

Pipeline Opportunities and Prospects, Calgary, October 7, 2004

Large-Diameter Pipe Demand of Gazprom

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East European Gas Analysis

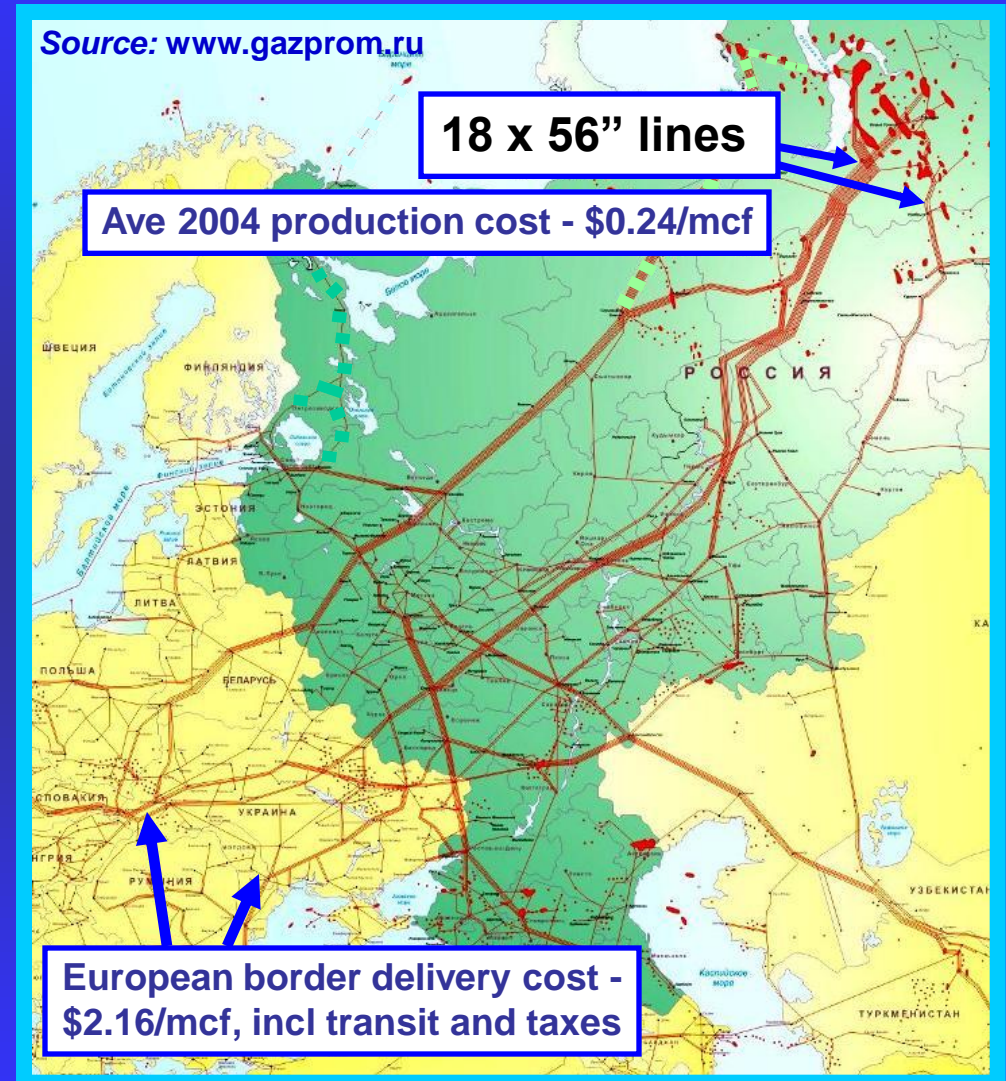
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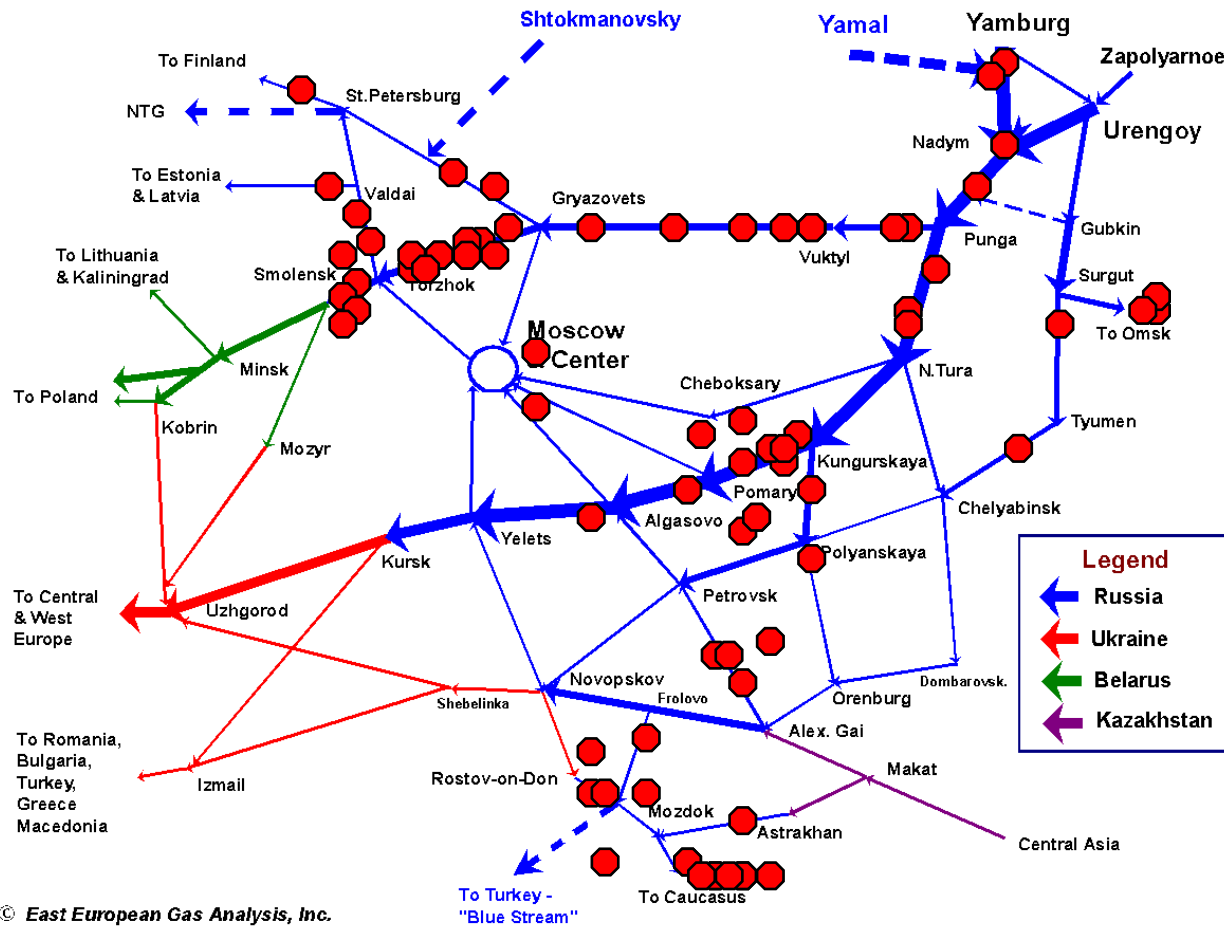


