

Russia's gas sector and gas export developments

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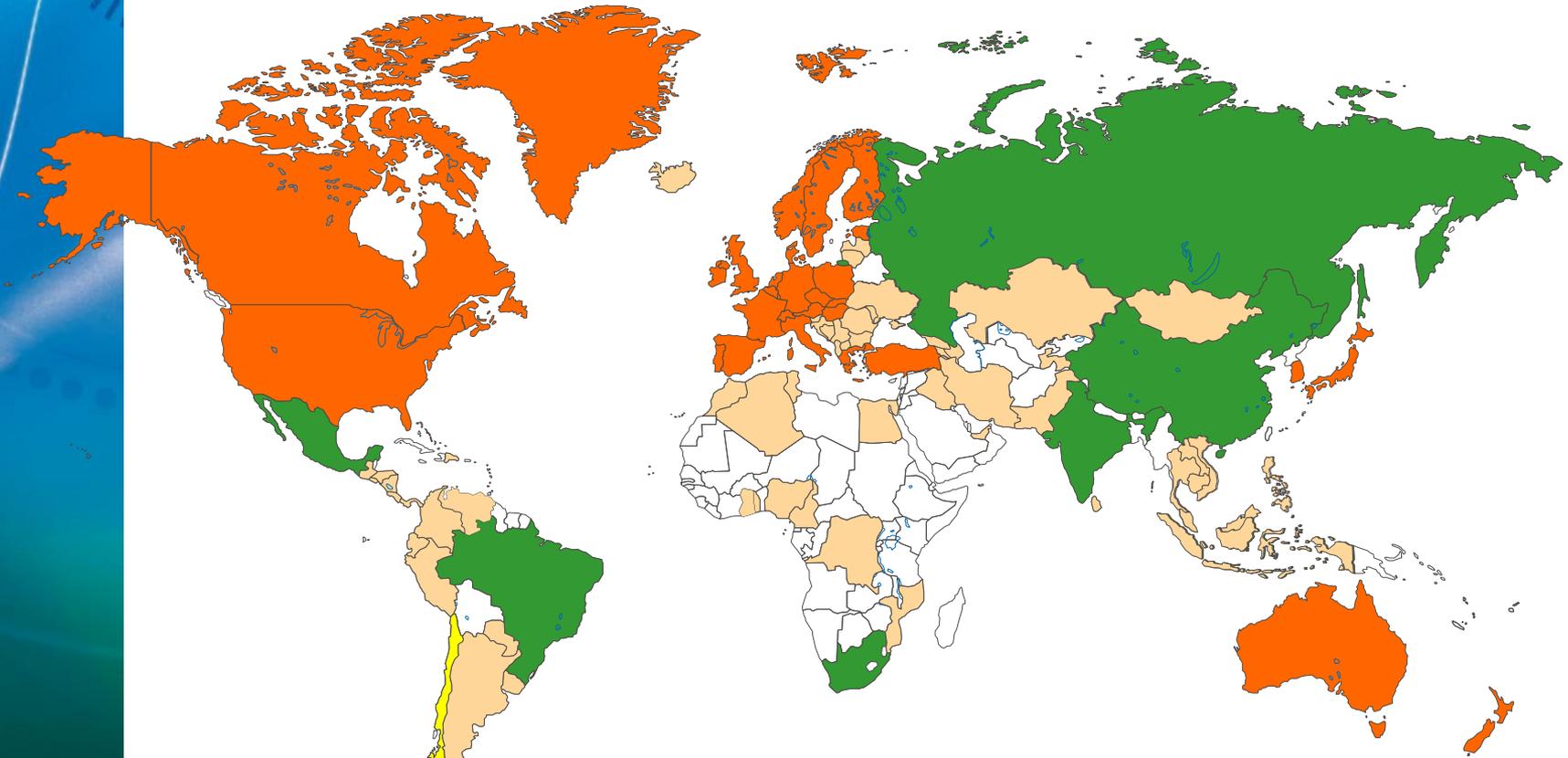
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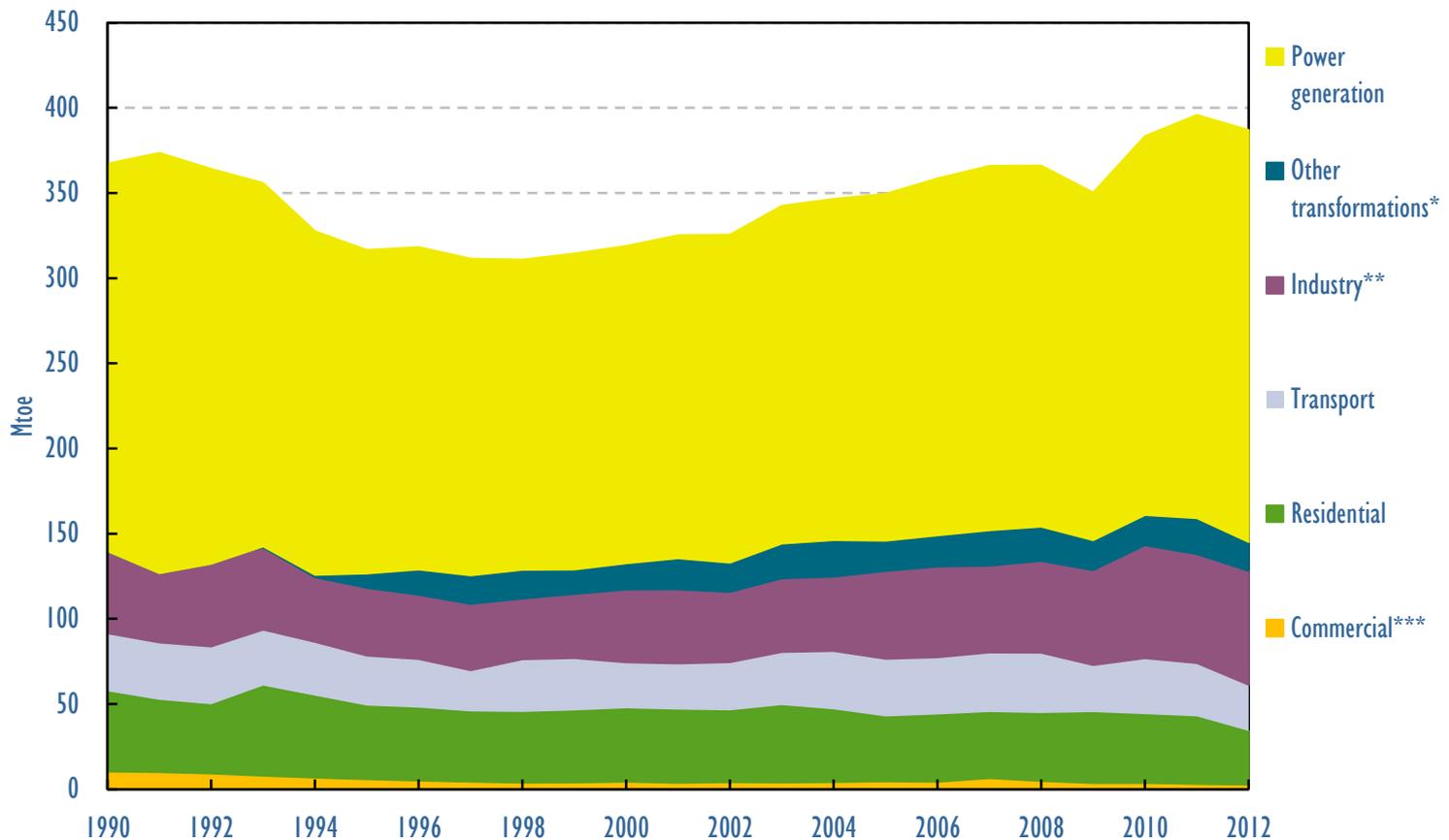
IEA: 29 Members, worldwide engagement



