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## Can South-Eastern Mediterranean Gas be a Supply for the EU?

by Elif Burcu Günaydın

### ABSTRACT

South-Eastern Mediterranean gas fields are still under exploration and development. Meanwhile, the question of which route or routes such gas would take into the global markets remains unanswered. The various possible routes appear to be problematic either politically or financially, leaving development stifled. However, with the crisis between Russia and Ukraine deepening Europe's interest in diversification of supplies, and with gas field owners and developers eager to monetise the resources, Eastern Mediterranean gas could become a potential source for the European Union. This paper tries to answer whether the South-Eastern Mediterranean resources can be regarded as a considerable supply for Europe and, if so, what are the alternative routes that would benefit all the parties involved.

*South-Eastern Mediterranean | Natural gas | Turkey | Israel | Cyprus | European Union*

keywords

## Can South-Eastern Mediterranean Gas be a Supply for the EU?

by Elif Burcu Günaydın\*

### Introduction

The South-Eastern Mediterranean (SEM) region is of historical importance, being home to many civilisations and the main commercial routes from the East to the West. Recently, it has become a focus of interest because of offshore gas discoveries and the energy potential elaborated by the United States Geological Survey (USGS) reports issued in 2010. The reports have created optimism for the hitherto energy-dependent countries of the South-Eastern Mediterranean, because the size of the fields suggest that even after domestic consumption is accounted for, a considerable amount of gas would remain to be exported.

The European Union (EU) is deeply interested in the discoveries and the promising potential of the region.<sup>1</sup> After the Russia-Ukraine crises, which have been on the agenda since the second half of the 2000s and deteriorated over time, the EU's desire to decrease its dependency on Russian gas has become more acute. This was reflected in the European Commission Communication in 2008, which called for the creation of a southern gas corridor in order to reach the Middle Eastern and Caspian resources as an official EU energy security policy.<sup>2</sup>

Turkey, a candidate member of the EU and a littoral country, is closely following such developments from a number of vantage points. Turkey would certainly be a customer for the gas, but it would also like to become a transport route for the SEM gas. This would meet its aspirations to become an energy hub for the region and,

<sup>1</sup> European Commission, *European Energy Security Strategy* (COM(2014)330), 28 May 2014, p. 13, 16, 17, <http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52014DC0330>.

<sup>2</sup> European Commission, *Second Strategic Energy Review: An EU Energy Security and Solidarity Action Plan* (COM(2008)781), 13 November 2008, <http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52008DC0781>.

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in turn, give it increased political clout in foreign relations. Turkey's interest in the gas also derives from the desire to protect the rights of Turkish Cypriots, who are not currently recognised as a state by the international community.

The United States (US) and the Russian Federation (Russia) are the other actors watching the developments in the SEM closely. The US has been even more enthusiastic than the EU for creating a Mediterranean gas corridor to the EU, controlled mostly by its allies. Meanwhile, Russia has signed agreements with several countries in the region for hydrocarbon developments offshore, indicating that it is not intending to stay out of the game.

The domestic consumption of the explorer countries is certainly not sufficient to finance further development; making exports a necessity rather than a choice. There are several alternatives being considered such as exports to the neighbouring countries via regional pipelines or exports in form of liquefied natural gas to the East Asian markets, which are more promising financially for the time being. However, several factors – such as the timing, the location and the political ties between the EU and the countries with a stake in the fields (one of which is actually a member state) – make the Union a likely export candidate. This paper focuses on this probability rather than the alternatives.

The first part of this paper outlines developments in the region concerning the explorations and discoveries. The second section provides an overview of the considered options for supplying the gas to the EU. The third section focuses on the most traditional method for transporting the gas, pipelines. Turkey is examined in detail under this section despite the political challenges, because it is considered the most feasible route economically and such a development would represent a political breakthrough at the same time. The fourth section explores the alternative methods such as liquefied natural gas, compressed natural gas and sub-sea electricity cables.

### 1. Overview of the South-Eastern Mediterranean gas discoveries

The USGS reports concerning the SEM gas resources were issued in 2010. The reports estimated around 10 trillion cubic meters (tcm) of natural gas in the two basins of the Eastern Mediterranean: the Nile and the Levant.<sup>3</sup> Even before the reports, offshore exploration was being carried out in the South-Eastern Mediterranean. However, except for Egypt, the exploration did not result in findings for many years. The turning point for the Levant Basin was the years 1999-2000, with the

<sup>3</sup> US Geological Survey, *Assessment of Undiscovered Oil and Gas Resources of the Levant Basin Province, Eastern Mediterranean*, Fact Sheet 2010 No. 3014, March 2010, <http://pubs.usgs.gov/fs/2010/3014>; US Geological Survey, *Assessment of Undiscovered Oil and Gas Resources of the Nile Delta Basin Province, Eastern Mediterranean*, Fact Sheet 2010 No. 3027, May 2010, <http://pubs.usgs.gov/fs/2010/3027>.

discoveries of Noa, Mari-B and the Gaza Marine Fields. Although the amounts were modest at first, they were followed by significant discoveries in the later years.<sup>4</sup>

According to the USGS reports, the Nile Basin is estimated to hold most of the gas in the SEM. However, the inferred findings are smaller and economic uncertainties in Egypt mean the resources remain undeveloped. Recently, increased domestic consumption forced Egypt to import gas in order to fulfill its export liabilities.<sup>5</sup> According to the 2010 USGS reports, the Levant Basin is estimated to hold 3.4 tcm of natural gas that could be exploited, creating high expectations for not only the coastal states but also for other international actors.

Nonetheless, several factors need to be taken into consideration before evaluating the potential of the region. Firstly, it should be stated that the reports address only the technically recoverable resources, but they do not address the economic viability of exploiting them. So, while the envisaged quantities are sufficient to inspire exploration, the economic viability of the exploitation cannot be taken for granted. Secondly, utilising the resources would require cooperation and contribution from all regional countries in a part of the world with remarkable domestic and international problems. Therefore, the whole basin may not be explored in the near future. Finally, the Levant Basin discoveries are not significant in a global sense.<sup>6</sup> Even if the whole amount estimated in the report is taken into account, it is dwarfed by the vast reserves of neighbouring countries, some of which are already significant players in the global gas market.<sup>7</sup> Nonetheless, the resources are certainly important for the region both politically and economically, giving the countries the chance to become at least partly energy independent and potentially even becoming exporters.

Israel has been conducting explorations since the 1990s and it has discovered the most significant resources in the region. Meanwhile, the Republic of Cyprus<sup>8</sup> has initiated exploration via international tenders and made a substantial discovery in the Aphrodite Field, which neighbours the largest discovery in the region, the Leviathan Field. Palestine also made a modest discovery offshore Gaza, but the reserve remains undeveloped due to Israeli objections and the political atmosphere;

<sup>4</sup> US Energy Information Administration (EIA), *Eastern Mediterranean Region*, updated August 2013, <http://www.eia.gov/countries/regions-topics.cfm?fips=em>.

<sup>5</sup> US Energy Information Administration (EIA), *Country Information: Egypt*, updated August 2014, <http://www.eia.gov/countries/cab.cfm?fips=eg>.

<sup>6</sup> Amounts of discoveries (approximately): Israel, 1.040 trillion cubic meters (tcm), Cyprus 140 billion cubic meters (bcm), Palestine, 28 bcm. Source: US Energy Information Administration (EIA), *Eastern Mediterranean Region*, cit., updated by Noble Press Releases.

<sup>7</sup> Amounts of proven reserves: Iran, 33.8 tcm; Russia, 31.3 tcm; Qatar, 24.7 tcm; Turkmenistan, 17.5 tcm. Source: BP, *Statistical Review of World Energy 2014*, June 2014, <http://www.bp.com/en/global/corporate/about-bp/energy-economics/statistical-review-of-world-energy.html>.