Gas Pipeline System of Gazprom

- The total length of Gazprom pipelines is about 154,000 km, including:
 - ~ 54,000 km of 56"
 - ~ 25,000 of 48"
 - ~ 16,000 of 40" pipelines
- The average age of pipelines is 22 years
- In 2003, the pipelines supplied 327 bcm to Russian consumers, 91 bcm to FSU and 140 bcm to Europe



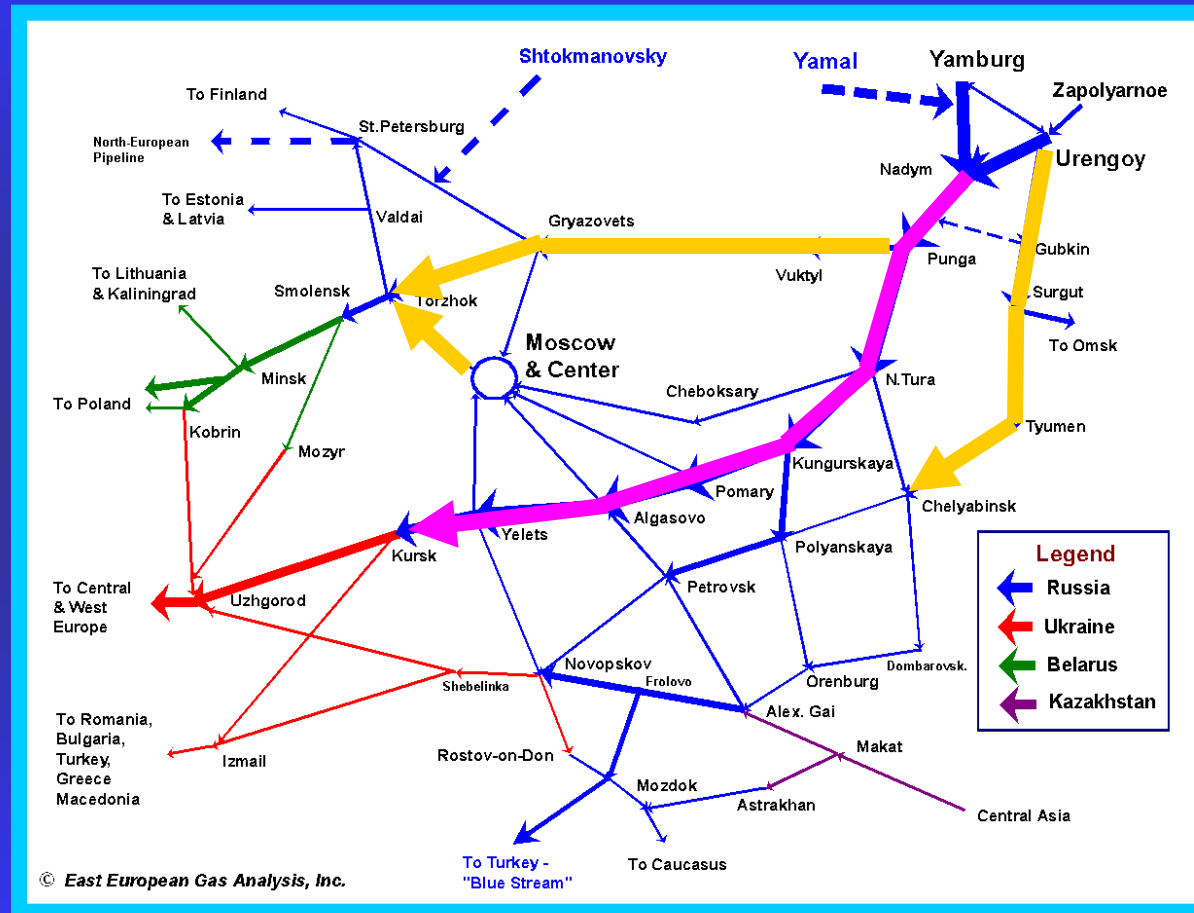
Pipeline Breaks in 2000-2002



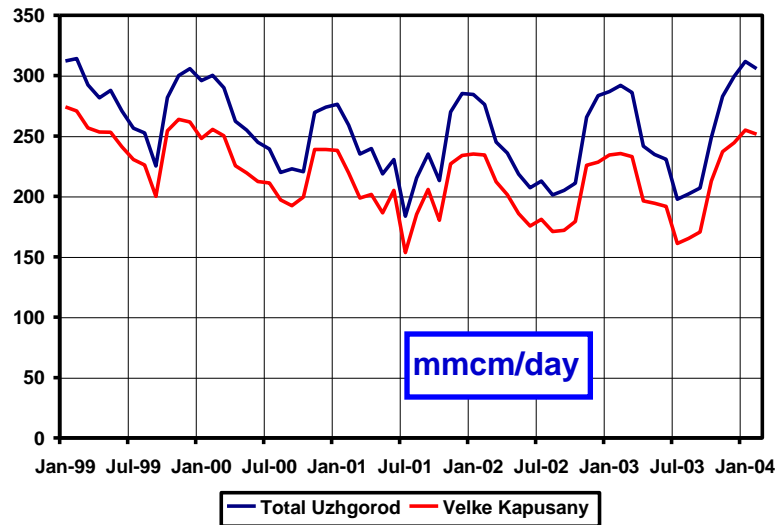
- Gazprom's pipeline break rate is about 0.2 per 1000 km, or ~30 per year
- Worst case repair time (tundra, no railroad, melting snow) is 72 hours; it's under 30 hours in populated areas
- Pipeline system has a lot of bypass capacity, which minimizes operational loss

