The Southern Gas Corridor: Current Perceptions and Future Prospects

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Current Realities - European Gas Demand in 2015

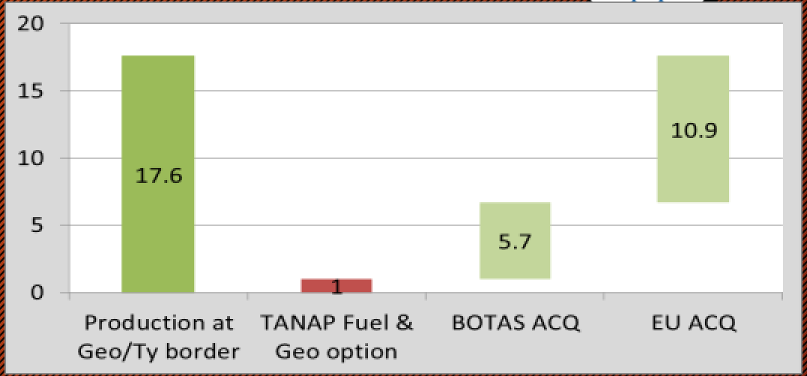
Gas demand in the European Union rose 4.6 per cent in 2015, from 384.5 bcm to 402.1 bcm. But gas production fell 8.0 per cent in 2015 from 130.5 to 120.1 bcm.

Net imports thus rose 9.3 per cent from 354.0 bcm in 2014 to 382.1 bcm in 2015.

The Southern Gas Corridor: How It Got Going

Source: SOCAR

Gas sales to EU buyers signed in 2013:
Axpo, GDF Suez, Gas Natural, E.ON, Shell
Hera, ENEL, Bulgargaz, DEPA
Gas to Europe to start ~1 yr later than 1st gas



Shah Deniz Field
South Caucasus Pipeline Expansion (SCPX)
Trans Anatolian Pipeline (TANAP)
Trans Adriatic Pipeline (TAP)

Gas sales to BOTAS
Stage 2 sales signed in 2011
(First Gas in 2018)
Complementing current Stage 1 sales

ACQ: Annual Contract Quantity

Costs & Shares in the Southern Gas Corridor

(Principal shareholders only)

	SGC Project Costs		Share in SGC Project			Share of Costs		
	($ bn) Original Dec-13	($ bn) Revised 2016 **	Socar* Stake 2016	BP Stake 2016	Turkish Stake 2016	Socar ($ bn) 2016	BP ($ bn) 2016	Turkish ($ bn) 2016
Upstream SD2	23	18.5	16.67%	28.80%	TPAO 19%	3.08	5.33	3.52
26 wells offshore	(6)							
Offshore facilities	(15)							
Sangachal terminal	(2)							
SCP	5	4.9	16.67%***	28.80%	TPAO 19%	0.82	1.41	0.93
Tanap	11 - 12	9.2	58%	12%	BOTAS 30%	5.33	1.1	2.76
Tap	5	5.8	20%	20%	n/a	1.16	1.16	n/a
Total:	c.44-45	38.4				10.39	9	7.21

- Note: Socar's shares in all the major projects have changed significantly since 2013.
- ** These are figures given by Azerbaijani Energy Minister Natiq Aliev in Baku on 2 June 2016, with further revisions to SD2 and TAP provided by SOCAR in September 2016.
- *** Includes both SOCAR and Azerbaijan's state-owned SGC Company.

Source: Methinks Ltd.

Progress in SGC - 1

- SD2 and SCP-X: September 2016. 82% complete. Contracts awarded $18 bn.
- TANAP: October 2016. Around half of the 1,850 kilometers of line have already been laid and pipe for the rest of the line largely delivered.
- July 2016: Malaysia's SapuraKencana secures $126m contract for the last major piece of pipe-laying, the 24km subsea crossing of the Dardanelles.
- Overall, TANAP appears to be slightly ahead of schedule and could be ready for routine operation as early as June 2018.

• Progress in SGC - 2

- TAP: Contracts let for the whole 445-km length across Greece and the whole 215-km length in Albania.
- Italy’s Saipem secures contract for a 105-km subsea line from Albania to Italy and the 8-km onshore section to the planned terminal at San Foca.
- Issues: Landfall.