<sup>8</sup> In this article Cyprus refers to the whole Island, while ROC refers to the Greek Cyprus Administration.

even though found more than a decade ago.<sup>9</sup>

The other countries of the region have also attempted to start their own research. Syria has launched international oil and gas exploration tenders which have resulted in disappointment.<sup>10</sup> The conflict in Syria certainly makes it more difficult to expect the explorations to start. Lebanon, on the other hand, has carried out surveys in identified areas of potential resources which are estimated to hold around 700 billion cubic meters (bcm) of natural gas offshore. The international tender for gas exploration created a great amount of attention, but due to the political and legal uncertainties the tender has not been finalised yet.<sup>11</sup>

Russia's determination to take its place in the Eastern Mediterranean developments can be seen even in the following problematic cases. After signing a Memorandum of Understanding (MOU) with the developers of an Israeli offshore gas field known as the Tamar Field in 2012,<sup>12</sup> Russia made moves towards more challenging alternatives. In October 2013, it signed an energy cooperation MoU for developing natural gas fields in Lebanon. Several Russian companies also bid on the Lebanese exploration tender, which is expected to be finalised by the end of 2014.<sup>13</sup> Meanwhile, the Soyuznefte Gas Company has made an agreement with the Syrian Ministry of Energy in order to explore in its Offshore Block 2.<sup>14</sup> Russia also signed an agreement with the Palestinian Authority for the development of the Gaza Marine Field.<sup>15</sup>

Production from the fields in Lebanon, Syria and the Palestinian territory remains to be seen in the future. Israel and Cyprus, however, can be expected to become the first gas exporters from the SEM region. Israel, the owner of significant amounts of natural gas, took more than one year to decide on its export policy. After the high level study conducted by a specialised commission,<sup>16</sup> the government decided to

<sup>9</sup> Simone Tagliapietra, "Towards a New Eastern Mediterranean Energy Corridor? Natural Gas Developments Between Market Opportunities and Geopolitical Risks", in *FEEM Note di Lavoro*, No. 12/2013 (December 2013), <http://www.feem.it/getpage.aspx?id=5321>.

<sup>10</sup> US Energy Information Administration (EIA), *Country Information: Syria*, updated February 2014, <http://www.eia.gov/countries/cab.cfm?fips=sy>.

<sup>11</sup> Karen Ayat, "Lebanon: Interview with Lebanese caretaker Minister of Energy & Water Gebran Bassil", in *Natural Gas Europe*, 9 December 2013, <http://www.naturalgaseurope.com/lebanon-minister-energy-water-gebran-bassil>.

<sup>12</sup> "Gazprom in LNG Purchase Deal with Israel", in *New Europe Online*, 2 March 2013, <http://www.neurope.eu/node/120258>.

<sup>13</sup> Daria Chernyshova, "Russia, Lebanon Ink Energy Cooperation Deal", in *The Brics Post*, 11 October 2013, <http://thebricspost.com/?p=19803>.

<sup>14</sup> Ziad Haidar, "Syria Signs Offshore Oil and Gas Exploration Deal with Russia", in *Al-Monitor*, 27 December 2012, <http://almon.co/1xmg>.

<sup>15</sup> Helmi Moussa, "Russia Preparing to Develop Gaza Gas Field", in *Al-Monitor*, 24 January 2014, <http://almon.co/1yll>.

<sup>16</sup> The committee consisted of Israeli bureaucrats, who each had the expertise to investigate different aspects of the issue. The committee chair was Shaul Tzemach, Director General of the Ministry of Energy and Water Resources, whom the report is named after. For detailed information see: Israel, *The Recommendations of the Inter-Ministerial Committee to Examine the Government's Policy Regarding Natural Gas in Israel: Executive Summary*, September 2012, <http://energy.gov.il/>

export 40 percent of its production. This decision was endorsed by the High Court of Justice and finalised in October 2013.<sup>17</sup> The endorsement was followed by the Israel's first export agreements. They were consistent with the advice from the study, which recommended exporting first to Israel's immediate neighbours. The first agreements were signed between the explorer companies<sup>18</sup> and customers from Jordan and Palestine for small amounts. Subsequent agreements were signed with the operators of the liquefied natural gas (LNG) terminals in Egypt and constituted almost half of the Israeli export quota.<sup>19</sup>

The Republic of Cyprus (ROC), on the other hand, is a little slower in the development process, as it does not have natural gas in its energy mix yet and the export options are more limited due to the quantities discovered. The ROC has been planning to transform its infrastructure to switch from oil to gas, especially in electricity generation. The whole transformation of generation facilities, industry and domestic use is expected to lead to a consumption of around 1 bcm/yearly.<sup>20</sup> Such a low energy consumption would not financially support the production alone, but it allows most of the gas production to be exported. The ROC considers this opportunity as an economic breakthrough and plans to exploit its convenient location to become an energy hub.<sup>21</sup> However, the commencement of production is still ambiguous as the estimate gas resources are not sufficient for the proposed export projects.

Nevertheless, this picture may change due to upcoming explorations. The licence holders ENI SpA (ENI) and Korea Gas Technology Cooperation (KOGAS) have started drilling at a reservoir named "Onasagoras" in Block 9 as of the end of September and the first results are expected around the end of 2014.<sup>22</sup> Meanwhile, Noble Energy the explorer of the 12th Block and French energy firm Total S.A, the licence holder of the 10th and 11th Blocks plan to start drilling in mid-2015.<sup>23</sup>

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English/Subjects/Natural%20Gas/Pages/GxmsMniNGPolicyIsrael.aspx.

<sup>17</sup> Yifa Yaacov, "Court gives green light to gas export", in *The Times of Israel*, 21 October 2013, <http://toi.sr/1a2FKou>.

<sup>18</sup> The main explorer companies in the major gas fields of Israel (Tamar and Leviathan) are Noble Energy, Delek Group, Delek Drilling and Avner Oil, Ratio Oil Exploration, Isramco Negev 2 LP, Dor Gas Exploration. For further information see, Federation of Israeli Chambers of Commerce, *Overview of the Oil & Gas Industry in Israel*, March 2013, <http://www.chamber.org.il/Content.aspx?code=21782&nl=273>.

<sup>19</sup> For detailed information on the agreements, see Noble Press Releases, <http://investors.nobleenergyinc.com/releases.cfm>.

<sup>20</sup> Fiona Mullen, Alexander Apostolides and Mustafa Besim, "Cyprus Peace Dividend Revisited: A Productivity and Sectoral Approach", in *PRIO Cyprus Centre Reports*, No. 1/2014, p. 72, <http://www.prio.org/Publications/Publication/?x=7411>.

<sup>21</sup> "Cyprus can be a regional energy hub, says Minister", in *Famagusta Gazette*, 7 July 2014, <http://famagusta-gazette.com/cyprus-can-be-a-regional-energy-hub-says-minister-p24230-69.htm>.

<sup>22</sup> Elias Hazou, "Saipem Starts Drilling in Block 9", in *Cyprus Gas News*, 26 September 2014, <http://www.cyprusgasnews.com/archives/5810>.

<sup>23</sup> Noble Energy presentation at Barclays CEO Energy Power Conference, 2 September 2014, [http://files.shareholder.com/downloads/ABEA-2D0WMQ/2975341938x0x779016/4b4783f5-9627-4930-94b8-351da4f97a15/2014\\_09\\_Barclays\\_In%20Room.pdf](http://files.shareholder.com/downloads/ABEA-2D0WMQ/2975341938x0x779016/4b4783f5-9627-4930-94b8-351da4f97a15/2014_09_Barclays_In%20Room.pdf); "French Total Expects to Start Drilling

## 2. Will the South-Eastern Mediterranean gas head to the EU?

The EU adopted its energy diversification policy, including for gas supplies, even before the need became more vital. The crises between Russia and Ukraine, starting in the second half of the 2000s and deteriorating overtime, endangered Europe's main gas import route and proved the correctness of this policy, even if the steps thus far in this direction have remained insufficient.

The size of the joint gas projects of Russian Gazprom and the European energy majors and the long-term gas agreements of most of the European countries indicate that Europe's dependence on Russia will last for decades, notwithstanding the political controversies or divergences with the EU *acquis*.<sup>24</sup> This fact is also emphasized in the working document of The European Energy Security Strategy 2014 which touches on the current energy projects with the financial investment decisions taken.<sup>25</sup> Since it is more difficult to change suppliers in the short term, the diversification of transport routes is regarded as a temporary solution. The giant projects of the Nord-Stream with a capacity of 55 bcm/y and the South Stream with a capacity of 63 bcm/y are the results of this approach. The Nord-Stream<sup>26</sup> has been supplying gas to Germany since October 2012, while the South Stream<sup>27</sup> is expected to come on-stream in 2017, although not all aspects of this project have been finally resolved.<sup>28</sup>

Today, the need to complement the gas supplies from other suppliers is more acute than ever before. Thus, the EU is considering several alternatives as a remedy, starting with pipelines from the Caspian region. Meanwhile the LNG opportunities offered by several exporters such as Qatar<sup>29</sup> and upcoming North American exports are also regarded as options.<sup>30</sup>

In this framework the SEM discoveries are intriguing for the EU. Especially considering that one of the explorers is an EU member state going through economic difficulties; the EU is certainly interested in developments taking

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in Cyprus EEZ in mid-2015", in *Famagusta Gazette*, 6 March 2014, <http://famagusta-gazette.com/french-total-expects-to-start-drilling-in-cyprus-ezz-in-mid-p22543-69.htm>.