-  IEA member countries
-  Accession country
-  Key Partner countries
-  Countries co-operating through IEA programmes

Power generation and consumption, driver and break of gas consumption

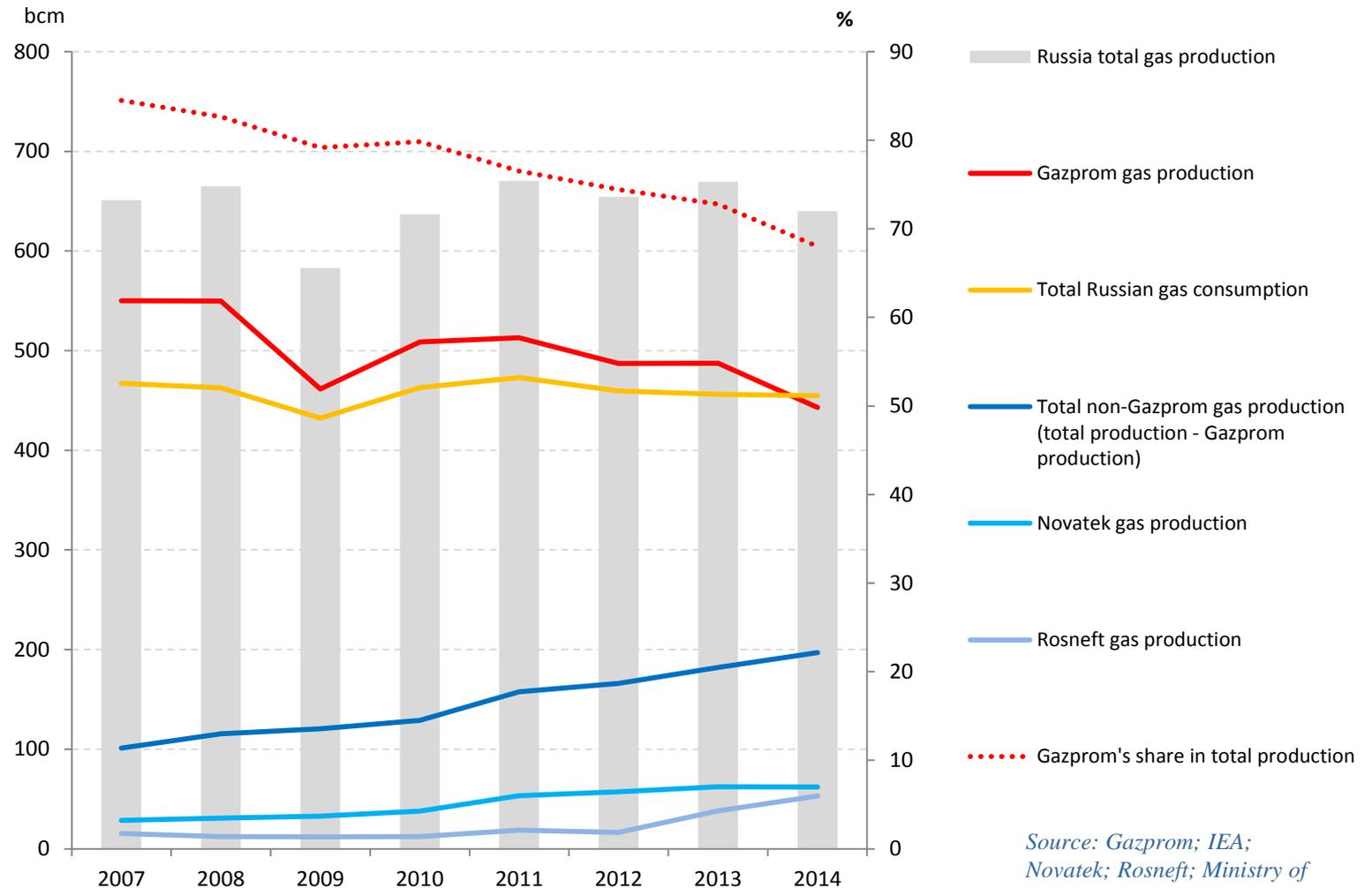
Natural gas supply by sector, 1990-2012



Source: IEA

Gazprom is Russia's swing producer with very large unused production capacity

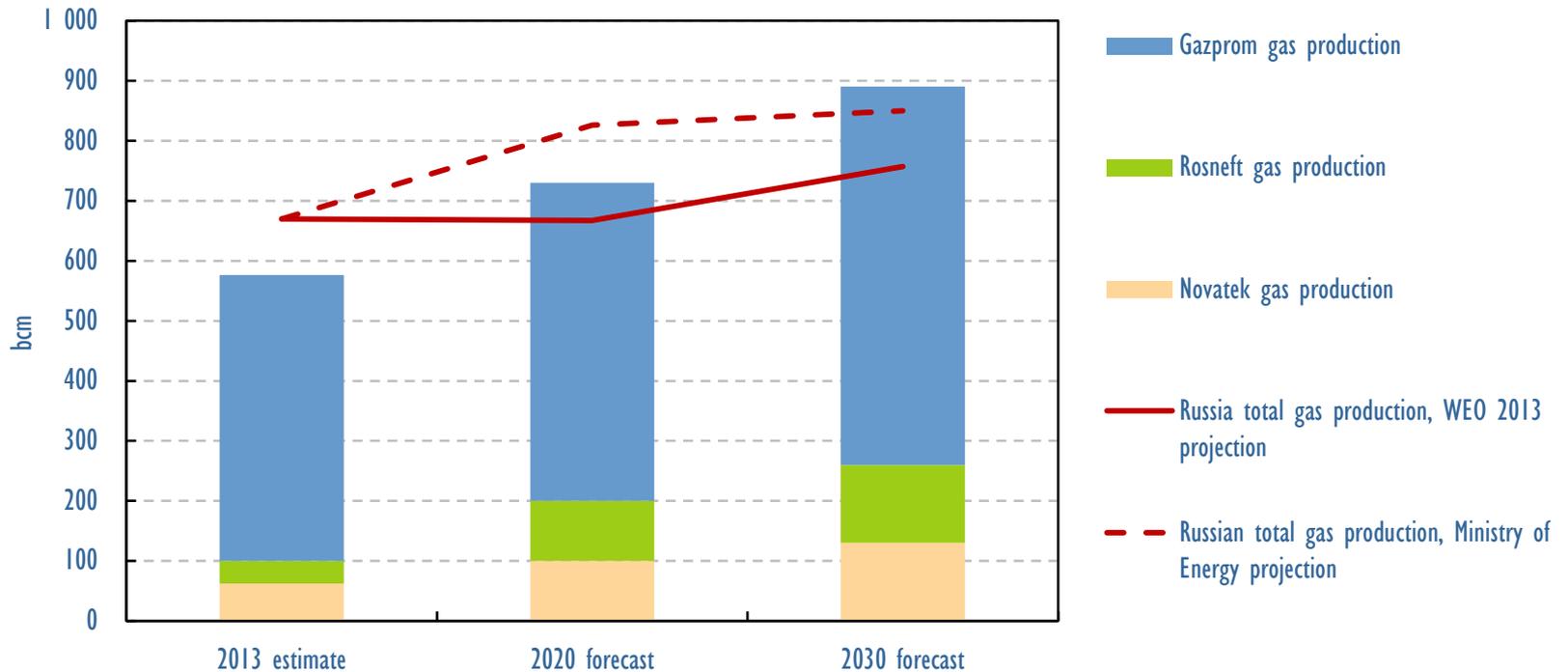
Overview of Russia's gas market, 2007-2014



Source: Gazprom; IEA; Novatek; Rosneft; Ministry of Energy of the Russian Federation

Gas production overcapacity as driver for more competitive markets ?