Existing Pipeline Capacity

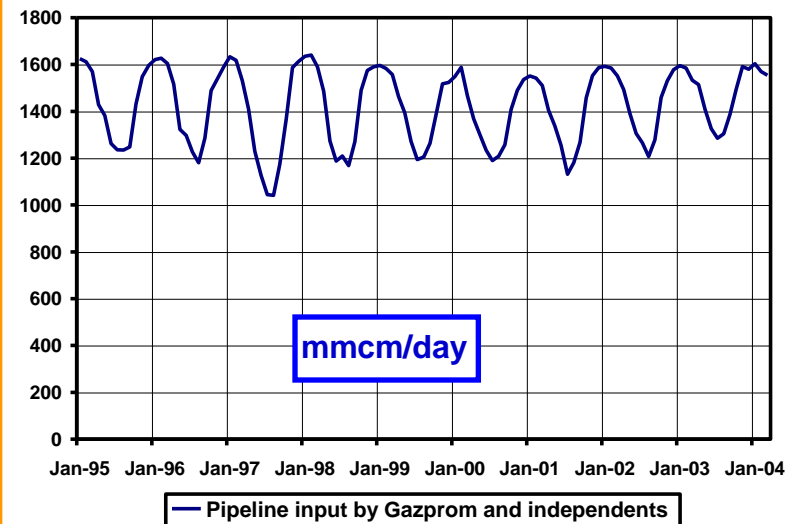
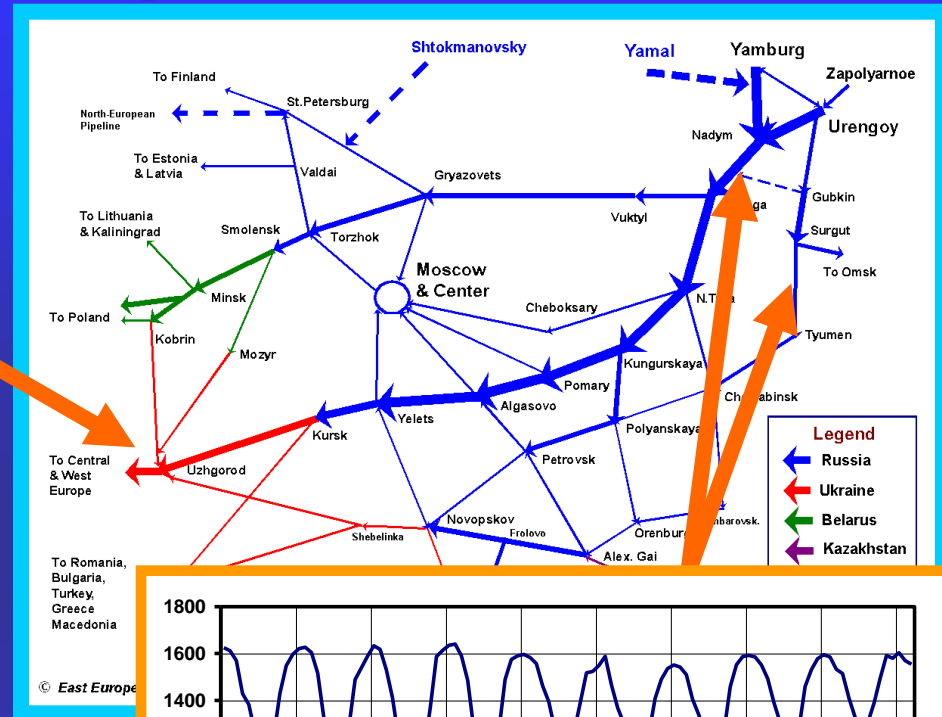
- Gazprom has spare capacity along the Central corridor from West Siberia through the Russian border
- Eastern Urengoy corridor and the North corridor are fully loaded
- The size and timing of pipe demand of Gazprom and its FSU neighbors depend on location and timing of the future capacity bottlenecks



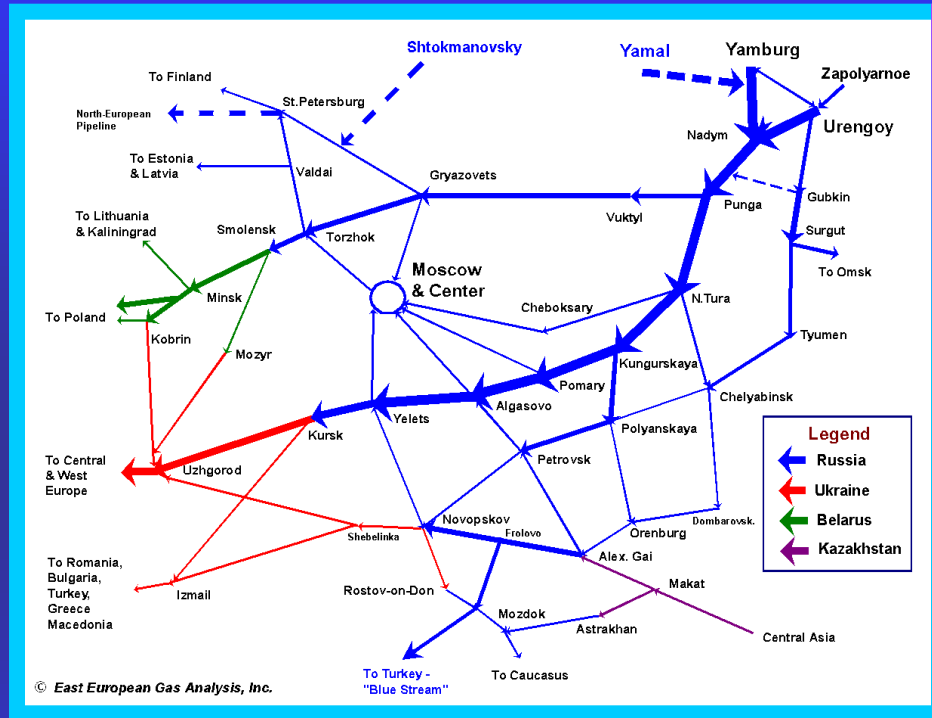
Daily Flow Projections Is the Key



- Pipeline capacity is defined by the maximum daily flow
- Russian gas flows have a huge seasonal swing
 - Winter peaks are partly shaved by storage withdrawal



