



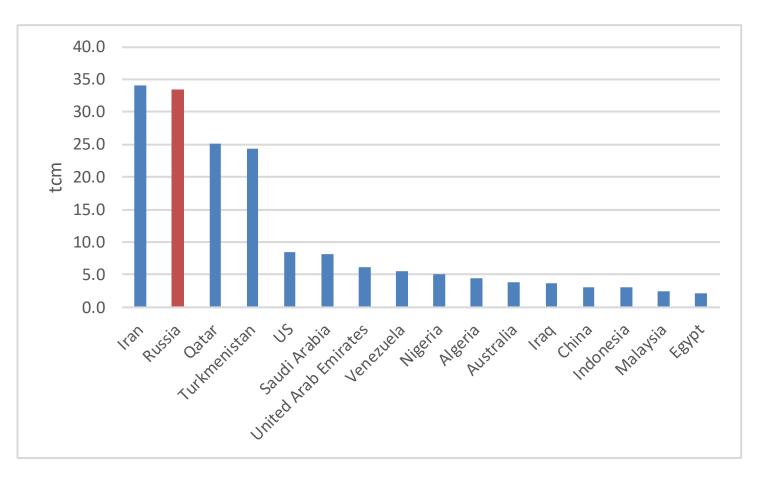


Russia Gas Sector

James Henderson

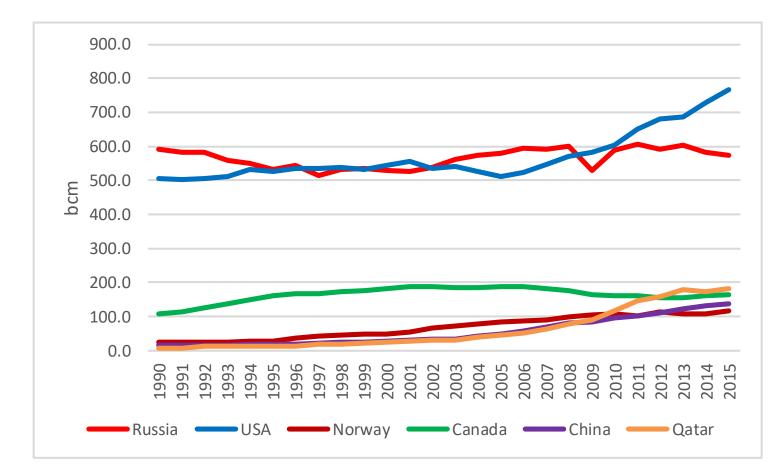


Russia is the world's second largest holder of gas reserves



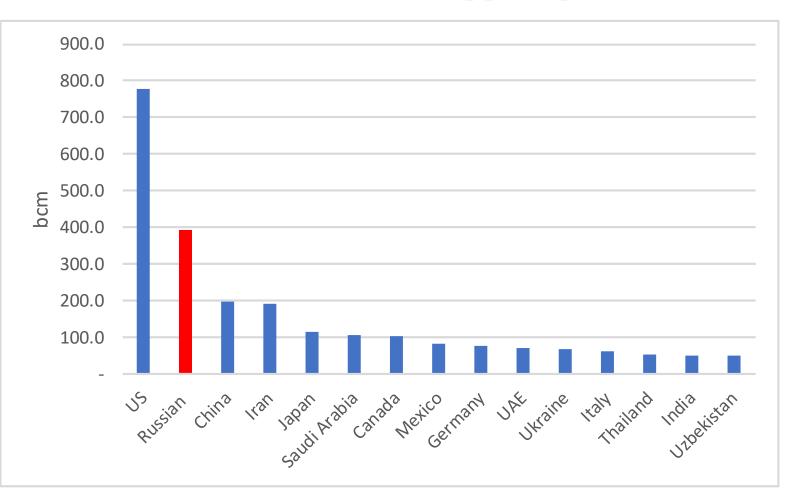
- Russia ranks only behind Iran in gas reserves, although the country's own estimate is that it has 44tcm of ABC1 reserves
- 33tcm is equivalent to almost 200 billion barrels of oil reserves, double Russia's provide oil reserves

Russia is also the second largest producer



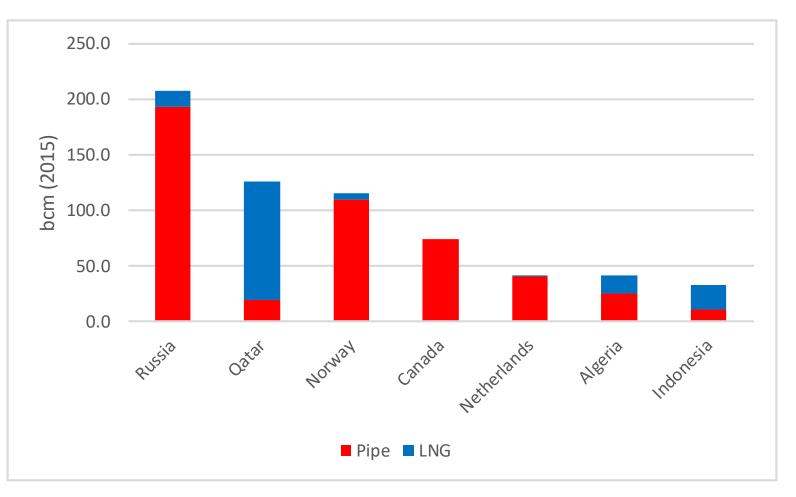
- Historically Russia (Soviet Union) has been the world's largest gas producer
- However, following the shale gas boom, it has now been overtaken by the USA
- Russia's problem is not a lack of resources, but a lack of markets

Russia is also the second biggest gas consumer



- The Russian economy depends on gas it accounts for 50% of energy demand
- Two thirds of power generation is gas-fired, and subsidised prices support industry
- The Russian population is very dependent on gas for warmth in winter

However, it is by far the largest exporter



- Russia is a "gas superpower" in terms of its impact on the global market
- It exports by pipeline to Europe and the FSU and by LNG to Asia, and is expanding its gas network

growth from the gas

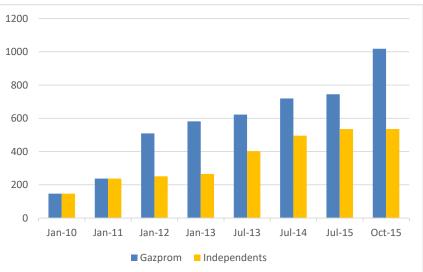
industry

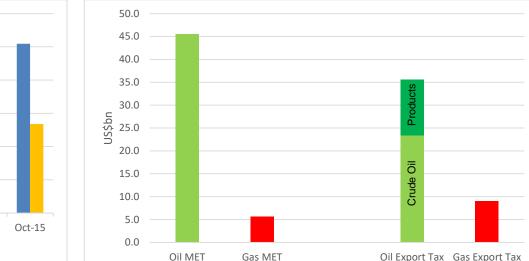
Russian State is the major stakeholder with a wide agenda, seeing gas as an important domestic and international political tool

State	Gazprom	IGPs	Consumers
 Security of gas supply for the domestic consumers including sensitive regions and social groups Low transportation 	 profitability and financial sustainability Stable production volumes 	 profitability and financial sustainability Access to the new markets domestically and 	 Acceptable (low) gas and electricity prices Reliable supplies (including for the non-payers)
 tariffs Low gas prices affordable for the industry and for the population 			 Gazification Transparent and easy access to gas supply services
Ensure politically important infrastructure projects and external gas policy		Stable production volumes	
Ensure tax revenue			

