

# The Importance of East Mediterranean Gas for EU Energy Security: The Role of Cyprus, Israel and Egypt

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## Abstract

*This paper analyzes the challenges facing EU's energy security in the natural gas sector since 2013. Despite the improvement of the Union's internal policy coordination, interconnectivity and market integration, the EU is becoming increasingly dependent on its existing primary supplier, Russia's Gazprom, while at the same time alternative sources of gas have become less reliable because of their associated political risk. In this regard, Mediterranean supplies were particularly affected by the 2011 Arab Revolutions. The paper argues that the new gas discoveries of the Eastern Mediterranean could transform the region to a new source of simultaneous supply and transit diversification for the EU. In this context the paper analyzes the gas policies of Egypt, Israel and Cyprus to illustrate their net export capacities while highlighting the evolution of EU energy policy making vis-à-vis the Eastern Med since 2014. It concludes with a comparative analysis of the different export options for the evacuation of East Med Gas to the EU.*

**Keywords:** EU energy security, geopolitics of natural gas, East Mediterranean gas

## The Status Quo of EU Gas Security: In Dire Need of Supply Diversification

In late 2008, the Directorate-General for Energy and Transport of the European Commission prepared a study that underlined the importance of improved interconnectivity for the future of EU gas import security, which highlighted the *then* current as well as the projected flows of gas exports to the EU for 2009, 2010, 2020 and 2030. The results of the study were incorporated into the EU's 2008 Strategy for TREN (Trans-European Energy Networks),<sup>2</sup> and constituted part of the background paper that scientifically corroborated the Commission's EU Security of Gas Supply Regulation (R.994/2010).<sup>3</sup>

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2 European Commission, Directorate-General for Energy and Transport, *Interconnecting Europe: New Perspectives for Trans-European Energy Networks* (Brussels: Office of the Official Publications of the European Communities, 2008).

3 European Union, *Regulation No 994/2010 of the European Parliament and of the Council of 20 October 2010, concerning measures to safeguard security of gas supply and repealing Council Directive 2004/67/EC*

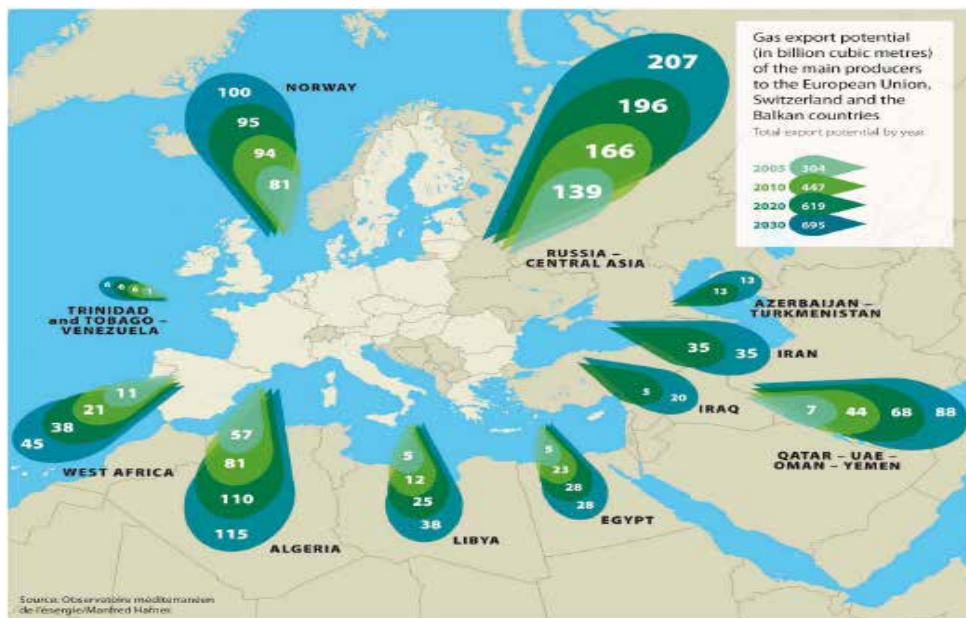


Figure 1: Gas Export Potential to the European Union (EC, 2008, 7)

That regulation was the first serious attempt to organize an EU-wide response to natural gas supply interruptions, like the one the Union faced in the winter of 2008-2009 between Russia and Ukraine. The regulation attempted to forge a unified and comprehensive reaction at the Union level that was based on energy solidarity, improved interconnectivity and the promotion of synchronized prevention and emergency action plans among the various member-states on a regional basis. One of the principal conclusions of R.2010/994 was that, although the EU's net import dependency was set to increase over the medium to long-term due to the projected drop in domestic gas supply, the Union would be able to cope with future risks if it increased its internal interconnectivity, completed the integration of its gas markets and improved the diversification of its import sources and import routes.