Daily Flows of Gas



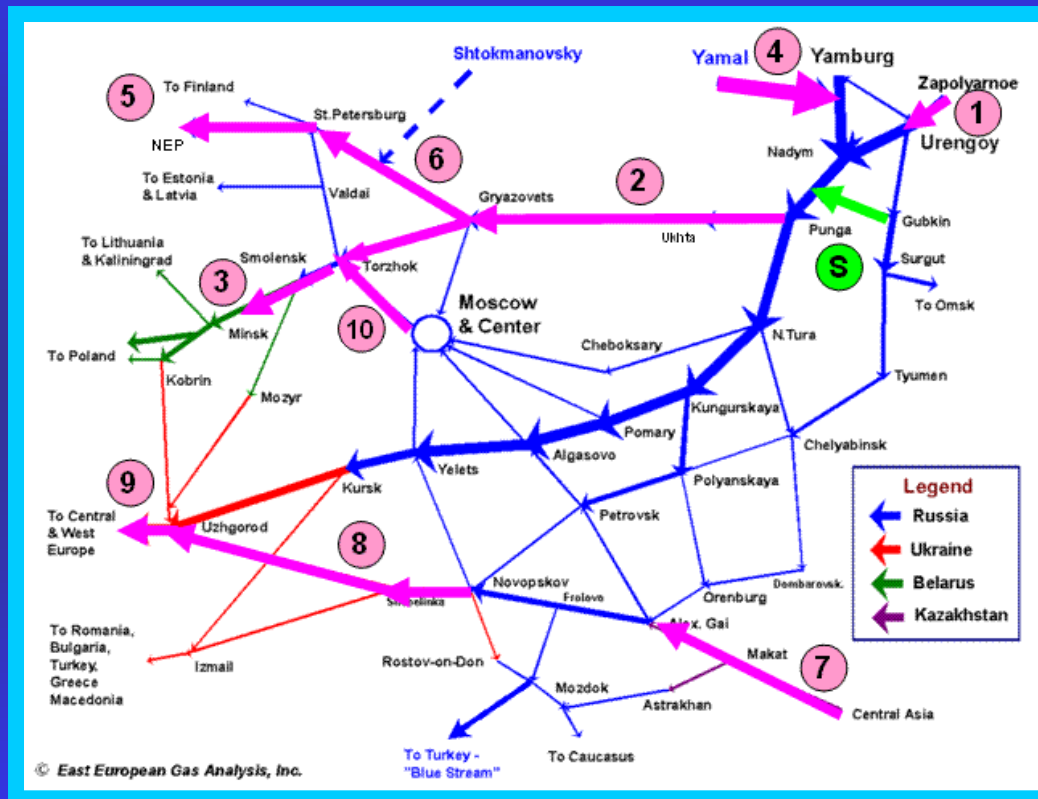
- EEGA has developed a model that calculates spare capacity and capacity deficit in the FSU gas pipeline system through 2020 (by year and by section)
- The model uses reasonable gas market forecasts for Russia, FSU and Europe
 - EEGA makes projections of gas consumption in the service area of Gazprom in Russia by region and in FSU

- The model calculates regional balances and maximum daily flows from West to East and compares the flows with the existing pipeline capacity
- Finally, location and timing of new pipeline projects are identified

