



Strategic Advisors in Global Energy

Black Sea Crude and Oil Product Exports

CSIS

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Black Sea Crude and Oil Product Export Flows

- Crude and oil product exports via the Turkish Straits have increased by 65% since 2000 to 150 million tons in 2005
- Expectation is that crude and product flows will continue to rise steadily in the coming years
- Question is by how much and over what time period?
- This has implications for the construction of a Bosphorus bypass pipeline in the Black Sea region



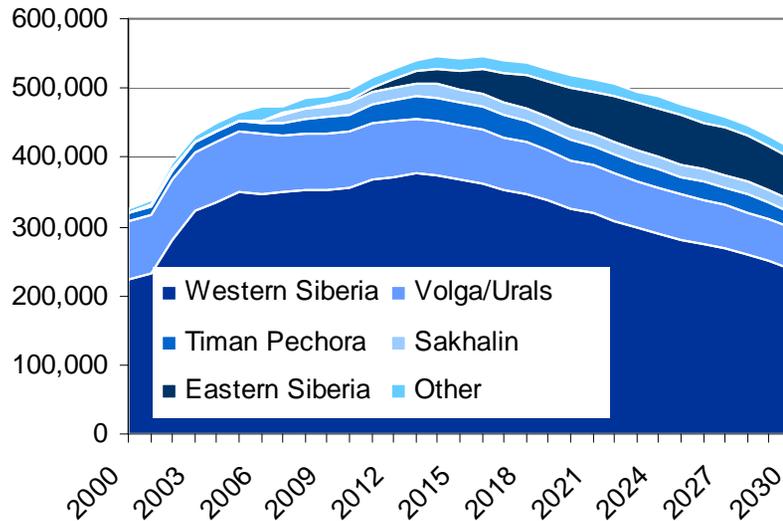
Key Variables

- **There is little doubt that crude and product exports via the Bosphorus Strait will continue to rise steadily through 2015**

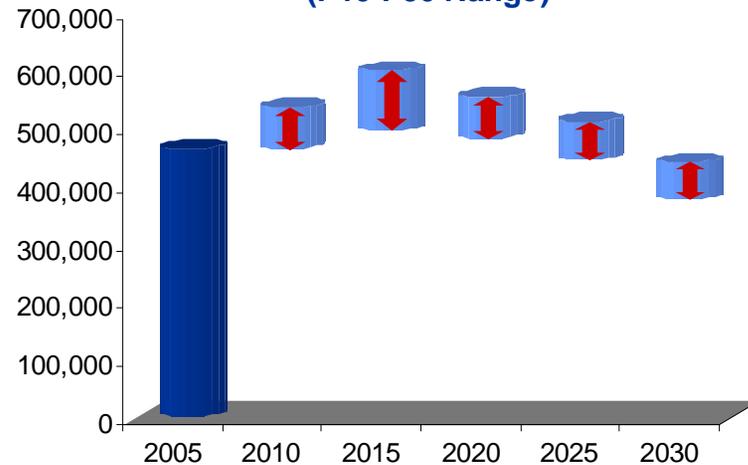
- **However, post-2015 crude and product volumes hinge on several key variables**
 - Russian crude production levels
 - Russian crude exports via the Eastern Siberia-Pacific Ocean (ESPO) pipeline
 - Kazakh crude production levels and export volumes via the BTC
 - Expansion of the CPC pipeline

Russian Crude Production Outlook

1,000 tons Russian Crude Production Outlook (P50)