Gas taxation is not nearly as important as oil

Comparative rates of MET for Gazprom and Independents





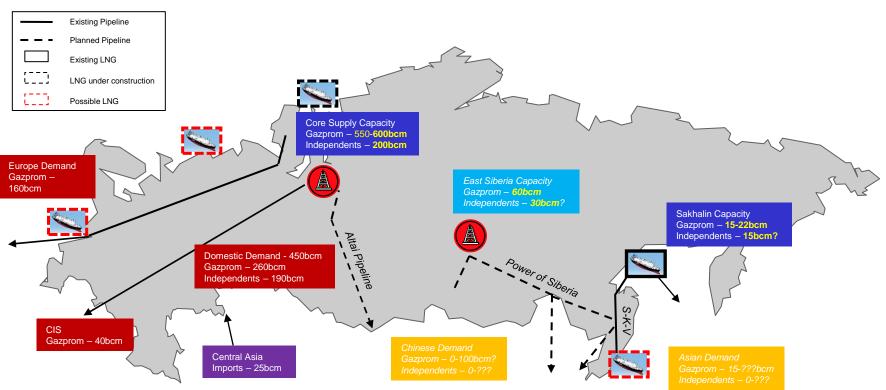
Comparative contributions of oil and gas taxes to federal budget

- Export tax rate is 30%, and is only paid on pipeline gas exports (i.e. is only relevant to Gazprom)
- LNG is free of export tax
- MET is based on a very complex calculation, involving a base tax adjusted for a series of field characteristics and location
 - Gazprom pays a different MET rate to Independent producers, in particular because in Q4 2015 the Russian government sought to extract extra tax revenue to fund the budget deficit
 - Gazprom paid RR745/mcm versus an average for the Independents of around RR550/mcm
 - However, Gazprom's rate was increased by 36.7% in order to generate an extra RR100bn+ for the government
 - Gas contributed 7% of budget revenues in 2015 compared to 36% from oil

rate (RR/mcm)

MET

Russia has a strategic geographical advantage



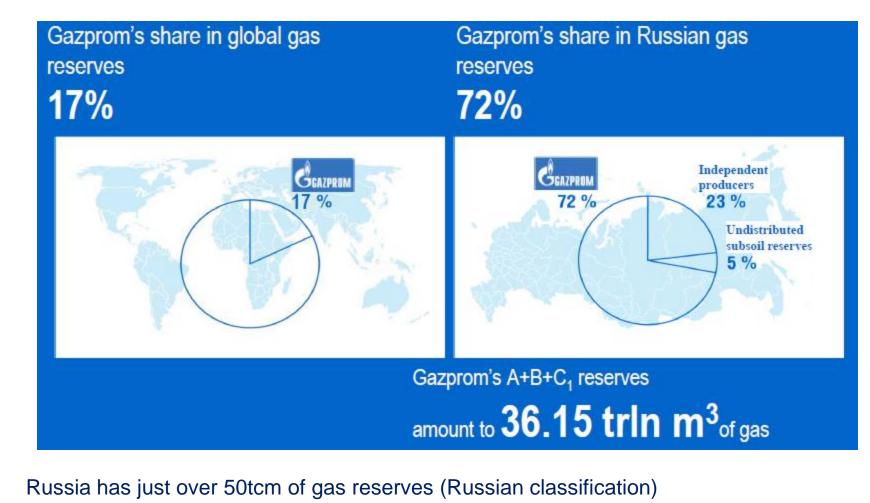
- Russia is strategically placed between the world's largest gas importing regions
- Gazprom's surplus capacity gives it a strong bargaining position, especially in Europe
- With Europe being the sink for surplus LNG, Russia's gas marketing strategy is of vital importance to global gas players
- Russian gas can also compete in Asia, although one window of opportunity has arguably been missed

The Russian Gas Matrix

SUPPLY SOURCES:	2002	2008	2012	2013	2014	2015	2016
Gazprom production	522	550	488	487	444	419	419
Non-Gazprom production	73	114	169	181	196	216	221
Central Asian imports	34	61	31	33	29	26	19
TOTAL	629	725	688	701	669	661	659
MARKETS:							
Russian gas demand (UGSS)	412	462	465	461	458	444	436
Exports to CIS countries	89	89	63	57	42	38	26
Exports to Europe (physical Russian gas)	129	159	139	163	152	163	179
LNG Exports to Asia	0	0	14	14	14	15	16
Change in Storage	-1	15	7	6	3	2	2
TOTAL	629	725	688	701	669	661	659

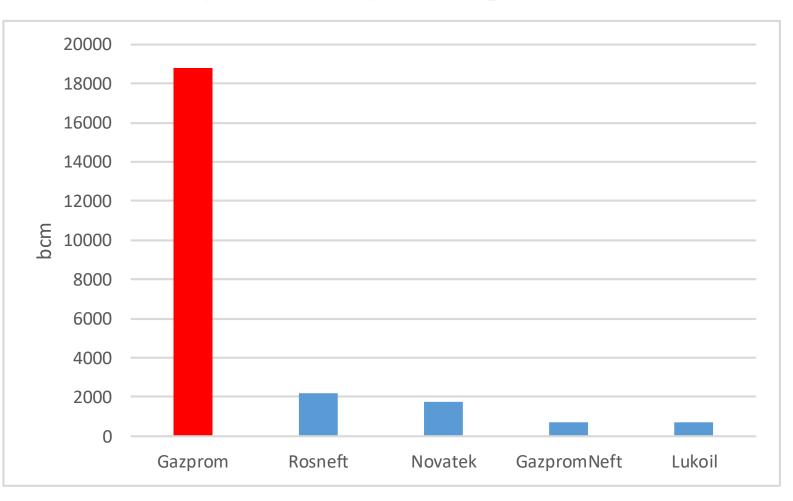
- Supply and demand for Russian gas is only balanced because of decline in Gazprom production
- Domestic demand is stagnant and independents are gaining market share
- CIS countries are looking to diversify away from Russia
- European demand has been in decline and EU now wants to reduce reliance on Russia
- Emergence of Asia is currently based on one LNG plant on Sakhalin

Russia's gas resources – Gazprom still dominates



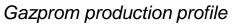
- Gazprom continues to dominate, but the issue of available resources is becoming less relevant
- The real challenge in 2016 is monetisation, as demand has come under pressure

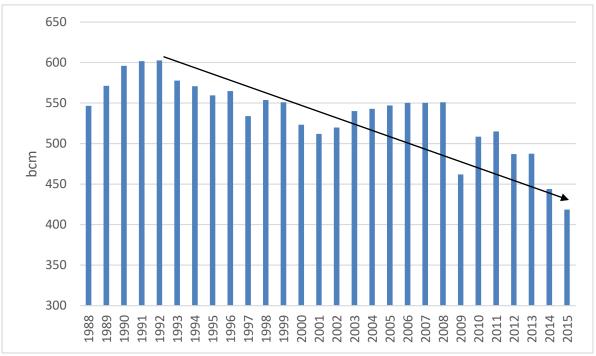
Comparison of proved gas reserves



- Although Gazprom is by far the largest company, Rosneft and Novatek also have global scale gas reserves
 - By comparison ExxonMobil has 1.75tcm of reserves and BP has 1.35tcm

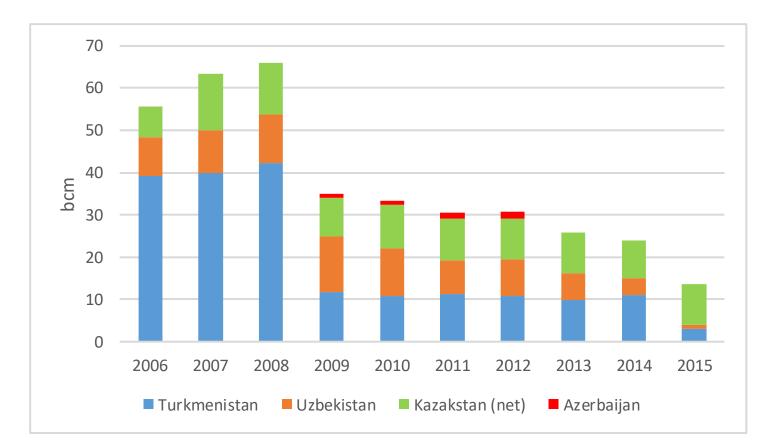
Gazprom's production has been in decline throughout the post-Soviet era