New Pipeline Construction

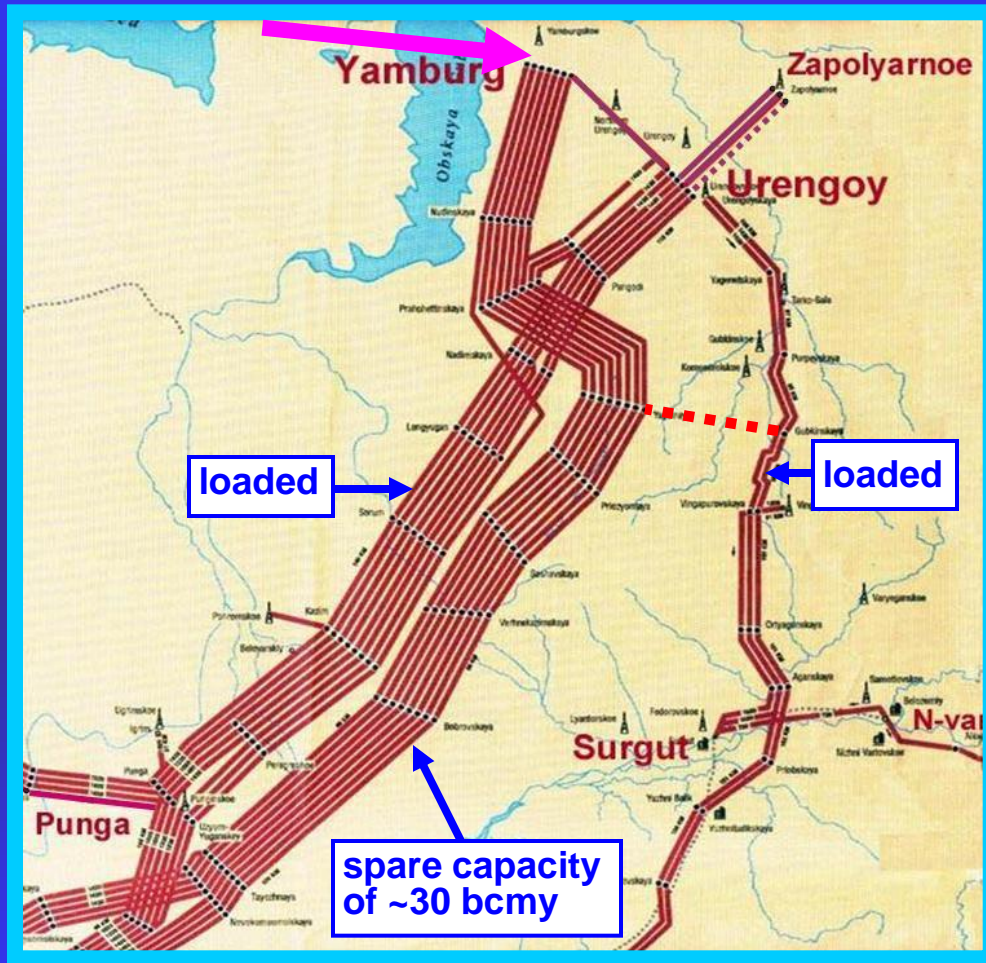
New Pipeline Projects Required under Moderate Market Scenario

1. Zapolyarnoe-Urengoy – 3x56"x200km – completed
2. Ukhta-Torzhok – 56"x 1324km – under construction
3. Torzhok-Smolensk – 56"x 324km (Russian section of Yamal-Europe) – completed
4. Yamal-Yamburg – 6x56"x 520km – in about 2006-2017