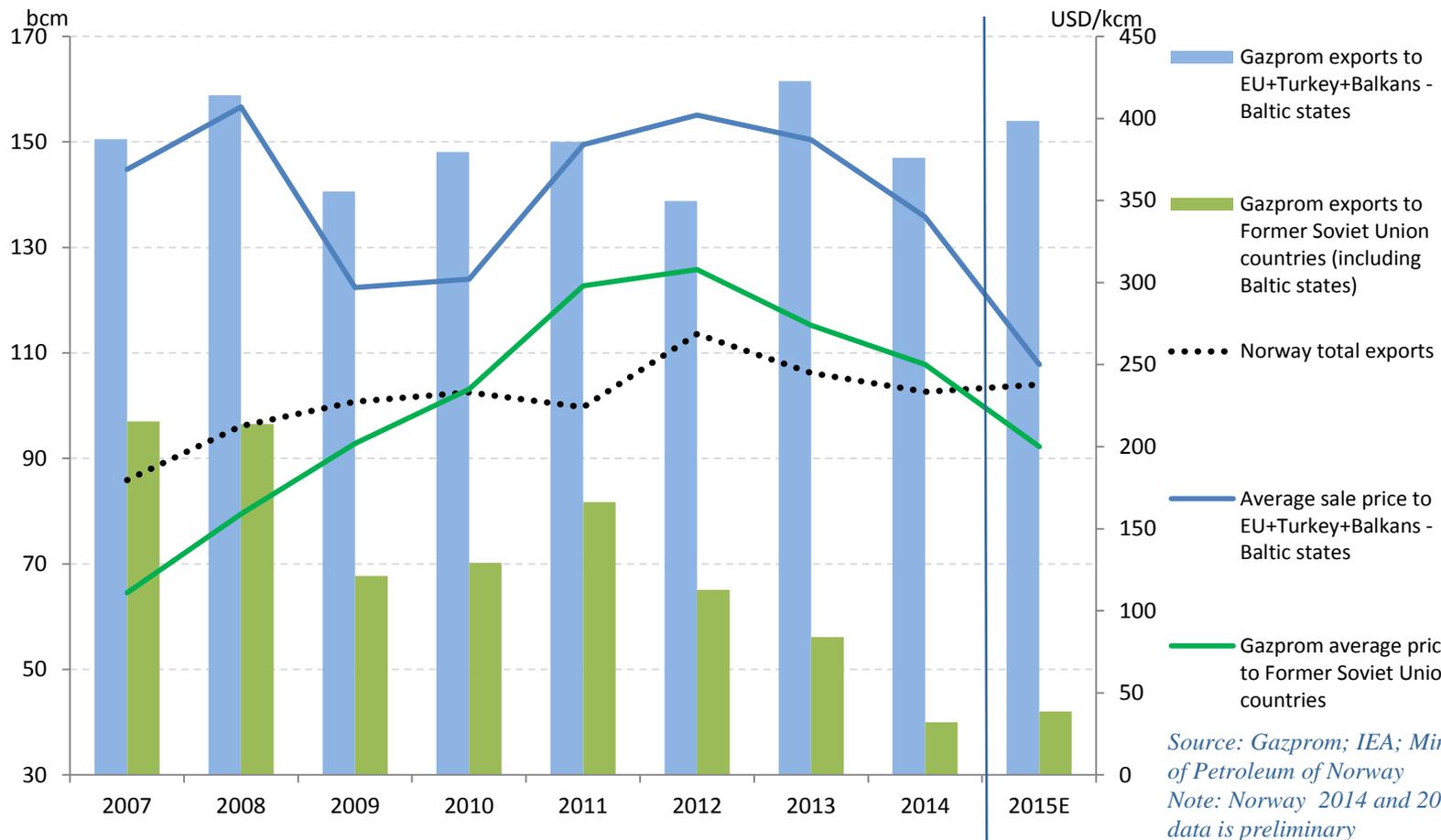
Outlook for Russia's gas production until 2030



Source: IEA WEO estimates, Ministry of Energy projections; Gazprom; Novatek; Rosneft

Gazprom's exports: falling revenues

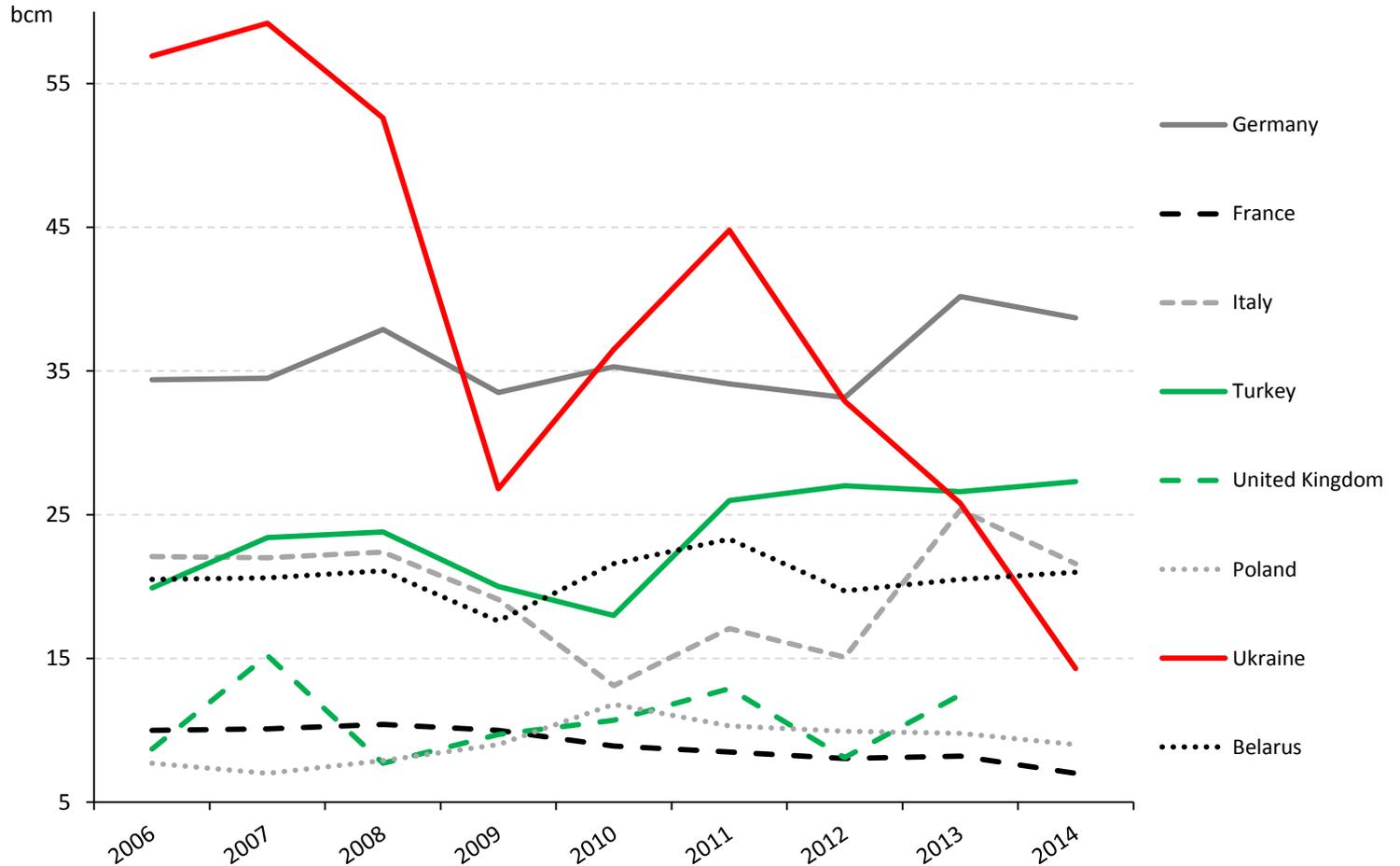
Gazprom's exports to Europe and the former Soviet Union (volumes and prices) and comparison with Norwegian exports, 2007-2015E