Gazprom production peaked at just over 600bcm in 1992 It declined relatively consistently to 2000, before recovering for a period as Zapolyarnoye was developed to meet domestic demand Since 2008, however, production has fallen by more than 100bcm, to reach a post-Soviet low of 420 bcm in 2015

Imports from Central Asia are also down sharply

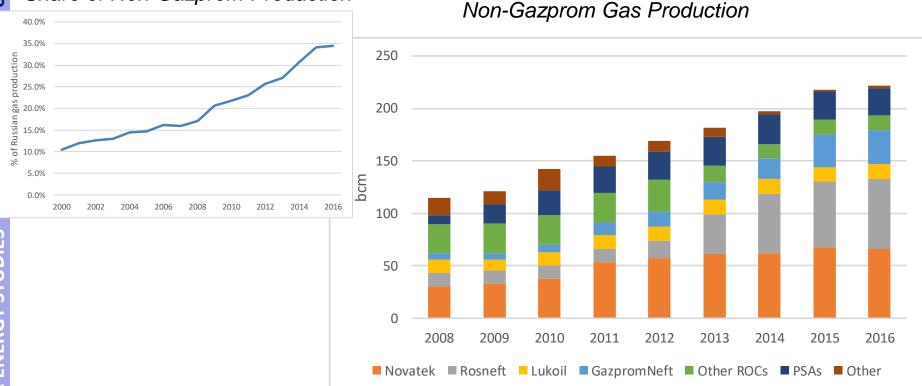


- Russia used to transit Central Asian gas to Europe
- Turkmenistan has almost ceased all sales through Russia, turning to China instead
- Kazakhstan is the only Central Asian country with any significant gas ties to Russia

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The "Independent" Sector has emerged

Share of Non-Gazprom Production



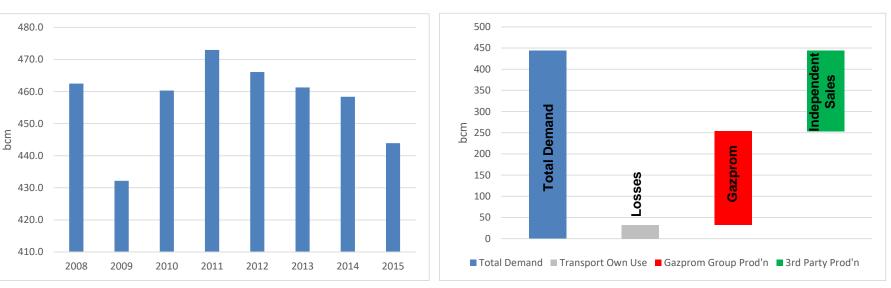
- Historically non-Gazprom producers only produced "associated" gas, which was
 essentially a waste product
- Now they have a market for this gas other than Gazprom and also produce natural "dry" gas
- Novatek and Rosneft have led the way in production growth and NGP output now accounts for over one third of the Russian total

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The changing Russian domestic gas market

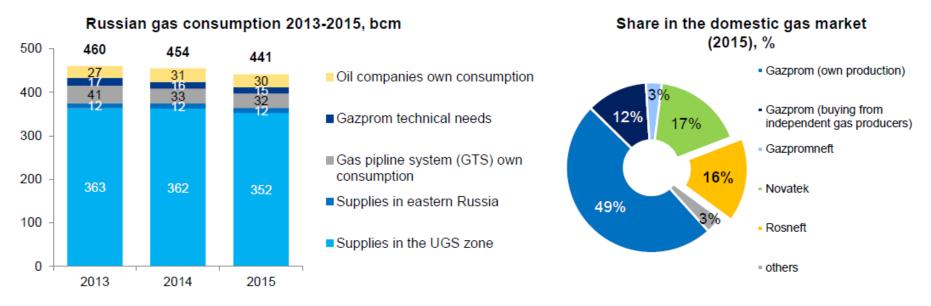
Gazprom's market share down to 50% in 2015

Russian gas demand has fallen by 6% since 2011



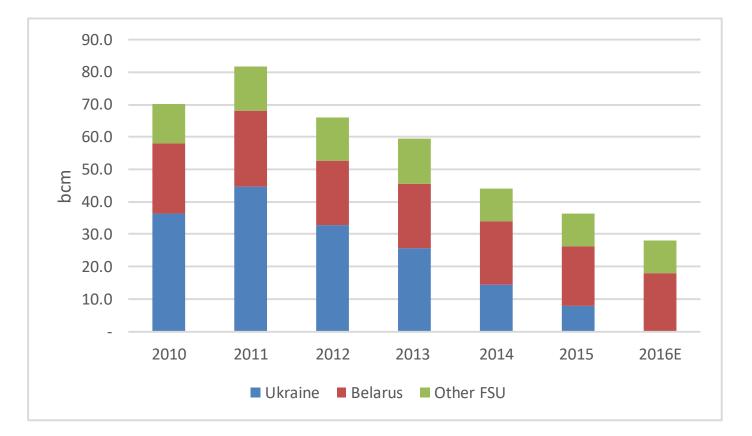
- Rising prices and economic stagnation have dampened demand in the domestic market
- Alternative sources of supply have also been encouraged
- Gazprom has been limited in its ability to compete due to regulated prices, despite requests to allow discounts
- Independents have offered discounts and more flexible contract terms to win significant market share
- Gazprom's market share has fallen to only 50%, a landmark event

Russian gas market breakdown



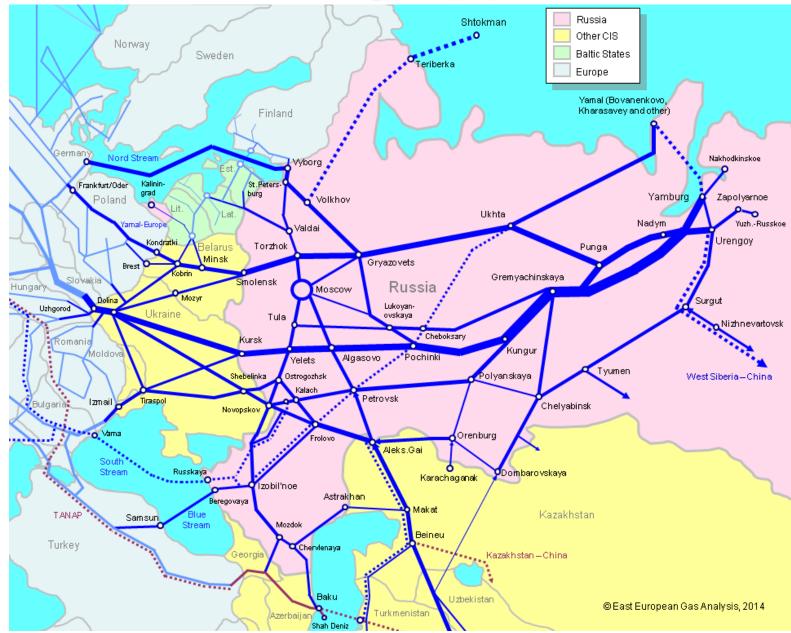
- A significant amount of gas is used for technical purposes
- Losses are also very large
- A triopoly of major gas companies has emerged Gazprom is the largest, and controls the pipeline system, but it is no longer a monopoly

Exports to FSU countries have collapsed

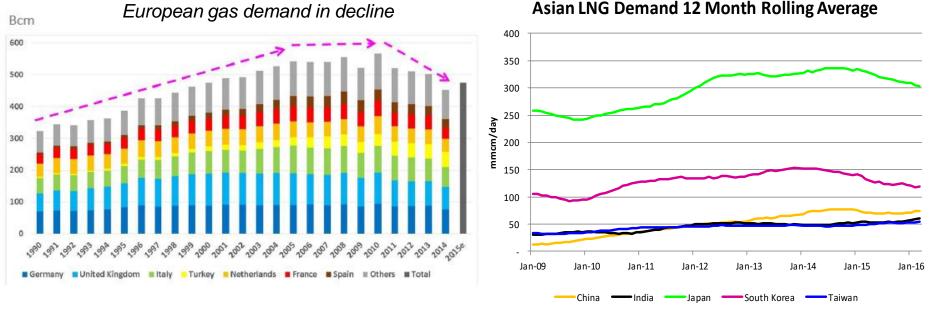


- Ukraine has managed to reduce Russian imports to zero in 2016
- Russia has lost one of its largest export markets, and is now exposed because it still transits gas to Europe through Ukraine
- The Soviet energy system is gradually unwinding, but the transition process has been long and painful

