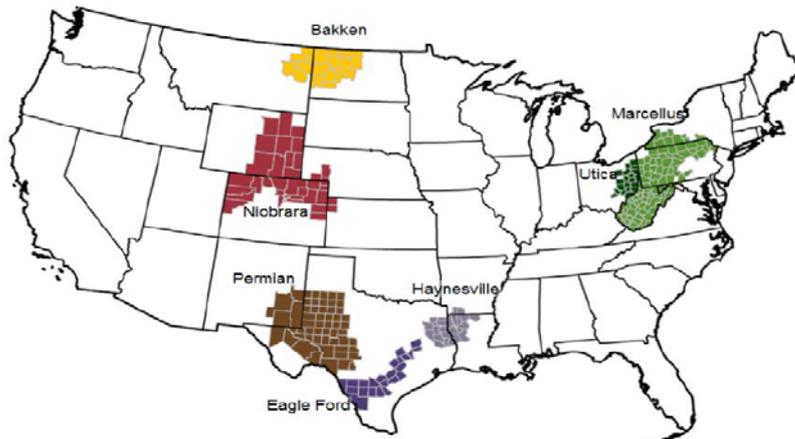


An increase in tight oil and offshore crude oil production is driving US output close to its record high. Crude oil production in the US was at its highest in 1970 when 9.6 million barrels per day (Mb/d) were produced. Production is expected to reach the same level between 2016 and 2020. The total “liquids” production – crude oil, natural gas liquids and ethanol combined – is now nearly 12 Mb/d, reducing the needs for imports from nearly 12 Mb/d in 2005 to slightly more than 6 Mb/d today.

Sweet crude oil with an API gravity of 40 or more accounted for roughly 96% of the growth in production between 2011 and 2013.

The EIA drilling Productivity Report states that seven key regions – Bakken, Niobrara, Permian, Eagle Ford, Haynesville, Utica and Marcellus – account for nearly all recent growth in oil and natural gas production

EIA Drilling Productivity Report: Seven key plays account for nearly all recent growth in oil and natural gas production



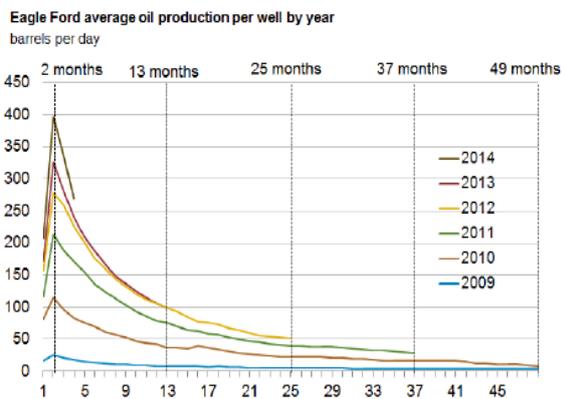
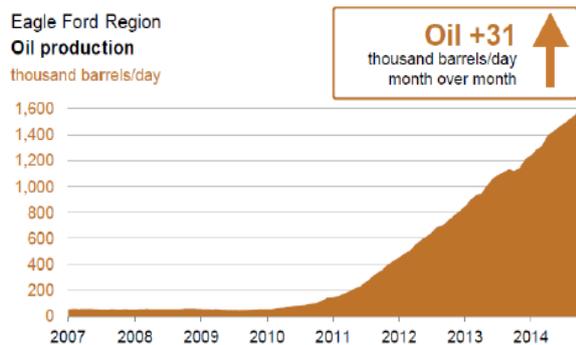
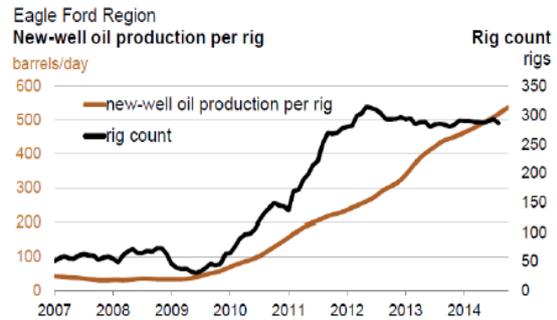
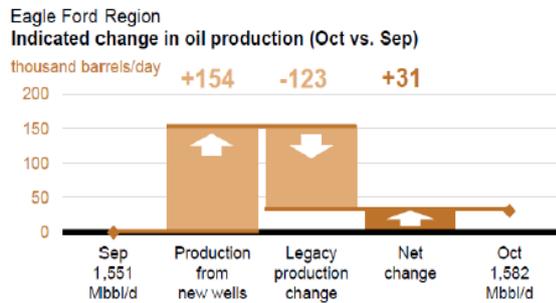
Source: EIA, Drilling Productivity Report, <http://www.eia.gov/petroleum/drilling/>

