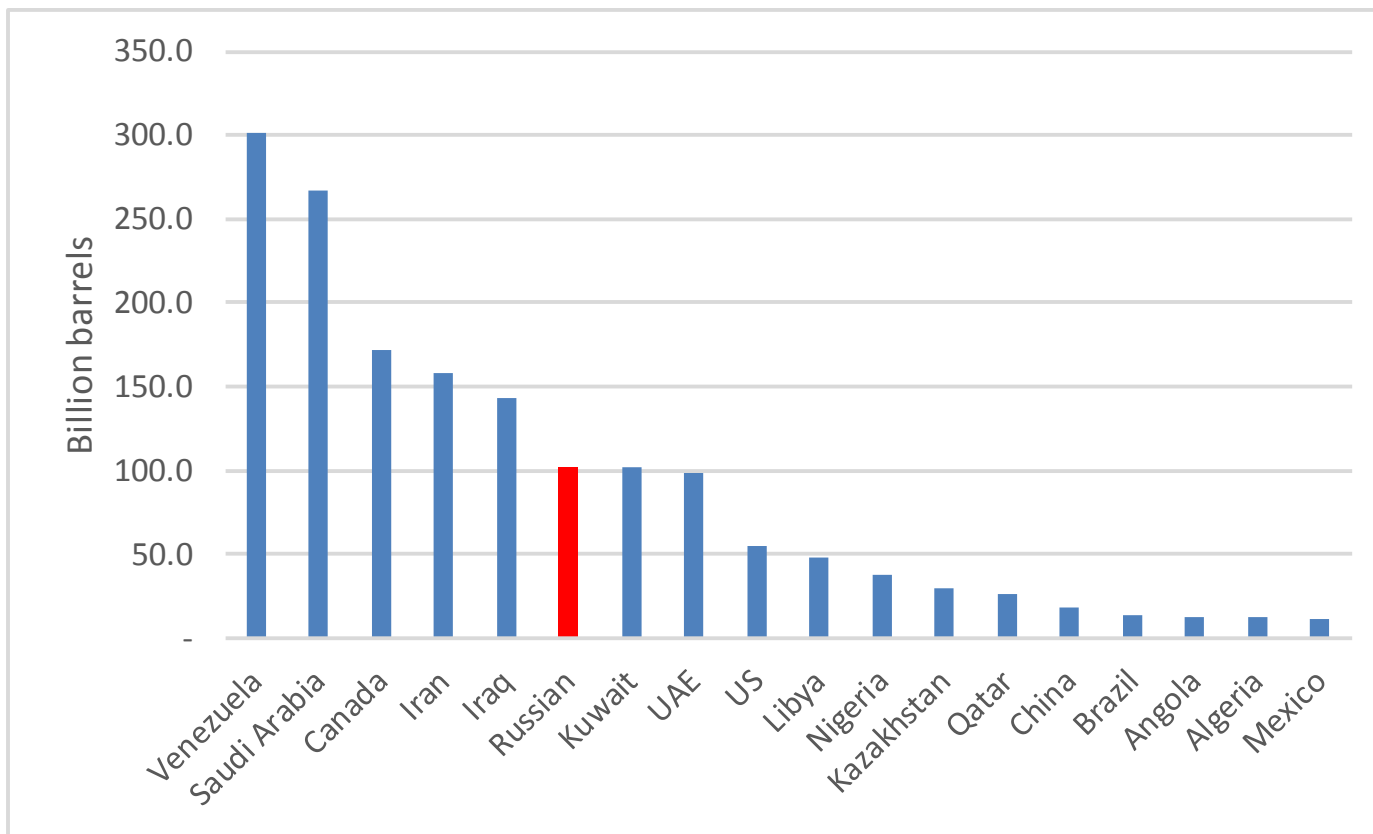


Russian oil in a global and domestic context

James Henderson

DECEMBER 2017

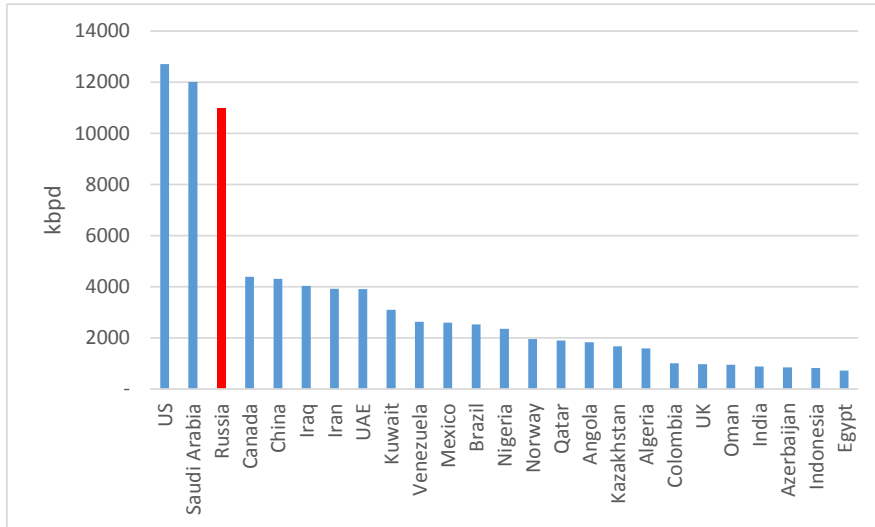
World oil reserves by country



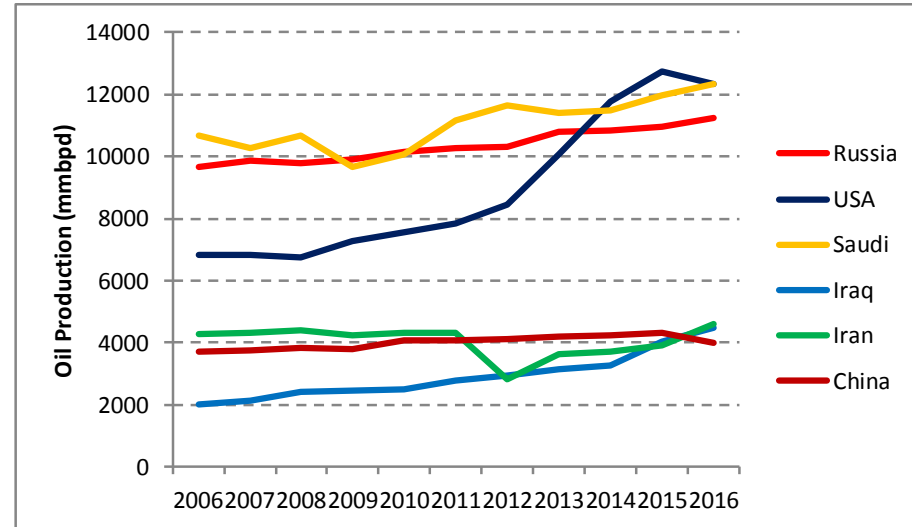
- Russia stands in 6th position in terms of proved oil reserves, and is the largest non-OPEC holder of conventional (low cost) oil

Three countries dominate a diversified supply mix

Global oil output by region



Growth in oil production by region (2006-2016)



- The US, Russia and Saudi Arabia produce more than 10mmbpd each and account for one third of total global oil supply
- Other supply is spread across the world, although the Middle East again accounts for roughly one third of output
- The OPEC cartel produced 38mmbpd in 2015, or 40% of total oil supply, but it is increasingly dominated by Saudi Arabia

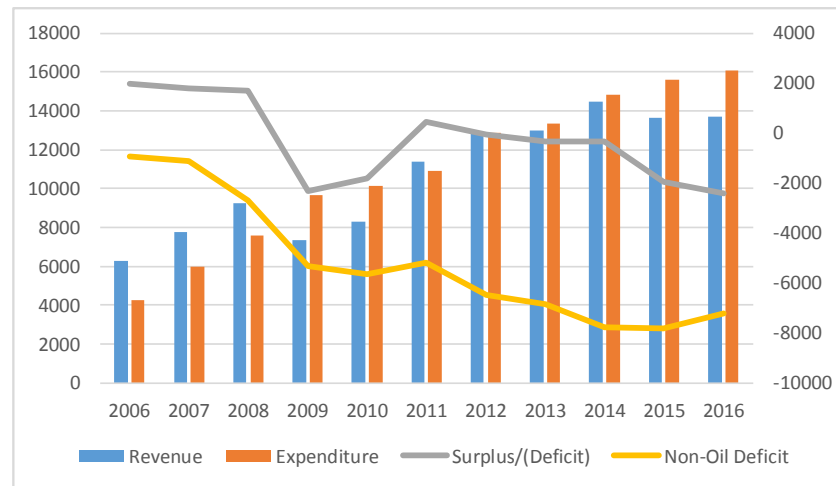
The oil price and the Russian economy

Oil price and Russian Rouble

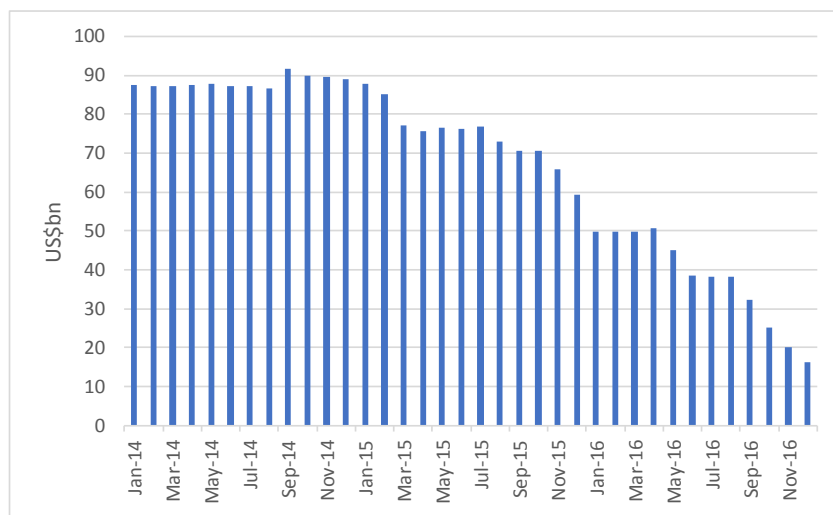
Russian Ruble Tracks Oil Prices



Russia running a large budget deficit at lower oil price



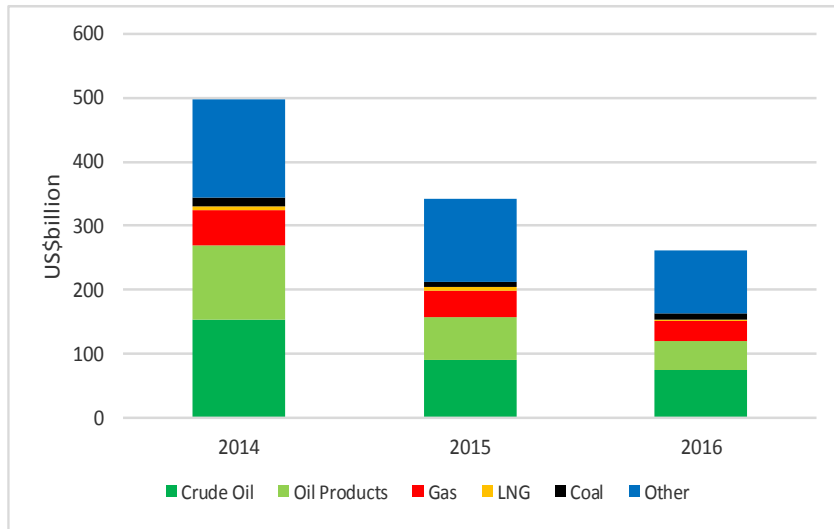
Russian Reserve Fund collapsed 2014-16



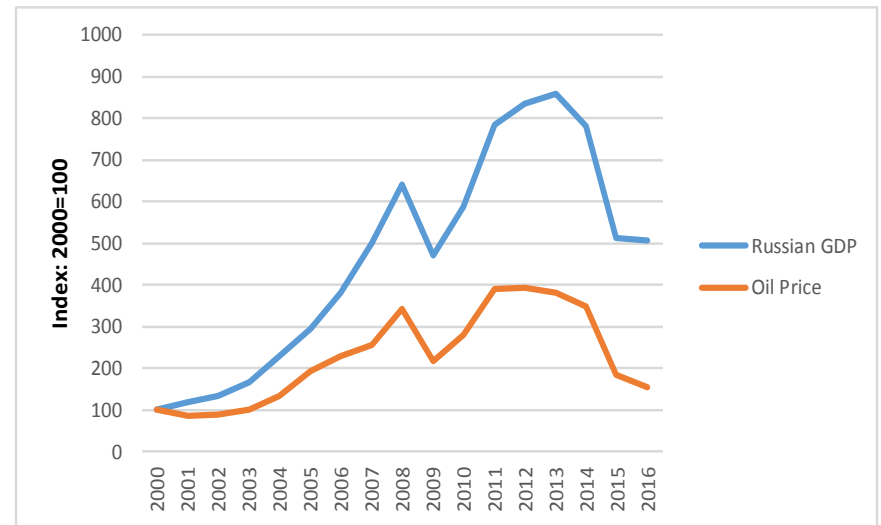
Tight correlation
between oil price, rouble
exchange rate and
Russian budget deficit

Importance of oil and gas to the Russian Economy

Split of Russia's export revenues



Correlation between oil price and Russia's GDP

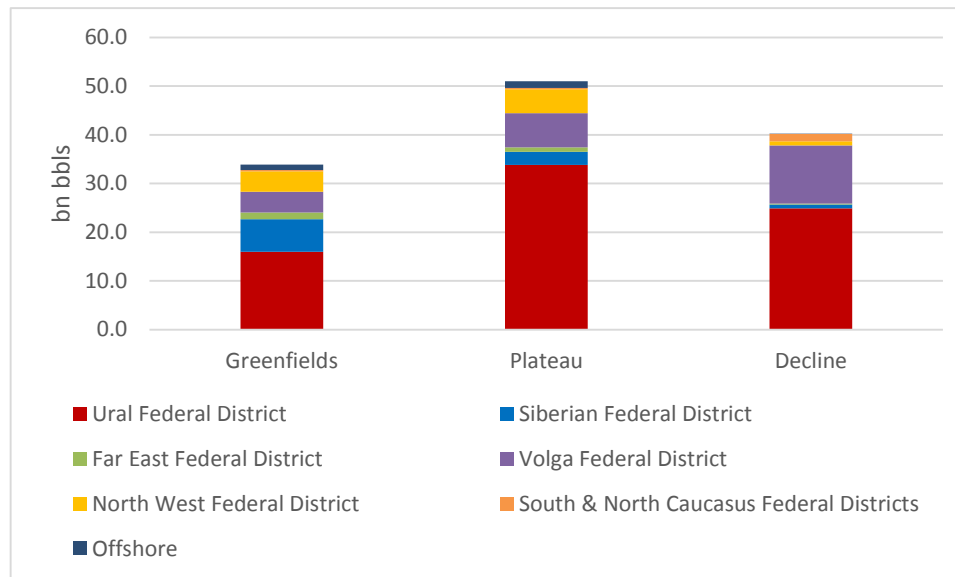


Source: Central Bank of Russia

- Oil is vital to the Russian economy, contributing much more than gas to exports and budget revenues
- Oil price and GDP are very tightly correlated. Oil makes a direct contribution of 15-20% of GDP.
- Oil price and rouble value are also tightly correlated, as evidenced over the past 6 months
- Oil and gas are both political symbols of Russia's strength and importance to the global economy