Russia's western gas pipeline network



Gas demand is declining in Europe and growth has slowed in Asia

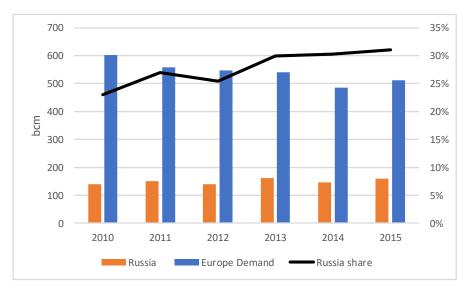


- Growth of renewables and cheap coal have undermined demand in Europe, combined with the economic downturn
- Slowing economic growth in Asia, especially in China, has tempered demand growth
- Gas is the cleanest fossil fuel, but the economics of coal are currently winning

Focus on European market will remain core Gazprom strategy for many years

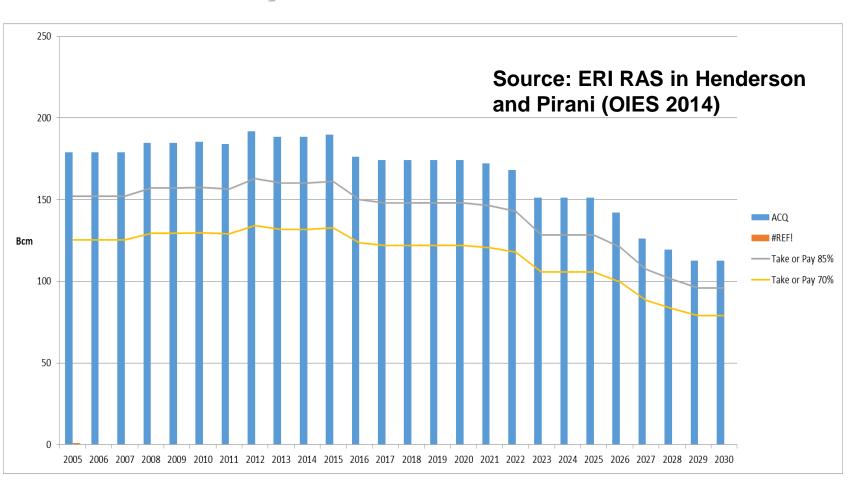
Gazprom sales to Europe

Gazprom market share in Europe



- Gazprom deliveries to Europe have surged in 2016, to reach 179bcm, a post-Soviet record
- Much of this growth was driven by cold weather and by a lack of alternative supply to Europe
- Not surprising that Gazprom is focused on maintaining European market share at 30%+; it remains key revenue generator
 - Uncertainty over political dimension is main doubt

Gazprom's long term take or pay contracts with European customers to 2030



Even at 70% ToP, Gazprom's average annual sales exceed 100 Bcm/year until the mid-2020s

Russian-European Relations in 2016/17

- Crisis in Russian relations with Europe
- Sanctions and counter-sanctions resemble a `trade war'
- Very difficult to conduct "normal commercial" gas relations in this environment or even to arrange meetings to discuss: DG COMP inquiry, OPAL, South Stream, general regulatory issues
- Hard to see relations "getting back to normal" even if Ukraine political situation settles down
- Winter Deals have been put together to avoid a gas crisis in Ukraine and Europe, but these are by their very nature ad hoc and short term
- Russia unclear as to whether it wishes to continue using Ukraine transport system to transit gas to Europe

DG COMP Proceedings Against Gazprom: the April 2015 Statement of Objections

DG COMP's press release covered 3 issues:

- Hindering cross border sales (territorial restrictions): Poland, Czech Republic, Slovakia, Bulgaria, Hungary, Latvia, Estonia, Lithuania – destination clauses found in some contracts (and removed)
- Alleged unfair pricing policy: "the specific price formulae ..have contributed to the unfairness of Gazprom's prices [and] seem to have largely favoured Gazprom over its customers" – relevant countries: Bulgaria, Estonia, Latvia, Lithuania and Poland
- Concerns on transport infrastructure: Bulgaria/South Stream (not going ahead); Poland/Yamal

Settlement now reached with Commission, but some member states and Ukraine continue to object

The 3rd Package and the GTM: the biggest impact is potentially on Gazprom



Number of borders crossed to reach a delivery point	Volumes, bcm/y	
1	26	
2	30	
3	43	
4	9	

Source: Yafimava 2013

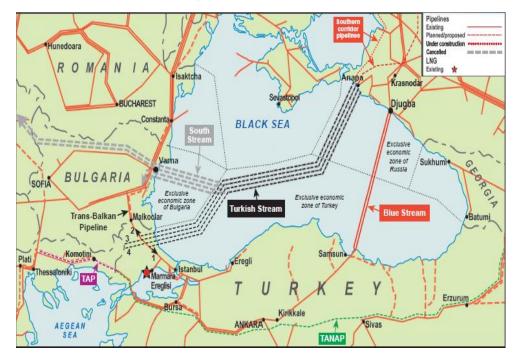
Gazprom's huge volumes need to cross multiple borders/jurisdictions before they reach delivery points - not comparable to any other supplier!

The Nord Stream Pipelines



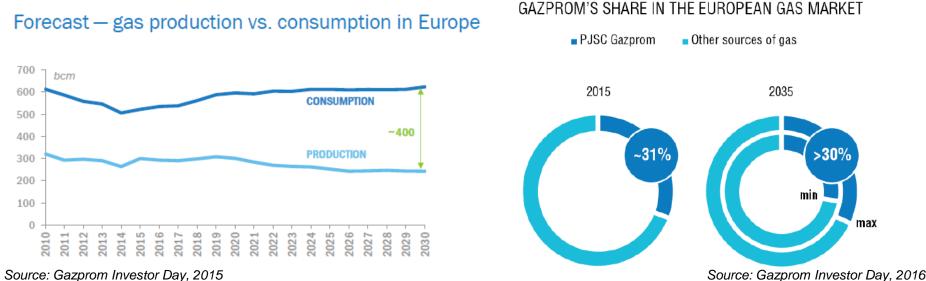
Gazprom cannot use more than 50% of OPAL (but it is assumed that the EC would lift the restrictions in the event of transit crisis)

Black Sea Pipelines – 1, 2 or none?



- South Stream to Bulgaria undermined by EU regulations and cancelled in December 2014
- Turkish Stream proposed as a replacement up to 4 strings providing gas to Turkey and southern Europe
- Turkey-Russia relations collapsed, leading to postponement, although rapprochement may be on the cards
- Key question is how will any new pipe interact with European market and EU politics

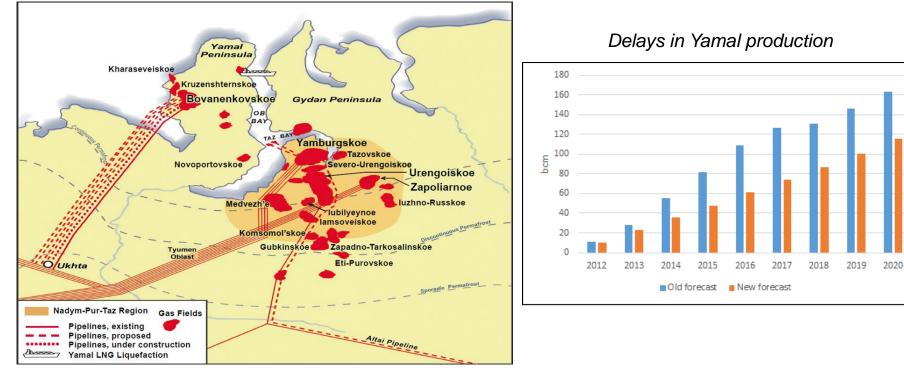
Gazprom export strategy to Europe based on growing import requirement



Source: Gazprom Investor Day, 2015

- Gazprom believes, not surprisingly, that its place in the European gas market is relatively secure
 - European import set to rise
 - Indigenous production in long-term decline
 - Alternative sources of competitive gas are not abundant
- Target is to at least maintain market share, which implies some small growth in volumes
- What will be the reaction to increased availability of LNG in short-tomedium term?