It also advocated the building of more LNG (Liquefied Natural Gas) import terminals to accommodate the expected flow of additional LNG imports that were considered to be safer and more flexible from a security point of view than piped gas that had to cross through the terrain of several transit countries.<sup>4</sup> This conclusion

(Brussels: European Union, 2010), available at <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32010R0994&from=EN>.

4 I. Dreyer and G. Stang, *Energy moves and power shifts: EU foreign policy and global energy security* (Paris: EU Institute for Security Studies, 2014).

is still valid today. In the ten years since the last major EU energy supply crisis, both internal interconnectivity and market integration have improved in the Union boosted by the Commission's EU Energy Union strategy. (Raines and Tomlinson, 2016).<sup>5</sup> New pipelines and LNG terminals were constructed particularly in the Eastern Member States that markedly improved their import diversification. Market integration between Member States ameliorated thanks to the expansion of physical interconnectivity as hub-based gas pricing also expanded across EU markets, helping to decrease the arbitrary indexation of gas sales to crude oil and oil product prices that was imposed onto EU consumers by gas exporters, including Gazprom.<sup>6</sup> What has not improved though is the level of its net import dependency and the associated political risk of this dependency as negative projections of a reduction in future indigenous supply materialized at a quicker pace than originally anticipated.

In the *2014 EU Energy Security Strategy*, the Commission projected an increase in the Union's net import dependency over a period of 20 years from around 62% of demand in 2010 to 65% in 2020 and 72%-73% in 2030.<sup>7</sup> Unfortunately, the collapse of the domestic EU gas supply has been much steeper. According to data processed from the BP Statistical Review of World Energy over the last five years, what was the projected level of Net Import Dependency (NID), the net volume of gas imports, after domestic production is deducted for 2030, was reached in 2016. More importantly the EU's NID continues to expand, as the latest available commercial data for 2017 suggest.<sup>8</sup>

Despite the expansion of US LNG exports to isolated EU markets, most notably in the Baltic region and Poland that have markedly improved their import diversification, the Union's net import dependence on LNG has been decreasing steadily since 2010. LNG imports have dropped as a share of total EU imports, from a high of 22% in 2010 to a low of 15.6%, which is estimated at 48.7 bcm in 2017, according to data compiled by the European Commission, IHS, and BP.<sup>9</sup>

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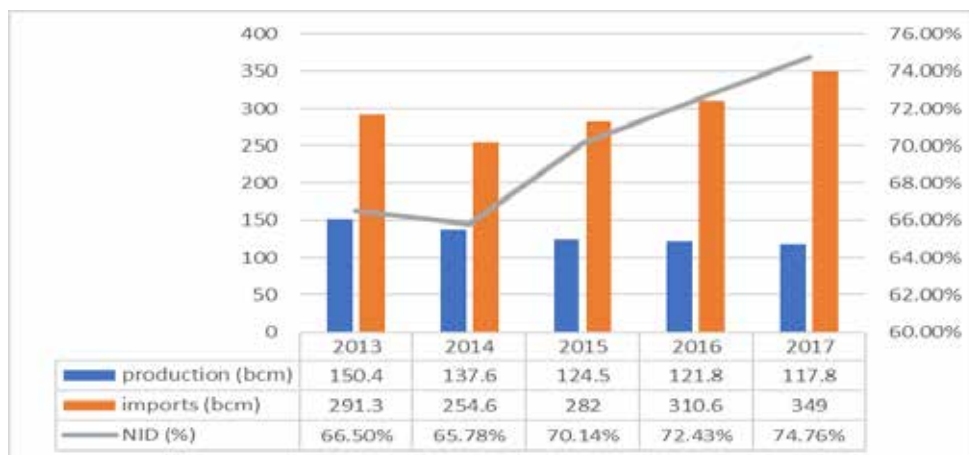
5 T. Raines and S. Tomlinson, *Europe's Energy Union Foreign Policy Implications for Energy Security, Climate and Competitiveness* (London: Chatman House Press 2016).

6 G. Stang, *Securing the Energy Union: Five pillars and five regions* (Paris: EU Institute for Security Studies, 2017).

7 European Commission European Commission, *Commission Staff Document: In-depth study of European Energy Security Accompanying the document Communication from the Commission to the Council and the European Parliament: European energy security strategy*, {COM(2014) 330 final}, (Brussels: Office of the Official Publications of the European Communities, 2014), 13.