Russia's oil reserves are spread across various types of field

Reserves by age of field



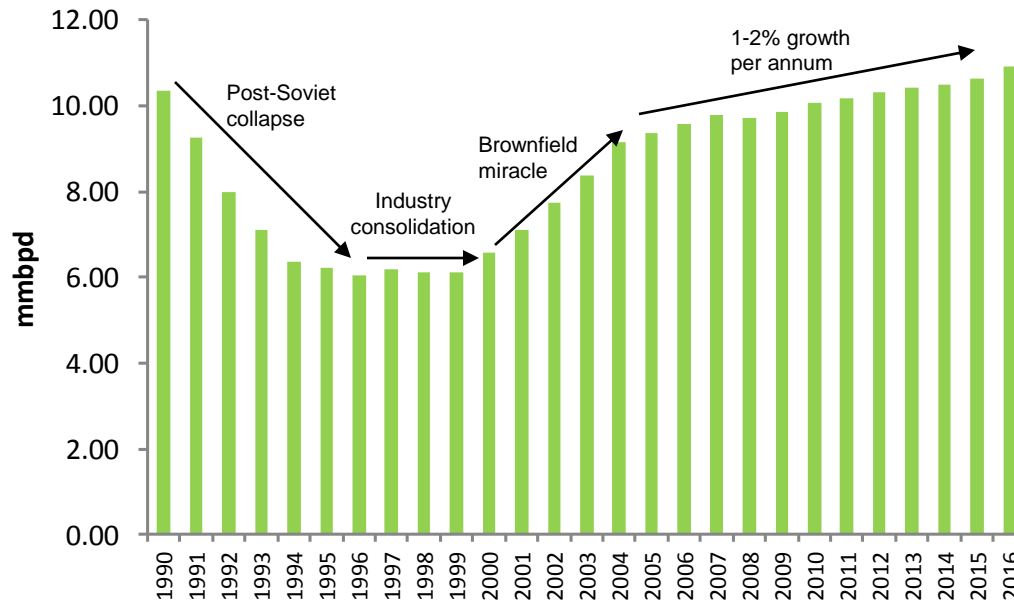
- Russian estimate of total reserves base is approximately 125 billion barrels
- The majority are located in the Urals federal district (which includes part of West Siberia)
- Importantly 85 billion barrels are in fields that are not yet in decline

Russian oil infrastructure



- Focused on the West, with a new pivot to the East
- West Siberia remains the heartland, but East Siberia is a major growth area and increasingly important from a political perspective

History of Russian oil production



- **Following the collapse in oil output from 1991, a period of low level stability in the late 1990s also saw the creation of the major VIOCs**
- **Partnership with foreign service companies saw a dramatic rebound in early 2000s**
- **Increase in state control of sector from 2005 coincided with slowdown in output recovery**
- **There has been only one year of decline since 2000 (2008) despite constant complaints about the tax system**

The Key Russian Oil Companies

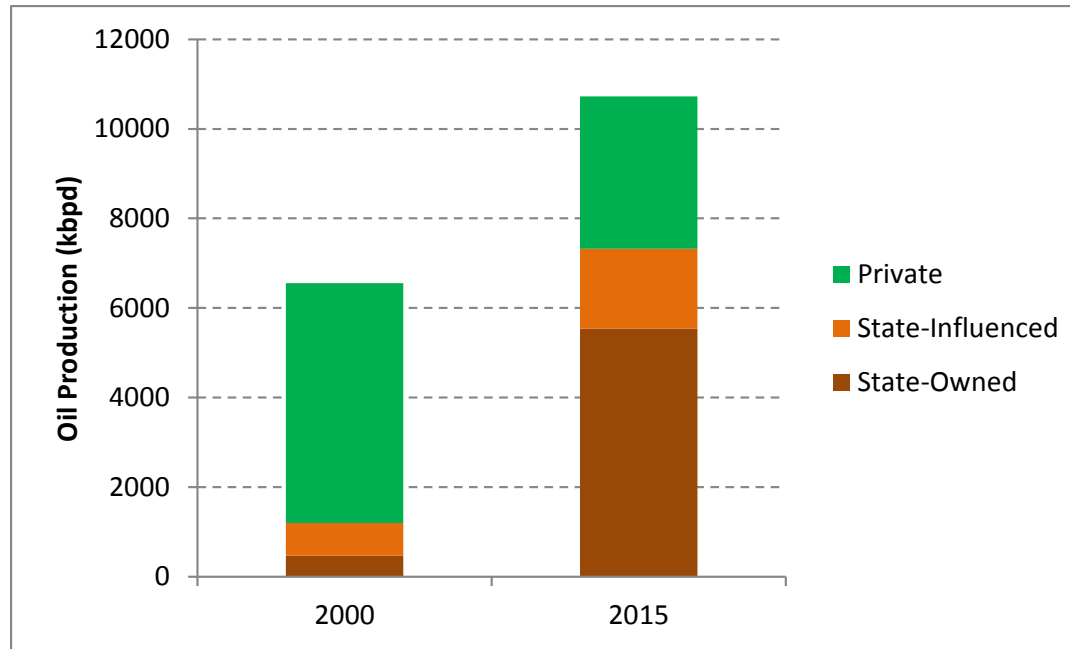
The Major Russian Oil Producers

	2015	2016	% change
Rosneft	3800	3799	0%
LUKOIL	1721	1662	-3%
SurgutNG	1237	1239	0%
Gazprom Neft	689	757	10%
Tatneft	547	575	5%
Slavneft	311	300	-3%
Bashneft	400	428	7%
Rusneft	148	140	-5%
Gazprom	341	348	2%
Novatek	95	161	70%
Other	1435	1556	8%
Russia Total	10725	10965	2%

- Production is dominated by eight major oil companies and two gas companies which produce condensate
- Three companies account for more than 60% of total production
- There are around 150 smaller companies who are growing strongly but make little in the way of overall contribution

Russian oil production by ownership

State control of Russian oil production

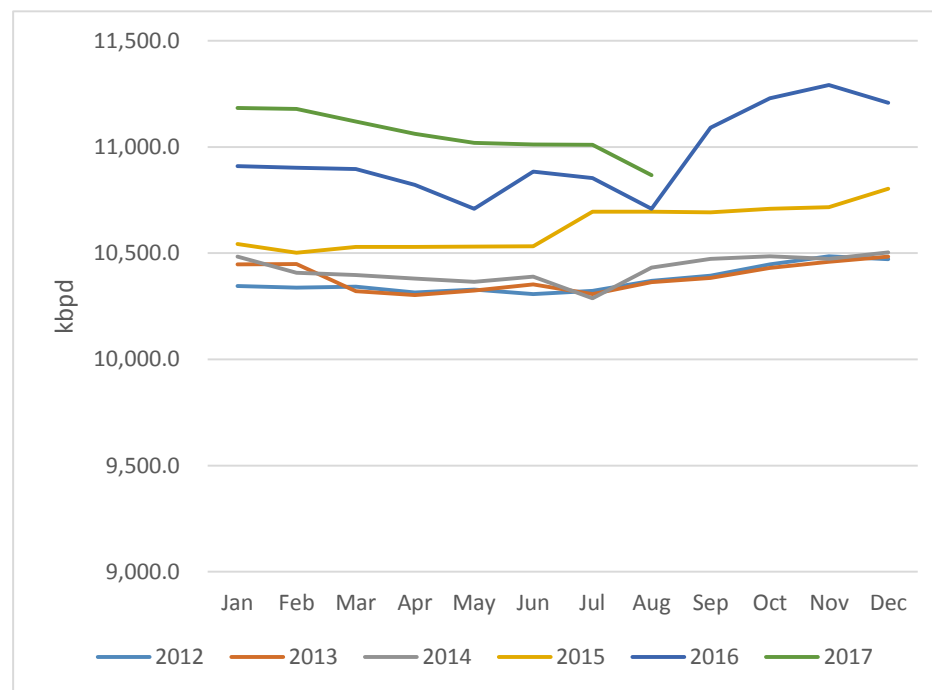


- Rosneft dominates Russian oil output, following takeover of TNK-BP in 2013, with a 37% share
- When the sector had been fully privatised in 2000 the State's equity share of total oil production was only around 300kbbpd (Rosneft)
- The share of state ownership has risen to 50% on an equity basis and almost 70% on a "control" basis

Russian oil production has been robust

- Production has continued to increase in 2016 and 2017, in line with the trend set in 2015
- No month has seen a decline year-on-year since July 2014, despite Govt. concerns
- Companies have been put under pressure to focus on core production, re-directing investment towards enhanced oil recovery at existing fields – stability seen as the minimum requirement
- New fields that were under development pre-2014 have also made a significant impact on short-term production
- Impact of tax changes, sanctions and rouble exchange rate will be key to outlook

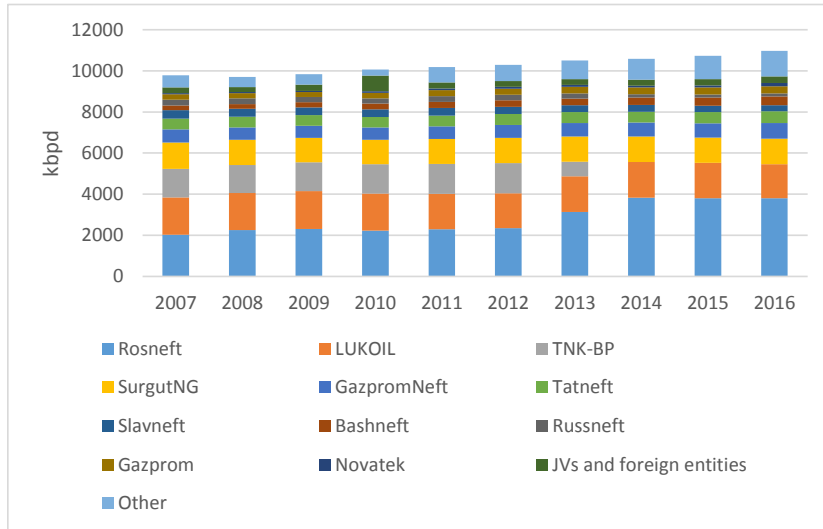
Total Russian Oil Production



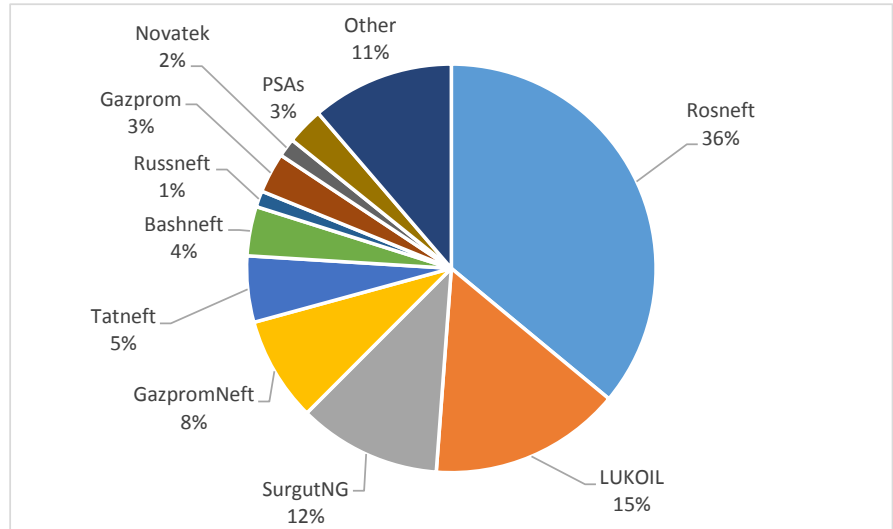


Russian oil production history by company

Liquids production by company

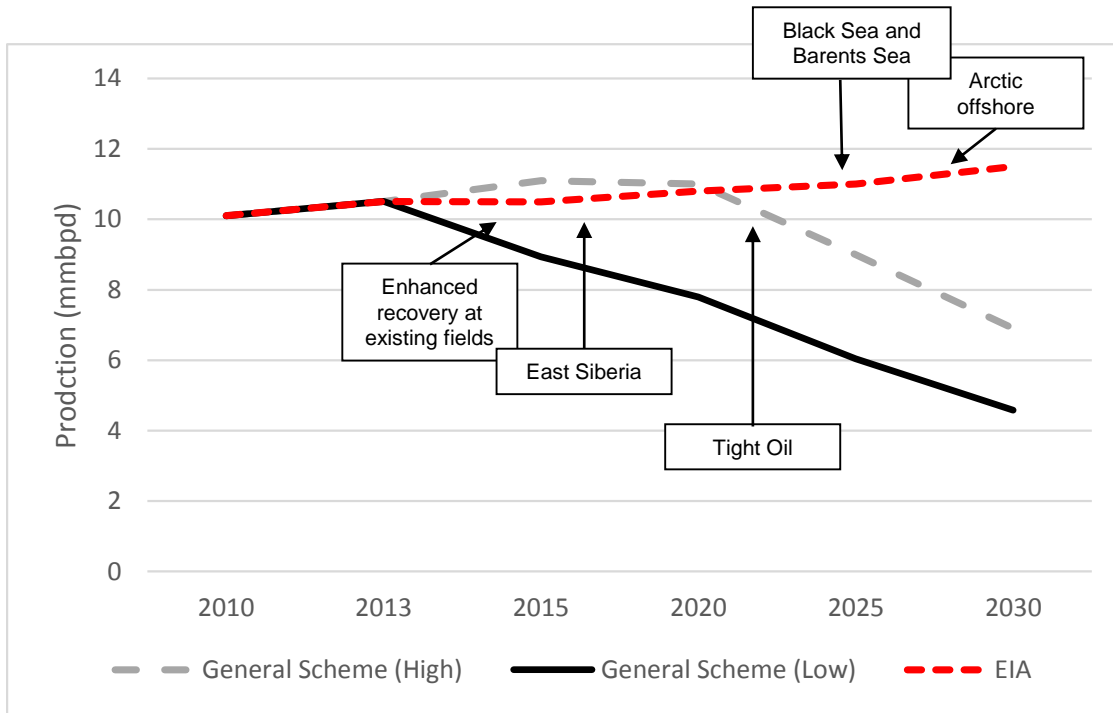


Share of total Russian liquids production

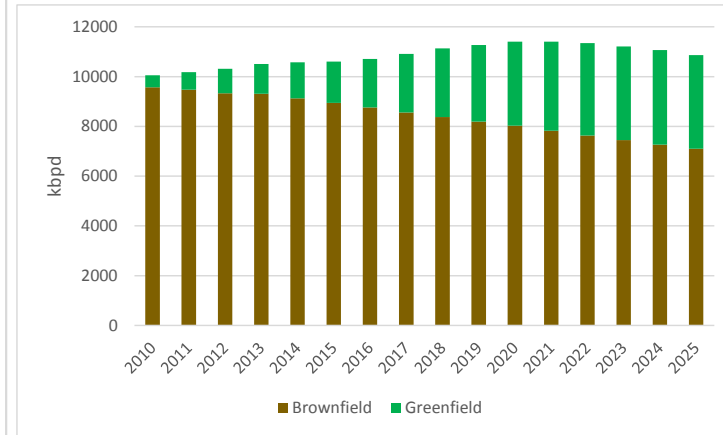


- Production growth has been seen across most companies
- Organic growth a feature of the early 2000s
- Subsequently M&A has played an increasing role
- Consolidation under state control has been a major theme
 - Rosneft, GazpromNeft, Bashneft, Slavneft now all under clear state control (with Gazprom also an important liquids producer)
 - Surgutneftegas, Tatneft and Novatek are heavily influenced by regional or federal authorities
- Rosneft now accounts for 40% of production, while the Russian government has control over 51% and significant influence over a further 19%

Future of Russian oil production – key drivers



Pre-2014 production outlook

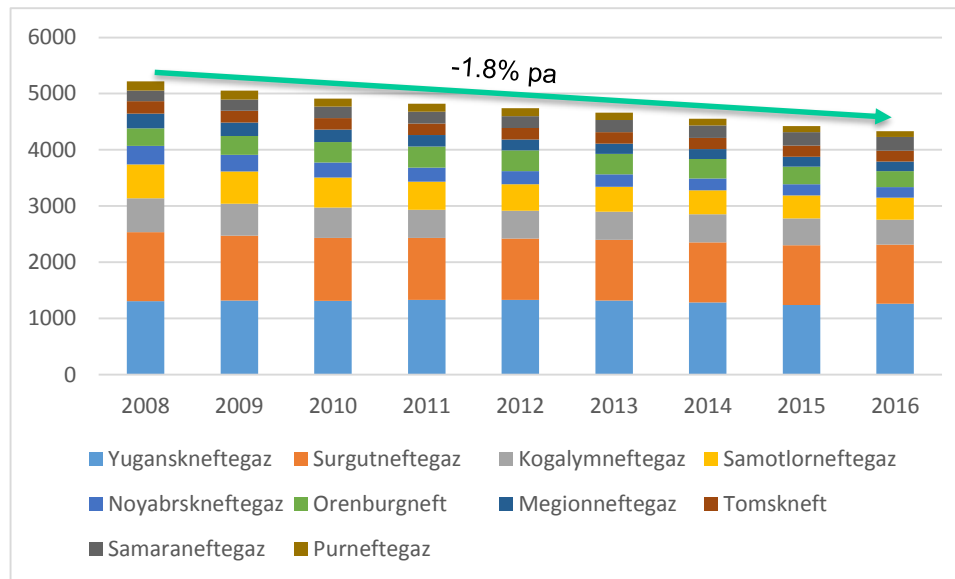


Source: Ministry of Energy, General Scheme of Development of Oil industry to 2020, EIA International Energy Outlook 2013