Gazprom's western production focussed on Yamal, but delays are driven by market forces



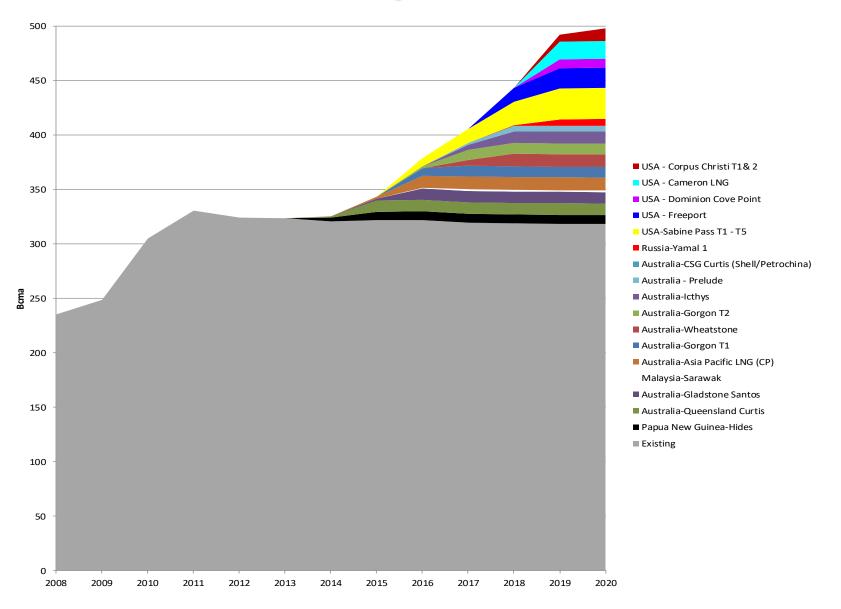
- Gazprom has seen its production profile shift away from its core West Siberian mega-fields
- Gazprom committed to development of Yamal peninsula in 2005/06, just before the economic crisis and impact of shale gas
- It is now stuck with this strategy, and is having to rein in production plans due to lack of demand
- However, Yamal is a long-term, low-cost resource

Increasing gas bubble in the domestic market

Gazprom has started Bovanenkovo, Rosneft and Novatek have extremely ambitious plans on gas production expansion, while obligatory utilization of the associated petroleum gas stimulates growth of VIOCs gas output

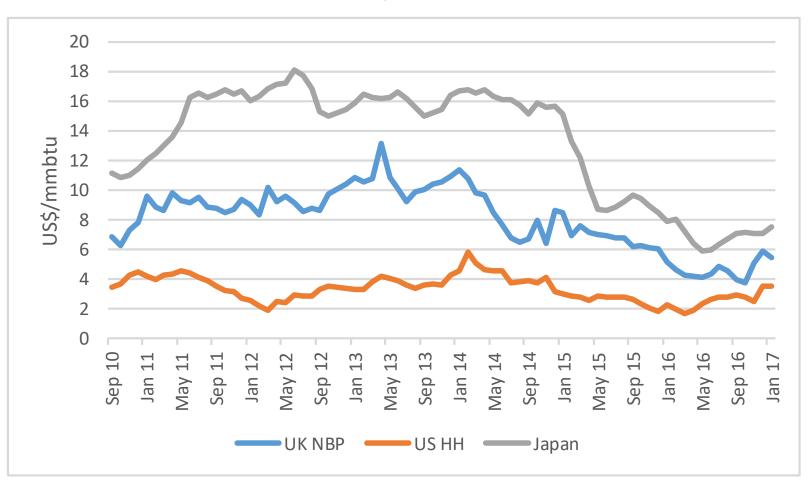
Company	Production in 2015, bcm	Unutilized potential and capacities additions under development by 2020, bcm
Gazprom	406	~155
Novatek	52	~48
Rosneft	42	~48
VIOCs (APG)	46	~15
TOTAL	635,5	266

Meanwhile growth in LNG supply is about to explode



Gas prices are converging due to global oversupply and increased LNG trading

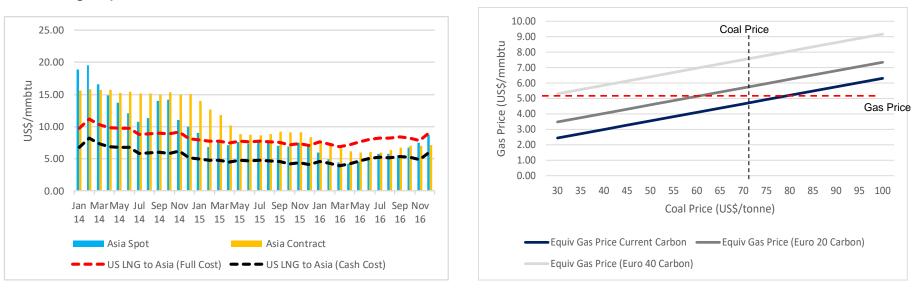
Global gas prices



Competitive pressure on Russian gas

Asian gas prices versus US LNG at SRMC and LRMC

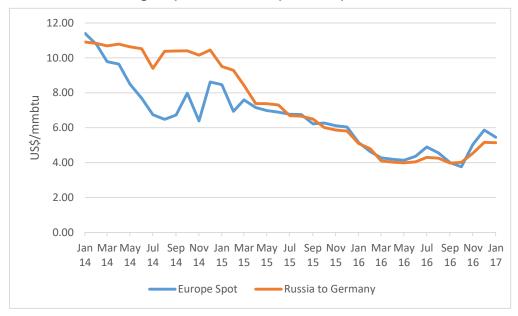
Gas price versus coal in Europe



- Key decisions to be made about the competitive position of Russian gas
- Resource base not a issue; key question remains commercial
- How will Gazprom (and other Russian exporters) compete with LNG?
- How will Russian gas compete with alternative fuels?
- Can Russian gas find a significant role in the Asian gas market?
- Will Gazprom be the only exporter of Russian gas via pipeline for much longer?

Gazprom has adjusted its pricing strategy

Russian gas price in Europe vs Spot Price

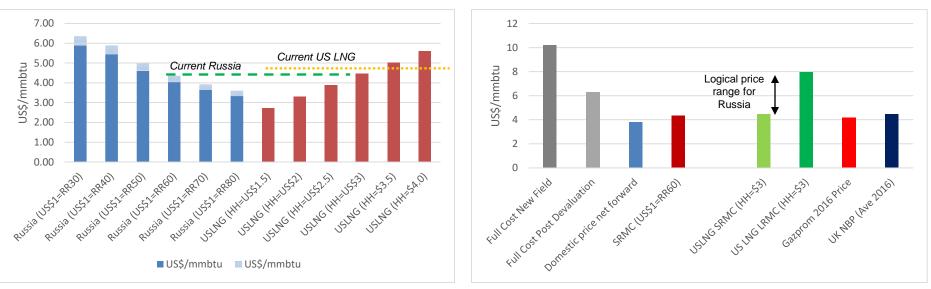


- Gazprom has demonstrated that it is prepared to shift towards market prices
- Price formation in long-term contracts may still be nominally linked to oil prices, but reality shows that actual prices are close to spot levels
- Renegotiation of contracts has introduced discounts, rebates and spot-linked pricing, and Gazprom is increasingly trading on European hubs
- Oil-linked price look set to remain competitive in 2017 despite recovery in oil price, although if LNG wave eventually arrives then a reaction may be required