Southern Gas Corridor Source Fields (Theoretical)

Field	Country	Estimated Reserves	Output & Production Timing
• Shah Deniz Phases I and II	Azerbaijan	1.2 tcm	25 bcm/y during 2018-2022
• Shah Deniz Phase III	Azerbaijan	c. 500 bcm	?
• ACG Deep Level	Azerbaija n	300-500 bcm	5-10 bcm/y by 2026-7???
• Apsheron	Azerbaijan	350 bcm	Startup in 2021. 5 bcm /y by 2023?
• 'Next Wave' cluster*	Azerbaijan	2.7 tcm	Post-2025.
• Kurdistan	Iraq	?	5-10 bcm/y before 2020; 10-20 later?
• Akkas	Iraq	59.4 bcm (GOI)	5-10 bcm/y long-term (ISIL factor)
• Galkynysh	Turkmenistan	Up to 26.2 tcm (gas in place)	10-30 bcm/y by 2016-2025
• Dauletabad	Turkmenistan	1 tcm	30 bcm/y with E-W pipeline
• Offshore Block 1	Turkmenistan	180 bcm	10 bcm/y by 2017-18

- PLUS:
- Iran
- Eastern Mediterranean

- * Umid, Babek, Nakhchivan, Zafer-Meshel, Araz-Alov-Sharq, Asiman-Shafaq

Source: Methinks Ltd.

Azerbaijan

- Prospects for Absheron, deep level, and the 'Next Wave.'
- Good resources but development may be held back by limited availability of drilling rigs.
- The Azerbaijan gas paradox: Major commitments for gas exports, but limited volumes available for domestic supply.
- Conclusion: Timing uncertain.

Supply: Turkmenistan's Gas (2016)

- Turkmenistan's reserves: 17.5 tcm (BP Statistical Review 2015)
- Turkmenistan's 2015 production: 72.4 bcm (planned, 83.8 bcm).
- Turkmenistan's 2015 exports: 38.1 bcm (planned,48 bcm).

<u>Principal resources for ongoing or new development:</u>

- Galkynysh. GCA audit: 13.1 tcm (low); 16.4 (best estimate); 21.2 tcm (high).
- Yashlar. GCA audit: 1.5 tcm (low); 2.65 tcm (best estimate); 5.0 tcm (high).
-

Turkmenistan: Policy & Aspiration - 1

- TAPI remains the predominant aspiration.
- Commercial raison d'etre: proximity to the Sub-continent.
- Problem: Afghanistan.
- Prospect for actual development in near future: limited.

Turkmenistan: Policy & Aspiration - 2

- “Turkmenistan and Austria share the view that ensuring global energy security is the most important component of stability and sustainability of the system of international political and economic relations today.” “Its key aspect is the diversification of energy supplies, in particular, establishment of new routes from Turkmenistan to the West.” President Berdimukhammadov, Vienna, 13 May 2014. Source: Trend 13 May 2015.
- 30 April 2015: President Gurbanguly Berdymukhamedov and Maros Sefcovic, Vice-President of the European Commission for Energy Union, discuss the "possibility of building a pipeline through the Caspian as well as through Iran, since diplomatic relations with Iran are developing positively". Source: Maros Sefcovic, quoted by AFP, 1 May 2015.
- “We have good mutual understanding. For Turkmenistan it is very important to diversify its export options, while for the EU it is very important to diversify its imports.”
- **“Europe expects supplies of Turkmen gas to begin by 2019.”**
- Maros Sefcovic, interview with Reuters, published 2 May 2015.

Turkmenistan: Policy & Aspiration - 3

- “We agreed to continue negotiations on regular basis. Apart from this, the Turkmen side expressed an intention to annually sell 30 bcm of gas on its border. Nevertheless, there are still many transit related issues left to solve.”
- Azerbaijan Energy Minister Natiq Aliev, 13 May 2015

- “According to the Iranian President, Iran is ready to cooperate in the field of transportation of Turkmen natural gas, oil and electricity to other countries through Iran.”
- Turkmenistan.ru 12 March 2015 on meeting of President Berdmukhammedov and President Rouhani in Ashgabat.

Turkmenistan: An Unpalatable Reality?

- Limited exports via a Block One linkup to Azerbaijan's ACG infrastructure?