8 BP, *BP Statistical Review of World Energy 2017* (London: BP, 2018), 28-29.

9 European Commission, *European energy security strategy*, 47; BP (2018), 28-29, 34.



**Figure 2:** Rise of EU Natural Gas Net Import Dependency (BP 2018, 28-29)

The decrease in LNG imports has increased concerns over the political risk of gas supplies to the Union. LNG is the most flexible source of gas imports since the importer has a far greater portfolio of potential exporters to choose from compared to pipeline gas, which corresponds to 85% of total EU imports. This 85% is essentially controlled by three suppliers: Russia, Norway and Algeria. Moreover, the EU’s strategic objective of diversifying from its principal supplier, Russia, and its gas pipeline export monopoly, Gazprom, has been undermined by the fact that Russian gas remains very competitive when compared to newer alternative supplies, and by the construction of viable alternative export routes that directly linked Gazprom with its primary EU markets in Central Europe via the Nord Stream pipeline system that bypasses Ukraine.<sup>10</sup> These bypasses have reduced the cost of transit for Russian gas to traditional EU markets and have eliminated the political risk of that transit through Ukraine. The absence of Nord Stream 1, which was commissioned between 2011-2013, would only have increased the possibility of a major energy supply crisis for the EU, given the two supply/transit interruptions of 2006 and 2009 and the deteriorating relations between Russia and Ukraine, following the annexation of the Crimea and Russia’s support for the Donbass secessionist movement after 2014.

Despite the worsening of EU-Russian political relations, the gas trade between the two sides is booming and it is important to note that EU sanctions in 2014 specifically refrained from targeting the Russian gas sector. US and EU sanctions on Russia, imposed in the aftermath of its annexation of the Crimean Peninsula, failed to curb

10 J. Henderson and S. Sharples, *Gazprom in Europe* (Oxford: Oxford Institute for Energy Studies, 2018), 3-21.

Russian oil and gas production, which keeps expanding and reaching record highs every consecutive year since 2014 (Coote, 2018).<sup>11</sup>

The emergence of Germany as the preeminent transit country for Russian gas in the EU has stabilized the existing EU-Russian gas partnership on a long-term basis, but has also created the potential for additional Russian gas exports to the EU, especially after the projected completion of the second Nord Stream pipeline network in late 2019. This potential is already materializing. As indicated by Figure 3, despite EU efforts to diversify from Gazprom, since 2013 Russian gas exports have been steadily increasing in both absolute and relative terms.

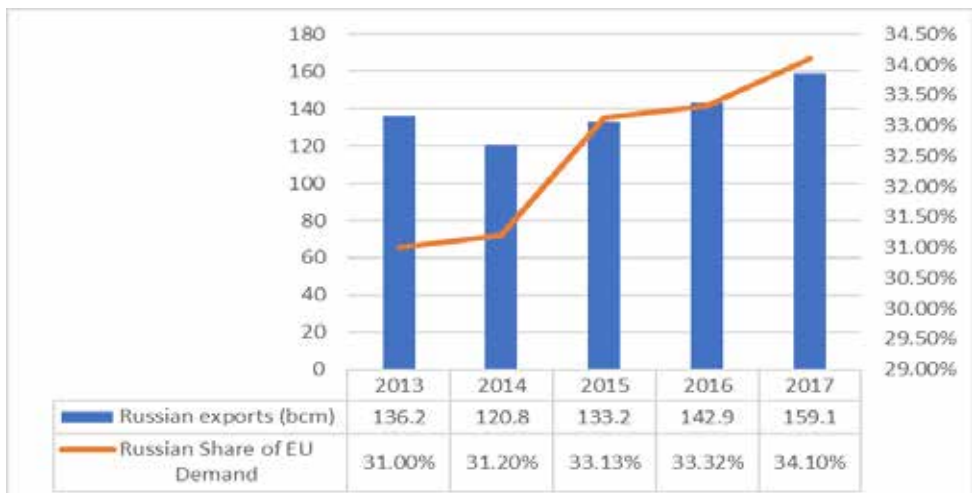


Figure 3: Russian Gas Exports to the EU (BP, 2014-2018)

The significance of Russian exports for EU gas security is further illustrated by the fact that Norwegian, Algerian and Libyan exports combined barely match Gazprom’s market share in the EU. As illustrated by Figure 4, Norwegian and Algerian supplies expanded between 2013 and 2017, but at a slower pace compared to Russian exports, adding 17.7 bcm/y to their cumulative supply. Exports from Libya have halved compared to 2010, and Egyptian supplies were all but eliminated.