Russian gas can be very competitive with US LNG in Europe

Russian pipeline gas versus US LNG at SRMC

Full comparison of Russian and US gas to Europe



- On a short-run marginal cost basis (SRMC) the key variables are the US\$/Rouble exchange rate and the price of Henry Hub gas
- At current levels Russian gas can compete with, and slightly undercut US LNG in Europe
- In the longer term, Russia would logically adopt a strategy to keep the European gas price between the short and long-run cost of US LNG \$4-8/mmbtu
 - Allow some US LNG to enter Europe but prevent new FIDs based on European economics

New field developments focused in East



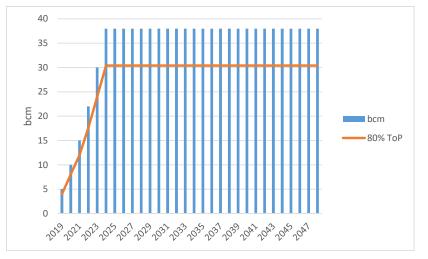
- Gazprom plans to develop the Chayanda and Kovykta fields in East Siberia, with a combined capacity of 60bcma
 Both fields are targeting the export market, now via pipeline to
- Both helds are targeting the export market, now via pipeline to
 China rather than the previous pipe and LNG plan
 LNG now focussed on Sakhalin Island, although growth in doubt

Program **Gas Researc** latural

Gazprom's pipeline deals can help to set a benchmark price in China

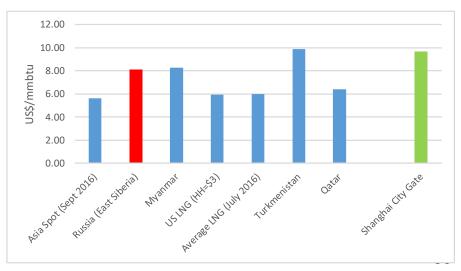
Power of Siberia:

- a 30 year contract, with peak flow of 38bcma
- ramp up period of five years, starting in 2019
- Miller quoted as saying that total value of contract is \$400bn
- range of prices is \$10-11/mcf, implying \$12-13 on east coast at a \$100 oil price
- At a \$50 oil price the economics of the project may be under question, although rouble devaluation will reduce costs
 Altai pipeline unlikely to move ahead because of low prices



Profile of Russian gas sales to China

Comparable gas prices in Shanghai (2016)



Altai pipeline presents a negotiating challenge, but low upstream cost is an advantage

- Altai can link West Siberian gas to China, providing a potential for arbitrage with exports to Europe
- China has stated a clear preference for Power of Siberia, and negotiations on a western route have stalled
- Upstream cost would be very low, which could make gas competitive with China's alternatives in the mid to long-term
- However, transport distance in China is a major issue, and low current gas prices are making negotiations very difficult

Altai pipeline route from West Siberia



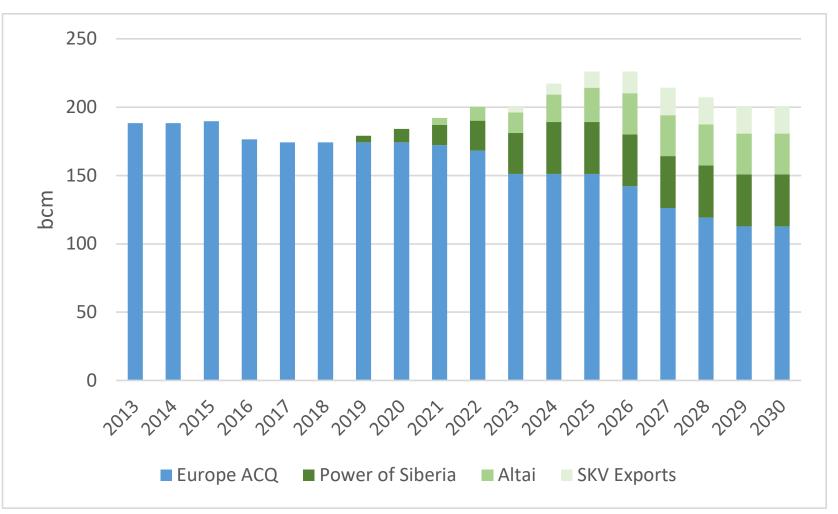
Option of third pipeline route could make sense if Sakhalin gas resources confirmed

- The possibility of a third pipeline route to China was raised during a Putin visit to Beijing in Sept 2015
- Appeared to be a desperate attempt to sign an MoU in absence of Altai agreement
- However, it could make sense as SKV pipeline already in place
 - Extra compression would be needed to expand capacity from 6bcm to 30bcm
- Exxon and Rosneft had a pipeline export plan in 2006
- SKV could be an export route for Sakhalin 1 gas or surplus output from Sakhalin 3 licence

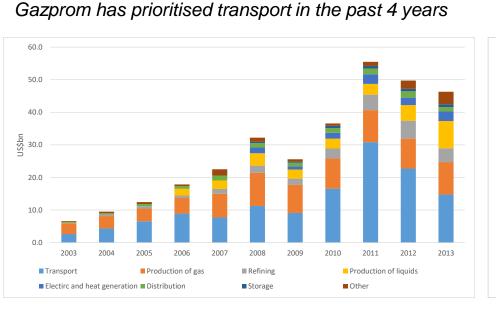
S-K-V pipeline route offers 3rd export alternative



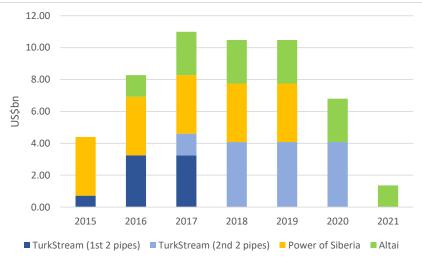
Gazprom's Goal of a Balanced Export Portfolio



Can Gazprom afford all its new pipeline plans?



Rouble devaluation has helped cost of pipelines



*Assumes 90% of capex will be Russian materials and labour and an exchange rate of RR60/\$

- Gazprom has spent \$20bn p.a. over the past three years on its transport business
 Deck coney for three new lines is likely to be a \$40bn p.a. and
 - Peak capex for three new lines is likely to be c.\$10bn p.a. and could be lower if Turkish Stream 3&4 are delayed

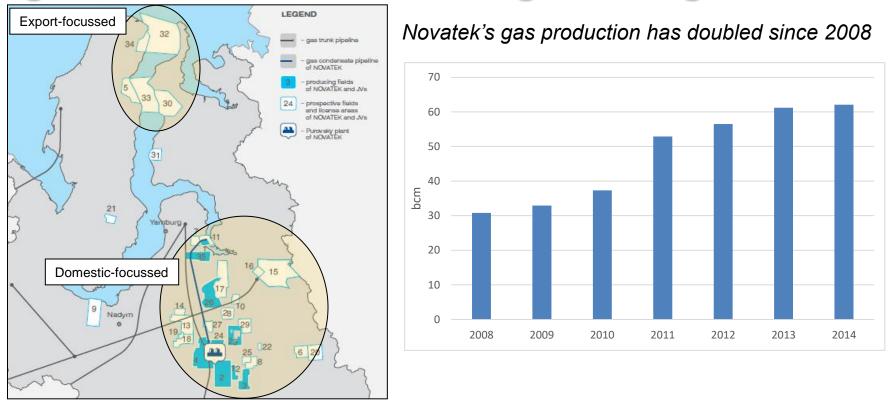
Gazprom capex turns cashflow negative in new price environment

Free cashflow turns negative even

Capex forecast (without Altai) without Altai \$80,000 \$45,000 Gas distribution and \$60,000 \$40,000 storage \$40,000 \$35,000 Electricity and heat generation ШЛ \$20,000 \$30,000 JS\$ Crude oil refining \$-\$25,000 \$(20,000) \$20,000 Gas processing \$(40,000) \$15,000 \$(60,000) Gas transportation \$10.000 2008 2009 2010 2011 2012 2013 2014E 2014E 2015E 2016E 2017E 2019E 2020E 2018E \$5,000 Crude oil production \$0 2015E 2016E 2017E 2018E 2019E 2020E 2014E Operating cash flow Gas production Investing cash flow, net - Free cash flow

