THE NEED FOR DIVERSIFICATION OF NATURAL GAS SUPPLY IN TURKEY:
IS TURKEY KEY TO EUROPE’S ENERGY DIVERSIFICATION?

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CHAIRMAN

Petco Enerji
Turkey is geographically located in close proximity to 71.8% of the world’s proven gas and 72.7% of oil reserves, in particular those in Middle East and Caspian basin.

It forms a natural energy bridge between the source countries and consumer markets and stands as a key country in ensuring energy security through diversification of supply sources and routes, considerations that have gained increased significance in Europe today.

Major pipeline projects realized and others under construction which will inevitably contribute to Europe’s energy supply security, are enhancing Turkey’s role as an important transit country on the Eurasia energy axis and energy hub in the region.
Turkey’s growing energy requirements give rise to its dependency in respect to energy. As the time passes it seems that Turkey’s dependency in that respect goes to increase more.

For instance Turkey’s energy dependency has been increased to 73 % in 2012 from 45.8 % in 1980. It is forecasted that Turkey’s energy dependency will reach to 76.5 % in 2020 (ETKB 1985 and ETKB 2012).

The growing import dependency brings, indeed, serious problems for a country in respect to its cost and imported quantity.
TURKEY NEEDS TO DIVERSIFY THEIR ENERGY SOURCES IN NATURAL GAS
# Natural Gas Demand Estimation and Export Volumes

<table>
<thead>
<tr>
<th>Natural Gas Demand Volume</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
<th>2025</th>
<th>2030</th>
</tr>
</thead>
<tbody>
<tr>
<td>Export Greece</td>
<td>492</td>
<td>737</td>
<td>737</td>
<td>737</td>
<td>737</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total Demand</td>
<td>38.025</td>
<td>41.640</td>
<td>44.543</td>
<td>57.720</td>
<td>66.604</td>
<td>70.546</td>
<td>76.378</td>
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</table>

Source: [www.botas.gov.tr](http://www.botas.gov.tr)

# Natural Gas Contracted Volumes

<table>
<thead>
<tr>
<th></th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
<th>2015</th>
<th>2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russian Fed.</td>
<td>6.000</td>
<td>6.000</td>
<td>6.000</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1. LNG (Marmara Erğ.) Algeria</td>
<td>4.444</td>
<td>4.444</td>
<td>4.444</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1. LNG (Marmara Erğ.) Nigeria</td>
<td>1.338</td>
<td>1.338</td>
<td>1.338</td>
<td>1.338</td>
<td>1.338</td>
</tr>
<tr>
<td>Russian Fed. (West) Addition</td>
<td>8.000</td>
<td>8.000</td>
<td>8.000</td>
<td>8.000</td>
<td>8.000</td>
</tr>
<tr>
<td>Russian Fed. (Black Sea)</td>
<td>12.000</td>
<td>14.000</td>
<td>16.000</td>
<td>16.000</td>
<td>16.000</td>
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<tr>
<td>Turkmenistan</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>5.000</td>
<td>6.600</td>
<td>6.600</td>
<td>6.600</td>
<td>6.600</td>
</tr>
<tr>
<td>Total Supplies</td>
<td>46.338</td>
<td>49.938</td>
<td>51.938</td>
<td>41494</td>
<td>41494</td>
</tr>
</tbody>
</table>

Source: [www.botas.gov.tr](http://www.botas.gov.tr)
TURKEY’S NATURAL GAS SUPPLY AND DEMAND AMOUNTS

NATURAL GAS SUPPLY AND DEMAND AMOUNTS IN TURKEY

YEARS

Total Supply

Total Demand

Source: Ministry of Turkish Energy and Natural Resources Web Site
THE ROLE OF THE NATURAL GAS IN CONSUMPTION IN TURKEY

Natural Gas Consumption in Turkey in 2011

Source: Ministry of Turkish Energy and Natural Resources Web Site
EXISTING SITUATION IN DIVERSIFICATION AND SECURITY OF SUPPLY AND PROBLEMS
## TURKEY’S NATURAL GAS SUPPLY CONTRACTS