Iran: Gas Prospects 2016

- Post-Sanctions (Jan 17, 2016) :
  - Revenue constraints
  - A focus on oil output and oil exports
  - A need for gas injection.
- Generic:
  - South Pars expansion
  - Domestic priorities: substituting for oil; use in industry; use in power generation; and (possibly) indirect export as electricity.
  - A limited medium-term export focus on Regional Exports:
  - Oman and Pakistan, and possibly Turkey?
  - A long-term focus on LNG

  Discussion:
  - Input to TANAP. TANAP's own requirements.

Northern Iraq: Gas from Kurdistan - 1

The costs and consequences of Iraqi breakup & Kurdish independence.

Kurdistan-Iraq:

- Stranded production, not just stranded resources.
- November 2013: Government of Turkey signs a GSA with the KRG on gas exports to Turkey.
- Volumes set at initial 4 bcm/y in 2017, 10 bcm/y by 2020 and an option to move to 20 bcm/y thereafter. Original Understanding: Exports to start in 2018.
- Principal resource base: Genel Enerji's fields at Miran and Bina Bawi.
- 20 November 2015: KRG Minister of Natural Resources Ashti Hawrami and Genel Enerji Chairman Tony Hayward say Kurdistan-Iraq will be in a position to deliver 20 bcm/y to Turkey in the early 2020s.

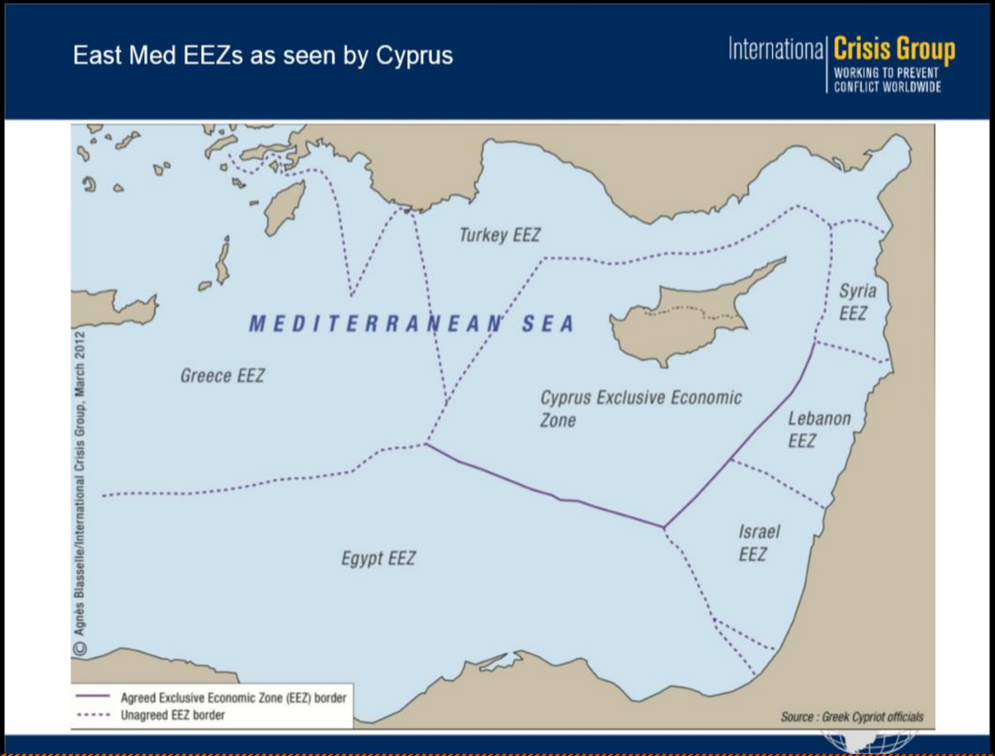
Northern Iraq: Gas from Kurdistan - 2

- December 2015 (and April 2016) Turkey organizes a tender for construction of a 185-km, 20 bcm/y capacity pipeline from Sirnak on the Iraqi-Turkish border to a connection with the Turkish grid at Mardin.
- February 2016: Genel Enerji estimates cost of initial development of Miran and Bina Bawi fields at $3.5 bn, with $1 bn required for Genel itself to start raw gas production and $2.5 bn for a proposed midstream company to develop the processing facilities required to convert the raw gas into actual sales gas. Additional lifetime costs put at $1.9 bn. Targeted production: 10 bcm/y capacity by end-2019.
- February 2016: After evaluating responses to the initial tender Botas says that the low bid of $29.8 million is still too much above the target cost of $25 million, and that a fresh tender will therefore be issued on 26 April 2016.
- 24 April 2016. Botas reiterates tender re-issue date of 26 April 2016.
- The Long Silence.

