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**Turkey as a Regional Natural
Gas Hub: Myth or Reality?
An Analysis of the Regional Gas
Market Outlook, beyond the
Mainstream Rhetoric**

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Summary

Over the last years Turkey has been increasingly associated in the international political and economic debate with concepts such as “gas corridor” and “gas hub”. This characterization of Turkey is clearly mainly due to its unique geographical position at the crossroads the Caspian region, the Middle East and Europe. In particular, this argument is often advanced in the political discussion on the rise of Turkey as a leading regional power and in the debate on the future prospects for the EU-Turkey relations. However, by going beyond the political slogans and by focusing on the concrete gas realities around Turkey this picture could be seriously put into question. The aim of this paper is to explore the real potential role of Turkey in the regional gas markets, firstly focusing on the current situation of gas producing countries around Turkey and then moving to the future prospects of gas cooperation in the region. To this end, the paper will provide an assessment of both the current situation and outlook of gas markets in Azerbaijan, Turkmenistan, Iraq, Iran, Israel and Cyprus, subsequently providing a discussion of the future prospects of the Southern Gas Corridor and of the potential Eastern Mediterranean Gas Corridor. This analysis will indicate that Turkey will hardly have the potential to become a regional gas hub in the medium term (up to 2020-2025). However, Turkey could have the potential to play an important role in the regional gas markets in the longer term (after 2025-2030) if a number of infrastructural, commercial and political barriers described in the paper are overcome and -last but not the least- if the EU gas demand recovers and the EU market actually needs more natural gas supplies.

Keywords : Natural Gas Markets, Southern Gas Corridor, Eastern Mediterranean Gas Corridor, Turkey Gas Outlook, EU Energy Policy, EU Security of Gas Supply

JEL Classification: Q40, Q42, Q48

This paper represents the third outcome of FEEM’s research project “The rise of Turkey and the new Mediterranean. Challenges and opportunities for energy cooperation in a region in transition”. This project analyses how energy could represent a major tool to strengthen the economic, political and social integration in the Euro-Mediterranean region. The project focuses particularly on Turkey, a country considered crucial for both the EU energy security and for the regional balance of power in the aftermath of the so-called “Arab Spring”.

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TURKEY AS A REGIONAL NATURAL GAS HUB: MYTH OR REALITY?

An analysis of the regional gas market outlook, beyond the mainstream rhetoric

by

Simone Tagliapietra
(Fondazione Eni Enrico Mattei)

Contents

1. Brief history of the rise of Turkey as a potential regional natural gas hub	3
1.1 <i>The international debate on Turkey as a potential natural gas hub</i>	3
1.2 <i>The internal driver: Turkey's growing natural gas import requirements</i>	3
1.3 <i>The external driver: the European quest for a new "Silk Road"</i>	5
2. The current situation of natural gas producing countries around Turkey	9
2.1 <i>Caucasus: Azerbaijan</i>	9
2.2 <i>Central Asia: Turkmenistan</i>	11
2.3 <i>Middle East I: Iraq</i>	13
2.4 <i>Middle East II: Iran</i>	17
2.5 <i>Eastern Mediterranean I: Israel</i>	19
2.6 <i>Eastern Mediterranean II: Cyprus</i>	22
3. The way forward: new gas corridors and the potential role of Turkey	24
3.1 <i>The Southern Gas Corridor between TANAP and TAP: what's next?</i>	24
3.2 <i>The Eastern Mediterranean Gas Corridor: realism or wishful thinking?</i>	28
3.3 <i>Turkey as a regional natural gas hub: myth or reality?</i>	29
Bibliography	30

1. Brief history of the rise of Turkey as a potential regional natural gas hub

The international debate on Turkey as a potential natural gas hub

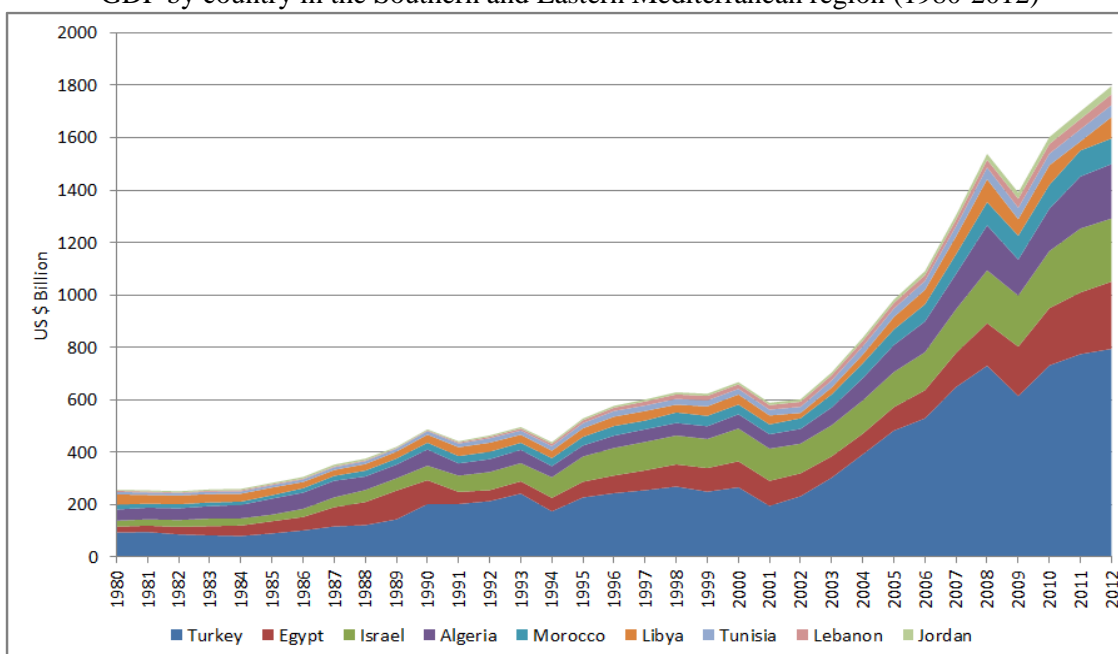
Over the last years Turkey has been increasingly associated in the international political and economic debate with concepts such as “energy corridor” and “energy hub”. This characterization of Turkey is clearly mainly due to its unique geographical position at the crossroads of Central Asia, the Middle East and Europe. Furthermore, the international debate on the future role of Turkey in terms of energy transit has particularly focused over the last decade on natural gas, making Turkey a hot topic of world -and notably European- natural gas markets. In particular, this latest trend has been mainly led by two key drivers: one of them is internal at Turkey itself and concerns the country’s expanding natural gas market, while the other is external at Turkey and concerns the European Union (EU)’s quest to diversify its natural gas supplies away from Russia. Let’s have a closer look at these two key drivers.

The internal driver: Turkey’s expanding natural gas market

Turkey has always been the major economy of the Southern and Eastern Mediterranean region and during the 2000s it has further strengthened its regional economic preeminence (Fig. 1)¹.

FIGURE 1

GDP by country in the Southern and Eastern Mediterranean region (1980-2012)

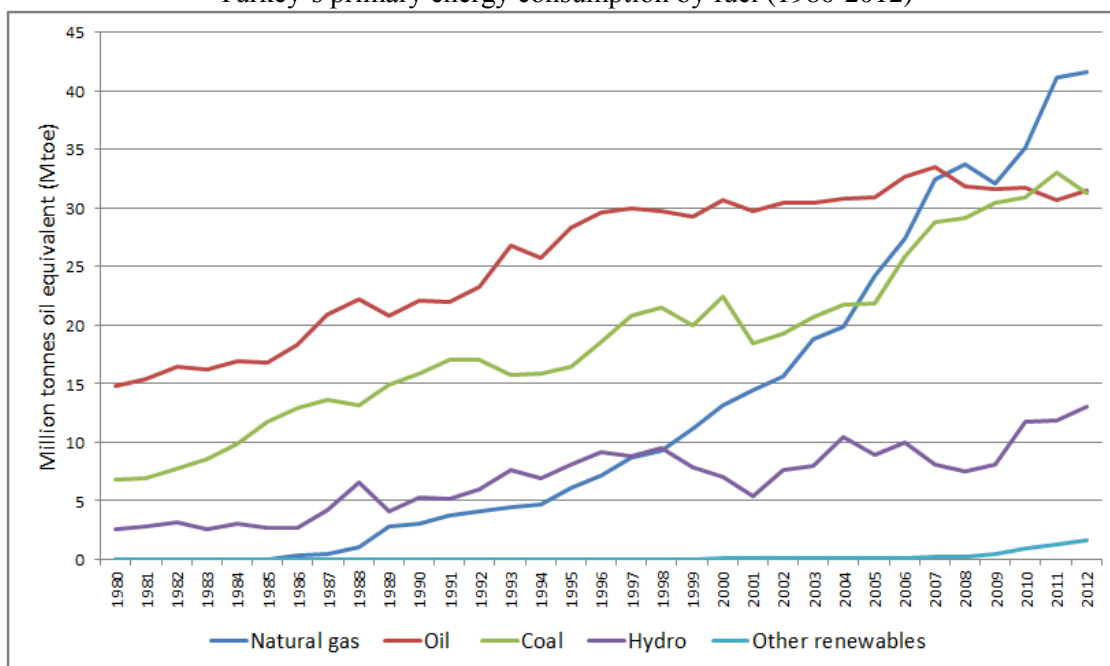


Source: own elaboration on IMF World Economic Outlook, April 2013.

¹ For a wider discussion on the macroeconomic position of Turkey in the region please refer to Tagliapietra (2012).

According to the International Monetary Fund (IMF), the gross domestic product (GDP) of Turkey has increased from a level of US\$ 266 billion in 2000 to a level of US\$ 794 billion in 2012². This strong economic growth has dramatically boosted the primary energy consumption of the country, from a level of 73 million tonnes of oil equivalent (Mtoe) in 2000 to a level of 119 Mtoe in 2012³. In order to satisfy this rapidly increasing energy need, over the last decade Turkey has particularly focused on natural gas (Fig. 2).

FIGURE 2
Turkey's primary energy consumption by fuel (1980-2012)



Source: own elaboration on the BP Statistical Review of World Energy, June 2013.

For this reason Turkey's natural gas consumption has grown dramatically over the last decade -from a level of 15 billion cubic metres (bcm) in 2000 to a level of 46 bcm in 2012- making the country the most dynamic natural gas market in the OECD region.

Considering that Turkey does not own significant natural gas reserves, all this increase in consumption has had to be fulfilled by growing natural gas imports. For this reason, the already high level of Turkey's energy dependency on external suppliers has further deepened, leading the government to make security of natural gas supplies as one of its main policy objectives. A key element of this policy is the diversification of natural gas supplies, a feature that led Turkey to establish solid relationships with all natural gas producing countries in the region: Russia, Iran, Turkmenistan, Azerbaijan and Iraq (notably with the country's autonomous province of Kurdistan).

² IMF World Economic Outlook, April 2013.

³ Unless otherwise stated, all energy statistics in this paper refer to BP Statistical Review of World Energy, June 2013.