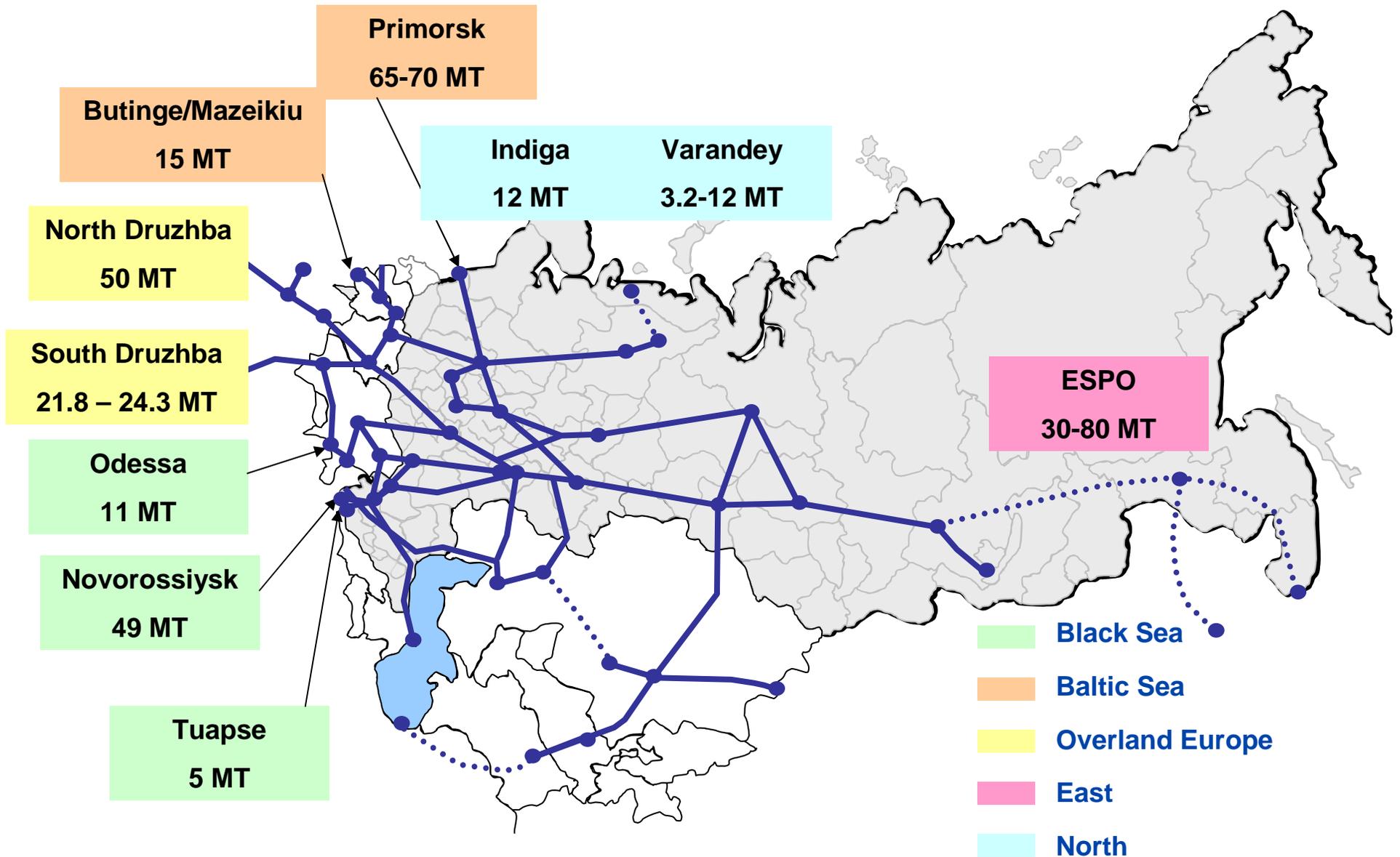


1,000 tons Russian Crude Production Outlook (P10-P90 Range)



- **Russian crude production is forecast to peak around 2015 at close to 550 million tons (11 mmb/d) before declining to below 410 million tons (8.2 mmb/d) in 2030**
 - **Production in 2006 is estimated to reach 482 mm tons or 9.6 mmb/d**
- **However, there is a wide range between the most optimistic P10 and the most likely P90 forecasts due to political and geological uncertainties**
 - Geological uncertainties related to decline rates at existing fields, delays in major new source projects, reserve adds through exploration, and the rate of development of other discovered undeveloped reserves
 - The production range between the P10 and P90 scenarios widens to over 100 million tons (2 mmb/d) in 2015
- **Those areas which are forecast to see a rise in production (Sakhalin, Timan Pechora, East Siberia and eventually the Arctic) cannot export crude via the Black Sea**