The US has experienced a rapid increase in natural gas and oil production from shale and other tight resources. US tight oil production has reached 4 Mb/d and dry shale gas production has reached 35 billion cubic feet per day (cf/d). US tight oil production has increased by nearly 50% of total US oil production. US shale gas production totaled 36.4 billion cf/d in August 2014, equating to approximately 52% of total US dry production.

While the reference case of the Energy Information Administration forecasts a maximum oil production of close to 10 Mb/d by 2016/2020. A “High resource/improved technology case” shows much stronger oil production in the US which could reach 12 Mb/d by 2020 and 13 Mb/d by 2030.

An average well in shale gas and continuous resource plays can have steep decline curves. Production is usually reduced by 50% after one year and 80/90% after two years, which require continued drilling to expand production.

Continued growth coming from Eagle Ford oil production productivity, not more activity

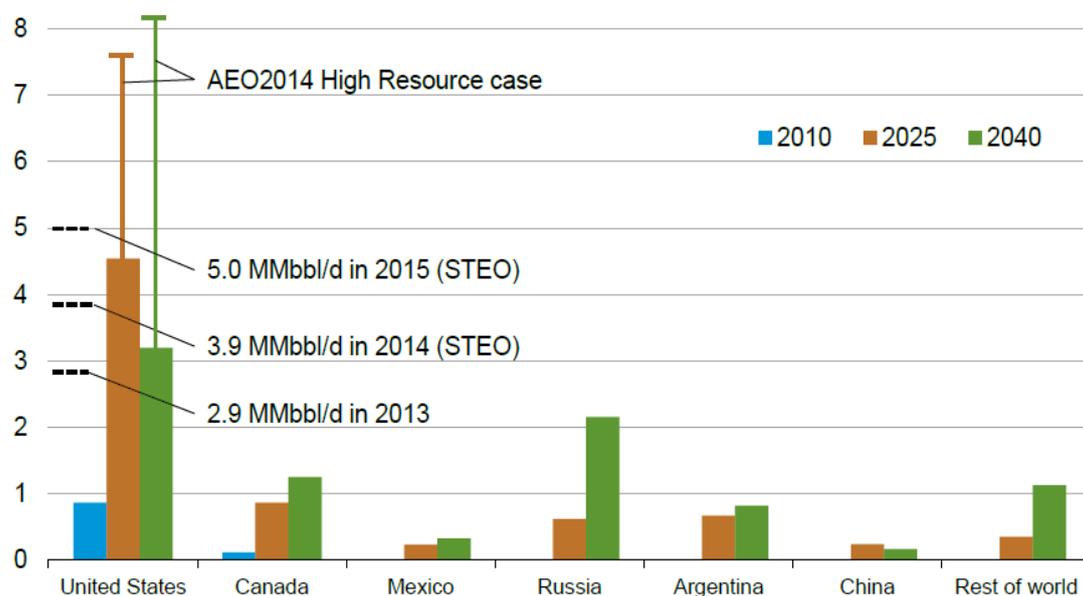


Source: EIA Drilling Productivity Report, Sept. 2014, DrillingInfo Inc.

Technological progress, however, continues to accelerate. In all major light tight oil producing regions, the production per well has increased. In Eagle Ford, the total production has increased from nearly 0 in 2010 to 1,200 b/d in 2014 while the number of rigs has remained roughly the same over the last few years.