<table>
<thead>
<tr>
<th>Existing Agreements</th>
<th>VOLUME (BCM/YEAR)</th>
<th>Date of Signature</th>
<th>Duration (Years)</th>
<th>STATUS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russian Fed. (Westward)</td>
<td>6</td>
<td>14 February 1986</td>
<td>25</td>
<td>In Operation</td>
</tr>
<tr>
<td>Algeria (LNG)</td>
<td>4</td>
<td>14 April 1988</td>
<td>20</td>
<td>In Operation</td>
</tr>
<tr>
<td>Nigeria (LNG)</td>
<td>1,2</td>
<td>9 November 1995</td>
<td>22</td>
<td>In Operation</td>
</tr>
<tr>
<td>İran</td>
<td>10</td>
<td>8 August 1996</td>
<td>25</td>
<td>In Operation</td>
</tr>
<tr>
<td>Russian Fed. (Black Sea)</td>
<td>16</td>
<td>15 December 1997</td>
<td>25</td>
<td>In Operation</td>
</tr>
<tr>
<td>Russian Fed (Blue Stream)</td>
<td>8</td>
<td>18 February 1998</td>
<td>23</td>
<td>In Operation</td>
</tr>
<tr>
<td>Turkmenistan</td>
<td>16</td>
<td>21 May 1999</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>Azerbaijan</td>
<td>6,6</td>
<td>12 March 2001</td>
<td>15</td>
<td>In Operation</td>
</tr>
</tbody>
</table>

Source: [www.botas.gov.tr](http://www.botas.gov.tr)
GAS SUPPLY DIVERSIFICATION AND SUPPLY SECURITY: PROBLEMS

- 65% reliance on single supplier versus EU standard of maximum 30% from a single source
- Not allowing private sector to import
- Refusing to issue an import license to an existing 10 bcm/yr completed facility
- 53% of electricity produced from imported natural gas
- Exposed to social unrest if political or technical disruption of supply occurs
NEW OPTIONS FOR
THE REALIZATION OF THE DIVERSIFICATION AND
GUARANTEEING THE SECURITY OF NATURAL GAS
SUPPLY IN TURKEY:

IS IT POSSIBLE TO REDUCE ENERGY DEPENDENCY?
Turkey as an East-West Energy Corridor, East-West Energy Terminal

Source: www.botas.gov.tr
NEW OPTIONS:
DIVERSIFICATION OF GAS SUPPLY SOURCES

NABUCCO

- Nabucco Pipeline will be connected near Erzurum with the Tebriz - Erzurum pipeline, and with the South Caucasus Pipeline, connecting Nabucco Pipeline with the planned Trans-Caspian Gas Pipeline.
NEW OPTIONS:
DIVERSIFICATION OF GAS SUPPLY SOURCES

NABUCCO

- Nabucco Pipeline will be connected near Erzurum with the Tebriz-Erzurum pipeline, and with the South Caucasus Pipeline, connecting Nabucco Pipeline with the planned Trans-Caspian Gas Pipeline.

- The pipeline will link the Eastern border of Turkey, to Baumgarten in Austria - one of the most important gas turntables in Central Europe - via Bulgaria, Romania and Hungary. When completed the 3,900 km pipeline’s annual capacity will be 31 bcm. The construction of the pipeline is supported by the 2009 Intergovernmental Agreement signed in Ankara in July 2009, which harmonises the legal framework and grants stable and equal transport conditions for all partners and customers.

- Russia, Central Asia, Azerbaijan or also North African or Middle Eastern gas are considered as potential gas sources.

- Nabucco has faced problems in securing guaranteed gas supplies. Gulf Feeder Option can be the one of the alternatives.
NEW OPTIONS:
DIVERSIFICATION OF GAS SUPPLY SOURCES

NABUCCO – GULF FEEDER OPTION

Source: ILF
Pipeline system is assumed to start at Ras Laffan (Qatar) via Iraq to Turkey, then follows the Iraq – Turkey Pipeline up to Ceyhan; from there, a route parallel to the existing Ceyhan-Kırıkkale oil pipeline corridor is proposed up to Ankara.

Total Pipeline Length is 2,900 km (Total On Shore Length: 2,350 km, Total Off Shore Length: 550 km).

Preliminary evaluations consider two cases in respect to system capacity: A) Base Case 20 BCM/a, B) Alternate Case 30 BCM/a.

Investment Cost for Base case is 8 billion USD and Alternate case is 10 billion USD.
NEW OPTIONS:
DIVERSIFICATION OF GAS SUPPLY SOURCES

NABUCCO – GULF FEEDER OPTION 1- QATAR-IRAQ-TURKEY

Source: ILF
NEW OPTIONS:
DIVERSIFICATION OF GAS SUPPLY SOURCES

NABUCCO – GULF FEEDER OPTION 1- QATAR-IRAQ-TURKEY

Source: ILF
Two major gas pipeline construction initiatives are present in Central and Eastern Europe, which are aiming to improve the security of supply situation of the region.