Key Crude Export Outlets and Expansion Plans



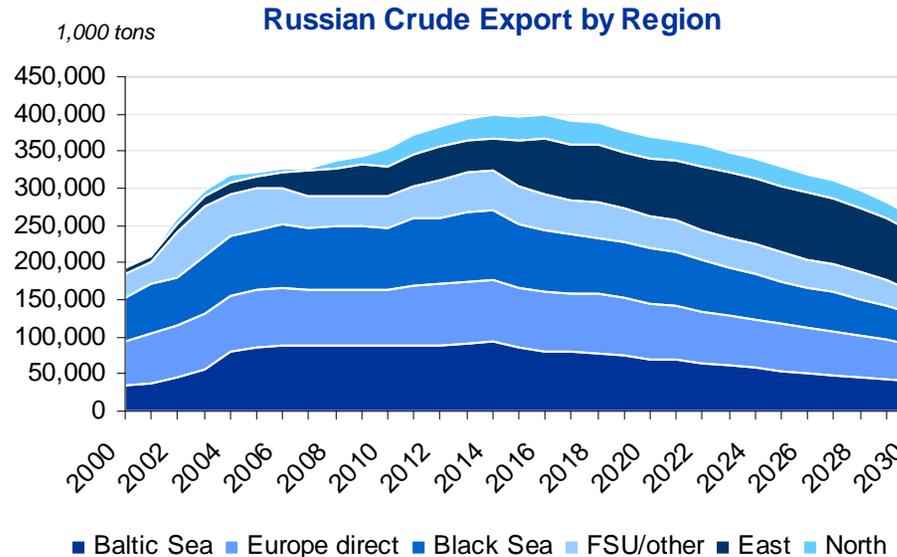
Relative Crude Export Netbacks

Relative crude export netbacks via pipeline

| <i>US\$/barrel</i> | 2005 |
|--------------------|--------------|
| Tuapse | 30.88 |
| Northern Pipeline | 30.09 |
| Novorossiysk | 28.36 |
| ESPO | 28.07 |
| Primorsk | 28.02 |
| Butinge | 27.85 |
| Czech Rep | 27.53 |
| Slovakia | 27.48 |
| Hungary | 27.48 |
| Germany | 27.36 |
| Poland | 27.33 |
| Odessa | 27.29 |
| ESPO | 26.55 |

- **Based on proposed Transneft tariffs of \$38.80/ton or US\$ 5.32/barrel, the ESPO would be one of the most attractive export destinations**
- **However, following moves to move the ESPO away from Lake Baikal it is likely that tariffs will rise**
- **Were tariffs to rise up to the initially mooted tariff of \$49.90/ton or US\$6.84/barrel, the ESPO route would appear the least favorable pipeline export destination**

Russia: Key Conclusions



- **Russian crude and product exports could peak in 2015 and then decline through 2030**
- **Russian Black Sea exports are forecast to decline from 2015, potentially accentuated by the streaming of the 2nd stage of the ESPO pipeline**
- **Russian Black Sea exports are more prone to decline than other export destinations when Russian crude production begins to decline**

Kazakh Crude Export Volumes

Kazakhstan Export Options



1. CPC
2. Atasu-Alashankou
3. Aktau-Makhachkala/Baku-Batumi/Baku-BTC/Neka
4. Atyrau-Samara
5. Rail

BTC Appears an Attractive Export Option



- **Atasu-Alashankou, BTC for shareholders and CPC are the most attractive export options**

 - Exports via Iran are likely to remain limited due to political factors

- **Based on relative transportation costs, exports via the BTC would appear as one of the best export options – even for non-BTC shareholders**