Russian net exports increased by 23 bcm/y between 2013 and 2017, more than double the 10 bcm/y of Azeri gas the EU expects to import by 2020 from the Southern Gas Corridor route, through the Trans Anatolian (TANAP) and Trans Adriatic (TAP) pipeline systems, which connect Azeri offshore gas reserves in the Caspian Sea to

11 B. Coote, *Impact of Sanctions on Russia’s Energy Sector* (Washington D.C.: The Atlantic Council Press, 2018).

Southeastern Italy via Turkey, Greece and Albania. This is a far cry from the initial



**Figure 4:** Norwegian, Algerian and Libyan Gas Exports to the EU (BP, 2014-2018)

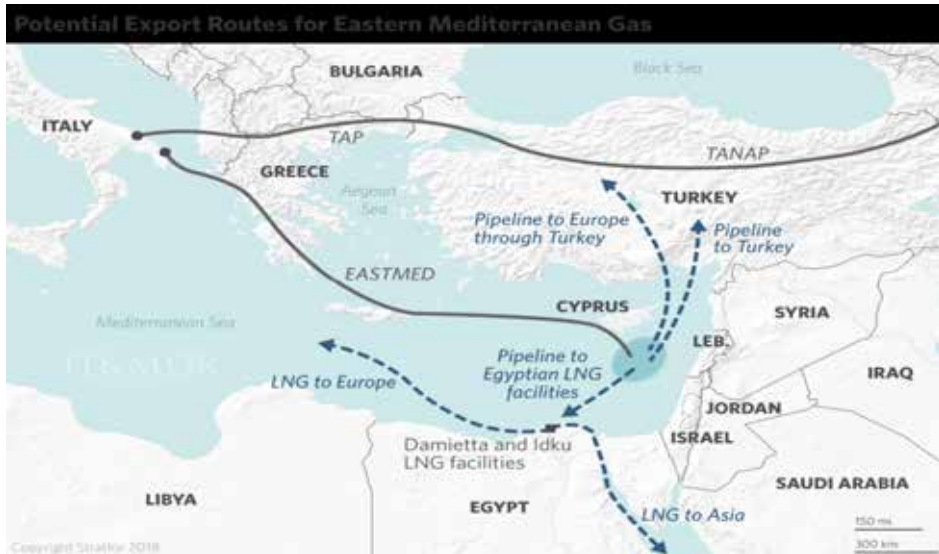
expectations to import more than 30 bcm/y from the region, a scenario which would have required the exportation of Iranian and/or Turkmen gas through Turkey.

Even if Azeri gas were available today, Norwegian, Algerian, Libyan and Azeri exports combined would account for 38.75% of EU demand for 2017. Gazprom alone accounts for 34.1% of net EU consumption. The need for new sources of supply diversification remains as critically important as it was ten years ago, when the 2009 Ukrainian crisis galvanized the EU’s efforts to materialize its Southern Gas Corridor Strategy.

This goal was only partially achieved in 2013 through the commitment of around 16 bcm/y of Azeri gas to the TANAP/TAP pipelines, of which only 10 bcm/y will reach EU markets.<sup>12</sup> This achievement, which has its own serious limitations given that China controls Turkmenistan’s gas sector and the deterioration of US-Iranian relations, which will seriously limit the availability of non-Azeri gas exports to the Southern Corridor over the next decade,<sup>13</sup> has already been seriously undermined by developments in this decade.

12 D. Koranyi, *The Southern Corridor: Europe’s lifeline?* (Rome: Istituto Affari Internazionali, 2014).

13 S. Pirani, *Let’s not exaggerate: Southern Corridor Prospects to 2030* (Oxford: Oxford Institute for Energy Studies, 2018), 11-22.



**Map 1:** Gas Export Options from the Caspian Sea and the Eastern Med (Gorvett, 2018)<sup>14</sup>

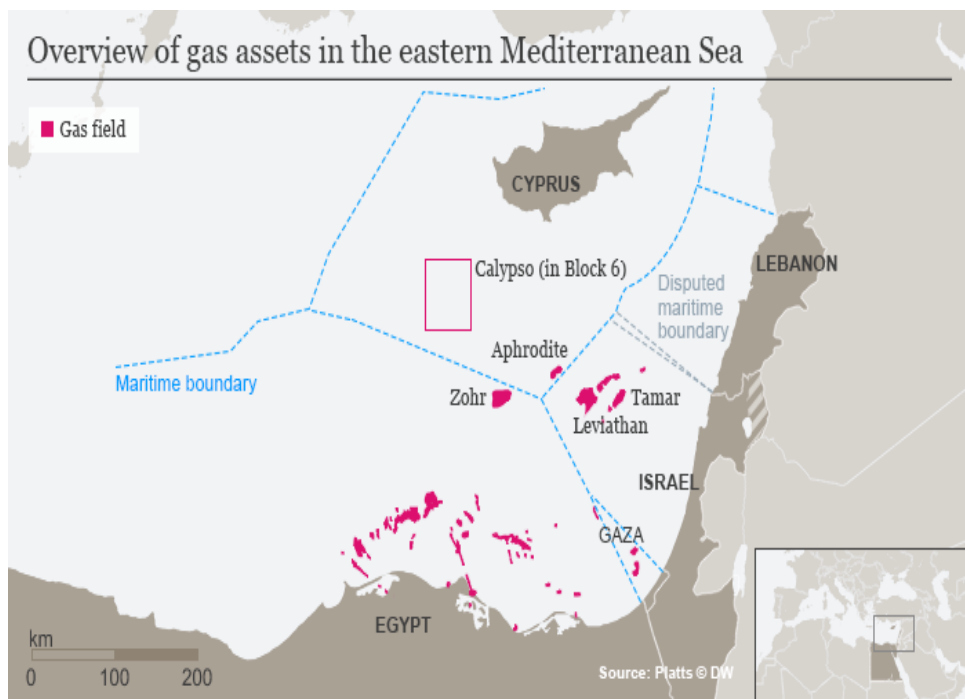
What the EU gained from its diversification efforts, through tapping into Azeri reserves, it lost due to the curtailment of Libyan exports and the loss of Egyptian supplies to the EU, both victims of the region’s structural destabilization in the aftermath of the 2011 Arab revolutions.