East Med: Too Early to Judge

- No realistic figure for export availabilities in 2020.
- IF Aphrodite's reserves are augmented, then LNG scale deliveries in the 2020s.
- NOTE: Good prospects for further discoveries but seismic not the same as drilling. (e.g. Israel's Daniel prospect).
- Export destination: Probably Europe. But how to get the gas to market?
- -- What prospects for reviving Egypt's LNG plants? Zohr????
- -- What prospects for reaching Turkey by pipeline or CNG?
- Overall: IF Leviathan is approved for export, then perhaps 10-15 bcm/y by 2020 (making due allowance for sales to Jordan and Palestine).

Eastern Mediterranean EEZs: Different Perceptions



The Question of Turkey:
Gas Transit – and War

2015: A Summer of Dangers

27 July 2015: PKK attack on the Iran-Turkey gasline near Agri in Eastern Turkey.

29 July 2015: PKK attack the Kirkuk-Ceyhan oil pipeline in Sirnak Province of southeastern Turkey.

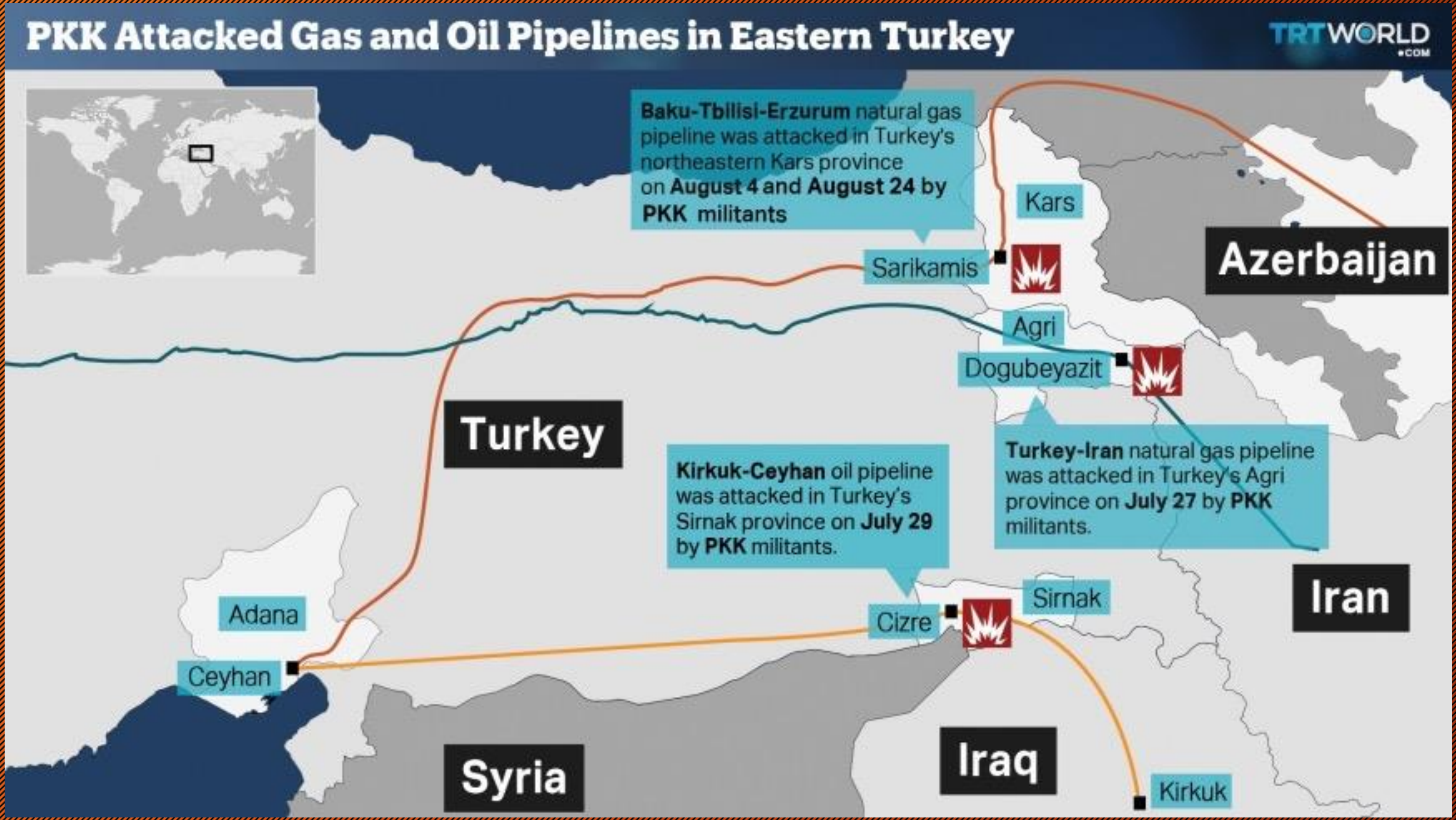
30 July 2015. PKK attack train carrying pipe for TANAP near Sarikamis in the northeastern Turkish province of Kars.

