Supplementary documentation

Perspectives of the Southern gas corridor

to the study
“Status and Perspectives of the European Gas Balance”

Commissioned by
Nord Stream 2 AG

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Berlin, 16 May 2017
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1 Introduction

In the second half of 2016, Prognos AG was commissioned by Nord Stream 2 AG to prepare the study “Status and Perspectives of the European Gas Balance - Analysis of EU-28 and Switzerland”.

This study analyzed possible sources of future gas imports to the EU and the corridors for the gas transport. In this context, the study presented, among others, the Southern corridor, as the countries of the Caspian region dispose of large (theoretical) potentials for gas exports. In addition, there are several possible gas infrastructure projects being planned or under discussion for this region. In the following, we want to present and assess the current status and the perspectives of possible gas infrastructure projects in the Southern corridor.

In the context of gas imports towards Europe, the term Southern corridor refers mainly to imports via Turkey or the Black Sea from countries bordering the Caspian Sea. In addition, the analysis comprises the respective connecting pipelines, e.g. through the Adriatic Sea. Due to its routing through the Black Sea, the TurkStream pipeline between Russia and Turkey will also be included.

The here presented information supplements the above-mentioned study.
2 Gas sources in the Southern corridor

The countries bordering the Caspian Sea dispose of large, conventional natural gas reserves. Therefore they constitute an alternative for supplying the EU’s future gas import demand.

Table 1: Natural gas reserves and resources in 2015 in billion m³

<table>
<thead>
<tr>
<th>Country</th>
<th>Reserves</th>
<th>Resources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkmenistan</td>
<td>9,904</td>
<td>15,000</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>1,148</td>
<td>1,800</td>
</tr>
<tr>
<td>Iran</td>
<td>33,500</td>
<td>10,000</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>1,918</td>
<td>4,180</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>1,608</td>
<td>1,400</td>
</tr>
</tbody>
</table>

Source: (BGR, 2016)

As there are no connections to the European gas network yet, current gas exports from the region are basically limited to Turkey, Russia and China. In comparison to the reserves and resources, the exports – stated here in a simplified way as production minus domestic consumption - are rather low, as the following table shows.

Table 2: Natural gas exports in billion m³

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Turkmenistan</td>
<td>36.0</td>
<td>36.0</td>
<td>39.5</td>
<td>41.6</td>
<td>38.1</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>6.7</td>
<td>7.1</td>
<td>7.6</td>
<td>8.1</td>
<td>8.4</td>
</tr>
<tr>
<td>Iran</td>
<td>-2.3</td>
<td>4.6</td>
<td>3.9</td>
<td>2.0</td>
<td>1.2</td>
</tr>
<tr>
<td>Kazakhstan</td>
<td>5.3</td>
<td>4.5</td>
<td>4.9</td>
<td>4.5</td>
<td>3.7</td>
</tr>
<tr>
<td>Uzbekistan</td>
<td>9.4</td>
<td>9.7</td>
<td>10.0</td>
<td>8.5</td>
<td>7.5</td>
</tr>
</tbody>
</table>

Source: Own calculations based on (BP, 2016b)

This means that infrastructure projects are decisive for the exploitation of the above presented reserves. The uncertain situation in most of these countries has, among other things, prevented the connection to the transmission networks within the EU. In the following, we will therefore provide an outline of the most important infrastructure projects that are in the planning or construction phase.
3 Infrastructure projects in the Southern corridor

3.1 Overview

For several years, pipeline connections from the Caspian region to Europe have been under discussion. In this context, the project with the most advanced status is the TAP/TANAP pipeline that is currently under construction and will transport gas from Azerbaijan (Shah Deniz II field) via Turkey to the EU.¹

In addition, the White Stream pipeline and the AGRI interconnector are two projects that compete regarding the connection of Georgia to Romania via the Black Sea. However, they are less advanced, as can been seen below. The connection of Turkmenistan depends mainly on the construction of the Trans-Caspian pipeline and the capacity expansion of the South Caucasus pipeline. In the future, gas from Russia is planned to be supplied to Turkey via the TurkStream pipeline that is currently under construction.