The discovery of new gas reserves in the Exclusive Economic Zones of Israel, Cyprus and Egypt could transform the region into a new source of supply for the Union, while cementing regional alignments into a more structured framework of cooperation between Cyprus, Greece, Israel and Egypt, which could stand against the rise of revisionist powers in the wider Levant area, including Turkey and Iran. How significant, though, is the region’s net export potential, given the importance gas plays in the energy policies of Egypt and Israel? What are the prospects for the introduction of natural gas in the Cypriot energy system and how would that affect the island’s export capacity?

<sup>14</sup> J. Gorvett, ‘Risks Posed by Competing Claims to Eastern Mediterranean Oil and Gas Resource’, *Washington Report on Middle East Affairs*, (2018, June/July), 34-35.

## The Export Potential of the Eastern Mediterranean and Its Significance for the Region

Contrary to the overemphasis put on Israeli and Cypriot gas discoveries, the Eastern Med is not a new hydrocarbons producer. More than a decade before the Tamar discovery (2008) in the Israeli EEZ, Egypt was already a significant gas producer and the region's principal reserves holder. In 1990, Egypt owned 0.4 trillion cubic meters (tcm) of proven *in situ* natural gas reserves, almost half of Israel's current reserve basis. In 2000, at the time Israel made its first commercial discovery in the now depleted Mari B field, estimated to contain 0.028 tcm, Egypt controlled 1.4 tcm. In 2010, by the time Israel had completed its stream of discoveries, including Tamar (0.318 tcm) and Leviathan (0.5 tcm), Egypt still controlled 2.2 tcm.



**Map 2:** East Med Gas Proven Reserves (Deutsche Welle)<sup>15</sup>

15 Deutsche Welle, 'Gas, pipeline dreams and gunboat diplomacy in Mediterranean', (2018, April 2), *DW*, available at <https://www.dw.com/en/gas-pipeline-dreams-and-gunboat-diplomacy-in-mediterranean/a-43228234>.



One year before the revolution that overthrew Mubarak from power, Egypt was producing 61.3 bcm/y and was exporting around 15 bcm/y, of which around one-third was exported to the EU in the form of LNG.<sup>16</sup> Even before the super-giant Zohr discovery (0.84 tcm) in August 2015, Egypt was unquestionably the epicentre of the Eastern Mediterranean in terms of reserves. Between 2010 and 2015, despite a period of unprecedented political turmoil and very low domestic gas prices, Egyptian gas reserves in the offshore Nile Delta kept expanding, thanks to the Atoll and WMDW (West Med Deep Water) discoveries, estimated to contain respectively 0.14 tcm to 0.196 tcm and 0.14 tcm.

In less than two years, between 2014 and 2015, Egypt, as a result of the Zohr, Atoll and WMDW discoveries, added to its proven reserves basis *more than the combined discoveries* of both Cyprus (0.125 bcm) and Israel (0.894). More importantly, there are still many areas of the currently delimited Egyptian EEZ that have yet to be explored, especially in the deep, offshore areas that are adjacent to the Cypriot EEZ. The political and economic crisis that Egypt has been going through since 2011 has not allowed Cairo to utilize its expanding reserve basis to re-emerge as the region's pivotal exporter, although it is likely that Egypt will once again become a marginal net exporter by the early 2020s.<sup>17</sup> Already since September 2018, Cairo decided to direct 2 bcm/y of gas from Zohr to the Damietta liquefaction plant for exports expected to begin in 2019.<sup>18</sup> This decision signaled the success of Egypt's gas policy that is expected to eliminate all imports in 2019.<sup>19</sup> This success was based on its decision to push forward with the monetization of the Atoll, WMDW and Zohr fields. Zohr began production in December 2017, which was in record time after less than 2½ years after its discovery. As a result, Egyptian domestic output increased by more than 60% in less than two years. According to Egyptian Oil Minister Tarek el Molla,<sup>20</sup> the natural gas sector of Egypt accounts for 15% of the country's GDP. Egypt is already using more natural gas than oil in its energy mix and this is set to expand as the government reduces energy subsidies and progressively deregulates its domestic gas market allowing for more competition.<sup>21</sup> Part of its strategy is to emerge as the region's