<sup>24</sup> For further information on the projects and the extended agreements see: <http://gazpromexports.com>.

<sup>25</sup> European Commission, *European Energy Security Strategy*, cit., p. 58-59.

<sup>26</sup> For further information see: <http://www.nord-stream.com>.

<sup>27</sup> For further information see: <http://www.south-stream.info/en>.

<sup>28</sup> "South Stream Bilateral Deals Breach EU Law, Commission Says", in *EurActiv*, 5 December 2013, <http://www.euractiv.com/node/269160>.

<sup>29</sup> Robert Tuttle and Anna Shiryaevskaya, "Qatar to Boost Europe LNG Sales as Gas Trades at 7-Year High", in *Bloomberg News*, 23 December 2013, <http://bloom.bg/1cpqxPK>. For further information see, Florence Gaub, "Gas Crisis in Europe and the Alternative Qatari Role", in *Al Jazeera Center for Studies Reports*, May 2014, <http://studies.aljazeera.net/en/reports/2014/05/20145665624846681.htm>.

<sup>30</sup> Yadullah Hussain, "How Europe is Turning to North America to wean itself off Russian Energy Exports", in *Financial Post*, 18 March 2014, <http://natpo.st/1ABjQp4>.

place in the offshore Mediterranean. This interest can easily be seen in the latest European Energy Security Paper released in May 2014, which posits the creation of a Mediterranean Gas Hub.<sup>31</sup>

Moreover, in 2013, three Eastern Mediterranean gas development projects were officially included in the Projects of Common Interest (PCI) List of the European Commission for the years 2014-20. The PCI List indicates the projects having significant benefits for at least two Member States, in regards to market integration, competition and enhancing the security of supply. Therefore, the PCIs are to receive faster and more efficient permit-granting procedures and privileged regulatory treatment.<sup>32</sup>

The Eastern Mediterranean gas projects concerned are:

1. The Mediterranean Gas Storage, envisaging an LNG Terminal in Cyprus for exporting Cypriot and Israeli gas, for an amount of 6 bcm/y initially.
2. The Eastern Mediterranean Pipeline, which projects subsea pipelines around 1,600 km in length, for connecting the Levantine gas fields to Greece with a capacity of approximately 8.5 bcm/y.
3. The Euro-Asia Electricity Interconnector for the construction of subsea cables and additional equipment in order to allow electricity trade between Greece-Cyprus and Israel, for an electrical capacity of 2000 megawatts.<sup>33</sup>

The PCI projects are eligible to receive financial support under the Connecting Europe Facility,<sup>34</sup> however, being in the list does not guarantee funding will be awarded for the investments. They have to be proved feasible for receiving the support.<sup>35</sup> So far, these alternatives have not been considered to be financially viable, according to several studies.<sup>36</sup>

Even though a gas pipeline via Turkey does not have a place in the current PCI List, the list is revised every two years and the Communication concerning the long-term infrastructure vision for Europe and beyond, states clearly that all options to transport gas from the Eastern Mediterranean to the EU should be considered and

<sup>31</sup> European Commission, *European Energy Security Strategy*, cit, p.16-17.

<sup>32</sup> European Commission, *Energy: Commission unveils list of 250 infrastructure projects that may qualify for €5.85 Billion of Funding (IP/13/392)*, 14 October 2013, [http://europa.eu/rapid/press-release\\_IP-13-932\\_en.htm](http://europa.eu/rapid/press-release_IP-13-932_en.htm).

<sup>33</sup> European Commission, *Full list of projects of common interest by country*, January 2014, [http://ec.europa.eu/energy/infrastructure/pci/doc/2013\\_pci\\_projects\\_country.pdf](http://ec.europa.eu/energy/infrastructure/pci/doc/2013_pci_projects_country.pdf).

<sup>34</sup> For further information on Connecting Europe Facility see, <http://inea.ec.europa.eu/en/cef/cef.htm>.

<sup>35</sup> European Commission, *Questions and Answers: Projects of Common Interest in Energy (MEMO/13/880)*, 14 October 2013, [http://europa.eu/rapid/press-release\\_MEMO-13-880\\_en.htm](http://europa.eu/rapid/press-release_MEMO-13-880_en.htm).

<sup>36</sup> For detailed information see, MIT Energy Initiative, *Interim Report for the Study Natural Gas Monetization Pathways for Cyprus. Economics of Project Development Options*, August 2013, <http://mitei.mit.edu/publications/reports-studies/interim-report-study-natural-gas-monetization-pathways-cyprus>; Fiona Mullen, Alexander Apostolides and Mustafa Besim, "Cyprus Peace Dividend Revisited...", cit.

evaluated according to their economic costs and benefits.<sup>37</sup> Accordingly, a project may be envisaged in the coming years.

The exportable amount from Israel and Cyprus needs a closer look at this point. The estimated Cypriot reserves are around 140 bcm, while the export amount decided by Israel is approximately 400 bcm.<sup>38</sup> If the estimated Cypriot gas consumption is also taken into account, the total amount remaining for export is around 500 bcm, which is far less than the average Russian production yearly.<sup>39</sup> Consequently, if all of the discoveries of Israel and ROC were to come on-stream in the coming years, the gas contribution from the fields would be around 20 bcm/y in a 25-year development plan. The amount roughly equates to 5 percent of the total EU gas imports,<sup>40</sup> which is not vital but only supplemental. Still even this scenario is not possible in many respects.

Firstly, even though the exploration studies and the deterioration of the relations between Israel and Turkey, led to a Greece-ROC-Israel rapprochement,<sup>41</sup> there is not an agreement for a common export policy between the countries. Therefore, the reserves should be evaluated separately.<sup>42</sup> Secondly the time frame of the development will differ among the fields. As of today the Tamar Field is heading for the second phase of exploitation and the Leviathan is expected to come on-stream by 2018.<sup>43</sup> Meanwhile, the predictions for the Aphrodite Field indicate late 2019 at the earliest.<sup>44</sup> Moreover, the agreements for the Leviathan Field reserves more than half of the export quota,<sup>45</sup> while the agreements for Tamar exceeds the reserved amount from current production and needs additional gas from the planned expansion.<sup>46</sup> If all the agreements are to be finalised, that leaves around 11bcm/y to be exported in total, 7 bcm/y to be supplied by Israel under a 25-year development plan.

<sup>37</sup> European Commission, *Long Term Infrastructure Vision for Europe and Beyond* (COM/2013/711), 14 October 2013, p. 7, <http://eur-lex.europa.eu/legal-content/en/TXT/?uri=celex:52013DC0711>.

<sup>38</sup> The calculation is based on the data from the EIA updated by the Noble Press Releases.

<sup>39</sup> BP, *Statistical Review of World Energy 2014*, cit.

<sup>40</sup> Ibidem.

<sup>41</sup> Theodoros Tsakiris, "Shifting Sands or Burning Bridges? The Evolution of Turkish-Israeli Relations after the Mavi Marmara Incident and the Strategic Energy Calculations of Greece & Cyprus", in *ELIAMEP Policy Papers*, No. 22 (February 2014), p.15-30, <http://www.eliamep.gr/?p=18780>.

<sup>42</sup> However, it should be stated that as the same companies are on the field for Israel and Cyprus, they are investigating if they can deliver more reserves from their Leviathan gas field for Cypriot terminal. See, "Next 6-12 Months 'Crucial' for Cyprus LNG Terminal", in *Financial Mirror*, 9 July 2014, <http://financialmirror.com/news-details.php?nid=32833>.

<sup>43</sup> Noble Energy presentation at Barclays CEO Energy Power Conference, cit., p.18-20.

<sup>44</sup> Noble Energy presentation at Analyst Conference, 17 December 2013, p. 150, [http://files.shareholder.com/downloads/ABEA-2D0WMQ/2975341938x0x714017/96d5af1f-ee87-485a-b49f-b31eaec0c6fd/2013\\_12\\_16\\_Analyst\\_Conference\\_In\\_Room\\_Combined\\_with\\_BREAK\\_SLIDE\\_\\_and\\_Appendix\\_Presentation.pdf](http://files.shareholder.com/downloads/ABEA-2D0WMQ/2975341938x0x714017/96d5af1f-ee87-485a-b49f-b31eaec0c6fd/2013_12_16_Analyst_Conference_In_Room_Combined_with_BREAK_SLIDE__and_Appendix_Presentation.pdf).