The external driver: the European quest for a new “Silk Road”

In addition to its rapidly expanding domestic market, Turkey has become a hot topic of world -and notably European- natural gas markets for another reason: the European quest for a new “Silk Road” aimed at diversify its natural gas imports away from Russia.

The European Union (EU) launched this policy in 2008, as a response to the energy security concerns emerged in Europe after the first Russian-Ukrainian-European natural gas crisis occurred in January 2006, when after a long-lasting disagreement on natural gas prices, Russia cut off supplies to Ukraine for 3 days, Ukraine diverted volumes destined to Europe, and as a consequence natural gas supply to some Central European countries fell briefly⁴. In order to enhance the EU security of natural gas supply architecture the European Commission (EC) thus adopted a double strategy. On the one hand, it targeted to enhance the EU internal energy market in order to foster natural gas flows between EU Member States. On the other hand, it aimed to enhance natural gas sources diversification, including building LNG receiving terminals in Central and South-East Europe and pursuing the 4th corridor (generally known as Southern Gas Corridor) in order to bring natural gas from Caspian and Middle Eastern natural gas producing countries to Europe without crossing Russia.

The implementation of this strategy -and particularly of the Southern Gas Corridor- was accelerated after a second major natural gas crisis between Russia and Ukraine occurred in January 2009. In fact, this crisis resulted to be even worse than the previous one, as the transit of Russian gas through Ukraine was completely cut for two weeks, which resulted in humanitarian crises in several Central and Eastern European countries that were strongly dependent on Russian gas supplies across Ukraine. This dispute has resulted in long-term economic consequences and affected the reputation of Russia as a reliable supplier and of Ukraine as a reliable transit country.

The official document on which the Southern Gas Corridor is rooted is the Communication “Second Strategic Energy Review – An EU Energy Security and Solidarity Action Plan”⁵ delivered by the EC in November 2008. The document recognized in the Southern Gas Corridor one of the EU's highest energy security priorities, outlying the need of a joint work between the EC, EU Member States and the countries concerned (Azerbaijan and Turkmenistan, Iraq and Mashreq countries) with the objective of rapidly securing firm commitments for the supply of natural gas and the construction of the pipelines necessary for all stages of its development. Uzbekistan and Iran were also mentioned in the Communication as potential partners, albeit only in a long-term scenario.

After the release of this document, the EC invited representatives of the countries concerned to a Ministerial level meeting aimed at secure concrete progress of the

⁴ As Pirani, Stern and Yafimava (2009) underlined natural gas conflicts between Russia and Ukraine go back to the immediate aftermath of the independence of the two countries. Regular transit conflicts emerged as transit usually became a part of the price dispute on the Russian gas price for the Ukrainian domestic market. In fact, no separation between the transit gas network and the domestic gas network exists in Ukraine and Ukrainian customers usually served themselves from the transit volumes which Russia called theft of gas through the transit system.

⁵ European Commission (2008).

initiative in May 2009. The summit, held in Prague and named “Southern Corridor - New Silk Road”, served to express the political support to the realization of the Southern Gas Corridor as an important and mutually beneficial initiative, aimed at promoting the common prosperity, stability and security of all countries involved. The countries participating at the summit declared to consider the Southern Gas Corridor concept as a modern Silk Road interconnecting countries and people from different regions and establishing the adequate framework, necessary for encouraging trade, multidirectional exchange of know-how, technologies and experience. The countries participating at the summit agreed to give necessary political support and, where possible, technical and financial assistance to the construction of the Trans-Caspian energy transportation project and to the development of Nabucco, a project already designated as of strategic importance in the Trans-European Networks - Energy (TEN-E) programme⁶.

FIGURE 3

The dawn of the Southern Gas Corridor: the original concept of Nabucco



Source: own elaboration (2013).

In reality, preparations for the Nabucco project started in February 2002 when first talks took place between Austrian OMV and Turkish BOTAŞ. In June 2002, five companies (OMV of Austria, MOL Group of Hungary, Bulgargaz of Bulgaria, Transgaz of Romania and BOTAŞ of Turkey) signed a protocol of intention to construct Nabucco, a pipeline with a capacity of about 30 bcm/year. The protocol followed by the cooperation agreement in October 2002. The name Nabucco comes from the same famous opera of Giuseppe Verdi that the five partners had listened to at the Vienna State Opera after this meeting. In December 2003, the EC awarded a grant in the amount of 50% of the estimated total eligible cost of the feasibility study including market analysis, and technical, economic and financial studies. On 28 June 2005, the joint venture agreement

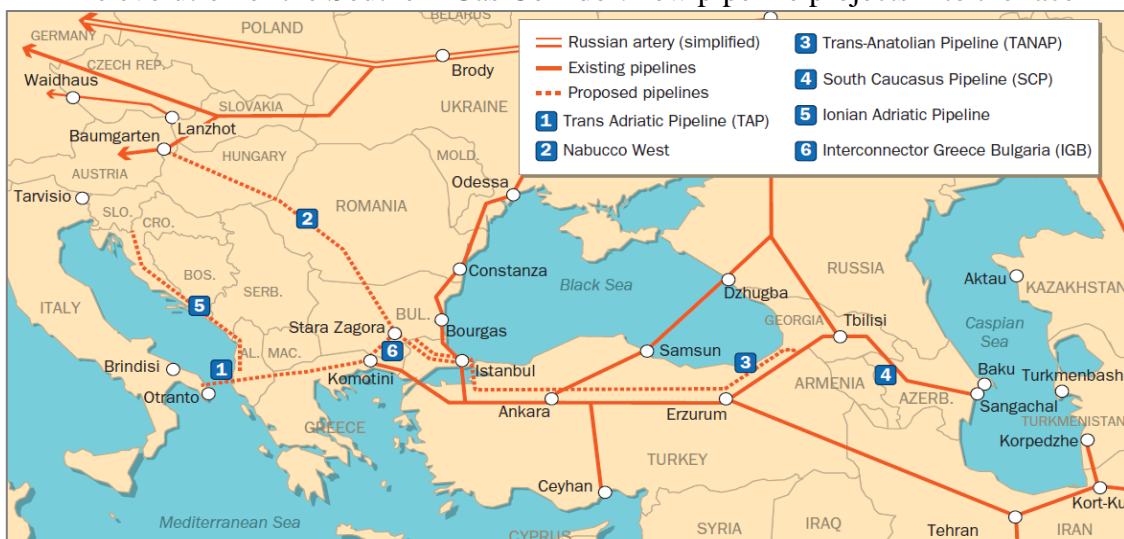
⁶ Official Journal of the European Union (2006).

was signed by five Nabucco partners. In June 2008, the first contract to supply gas from Azerbaijan through the Nabucco pipeline to Bulgaria was signed. The President of Azerbaijan confirmed in early 2009 that Azerbaijan was planning to at least double its gas production in the coming five years to supply the pipeline. Successively, the Minister of Energy of Turkey confirmed that Turkey was ready to sign a deal, provided that Turkey would have got 15% of the natural gas to be carried through the Nabucco pipeline. The intergovernmental agreement between Turkey, Romania, Bulgaria, Hungary and Austria was signed by five prime ministers on 13 July 2009 in Ankara. In the following months all the countries concerned -Hungary, Bulgaria, Romania and Turkey- ratified the agreement⁷.

In the meantime, a great debate evolved with regard to the various shapes that the Southern Gas Corridor could have assumed. In fact, many pipeline projects progressively entered the Southern Gas Corridor race (i.e. TAP, TANAP; Nabucco West; SEEP; AGRI; White Stream). With the exception of White Stream (a submarine pipeline across the Black Sea linking Georgia-Romania-Ukraine) and AGRI (a concept of Azerbaijan, Georgia and Romania to build an LNG chain across the Black Sea) all these projects shared a common feature: the transit through Turkey.

FIGURE 4

The evolution of the Southern Gas Corridor: new pipeline projects into the race



Source: Platts (2013).

In particular, Azerbaijan was the country most interested on the development of the Southern Gas Corridor, due to the investments already made on its Shah Deniz field and to the need of reaching a final investment decision for Shah Deniz Phase II (a decision that finally arrived, as will be explained in the next section, on December 17, 2013). For this reason, Azerbaijan speeded-up the process and rapidly conceptualized the Trans-Anatolian Pipeline (TANAP) project to evacuate future natural gas flows from Shah

⁷ For a wider discussion of the Nabucco project please refer to: Hofstätter (2011) and Barysch (2010).

Deniz Phase II to Turkey and in December 2011 the governments of Azerbaijan and Turkey officially decided to advance the TANAP project⁸.

Moreover, in June 2013 the consortium developing Shah Deniz chose the Trans Adriatic Pipeline (TAP) project to fill the gap between TANAP and the European market. TAP will thus constitute, together with TANAP, the concretization of the Southern Gas Corridor. But let's have a closer look at the two pipeline projects.

TANAP is a projected natural gas pipeline designed to carry natural gas to be produced in Shah Deniz Phase 2 field and other fields of Azerbaijan (and other possible neighboring countries) through Turkey to Europe with a capacity of 16 bcm/year. TANAP is planned to begin from Georgia-Turkey border and go through the provincial borders of Ardahan, Kars, Erzurum, Bayburt, Gümüşhane, Erzincan, Sivas, Yozgat, Kırıkkale, Ankara, Eskişehir, Bilecik, Kütahya, Bursa, Balıkesir, Çanakkale, Tekirdağ, Edirne, respectively. Memorandum of Understanding was signed between the governments of Turkey and Azerbaijan on December 24, 2011 in Ankara. The project is currently shared by the State Oil Company of Azerbaijan (SOCAR) -which holds an 80% stake in the project- and the Turkish state company BOTAS. However, the project will be open-up to the other Shah Deniz operators (BP, Statoil and Total) with a share composition that will likely downsize SOCAR position to 51%. TANAP is crucially important for the Azeri company, as it would have a role in the delivery of natural gas from its Shah Deniz field further down the supply chain to Europe, rather than selling at its border⁹.

TAP is an 800 km-long projected natural gas pipeline designed to provide the missing link for gas transportation from Greece to Italy through Albania and the Adriatic Sea. TAP is considered to be the shortest route in the Southern Gas Corridor, linking Europe to new sources of gas in the Caspian and Middle East regions. The pipeline is planned to start in Greece near Komotini, cross Albania and the Adriatic Sea and come ashore in Italy near Brindisi. The length of Greece section will be 465 kilometres. The length of the offshore pipeline section will be 115 kilometres at a maximum depth of 820 metres. The initial capacity of the pipeline will be about 10 bcm of natural gas per year, with the option to expand the capacity up to 20 bcm. TAP also plans to develop an underground natural gas storage facility in Albania and offer a reverse flow possibility of up to 8.5 bcm. These features will ensure additional energy security for the Southeastern Europe. TAP is owned and actively supported by EGL, Statoil, E.ON Ruhrgas, British Petroleum, Socar, Total and Fluxys¹⁰. TAP is ready to commence pipeline operations in time for first gas exports from Shah Deniz II (expected in 2017–2018)¹¹.