- **Potentially leaving Atyrau-Samara as the swing export route**

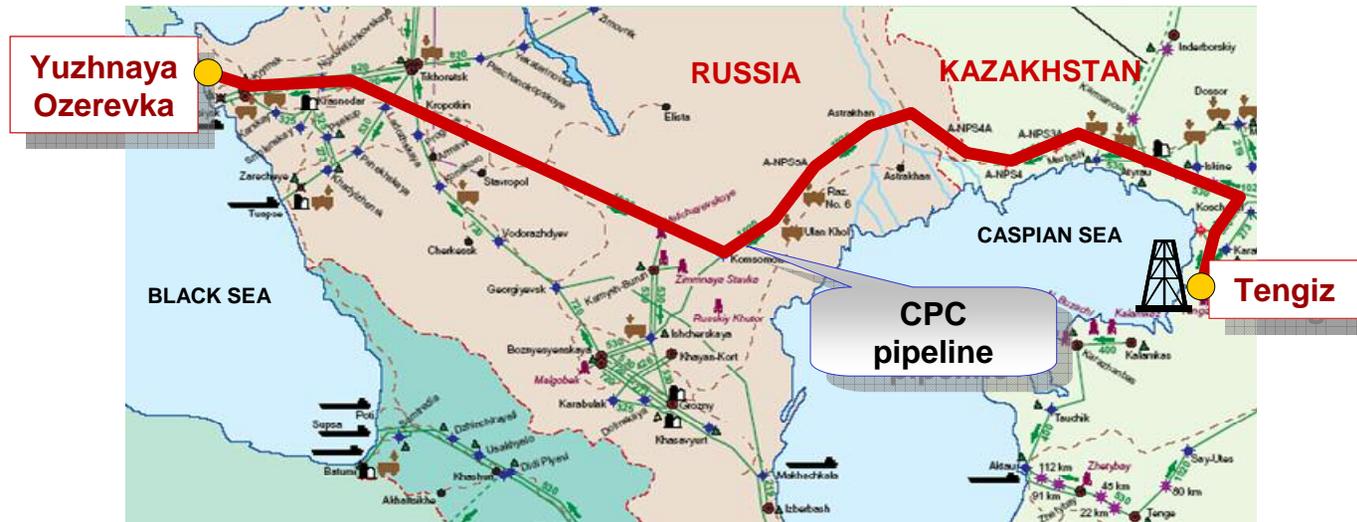
 - The lack of any quality bank and energy security concerns make this export route appear less favorable

Relative Kazakh export costs by route

| <i>US\$/ton</i> | |
|--------------------------------|------|
| Atasu-Alanshkou | 16.1 |
| Aktau-Neka | 24.5 |
| Aktau - BTC (shareholder) | 29.1 |
| CPC | 30.8 |
| Aktau-Baku-Batumi | 37.6 |
| Aktau - BTC (non-shareholder) | 37.9 |
| Rail (Iran) | 48.0 |
| Atyrau-Samara-Novorossiysk | 61.7 |
| Aktau-Makhachkala-Novorossiysk | 70.3 |
| Atyrau-Samara-Primorsk | 71.7 |
| Atyrau-Samara-Odessa | 78.8 |
| Rail (Atyrau-Europe) | 93.1 |

Export costs are similar but Fob Med prices are more attractive than Fob Black Sea

CPC Delays Result in Diversification of Export Routes



- **The Russian government continues to block expansion of the CPC pipeline from 28 MT/yr to 67 MT/yr**
 - Russia has linked CPC shareholder involvement in the Bourgas-Alexandroupolis Bosphorus bypass pipeline as a condition to CPC expansion
- **The continued delays may negatively impact production at the Tengiz field and will result in short-term export alternatives**
 - Rail to Odessa and Feodosia
 - 5 MT/yr to pass along the Aktau-Baku-Batumi route from 2007
- **CPC expansion remains critical to Kazakh crude output plans and is assumed to take place from 2010**