Figure 1: Overview of the gas infrastructure projects in the Southern corridor

With the exception of the existing South Caucasus pipeline (SCP), the expansion stage that is currently under construction (SCPX) and the additionally planned expansion (SCPFX) as well as the Trans-Caspian pipeline (TCP), the study “Status and Perspectives of the European Gas Balance” already included a brief presentation of all projects of the Southern corridor shown in the following table.

The European “Ten Year Network Development Plan” 2017 (TYNDP 2017) for gas, which is the guideline for the development of the European gas network infrastructure, includes the following projects (cf. Table 3).

**Table 3:** Relevant gas infrastructure projects in the Southern corridor

<table>
<thead>
<tr>
<th>Name</th>
<th>TYNDP Code</th>
<th>Project webpage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trans-Anatolian pipeline (TANAP)</td>
<td>TRA-F-221</td>
<td><a href="http://www.tanap.com/">http://www.tanap.com/</a></td>
</tr>
<tr>
<td>Trans-Adriatic pipeline (TAP)</td>
<td>TRA-F-051</td>
<td><a href="https://www.tap-ag.com/">https://www.tap-ag.com/</a></td>
</tr>
<tr>
<td>South Caucasus pipeline, 2nd expansion (SCPFX)</td>
<td>TRA-N-1138</td>
<td>none</td>
</tr>
<tr>
<td>Trans-Caspian pipeline (TCP)</td>
<td>TRA-N-339</td>
<td><a href="http://www.w-stream-transcaspian.com/">http://www.w-stream-transcaspian.com/</a></td>
</tr>
</tbody>
</table>

Source: Own presentation based on ENTSOG

The TurkStream pipeline ([http://www.gazprom.com/about/production/projects/pipelines/built/turk-stream/](http://www.gazprom.com/about/production/projects/pipelines/built/turk-stream/)) across the Black Sea also passes through the Southern corridor. However, it is not included in the European gas network infrastructure planning as it mainly supplies Russian gas to Turkey.

In the following, we will present these projects in more detail.
3.2 Trans-Anatolian pipeline (TANAP)

The Trans-Anatolian pipeline (TANAP) passing through Turkey has been under construction since 2015 and will, according to TYNDP 2017, start operations in 2018/2019. The TANAP pipeline will cross Turkey and transport natural gas from the Azerbaijani gas field Shah Deniz II to the EU border where the TAP pipeline - that also is currently under construction - will connect.

According to TYNDP 2017, the TANAP pipeline will initially transport 16 billion m³ gas per year, whereof 10 billion m³ to the Greek border.

The total pipeline capacity is planned to be increased to 23-24 billion m³ by 2023 and to 31 billion m³ by 2026. The long-term goal is an annual transport capacity of 60 billion m³.

The project is developed by the State Oil Company of Azerbaijan Republic (SOCAR), an Azerbaijani state-owned energy group. The project corporation is a consortium consisting of:

- 58 % SOCAR
- 30 % BOTAS (Turkey’s state-owned pipeline corporation) and
- 12 % BP.

The current 2015 list of the European Commission includes the TANAP pipeline under number 7.1.1 as a “project of common European interest” (PCI).

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3.3 Trans-Adriatic pipeline (TAP)

The Trans-Adriatic pipeline (TAP) has been under construction since 2016 and will, according to information from the project corporation Trans-Adriatic Pipeline AG, start operations in 2020. According to TYNDP 2017, the pipeline will start operations in 2019. The pipeline is planned to transport the gas supplied by the TANAP pipeline from the Turkish border, via Greece, Albania and the Adriatic Sea, to Italy. TAP is planned to have an initial annual transport capacity of 10 billion m\(^3\) that - depending on demand - can be increased by two additional compressor stations to over 20 billion m\(^3\).

Project developer is the Trans-Adriatic Pipeline AG with the following shareholders:
- 20 % BP
- 20 % SOCAR (Azerbaijan’s state-owned energy group)
- 20 % Snam S.p.A (Italian gas network operator)
- 19 % Fluxys SA (Belgian gas network operator)
- 16 % Enagás (Spanish gas network operator)
- 5 % Axpo (Swiss utility).

The current 2015 list of the European Commission includes the TAP pipeline under number 7.1.3 as a “project of common European interest” (PCI).