Tight oil production will spread to nations outside of the United States and Canada over the projection

tight oil production, Reference case
million barrels per day



Source: EIA, International Energy Outlook 2014

The production of shale gas, tight gas and coal bed methane will continue to increase and will allow, for instance, the production of gas to increase from 3 Tcf (2014) to 10 Tcf (2040) in China, from 5 Tcf to 8 Tcf in Canada and from 29 Tcf (2010) to 42 Tcf (2040) in the US.

While the production of tight oil is more difficult to predict, especially in the US, it could reach between 8 Mb/d and 13 Mb/d in 2014 according to EIA. A new business model is needed to accommodate for the variations in prices.

The discussion moved on to look at the situation in Bazhenov Shale.



The Bazhenov Shale covers a huge area in Russia.

Major LTO resource holders – billion barrels

Country	Areas assessed	Technical recoverable LTO resources
Russia	Bazhenov shale	76
United States	Bakken, Bone Springs, Eagle Ford, Granite Wash, Niobrara, Spraberry, Wolfcamp, Monterey and Woodford shales	58
China	Sichuan, Yangtze, Jiangnan, Greater Subei, Tarim, Junggar and Songliao basins	32
Argentina	Neuquen, San Jorge, Magallanes and Parana basins	27
Libya	Ghadames, Sirte, and Murzuq basins	26
Australia	Cooper, Maryborough, Perth, Canning, Georgina, and Beetaloo basins	18
Venezuela	Maracaibo basin	13
Mexico	Burgos, Sabinas, Tampico, Tuxpan and Veracruz basins	13
Pakistan	lower Indus basin	9
Canada	Horn River, Cordova, Liard, Deep, Alberta, Windsor basins, Duvernay, Bakken, Utica shales	9

Source: US EIA (2013a).

The Bazhenov Shale could represent 76 billion barrels of resources or close to 25% of all LTO resources in the world (close to 300 billion barrels).

The Bazhenov Shale has a very large areal extension (around 1 million km²: i.e. twice the size of France). It features shale of Upper Jurassic age (golden age of source rocks). It has been extensively surveyed since the 1960s. It is the source rock of major Russian fields – Samotlor and Salym (oil) as well as, Urengoy and Zapolarnoye (gas) – totaling over 1,000 fields. It features a complex “interbedded” lithology (mainly shale and limestone). It has two gas sources (thermogenic and biogenic), a high Total Oil Content (between 5 and 15%) and highly variable porosity and permeability.

The future of “shale gas” and “shale oil” was then discussed.

The US unconventional revolution has been largely driven by technological advances.

The example of Barnett Shale is of interest:

- 1995: horizontal drilling, hydraulic stimulation; re-fracture stimulation
- 2000: multistage fracturing, integrated perforation, advanced compression, lifting mechanisms, horizontal imaging
- 2005: micro Seismic, reservoir modeling, reservoir and completions quality, fluid chemistry, water treatment
- 2010: reservoir characterization, fracture network modeling

This recently resulted in well productivity being increased by more than 50%.

Between 2008 and 2013, the break-even price has been reduced by 40% in the Barnett Shale, 29% in the Fayetteville Shale, 24% in the Haynesville Shale and 41% in the Marcellus Shale.

Thanks to this, North American LNG has a favorable position in the global supply curve. US LNG could reach Japan for \$11/Mcf (compared to less than \$8/Mcf for Qatar, Malaysia, Indonesia, and less than \$10/Mcf for Australia but more than \$14/Mcf for Africa or Europe).

The LTO break-even price continues to go down, reaching majors' full cycle cost.

The discussion focuses on the fact that some operators' cash flow is negative. This is not due to the cost being more than the price but rather it is due to them wanting to develop their production, which requires a lot of investment. Each field is different: in the same area one field can produce 650 b/d, while another one can produce 350 b/d.

The problem of public acceptance is not an issue in some areas, because of the low population but becomes crucial in dense areas.

The price of gas is of course a key issue. If the price of gas was \$5/MMBTU instead of \$4/MMBTU there would be probably a huge increase in production. Production costs are very different from one region (and one place) to another and depend on the content of liquids (NGL associated to gas) but in one case dry gas profitable at \$2.5/MMBTU.