The debate on the various infrastructural options of the Southern Gas Corridor has brought Turkey at the frontline of international natural gas markets, further enhancing

⁸ Among other factors, a key element of strength of the TANAP project related to its financing: because of the considerable oil revenues provided by the exports through the Baku-Tbilisi-Ceyhan, Azerbaijan has indeed been able to directly ensure the financing of the infrastructure.

⁹ See: www.tanap.com

¹⁰ The TAP project was announced in 2003 by Swiss energy company EGL Group. The feasibility study was concluded in March 2006. Two options were investigated: a northern route through Bulgaria, Republic of Macedonia and Albania, and a southern route through Greece and Albania, which finally was considered to be more feasible.

¹¹ See: www.trans-adriatic-pipeline.com

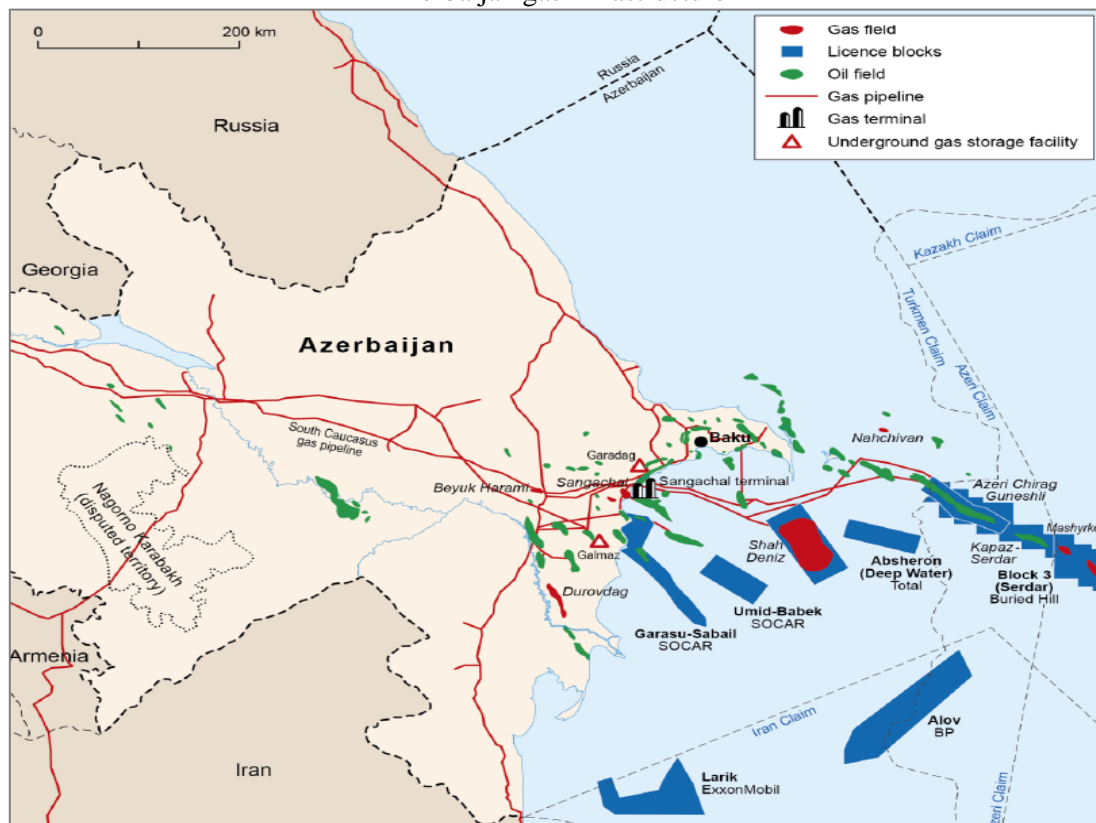
its relevance in terms of future regional energy transit. However, the best way to understand the real potential of Turkey to become a regional natural gas hub is to follow a double step approach, firstly focusing on the current situation of natural gas producing countries around Turkey and then moving to the future prospects of natural gas cooperation in the region. For this reason, the next paragraph will provide an overview of the current situation of natural gas markets in Azerbaijan, Turkmenistan, Iraq, Iran, Israel and Cyprus, firstly focusing on their geological realities and then analyzing their current production trends in tandem with the existing natural gas export infrastructure.

2. The current situation of natural gas producing countries around Turkey

Caucasus: Azerbaijan

Azerbaijan owns 1.3 trillion cubic meters (tcm) of proven natural gas reserves¹². These reserves are mainly located within two major fields in the offshore Caspian Sea: Shah Deniz and the Azeri-Chirag Guneshli (ACG) field¹³.

FIGURE 5
Azerbaijan gas infrastructure



Source: Oxford Institute for Energy Studies (2012).

¹² Cedigaz (2013).

¹³ This field -located 100 km east of Baku- is operated by BP on behalf of an international consortium and its natural gas production is about 4-5 bcm/year.

Shah Deniz, the largest natural gas field of the country, is located on the deep water shelf of the Caspian Sea, 70 km south-east of Baku. It covers approximately 860 sq. kms and it has proven natural gas reserves estimated at 1 tcm. The Shah Deniz field was discovered in 1999 and is currently operated by British Petroleum (BP) and Statoil, which respectively have a share of 25.5%. Other partners include SOCAR (10%), Total (10%), Lukoil (10%), NIOC (10%), and TPAO (9%). The field is being developed in two stages: Shah Deniz Stage 1 and Shah Deniz Stage 2¹⁴.

Shah Deniz Stage 1 started operations in 2006 and currently produces about 9 bcm of natural gas per year, part of which is sold on the Azeri domestic market and part of which is exported to Georgia and Turkey. In order to transport this natural gas to Turkey, a 691 km-long natural gas pipeline has been constructed from the Shah Deniz field, through Georgia and on to the Georgia-Turkey border. The pipeline, generally known as South Caucasus Pipeline (SCP), follows the route of the Baku-Tbilisi-Ceyhan (BTC) crude oil pipeline through Azerbaijan and Georgia to Turkey, where it is linked to the Turkish natural gas distribution system. The SCP pipeline is capable of carrying up to 7 bcm of natural gas per year. First deliveries of natural gas to Turkey commenced on 30 September, 2006.

FIGURE 6
The South Caucasus Pipeline



Source: own elaboration (2013).

After the successful development of Shah Deniz Stage 1, the Shah Deniz consortium launched Shah Deniz Phase II, a project to add a further 16 bcm per year of natural gas production from the field. As illustrated in the previous section, the transportation of additional 16 bcm of natural gas to Turkey and Europe will require the expansion of the SCP pipeline with a new parallel pipeline across Azerbaijan and Georgia and the construction of two new pipelines: the Trans Anatolian Pipeline (TANAP) and the Trans Adriatic Pipeline (TAP).

¹⁴See: www.bp.com

The Shah Deniz consortium announced on December 17, 2013 the final investment decision for Shah Deniz Phase II. This decision has finally paved the way for the expansion of the South Caucasus Pipeline through Azerbaijan and Georgia, for the construction of the TANAP pipeline across Turkey and for the construction of the TAP pipeline across Greece, Albania and into Italy.

In addition to this infrastructural system, the Shah Deniz consortium decided to advance the drilling of 26 subsea wells, the construction of two offshore bridge-linked platforms and the construction of new onshore processing and compression facilities at Sangachal.

The total cost of the Shah Deniz Phase II and South Caucasus Pipeline expansion projects will be around US\$ 28 billion. 16 bcm/year of gas produced from Shah Deniz will be carried some 3,500 kilometres to Georgia, Turkey, Greece, Bulgaria and Italy. First gas is targeted for late 2018, with sales to Georgia and Turkey; first deliveries to Europe will follow approximately a year later.

In the shorter term, the Shah Deniz partners have agreed terms with SOCAR for expanding production through the existing facilities by 1.4 bcm/year. The production increase is already in progress and is expected to be complete by the end of 2014.

SOCAR and the Shah Deniz partners have also agreed terms for extending the Shah Deniz Production Sharing Agreement up to 2048. The Shah Deniz partners have agreed to undertake exploration and appraisal work on prospects within the PSA area.

Central Asia: Turkmenistan

The size of Turkmenistan's natural gas reserves is highly uncertain and for this reason all their estimations have rapidly grown over the last years. In 2012 estimates ranged from the 10 tcm of Cedigaz to the 17.5 tcm of BP, while according to Gaffney, Cline and Associates (a leading petroleum advisory services firm) the country's largest field (South Yoloten) alone would contain about 19 tcm of natural gas¹⁵.

The backbone of Turkmenistan's natural gas production has traditionally been the Dauletabad field, located in the south-east of the country, a few kilometres from the Iranian border. The field, which natural gas reserves are estimated at 0.9-1.7 tcm, was discovered in 1974 and production started in 1984. It then rapidly became a key source of supply to the Central Asia-Centre pipeline to southern Russia and Ukraine. In the late 1990s Turkmenistan took its first step towards natural gas export diversification away from Russia and in 2010 a pipeline connecting the Dauletabad field with Iran was thus opened¹⁶.

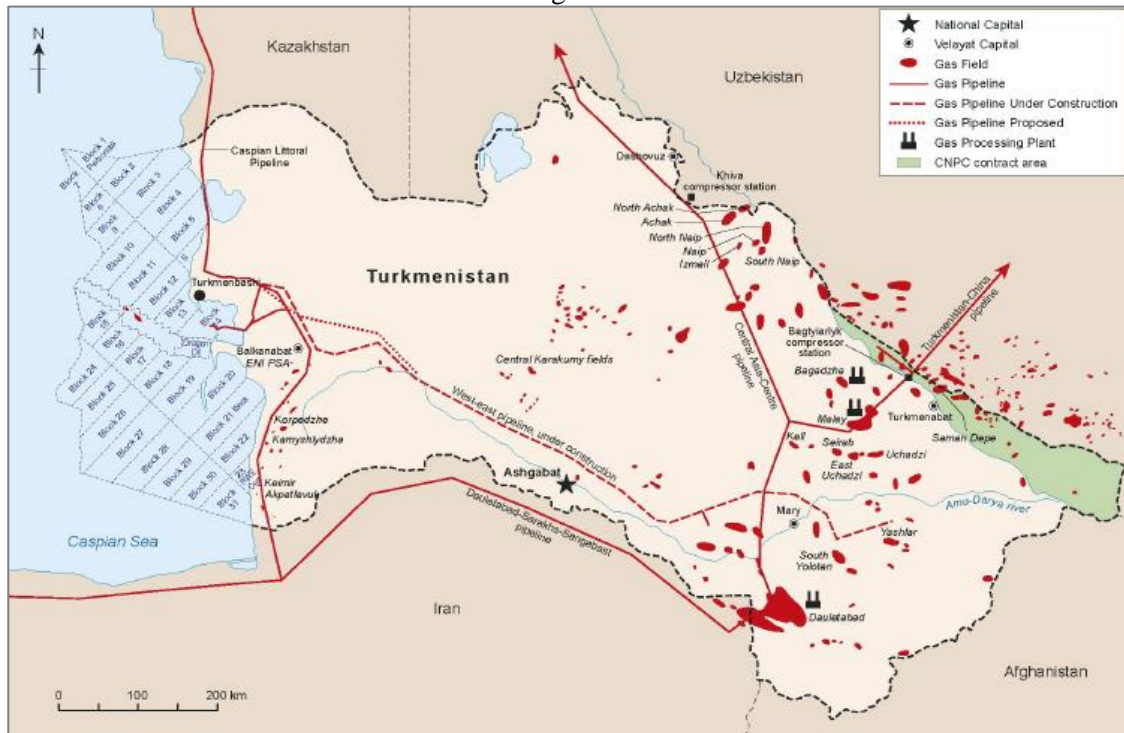
Other key natural gas fields in Turkmenistan are the Malay field and the Uchadzi field, which represent the main sources of Turkmenistan's natural gas supply to China. In late 2009 the Turkmenistan-China Pipeline was inaugurated, opening a new chapter in the regional gas trade, with Turkmenistan's natural gas increasingly diverted to the East. The 1,911 km-long pipeline has a capacity of 30 bcm/year and runs through Uzbekistan and Kazakhstan, before to enter China in the north-western Xinjiang province.