- **Maintaining oil production growth is certainly a challenge**
- **Slow growth from 2014 levels (10.6mmbpd) had been expected**
- **The impact of new fields could have seen total output at 11.5mmbpd by 2020, and this level could have been sustained with Arctic output**
- **Challenge now is to optimise capital expenditure and prioritise key developments**

Brownfield decline has been actively managed

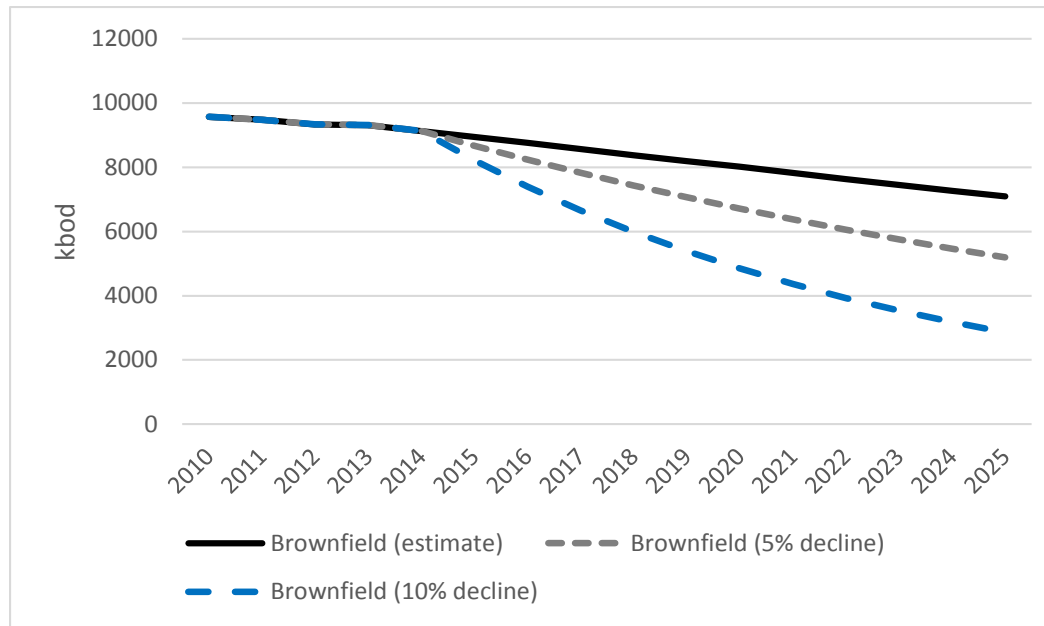
Output from 10 largest production companies



- Russian companies have been relatively successful at restricting brownfield decline
- Expected natural decline at a West Siberian field would be 10-15% per annum, but the average decline at the top 10 producing companies has been less than 2%
- Relatively simple secondary recovery techniques have been used to date, in tandem with enhanced computer technology to monitor reservoir performance

Potential decline in brownfield output

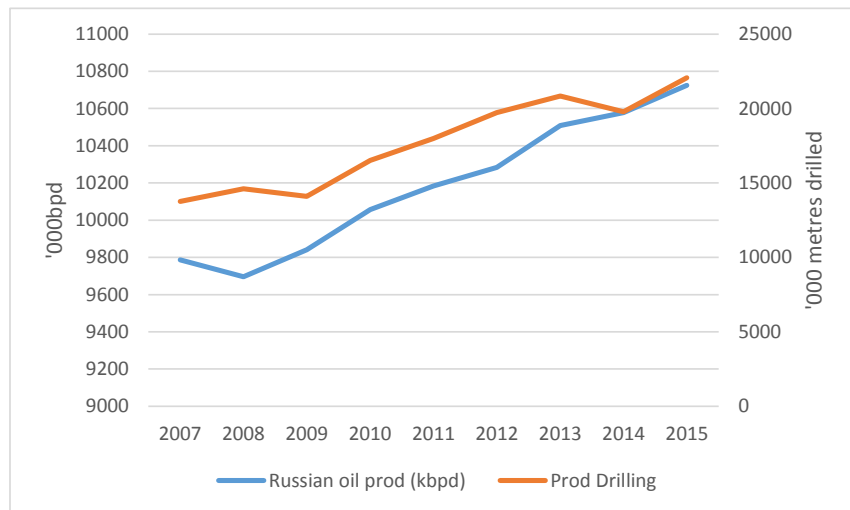
Decline rate scenarios from Russian brownfields



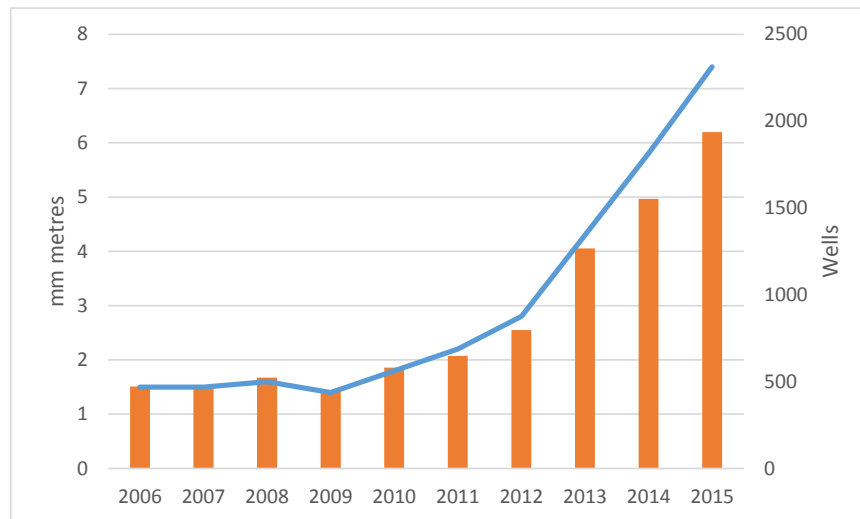
- **Average decline rate with sustained investment is 2.0% per annum**
- **Natural decline rate from fields is 10%+ without any remedial action**
- **Decline in early 1990s averaged 8.6% per annum (1990-1996)**
- **Mid case assumed at 5% per annum to reflect possible reduction in spending and increasing maturity of fields**

Production, especially at brownfields, is driven by drilling

Levels of drilling and oil production



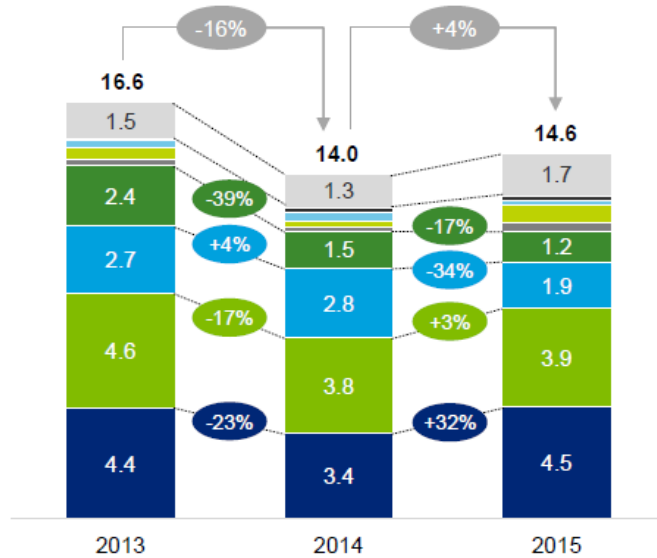
Horizontal drilling in Russia



- Not surprising that there is a strong correlation between production drilling and oil output
- R squared of 0.92 suggests imperative to keep drilling in order to maintain production
- Drilling, both conventional and horizontal, continues to increase
- However, companies need to be encouraged to invest – costs need to be controlled and the Russian tax system needs to provide incentives

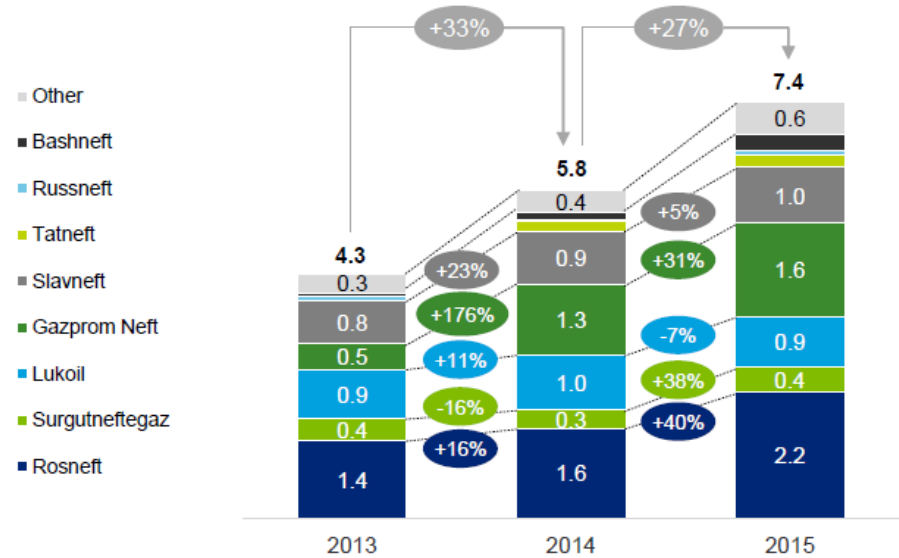
Increased use of directional and horizontal drilling has improved well performance

Directional drilling, million m



Source: "Oil and Gas Vertical" magazine (CDU TEK)

Horizontal drilling, million m

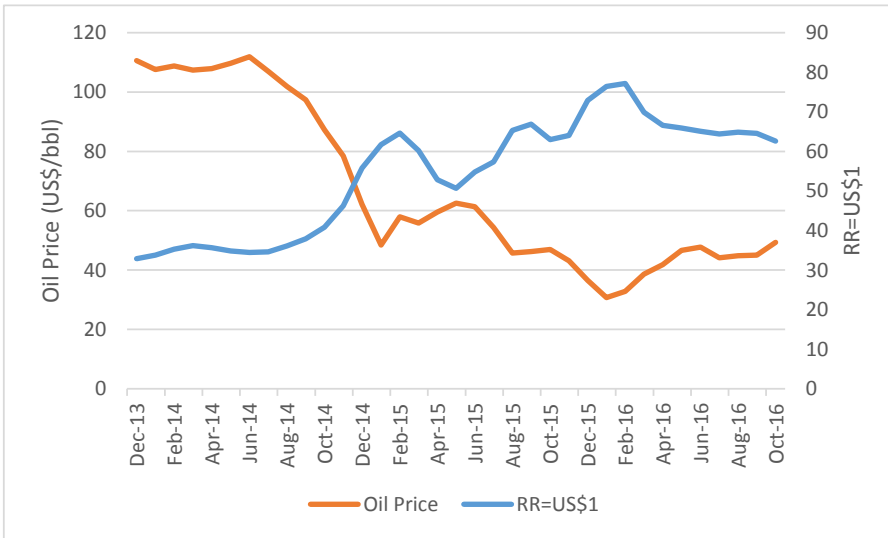


Source: "Oil and Gas Vertical" magazine (CDU TEK)

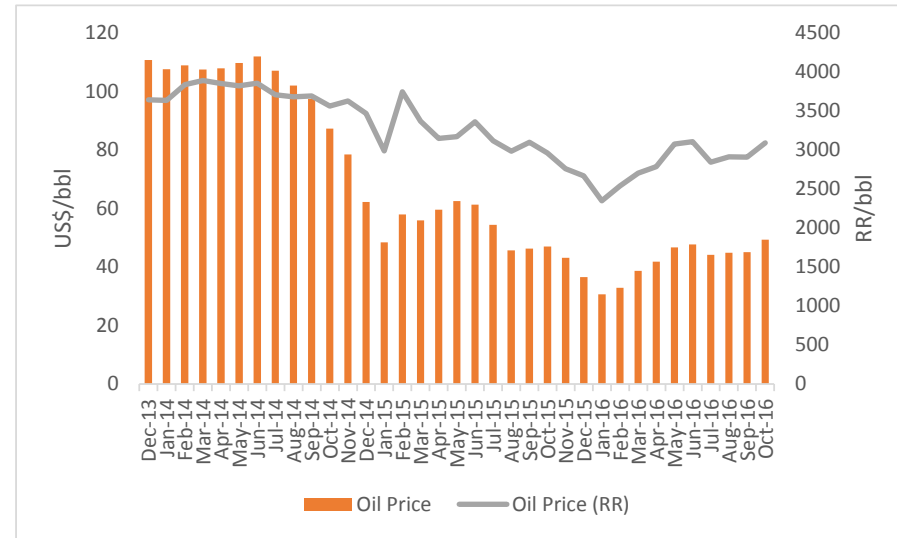
- Sanctions have had an impact on availability of new technology, but Russian service companies can still provide significant input to improving production
- Increase in horizontal drilling has been dramatic over the past 3-4 years
- GazpromNeft in particular has tripled the amount of horizontal drilling, especially at its Salym subsidiary in West Siberia

Impact of Ruble Devaluation

Oil price versus rouble exchange rate



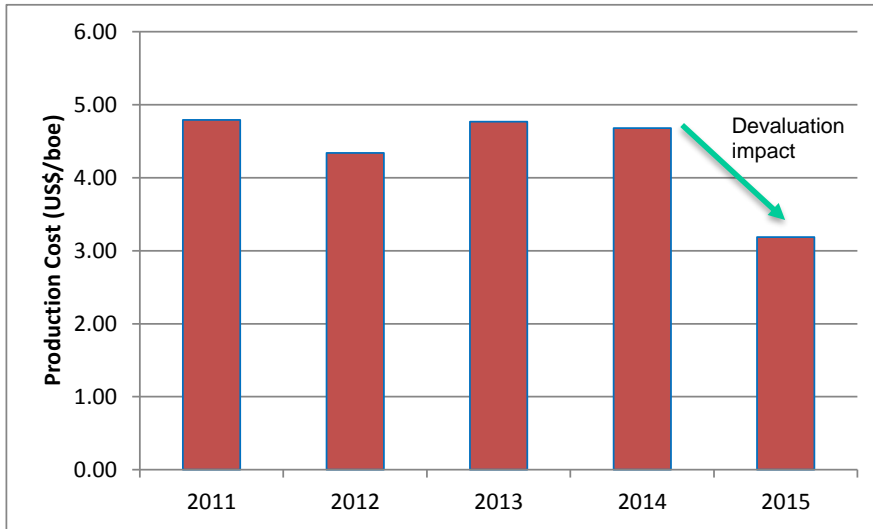
Oil price in roubles and dollars



- 80-90% of capex is in roubles, so investment costs in US\$ have fallen sharply
- Around two thirds of operating costs are in roubles
- Correlation between oil and price and exchange rate remains very strong – if anything the rouble oil price has recovered recently after a worrying fall in 2015
- Key question is how Central Bank will respond if oil price recovers significantly