<sup>45</sup> The export quota for the Tamar and the Leviathan Field equals the half of the production, see, *ibidem*, p. 143.

<sup>46</sup> Ibidem.

There is another important fact that should be taken into account while considering the SEM gas as a supply to the EU. In Israel's current agreements, prices are mostly linked to the Brent crude-oil price,<sup>47</sup> consistent with traditional long-term gas contracts.<sup>48</sup> This linkage, which exists in most of the agreements of EU countries, is quite problematic because it makes it impossible to purchase gas at hub-based prices (the latter are set by the market conditions formed in gas trading hubs). Considering that some of the European countries succeeded to decrease the share of oil-indexation in their long-term gas contracts with Russia,<sup>49</sup> supplying the gas via long-term contracts linked to oil prices once more may not be so appealing.<sup>50</sup> On the other hand, the prices are determined on a contractual basis and the conditions may differ accordingly.

Consequently, despite the above-mentioned issues, gas from the Levant Basin may contribute to the EU gas supply, with at least some of the gas coming from an EU Member State and an important ally. However, the focus must be on finding a cost-effective method, as the amounts are currently too modest to finance a new energy corridor. The following sections focus on the options for transporting the gas from the region to the broader EU.

### 3. Traditional method for transport: pipelines

The majority of the EU gas trade is realised via pipelines which are laid down according to long-term agreements, as expected.<sup>51</sup> The EU customers are mostly<sup>52</sup> connected to producers from Russia, Norway and North Africa. As joining one of these connections is not possible, the SEM gas will need another pipeline route for transportation to the broader EU.

<sup>47</sup> Brent crude refers to the oil produced from North Sea and it is a major trading classification of sweet light crude oil. While it serves as a major benchmark price for purchases of oil worldwide it is also the major input in the long-term gas agreements, which causes the prices to be linked with the oil prices instead of real cost or market conditions.

<sup>48</sup> The price conditions can be reached at the Noble Press Releases concerning each agreement, <http://investors.nobleenergyinc.com/releases.cfm>.

<sup>49</sup> Anna Shiryayevskaya and Tino Andresen, "Gazprom Awaits Arbitration as RWE Gas Price Talks Stall", in *Bloomberg News*, 7 November 2012, <http://bloom.bg/VzKfQ3>; Anna Shiryayevskaya and Isis Almeida, "GDF Suez to Review Gazprom Gas Contract in Market Push", in *Bloomberg News*, 23 May 2014, <http://bloom.bg/1oV9HOH>.

<sup>50</sup> For detailed information on the gas pricing mechanisms and the EU gas prices see, Uwe Albrecht et al., *The Impact of the Oil Price on EU Energy Prices*, Brussels, European Parliament, February 2014, p. 33-62, [http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/518747/IPOL-ITRE\\_ET\(2014\)518747\\_EN.pdf](http://www.europarl.europa.eu/RegData/etudes/etudes/join/2014/518747/IPOL-ITRE_ET(2014)518747_EN.pdf); Robert Zadjler, *The Future of Gas Pricing in Long-Term Contracts in Central Eastern Europe. Global Market Trends Versus Regional Particularities*, Warsaw, Sobieski Institute, 2012, <http://www.sobieski.org.pl/the-future-of-gas-pricing>.

<sup>51</sup> BP, *Statistical Review of World Energy 2014*, cit.

<sup>52</sup> Greece is also connected to Azerbaijan via the first part of the Interconnector Turkey-Greece-Italy pipelines.

As mentioned previously, there is the Eastern Mediterranean Pipeline proposal to export gas from the region to the EU. However, this alternative is shelved due to many reasons, such as physical constraints or probable maritime disputes. Moreover, it would be one of the longest subsea pipelines and the export amounts may not be sufficient to finance this project.<sup>53</sup> Nevertheless this project may become viable in case of new discoveries offshore Cyprus or Greece<sup>54</sup> or due to technological developments.

Nonetheless, the first phase of the pipelines may be realised due to the gas supply tender opened by the ROC in 2014. Since the Aphrodite Field is not expected to come on-stream soon, the ROC decided to buy natural gas for electricity generation. The Leviathan partners<sup>55</sup> gave a bid for the tender including the construction of a pipeline from the Leviathan Field to Vasilikos. The results are to be announced around the end of 2014.<sup>56</sup>

The other considered route for transporting the gas to the EU, is building pipelines from the offshore fields to Turkey. Although Turkey has been claimed to be the cheapest alternative for exporting gas from the region,<sup>57</sup> it does not have a place in the present projects due to political challenges. However, as international relations are constantly in flux, this alternative deserves to be explored.

Firstly, it should be said that Turkey itself, might be a customer for the SEM gas, rather than an export route. It is one of the few large consumers in the region with an increasing demand and the domestic production meets less than 2 percent of its consumption. Consequently, Turkey is heavily dependent on imports. Even if it has diversified suppliers overtime, its main supplier continues to be Russia. Russia accounts for almost 58 percent of Turkish gas imports as of 2013, with almost half of this gas coming via Ukraine.<sup>58</sup> Additionally, Russia, together with Turkey's other main supplier, Iran, are the most expensive sources for Turkey. Therefore, the need for diversification and the desire to decrease its gas bill mean Turkey is

<sup>53</sup> The Eastern Mediterranean Gas Pipeline would be over 1000 km and cost is expected to be around 20 billion dollars according to several studies: Theodoros Tsakiris, "Shifting Sands or Burning Bridges?", cit., p. 56-58; Ayla Gürel, Fiona Mullen and Harry Tzimitras, "The Cyprus Hydrocarbons Issue: Context, Positions and Future Scenarios", in *PRIO Cyprus Centre Reports*, No. 1/2013, p. 83-85, <http://www.prio.org/Publications/Publication/?x=7365>.

<sup>54</sup> "25 Companies are interested in natural gas and oil in Crete", in *ChaniaPost.eu*, 3 October 2014, <http://chaniapost.eu/?p=7353>.

<sup>55</sup> Leviathan Partners are currently Noble Energy (39.66%), Delek Drilling (22.67%), Avner Oil Exploration (22.67%) and Ratio Oil Exploration (15%).

<sup>56</sup> Elias Hazou, "High Price for Israeli Gas, Reports Say", in *Cyprus Mail*, 12 May 2014, <http://cyprus-mail.com/?p=24337>.

<sup>57</sup> Ayla Gürel, Fiona Mullen and Harry Tzimitras, "The Cyprus Hydrocarbons Issue...", cit. p. 84-86; MIT Energy Initiative, *Interim Report for the Study Natural Gas Monetization Pathways for Cyprus*, cit., p.75-77; Fiona Mullen, Alexander Apostolides and Mustafa Besim, "Cyprus Peace Dividend Revisited...", cit., p. 71-74.

<sup>58</sup> Energy Market Regulatory Authority (EMRA), *Doğal Gaz Piyasası Sektör Raporu 2013* (Natural Gas Market Report 2013), 2014, p. 24, <http://www.epdk.org.tr/index.php/dogalgaz-piyasasi/yayinlar-raporlar>.

open to alternatives. Accordingly there is a strong possibility that the Levantine gas would be consumed domestically by Turkey rather than being transported to the EU. On the other hand, Turkey has framework gas buying agreements with other producers.<sup>59</sup> If these agreements satisfy Turkish energy needs, directing the SEM gas to the European countries may be appealing for Turkey because it would strengthen its position as an energy bridge and provide political leverage.

The second question in this scenario is the capacity constraints. The gas would probably enter the country from Mersin or Ceyhan and the pipeline can easily be connected to the Boru Hatları ile Petrol Taşımacılık A.Ş. (BOTAŞ) transmission system. However, the system is working full capacity in winter. So it would need expansion for hosting additional amounts.<sup>60</sup> The existing connections to Greece and Bulgaria also cannot be used without further investments. The Greece-Turkey interconnection is working at full capacity and the current Bulgarian-Turkish interconnection needs reverse flow adjustments for exports. Fortunately, there are companies who were awarded licences to export gas to Macedonia and Bulgaria from Turkey, which indicates further investments in that direction.<sup>61</sup> Furthermore, the MOU for Bulgaria-Turkey interconnection was signed in 2014 and is planned to be completed in 2015. If the BOTAŞ transmission system is decided to be used for the SEM exports, the required investments can be provided by the related parties and later paid for by the transport fees.