In the current market environment, given its low marginal cost production and high capital expenditure commitments, Gazprom needs to maximize revenues and should thus logically seek to expand market share and offer competitive prices, including to Ukraine

Strong volumes to Germany, Turkey growing exports, supplies to Ukraine falling

Evolution of Gazprom's exports to its key markets, 2006-2014



Source: Gazprom; Naftogaz

Gazprom in a comfort zone on the European market in the medium term

Market factors positive for Gazprom's exports to Europe	Challenging, uncertain or negative trends for Gazprom's exports to Europe
<p>Decline in European gas production:</p> <ul style="list-style-type: none"> - Groningen output reduction - Norway production flat - Failure to develop shale gas at any significant scale - Other producers see steady ongoing decline in production 	<p>Gas supply security strategy:</p> <ul style="list-style-type: none"> - Short term: Lithuania and Poland access LNG; LNG bouncing back to Europe, issue of price difference between Asia and Europe; - Medium Term: Shah Deniz 2/TANAP/TAP; Black Sea offshore Romania; more LNG likely to be available; - Market integration, interconnections, liquid hubs;
<p>Capacity to withstand competition:</p> <ul style="list-style-type: none"> - Very low marginal cost production given sunk investments and low delivery costs implying a strong capacity to underprice competitors - Lower gas prices are a challenge for potential new market entrants - Flat or lower supplies from North Africa: turmoil in Libya; strong domestic demand in Egypt and Algeria 	<p>Lower gas consumption:</p> <ul style="list-style-type: none"> - Energy efficiency potential in Europe large, especially in residential sector in Eastern Europe, will depend on implementation of Energy Union proposals and ambitions - GDP growth levels remain low
<p>Potential for increased gas consumption:</p> <ul style="list-style-type: none"> - Gas for transportation: maritime transportation, such as in the Baltic sea - Additional nuclear decommissioning by 2020 - Large combustion plant directive, unlikely new investments in additional coal generation, phasing out of old coal fired power generation capacity, such as through climate levy proposals (DE) - Higher GDP growth levels 	<p>- Competition from other fuels:</p> <ul style="list-style-type: none"> - High gas prices limit gas for power generation, coal remains cheaper for power generation than USD 7/Mbtu gas, low carbon prices - Pace of further RES deployment; possible progress in hydrogen electricity storage technologies; Will biogas replace shale gas?

With falling domestic production, nuclear and old coal fired power plants decommissioning, growing European import needs can only be met by LNG, Gazprom, Iran and Turkmenistan.

Producers with sunk cost infrastructure and low cost production have an advantage.