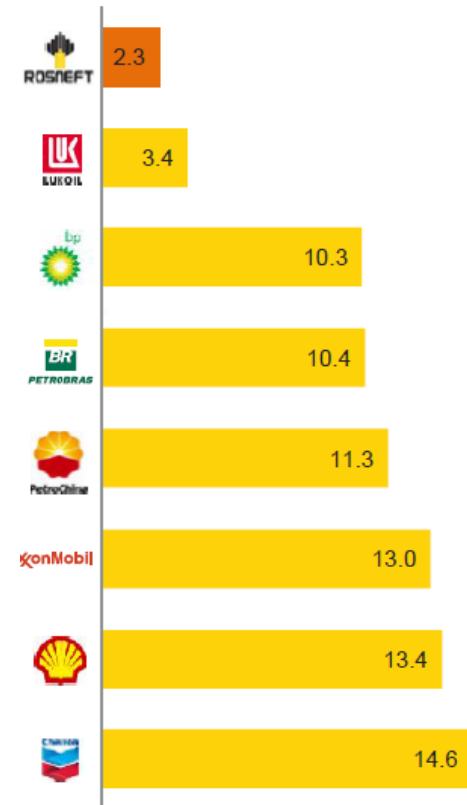
Russian oil company cost base is very low

Russian oil production costs

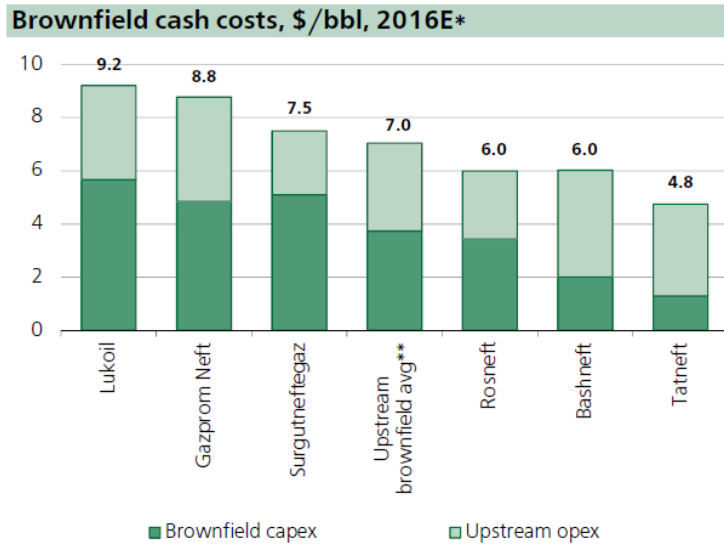


- 80% of operating costs and around two thirds of capital costs are rouble-based
- As a result, post-devaluation Russian costs are among the lowest in the global oil economy
- Obviously, a rise in the oil price will be offset by an increase in US\$ costs

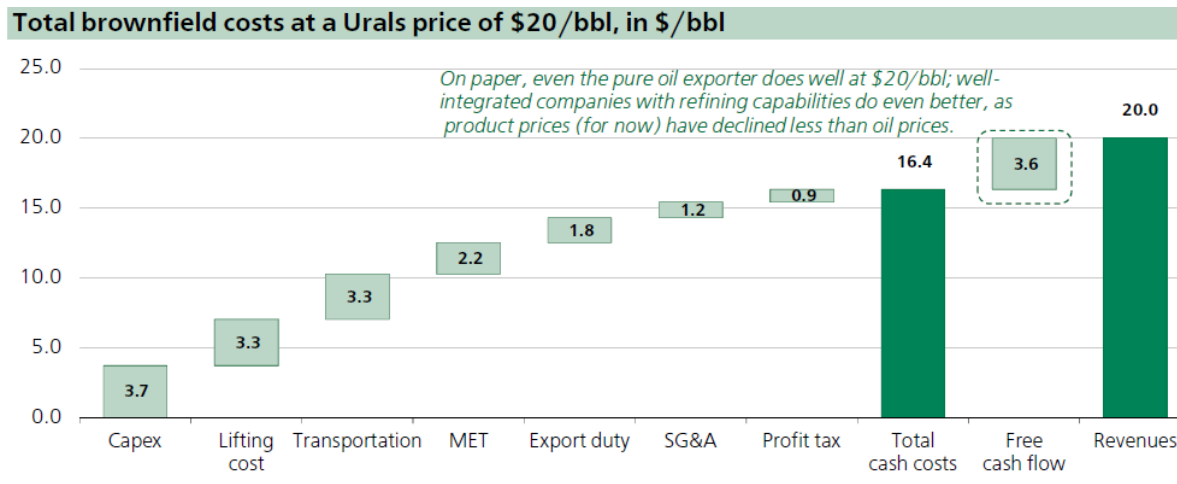
Russian costs versus global peers (US\$/boe, 2016)



Russian breakeven oil price is below \$20 per barrel



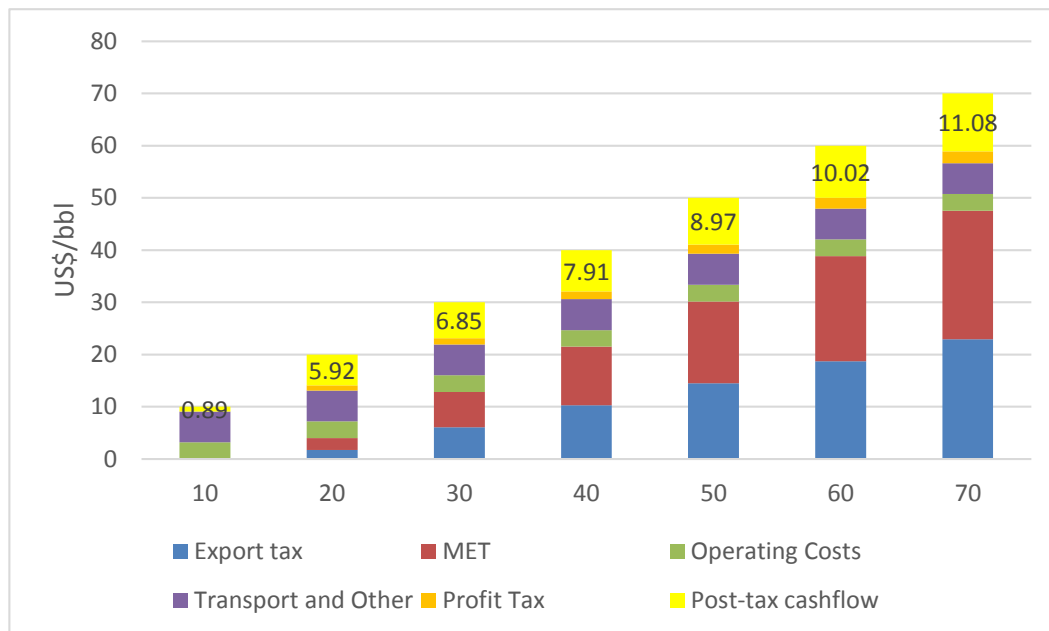
- Despite tax adjustment in 2016 Russian oil production is very economically robust
- Cash costs are below \$10 per barrel
- Including taxes and transport, Russian oil production from brownfields breaks even at below \$20 per barrel
- Key parameter is initial flow rate of wells, to allow early recovery of costs



Note: Average cost across Russian oil majors, assuming USD/RUB of 75. METs and export duties provided per 2016 schedule.

High tax burden constrains cashflow but also provides a buffer against low oil prices

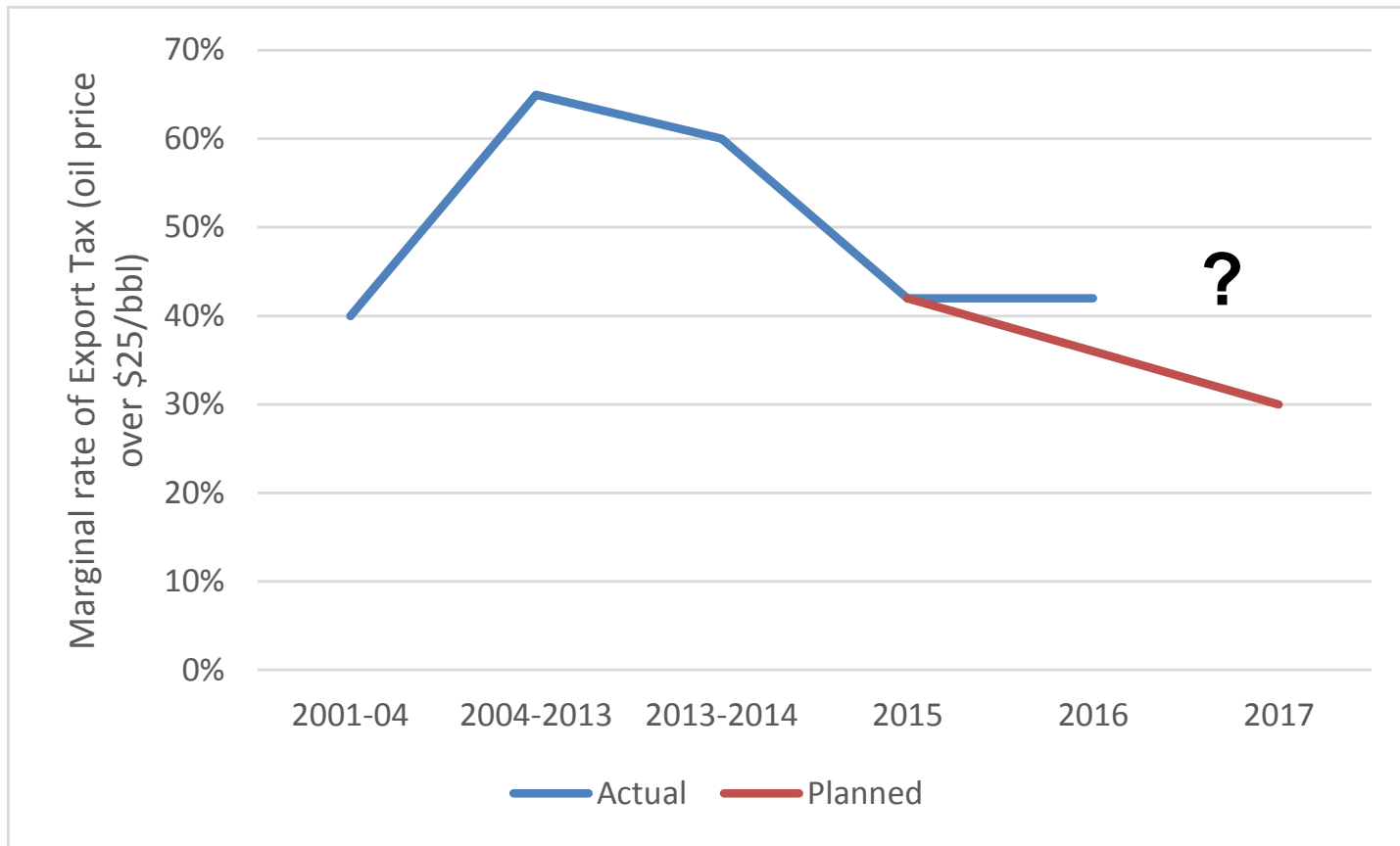
Breakdown of oil company upstream cashflow



- Russia's high level of revenue taxes (export tax and MET royalty) has limited cashflow throughout post-Soviet era
- However, sliding scale of taxes means that government bears most of the burden in a falling oil price environment
- In 2015, for every \$10 decline in the oil price Russian oil companies only lost \$1.44 per barrel of post-tax cashflow
- Percentage decline was still significant, but high tax rates acted as something of a buffer

Taxation remains a major area of debate

Russian tax grab in 2016 and 2017



- Governments are always changing the rules – Russia is no exception
- Companies hate uncertainty, and won't invest if they think the playing field is being changed constantly

Profit tax for old and new fields now being discussed

12 fields for onshore trial

Profit / Return-based system used in Russian offshore

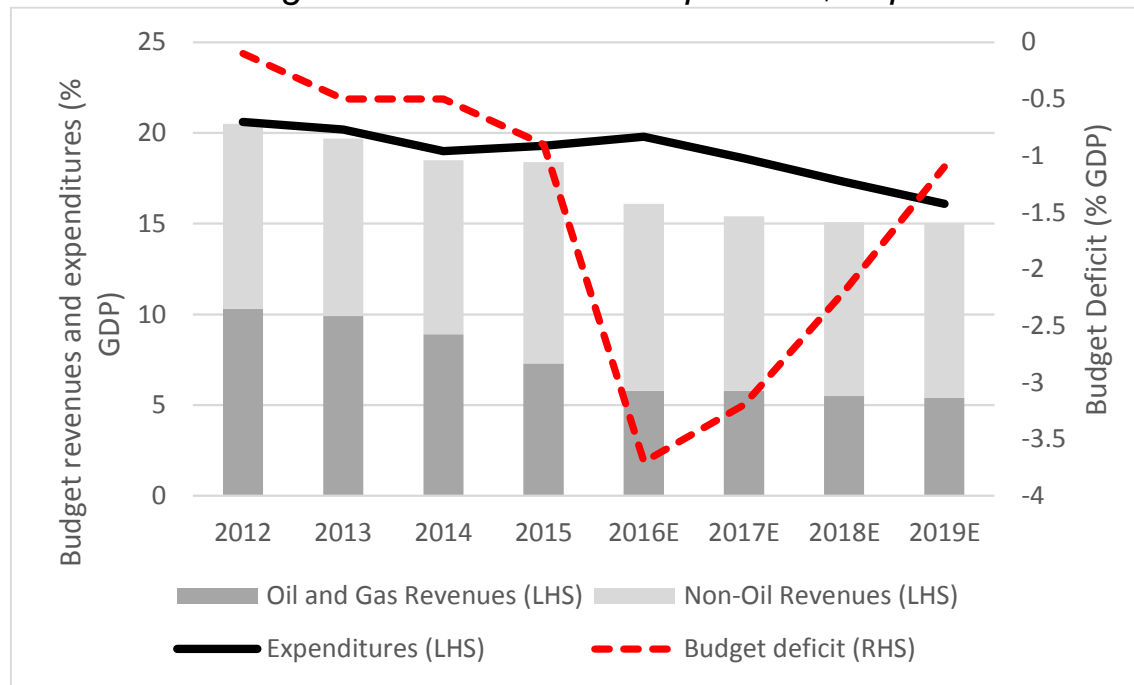
Group	Location	IRR target	Royalty rate
1	Baltic/Azov Seas	16.5%	30%
2	Shallow waters of the Black Sea, Pechora and White Sea, southern part of the Okhotsk Sea, offshore Sakhalin	18.5%	15%
3	Deep waters of the Black Sea, the northern part of the Okhotsk Sea, southern part of the Barents Sea	20.5%	10%
4	Offshore projects in the Arctic (includes Kara Sea), the northern part of the Barents Sea, the Eastern Arctic	22%	5%

Company	Fields
Lukoil	Lazarevskoye
	Krasnoleninskoye
	Nivagalskoye
	Las-Yeganskoye
Rosneft	Imilorskoye-Istochnoye
	Khasyreiskoye
	Nadeiyuskoye
	Bakhilovskoye
GazpromNeft	Verkhne-Kolik-Yeganskoye
	Vyngayakhinskoye
	Yety-Purovskoye
	Vokyntoiskoye

- Profit-based tax system introduced for offshore, to appease ExxonMobil in Arctic
- Easy to implement and no immediate impact on government revenues
- New scheme to be trialled for onshore fields under development
- 12 fields selected, but no details as yet of tax scheme to be used
- Key element is cost recovery, which allows companies to make a better rate of return and reduce risk

Russian budget has been put under pressure by lower oil price

Budget deficit c.3% at an oil price of \$50 per barrel



- However, Russian fiscal policy remains a critical issue, as the fall in oil and gas revenues has created a significant budget deficit
- At the budgeted oil price of \$40 per barrel Russia would run a budget deficit of almost 4%
- The oil contribution to budget revenues has fallen sharply – from over 50% to around 35%



Russia's relationship with OPEC – finally cooperation



- Until 2016, Russia's relationship with OPEC had featured a series of unfulfilled promises
- The Doha meeting in April 2016 marked something of a turning point, although Russia again failed to deliver an agreement
- Necessity proved to be the mother of invention in November 2016, however, and Russia played a leading role in the OPEC/Non-OPEC production cut