4 August 2015: PKK attack the Baku-Tbilisi-Erzurum (BTE) gasline near Sarikamis.

24 August 2015: PKK again attack the BTE line near Sarikamis.

2003 – 2015: Repeated attacks by various anti-Baghdad forces on the Iraqi section of the Kirkuk-Ceyhan oil pipeline.

MAP: A Month of Attacks



- PLUS attack on train carrying pipes to northeastern Turkey for construction of TANAP

TRT World 25 Aug 2015.
TRT is the Turkish Radio and Television Corporation.

Turkey: It really is a war

- "Today the Turkish Air Forces are actually waging a war. More than just a medium-scale war, it is fighting on two fronts." The two fronts to which Commander Ünal was referring are southeastern Turkey and northern Iraq.
- Air Force Commander Abidin Ünal, October 2015.
  - *Hurriyet*, "Top commander says Turkey 'actually waging war' since July," October 6, 2015, http://www.hurriyetdailynews.com/Default.aspx?pageID=238&nID=89490&NewsCatID=338.

Casualty Estimates in Turkey's Renewed Kurdish War (since July 2015)

1. Government reported fatalities (May 2016):
- 483 members of the security forces;
- 2,583 PKK fighters and youth-wing militants in Turkey itself;
- 2,366 in air strikes in northern Iraq.

2. PKK reported fatalities (26 June 2016):
- 6,705 members of the security forces;
- 721 PKK fighters and militants.

3. Civilian fallout (The International Crisis Group, March 2016):
- 400 civilians killed;
- 350,000 people displaced.

Sources: Next Slide.

Sources: Casualty Estimates in Turkey's Renewed Kurdish War (since July 2015)

Government claims: Ana Sayfa, "7 bin 78 PKK'lı etkisiz hale getirildi Kaynak: 7 bin 78 PKK'lı etkisiz hale getirildi," Yenicag, May 23, 2016, http://www.yenicaggazetesi.com.tr/7-bin-78-pkkli-etkisiz-hale-getirildi-138066h.htm.

2. Hisham Arafat, "PKK claims killing 7,000 Turkish soldiers," kurdistan24.net, June 22, 2016, http://www.kurdistan24.net/en/news/8c60f8cf-02e5-4037-8e6a-dd9dd4970941/PKK-claims-killing-7-000-Turkish-soldiers.

3. International Crisis Group, The Human Cost of the PKK Conflict in Turkey: The Case of Sur (Diyarbakir/Istanbul/Brussels, March 2016), http://www.crisisgroup.org/en/regions/europe/turkey-cyprus/turkey/b080-the-human-cost-of-the-pkk-conflict-in-turkey-the-case-of-sur.

Outages on Kirkuk-Ceyhan line

The PKK has on several occasions attacked the Kirkuk-Ceyhan pipeline. In August 2015, PKK sabotage disrupted flows with the KRG estimating the value of lost exports at $250 million.

February 17 to March 11, 2016. Line closed for 23 days. Cause not confirmed. No initial indication that the line had been damaged.
February 25, Turkish officials report an explosion

Losses to KRG: More than $13 million per day, roughly $300m in export revenues.