¹⁵ Oil and Gas Journal (2011).

¹⁶ The Dauletabad-Sarakhs-Khangiran pipeline was opened in January 2010 and then further extended by 190 km to Sangbast, near Mashhad in Iran.

However -as mentioned before- Turkmenistan's importance as a source of natural gas over the long term was substantially enhanced in 2011, due to the progress of geological surveys of the South Yoloten field¹⁷. This field -located in the province of Mary Welayaty- has rapidly established itself as the second largest in the world after the giant South Pars/North Dome field in Iran and Qatar.

FIGURE 7
Turkmenistan gas infrastructure



Source: Oxford Institute for Energy Studies (2012).

The name South Yoloten is often used to denote four adjacent fields: South Yoloten (by far the largest), Osman, Minara and Yashlar. In November 2011 the area was renamed Galkynysh (renaissance) by the Turkmen government. After an attentive exploration activity in the field, in 2011 Gaffney Cline & Associates was able to estimate the aggregate of South Yoloten and Yashlar reserves at 14.5-26.2 tcm, with a best estimate of 19 tcm. The development of the Galkynysh natural gas complex represents another element of strength in the already strong natural gas cooperation between Turkmenistan and China.

In fact, Turkmenistan agreed to enhance its natural gas supply to China from the current level of about 20 bcm/year to a level of 65 bcm/year by 2020. In 2007 China's National Petroleum Corporation (CNPC) and Turkmengaz signed an initial sales and purchase agreement for China to import 30 bcm/year of natural gas for 30 years from Turkmenistan. In 2008, the two companies agreed to boost the volume to 40 bcm/year by 2015. Turkmenistan began delivering gas to China in late 2009 through the

¹⁷ BP (2013) estimated Turkmenistan's natural gas reserves at 2.3 tcm in 2007, 7.3 tcm in 2008 and 2009, 10.2 in 2010 and 17.5 in 2011 and 2012.

Turkmenistan-China Pipeline. Construction of the second line of the pipeline network dubbed Central Asia-China, with 10 bcm/year capacity, with potential to increase to 15 bcm/year, is expected to be completed in 2015. Preparation work for construction of the third, 25 bcm/year line, or Line C, started in 2012 and the line is expected to start delivering gas in 2014. In September 2013 Turkmenistan and China signed a number of new deals concerning their natural gas cooperation. In particular, China committed to finance the second stage of development of the Galkynysh fields. In addition, state-run Turkmen gas corporation and CNPC inked a contract to design and build a 30 bcm/year upstream complex for the Galkynysh second stage. The two also signed a contract on additional supplies of 25 bcm/year to China and agreed to build the fourth route, Line D, of the Turkmenistan-China Pipeline, which will run via Uzbekistan, Tajikistan and Kyrgyzstan, to deliver the newly agreed volumes to China¹⁸.

According to a major study carried out by Pirani of the Oxford Institute for Energy Studies¹⁹, Turkmenistan's total natural gas production could well reach 110 bcm/year at some point in the 2020s²⁰, of which 65 bcm/year will be exported to China. This figure clearly exemplifies the "special relationship" established between Turkmenistan and China, a relationship that is likely to further consolidate in the future.

Given its world-class natural gas reserves, Turkmenistan could well be in the position to supply natural gas to Turkey and to the EU -in addition of the already mentioned volumes targeting the Chinese market- but two major barriers will likely make such a development unfeasible: the first is the lack of interest of the EU due to its stagnant natural gas demand, and the second is the infrastructural problem related to the divergences existing between Russia, Iran and Turkmenistan on the legal status of the Caspian Sea. As a matter of fact, these divergences have already halted in the past the development of the Trans-Caspian Pipeline project²¹, paving the way for the conceptualization -and the quick construction- of the Turkmenistan-China Pipeline.

Middle East I: Iraq

Iraq owns 3.4 tcm of proven natural gas reserves and around three-quarters of these proven reserves consist of associated gas, with the rest in a small number of non-associated fields. The country's natural gas fields have traditionally been concentrated in the south, mostly as the large associated natural gas reserves in the giant fields of Rumaila, West Qurna, Majnoon, Hahr Umr and Zubair.

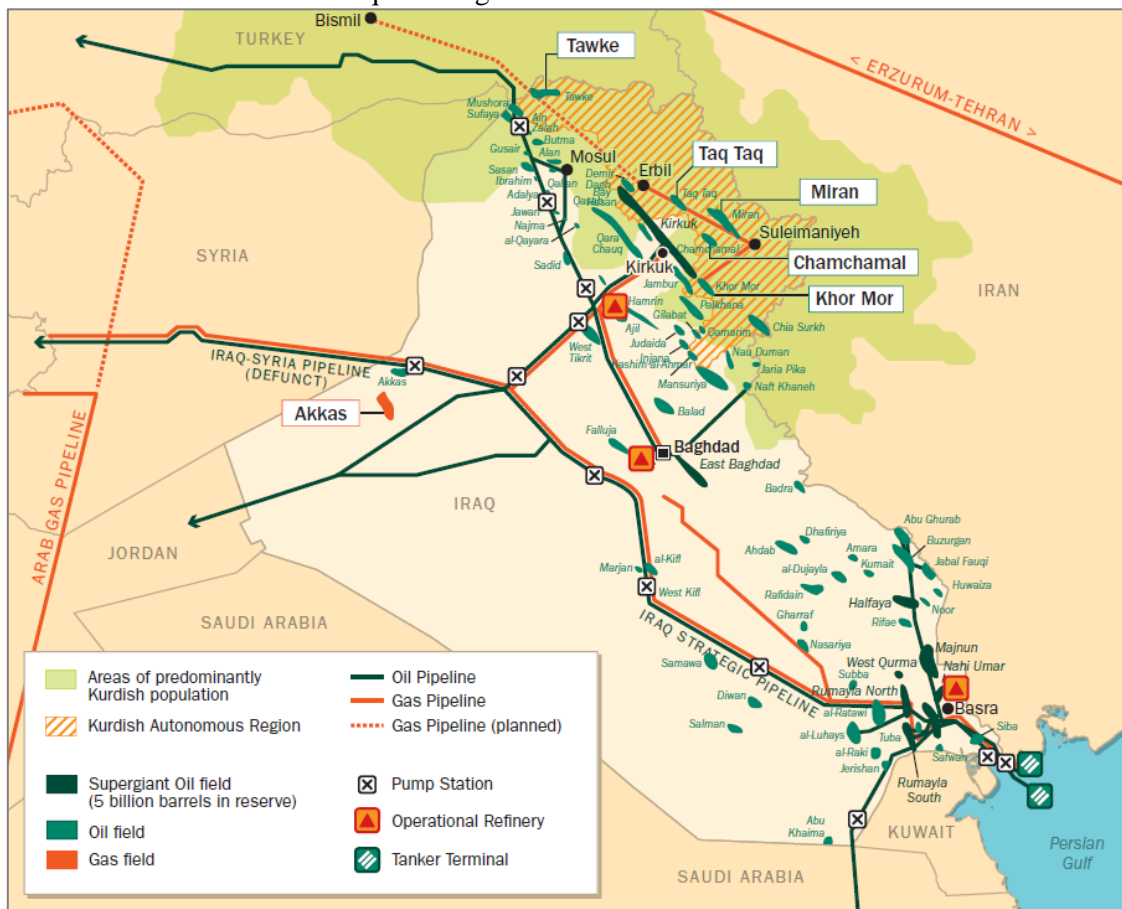
¹⁸ Platts Energy Economist (2013).

¹⁹ Pirani (2012).

²⁰ Of which: 65 bcm/year to be exported to China, 10 bcm/year to be exported in Iran, 11 bcm/year to be exported to Russia, 4 bcm/year to be exported in Central Asian countries, 20 bcm/year to be devoted to the domestic market. Furthermore, the Turkmen government is targeting a production of 230 bcm per year by 2030.

²¹ On September 12, 2011 the EU 27 Member States accorded to the EC a mandate to negotiate a legally binding treaty between the EU, Azerbaijan and Turkmenistan to build a Trans Caspian Pipeline System.

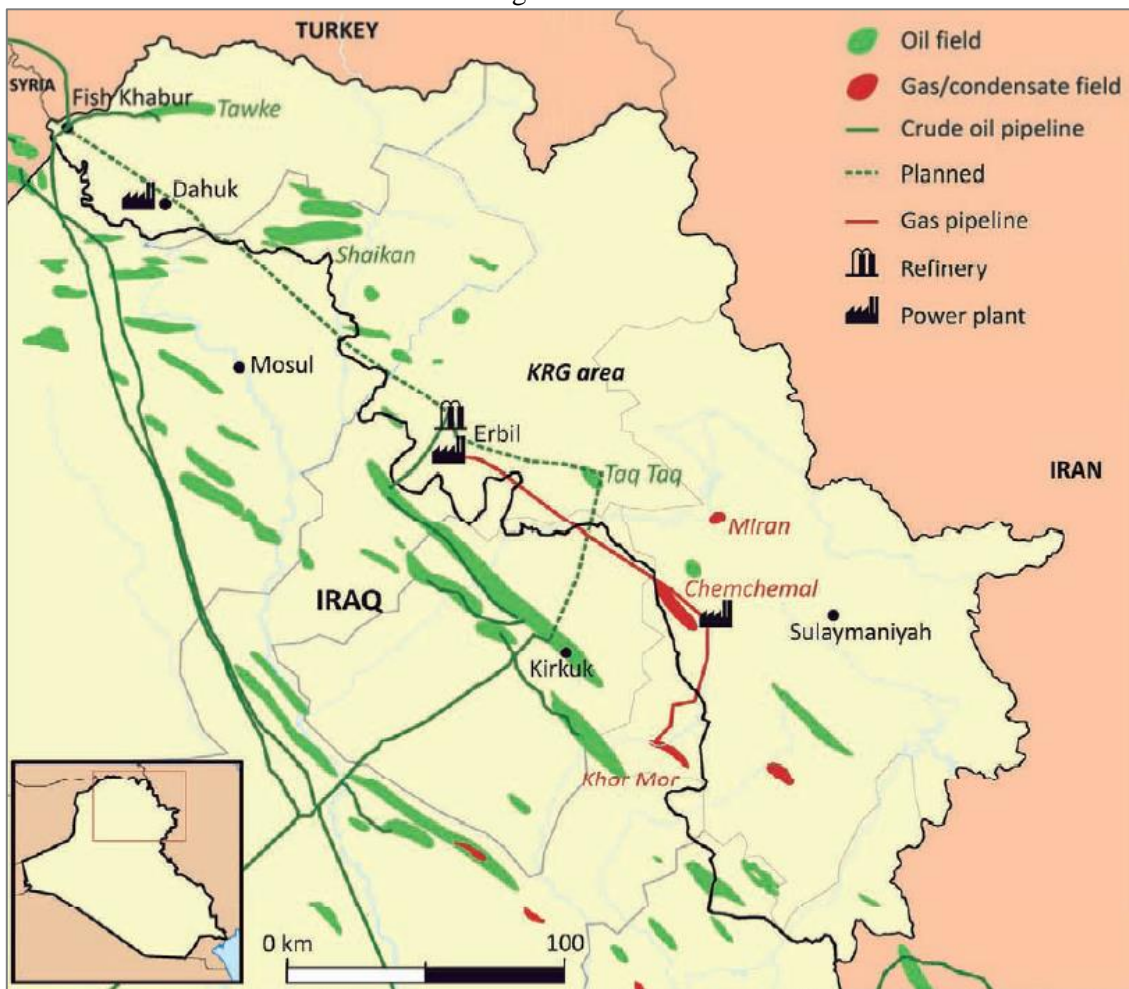
FIGURE 8
Iraq oil and gas fields and infrastructure



Source: Platts (2013).