Source: KPMG Conference Paper, October 2009
NABUCCO: A STRATEGIC PROJECT FOR TURKEY

- Nabucco is a key project for the establishment of the energy hub in Turkey

- As a transit country, security of domestic supply with natural gas can be better achieved

- Natural Gas Storage as another pillar besides transit and trading to balance supply

- Connect the two hubs will be of benefit for both of us to reach our strategic goals
NEW OPTIONS:
Diversification of Gas Supply Sources

Nabucco: A Strategic Project for Turkey

Mr. Paolo Scaroni, CEO of ENI said: ‘Turkey became a member of EU, once signed a Nabucco Agreement’ at the Black Sea Energy and Economic Forum, October 2, 2009.
The Nabucco project would ensure the route diversification while it would also provide access to alternative gas sources.

The project is also promoted by the US in order to decrease Europe’s dependency on Russian gas supply through diversification of the gas sources and as a result, to lessen the dominance of Russia.

The South Stream pipeline project is promoted by Russia would mostly account for a route diversification through bypassing the currently dominant transit country, Ukraine.

The South Stream project is driven by the Russian Federation, which has strong interest in the project since it would be enable larger gas sales to Europe and thus strengthen Russia politically.
Nabucco and South Stream have been considered as competitors since the conception of both plans. The competition is for the same consumer markets, almost identical routes and in some extent the natural gas sources as well.

If both project are realized the risk might arise that the potential sales revenues must be shared between two projects or their revenues would be fully jeopardized by one other. However, if natural gas demand in the region will follow the forecast trend, both project’s ample utilization and thus, profitability can be secured simultaneously.
# NABUCCO VS. SOUTH STREAM ?

<table>
<thead>
<tr>
<th></th>
<th>Nabucco</th>
<th>South Stream</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Length</strong></td>
<td>3,300 km onshore pipeline</td>
<td>3,700 km out of 1.000 km off shore section</td>
</tr>
<tr>
<td><strong>Capacity</strong></td>
<td>1st stage 8 bcm per year After year 2020:31 bcm per year</td>
<td>63 bcm</td>
</tr>
<tr>
<td><strong>Potential Sources</strong></td>
<td>Azerbaijan, Turkmenistan, Kazakhstan, Egypt, Iran and Iraq</td>
<td>Russia, Central Asia, Azerbaijan or also North African or Middle Eastern gas via swap deals</td>
</tr>
<tr>
<td><strong>Investment Cost</strong></td>
<td>EUR 9 billion (USD 11.7 billion)</td>
<td>EUR 19-24 billion (USD 24.7-31.2) (Calculation for the initial 30 bcm/year capacity)</td>
</tr>
<tr>
<td><strong>Key Project Sponsors</strong></td>
<td>EU and USA</td>
<td>Russia</td>
</tr>
<tr>
<td><strong>Main Purpose of the Sponsors</strong></td>
<td>Reducing dependency from Russian gas and Russia Alternative route to reduce the dominance of transiting countries, like the Ukraine. Decreasing the power of Russia</td>
<td>Alternative route to reduce the dominance of transiting countries, like the Ukraine. Increasing gas sales to Europe Increasing influence on Europe</td>
</tr>
<tr>
<td><strong>Transit Countries</strong></td>
<td>Turkey, Bulgaria, Romania, Hungary and Austria</td>
<td>Russia, Bulgaria, Serbia, Hungary, Austria, Slovenia, Greece and Italy</td>
</tr>
<tr>
<td><strong>Companies involved</strong></td>
<td>OMV, MOL, Transgaz, Bulgargaz, BOTAS, RWE</td>
<td>Gazprom and ENI</td>
</tr>
</tbody>
</table>

Source: Official website of Nabucco
Overall, both of the projects provide significant improvements in all three measurement categories concerning 1. Supply Demand Balance, 2. Production Source, 3. Transit Route Diversification compared to the current market situation.

Justifying the purpose of Nabucco, it would improve not only the transit route but also the production source diversity. As a result it would decrease the gas supply dominance of the Russian Federation in CEE (Countries of Central Eastern Europe) region.

The higher diversity is to be reached via involving producer countries with high political risks. However, its scale is not sizeable enough to significantly improve the substitutability of the current supply sources.
South Stream would support security of supply via transit route diversity by transiting Russian gas by passing the Ukraine. It would notably improve the supply demand balance due to its larger scale, however, the dependence on Russia would increase significantly.

In the short term, between 2015 and 2026, the pipelines are expected to compete with each other, unless the current transit flow through Ukraine, the dominant transit country, is not diverted to South Stream pipeline.

Besides the competition for consumer markets the rivalry for project financers and supply sources raise the uncertainty of the implementation of the projects.