"It's not impossible that the Turks are sending a warning to Iraqi Kurdistan saying, 'You can only go so far before we yank your leash'." Marina Ottaway quoted by Keith Johnson, "A Mysterious Pipeline Closure Is Bankrupting Iraqi Kurds," Foreign Policy blog, March 2, 2016, http://foreignpolicy.com/2016/03/02/a-mysterious-pipeline-closure-is-bankrupting-iraqi-kurds/.

The Sirnak-Mardin Pipeline: The PKK response

“We will not accept such an agreement to bolster Turkey and to let it stand on its feet since this agreement is a conspiracy putting the lives of the Kurdish nation at risk."

Statement by Demhat Agid, spokesman for the Group of Communities in Kurdistan (KCK), an offshoot of the PKK.
18 February 2016.

The Turkish Coup: Long-term issues - Gas

CURRENT
6.6 from Azerbaijan via BTE
7.8 bcm from Iran via Dogubayezit (2015)
12.9 bcm from Russia via Eastern Balkans System (2014)
14.4 bcm from Russia via Blue Stream (2014).

FUTURE

2H 2018:	6.0 bcm/y via TANAP to Turkey
2020:	10.0 bcm/y via TANAP as transit
2018-20 ??	5-10 bcm from northern Iraq via Sirnak-Mardin

Turkish Stream and Eastern Mediterranean gas ????

TurkStream – Return from the Grave
(Map Source: Gazprom)

15 July 2016: "It is important for Russia and Turkey to restore and implement Turkish Stream pipeline and Akkuyu NPP construction projects as well as to focus efforts on attracting greater numbers of Russian tourists to our resorts and of our citizens to Russia."
Turkish PM Binyali Yildirim.

1 Dec 2014: Turkish Stream launched by Putin in Ankara.

I July 2015: Italian pipe laying vessels leave Burgas for Anapa.

8 July 2015: Vessels told they will not be needed this year.

24 Nov 2015. Turkish warplanes down Russian bomber over Turkish-Syrian borderlands.

27 June 2016: “The Turkish Stream project has been meticulously worked out. The cost of the four lines was estimated approximately at €11.4bn. The level of readiness to attract project financing is very high.”
Gazprom deputy head of finance, Igor Shatalov.

TurkStream: Onwards from Ipsala/Kipoi?

20 February 2012. ITGI loses out to TAP as favoured candidate for last leg of SGC System.
24 February 2016. Gazprom, Depa and Edison sign MoU on delivery of Russian gas to Italy via Greece.

"*The expansion of intra-European gas transit capacity is key to strengthening reliability and security of natural gas supplies, including from Russia, to customers all around Europe*" Gazprom CEO Alexei Miller.