Ukraine's gas transmission system

Map of Ukraine's gas transmission system

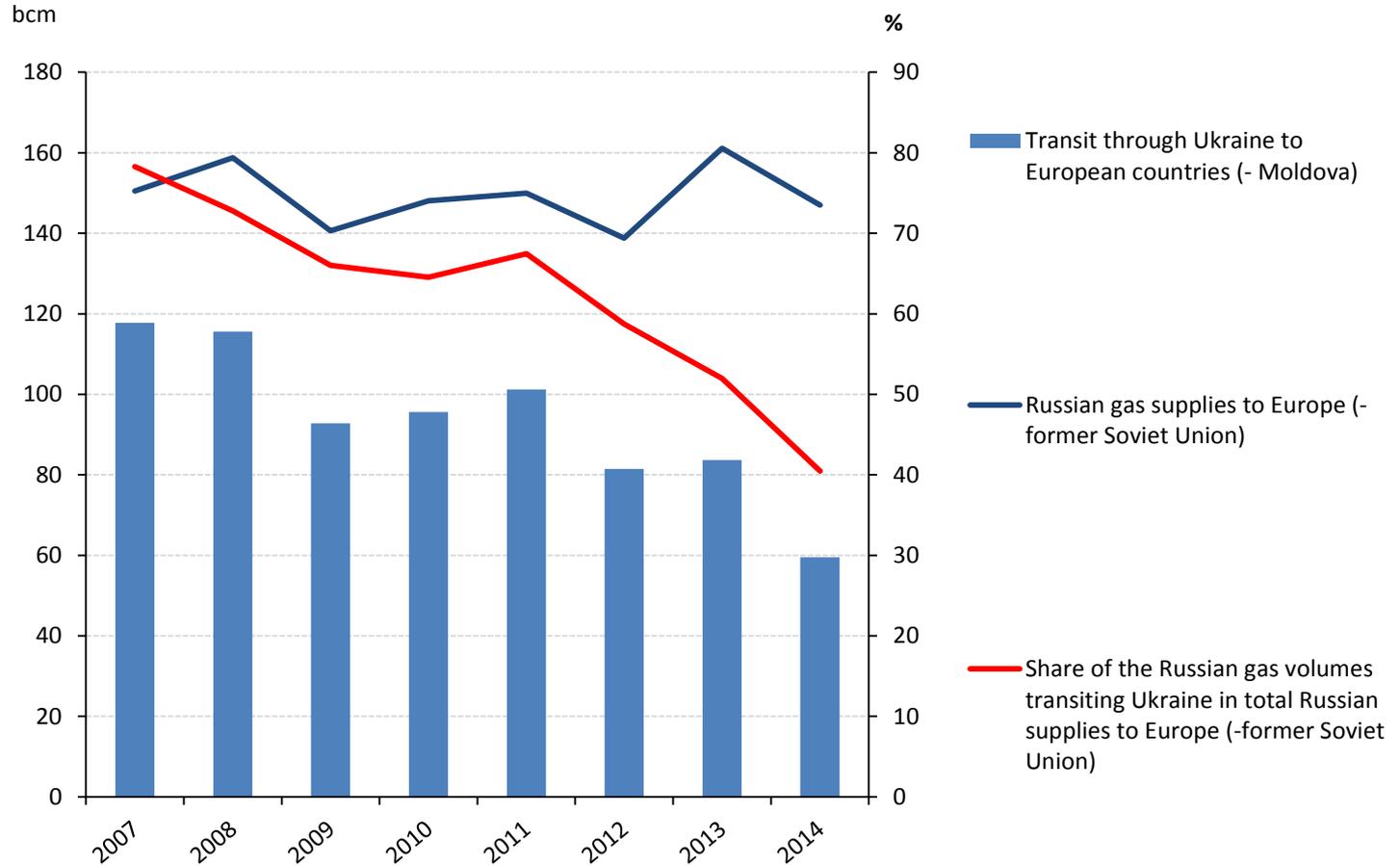


This map is without prejudice to the status of or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area.