The major doubt of Nabucco’s implementation stands in the securing of gas supplies, while South Stream strives to secure its financial viability.
Considering the long term future outlook of the expected CEE and EU demand levels, both projects would become major pillar of natural gas security of supply. The additional capacity of both projects is of vital importance for CEE region to be able to maintain the economic and social development of the countries.

If both Nabucco and South Stream are implemented, their final aggregated annual capacity would reach almost 93 bcm, which would account approximately for the 1/3 of the total annual CEE supply.

This way the natural gas demand of the CEE could be satisfied until 2016 without raising the need for further infrastructural development.
The Trans-Anatolian gas pipeline is a proposed natural gas pipeline from Azerbaijan through Turkey to Europe. If constructed, it would transport gas from the second stage of the Shah Deniz gas field.

The pipeline is expected to cost US$5–7 billion and is planned to be completed by 2017. The planned capacity of the pipeline would be 16 billion cubic meters (570 billion cubic feet) of natural gas per year at initial stage and would be increased later up to 24 billion cubic meters (850 billion cubic feet).

The pipeline will run from Georgian–Turkish border to Turkish European border. The exact route of the pipeline is not clear. However, it was announced that one branch from Turkey would go to Greece and the other to Bulgaria.

The project was announced on 17 November 2011 at the Third Black Sea Energy and Economic Forum in Istanbul. On 26 December 2011, Turkey and Azerbaijan signed a memorandum of understanding establishing a consortium to build and operate the pipeline. SOCAR (80%), BOTAŞ (10%), and TPAO (10%) are the founding members of the consortium.
NEW OPTIONS:

DIVERSIFICATION OF GAS SUPPLY SOURCES

Trans Anatolian Gas Pipeline (TANAP)

The TANAP agreement of intent, signed by Azerbaijan’s and Turkey’s governments on December 26, 2011, gave Nabucco a new lease on life as a potential extension of TANAP into EU territory.

As TANAP plans to replace Nabucco on Turkey’s territory, Nabucco would link up with TANAP at the Turkish-Bulgarian border, continuing via Romania and Hungary to Vienna, for an expected 10 billion cubic meters (bcm) of Azerbaijani gas annually in the initial stage of both TANAP and Nabucco. With Azerbaijan offering to finance up to 80 percent of TANAP’s construction costs, the continuation pipeline in the form of an abridged Nabucco into EU territory becomes financially credible and bankable.
In the interview of Minister Yıldız to Anadolu Ajansı, Minister has assessed critics that the end of Nabucco came once Turkey permits construction of South Stream natural gas pipeline and said “I don’t believe Nabucco ends”.

Stating that EU needs 700 billion cubic meters of gas until 2030, Yıldız said “Even if The South Stream and The Nabucco, Turkey Anatolian Pipeline (TANAP) of Turkey – Greece - Italy (ITGI) and TAP pipelines are realized, they do not meet the gas need of Europe.

All of these are long term projects, threats and opportunities never ends upon occurrence of projects having value of 5-7, 10-22 billion USD, Yıldız said “one has more opportunity today, one other has more opportunity tomorrow”. 
The Trans-Arab pipeline, which currently runs from Egypt through Jordan to Syria, has a capacity of 10 bcm per year. The pipeline, which will be interconnected with Turkey and Iraq, will provide a new transport route for gas resources from the Mashreq region to the EU.
The state-owned Turkish Pipeline Company (BOTAŞ) has launched feasibility studies for the Turkish segment of the planned Iraq-Turkey natural gas pipeline, to be built parallel to the existing Kirkuk-Yumurtalık oil pipeline. BOTAŞ will complete the segment of pipeline that crosses through Turkey's territory along a Silopi-Bismil-Şırnak-Diyarbakır-Yumurtalık line.

The project aims to transfer 10 billion cubic meters (bcm) of Iraqi natural gas annually to the Turkish and world markets in ten years.
Underground natural gas storage facilities are built to regulate fluctuations in consumption and to meet the supply deficit. Two projects are on the agenda:

- Northern Marmara Gas UGS Project (2.5 BCM)
  (Completed in 2007)

- Salt Lake UGS Project (1+4 BCM)

  - Based on caverns built by leaching of salt domes
Turkey will remain as a net importer of natural gas unless significant gas reserves are discovered in Black Sea.

Consumption and bill for imports will double in 2020.

All provinces will be consuming natural gas.

With current level of dependency on natural gas in power generation and industrial sectors, access to cheap gas will be crucial to be competitive and to ensure sustainable economic growth.

Supply diversity will also be important to enhance supply security.

BOTAS has to diversify its business portfolio because of the restrictions brought by Law No. 4646.