The alternative route for transporting the gas to Europe via Turkey is the Southern Gas Corridor project. The first steps of this plan are the Trans-Anatolian Pipeline (TANAP)-Trans-Adriatic Pipeline (TAP) Projects, in order to bring Caspian gas to Europe.<sup>62</sup> Both projects are planned suitable for capacity increases.<sup>63</sup> The initial capacity of the TANAP project is 16 bcm/y, but it is expected to be increased to 24 bcm/y by 2023 and to 31 bcm/y by 2026. Azerbaijan has a growing natural gas demand and it also exports gas to its neighbours.<sup>64</sup> Therefore, the pipelines may

<sup>59</sup> Such as Iraq (Kurdistan Regional Government) and Turkmenistan. For further information on these agreements, see, General Energy, Operations: Kurdistan Region of Iraq, <http://www.genenergy.com/operations/kurdistan-region-of-iraq.aspx>, Turkey, *Law No. 4466 of 3 November 1999* (in Turkish), <http://www.tbmm.gov.tr/kanunlar/k4466.html>. Additionally, it should be mentioned that, according to the intergovernmental agreement between Turkey and Azerbaijan concerning the TANAP project, Turkey has priority rights on buying additional amounts to be supplied from the Shah Deniz 2 production.

<sup>60</sup> BOTAŞ, *e-Bulletin* (in Turkish), <http://ebulten.botas.gov.tr/maxKapasite.aspx>.

<sup>61</sup> Energy Market Regulatory Authority (EMRA), *Doğal Gaz Piyasası Sektör Raporu 2013*, cit. p. 31.

<sup>62</sup> The TANAP will carry the 16 bcm gas/yr from Azerbaijan via Georgia and Turkey to the EU. 6 bcm of this gas will be consumed in Turkey while the 10 bcm will be carried through the EU by the TAP project. TAP project is planned to end in Italy. The contracts are signed in order to supply 1 bcm/y to Greece and Bulgaria and 8 bcm/y to Italy to be transported to adjacent markets. TANAP is to come on-stream in 2018 and TAP in 2020.

<sup>63</sup> TAP, *TAP at a Glance*, <http://www.tap-ag.com/the-pipeline>; TANAP, *Environmental Impact Assessment Application File*, March 2013, [http://www.tanap.com/en/wp-content/uploads/2013/03/TANAP\\_EIA\\_Application\\_File-1.pdf](http://www.tanap.com/en/wp-content/uploads/2013/03/TANAP_EIA_Application_File-1.pdf).

<sup>64</sup> BP, *Statistical Review of World Energy 2014*, cit.; "Azerbaijan's SOCAR to lower gas exports in 2014", in *Reuters*, 19 May 2014, <http://uk.reuters.com/article/2014/05/19/azerbaijan-gas-exports->

have surplus capacity to host additional amounts from other producers.<sup>65</sup>

Other questions over the TANAP pipelines are third party access and determination of the tariffs. Even though Turkish Natural Gas Market Law (NGML) enforces third party access to the transmission, distribution, LNG and storage systems, the inter-governmental agreement between Turkey and Azerbaijan exempts TANAP from this obligation.<sup>66</sup> The exemption gives the TANAP company<sup>67</sup> jurisdiction over third party access and the tariffs. This situation if considered together with the oil-linked gas prices of the current agreements of Israel may overshadow the attraction of the SEM gas.

Still, if surplus capacity is available in the pipelines, it may be available for the SEM exporters as they have considerable relations with Azerbaijan. Israel is among Azerbaijan's top trading partners. Azerbaijan is the top oil supplier to Israel and it, in turn, imports military equipment and know-how. Additionally, the first operation of State Oil Company of Azerbaijan Republic (SOCAR) outside the Caspian Sea is one of the Israeli offshore oil fields.<sup>68</sup> And it should be mentioned that SOCAR now owns the transmission company of Greece National Natural Gas System Operator S.A., (DESFA). Therefore, allowing Israeli or Cypriot gas would not only be a bright political move but also provide economic benefits both via the TANAP and DESFA pipelines.

The Turkish route, either via the current system or the planned pipelines, would be directing the gas to the countries with high dependency on Russian gas coming via Ukraine. The gas can head to Greece or Bulgaria and easily be directed to other south-east European countries via interconnections.<sup>69</sup> However, despite all these advantages, the Turkish route cannot be explicitly considered in the current plans because of the significant problems Turkey has with the supplier countries.

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<sup>65</sup> BP, *Shah Deniz Stage 2*, [http://www.bp.com/en\\_az/caspian/operations/projects/Shahdeniz/SDstage2.html](http://www.bp.com/en_az/caspian/operations/projects/Shahdeniz/SDstage2.html).

<sup>66</sup> Intergovernmental Agreement between Turkey and Azerbaijan Concerning the TANAP, art. 7.4. The TAP project is also exempted from the EU acquis, see, European Commission, *Decision on the exemption of the Trans Adriatic Pipeline from the requirements on third party access, tariff regulation and ownership unbundling ...* (C(2013)2949), 16 May 2013, [http://ec.europa.eu/energy/infrastructure/exemptions/doc/doc/gas/2013\\_tap\\_decision\\_en.pdf](http://ec.europa.eu/energy/infrastructure/exemptions/doc/doc/gas/2013_tap_decision_en.pdf).

<sup>67</sup> TANAP company consists of two shareholders as of today, SOCAR (70%) and BOTAŞ (30%). However BP agreed to buy the 12 percent of SOCAR's share and will become the third shareholder after the legal procedure is completed, which is expected to happen before the end of 2014. Source: "BP to become member of TANAP pipeline project before the end of 2014", in *Reuters*, 27 October 2014, <http://uk.reuters.com/article/2014/10/27/uk-azerbaijan-tanap-idUKKBN0IG1SK20141027>.

<sup>68</sup> Brenda Shaffer, "Azerbaijan's Cooperation with Israel Goes Beyond Iran Tensions", in *Policywatch*, No. 2067 (April 2014), <http://www.washingtoninstitute.org/policy-analysis/view/azerbajians-cooperation-with-israel-goes-beyond-iran-tensions>.

<sup>69</sup> Greece and Albania is to be connected via TAP, Bulgaria is already connected to Romania and Macedonia and Bulgaria-Serbia interconnection is to be completed in the medium term.

Turkish-Israeli relations started to deteriorate after Hamas took over Gaza in 2007 and took a blow with the Davos incident in 2009 following the Operation Cast Lead in December 2008. The relations downgraded diplomatically after the Mavi Marmara raid, which caused the death of nine Turkish citizens in 2010. Turkey has set three conditions in order to normalise relations. Firstly, an apology had to be made for the raid. Secondly, families of the victims should be paid compensation. Lastly, the Gaza Siege had to be ended. As Israel was claiming that the raid was self-defense, none of these conditions were met, until the US President Barack Obama visited Israel in 2013. The apology came at the end of this visit and the first condition was met clearly after the US efforts.<sup>70</sup> The negotiations on the compensation amount have started after the first condition was met. Even though talks continued at a slow pace, they were almost concluded in the spring of 2014. Additionally, the last condition was revised as allowing the entrance of humanitarian aid to Gaza.<sup>71</sup> Even though there was a court decision from Istanbul ordering the arrest of the Israeli soldiers involved, the decision was not seen as an obstacle to the process.<sup>72</sup> Therefore, it can be said that before the latest operation, Operation Protective Edge in July 2014, rapprochement was almost sealed.

Encouraged by this course of events, several firms were making feasibility studies and meeting with the explorers of the region. Additionally, the average production cost and the probable gas prices were reportedly determined. Even though the gas prices are supposed to be confidential, they were reported by the newspapers to be much lower than the Turkey's current export prices.<sup>73</sup>

However, things changed course immediately after Operation Protective Edge, which was launched by Israel in July 2014. The harsh declarations from each side damaged relations and reversed the normalisation process. Predictably, these developments affected the idea of a gas route to be built between the countries. While then-Prime Minister Recep Tayyip Erdoğan announced that the normalisation was not possible in the near future,<sup>74</sup> the energy minister of Turkey, Taner Yıldız, announced that Turkey closed its doors for the Israeli gas and will keep them closed until the situation in Gaza improves.<sup>75</sup>

<sup>70</sup> Theodoros Tsakiris, "Shifting Sands or Burning Bridges?", cit., p.7-8.