Session 2 – The situation in the Middle East –ISIS

The emergence of ISIS has taken most of the players by surprise. Following the rapid advance of ISIS in Iraq in June 2014, the price of oil increased to \$115/b.

However, the quantities of oil (reserves and production) controlled by ISIS remain limited to a few fields mainly in Syria. Estimated production in the hands of ISIS was estimated between 40,000 and 80,000 b/d, before the strikes of the coalition, which have probably reduced this production significantly. Part of the crude was processed in simple artisanal refineries (simple distillation columns) to produce mainly diesel oil, the product most used by ISIS for their equipment such as trucks, tanks, etc. The sale of oil –which is of course smuggled – at a price supposed to be half the current price (\$40 vs \$80 for instance) could have generated revenues of between \$1 and \$2 million per day (this can be added to the cash seized in the banks of Iraq in June, at the time of the rapid advance of ISIS with no resistance from the Iraqi Army).

The number of ISIS troops is estimated to be between 30,000 (US) and 100,000 (Russia). Most of the troops are experienced former Iraqi soldiers. Even if the US is contributing the most to the coalition, it will be increasingly difficult for the US to finance military operations. Soon close to 45% of the US budget will be dedicated to medical aid.

There is a risk of ISIS spreading into Algeria and Libya. In Libya, two parliaments and two prime ministers who are fighting. Both sides are supported by various Gulf countries.

An important question is the position of Turkey and its attitude towards Kurds. The Turkish Army is the largest army in the region and the first candidate to have troops on the ground.

As regards Saudi Arabia, the situation of the country is a difficult one. The king is old and the fight for succession will be complex. Saudi Arabia is part of the coalition against ISIS. The government has understood the risks related to the progression of ISIS, which has threatened Saudi Arabia, but there is a chance that some individuals there support ISIS. Saudi Arabia is also concerned with the situation in Yemen and the rise of the Houthis there.

As regards Iran, the discussion 5+1 between Teheran and the members of the security council continues. A meeting is scheduled for 24 November 2014. Three scenarios are possible:

- Collapse of negotiations: sanctions reinforced
- Full agreement
- Partial agreement with partial removal of sanctions

The US would like to conclude a 20-year agreement, while Iran is only prepared to conclude a 3/5-year agreement. It goes without saying that the situation in the Middle East brings the US and Iran closer together. Is this the reason for a rapid agreement?

All of these aspects (ISIS, Iran negotiation) have an impact on the price of oil. There is some debate over the oil policy in Saudi Arabia.

Is Saudi Arabia ready to once again play the role of swing producer? Apparently not. The Riyadh policy can be interpreted as follows :

- 1 - Saudi Arabia wants their market share
- 2 - Saudi Arabia wants to punish Iran and Russia
- 3 - Fear of large production in Iran and Iraq
- 4 - Fear of loss of power vis-à-vis the US. Attempt to reduce shale oil production?

The situation in 2008 is recalled. The price of oil fell from \$148/b in July to \$40/b at the end of the year. In September 2008 OPEC decided to reduce its production quotas by 10%, which saw the price go back up to \$75/80/b before increasing to \$110/b. This was probably due to the Arab Spring. However, some participants feel it would be very difficult for most of the producing countries except GCC countries to reduce production.