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16 BP, *BP Statistical Review of World Energy 2011* (London: BP, 2011), 20, 22, and 29.

17 BNP Paris Bank, *Egypt: Bid to become a regional energy hub* (BNP Paris Bank, Economic Research Division, 2017), 23-26.

18 M. Adel, 'Damietta LNG plant exports gas again after six-year suspension', *Daily News Egypt*, (2018, September 4), available at <https://dailynewsegyp.com/2018/09/04/damietta-lng-plant-exports-gas-again-after-six-year-suspension>.

19 A. Ismail, 'Egypt sets sights on doubling natural gas output by 2020', Reuters, (2017, July 17); A. Ismail, 'Cutting back on Imported Gas', *Al-Abram Weekly* (2017, May 24).

20 T. El-Molla, 'Natural Gas accounts for 15% of Egypt GDP', *Egypt Oil & Gas Newspaper* (2018, November 28), <https://egyptoil-gas.com/news/el-molla-natural-gas-accounts-for-15-of-egypt-gdp>.

21 BNP, 'Egypt: Bid to become a regional energy hub', 25-26.

natural gas hub, through the construction of additional connecting infrastructure with Cyprus and Israel for the export of gas from Aphrodite, Tamar and Leviathan to its two LNG liquefaction plants in Idku and Damietta.<sup>22</sup> Israeli gas developers, Noble and Delek, signed the first agreement to that effect in February 2018 with the Egyptian gas trading company Dolphinus for the export of 64 bcm between 2019 and 2030.<sup>23</sup> This contract is estimated to be worth \$15 billion. Another agreement between the developers of the Aphrodite field and the operators of the Idku terminal is expected to be completed in the first quarter of 2019. The Cypriot contract is expected to export 120 bcm over a period of 17 years.

If the impact of Zohr was crucial in helping Egypt overcome its economic crisis, the discoveries of Tamar and Leviathan had a revolutionary effect on Israel's economy and its energy security. They not only significantly reduced Israel's electricity costs, but also expanded the country's ability to depend on its domestic energy resources for the first time in its history. In 2011, before Egypt shut down its exports to Israeli through the El Arish-Ashkelon pipeline, Tel Aviv produced less than 10% of its energy consumption.

In 2016, according to data from the International Energy Agency, Israel produced 33% of its final energy consumption and 100% of its expanding natural gas demand. Gas consumption almost quadrupled between 2012 (2.6 bcm) and 2017 (9.9 bcm),<sup>24</sup> and it is expected to increase by more than 2.5 times to 24.8 bcm by 2040, fuelled primarily from the use of natural gas for electricity generation. Israeli gas reserves, all located offshore, are estimated by the Ministry of Energy's latest review in November 2016 at 858.5 bcm, divided between the following fields: Leviathan (500 bcm), Tamar & Tamar Southwest (282 bcm), Shimshon (5 bcm), Karish & Tanin (55 bcm), Dalit (8 bcm), Ishai (7-10 bcm, average of 8.5 bcm).<sup>25</sup>

To this estimate, we need to add the update of the Tamar reserves completed in July 2017, which increased the proven volume of reserves to 318 bcm in the Israeli EEZ to 894.5 bcm.<sup>26</sup> In 2015, Israel used natural gas to generate 50% of its electricity

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22 S. MacDonald, 'Here's How Egypt Could Become a Major Gas Exporter', *The National Interest* (2018), available at <https://nationalinterest.org/feature/heres-how-egypt-could-become-major-gas-exporter-27056>.

23 O. Eran, E. Rettig, and O. Winter, 'The Gas Deal with Egypt: Israel Deepens its Anchor in the Eastern Mediterranean', *Insight* No.1033 (2018, March), available at <http://www.inss.org.il/publication/gas-deal-egypt-israel-deepens-anchor-eastern-mediterranean/>.