Source: IEA 2012 Ukraine Energy Policy Review

Ukraine: decreasing transit role

Evolution of Ukraine's role for the transit of Russian gas, 2007-2014



Turkish stream and its challenges

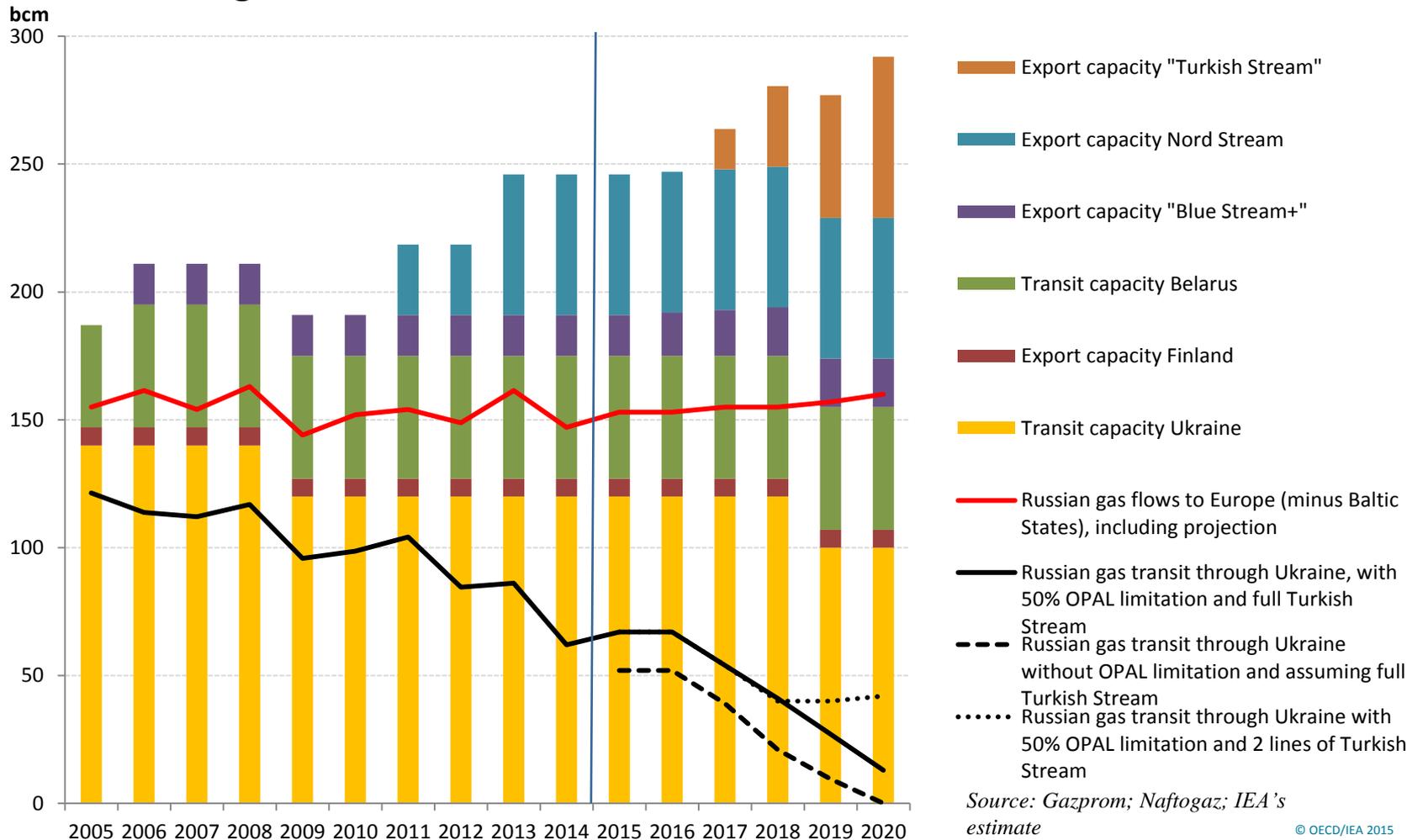


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Line 1 of Turkish Stream to Turkey makes economic and strategic sense for both Russia and Turkey, but building the other three lines by 2020 is highly