Production since OPEC agreement

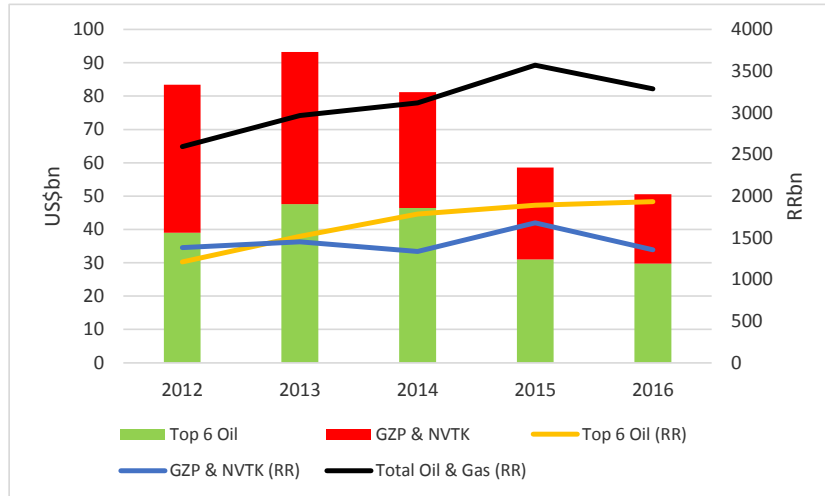
	Oct-16	Jan-17	Apr-17	Jun-17	Aug-17	Apr-Oct	June-Oct	Aug-Oct	Aug % change
Rosneft	3860	3781	3744	3748	3758	-116	-112	-102	-2.6%
Lukoil	1669	1661	1636	1625	1625	-33	-44	-44	-2.6%
SurgutNG	1234	1234	1209	1201	1201	-25	-33	-33	-2.7%
GazpromNeft	812	780	800	781	796	-12	-31	-16	-2.0%
Tatneft	592	590	575	575	576	-17	-17	-16	-2.7%
Bashneft	429	439	433	416	403	4	-13	-26	-6.1%
Slavneft	296	292	295	286	300	-1	-10	4	1.4%
Russneft	143	142	139	139	140	-4	-4	-3	-2.1%
Gazprom	329	365	331	351	316	2	22	-13	-4.0%
Novatek	337	334	326	318	321	-11	-19	-16	-4.7%
Sakhalin PSAs	317	311	334	335	293	17	18	-24	-7.6%
Other	1165	1136	1128	1123	1139	-37	-42	-26	-2.2%
Total	11183	11065	10950	10898	10868	-233	-285	-315	-2.8%

- Company performance has varied quite widely, depending upon individual asset portfolios
- Of the major companies GazpromNeft had the most to lose, as it was planning significant production growth
- Rosneft, in contrast, was probably quite relieved to have an excuse to report inevitable production decline
- Slavneft, jointly owned by Rosneft and GazpromNeft, is the only company to have shown an increase since October 2016

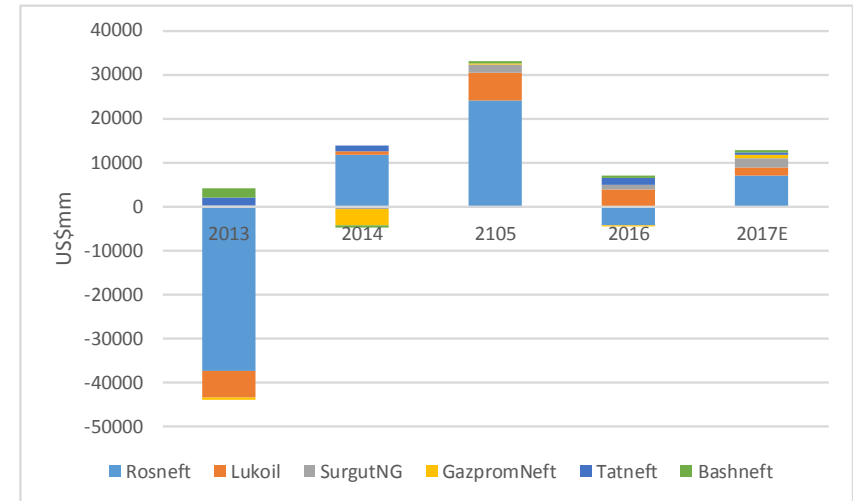


Capital expenditure funded by internal cashflow

Annual Capex (US\$m)



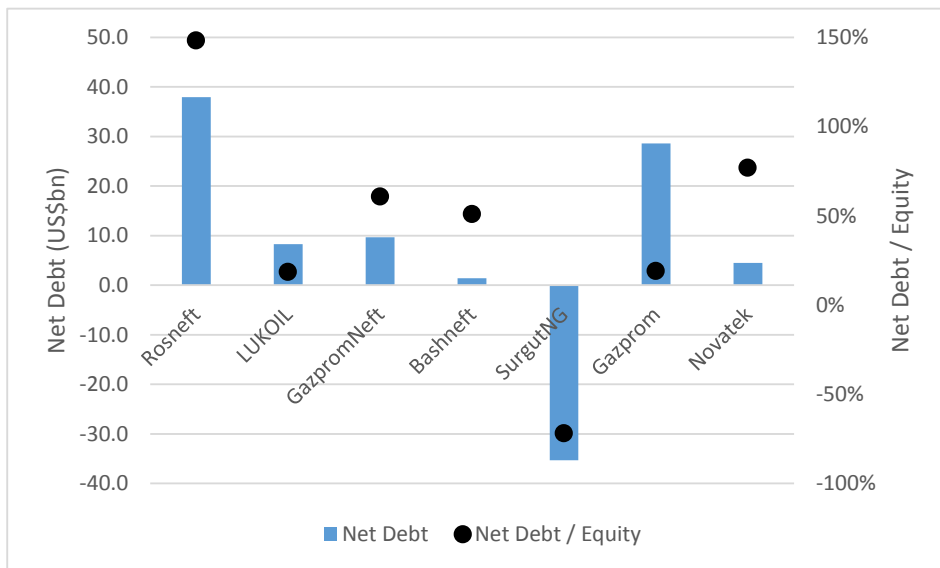
Annual Free Cashflow (Oil Cos.) (US\$m)



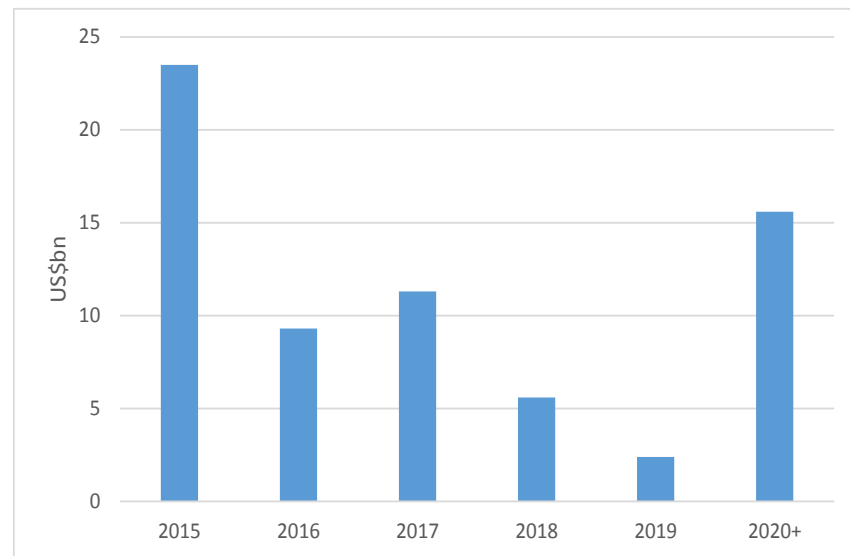
- Lack of international finance has forced companies to focus on maintaining positive free cashflow
- This has been consistently achieved by most companies since 2014, while managing to maintain capex in RR terms
- Rosneft's acquisition of TNK-BP in 2013 caused balance sheet problems, although these were resolved with the aid of Chinese oil pre-payments and loans from Russia banks

Only Rosneft has really struggled to pay the bills

Russian oil and gas company debt



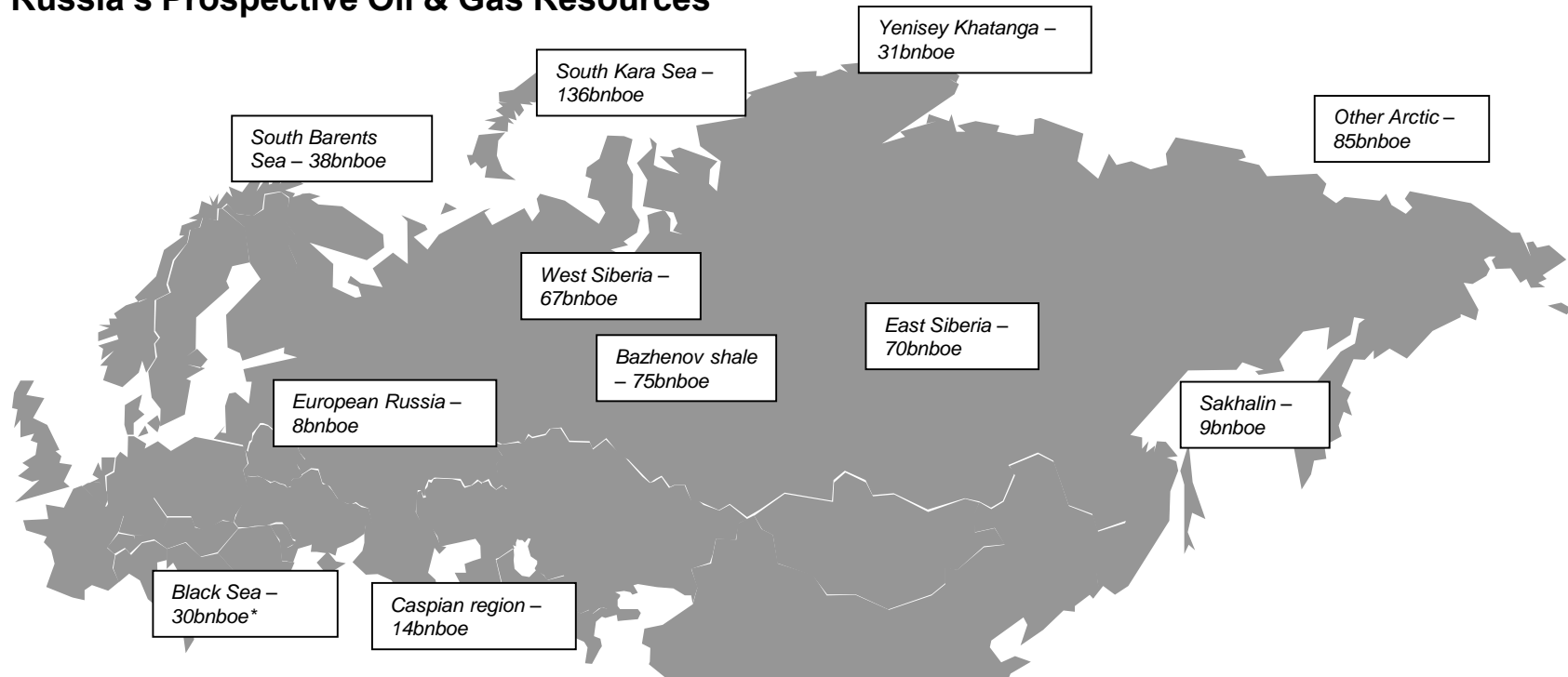
Rosneft debt repayment schedule



- Rosneft had \$37bn of net debt at the end of 2015, but also had prepayment arrangements totalling \$26bn
- Rosneft has had to rely on Chinese support to pay off debt from purchase of TNK-BP
- Crisis was averted in Q3 2015, when a prepayment from CNPC allowed repayment of short-term debt
- Other companies have struggled to raise debt due to sanctions, but are surviving on operating cashflow
- Novatek has recently received project finance for Yamal LNG from China

Offshore regions contain the majority of Russia's future resources, although shale and East Siberia have significant potential

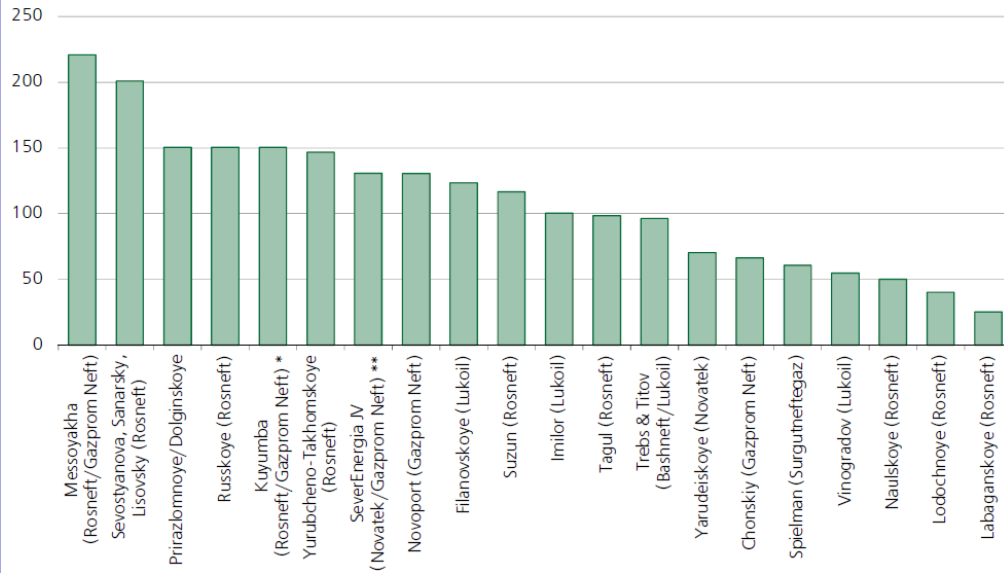
Russia's Prospective Oil & Gas Resources



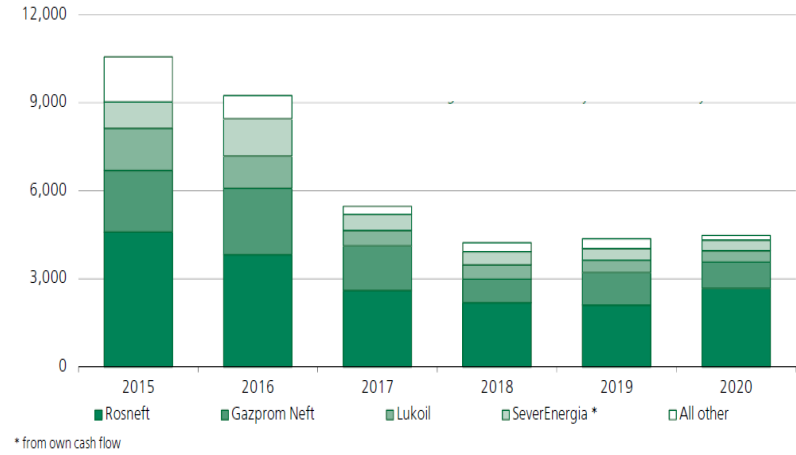
- A new tax regime has been introduced for Russian offshore, where two thirds of Russia's future resources are located offshore, with more than half in Arctic waters
- Gas also makes up two thirds of the resource base, but oil resources remain significant
- Exploitation of existing regions will be a priority, but a shift towards the frontiers appears inevitable
- International investment will be a necessity, for finance and technology