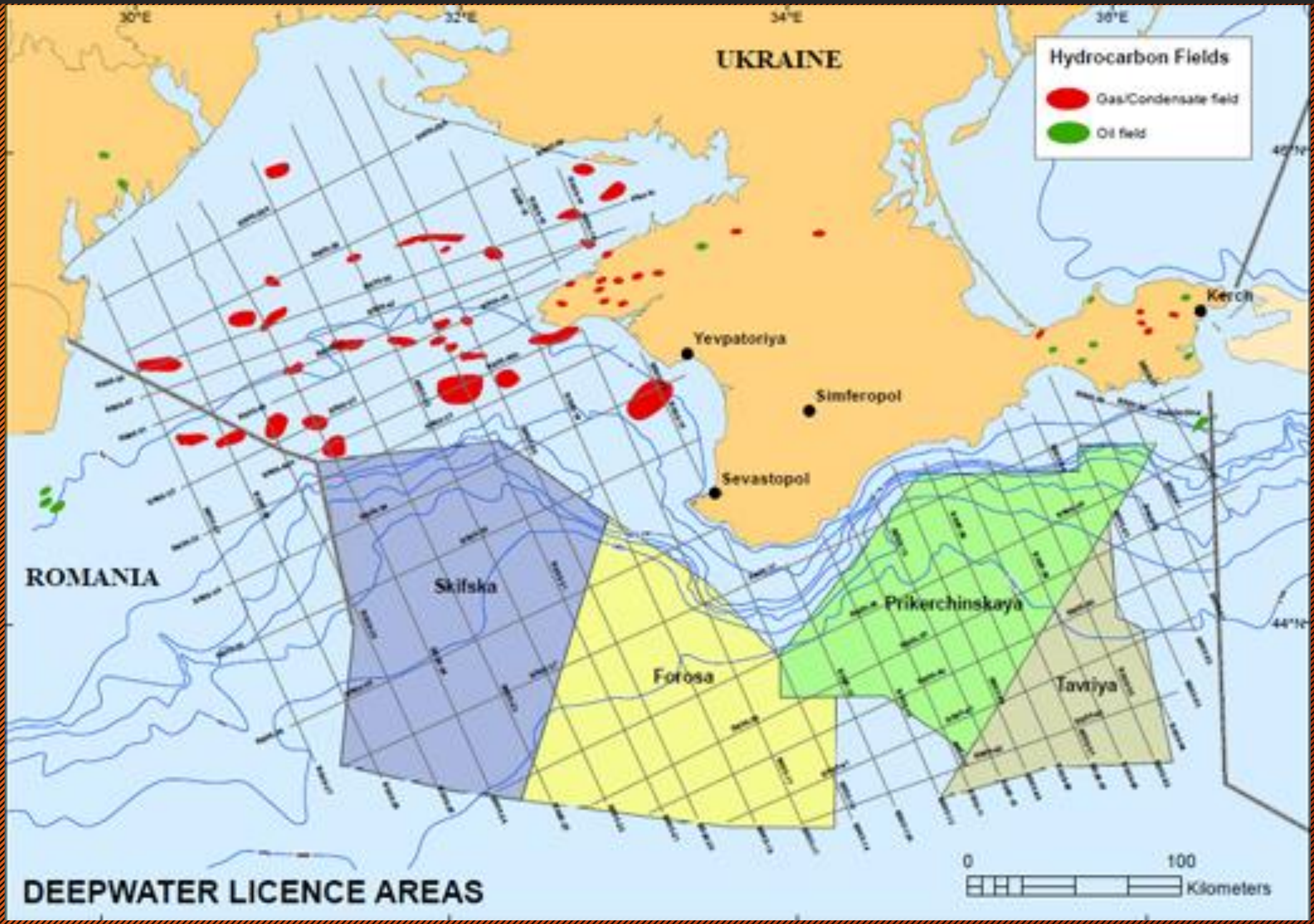
Russia: Tough Practices
Putative Black Sea Boundaries in the Wake of Russia's Annexation of Crimea

- Officially recognised EEZs
  - Source: Defence24.pl

If the Annexation were to be recognised

Source: Defence24.pl

Offshore Ukraine:
Consequences of the Crimean takeover



Four blocks impacted:
Skifska: Shell signs agreement to develop PSA in 2012. Abandoned March 2014.
Prykerchenska: Vanco signs agreements in 2006 and 2013.
Forinska: No bidding interest.
Tavriya: No bidding interest.

Ukraine: Prykerche

Vanco's Prykerchenska licence of 2006 and 2013: a 3.2 million-acre block off SE Crimea. Some parts of the field located at depths of more than 6,500 feet.

Gas: Russia's Dilemma

The principal problem: How to pay for megaprojects to both East and West.

<u>EAST:</u>

- $55 bn for development of the 4,000-km Power of Siberia gasline and upstream costs of the Vostok project, notably the Chayanda gasfield in Yakutia (albeit, with a $25bn upfront Chinese loan).
- $18.5bn for the Altai Pipeline.