24 BP, *BP Statistical Review of World Energy 2018* (London: BP, 2018), 29.

25 State of Israel, Ministry of Energy, *Israeli Gas Opportunities* (Tel Aviv: Israeli Energy Ministry, 2016), 4, available at [http://www.energy-sea.gov.il/English-Site/PublishingImages/Pages/Forms/EditForm/Roadshow\\_2016\\_Presentation%20GD%20Shaul%20Meridor\\_Regulatory%20and%20Fiscal%20Regim.pdf](http://www.energy-sea.gov.il/English-Site/PublishingImages/Pages/Forms/EditForm/Roadshow_2016_Presentation%20GD%20Shaul%20Meridor_Regulatory%20and%20Fiscal%20Regim.pdf).

26 H. Koren, 'Tamar partners increase gas field estimate by 13%', *Globes* (2017, July 2).

production, a share expected to rise to 75% by 2030. Electricity is and will remain the primary factor driving natural gas demand in the country.<sup>27</sup> The unprecedented level of energy self-sufficiency these gas discoveries provide Tel Aviv have induced the Israeli government to direct the majority of these reserves to its domestic energy market.

In June 2013, Israel decided to reserve 60% of its proven reserves for domestic consumption while directing the remaining 40% to regional and international markets. This establishes a net export capacity estimated at approximately 360 bcm. Exporting 360 bcm for Israel is a very challenging task, given the absence of international players in its EEZ who could help finance the necessary export infrastructure and the over-concentration of existing reserves in the hands two companies, Noble and the two subsidiaries of the Delek Group (Delek Drilling and Avner), which together control 85% of existing reserves.

Contrary to the cases of Egypt and Cyprus, the current regulatory and investment framework has so far failed to attract major foreign investment, although Tel Aviv decided to auction off 24 of its 69 offshore blocks in its first international licensing tender. Offers for the tender, whose deadline was extended twice in 2017, indicated a lukewarm response on the part of the international oil industry because of the regulatory upheaval Israel that has engulfed itself in after the country's Competition Authority decided to revoke Leviathan's export license in December 2014. The results of the round proved rather disappointing since no major oil company even submitted a proposal for any of the fields offered.

Italy's Edison and Spain's Repsol pulled out from submitting an offer. The only participants were a consortium of four Indian companies, led by state-controlled ONGC, as well as a Greek company, Energean Oil & Gas, which in August 2016 bought the Tanin and Karish fields from Delek Drilling and Avner Oil. In December 2017, Israel's Petroleum Council granted five blocks (12, 21, 22, 23 and 31) to Energean, as well as Block 32 to the Indian consortium.<sup>28</sup> Despite these setbacks, the potential for further discoveries is significant, since currently less than 30% of the Israeli EEZ has been licensed for exploration.

The Ministry of Energy has announced its intention to launch a second licensing round in 2018, although a new licensing round was later postponed to 2019. It is difficult to see, though, how exploration efforts will advance if there is no major

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27 State of Israel, Ministry of Energy, *Israeli Gas Opportunities*, 14.

28 State of Israel, Ministry of Energy, *The Petroleum Council Approved the Winning Bids of the First Israeli Offshore Licensing Process*, Israel Ministry of Energy, [Press Release] (2017, November 12), available at <http://energy.gov.il/English/AboutTheOffice/SpeakerMessages/Pages/GxmsMniSpokesmanPetroleumCouncil.aspx>.

infusion of capital and expertise from the international oil industry. Israel's gas industry is too introverted and may need to revise some of its regulations that will increase the gas volumes available for export, even from smaller fields such as Karish, Dalit and Tanin.

In the case of Cyprus, after the initial discovery of the Aphrodite field in Block 12 in 2011, which is estimated to contain 112 bcm, the country has been faced with a series of disappointments. In 2014 and 2015, ENI drilled two exploratory wells in Block 9, and in February 2015, Total pulled out of Block 10, while ENI chose to freeze additional exploration in Blocks 2 and 3 until it reviewed its previous geological assessment model. Had it not been for the discovery of Zohr in August 2015, Cyprus' offshore exploration efforts may have ended in failure. It was Zohr's discovery that regvanized the interest of the major international energy companies.

Total remained in Block 11 and drilled an exploratory well in the Onisiforos target in September 2017. The results were disappointing in that the 11.2 bcm discovery could not be autonomously developed, but they confirmed the existence of hydrocarbon reserves to the north of the Zohr discovery and around the underwater sea mountain of Eratosthenes. In April 2017, the Republic of Cyprus tendered Block 8 to ENI, Block 6 to ENI/Total and Block 10 to a consortium made up from Exxon and Qatar Petroleum, where Exxon holds 80% of the joint venture.