Greenfield potential close to existing infrastructure

20 new fields planned for development



NOCs dominate spending



* from own cash flow

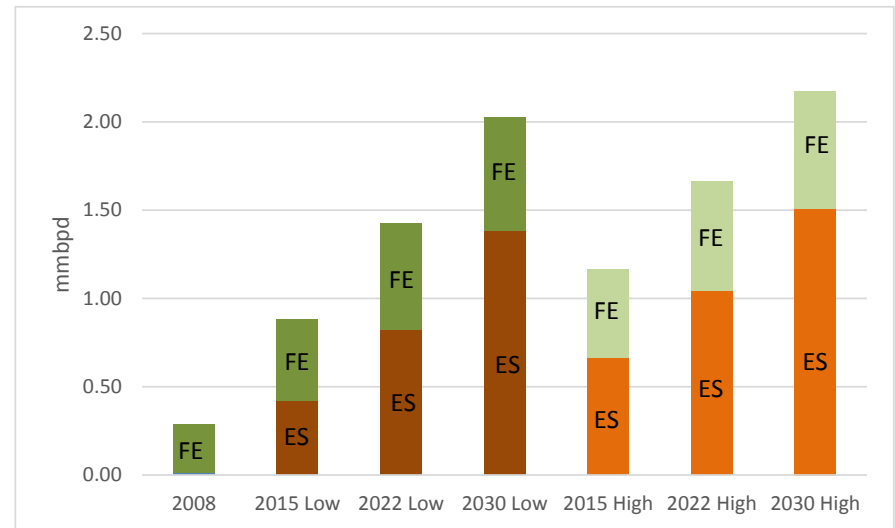
- Russia has as many as 20 new fields set for development, many of them close to existing infrastructure
- However, c.\$40 billion will need to be spent to ensure timely development
- A key issue is that NOCs dominate the development plans, with Rosneft and GazpromNeft needing to spend \$11bn in the next two years alone

Russia's "pivot to Asia" has been spearheaded by Rosneft and the oil industry

The ESPO pipeline has provided a vital infrastructure catalyst



The production potential of the Russian Far East is very significant



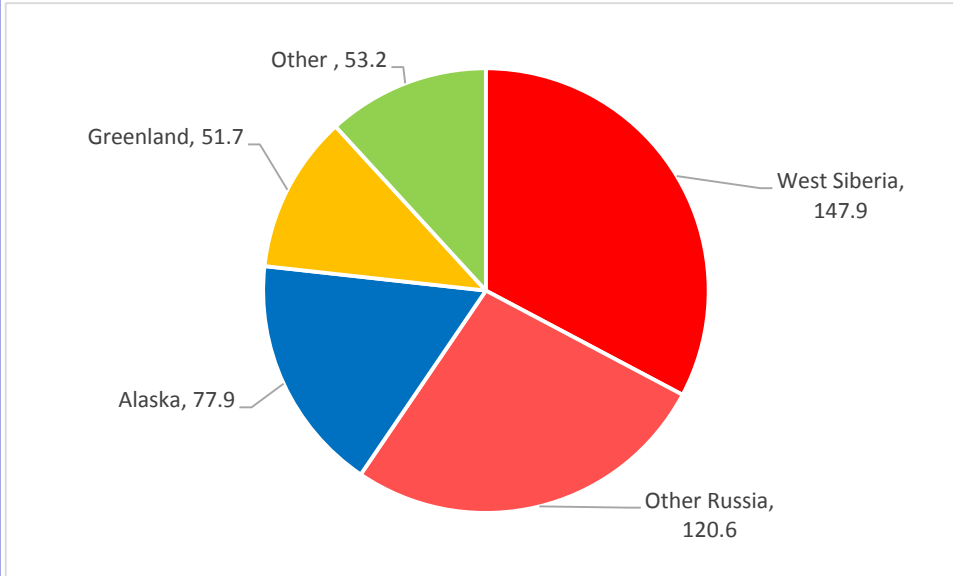
Russian government projections

- East Siberian oil resources are estimated in a wide range of 70-160 billion barrels, and major tax breaks have been offered for their development
- Realistic production estimates suggest that 2mmbpd could be produced from the region by the end of the next decade
- Oil is also being redirected from West Siberia to fill the ESPO pipeline, which will have an ultimate capacity of 1.6mmbpd to China and the Pacific coast
- Rosneft is the main player in the region, and has dominated the relationship with China
- Foreign companies are becoming increasingly involved, with a focus on Asian players

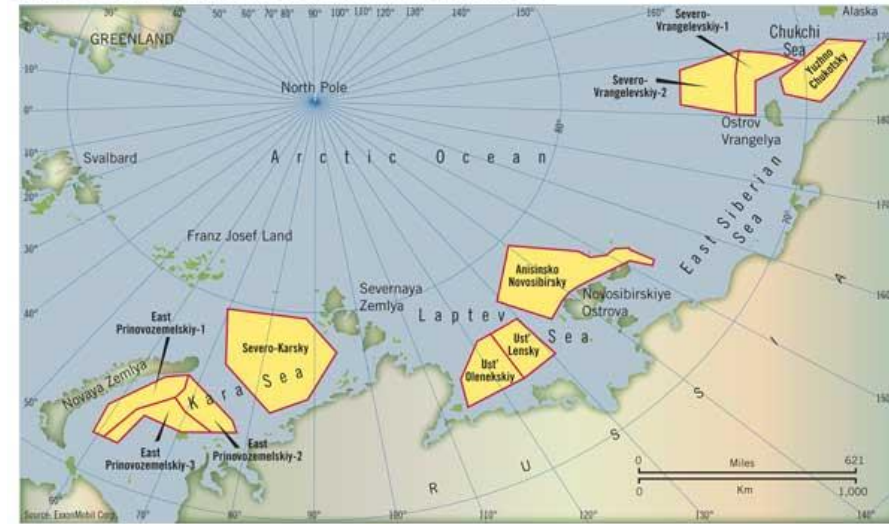
Development of Russian Arctic a possible long term option but now in serious doubt

Russia has largest share of Arctic resources

Partnership with Exxon has been key focus



ROSNEFT-EXXONMOBIL STRATEGIC COOPERATION AGREEMENT AREAS



- Arctic development a prestige political project for Russia as well as a long-term production solution
- Opportunity to develop world-leading technology in partnership with IOCs and establish important presence in emerging new region
- Rosneft will not be able to move forward with plans without IOC support, both financial and technical

For Russia the Arctic is geo-political as well as commercial

The Northern Sea Route set to become the “Cold Silk Road” to Asia



The Russian Arctic holds vast hydrocarbon potential (240 billion boe), which could sustain the country’s oil output beyond 2030 and form the basis of an LNG hub

The Russian government is keen to develop the economic potential of its Northern regions, and plans to use the oil and gas industry as a foundation for this

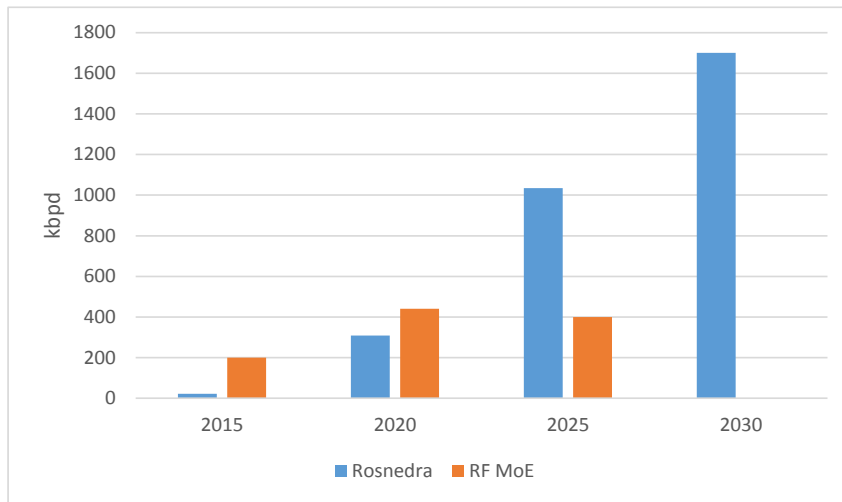
- New tax regime based on sliding royalty to incentivise investment

The Kremlin has clear geo-political ambition in the region, which goes beyond commercial logic – control of the northern sea route is a core strategy and Soviet military bases are being re-opened

Oil production has started (2 fields), the Yamal LNG project is set to come online in 2017 and a major discovery has been made in the South Kara Sea

Outlook for shale oil in Russia limited by sanctions

Estimated production potential of Russian shale oil



Location of Bazhenov in West Siberia

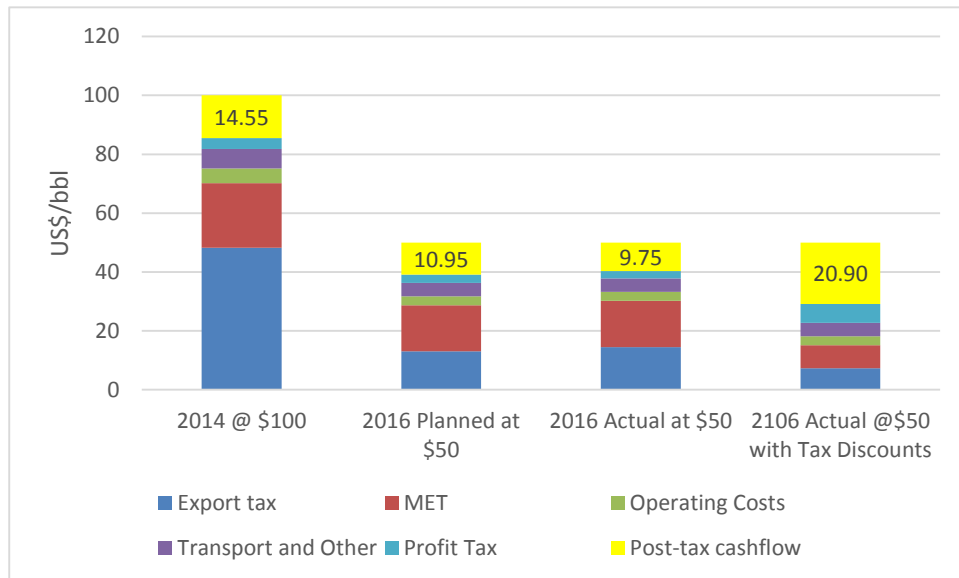


□ Self-Sourced Bazhenov Fractured Reservoirs Assessment Unit 11740102
□ West Siberian Basin Geologic Province 1174

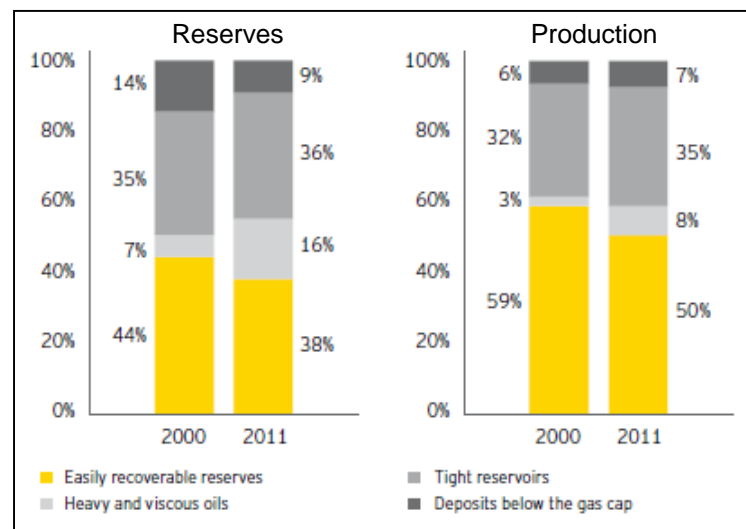
- Russian shale oil in Bazhenov had been identified as a key source of medium-term production
- Original expectations of 1-1.5mmbpd of production by mid-2020s
- Joint ventures involving Shell, BP, ExxonMobil, Statoil and Total were undermined by sanctions, which specify no transfer of technology for use specifically in shale reservoirs
- Key technology issues appear to concern multi-stage hydro-fracking and logging while drilling, where Russian companies lack proprietary technology
- Major long-term concerns likely to be infrastructure and governance – can Russia build enough rigs and are state companies the ideal players

Tax manoeuvre can benefit “hard-to-recover” reserves

Comparison of cashflow breakdowns



Increasing share of hard to recover reserves in Russia

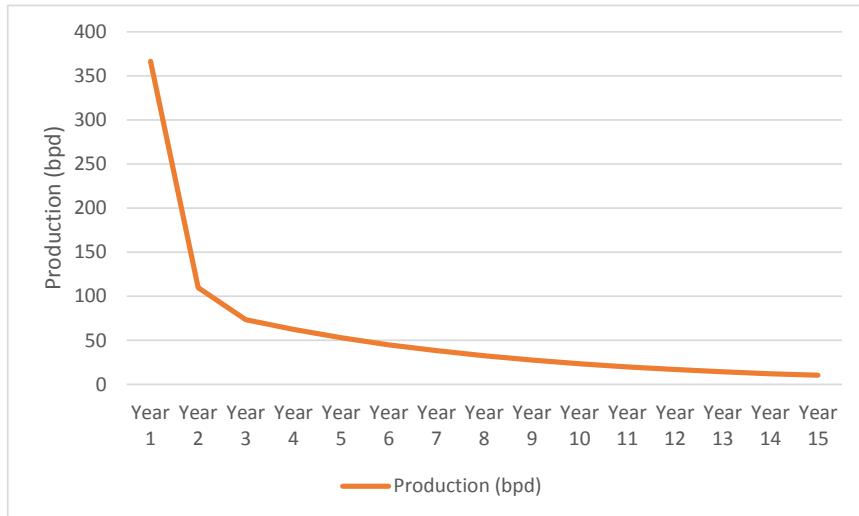


Source: Ernst & Young

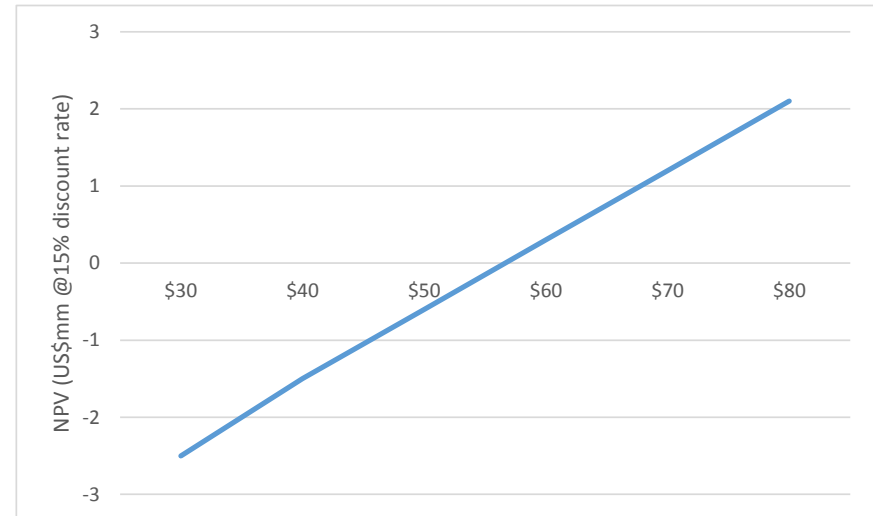
- **Cashflow for hard-to-recover oil with 50% discount to MET and export tax is greater at \$50 per barrel oil price as 2014 total cashflow at \$100 per barrel without discount**
- **MET discount can range up to 100% of specific reservoirs and types of crude oil, while export tax and also be reduced to zero**
- **However, these benefits have been partially offset by an adjustment to the 2016 tax arrangements**
- **A planned reduction in the export tax rate was postponed in order to generate an extra \$3 billion for the federal budget**

Economics of a Bazhenov well

Assumed flow rate of Bazhenov well



NPV sensitivity to oil price for Bazhenov well



- A standard Bazhenov well close to existing infrastructure in West Siberia would appear to breakeven at an oil price of around \$55-60 per barrel
- Companies such as GazpromNeft and Rosneft are currently maintaining a watching brief on Russian shale, without making any major financial commitments
- BP has signed a JV with Rosneft to explore the Domanik tight oil formation, committing \$300mm of exploration funds
- Bazhenov economics based on data from 2014, adjusted for devaluation of rouble
 - Original cost of Bazhenov horizontal well with multi-stage fracking was estimated at up to \$9mm – rouble devaluation would imply that this has fallen to around \$5mm
 - Initial flow rate assumed to be 50 tonnes per day (370bpd), declining to 15 tonnes per day (110bpd) in year 2
 - Zero MET assumed, in accordance with current tax rules
 - 50% of crude oil exported, 50% sold on domestic market