However, Iraq's natural gas scenario is radically changing because of the enormous natural gas reserves being discovered in the country's semi-autonomous region of the Kurdistan Regional Government (KRG). This northern region is actually paving the way to Iraq's emergence as world-class natural gas province. In fact, between 3 tcm and 6 tcm of non-associated natural gas reserves are estimated to be located in this territory at the confluence of Iraq, Iran and Turkey.

FIGURE 9
Kurdistan oil and gas fields and infrastructure

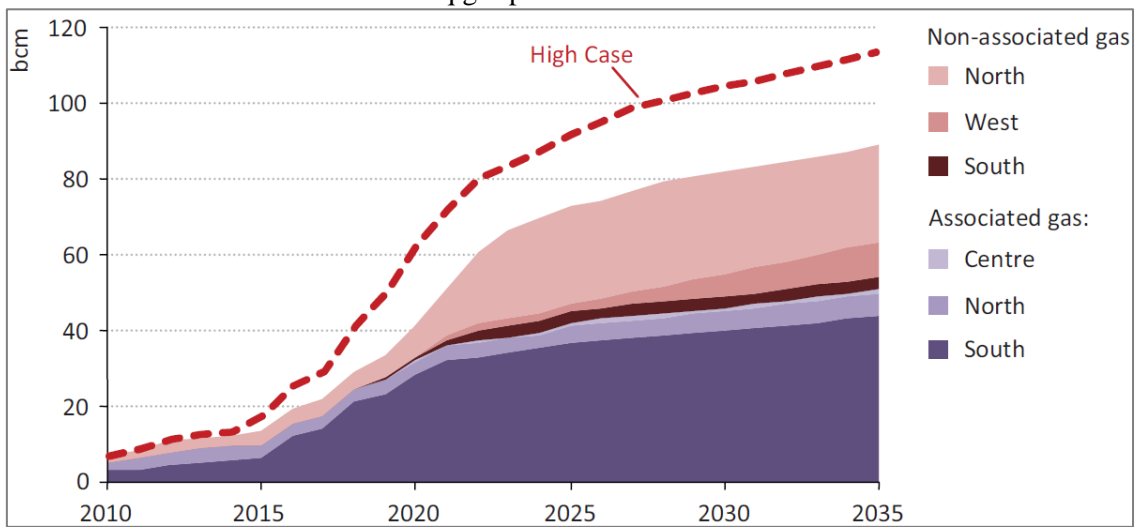


Source: International Energy Agency (2012).

This new development has the potential to radically change Iraq's natural gas production outlook. In fact, the country's natural gas production has decrease substantially over the last decade, from 3.2 bcm in 2000 to 0.9 bcm in 2012. This trend was due to the fact that hydrocarbon exploration in the country was limited and predominantly focused on oil. Nowadays, because of a more efficient use of associated natural gas reserves in the southern part of the country and because of a phenomenal growth in exploration activity in the KRG region occurred in the past five years, Iraq's natural gas production outlook seems to be at the dawn of a new renaissance. According to the IEA, Iraq's natural gas production could increase from a level of 10 bcm in 2010 to a level of 90 bcm in 2035²².

²² International Energy Agency (2012).

FIGURE 10
Iraq gas production outlook



Source: International Energy Agency (2012).

The development of associated natural gas reserves in the southern part of the country will follow the path of the increasing oil production trend. The reduction of gas flaring will be crucial for this development, and the additional volumes of natural gas being produced could well be devoted to the domestic market in order to free-up additional volumes of oil for export.

The development of non-associated natural gas reserves in the KRG region will firstly target the domestic market. In fact, the KRG has already more than tripled its 2015 target for installed natural gas-fired power generation capacity. However, in a second phase the KRG could well export part of its natural gas to Turkey. In particular, it is possible to expect the KRG to export something about 10 bcm of natural gas to Turkey by 2020.

The key barrier to a quick development of KRG natural gas resources is represented by the still open debate on state sovereignty between the KRG in Erbil and the Iraqi Federal Government in Baghdad. Essentially, Baghdad and Erbil are at odds over the KRG's desire for autonomy and the central government's desire for sovereignty and control²³. This debate translates into the energy sector as well, as the governments in Baghdad and Erbil have been unable to resolve their differences over the federal hydrocarbon law. This dispute generates significant political risk and is already creating a number of problems with regard to oil export. In fact, the KRG plans to export oil independently via pipeline to Turkey²⁴ but the Iraqi Federal Government has warned Turkey and the KRG such an action would be illegal and would be considered as smuggling of Iraqi oil without the permission of the Baghdad government²⁵. Turkey has

²³ For a wider discussion on Iraq's internal division please refer to: Elliott and Beryl (2012).

²⁴ An oil pipeline linking Khurmala Dome in the KRG region with Fishkabur on the Turkish border is very close to being completed, but it is not yet clear whether the KRG will heed Baghdad's request to tie-in to the federally controlled metering station, or go beyond Fishkabur to a new metering station to be installed by the KRG.

²⁵ Middle East Economic Survey (2013a), p. 17.

yet to give public approval to independent Kurdish exports as Ankara has had to balance its economic interests in the Kurdish province with its political relationship with Baghdad, which has been under strain. This was partly over the cosy relationship between Turkey and Erbil and, more recently, over the Syrian crisis. The US, which enjoys close diplomatic ties with both Baghdad and Ankara, has been pressing all parties to reach an agreement and is known to oppose Erbil's unilateralist energy plans. The Syrian civil war has also deepened the Shi'ite-Sunni divisions in Iraq with a spate of bombings and violence resulting in the deaths of nearly 900 people in September 2013 in various parts of the country, including Erbil²⁶. The attacks, the first in six years, dented the image of the KRG region as an oasis of calm and a magnet for foreign investment but did not have an impact on the natural gas exploratory activities. However, a safe environment is a key prerequisite of any hydrocarbon activity and further attacks in the future could seriously damage the current operations being undertaken in the KRG region.

Middle East II: Iran

Iran is the perennial "elephant in the room" of international gas trade, a country which could, one day, become a major game changer of international gas markets but the potential of which still remains today fundamentally untapped due to a number of geopolitical and commercial reasons. Iran owns the second largest proven natural gas reserves in the world after Russia (about 34 tcm) but since 1997 it is a net-importer of natural gas. For instance, in 2012 Iran produced 160 bcm of natural gas, consumed 156 bcm, imported 9 bcm from Turkmenistan and exported 7.5 bcm to Turkey and 1 bcm to Armenia and Azerbaijan. This paradoxical situation is caused by a wide variety of factors but before to analyze them let's have a closer look at the geological reality of the country and at its current natural gas production trend.

Iran's largest natural gas field is South Pars, one of the largest independent natural gas reservoirs in the world that lays on the territorial border between Iran and the State of Qatar in the Persian Gulf. This field covers an area of 9,700 sq. km. of which 3,700 sq. km. belongs to Iran. The Iranian portion is estimated to contain some 14 tcm of natural gas reserves. This amounts to roughly 7.5 % of the world natural gas reserves and approximately half of the Iran's gas reserves. Presently, some precise and sophisticated projects have been designed for development of 24 phases with the target to produce up to 290 bcm of natural gas per year. As of January 2013, the first nine phases were operating with an output capacity of 79 bcm/year, while Phase 10 was due for completion in the short term. The South Pars Phases have encountered many delays and it seems unlikely that the phases 12, 15, 16, 17, 18, 20 and 21 (the most advanced so far) will start-up before the end of 2014, especially given the escalation in international sanctions. The South Pars natural gas field is operated by Pars Oil and Gas Company (POGC), a subsidiary of National Iranian Oil Company (NIOC), which was established in 1998. POGC's mandate is the development of the South Pars gas field and North Pars gas field respectively. Decisiveness of the Ministry of Petroleum to uphold and exploit the Islamic Republic of Iran rights in the South Pars gas field led onto the establishment of POGC. The Pars Special Economic Energy Zone (PSEEZ) was, in accordance with

²⁶ Middle East Economic Survey (2013b), p. 2.

the Iranian government approval, also established in 1998 to accommodate South Pars related refining facilities and various activities in the oil, gas and petrochemical upstream and downstream industries and also to render support services to these industries. The development of the offshore South Pars field is of vital importance to Iran, both politically and economically. Natural gas production from South Pars is indeed critical to meet increasing domestic consumption and to meet Iran's current and future export obligations.

FIGURE 11
Iran gas fields and infrastructure



Source: Central Intelligence Agency (2011).

In addition to South Pars, Iran's major existing field developments include the North Pars and Kish natural gas fields, which are among the largest natural gas fields in Iran, as well as the offshore Arash field and the Lavan and Balal fields. In addition, the volume of associated gas recovered in Iranian oil fields will increase further with the

completion of a gas-gathering and NGL recovery system, which is being installed around Kharg Island in the Forouzan field.

In addition, in 2011 the National Iranian Oil Company (NIOC) reported several important discoveries: the huge Madar discovery in the Zagros basin, believed to hold 350 bcm of recoverable natural gas; the Khayyam field off the Gulf shore in Hormuzgan province with discovered reserves claimed at about 190 bcm; the Sardar Jandar field in the South Caspian area, estimated at 85 bcm.

However, political, funding and investment issues, international sanctions and Western pressure may strongly constrain the pace of development of these projects. In fact, as Jalilvand outlined, there are many obstacles to Iranian gas developments, such as international sanctions, factionalism in the Islamic Republic's political economy, subsidies and domestic over-consumption, objection to foreign participation, policy and institutional conflicts²⁷.