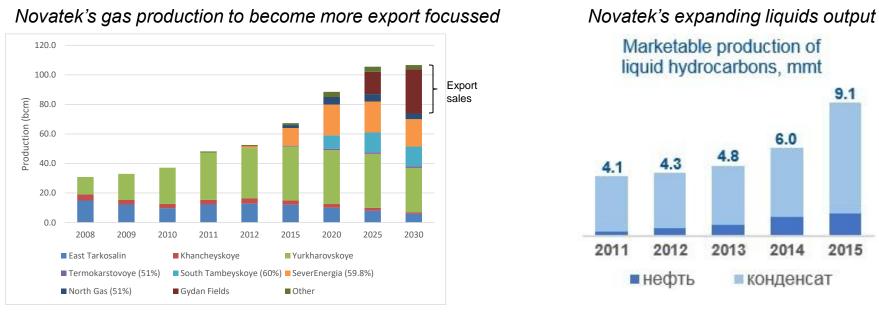
- From 2014-2017 transport will again make up a large share as Turk Stream and Power of Siberia are built
- The impact of rouble devaluation should reduce costs in US\$ terms, meaning total capex will average \$30-35bn per annum
- Falling cashflow from lower prices and lower domestic revenues will mean that free cashflow could turn negative
- \$20bn of capex for a second eastern pipeline would clearly worsen the situation

Novatek is a local gas company that now has global ambition based on significant growth



- Novatek has benefitted from a focus on core NPT asset base
- Production has risen dramatically, mainly through organic growth (but also helped by recent acquisitions) to 62 Bcm in 2014
- Novatek also produces around 6mmtpa of crude oil and condensate, which it exports to the European and Asian markets

Novatek's production continues to grow, but is becoming more liquids and LNG focussed

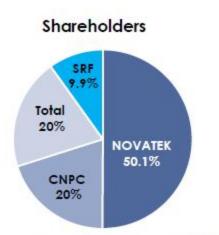


- Novatek's gas output continues to grow rapidly, although its 100bcm target by 2020 is likely to be missed
- Sales into the domestic market will peak by the end of the decade, with LNG exports becoming a core source of revenue
- Growing liquids production will also be a vital driver of company profits, especially as Severenergia output rises
- A key question for Novatek will be whether sanctions continue to undermine its LNG growth plans

Yamal LNG set to come online in 2017

Project for construction of an LNG plant on the Yamal Peninsula:

- 2P PRMS gas reserves of the South-Tambeyskoye onshore conventional field at 31.12.15 - 926 bcm
- Liquefaction capacity 16.5 mmt of LNG per annum (3 trains)
- FID date December 2013
- Capex estimate USD 27 bln
- First production is scheduled for 2017





 \$20 billion of financing secured in 2016 from a portfolio of Chinese and Russian banks, plus support from Russian government

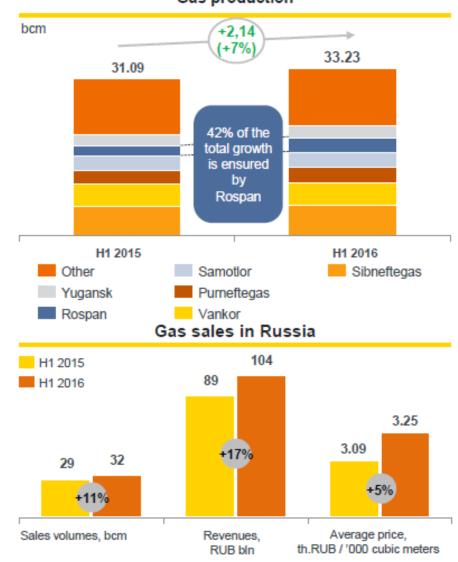
Rosneft has challenged Gazprom with a broad-based gas strategy



- Following the acquisitions of TNK-BP, Itera and Sibneftegas Rosneft has a broad portfolio of gas assets in Russia
- Total reserves are now approaching 7 Tcm, with West Siberia and Eastern Russia accounting for the majority
- Rosneft has challenged Gazprom in the western domestic market and also in the area of eastern gas exports

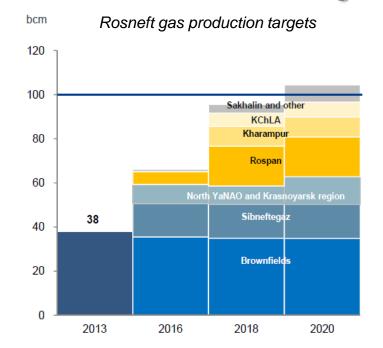
Rosneft gas output growing to meet contractual commitments

- Rosneft is under pressure to increase output in order to meet its contractual obligations
- In H1 2016 it claimed to have achieved this, and even to have sold some gas on the St Petersburg Exchange
- Development of the Rospan fields is underway, but will need to accelerate if Rosneft is to meet its output target of 100bcm for a full year
- The Kharampur gas field will also need to be prioritised is Rosneft is to avoid a supply crunch
- LNG plans appear to have gone backwards, with Sakhalin gas now more likely to be sold to Gazprom or via pipe to China

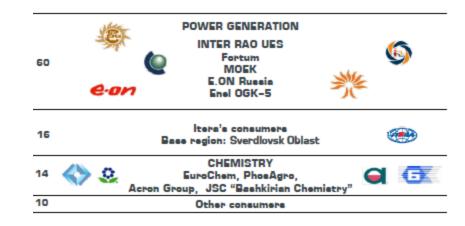


Gas production

Rosneft: aggressive output targets backed up by contracts

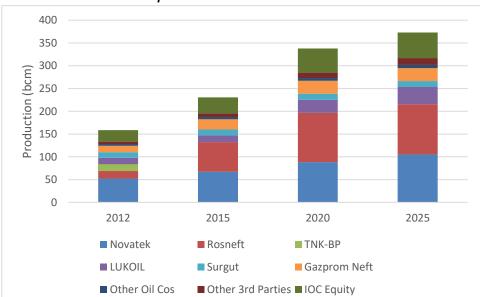


Split of contracts signed with industrial customers



- Rosneft aims to produce 100bcm by 2020
- It believes that it can have a domestic market share of 19-22% by that date
- A number of long-term contracts have already been signed to back up this claim, especially with power generators
- Questions over whether Rosneft has sufficient gas to meet demand, and also over prioritisation of export plans

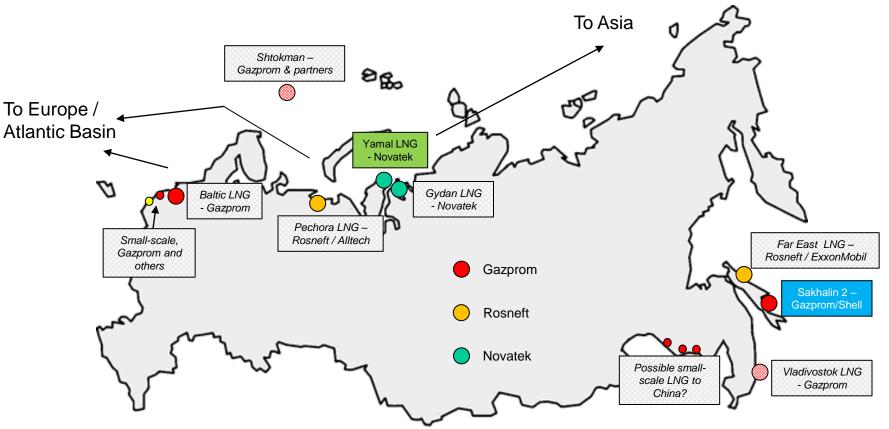
Conclusions on Independent Gas Supply



Potential Independent Gas Production in Russia

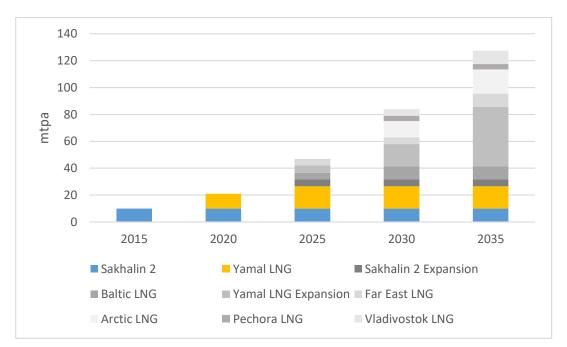
- Independents could theoretically produce over 300bcma by 2020
- Their gas is generally lower cost than Gazprom's new developments in Yamal, giving a domestic competitive advantage
- Independents likely to have as much as 60% of domestic market by 2020
- Limited exports of LNG can provide a first entry into global markets which could expand further if political support is maintained