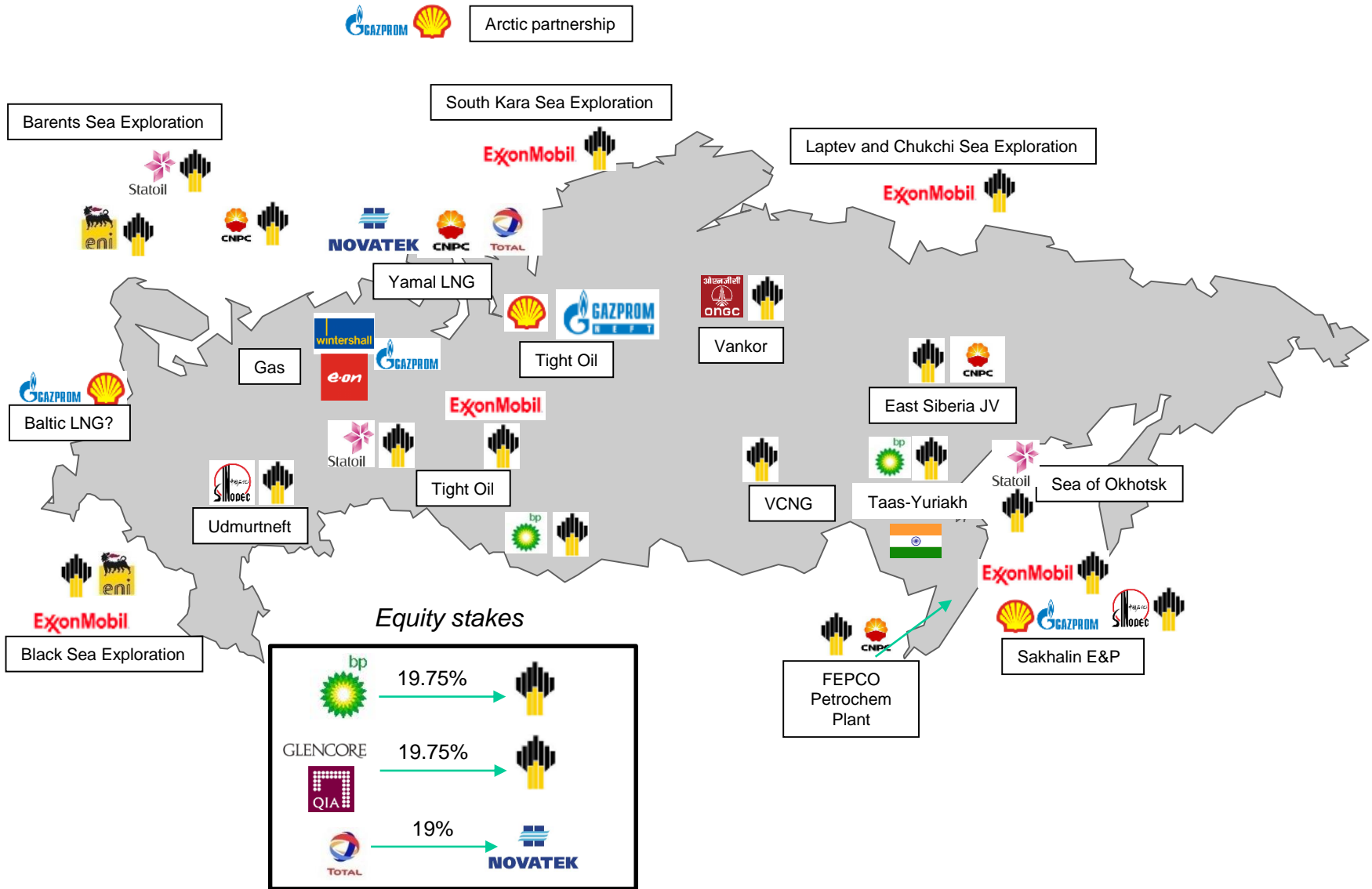
Sanctions have forced a strategic re-think

	US Treasury EO 13662 Directive 2 (Financing)	US Treasury EO 13662 Directive 4 (Technology)	US Commerce Dept. Export Controls	EU Finance Restrictions	EU Technology Restrictions
Transneft	Yes			Yes	Yes
Gazprom		Yes	Yes		
South Kirinskoye field (Sakhalin 3 - Gazprom)		Yes	Yes		
GazpromNeft	Yes	Yes	Yes	Yes	Yes
Lukoil		Yes	Yes		
Novatek	Yes				
Rosneft	Yes	Yes	Yes	Yes	Yes
Surgutneftegas		Yes	Yes		

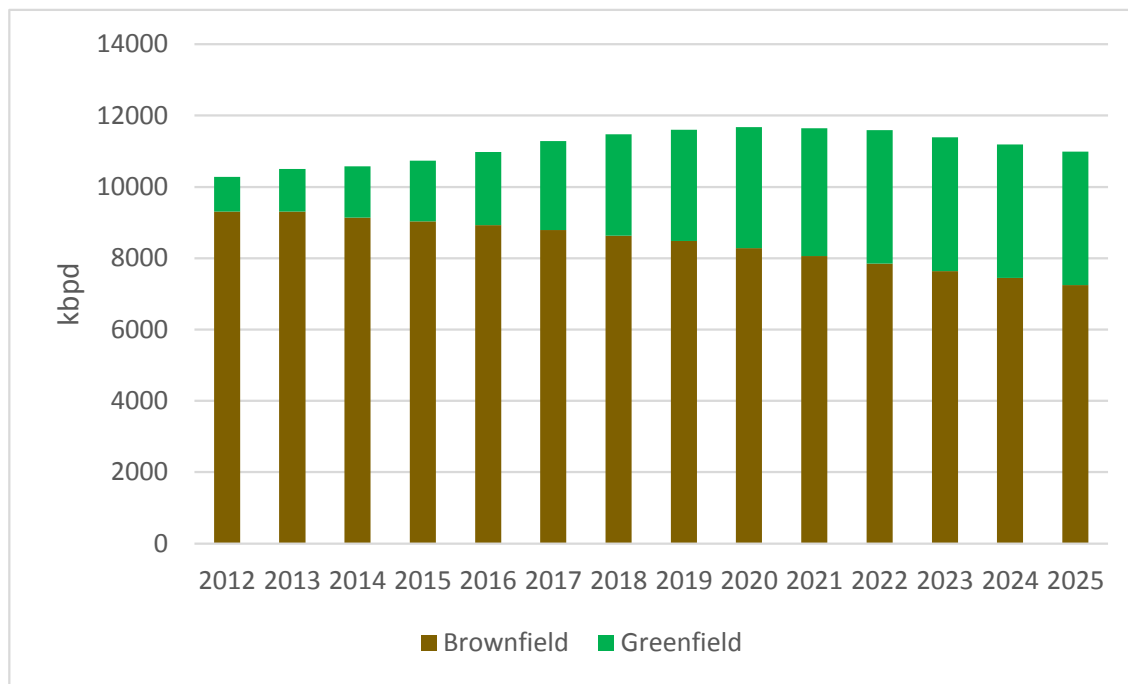
- **Technology bans in the Arctic and shale oil have had little impact on short-term production but have changed investment priorities**
- **Arctic investment acknowledged as irrational at current oil price; tight oil desirable but unachievable until sanctions lifted**
- **Key concerns with regard to sanctions concern financing:**
 - **Specific limits on finance-raising for certain companies**
 - **The downgrade of Russian sovereign debt to junk status, with a consequent impact on state companies' financing ability**
- **Re-focus on core assets and enhanced recovery**



International oil company activity in Russia – increasing Asian presence

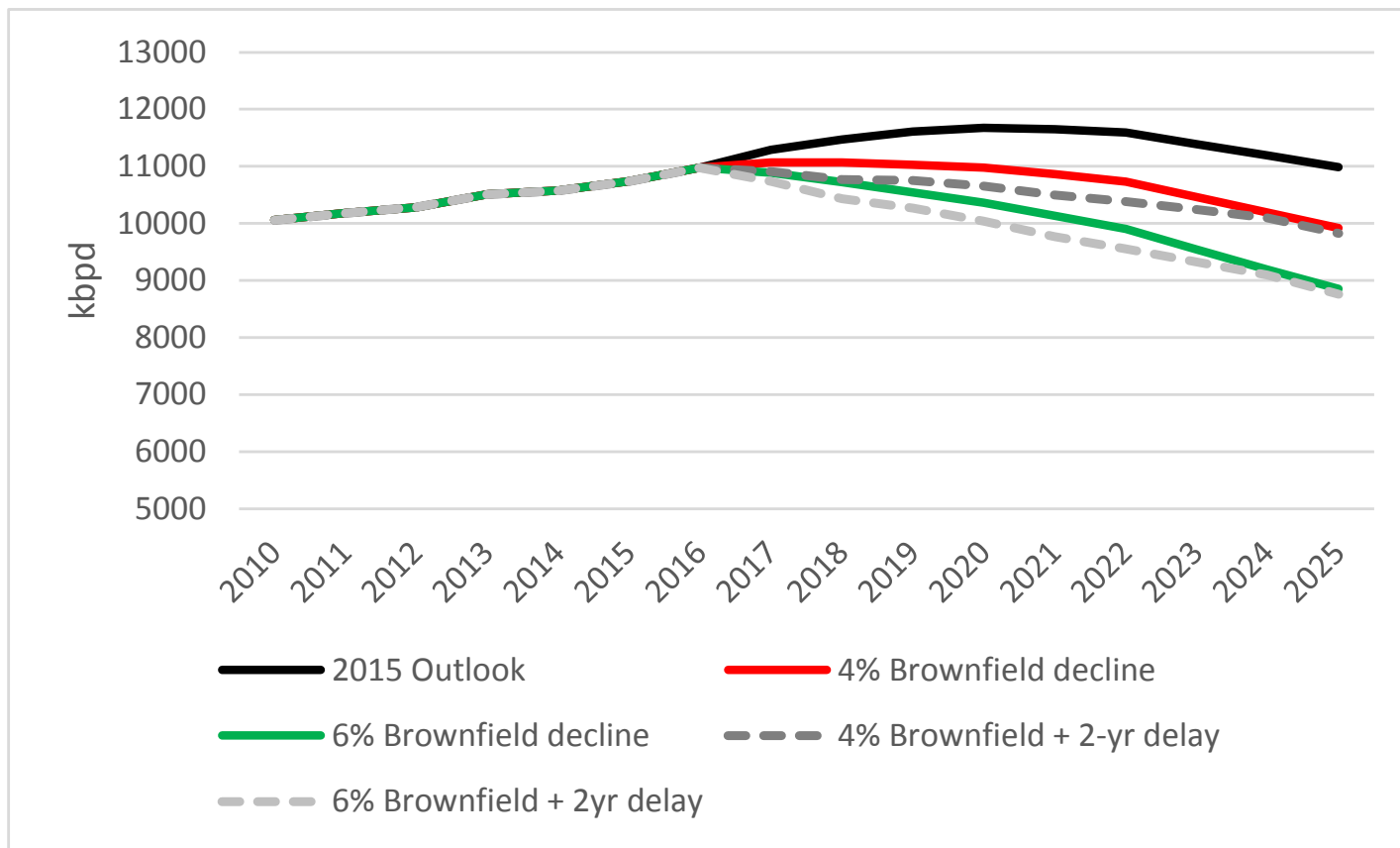


A Base Case Production Outlook



- **Assumes 2% brownfield decline curve**
- **No delay at green-fields already on production or set to commence in the next year**
- **2 year delay for all new fields that can realistically be delayed**
- **Result is a steady increase in output to 11mmbpd in 2020**
- **No production from tight oil or Arctic**

Downside scenarios underline the risks of getting the balance wrong

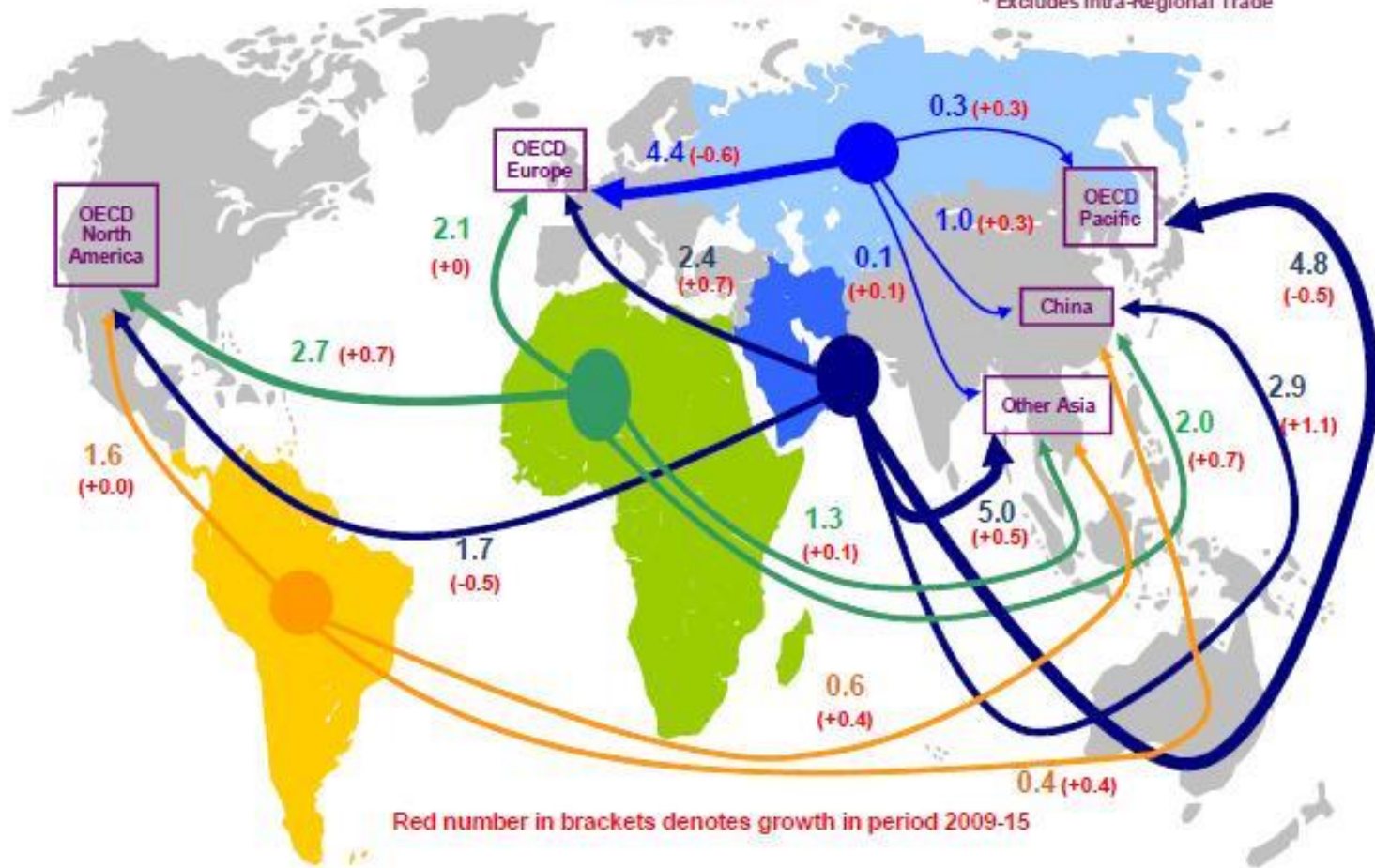


Russian government has a good track record in the post-Soviet era, though

Oil trade is becoming more competitive in a low price environment

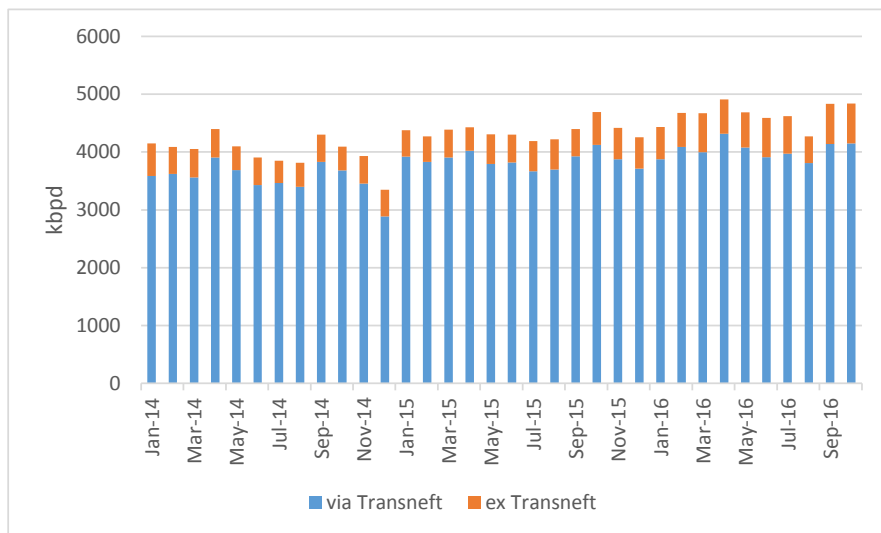
Crude Exports in 2015 and Growth in 2009-15 for Key Trade Routes*
 (million barrels per day)