<sup>71</sup> Arad Nir, "Netanyahu Stalls on Reconciliation Process with Turkey", in *Al-Monitor*, 8 May 2014, <http://almon.co/22ur>.

<sup>72</sup> AFP, "Ya'alon: Israel 'not happy about' Turkey arrest move" in *Times of Israel*, 28 May 2014, <http://toi.sr/1mq49GL>.

<sup>73</sup> "Israel, Turkey step up gas export negotiations", in *Today's Zaman*, 19 February 2014, <http://www.todayzaman.com/news-339887-israel-turkey-step-up-gas-exports-negotiations.html>.

<sup>74</sup> "Başbakan Erdoğan'dan Flaş İsrail Açıklaması", in *Cumhuriyet*, 13 July 2014, <http://www.cumhuriyet.com.tr/haber/siyaset/93751>.

<sup>75</sup> Sharon Udasin, "Turkey forbids completion of gas deal with Israel until peace with Gaza achieved", in *The Jerusalem Post*, 6 August 2014, <http://www.jpost.com/Enviro-Tech/Report-Turkey-forbids-completion-of-gas-deal-with-Israel-until-peace-with-Gaza-achieved-370192>.

Even though cease-fire was achieved shortly after these announcements, the situation made clear that an Israel-Turkey pipeline cannot be considered as a reliable prospect in the short term. The alternative cannot be ruled out permanently since an energy corridor in the region would be incomplete without these actors. But the mutual distrust must be overcome in order to envisage energy cooperation.

Turkey's problems with the ROC are even more complex. Cyprus has been a point of dispute from the foundation of the Republic of Cyprus in 1960. After Turkey's intervention in 1974 following the Greek coup aimed at annexation of the island, the problems changed form. Greek Cypriots continued to administer the Republic of Cyprus and Turkish Cypriots founded the Turkish Republic of Northern Cyprus (TRNC) in 1983. The TRNC is recognised only by Turkey. Since then there have been several initiatives for providing a permanent settlement but none of these initiatives have succeeded. The offshore gas exploration complicated the conflict further as it aggravated the sovereignty discussions over the sea.<sup>76</sup>

The ROC, administered by Greek Cypriots, is not recognised by Turkey in its present form. Every step it has taken on the delineation of the maritime borders has been contested by Turkey. Firstly, Turkey's continental shelf in the Eastern Mediterranean overlaps with several Cypriot gas blocks. After the tender announcement, Turkey made clear that it would not allow any activity in this area. Consequently, these blocks either coincidentally or on purpose were not licensed. Other opposition derives from the belief that both communities have rights over the offshore hydrocarbon reserves. Turkey and the TRNC urged the ROC to cease offshore exploration activities until a permanent solution is found. They also made a proposal to the UN to form a joint commission for deciding the future of the hydrocarbon resources and revenues. After this proposal was rejected by the ROC, Turkey and the TRNC signed an agreement for maritime delimitation and Turkish Petroleum Company was awarded a licence for offshore explorations.<sup>77</sup>

The energy discoveries, however, were a major factor behind the US-championed re-launch of the negotiation over the Cyprus issue in February 2014.<sup>78</sup> This claim is supported by the ROC President Nicos Anastasiades' statement that the growing interest in the accords is based on the possibility for energy cooperation. He also mentioned the possibility of a pipeline to Turkey for the first time just a few days after the negotiations were resumed.<sup>79</sup> Due to the current expected volumes the Cyprus-Turkey pipeline may be the only economically viable alternative for Cypriot gas. Additionally, this route is the only one that would pass through the island from

<sup>76</sup> Elif Burcu Günaydın, "The Potential Role of Turkey in the Emerging South Eastern Mediterranean Corridor", in *IAI Working Papers*, No. 14/05 (March 2014), p.14, <http://www.iai.it/content.asp?langid=2&contentid=1078>.

<sup>77</sup> *Ibidem*, p.15.

<sup>78</sup> "Our View: Energy and Alliances Behind US Involvement", in *Cyprus Mail*, 9 February 2014, <http://cyprus-mail.com/?p=18387>.

<sup>79</sup> Menelaos Hadjicostis, "Cyprus President Trumpets Energy Boost for Turkey", in *AP News*, 17 February 2014, <http://apne.ws/ZGNlpV>.

south to north and provide investment for supplying gas to the whole island.<sup>80</sup>

At a September 2014 meeting, the two Cypriot leaders signaled the intention to accelerate the pace of the negotiation.<sup>81</sup> Notwithstanding, in October 2014, new drilling operations sparked the conflict on the sovereignty issues once more. While Turkey urged the ROC to refrain from unilateral acts on the hydrocarbon resources, the ROC announced that the negotiations cannot be conducted under these circumstances and decided to halt the negotiation process.<sup>82</sup> These developments, while not irreversible, are certainly unnerving. The effects remain to be seen in the coming days.

The economic benefit argues in favor of the options that include Turkey in the picture. Additionally Israel and Turkey certainly need a political breakthrough in regards to foreign policy. On the other hand, energy policy is a vital decision for the countries and relations have to be normalised or at least stabilised in order to achieve this alternative.

## 4. Alternative methods for transport

### 4.1 Rising trend: liquefied natural gas

The liquefied natural gas (LNG) trade is a rising trend in the world. As of 2013, 30 percent of the world gas trade was made via LNG.<sup>83</sup> This share is to increase in the coming years due to technological developments, discoveries and the vast LNG terminal investments planned all over the world.<sup>84</sup>

LNG trade is the only alternative for some countries with limited pipeline options and provides more flexibility than pipelines. Nevertheless, it also has negative aspects that are hard to ignore. Firstly, LNG terminals are high cost investments and may require guaranteed customers in order to be financed. Also, as LNG terminals use 12 percent of the production in the process, it can be considered ineffective, especially for modest reserves. Additionally, the LNG investments take more time to be completed than regional pipelines. There are many projects that have been carried out and are expected to come on-stream in the near-term. Therefore, by the time the Eastern Mediterranean exporters complete their investments, the

<sup>80</sup> Fiona Mullen, Alexander Apostolides and Mustafa Besim, "Cyprus Peace Dividend Revisited...", cit., p. 72-74.

<sup>81</sup> Statement of Mr. Eide Special Adviser of the Secretary-General following his meeting with Cypriot Leaders, 17 September 2014, [http://www.uncyprustalks.org/nqcontent.cfm?a\\_id=6605](http://www.uncyprustalks.org/nqcontent.cfm?a_id=6605).

<sup>82</sup> AP, "Cyprus halts unity talks with Turkey", in *Al-Jazeera*, 7 October 2014, <http://aje.me/ZrXiqV>.

<sup>83</sup> BP, *Statistical Review of World Energy 2014*, cit.

<sup>84</sup> Global LNG, *World's LNG Liquefaction Plants and Regasification Terminals*, updated September 2014, <http://www.globallnginfo.com/world%20lng%20plants%20&%20terminals.pdf>.

promising LNG market might be already taken up by the larger producers.<sup>85</sup>

Nonetheless, LNG exports have been considered by the explorer countries from the beginning, especially by the ROC. It has been planning to build an LNG terminal on the southern shore of the island. The terminal would consist of one liquefaction train with capacity of 5 million tons of LNG (6.8 bcm)/y initially to be expanded to 15 million tons (20 bcm)/y in the case of further discoveries.<sup>86</sup> However, this project is admitted to be infeasible even by the Energy Minister of the ROC, Yiorgos Lakotyrtiptis, in addition to several studies referenced above.<sup>87</sup> The explorer companies also do not consider it financially viable. Although almost all of them have MOUs with the government for the LNG project, they are only to be carried out in case of new discoveries.

Proposed Israeli LNG exports have faced questions regarding territorial constraints, environmental issues and security concerns. Notably, the cancellation of an agreement with one of the global LNG players, Woodside Petroleum Ltd., indicates the LNG project is shelved for now.<sup>88</sup> Additionally, if the current sales agreements are finalised, the remaining amount may not be sufficient to finance the LNG terminal, even if the market conditions are favorable.

The Floating LNG terminal (FLNG) has been proposed as a cost-effective alternative for offshore developments for smaller resources and depleting reserves. It would also be convenient as it does not require onshore facilities and it is regarded to be considerably cheaper and faster than an onshore LNG terminal facility.<sup>89</sup> However, especially for Israel the security issue is always a high concern in regards to FLNG. Moreover, the FLNG terminal is a brand-new technology and the first one is planned to come on-stream in 2016.<sup>90</sup> Therefore waiting for the planned FLNG terminals to commence operation seems more rational than investing in such a risky project without vast reserves.