Eastern Mediterranean I: Israel

The energy landscape of the Eastern Mediterranean region in rapidly changing and Israel is the key driver of this recent developments. Offshore exploration in the waters of the Eastern Mediterranean region started in the late 1960's and early 1970's with a series of wells drilled by Belpetco. These wells targeted structural culminations on the shallow shelf of Israel and northern Sinai, but all were found dry²⁸. Although unsuccessful in terms of hydrocarbon production, these early wells provided important information and established the initial geologic model of the Eastern Mediterranean region. A second exploration campaign, occurred between the mid-1970's and the mid-1980's, resulted in more success. Several wells were drilled offshore Sinai and light oil was found in several areas, although no commercial production was established²⁹. Exploration activity in the offshore Eastern Mediterranean experienced a significant renaissance since 1999-2000 when five modest natural gas fields were discovered at a shallow depth west of the coastal town of Ashqelon and the Gaza Strip³⁰. These discoveries speeded up exploration efforts and promoted the acquisition of geophysical data throughout the entire Eastern Mediterranean area, particularly in the Levant basin. The real turning point in terms of natural gas discoveries came in 2009, when Noble Energy announced the discovery of the Tamar field (250 bcm) in offshore Israel. After this first major discovery, Noble Energy announced other two major finding in the Levant Basin: the Leviathan field (476 bcm) in offshore Israel (2010) and the Aphrodite field (140-220 bcm) in offshore Cyprus (2011).

²⁷ Jalilvand (2013), pp. 13-21.

²⁸ For a detailed overview of oil and gas explorations in Israel, please refer to: Ministry of Energy and Water Resources of the State of Israel (2013).

²⁹ Gardosh, Druckman, Binyamin and Rybakov (2008).

³⁰ Noa, Or, Mari-B and Nir in offshore Israel, and Gaza Marine in offshore Gaza Strip.

TABLE 1
Natural gas volumes in offshore Israel

Leviathan	476 bcm
Tamar	250 bcm
Dolphin	2 bcm
Dalit	14 bcm
Tanin	33 bcm
Mari-B	30 bcm
Noa	1 bcm

Source: U.S. Geological Survey and companies' information (2013).

FIGURE 12
Israel offshore natural gas fields



Source: Noble Energy (2012).

The offshore Tamar field was discovered 90 km off the northern coast of Israel in February 2009. The field holds 250 bcm of gas reserves and is expected to come on-stream in 2013³¹. The main investors in Tamar include Noble Energy (36%), Delek (15.6%), Houston-based Isramco (28.7%) and Israeli firm Dor Alon Energy with 4%³². When fully operational, it is expected to produce about 10 bcm/year of gas. This gas will be devoted to satisfy Israel's growing domestic gas demand, a very urgent concern for the country. In fact, natural gas consumption in Israel has grown from zero in 2000 to 5.3 bcm in 2010³³, of which 40% had been supplied by Egypt via the El-Arish-Ashkelon Pipeline. After the halt of Egyptian gas supplies to Israel occurred in 2011, the country received LNG equivalent to 2.5 bcm/y of gas through a floating

³¹ See: www.nobleenergyinc.com

³² International Oil Daily (2012).

³³ Domestic demand for natural gas in Israel is mainly driven by electricity generation, and more specifically by the Israel Electricity Corporation (IEC), which produces 98% of Israel's electricity. Natural gas demand in Israel is projected to increase to 12 bcm in 2020 and 18 bcm in 2030.

regasification and storage unit (FRSU) to cope with the gas shortage created by the halt of Egyptian gas deliveries, until the gas production in the Tamar field finally began in April 2013.

The offshore Leviathan field (476 bcm) was discovered in December 2010, 135 km off the northern coast of Israel. Since Tamar can fulfill a significant part of Israel's gas requirements for the foreseeable future, the Leviathan output will likely be directed towards exports, expected to start in 2017³⁴. Noble Energy has recently brought into the Leviathan field an experienced LNG partner with a 30% stake: Australian LNG specialist Woodside Petroleum. This new partner is expected to help Noble Energy to resolve some of the logistical and economic challenges complicating possible LNG development.

Owning the largest natural gas reserves in the offshore Eastern Mediterranean, Israel has a pivotal role in the emerging regional natural gas architecture. In other words, a large-scale development of Eastern Mediterranean natural gas seems to be very difficult without a strong commitment of Israel to export a substantial part of its gas resources. In October 2011 the Government of Israel appointed an inter-ministerial committee to examine government policy on the natural gas industry in Israel³⁵. The committee, chaired by Mr. Shaul Tzemach, Director General of the Ministry of Energy and Water Resources, conducted a comparative study of the accepted policy in the natural gas sector around the world. The goal was to learn from accrued international experience and identify best practices, and accordingly to recommend to the Government of Israel the optimal policy for the natural gas industry in Israel. Because of the importance of the gas resources for the future of the Israeli economy and society, the committee attributed great importance to ensuring that these limited resources would be utilized in such a way as to maximize their value for the Israeli public and contribute to the country's foreign relations. The government policy finally proposed by the committee in August 2012 gives total preference to supplying natural gas for the needs of the local economy in a way that weighs considerations of economic feasibility and constitutes social-wide optimization, particularly in view of the perception that gas resources are a public resource. For this reasons, the committee suggested that Israel could export by 2037 no more than 500 bcm of its existing and perspective gas resources.

The results of the Tzemach committee opened a wide debate in Israel and only in June 2013 the Israeli government finally reached a decision on natural gas exports. The government decided to keep 540 bcm of natural gas for the domestic market over a 25-year period, leaving only 360 bcm or 40% of projected supply for export. This is lower than the 500 bcm recommended by the Tzemach committee, and reflects public and political concerns over whether the government was giving away too much of Israel's natural gas bonanza. These concerns were also channelled into a set of petitions filed by the Academic Law and Business Center and other petitioners, who basically required the natural gas policy to be established through Knesset legislation and not by governmental decisions.

³⁴ See: www.nobleenergyinc.com

³⁵ For a detailed information please refer to: The Inter-ministerial Committee to Examine the Government's Policy Regarding Natural Gas in Israel (2013).

The Israeli Supreme Court rejected this set of petitions in October 2013, avoiding a setback of Israeli natural gas export plans for an indeterminate time period³⁶. The court's rejection of the petition is likely to give a new impetus toward completion of the Leviathan field buy-in by Australia's Woodside, which had most recently been eyed for June 2013. Woodside agreed to take a 30% stake in the Leviathan field, but had yet to finalize the deal as it awaited for an Israeli decision on export proportions³⁷.

This development will certainly enhance the discussion on Israel's natural gas export options in the near future. In fact, many options are currently on the table, even if none of them is yet a frontrunner: a) Construction of a pipeline to Turkey (via Lebanon and Syria or via the Republic of Cyprus EEZ); b) Construction of a pipeline to Jordan and to the Palestinian Territories; c) Utilization of the existing pipeline from Ashkelon to Egypt -reversing the flow- and then utilization of the Egyptian LNG plant in Idku; d) Construction of a submarine pipeline from the Leviathan field to the Egyptian LNG plant in Idku; e) Construction of an onshore LNG plant on Israel's Mediterranean coast; f) Construction of a LNG plant on the Israeli shore of the Gulf of Aqaba; g) Development of a FLNG plant in the Israeli offshore Mediterranean; h) Development of a compressed natural gas (CNG) solution; i) Construction of a pipeline to Cyprus and construction of a joint LNG plant in Vasilikos.

Eastern Mediterranean II: Cyprus

In 2011 Noble Energy discovered in offshore Cyprus (Block 12) a natural gas reservoir with a resource estimated at 140-220 bcm: the Aphrodite field³⁸. This discovery paved the way for a wave of enthusiasm regarding the country's natural gas prospects. Notwithstanding the still open dispute with the self-declared state of the Turkish Republic of Northern Cyprus also concerning the exploitation of offshore natural gas resources, over the last two years the Republic of Cyprus launched two rounds of offshore exploration licenses.

Despite the previous warnings of the government of the Republic of Turkey to put into question the interests of international oil and gas companies operating in Turkey if committed to become active also in the Republic of Cyprus, the two rounds of offshore exploration licenses experienced the participation of a large number of international companies, such as Russia's Novatek in conjunction with Gazprom's GPB Global Resources, Italy's Eni, France's Total, Malaysia's Petronas and Korea's Kogas. Bids have also been received from Vitol (headquartered in the Netherlands and Switzerland), Delek (Israel), Marathon Oil (US) and Woodside Energy Holdings (Australia). International companies from Canada, Cyprus, Indonesia and Lebanon and the UK were also involved in individual or joint bids. These busy tenders resulted in France's Total being awarded of blocks 10 and 11 and in a consortium composed by Italy's Eni (80%) and South Korea's Kogas (20%) being awarded in blocks 2, 3 and 9.

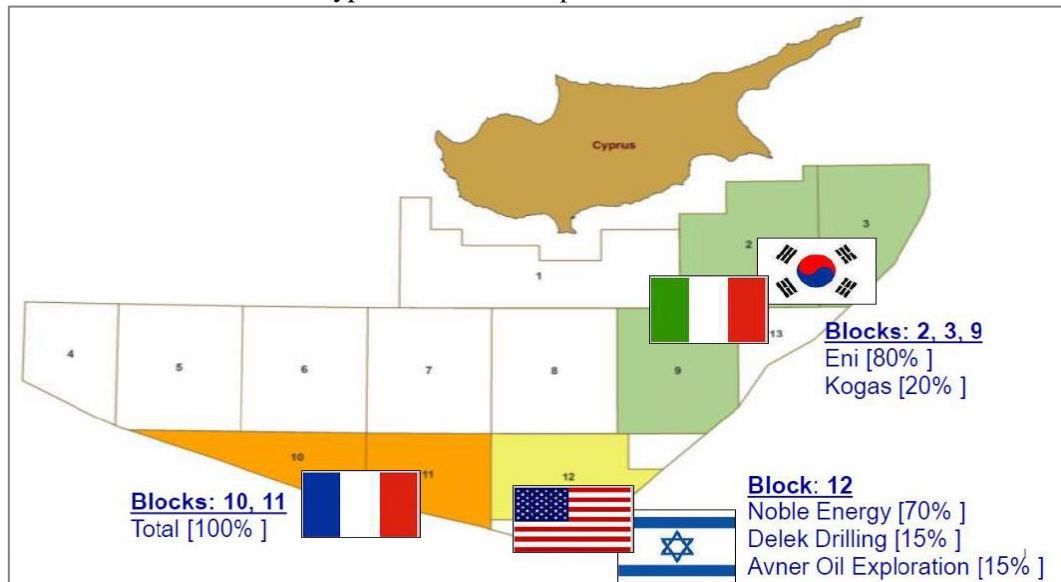
³⁶ LNG Intelligence (2013a).

³⁷ LNG Intelligence (2013b).

³⁸ Middle East Economic Survey (2012a).

In the meantime, Noble Energy opened-up its activities in the country to two other operators, Delek Drilling and Avner Oil Exploration, which now compose a consortium led by Noble Energy itself with a share of 70%.

FIGURE 13
Cyprus's offshore exploration licenses



Source: MCIT (2013).