Developing international trade and transit projects are of utmost importance for such diversification.
Turkey will plan to increase its export capacity to 500 billion USD until 2023.

Electricity consumption of Turkey will reach to 500 billion Kwh until 2023.

Electricity consumption of Turkey will reach to 500 billion Kwh until 2023. (Expected electricity consumption at the end of 2012 will be 250 billion Kwh.)

25,000 USD per capita national income will be targeted until 2023.

The Main problem is that How Turkey secure guaranteed natural gas resources in order to meet the needs of growing economy until 2023?
GAS TRANSPORTATION VIA TURKEY IS THE KEY FOR THE SECURITY AND DIVERSIFICATION OF THE EUROPEAN GAS SUPPLY?
Energy security debates within the EU increasingly focus on security of gas supply. Rising demand and declining domestic production compel the EU to forge a comprehensive policy toolset unifying energy and external policy.

Security of gas supply in the EU has been tried to be tackled by market-oriented measures such as liberalization, solidarity measures or Community mechanism. However, supply risks are transcending the boundaries of EU internal market forcing the EU to adopt policies based on geopolitics.

In this context, Turkey seems to play a key role as part of the strategic Southern Corridor planned to be a new gas artery from the Caspian region through Turkey to Europe. In addition, the further integration of nascent Turkish gas market to the EU appears to be in harmony with efforts relying on deepening of EU internal
In 2009, the EU consumed 484 bcm of natural gas. Nearly 36% of gas demand has been met by domestic production. The remainder has been met by import.

When considered the origin of the gas imports; Russia, Norway and Algeria hold shares of 22%, 19% and 10% within the total EU gas consumption respectively. However, import dependency has different patterns across the member states, exposing some of them to various security risks. For example, Bulgaria and Slovakia are fully dependent on the Russian gas supply and these are the countries that are severely affected by any disruption in the Russian gas.

According to future projections, a notable change in the share of natural gas within EU energy mix is not anticipated, yet natural gas demand is expected to expand by 79 bcm up until 2030, meaning a 16% increase between 2005 and 2030.
The challenge is increasing since import need of Europe has to be met from politically unstable countries. This trend will apparently gain momentum after foreseen oversupplied period until 2012 is over. After 2020, it is expected that Qatar and Iran will emerge as major suppliers alongside Russia. However, Europe’s import dependency especially to Russia, raises concern within the EU and in some member states. Certainly there are other reasons for Russia to become a source of concern all but its high share in EU gas import.

Source: OMV and Petform
EUROPE NATURAL GAS DEMAND FORECAST 2006-2015

Source: OMV and Petform
Turkey is positioned to play an even bigger role linking gas producers in the Caspian and Middle East to consumers in south-eastern and central Europe with the proposed Nabucco gas pipeline project. The Nabucco project is geopolitically significant to European security by diversifying supplies as it will secure access to new gas supplies from new sources in the Caspian region as well as the Middle East. For this reason it has been regarded as vital for the EU's long-term strategy to boost supply security. Nabucco pipeline is expected to run about 2,000 miles from Erzurum in Turkey to Baumgarten in Austria and carry more than 30 bcm of natural gas. However, most recent trade press reports indicate that the start-up date of the pipeline has been delayed to 2017.
Additional pipeline projects have been proposed, including the Trans-Caspian Gas Pipeline (TCP) and Trans Anatolia Gas Pipeline. If completed, the TCP is expected to be nearly 1,500 miles long with a capacity of up to 30 bcm. Repeated setbacks have effectively resulted in shelving of the project however the EU continues to advocate for the completion of the pipeline, which would connect to Nabucco.
GAINS FOR EUROPE FROM GAS TRANSPORTATION VIA TURKEY
GAINS FOR EUROPE FROM GAS TRANSPORTATION VIA TURKEY

- Access to alternative supply sources via alternative routes:
  Supply diversity and enhanced supply security

- A more liberalized gas market:
  Gas to gas competition
  Increase in consumer surplus

- Enhancement of cooperation with gas producing countries:
  Russia, Central Asia, Middle East, etc.
WHAT DRIVE SECURITY OF SUPPLY?

**ASPIRATION**

- Diversity of Supply
  - Due to the greater reliance on gas imports from outside

- Competition
  - Open markets with multiple supplies competing

- Reliability of Supply
  - Supply sources we can depend on

**RISKS**

- Supply risks through a lack of import options

- Market Power
  - Especially with regards to transport capacity

- Risk of Upstream and infrastructure underinvestment
DIVERSITY OF SUPPLY IS KEY TO SECURITY OF SUPPLY
THANK YOU

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