Russia's LNG Projects – Slow-burning progress



- Eight major LNG projects have been proposed in Russia, with a total potential capacity of over 100mtpa
- However, only one is producing (Sakhalin 2) while one is under construction (Yamal LNG)
- Russia now has the opportunity to exploit the hiatus in global LNG projects to develop new production for the early to mid-2020s, when the market is likely to re-balance
- Small-scale projects as well as global scale developments can provide increased flexibility

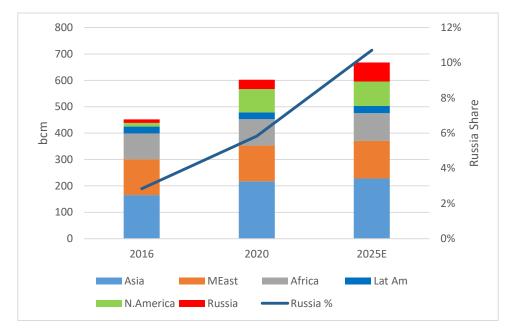
Russian LNG – How much growth is possible?



Existing, planned and possible Russian LNG projects

- Significant plans have been discussed, and it is interesting that the possibility of large brownfield expansion is on the agenda
- Sakhalin 2 Train 3 has always made economic sense it is arguably the most commercial new development prospect in the LNG world
- Expansion of Yamal LNG could build on existing expertise to keep costs down, if adequate gas supply is available
- Greenfield projects could be challenging unless costs are kept low

Russian LNG in a Global Context

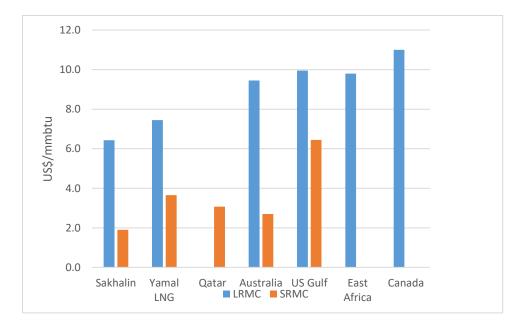


Estimated growth in global LNG supply

- Russia currently accounts for around 3% of global LNG capacity
- Gazprom has historically targeted a 14% market share of global LNG market by 2030
- Potential for Russia as a whole to reach a share of over 10% by 2025, although Gazprom may not be the leader by then
- Longer term future will depend on competition with other forms of fuel in the global energy economy

Russian LNG looks very competitive from Yamal and Sakhalin

Comparative cost of LNG delivered to Asia



- In the short term (to the early 2020s) the key will be the ability to compete in a potentially oversupplied market
- Costs are sunk for Sakhalin-2 and (almost) for Yamal LNG, and so they can compete down to short-run marginal cost
- Qatar and Australia look very competitive on this basis, while US LNG competitiveness will largely depend on the level of Henry Hub gas price
- FID for expensive new projects seems unlikely in the short-term unless IOCs are prepared to take a significant future price risk

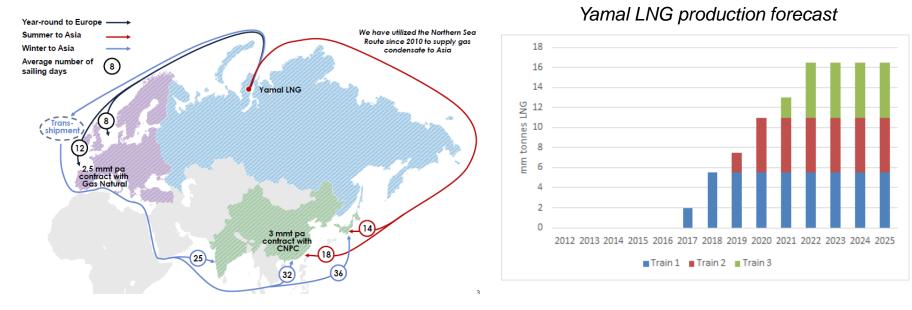
However, a number of Gazprom projects have been delayed



- Gazprom attempted to replicate Rosneft's ESPO strategy with Vladivostok LNG
- However, liquefaction at Vladivostok was always a high cost alternative and has now been postponed
- Even the expansion of the existing plant at Sakhalin 2 has been pushed back
- Gazprom has also postponed Baltic LNG in the West, bringing its entire LNG strategy into question

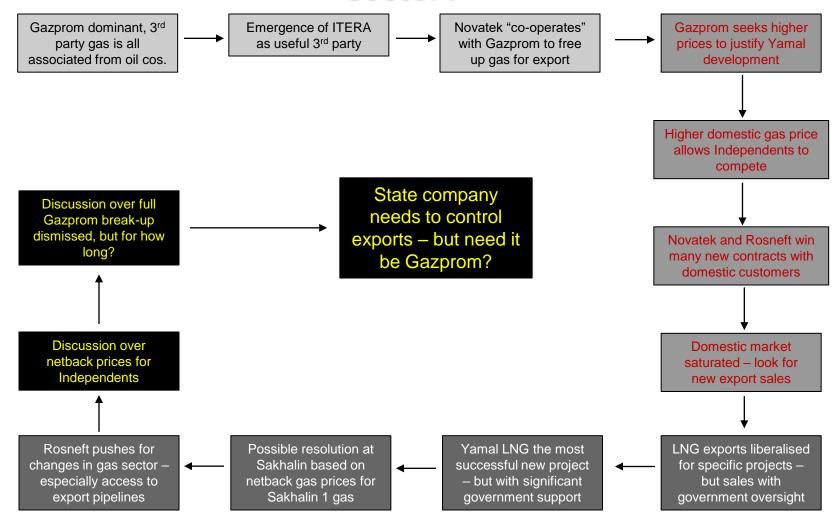
Yamal LNG will be the first (only?) new project, with gas going west as well as east

Yamal LNG project to access eastern and western markets



- The Yamal LNG project is estimated ultimately to produce 16.5mmtpa with first gas coming in 2017/18 – construction is well underway
- The introduction of CNPC as a 20% partner and LNG purchaser is a significant advance for the project and could be crucial for financing
- Technical complexity and the harsh environment could cause some delay, financing of total \$27 billion budget remains biggest problem
- Gas will be transported west for up to 7 months of the year, creating the potential for competition with Gazprom in Europe

Is LNG part of a logical progression in the Russian gas sector?



Gazprom remains a favoured state entity, but global market conditions may force radical change involving gradual introduction of new players

Conclusions

- The Russian gas sector is undergoing significant change, and is having to respond to domestic and international pressure
- In the FSU, political reasons have caused a decline in exports
- In Europe, political and commercial reasons have put Gazprom under greater pressure, although it has responded
- Gazprom's overall role in Russia is declining, but it remains the main exporter by pipeline
- Novatek and Rosneft are increasing their share of the domestic market, and are also challenging Gazprom in the LNG market
- It may be the case that Gazprom's dominant position as gas exporter to Asia and Europe could also be challenged
- Russian gas is competitive in both markets, but the Russian government needs to decide if it needs to diversify its exporting options
- Russian gas will remain a vital part of the global gas system, if it is marketed in a commercial rather than a political fashion

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