The great expectations regarding the potential natural gas bonanza, together with the urgent need to find a way out of the deep economic crisis affecting the country, led the Republic of Cyprus's government to promote an LNG export option to quickly monetize the potential natural gas resources. The idea is to develop an LNG plant with an initial export capacity of 5 million tonnes of LNG per annum (one liquefaction train), expandable to 15 million tonnes of LNG per annum (three liquefaction trains) in Vasilikos, an area located in the southern coast of Cyprus, around 40 km away from the city of Larnaca and 25 km away from the city of Limassol.

The Republic of Cyprus signed in June 2013 a MoU with Noble Energy, Delek Drilling and Avner Oil Exploration, stating their intent for the development of the LNG plant in Vasilikos. A MoU between the Republic of Cyprus and Total -who is also interested in participating in the development of the LNG plant- was also signed in October 2013. According to the Republic of Cyprus's government, the Vasilikos LNG project will likely follow this time schedule: a) End-2013: signing of the LNG Project Agreement; b) Mid-2016: completion of LNG sales, secure investment/funding, completion of the FEED and select the EPC contractor and reach of the final investment decision; End-2016: start of the construction.

Other options for Cyprus's potential natural gas exports have been proposed and discussed over the last two years. Some of them are mainly based on commercial considerations, while others are based on geopolitical issues. In particular, a pipeline to Turkey is an option currently on the table: this solution would certainly have commercial sense in case additional volumes of natural gas will be discovered in

offshore Cyprus, but it encloses a number of geopolitical problems that are currently far from being resolved (i.e. the long-lasting Cyprus dispute).

As an overall trend, to date it seems too early to fully understand what export option will be finally chosen, and when. In fact, in October 2013 Noble Energy downsized the expected natural gas reserves in the Aphrodite field from 220 bcm to 140 bcm. Moreover, Total, Eni and Kogas will not be able to provide additional evidence from their respective blocks until 2015-2016, as the exploration drilling is scheduled for late 2014 - mid 2015. These features suggest the need for more caution in discussing the prospects for Cyprus's natural gas potential export options, as any project must be based on certain geological realities that are currently still largely unknown.

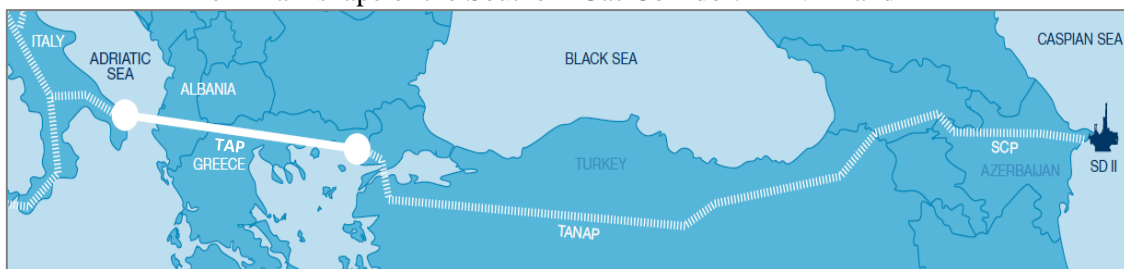
3. The way forward: new gas corridors and the potential role of Turkey

The Southern Gas Corridor between TANAP and TAP: what's next?

As described in paragraph 1.3, the ultimate infrastructural shape of the Southern Gas Corridor will be represented by the pipeline-tandem TANAP/TAP. In short, the 16 bcm/year of gas that will be produced in Shah Deniz Phase II will flow through a new parallel of the South Caucasus Pipeline across Azerbaijan and Georgia up to the Turkish border. From here, the gas will flow through Turkey via TANAP, to reach the Turkey/Greece border. At this point, the 10 bcm/year of Shah Deniz Phase II gas devoted to the European market will flow via TAP through Greece and Albania to Italy, its final destination. The target date for the first gas exports from Shah Deniz Phase II to Turkey is 2018, while the one to Europe is 2019.

FIGURE 14

The "final" shape of the Southern Gas Corridor: TANAP and TAP



Source: TAP (2013).

The TANAP 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, with SOCAR owning a share of 80% of the pipeline, leaving the Turkish companies BOTAS and TPAO with only 10% each. This feature was generally considered as a clear sign of the willingness of Azerbaijan to play a key role in the delivery of gas from its Shah Deniz field further down the supply chain to Europe rather than selling at its border. For this reason TANAP was initially seen -particularly in Brussels- as a pipeline "of Azerbaijan, by Azerbaijan and for Azerbaijan". The

concerns of the EU over TANAP were further amplified by the rapid and progressive move of SOCAR to build up a portfolio of overseas assets concentrated around the Mediterranean Sea. In particular, SOCAR's most valuable acquisition was the purchase of a 66% stake in Greek state gas transmission company Desfa, which was concluded in August 2013³⁹. With this operation SOCAR positioned itself as the future dominant gas supplier to Greece, as long-term contract with Gazprom -held by state importer Depa- will expire in 2016⁴⁰.

The concerns of the EU over TANAP controlled by SOCAR were lately eased by the Azeri decision to open-up the pipeline consortium to the other Shah Deniz operators: BP, Statoil and Total. This decision will likely be finalized in 2014, with SOCAR scaling down from a share of 80% to a share of 51% in the project. Furthermore, in November 2013 Azerbaijan signed long-term sales and purchase agreements with nine companies for output from Shah Deniz Phase II. The bulk will be sold to Italy, with smaller volumes to Greece and Bulgaria. The Shah Deniz consortium inked the 25-year deals with Royal Dutch Shell, Bulgaria's state Bulgargas, Spain's Gas Natural, Germany's E.On, France's GDF Suez, Italian firms Enel and Hera Trading, Switzerland's Axpo and Greece's Depa. The aim is to start Phase II production in 2018 and hit peak output of 16 bcm/year in 2022. The plateau is due to last seven or eight years. Of the gas, 10 bcm/year is destined for Europe -with 8 bcm/year to be sold into Italy, and 1 bcm/year each into Bulgaria and Greece- and 6 bcm/year for Turkey. Deliveries to Turkey are due to start in 2018 and to Europe the following year. Gas pricing was not disclosed, but both hub and oil-indexed pricing are likely to be used, with the proportion varying from contract to contract.

Further than Azerbaijan, the Southern Gas Corridor is generally expected to carry natural gas to the EU from Turkmenistan, Iraq and -in the longer term- Iran. On the basis of the analysis previously conducted in this paper what should we expect with regard to this potential development?

a) Turkmenistan

As described in paragraph 2.2, a "special relationship" is being established between Turkmenistan and China, and this liaison is likely to further consolidate in the future. However, given its world-class natural gas reserves, Turkmenistan could well be in the position to supply natural gas to Turkey and to the EU -in addition of the already mentioned volumes targeting the Chinese market- but two major barriers will likely make such a development unfeasible, at least in the medium-term: the first is the current lack of interest of the European gas market due to its stagnant gas demand, and the second is the infrastructural problem related to the divergences existing between Russia, Iran and Turkmenistan on the legal status of the Caspian Sea and therefore on the construction of the Trans-Caspian Pipeline. In order to try to bypass this problem, in

³⁹ Kardas (2013).

⁴⁰ Moreover, SOCAR is also looking to establish a presence in Albania, where gas demand is rising rapidly but infrastructure is severely lacking. In late July 2013, SOCAR President Rovnag Abdullaev visited Tirana to discuss plans to invest in new underground storage facilities and help the Albanian government on the road to gasification.

2010 Eni proposed to Azerbaijan and Turkmenistan a CNG (compressed natural gas)⁴¹ project that would permit the transport and transit of considerable volumes of Turkmen gas across the Caspian Sea to the coast of Azerbaijan, from where it would be transported through an overland pipeline to other destinations⁴². At the time this project was halted by Azerbaijan, which did not want Turkmen gas to compete with its resources being developed. Such a project could maybe be revive in the future if Azerbaijan will temporary need additional volumes to fill the TANAP pipeline, while waiting for additional production in Shah Deniz. However, this solution will likely be very costly and very limited in both time and volumes. For this reasons, the aspiration of Turkey and of the EU to bring major volumes of Turkmen gas into the Southern Gas Corridor would probably need to be revised, at least until the dispute on the legal status of the Caspian Sea will finally be resolved and until the EU natural gas demand will fully recover, leading the EU to seek for substantial volumes of additional gas imports.

b) Iraq

As outlined in paragraph 2.3, the development of associated natural gas reserves in the southern part of Iraq will follow the path of the increasing oil production trend. The reduction of gas flaring will be crucial for this development, and the additional volumes of natural gas being produced could well be devoted to the domestic market in order to free-up additional volumes of oil for export.

The development of non-associated natural gas reserves in the KRG region will firstly target the domestic market. In fact, the KRG has already more than tripled its 2015 target for installed natural gas-fired power generation capacity. However, in a second phase the KRG could well export part of its natural gas to Turkey. In particular, it is possible to expect the KRG to export about 10 bcm of natural gas to Turkey by 2020-2025.

c) Iran

As defined in paragraph 2.4, Iran is the perennial “elephant in the room” of international gas trade, a country which could, one day, become a major game changer of international gas markets but the potential of which still remains today fundamentally untapped due to a number of geopolitical and commercial reasons. The main reason of the current under-exploitation of Iran’s natural gas resources is clearly linked to the difficult political relations evolved over the last decades between the country and the West. However, the history of international relations has shown several times that relations between major actors in the international system could rapidly shift if the political willingness to do so is there. An example of these sudden shifts is the rapprochement between the United States (US) and China occurred in the early 1970s

⁴¹ The CNG technology allows the transport of high pressure gas (not liquefied) by vessels provided with special containment systems. Once delivered to the destination ports, the decompressed gas is ready to be transported through conventional pipelines. At the time Eni was committed to applying CNG technology to maritime transport in situations where, due to distance and available volumes, this technology allows the feasibility of projects otherwise not achievable with traditional technologies such as transport by pipeline or LNG.

⁴² Eni (2010).

after a great diplomatic effort of the US Secretary of State Henry Kissinger. Furthermore, the more recent political developments in the southern shore of the Mediterranean clearly exemplify the need to be able to think the unthinkable. Few people were able to predict the Arab Spring and its rapid development, but the turmoil actually occurred, radically changing the geopolitical equilibrium of the region in a structural dimension. The dynamism of international relations exemplified by these two different historical moments could be applied also to Iran and its relations with the other actors of the international system and notably the US. As a matter of fact, the presidents of the US and Iran talked for the first time since 1979 when Barack Obama called Hassan Rohani on September 27, 2013. Moreover, after years of frustration and an impasse in negotiations between Iran and six world powers (the five permanent members of the UN Security Council plus Germany, known as the P5+1), a first Iran nuclear deal was finally reached in Geneva on November 24, 2013.