5. North European Pipeline – 42"x1200km – in about 2011-2014
6. Gryazovets-NEP – 56"x610km – same timing as NEP
7. Turkmenistan-Russia – 56"x 1070km – in about 2012-2016
8. Novopskov-Uzhgorod – 56"x 1420km – in about 2010-2014
9. Bogorodchany-Uzhgorod – 56"x240km – in 2006-2008



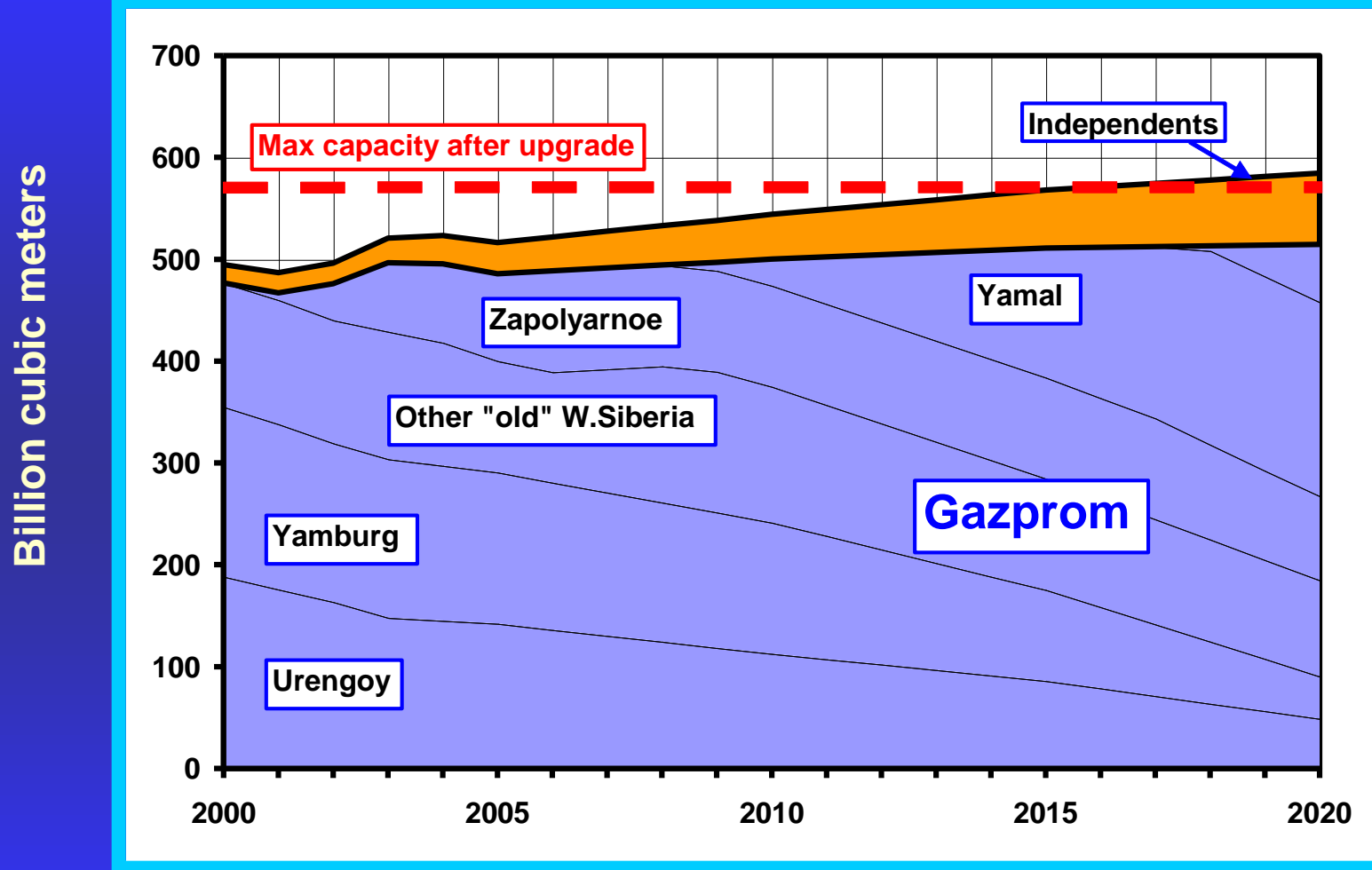
10. Tula-Torzhok – 56"x540km – in about 2008-2011