Session 3 – Current Issues

3.1 Oil in limbo

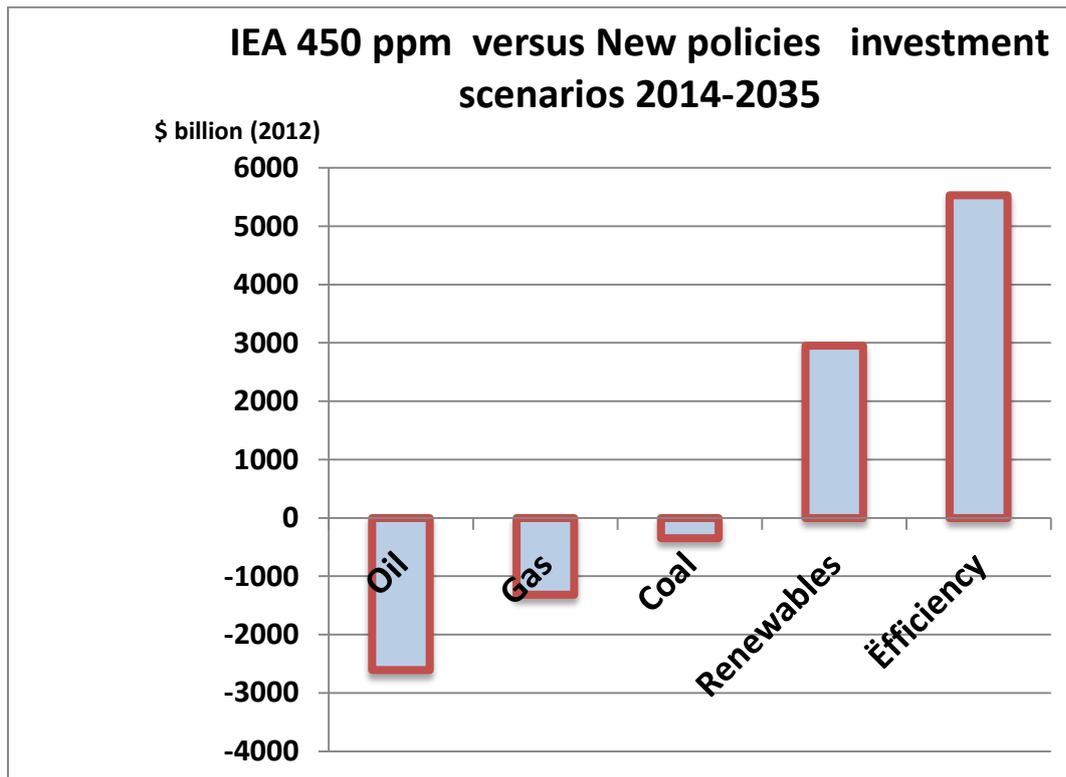
Fair amounts of oil could remain in limbo due to CO₂ emission limitations.

Taking into account the 2010 oil reserves adjusted for 2012-2013 production, as well as 122 billion barrels Canadian Tar sands and 212 Venezuelan billion barrels heavy oil for which there is a less than 50% probability of development in the time frame (in the run-up to 2035), unburned oil would total 1,072 billion barrels and produced oil in the run-up to 2035 would total 37% of reserves.

In Low-carbon, no CCS scenario there is no production from Arctic oil before 2035, as carbon budget constrains total production and Arctic oil, the highest cost, drops off the supply curve. 570 unburned is matched with 630 produced.

Models cap CO₂ emissions to meet the 450 ppm criterion through to 2100. Regional caps are imposed based on Copenhagen pledges. The models optimize between fuels and regions to minimize cost. Demand responds to the marginal cost-based price.

A major conclusion can be drawn from the model is that CCS. If it adopted as modeled, it could reduce emissions and allow for the burning of an additional billion barrels of oil (14% of production without CCS).



3.2 Russia and Ukraine

Russia is aiming to gain influence in Ukraine through a Eurasian common market, offering money and natural gas. The EU is aiming to gain influence in Ukraine, but without overtly provoking Russia, offering some money, but no natural gas, as well as EU association, but no membership. The US is aiming to remove Ukraine from Russia's sphere of influence, eventually securing a NATO presence, and isolating and encircling Russia.

Brussels and Washington have shown a great deal of incompetence, ignoring basic Russian interests. Moscow, feeling provoked, has broken international law and the 1994 agreement guaranteeing Ukraine's integrity. In Ukraine, the EU and the US have challenged Russia, so far, without success, with a likely impact on EU relations with both Russia and the US.

The Ukraine crisis is not spontaneous. It appears to be well thought out, exploiting the collapse of the Ukrainian economy and the Yanukovich government, by the West as well as Russia.

Who benefits from the crisis?

Ukraine does *not* benefit. It would be better off as an intermediary between the EU and Russia.

Russia does *not* benefit from the crisis due to sanctions and strained relations with Europe, but it has overplayed its hand.

Europe does *not* benefit from sanctions and strained relations with Russia, but the EU has no strategy for dealing with Russia.