* Excludes Intra-Regional Trade

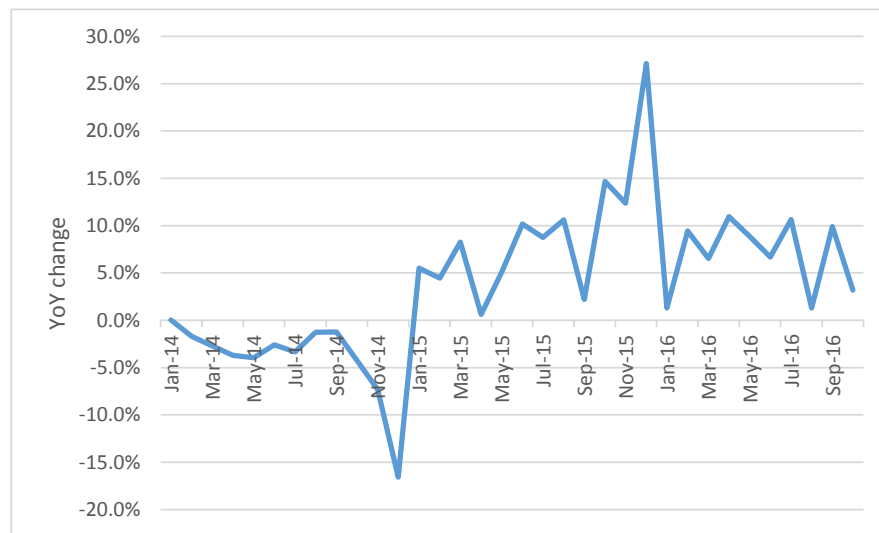


Crude exports continue to rise faster than output

Monthly crude exports 2013-2016



Year on year change by month 2014-16

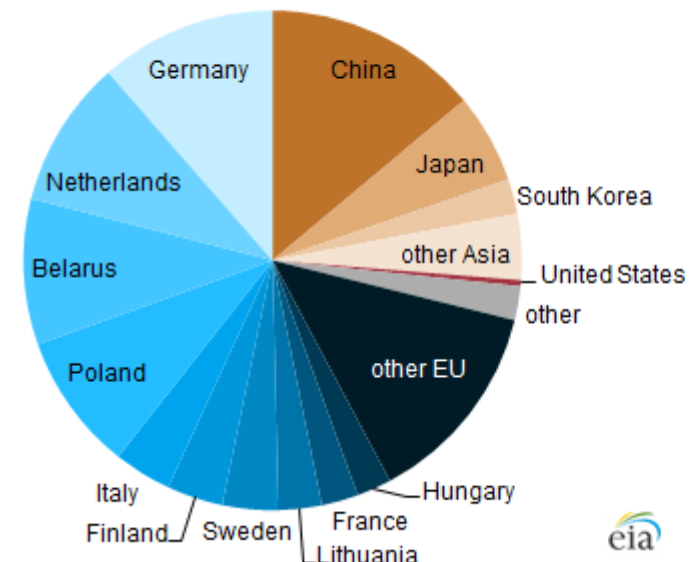


- Russian oil companies have been desperate to maximise dollar revenues and have therefore sought to increase crude oil exports
- This has been a consistent theme since Jan 2015, since when exports have not decreased YoY
- Domestic oil demand had also been in decline, due to the economic downturn, reducing the incentive to refine crude oil
- In addition changes in downstream taxation have also increased crude available for export
- Tax adjustments have meant that it has been less profitable to produce fuel oil, leading oil producers to reduce refinery throughput (as they could not afford upgrade plans)

Russia's oil export system – still focussed on the West

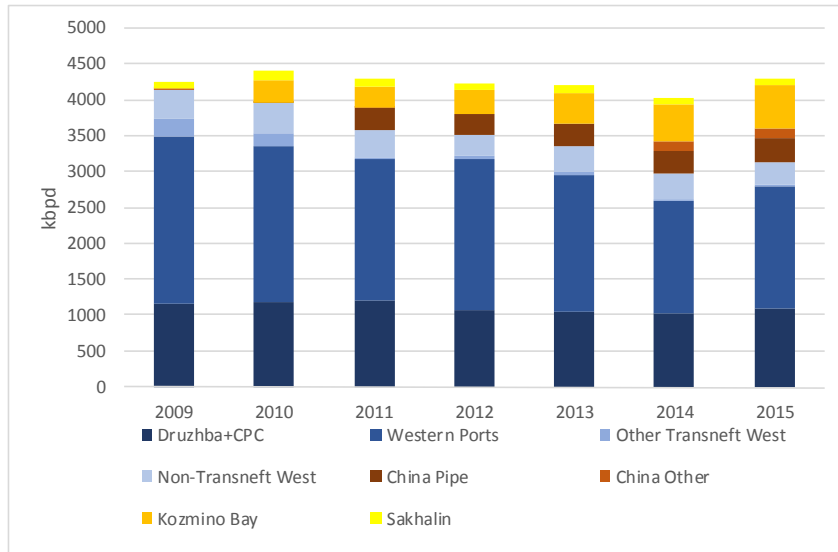


Russia crude oil exports by destination
total 4.75 million barrels per day

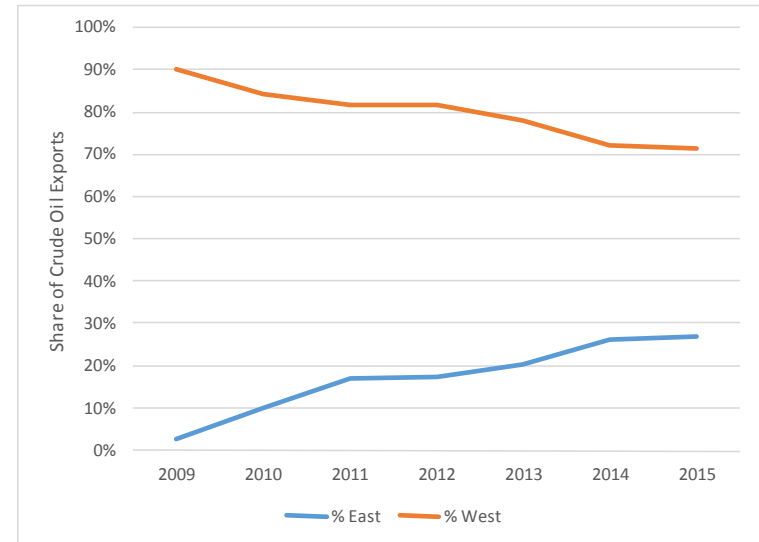


Exports are shifting towards the East

Crude oil exports by destination



Share of eastern oil sales increasing

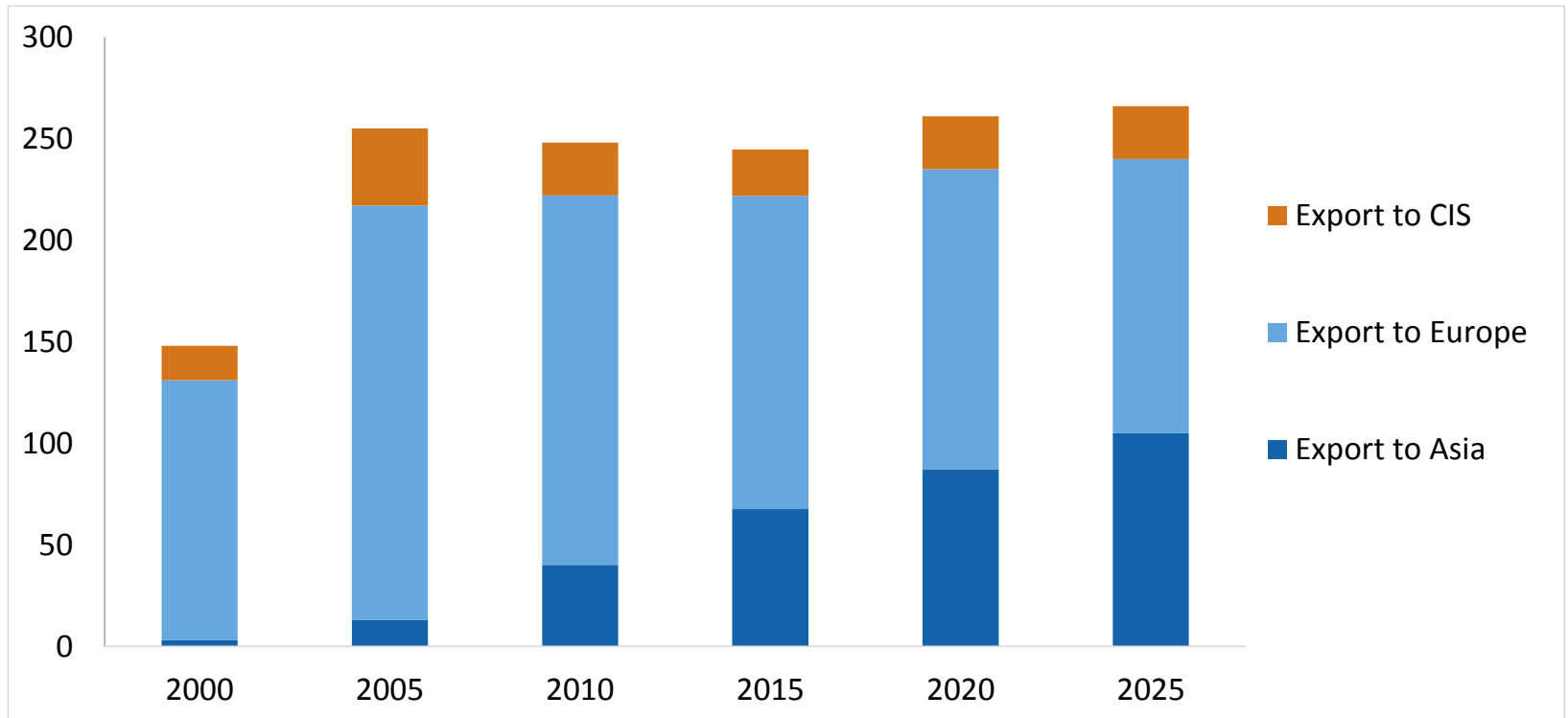


- Another trend has been towards eastern oil exports, which now account for more than 25% of the total
- The expansion of the ESPO and Rosneft's commitments to pre-payment sales to CNPC have driven this shift
- Further expansion of ESPO has been delayed slightly, but Rosneft is exporting oil via Kazakhstan to increase sales to China



Oil export outlook shifting further East

Russian oil exports



- There has been a clear trend towards Asia for oil exports, and this is expected to continue
- Expansion of the ESPO system will be at the heart of this strategy
- Exports via Kazakhstan are also playing an important role as Rosneft fulfils its commitments to CNPC's pre-payment deal

Russia's new oil link to Asia

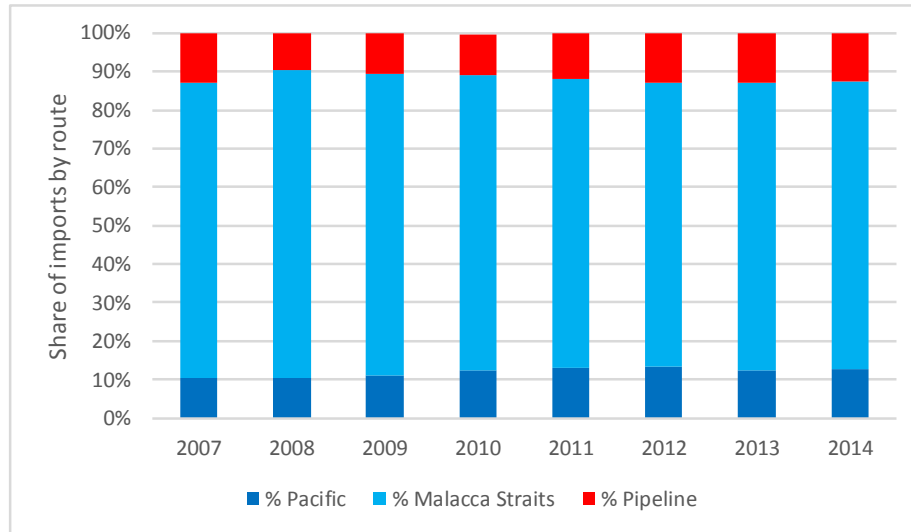
The East Siberia – Pacific Ocean (ESPO) Pipeline



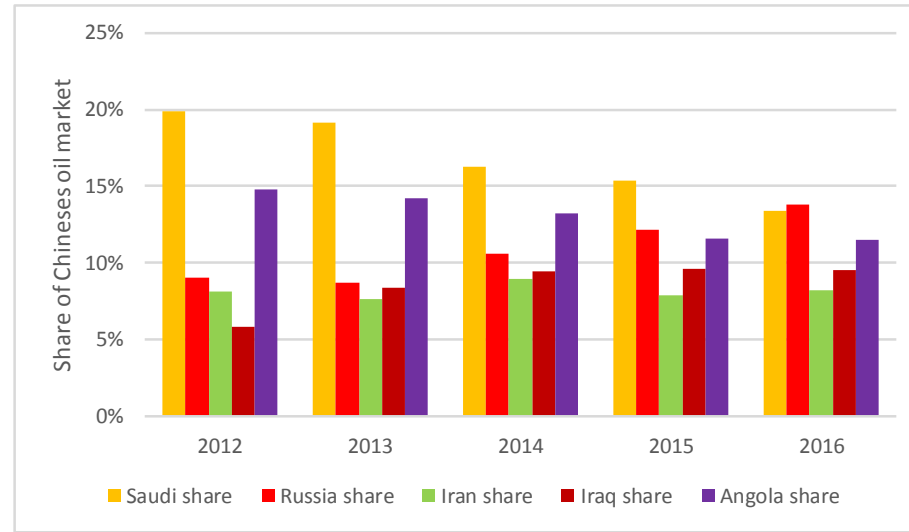
ESPO was completed in 2010 and will eventually export 1.6mmbpd to China and the Pacific Coast

Russia's increasing role in the Chinese market

China concerned about direction of imports



Russia became largest supplier in 2016



- China has been keen to diversify away from Middle Eastern crude
- It has also been concerned about receiving too much oil by sea via the Malacca Straits
- Russian oil provides a pipeline and seaborne option, plus high quality crude
- Russia has become China's largest supplier of crude oil in 2016

Conclusions

- Pre-2014 Russian oil production looked set to reach 11.5mmbpd by 2020s
- Impact of lower oil price and sanctions was initially significant
- Rouble devaluation has helped to offset impact for up to 3 years
- Russian oil companies have been forced to re-prioritise, and tax changes have helped to catalyse focus on brownfields
- Rosneft has the biggest financing problems, but is finding ways to generate short-term cash
- Its main problem is in downstream, where tax changes have hit simple refineries and created need for investment
- Shut down of some refineries and lower demand will free up crude oil for export
- Outlook for production beyond 2017 is more difficult if oil price stays low and benefits of devaluation unwind, but upside still exists
- Crude exports likely to remain flat at worst, and to be focussed more on Asian markets