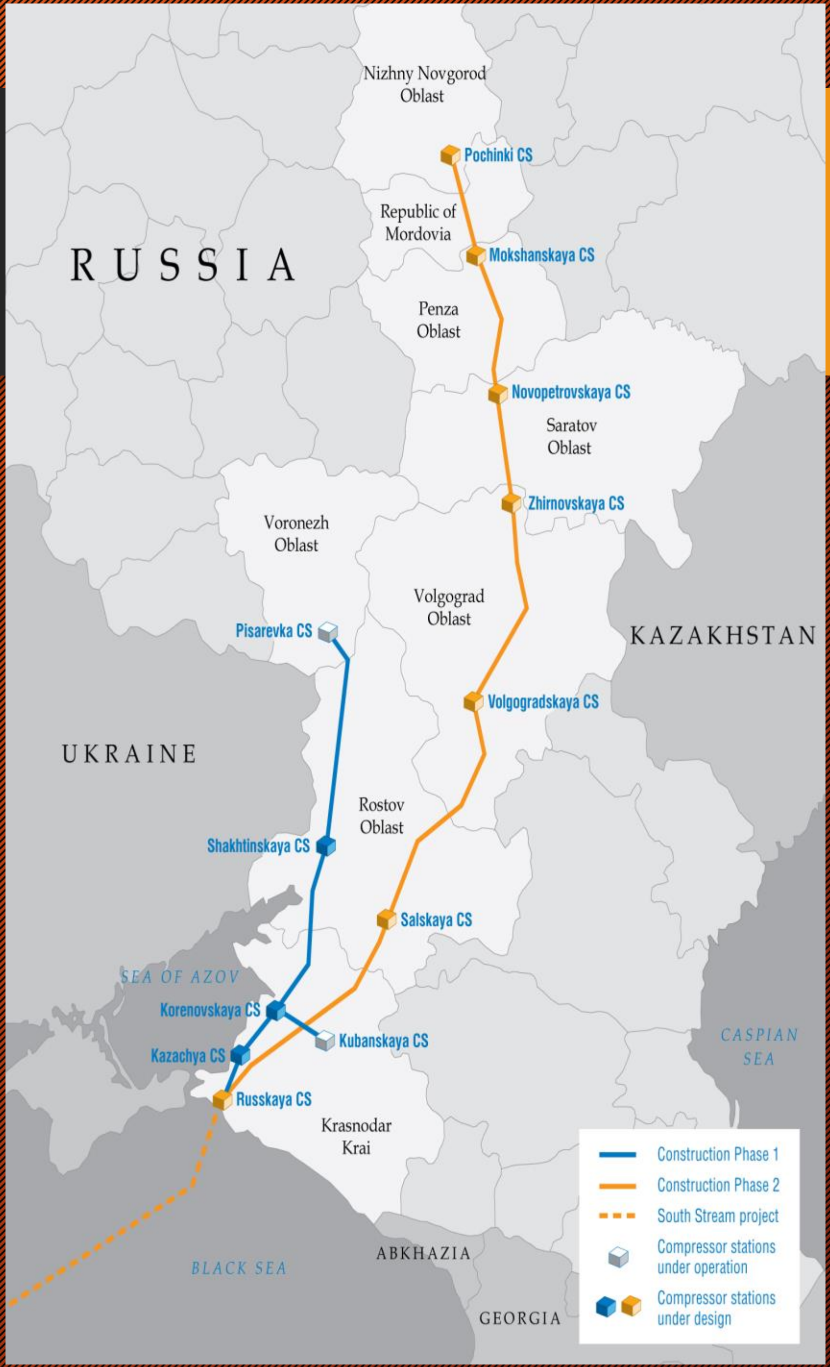
<u>WEST:</u>

- $22.5bn for Russia's Southern Corridor.
- In 2014, $22.5 bn for a 63 bcm/y South Stream (four string offshore) and twin-pipe onshore line to Tarvisio, Italy and/or Baumgarten, Austria (Onshore estimated cost: €16-17bn in 2013).
- In 2016, c. $11.4 bn for a 31.5 bcm/y Turkish Stream (two string offshore) and single pipe onshore line to Ipsala/Kipoi.
- In 2H 2015. c. $11 bn for the 2 x 27.5 bcm/y Nordstream 2.

Russia’s Southern Corridor in 2014

<u>Purpose:</u> Strengthening of gas connections from Russia’s existing system to Russkaya pumping station near Black Sea port of Anapa and onward connection to Europe by subsea line across the Black Sea.
<u>Details:</u> 2506 kms; 10 compressor stations.
<u>Target:</u> Ready by 2018.

- Western Route: 880.6 kms, including Kubanskaya CS and the Korenovskaya CS interconnector; compressor stations’ capacity, 574 MW.
- Eastern Route: 1,625.6 kms; compressor stations’ capacity, 942 MW.
- PRINCIPAL ISSUE: How will gas reaching Anapa be transported to Europe?



Map source: Gazprom 2011

Questions?

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