In the US:

The military-industrial complex and anti-Russian ideologues, the neoconservatives, and may be the shale gas industry, *do* benefit from tension with Russia.

The large US oil companies do *not* benefit.

China *does* benefit from an enhanced bargaining position with Russia, whose gas export preferences shift away from the EU.

Ukraine

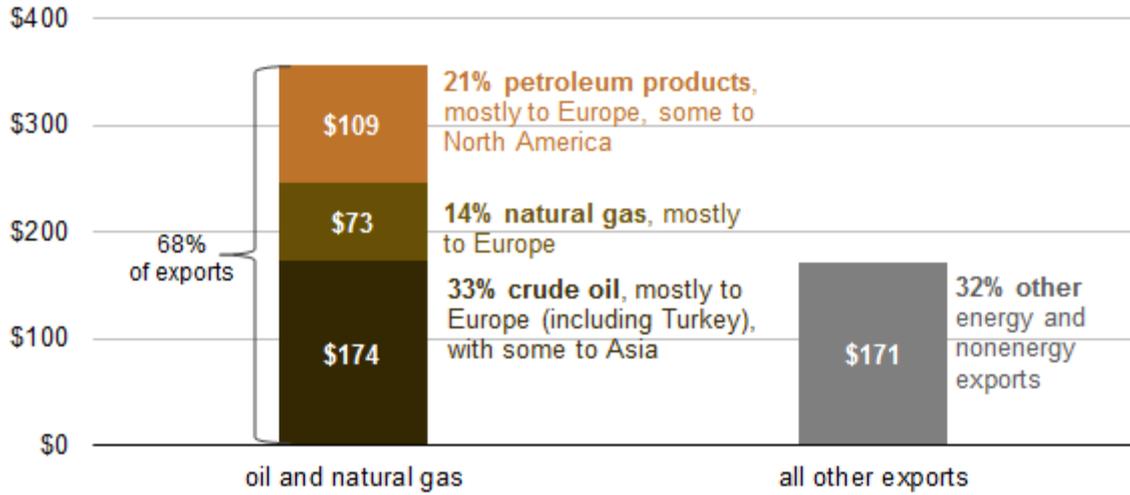


Russian as native language:
● Less than 20% ● 20-50% ● 50%+ — Russian Gas Pipelines to Europe

Sources: IEA, EIA, 2001 National Census, the Wall Street Journal and National Security and Defense Council of Ukraine

Hydrocarbons represent 68% of total Russian export sales.

Russia Gross Export Sales, 2013, bln US\$



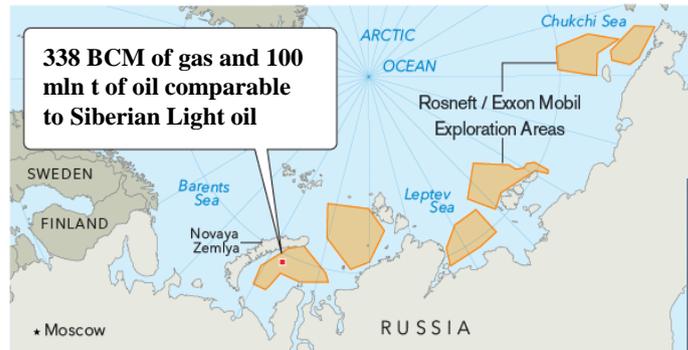
EIA

The sanctions against Russia are a big threat for the joint investments in Russia.

Exxon and Russia's Rosneft Find Oil at Sanctions-Struck Arctic Deposit

Exxon Mobil Arctic Project at Risk

Russia's Rosneft and Exxon had planned to drill 40 Arctic prospects by the end of 2018.



Sources: ExxonMobil, Data by Bloomberg

Bloomberg Visual Data

On the 30th of September, 2014, Rosneft and ExxonMobil had successfully completed drilling of the Universitetskaya-1 well in the Kara Sea oil province, where oil reserves are estimated to be comparable to those of Saudi Arabia.

Despite the discovery, Rosneft and ExxonMobil will not be able to do additional drilling, thus putting the exploration and development of the region in abeyance unless and until the US sanctions are abrogated or amended.