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6 https://www.tap-ag.com/the-pipeline/project-timeline
7 https://www.tap-ag.com/the-pipeline
### 3.4 Expansions of the South Caucasus pipeline (SCPX/SCPFX)

The South Caucasus pipeline (SCP) between Baku (Azerbaijan), Tbilisi (Georgia) and Erzurum (Turkey) has been already existing since 2006 and mainly feeds gas from the Caspian Sea into the Turkish gas network.

The **SCPX** (South Caucasus Pipeline Expansion) is currently under construction in order to expand the South Caucasus pipeline and transport the increasing volumes from the Shah Deniz gas field (second expansion level) to Turkey and Europe. The second expansion level (Shah Deniz 2) targets an annual gas export of 16 billion m³, whereof 6 billion m³ to Turkey and 10 billion m³ to Greece and Italy. Once the expansion is completed, the transport capacity of the South Caucasus pipeline will increase from approximately 7 billion m³ to over 20 billion m³. The SCPX is planned to be completed in 2018 and to be connected to the Trans-Anatolian pipeline in 2019.

A second expansion of the South Caucasus pipeline, **SCPFX** (South Caucasus Pipeline Future Expansion), is planned to feed in an additional 5 billion m³ of gas into the TANAP pipeline. According to TYNDP 2017, SCPFX will possibly start operations in 2021, with the project status being “non-FID, less-advanced”. The Azerbaijani state-owned energy group SOCAR that is also shareholder of the TAP/ TANAP pipeline is assumed to be the project developer.

The current 2015 list of the European Commission includes both expansions of the South Caucasus pipeline (“SCP-(F)X”) under number 7.1.1 as “projects of common European interest“ (PCI).

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3.5 White Stream pipeline

The White Stream pipeline is planned to transport gas from Georgia’s Caspian region via the Black Sea to Romania. In the East, this would require a pipeline connection to the Caspian Sea shore in Azerbaijan, which could be built along the existing South Caucasus pipeline (SCP), for instance. In addition, a connection to Turkmenistan would require a pipeline across the Caspian Sea, such as the Trans-Caspian pipeline (TCP) that is under discussion. Currently, neither project appears to be realistic.

The original plans state an annual transport capacity of 16 billion m³ for the White Stream pipeline. At a later point, it may be increased up to 32 billion m³.12

According to TYNDP 2017, the White Stream pipeline will possibly start operations in 2022, with the project status being “non-FID, less-advanced”. As of now, no feasibility study has been carried out for this project.

The project developer is White Stream Ltd., a subsidiary of W-Stream Caspian Pipeline Company Ltd. that is also responsible for the project development of the Trans-Caspian pipeline. In the UK’s companies’ register, W-Stream Pipeline Company Ltd. with registration number SC448435 has capital resources of only 100 GBP. The shareholder is one individual.13

The 2013 list of “projects of common European interest” (PCI) of the European Commission includes the White Stream pipeline under number 7.2.3.14 The current 2015 list of the European Commission does not include the pipeline as a PCI project any longer.

12 https://www.tagesschau.de/wirtschaft/pipeline120.html
13 https://beta.companieshouse.gov.uk/company/SC448435/filing-history
3.6 AGRI interconnector

As an alternative to the White Stream pipeline, the planned AGRI LNG connection is supposed to consist of one LNG terminal in Georgia and another one in Romania. However, the Azerbaijani utility SOCAR deemed the construction of an LNG terminal on the Georgian side to be unnecessary, in the near future.\(^{15}\)

The planned annual regasification capacity, and thus the project capacity, amounts to 8 billion m\(^3\).\(^{16}\)

According to TYNDP 2017, the AGRI LNG connection will possibly start operations in 2026, with the project status - similar to the White Stream project - being "non-FID, less-advanced". There is already a feasibility study for the project. However, the financial calculations have to be thoroughly revised due to decreased prices.\(^{17}\)

The project developer is AGRI LNG Project Company SRL with the following shareholders:

- GOGC (Georgian oil and gas provider)
- MVM (Hungarian utility)
- ROMGAZ (Romanian utility) and
- SOCAR.

AGRI is neither currently nor has been in the past a “project of common European interest” (PCI). According to media reports from April 2017, there are “plans to start preparations for submitting a PCI status application for the AGRI project”.\(^{18}\) It remains unclear what this means.