This occurrence certainly represents just a first step toward a truly complete resolution of the Iranian nuclear issue, but it could be seen as a positive sign for the future. If these recent positive developments will have an effective follow up, great opportunities could open up in Iran, also with regard to the natural gas sector. Considering the geographical location of Iran's natural gas reserves, such a development will likely first interest the global LNG market before to interest the Turkish and European markets via pipeline. Furthermore, the first international pipeline that the country will likely develop will not target the European market, but the Asian market. In fact, Iran is already working on a pipeline to Pakistan, in order to export its natural gas not only to this country but also to India. Moreover, the Chinese interest on the country's natural gas reserves is also very strong and Iranian natural gas exports to China will likely take place in the future as well. For these reasons it seems that in the medium-term Iran will difficultly fit into the Southern Gas Corridor concept, as it will first target the global LNG market and Asian markets via pipeline.

Finally, it is necessary to outline that a full resolution of the nuclear issue will not automatically change the Iranian natural gas outlook in a short period of time, as a number of commercial barriers will likely remain on the table. In fact, in the energy industry there is a general awareness of the difficulty to develop energy projects in Iran, a difficulty mainly due to the complex institutional and regulatory environment of the country. In particular, the struggle for economic independence wanted by Iran since the 1979 revolution has led to very restrictive participation opportunities for foreign companies, notably under the so-called buyback-scheme. As Jalilvand (2013) outlined: «The constitution of the Islamic Republic declares all natural resources as public wealth. Therefore, the only possibility for foreign companies to engage in Iran's energy sector is through so called buyback-contracts, under which private companies develop energy projects without actually owning the reserves identified. The role of private companies is thereby limited to financing and providing technology. This differs substantially from the widely used production sharing agreements which normally allow foreign parties to own parts of the reserves and mandate share in costs and profits from development»⁴³.

⁴³ Jalilvand (2013), p. 19.

The Eastern Mediterranean Gas Corridor: realism or wishful thinking?

Over the last few years the Eastern Mediterranean region has progressively attracted the attention of the world natural gas industry due to a series of natural gas discoveries in the offshore Israel and Cyprus already described in paragraphs 2.5 and 2.6. In particular, after the discovery of the Leviathan field in 2010 and the Aphrodite field in 2011 a wide debate emerged on the natural gas export potential of the region and on its consequential infrastructure options. But is this debate justified by the geological realities of the region? Looking at the volumes of current proven natural gas reserves, it seems that the Eastern Mediterranean region does not have the potential to become a world-class natural gas province. The two major natural gas fields in the region, Leviathan and Aphrodite respectively enclose 476 bcm and 140 bcm of natural gas reserves, for a total of 616 bcm. Taking into consideration that -for instance- only the recently discovered natural gas fields in Mozambique are estimated to enclose about 4,000 bcm of natural gas reserves, it is clear that with the current volumes the Eastern Mediterranean will unlikely become a game changer in world natural gas markets.

However, the natural gas resources being discovered in the region could well represent a game changer for the region itself, in particular as far as natural gas cooperation is concerned. In particular, the proposed joint LNG plant at Vasilikos in southern Cyprus is currently seen by many stakeholders as the better cost-effective way of monetizing both countries' resources and achieving economies of scale⁴⁴.

FIGURE 15

The proposed LNG plant in Vassilikos and the Mediterranean regasification terminals



Source: Middle East Economic Survey (2013).

After the decision of Israel's Supreme Court to confirm the legitimacy of the government's decision to export up to 40% of the country's natural gas resources (see paragraph 2.5), the natural gas developments in the country are likely to speed-up. However, the downgrade of the Aphrodite field made by Noble Energy in October 2013 will likely slow-down the evaluation of natural gas export options in Cyprus, at least until Noble Energy, Total, Eni and Kogas will get additional evidences on the country's

⁴⁴ For a wider discussion of East Med natural gas export options please refer to Tagliapietra (2013).

natural gas resources from their exploratory activity. These developments are likely to take time and for this reason it seems reasonable to foresee that any final decision on the potential Eastern Mediterranean natural gas exports will be postponed to 2015-2016.

Turkey as a regional natural gas hub: myth or reality?

Having analyzed the current situation and outlook of natural gas producing countries around Turkey, the prospects for the Southern Gas Corridor and the outlook of the potential Eastern Mediterranean Gas Corridor, it is now time to face our initial question: has Turkey the potential to become a regional natural gas hub?

Looking at the medium-term horizon (up to 2020-2025) the answer to this question is no: Turkey will likely not have the potential to become a regional natural gas hub. In fact, looking at the numbers characterizing the Southern Gas Corridor, within this time frame it will not be possible to expect more than 10 bcm (from Shah Deniz Phase II) to flow through Turkey to the EU. This amount certainly represents an historical step -as it will be the first concretization of the long-lasting Southern Gas Corridor odyssey- but it will certainly not radically change the EU natural gas security of supply architecture. In fact, 10 bcm by 2020-2025 will basically represent less than 3% of the EU natural gas import needs: a level equal to the one currently covered by Nigeria. Furthermore, looking at the medium-term horizon it is very unlikely to expect a direct involvement of Turkey in the potential Eastern Mediterranean Gas Corridor. In fact, as the previous section tried to elucidate, the first natural gas exports from the region will likely occur in the form of LNG.

Looking at the long-term horizon (after 2025-2030) the answer to this question is highly uncertain. In fact, in this time framework Azerbaijan *could* well be able to supply more volumes of natural gas to the EU, Turkmenistan *could* be in the position to supply a considerable amount of natural gas (20-40 bcm/year) to Turkey and to the EU, Iraq *could* also be in the position to supply some natural gas volumes to the EU from KRG and Iran *could* well have the potential to improve its natural gas supply to Turkey. Furthermore, *if* substantial additional natural gas reserves will be discovered in offshore Israel and Cyprus, the project to evacuate Eastern Mediterranean gas to Turkey via pipeline *could* become commercially viable and politically feasible, but only *if* in the meantime the Cyprus dispute will be finally resolved. As illustrated by the hypothetical tone of these sentences, a number of factors will determine whether Turkey may or may not become a regional natural gas hub in the long-term. What seems to be certain is that the real underlying force of this development will not come from the supply side, but instead from the demand side. In the long-term, natural gas producing countries located around Turkey will likely have the potential to export significant volumes of gas to the EU but this potential will become a reality -defeating the current infrastructural, commercial and political barriers- only if the EU market will actually need more natural gas supplies. In other words, as an old English proverb says, “Where there’s a will, there’s a way”.

Bibliography

Barysch, K. (2010), "Should the Nabucco Pipeline Project be Shelved?", Transatlantic Academy Paper Series, Washington, D.C.

British Petroleum (2013), "Statistical Review of World Energy", available online.

Cedigaz (2012), "Natural gas in the world", Rueil Malmaison.

Elliott, S. and Beryl, L. (2012), "Natural Gas Development in Kurdistan: A Financial Assessment", Belfer Center for Science and International Affairs, Harvard University.

Energy Community (2011), "Energy Community Regulatory Board. Annual report 2010", ECRB Section Energy Community Secretariat, Vienna.

Eni (2010), "Eni in Azerbaijan to discuss CNG transport", Press release, July 20.

Eni (2013), "Eni: awarded three offshore exploration blocks in the Republic of Cyprus", Press release, January 24.

European Commission (2008), "Second Strategic Energy Review – An EU Energy Security and Solidarity Action Plan", Brussels.

Gardosh, M., Druckman, Y., Binyamin, B. and Rybakov, M. (2008), "The Levant Basin offshore Israel: stratigraphy, structure, tectonic evolution and implications for hydrocarbon exploration", Study prepared by the Geophysical Institute of Israel and the Geological Survey of Israel for the Ministry of National Infrastructure of Israel, Lod and Jerusalem.

Hofstätter, P. (2011), The Nabucco-Pipeline: Economic and political effects in relation to the EU (VDM: Düsseldorf).

International Energy Agency (2012), "Iraq Energy Outlook", Paris.

International Monetary Fund (2013), "World Economic Outlook", available online.

International Oil Daily (2012), "Delek Consortium Continues Pursuit of Cyprus Blocks", November 16.

International Oil Daily (2012), "Eni's Cyprus Ambitions Undeterred by Turkey's Threats", November 5.

Jalilvand, D.R. (2013), "Iran's gas exports: can past failure become future success?", NG 78, Oxford Institute for Energy Studies, Oxford.

Kardas, S. (2013), "Turkey and the Southern Corridor after TAP's Selection as the Main Export Route for Caspian Gas, On Turkey Analysis, German Marshall Fund of the United States", Washington, D.C.

- LNG Intelligence (2013a), “Israeli Supreme Court Oks Exports”, October 23.
- LNG Intelligence (2013b), “Noble Sees Leviathan Moving Faster After Court Ruling”, October 25.
- Middle East Economic Survey (2012a), “TPAO Completes Well In Turkish Cyprus, Plans Second”, September 21.
- Middle East Economic Survey (2012b), “Political Agenda Emerges as Cyprus Kicks Off Gas Block Talks”, November 16.
- Middle East Economic Survey (2013a), “Iraqi Deputy Prime Minister Warns On KRG Exports”, Vol. 56 n. 42, 18 October.
- Middle East Economic Survey (2013b), “KRG Edges Closer To Independent Exports But Could Yet Fall At Final Hurdle”, Vol. 56 n. 40, 4 October.
- Ministry of Energy and Water Resources of the State of Israel (2013), “Index of Oil and Gas Wells in Israel”, Haifa.
- Official Journal of the European Union (2006), “Decision No 1364/2006/EC of the European Parliament and of the Council of 6 September 2006 laying down guidelines for trans-European energy networks and repealing Decision 96/391/EC and Decision No 1229/2003/EC”, L 262/1, Brussels.
- Oil and Gas Journal (2011), “GCA: Turkmenistan's Iolotan gas field is world's second-largest”, October 13.
- Omonbude, E.J. (2013), Cross-border oil and gas pipelines and the role of transit country. Economics, challenges and solutions (Palgrave: London).
- Pirani, S. (2012), “Central Asian and Caspian Gas Production and the Constraints on Export”, NG 69, Oxford Institute for Energy Studies, Oxford.
- Pirani, S., Stern, J. and Yafimava, K. (2009), “The Russo-Ukrainian Gas Dispute of January 2009: A Comprehensive Assessment”, NG 27, Oxford Institute for Energy Studies, Oxford.
- Tagliapietra, S. (2012), “The Rise of Turkey and the New Mediterranean. Challenges and Opportunities for Energy Cooperation in a Region in Transition”, Nota di Lavoro n. 66, Fondazione Eni Enrico Mattei (FEEM), Milano.
- Tagliapietra, S. (2013), “Towards a New Eastern Mediterranean Energy Corridor? Natural Gas Developments Between Market Opportunities and Political Risks”, Nota di Lavoro n. 12. 2013, Fondazione Eni Enrico Mattei (FEEM), Milano.
- Tagliapietra, S. and Hafner, M. (2013), The Globalization of Natural Gas Markets. New Challenges and Opportunities for Europe (Claeys&Casteels: Deventer).

The Inter-ministerial Committee to Examine the Government's Policy Regarding Natural Gas in Israel (2013), “Executive Summary”, available online.

World Gas Intelligence (2013), “Israel, Cyprus May Band Together”, October, 16.

Web sites

www.bp.com

www.energy.gov.il

www.energyintel.com

www.inogate.org

www.nobleenergyinc.com

www.tanap.com

www.trans-adriatic-pipeline.com

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