Upstream West Siberia



- Nearly all independent producers are located along and east of the Urengoy-Surgut-Chelyabinsk pipelines
 - This section is fully loaded but there are options, like flow reversal and “Siberian Interconnector”
- Production decline at Urengoy, Yamburg and other “old” fields will free up enough capacity for the Yamal gas
- All Gazprom projections anticipate high gas markets in Russia and Europe

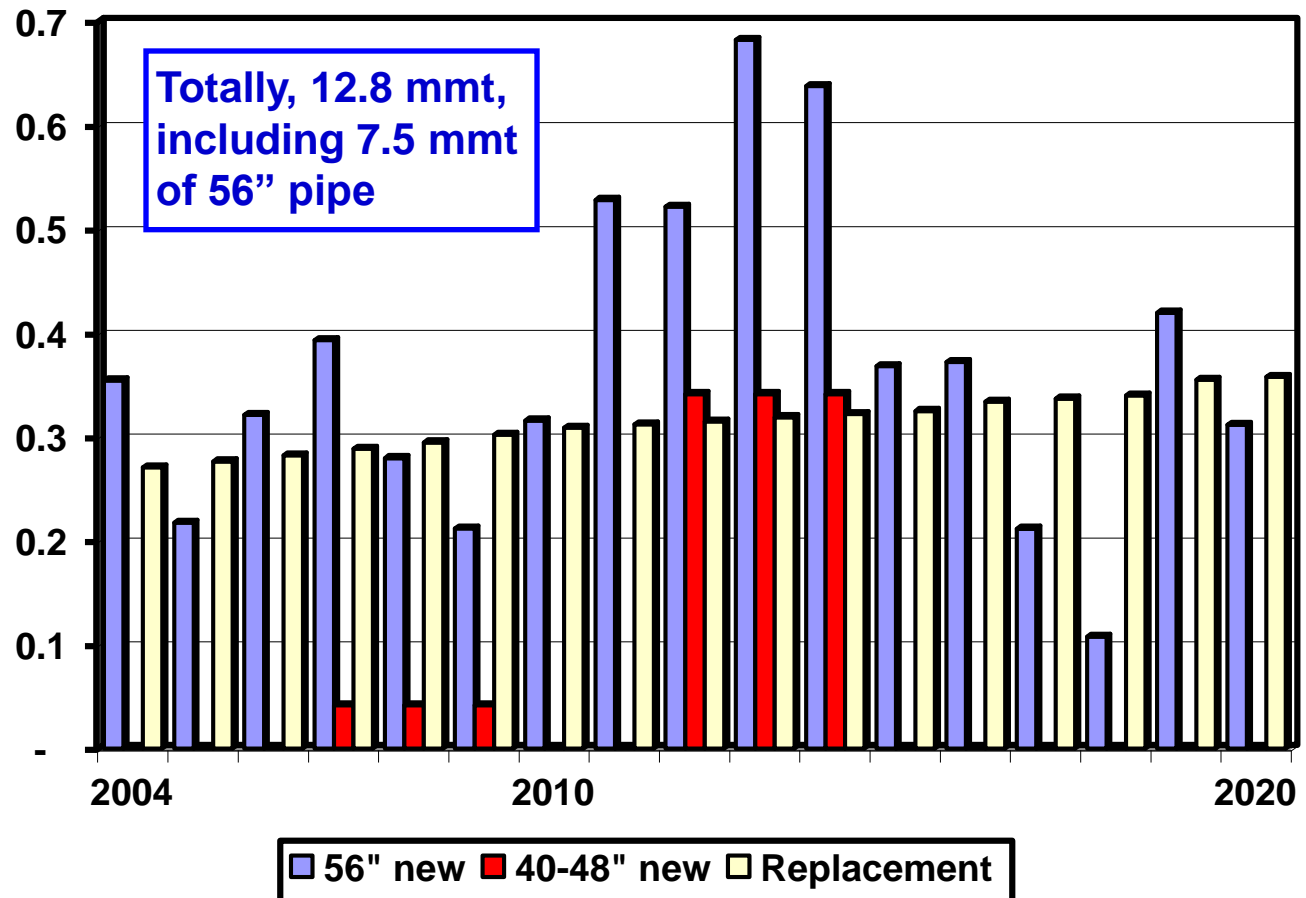
West Siberian Pipeline Input



- Gazprom has enough pipeline capacity to take all West Siberian gas

The Size of the Pipe Market, MMT

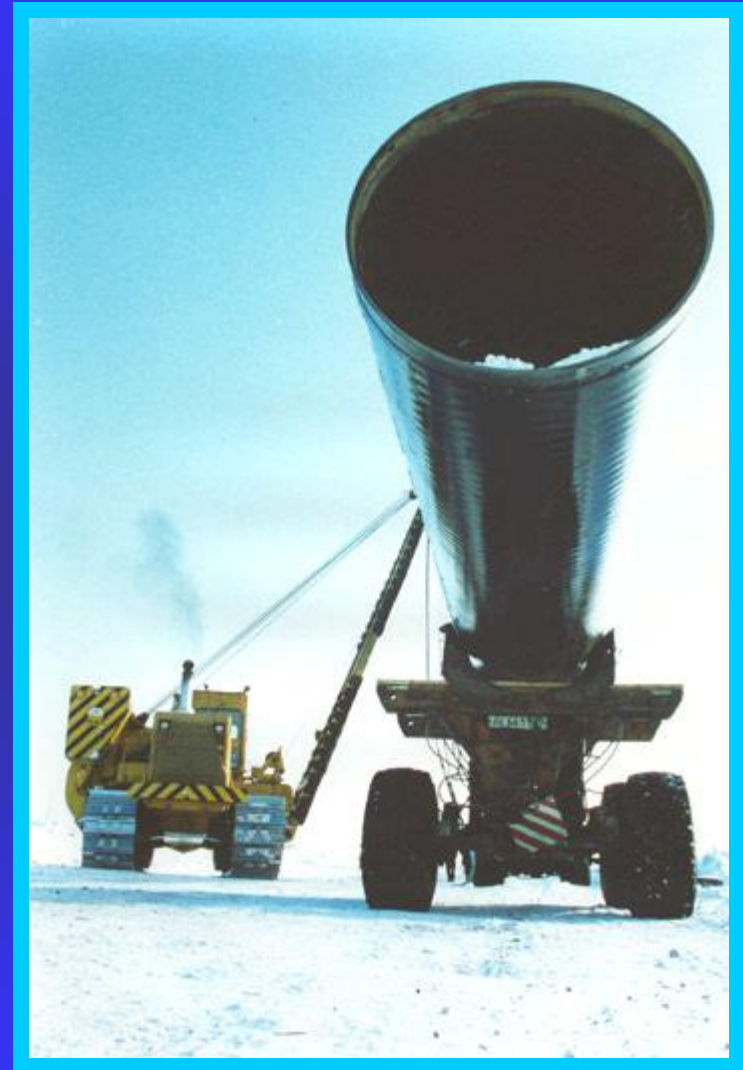
- Nearly all new gas pipeline projects require 56" pipe of grade X65 and higher
- Standard operating pressure is 75 and 85 bars
- Gazprom considers use of X100 pipe in Yamal



- 40" and 48" pipe is mostly required for replacement works

Where Does Gazprom Shop for Pipe?

- In Russia, only Volzhsky Pipe Mill can make 56" pipe (spiral-weld)
- Ukrainian 56" pipe of Kharzyzsk Mill is the most popular product for replacement works and projects of local importance
- All export projects use imported pipe (mostly Mannesmann)
- Typically, Gazprom gets conditional loan through ExIm bank of Germany, or Japan, or Italy, etc
 - By the loan terms, Gazprom has to buy pipe and compressor equipment from the creditor-country
- European pipe became very expensive, as Gazprom gets paid in Dollars and buys pipe in Euros





You won't find a project location in Russia that looks anything like the site of Aruba refinery

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Most of new pipeline projects are located in areas where summer looks like this

Thank you