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\(^{15}\) [https://www.azernews.az/oil_and_gas/91412.html](https://www.azernews.az/oil_and_gas/91412.html)

\(^{16}\) [http://www.agrilng.com/agrilng/Home/EUProjectOfCommonInterest](http://www.agrilng.com/agrilng/Home/EUProjectOfCommonInterest)

\(^{17}\) [https://www.azernews.az/business/110810.html](https://www.azernews.az/business/110810.html)

\(^{18}\) [https://www.azernews.az/oil_and_gas/111518.html](https://www.azernews.az/oil_and_gas/111518.html)
3.7 Trans-Caspian pipeline (TCP)

The construction of the Trans-Caspian pipeline (TCP) is essential for connecting Turkmenistan to the Southern corridor. This pipeline is planned to run from the West Turkmen border through the Caspian Sea to Azerbaijan (Baku). Currently, Turkmenistan is in favour of building the TCP pipeline; however, there are many questions that have to be dealt with on an international level. These include the status of the Caspian Sea which is disputed under international law (inland lake vs ocean), which affects the applicable permission granting procedures.

TYNDP 2017 does not state any date for the Trans-Caspian pipeline to start operations. Similar to the White Stream and AGRI projects, the project status is “non-FID, less-advanced”. TYNDP 2017 does not include any further information regarding the project status.

The project developer is W-Stream Caspian Pipeline Company Ltd. that is also responsible for the project development of the White Stream pipeline.

The current 2015 list of the European Commission includes the Trans-Caspian pipeline together with the TANAP pipeline and the expansion of the South Caucasus pipeline under number 7.1.1 as a “project of common European interest” (PCI).

3.8 TurkStream 1+2 pipeline

After Turkey shot a Russian fighter-bomber at the end of 2015, Moscow stopped its plans for a pipeline from Russia via the Black Sea to Turkey. Following the rapprochement of the Russian and Turkish government, an official agreement was signed and the project was resumed on 10 October 2016. TurkStream is a PAO Gazprom project with two pipelines that are planned to end in Turkey’s European part.

The first pipeline (TurkStream 1 pipeline) with a capacity of 15.75 billion m\(^3\) is intended to supply gas to Turkish consumers, and if possible smaller residual volumes to the EU (Bulgaria and Greece). The submarine pipes of the first pipeline will be laid from 2017; and operations are expected to start in late 2019.

The second pipeline (TurkStream 2 pipeline) is also planned to have a capacity of 15.75 billion m\(^3\) and could be used for supplying gas to Southern and Southeast Europe. Turkey has already granted permission for this project; and the contract with the Allseas Group S.A. for the construction of the first part of the offshore section includes an option for laying the second pipeline. The project appears to be realistic; however, it depends to a large extent on possible connections in Turkey. As the TAP pipeline will not have sufficient capacity to cope with such large volumes, plans for the Poseidon pipeline - that were temporarily stopped and then resumed in 2016 - could be of interest. It remains unclear though, whether there will be any transport capacities from the Turkish-Greek transfer point through Greece (IGI onshore project). Such a connection would be necessary for transporting Russian gas from the TurkStream 2 pipeline to the Poseidon pipeline.
4 Conclusions

Based on the facts that this study provides on infrastructure projects, we arrive at the following conclusions:

▪ The TAP/ TANAP pipelines and the SCP expansion (SCPX) are the projects with the highest probability of materializing. These projects are under construction and are marked as “projects of common European interest” (PCI) in the current 2015 list of the European Commission.
▪ In addition, the TurkStream 1 pipeline that is planned to transport Russian gas to Turkey can be expected to be built. The construction of TurkStream 1 is planned to start in 2017.
▪ White Stream, SCPFX, AGRI and TCP are the project with the lowest probabilities of materializing. They are least transparent. There have been no discernible activities in the last three years; and only SCPFX and TCP have PCI status. The project corporation White Stream Caspian Pipeline Company Ltd. has hardly any capital resources (100 GBP). The origin of the gas is unclear. In addition, the gas transport between Azerbaijan and the Black Sea remains unclear, as the above mentioned expansion of SCP is earmarked for gas from Shah Deniz that is planned to be fed into TANAP.
▪ Against this background, we assume that - with the exception of the TAP/TANAP pipeline - no further volumes of non-Russian natural gas will be transported through the Southern corridor to the EU in the medium term, i.e. until 2025. Whether additional gas sources will be exploited and connected at a later time is nothing but speculation, from a today’s perspective.
▪ Supplies of Russian natural gas into the EU via TurkStream 2 appear to be possible in the medium term. However, they depend to a large extent on possible connections in Turkey (IGI onshore project und Poseidon pipeline). It remains unclear whether the connections would be provided by the Greek network operator DESFA. Therefore, we assess the probability of the TurkStream 2 pipeline to be constructed only as medium-high.
Table 4: Status and assessment of natural gas infrastructure projects in the Southern corridor