The receiving end of the LNG trade is also important in this assessment. The regasification capacity of the EU is around 200 bcm/y and planned to reach to 275

<sup>85</sup> International Energy Agency (IEA), *Resources to Reserves 2013*, Paris, IEA, 2013, p. 103-106.

<sup>86</sup> Vasilikos Energy Center, *Natural Gas*, <http://www.mcit.gov.cy/mcit/mcit.nsf/b1d9808b11a79c45c2256e6600488e3a/02b6e904de1dc822c2257b2100257b20?OpenDocument>.

<sup>87</sup> "Deutsche Bank eyes Cyprus LNG Terminal Funding", in *Financial Mirror*, 24 April 2014, <http://www.financialmirror.com/news-details.php?nid=32421>.

<sup>88</sup> Sharon Udasin, "Woodside Terminates Leviathan Deal", in *The Jerusalem Post*, 21 May 2014, <http://www.jpost.com/Business/Business-News/Woodside-terminates-Leviathan-deal-352893>.

<sup>89</sup> IEA, *Resources to Reserves 2013*, cit., p. 110.

<sup>90</sup> The world's first FLNG terminal Project is being constructed in Australia mainly by Shell, while another project by Petroliam Nasional Berhad (Petronas) in Malaysia is expected to come on-stream before. KOGAS, one of the license holders in Cypriot Blocks and Technip S.A the researcher on the Cypriot LNG possibilities have place in these projects. For further information see, 2b1st Consulting, Shell and Petronas to Race on floating LNG, 7 June 2012, <http://www.2b1stconsulting.com/?p=4489>.

bcm by 2022, according to the latest Communication on the energy security.<sup>91</sup> An increase of the re-gasification capacity is described as one of the ways to provide supply diversification. However, most of the available capacity is located in the west and south-west of Europe. These countries such as France and Spain already have diversified sources and their dependency on Russian gas is already lower than the Central or Eastern European countries.<sup>92</sup>

Therefore, some adjustments should be made in order to make the most of these resources. Firstly, the interconnectivity of transmission systems should be completed as planned. Secondly, as the gas would be flowing from the south-western countries, instead of the eastern route, the reverse flow investments must be completed, in order to send the additional amounts to the vulnerable states.

There are two projects that are more important in regards to the SEM cargoes. One of them is the Austria reverse flow modifications, which have been completed in 2011, regarding the connections between Baumgarten and the import pipelines known as the Hungary-Austria Gas Pipeline (HAG) and Trans-Austria Gas Pipeline (TAG). These connections allow the use of the Italian LNG terminals as a new trading route and a precaution in case of a disruption.<sup>93</sup> The other one is the ES-FR "Midcat" interconnector project that enables bi-directional flows between France and Spain. This project allows Spain to send gas north; so it would be important in order to send the SEM LNG to Central Europe. This project also has a place in the PCI List and is planned to be completed in 2020. However, the feasibility studies are being conducted and there is no definite timeframe for this project as yet.<sup>94</sup>

Additionally, as Greece has a high probability to host the facilities from which the LNG cargoes would be directed from the SEM, the investments to flow gas from Greece to Bulgaria and further are also highly important to provide flexibility to these markets.<sup>95</sup>

There is, however, a way of transporting the SEM gas to the EU as LNG other than exporting it directly from countries in the Levant. The agreements between the explorer companies of Israel and the operators of the under-utilised Egyptian LNG terminals will probably see the SEM gas heading to Europe.

Egypt used to supply the EU via the LNG terminals built during the 2000s. However, the EU exports have declined significantly due to the stagnating production and

<sup>91</sup> European Commission, *European Energy Security Strategy*, cit., p. 53.

<sup>92</sup> Ibidem; BP, *Statistical Review of World Energy 2014*, cit.

<sup>93</sup> European Commission, *European Energy Security Strategy*, cit., p. 48.

<sup>94</sup> European Network of Transmission System Operators-Gas (ENTSO), *Ten Year Network Development Plan 2013-2022, TYNDP 2013-2022 - Annex A: Infrastructure Projects Corrigendum*, 10 July 2013, p. 137, <http://www.entsog.eu/publications/tyndp#entsog-ten-year-network-development-plan-2013-2022>.

<sup>95</sup> Ibidem.

increasing domestic consumption.<sup>96</sup> The remaining cargoes from Egypt mostly headed to Asia where they could obtain better prices.<sup>97</sup> Consequently, Egypt was faced with paying compensation to the shareholders for not meeting its export liabilities. At the beginning of 2014, BG Group declared force-majeure in regards to the Idku facility, as it did not have enough gas to operate.<sup>98</sup> Meanwhile, ENI filed a complaint to the International Chamber of Commerce (ICC), for the Damietta terminal, claiming that Egyptian Natural Gas Holding Company (EGAS) did not provide the contracted supplies for the exports.<sup>99</sup>

In this framework the Israeli-Egyptian gas trade promised a solution for both parties. The agreements are expected to be approved by both governments and finalised by the end of 2014. Israeli-Egyptian relations, which had deteriorated under the brief spell in power of the Muslim Brotherhood in Cairo, improved significantly after General Abdel Fattah El Sisi became president in early 2014 and were further strengthened during Israel's Operation Protective Edge in Gaza, in July 2014.<sup>100</sup> The energy minister of Egypt declared that the outcome will be positive as the need is urgent for both sides and the agreements are not inter-governmental agreements but will be signed between companies.<sup>101</sup>

The gas exports from Israel to Egypt will be pipeline gas trade for Israel, but in order to fulfill Egypt's contractual obligations, they will be probably shipped to European customers as LNG. The production from the Idku LNG Terminal is reserved for its European shareholders for 20 years.<sup>102</sup> The Damietta LNG Terminal reserves 60 percent of the production for Union-Fenosa Gas,<sup>103</sup> while the remaining amount is bought by the state-owned Egyptian company.<sup>104</sup> Consequently these new agreements may redeem the exports to the EU from Egypt, but they cannot be considered as new supplies.

<sup>96</sup> The EU exports have decreased to 3.7 bcm/y in 2013 from the amount of 13.61 bcm/y in 2007, while the export amounts dropped 10 bcm/y in six years, due to the increasing consumption. Source: BP, *Statistical Review of World Energy* for the years 2007 to 2014.

<sup>97</sup> For instance, 3 bcm of the total 3.7 bcm to be exported headed to Asia in 2013. Source: BP, *Statistical Review of World Energy 2014*, cit.

<sup>98</sup> Alex Forbes, "Egypt's worsening gas crisis takes its toll on BG", in *Gastech News*, 31 January 2014, <http://www.gastechnews.com/lng/egypts-worsening-gas-crisis-takes-its-toll-on-bg>.

<sup>99</sup> Miguel Jiménez, "Gas Natural, ENI file suit over stoppage of Egyptian Gas Plant", in *El País English*, 3 March 2014, [http://elpais.com/elpais/2014/03/03/inenglish/1393848770\\_325514.html](http://elpais.com/elpais/2014/03/03/inenglish/1393848770_325514.html).

<sup>100</sup> Tom Kutsch, "In Israel operation in Gaza, a clear sign of Egypt's distaste for Hamas", in *Al-Jazeera America*, 18 July 2014, <http://alj.am/1oNK2SR>.

<sup>101</sup> Mohamed Ayyad, "No shame in Egypt using Israeli gas through British Oil Company, after state's approval: Petroleum minister", in *Daily News Egypt*, 6 July 2014, <http://shar.es/1Xj7mz>.

<sup>102</sup> The production of Train-1 is reserved for GDF Suez S.A while Train-2 is reserved for the British Group. See BG Group, *Egypt*: <http://www.bg-group.com/databook/2014/27/where-we-work/egypt>.

<sup>103</sup> Union Fenosa Gas is a partnership of Italian ENI and Gas Natural Fenosa of Spain; it holds a share of 80 percent of the Spanish Egyptian Gas Company and the Damietta LNG Terminal.

<sup>104</sup> Tracy Rucinski, "Damietta LNG plant files complaint against Egypt's EGAS", in *Reuters*, 24 April 2013, <http://www.reuters.com/article/2013/04/24/egypt-gas-idUSL6N0DB30820130424>.

Cyprus is also considering using Egyptian LNG terminals for gas exports in the first place. The two countries have cooperation agreements on offshore hydrocarbon developments and the ties are strong concerning energy issues. Cypriot Energy Minister announced the country's intention to export to Egypt in case of new findings in August 2014.<sup>105</sup> Therefore, Cypriot gas may contribute to the EU gas supplies via Egyptian LNG terminals.