uncertain so that Ukraine should remain a significant transit country for Russian gas

Ukraine transit down to 40% of Russian exports and proved fully reliable in 2014

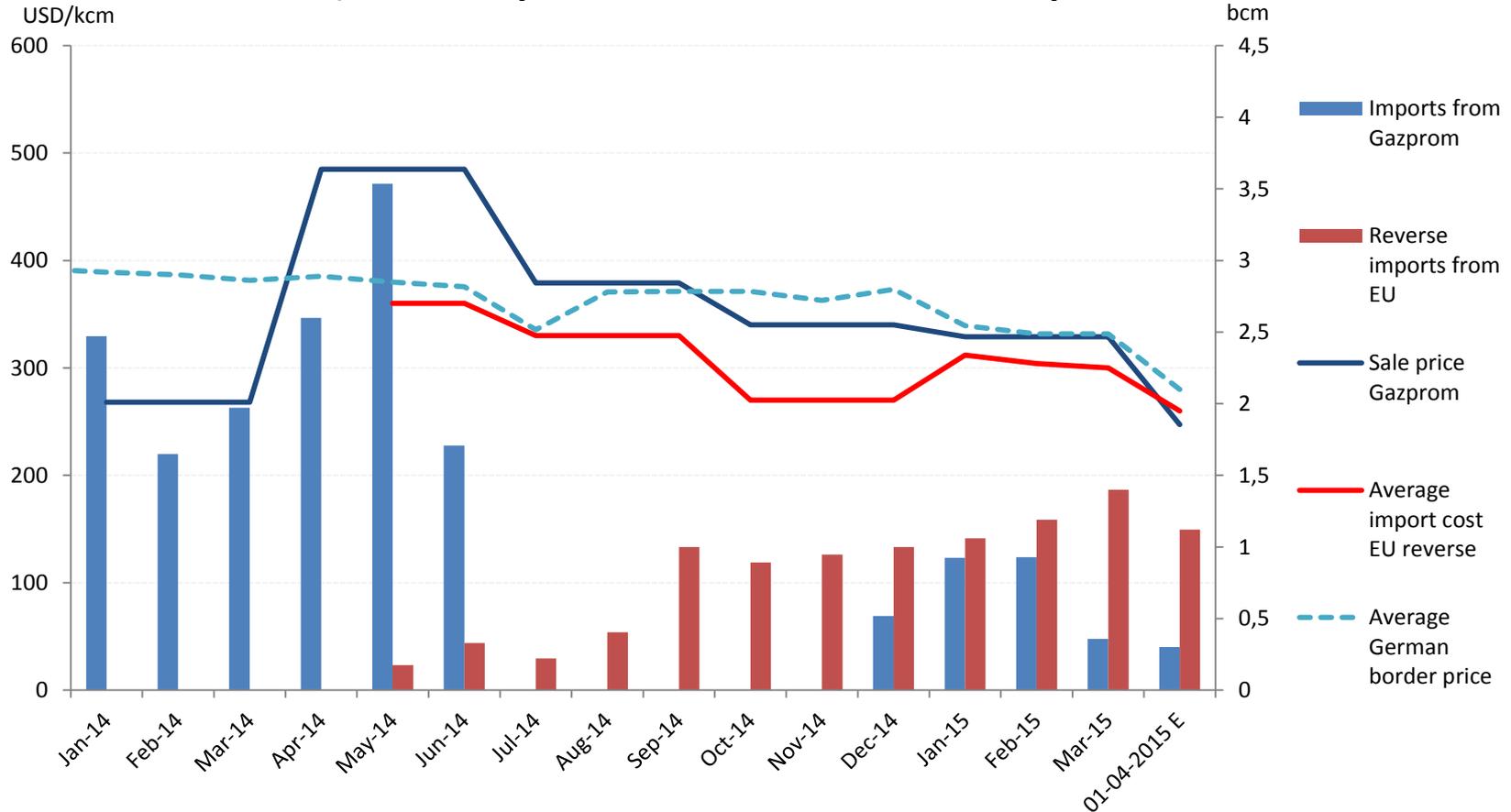
Evolution of Russian gas export capacities via pipelines to Europe and of gas volumes



Source: Gazprom; Naftogaz; IEA's estimate

Ukraine: major import diversification in 2014 as Gazprom not competitive, reversal in 2015?