<table>
<thead>
<tr>
<th>Project name</th>
<th>TANAP</th>
<th>TAP</th>
<th>SCPX</th>
<th>SCPFX</th>
<th>White Stream</th>
<th>AGRI</th>
<th>TCP</th>
<th>TurkStream 1</th>
<th>TurkStream 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYNDP Code</td>
<td>TRA-F-221</td>
<td>TRA-F-051</td>
<td>-</td>
<td>TRA-N-1138</td>
<td>TRA-N-053</td>
<td>TRA-N-376</td>
<td>TRA-N-339</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>TYNDP 2017 Status</td>
<td>FID</td>
<td>FID</td>
<td>FID</td>
<td>non-FID, less-advanced</td>
<td>non-FID, less-advanced</td>
<td>non-FID, less-advanced</td>
<td>non-FID, less-advanced</td>
<td>FID</td>
<td>FID</td>
</tr>
<tr>
<td>Initial operation</td>
<td>2018/2019</td>
<td>2019</td>
<td>2018</td>
<td>2021</td>
<td>2022</td>
<td>2026</td>
<td>not known</td>
<td>2019</td>
<td>not known</td>
</tr>
<tr>
<td>Capacity (billion m³)</td>
<td>16 to 31</td>
<td>10 to &gt; 20</td>
<td>ca. 15</td>
<td>5</td>
<td>16</td>
<td>8</td>
<td>Up to 3 pipelines with 8 each</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>Origin of gas</td>
<td>Azerbaijan (Shah Deniz 2)</td>
<td>Azerbaijan (Shah Deniz 2)</td>
<td>Azerbaijan (Shah Deniz 2)</td>
<td>Caspian region</td>
<td>unspecified</td>
<td>unspecified</td>
<td>Turkmenistan</td>
<td>Russia</td>
<td>Russia</td>
</tr>
<tr>
<td>Project developer</td>
<td>SOCAR</td>
<td>Trans Adriatic Pipeline AG</td>
<td>BP</td>
<td>SOCAR</td>
<td>W-Stream Caspian Pipeline Company Ltd.</td>
<td>AGRI LNG Project Company SRL</td>
<td>W-Stream Caspian Pipeline Company Ltd.</td>
<td>PAO Gazprom</td>
<td>PAO Gazprom</td>
</tr>
<tr>
<td>Shareholders</td>
<td>public / private</td>
<td>public / private</td>
<td>private</td>
<td>public / private</td>
<td>private</td>
<td>public</td>
<td>private</td>
<td>public / private</td>
<td>public / private</td>
</tr>
<tr>
<td>PCI status (2015)</td>
<td>yes (No. 7.1.1)</td>
<td>yes (No. 7.1.3)</td>
<td>yes (No. 7.1.1)</td>
<td>yes (No. 7.1.1)</td>
<td>no (in 2013)</td>
<td>no</td>
<td>yes (No. 7.1.1)</td>
<td>no</td>
<td>no</td>
</tr>
<tr>
<td>Transparency</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●○○</td>
<td>●○○</td>
<td>●○○</td>
<td>●○○</td>
<td>●●●</td>
<td>●●●</td>
</tr>
<tr>
<td>Discernible activities 2014-2017</td>
<td>yes</td>
<td>yes</td>
<td>yes</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>no</td>
<td>yes</td>
<td>yes</td>
</tr>
<tr>
<td>Feasibility study</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>×</td>
<td>×</td>
<td>(✓)</td>
<td>×</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Probability of construction until 2025</td>
<td>●●●</td>
<td>●●●</td>
<td>●●●</td>
<td>●○○</td>
<td>○○○</td>
<td>●○○</td>
<td>●○○</td>
<td>●●●</td>
<td>●●○</td>
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</tbody>
</table>