However, by the time additional discoveries are made in offshore Cyprus and the pipeline connection is completed, the need for gas in Egypt may be eased due to Israeli imports.<sup>106</sup> Additionally, explorations are being carried on in the Nile Delta region and the companies involved plan to increase production.<sup>107</sup> Also due to a major decrease in the energy subsidies there has been a significant increase in the natural gas price, which may slow down the growth of domestic consumption.<sup>108</sup>

Consequently, the LNG exports from the SEM producers will not be available in the short term, except for the redeemed Egyptian LNG exports, which are already reserved for the shareholders with long-term agreements.

### 4.2 Benefits of new technology: compressed natural gas

Compressed natural gas (CNG) is another alternative for gas trading, although it is mostly used domestically rather than for exports. CNG investments are said to be technically less complicated, lower-cost, energy-efficient and have shorter development periods compared to the LNG facilities or pipelines. Also CNG exports may be more flexible according to the assets, market location, reservoir size and production profile.

According to the latest Resources and Reserves study of the IEA, CNG projects would be convenient economically if the distance involved is less than 2,000 km and the amount is under 5 bcm/y.<sup>109</sup> This kind of an assessment brings the CNG method to the table for the SEM gas exports. As Israel has larger quantities and already took its decision for regional exports for its production in the first phase, Cyprus may be a more proper candidate for CNG projects. The introduction of new vessels, which do not need a Floating Production Storage Offloading (FPSO) facility, makes the floating CNG option possible for small reserves.<sup>110</sup> Also the inventor of this technology, the Canadian Sea NG Corp., hints that it is interested in Cypriot

<sup>105</sup> "Lakkotrypis in Egypt for talks on hydrocarbons", in *Cyprus Mail*, 18 August 2014, <http://cyprus-mail.com/?p=30994>.

<sup>106</sup> Israeli imports reserve 11.2/y of 16.7/y LNG capacity of the terminals.

<sup>107</sup> "Egypt's gas production to increase 500 mcf per day", in *Ahram Online*, 12 June 2014, <http://english.ahram.org.eg/News/103514.aspx>.

<sup>108</sup> Amer Thiab al Tamimi, "Egypt decides to cut subsidies", in *Al-Monitor*, 27 July 2014, <http://almon.co/25av>.

<sup>109</sup> IEA, *Resources to Reserves 2013*, cit., p.114-116.

<sup>110</sup> Sea NG, *Coselle System Overview*, <http://www.coselle.com/coselle-system/overview>.

reserves.<sup>111</sup>

The position is convenient for European markets as well as North Africa or Turkey. An onshore CNG facility and the pipelines to the shore may be ready until the Aphrodite Field comes on-stream. Meanwhile, an offshore CNG facility will not require pipelines to shore and enable the gas to be exported directly from the field. The production may head to Greek generation facilities located in the coast. While contributing to Greece's supply diversification it could also be the first step to monetise the reserves and help finance further investments.

Nevertheless, there are several negative aspects that should also be mentioned. In contrast to LNG trading, CNG trading does not have the advantage of the "economies of scale".<sup>112</sup> While it has visible cost advantages concerning the infrastructure at both the sending and the receiving ends, the shipping costs constitute the largest share of the process. So, if further explorations were to result in discoveries soon, the additional amounts would increase the costs instead of profits.<sup>113</sup> In this case the CNG exports may only be considered as an interim solution. Moreover, the exporters may avoid trying this new method without a qualified partner included in the project or until the first results from the other initiatives.<sup>114</sup>

### 4.3 Sub-sea electricity cables

As natural gas is cleaner and more efficient than other energy sources, its share in electricity generation is rising.<sup>115</sup> This concept makes electricity generation another alternative for utilising the natural gas reserves. In this framework a project for exporting gas via electricity is introduced for the SEM gas exports as mentioned above.

The Euro-Asia Interconnector project plans a submarine electricity cable from Israel to Cyprus, Crete and the Greek mainland, in order to export 2,000 megawatts. The first stage is projected to start in 2018, while the second stage is planned for 2020. The project envisages a connection that can be operated both ways, in order to end the energy isolation of the Greek islands and Israel.<sup>116</sup>

<sup>111</sup> Robert Peck, "Canada seeks involvement in Cyprus offshore hydrocarbons sector", in *Financial Mirror*, 13 March 2014, <http://www.financialmirror.com/news-details.php?nid=32151>.

<sup>112</sup> Economies of scale basically refers to the cost advantage that arises with increased output of a product.

<sup>113</sup> IEA, *Resources to Reserves 2013*, cit., p. 115.

<sup>114</sup> Indonesia will be the first to utilise this method as it ordered the first CNG marine to China. It is expected to commence operation in 2016. Marcus Hand, "Indonesia's PT PLN Orders World's First CNG Carrier in China", in *Sea-Trade Global*, 29 July 2014, <http://www.seatrade-global.com/fw3w>.

<sup>115</sup> IEA, *Key World Energy Statistics 2014*, p. 24, <http://www.iea.org/publications/freepublications/publication/key-world-energy-statistics-2014.html>.

<sup>116</sup> Ayla Gürel, Fiona Mullen and Harry Tzimitras, "The Cyprus Hydrocarbons Issue...", cit., p. 88.

The ministers of Israel, the ROC and Greece have signed an MOU in 2012 followed by another in 2013, emphasising their commitment to the Euro-Asia interconnector project. Nevertheless, the MOU is ambiguous about concrete steps forward.<sup>117</sup>

There are financial and physical constraints in the way. DEH-Quantum Energy Ltd will build the interconnection at an estimated cost of \$1.5 billion for the project. This cost is just for laying down the cables. Certainly this kind of an export route will need new generation facilities in order to create the surplus capacity and this will incur additional costs. The expected revenues for the proposal are much lower than the potential profits to be made from gas trading. Additionally, the subsea depths of the route and the total distance involved make the route more challenging.<sup>118</sup> Consequently, the feasibility studies carried out on this project do not consider it an economic alternative for the time being.

### Conclusion

The SEM gas corridor is an ideal to be created. It has great potential for increasing the welfare of the regional countries and also provides a reliable energy market for the western customers. However, there is a long way ahead before it can be regarded as a considerable supplier for the EU.

As examined in detail above, the Turkish route would be the most convenient way for the exports to the EU. The challenges on the capacity constraints may be overcome by the time the production commences and as Turkey plans to receive gas from several other suppliers it may act as a transport route in the coming years. The Turkish route has additional advantages as it provides investment for gasifying the whole island of Cyprus and there are several companies ready to invest in carrying gas from Israel. However, this bright promise is not enough to overcome all the difficulties. Energy policy is of vital importance for the countries and political will is required to build the right atmosphere for this kind of development.

The alternative routes, on the other hand, seem problematic in both technical and financial aspects. The pipelines need additional supplies or drastic technological developments to become economically viable. The LNG terminal is considered in the plans of the companies, but for Israel it is planned in the second development of the Leviathan Field, while for Cyprus it awaits additional discoveries.

The SEM gas could contribute to EU gas consumption via CNG exports. The location and the amounts are convenient especially for Cyprus. Hence, it can be the first step of exports and used to provide funding for other investments. However, as it is

<sup>117</sup> Evie Mitsidou Phillips, "Cyprus, Israel and Greece sign MoU on energy and water", in *Famagusta Gazette*, 8 August 2013, <http://famagusta-gazette.com/cyprus-israel-and-greece-sign-mou-on-energy-and-water-p20222-69.htm>.

<sup>118</sup> Ayla Gürel, Fiona Mullen and Harry Tzimitras, "The Cyprus Hydrocarbons Issue...", cit., p. 88.

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a new method to be introduced, the companies may be hesitant to try.

Moreover, the EU is striving to reach gas at market prices. The high transport costs combined with the price formulation in the current contracts might not provide sufficient incentives to start importing gas from Eastern Mediterranean.

In conclusion, the most feasible alternative, the Turkish route, requires political resolution, while the others need development in other respects. Timing is a key factor for energy investments. There are several resources all over the world expected to come on-stream in the near future. The EU's urgent need for energy diversification warrants that a solution is found rapidly. While disputes between regional states stand in the way of the full development of SEM gas fields, other sources may find their way to European customers and close this window of opportunity for Eastern Mediterranean countries. Consequently, action should be taken as soon as possible in order to utilise the resources for the benefit of all parties.

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