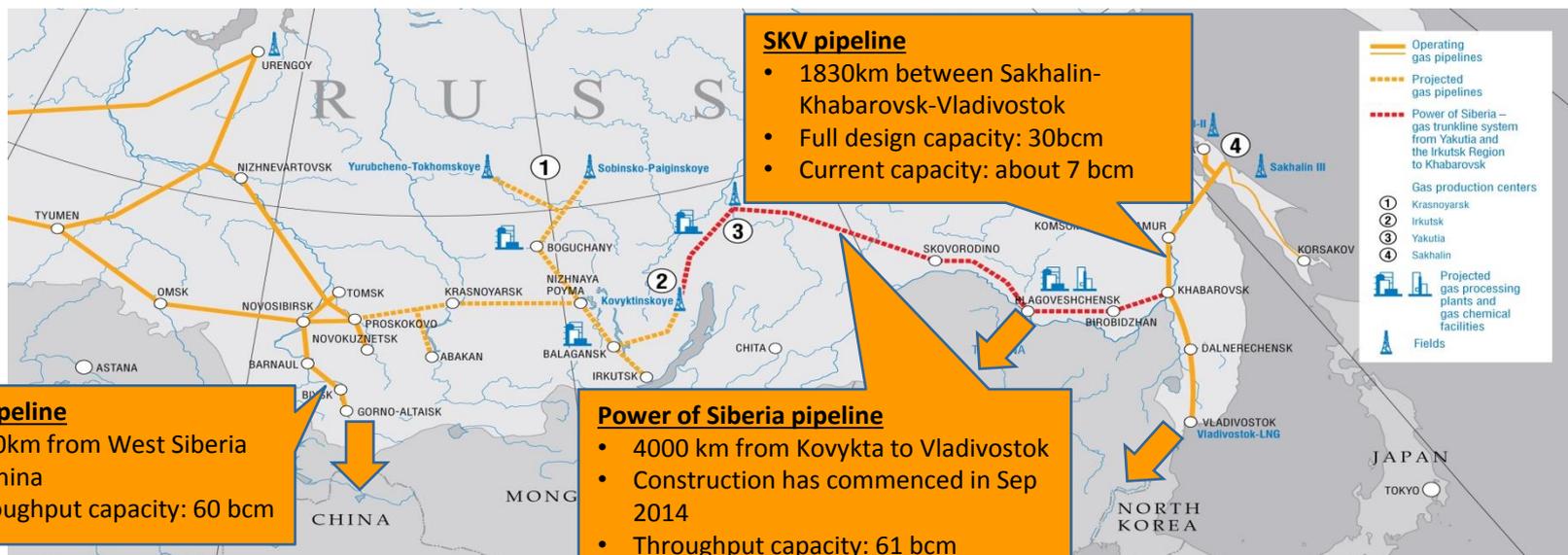
Evolution of Ukraine's imports by source (prices and volumes, 2014-2015) and comparison with German border price



Source: Naftogaz, Ukrtransgaz, Gazprom, IMF

With the prolongation of the winter interim agreement and the lower contractual oil-linked gas price, Gazprom's supplies are now competitive again, so that Ukraine should tap both Russian and reverse flow gas to fill up its storages

New export projects to Asia



	Eastern Route	Western (Altai) Route	SKV
Status	Purchase and Sale contract in May 2014	Framework agreement Nov. 2014, MoU May 2015	Under negotiation
Volume	38 bcm for 30 years	30 bcm for 30 years	30 bcm – domestic uses
Possible commission	2019	After 2019	midterm project
Cost	USD 55 billion for; - Power of Siberia pipeline - Development of gas fields	USD 20 billion for Russian section - Pipeline : USD 11-14 billion	
Gas Source	East Siberia (Chayanda, Kovykta)	West Siberia	Sakhalin 3

Russia developing Asian gas exports: a pipeline export story to China

- Operating: Sakhalin-2 LNG: 14.8 bcm
- Final Investment Decision/under construction
 - Yamal LNG: 3 successive trains of 7.5 bcm, first as of 2018 **if finance is secured**
 - Power of Siberia (2020): 38 bcm final capacity in the mid 2020s
- Pending/delayed
 - Power of Siberia “XXL”: + 23 bcm
 - Altai pipeline: 30 bcm
 - Vladivostok LNG: 13.7-20.5 bcm
 - Far East LNG (Sakhalin-1, Rosneft): 6.8 bcm
 - Sakhalin-2 expansion (Gazprom): 6.8 bcm
 - Pechora LNG (Rosneft): 6.8-13.7 bcm
- ➔ **By 2020, 21-30 bcm LNG capacity possible (Sakhalin-2 +Yamal 1 or 1+2)= ~4-5% of total global capacity by 2020, unchanged + 8 bcm pipeline gas to China**
- ➔ **Pending/delayed/uncertain: 34-48 bcm LNG + 52 bcm of pipeline export capacity**