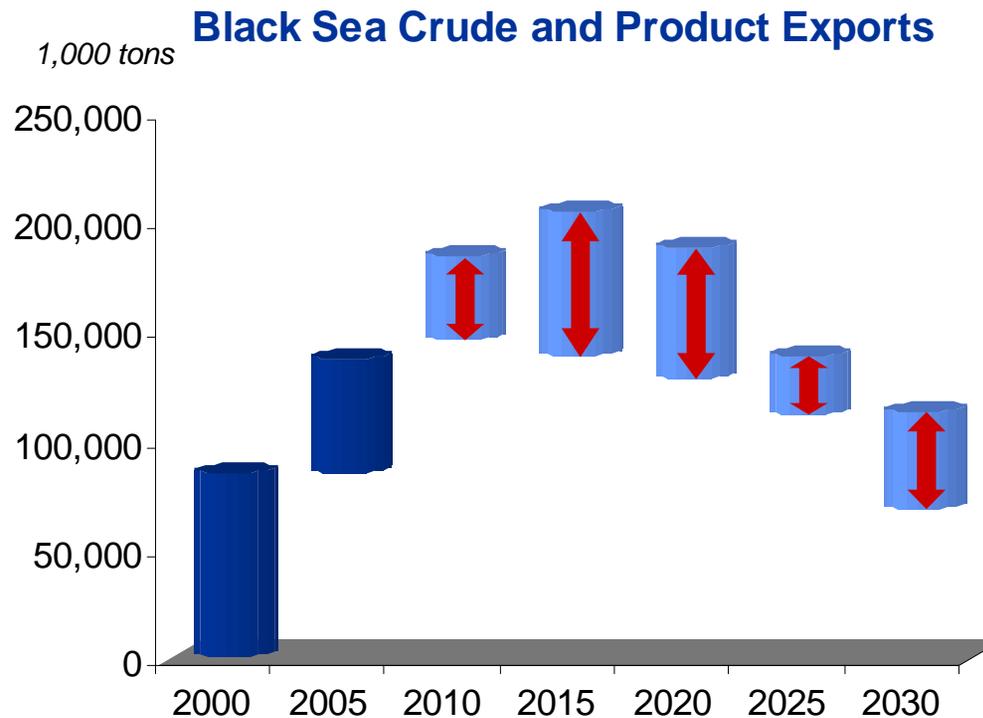
Logistics Crucial to Large Kazakh Export Volumes via BTC

- **Logistical developments on both the Kazakh and Azeri side could allow for over 40 MT/y of Kazakh crude exports via BTC by 2020**

- **On the Kazakh side, the key developments include:**
 - Expansion of Aktau port capacity from 8 MT/yr to 20 MT/yr
 - Construction of the Kuryk terminal (7 MT/yr, potentially expandable to 14 MT/yr)
 - Construction of a 20 MT/yr underwater pipeline

- **On the Azeri side, a combination of one or several of the following:**
 - Expansion of the BTC pipeline from 50 MT to 90 MT
 - The reversal of the 12 MT/y pipeline linking Sangachal to BTC currently used for AIOC rail exports to Batumi
 - There is another 12 MT/y pipeline linking Sangachal to BTC which is currently not in use
 - The construction of a 8-10 MT/y pipeline linking Dubendi to BTC
 - The construction of a 30 MT/y terminal and pipeline link at Karadag
 - The construction of a new terminal and pipeline link by Total (Shurabad, Pirsagat)

Black Sea Crude & Product Exports



- Taking the aggregate of Russian, Kazakh, Azeri, Ukrainian, Romanian, and Bulgarian crude and oil product exports via the Black Sea, and making allowances for intra-Black Sea flows, PFC Energy forecasts that total crude and oil product export flows via the Bosphorus Straits will peak at slightly under 180 million tons (3.6 mmb/d) in 2015 before potentially declining to below 90 million tons (1.8 mmb/d) in 2030

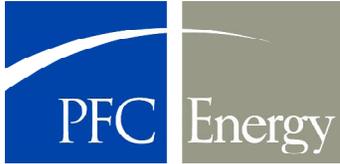
Implications

- **Crude and oil product exports via the Black Sea are forecast to rise steadily through 2015 and then decline**

- **However, there is major sensitivity around Russian crude production, Russian exports via ESPO, and Kazakh export flows via BTC**
 - Forecast decline in crude and product exports post-2015 depends entirely on how you view these key parameters

- **All of these variables are due to take place in the next decade**

- **Adds to the risk of any crude producer looking to invest in a Bosphorus bypass pipeline**



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