Despite Turkey's claims that the northern part of Blocks 6 and 7 belongs to its continental shelf and its warnings against their tendering to international energy companies, ENI and Total drilled in Block 6 in January 2018. Their drilling led to the discovery of the Kalypso reservoir, which is believed to extend to Block 7. In December 2018, exploration rights over Block 7 are expected to be awarded to the Total/ENI consortium, opening the way for new drilling in 2019 that will ascertain the size and potential extractability of Kalypso. If confirmed it would constitute the second proven gas reserve of the Cypriot EEZ.

In November 2018, Exxon commenced drilling operations in its first (Delphini) of three targets in Block 10. The exploration drilling on Blocks 6, 7 and 10 are expected to confirm or not the existence of a Zohr or Leviathan-size gas field inside Cyprus' EEZ. These results, if positive, will spearhead additional exploration, including the possibility of a fourth licensing round. Although Cyprus appears to be surrounded by gas reserves, it does not use any gas in its energy mix, despite efforts to import gas in LNG form in order to generate electricity that have been ongoing since 2007.

In January 2018, the government secured a €101.5 million EU grant to build an FSRU (Floating Storage and Regasification Unit) close to the port of Vassilikos to import and regasify LNG for electricity generation. The entire infrastructure, which includes buying an LNG carrier that will be retrofitted in order to gasify the LNG,

the pipelines and other docking facilities, is expected to cost more than 500 million.<sup>29</sup> (Kafkarides, 2018)

Import volumes to be contracted are scalable and are estimated to vary between 0.5bcm-1bcm. If such an option materializes, then it can cover the long-term demand of the country for up to 10 to 15 years.<sup>30</sup> This means that all the reserves discovered in the Cypriot EEZ can be dedicated to exports, an option which is viable for neither Israel nor Egypt. So far, only Aphrodite's 121 bcm of proven reserves can be exported: a gas volume equal to merely one-third of the existing Israeli net export capacity.

### **The Prospective Significance of East Med Gas: The Evolution of EU Strategies**

The East Med can provide new sources of gas to the EU, thereby helping the Union meet its strategic objective of limiting its increasing dependence on Gazprom. Yet, the region's prospective significance goes beyond supply diversification. The East Med, 'thanks' to the potential resources of the Cypriot EEZ, could emerge as a new source of indigenous supply that could partly compensate for the rapid decline of domestic EU production in the North Sea.

Furthermore, East Med gas offers simultaneous diversification of import sources *and* import routes regardless of whether it is exported to the EU via LNG or via the East Med Gas Pipelines (EMGP), which could link the region to Italy via Greece. As Turkish-EU strategic interests continue to diverge, and the prospects of a Turkish accession to the EU are minimized, the EU does not want to become overdependent on Turkey for the transit of East Med gas flows, despite the country's existing centrality to the Southern EU Gas Strategy.

The Trans Anatolian pipeline (TANAP) is the principal export option to transport all current and future gas supplies from Azerbaijan and prospectively Turkmenistan, Iran or Northern Iraq to the EU via Greece. If a second TurkStream pipeline is also constructed to export Russian gas to Southeastern EU states via Turkey,<sup>31</sup> then Ankara's importance will further expand, making the need for EU planners to construct a Turkish bypass for East Med gas even more pronounced. The prospective importance of East Med hydrocarbons for the EU initially emerged in the think-tank

29 Y. Kafkarides, 'Cyprus announces €500 million tender for LNG terminal', *Kathimerini Cyprus* (2018, October 5), available at <http://knews.kathimerini.com.cy/en/business/cyprus-announces-%E2%82%AC-500-million-tender-for-lng-terminal>.

30 C. Stambolis, 'Energy: Have Cyprus LNG plans been derailed', *Financial Mirror* (2018, August 28), <http://www.financialmirror.com/blog-details.php?nid=2025>.

31 Henderson and Sharples, *Gazprom in Europe*, 21-25.

circuit in Brussels during 2012-2013,<sup>32</sup> but it did not reach the level of official policy-making until mid-2014 when the region was first mentioned in the *EU's Energy Security Strategy (EUESS)* as a potential supplier of natural gas. However, it must be noted that natural gas exports from the Eastern Mediterranean are not a new phenomenon. Between 2005 and 2012, several EU member-states, including Spain, Italy and France, imported Egyptian LNG from the two currently idle LNG liquefaction plants located in Idku and Damietta.

The renewed attention of EU authorities in the region emanated not only from the fact that two new significant gas exporters came to the fore, one of which is a Member State, but also from the need to enhance the Union's external energy policy at a time of renewed tensions with Russia over Ukraine. The EU's Energy Security Strategy proposed a series of external policy measures which centred around the need to improve supply and transit diversification. In this regard, the *EUESS* called for 'the EU to engage in intensified political and trade dialogue with Northern African and Eastern Mediterranean partners, in particular with a view to creating a Mediterranean gas hub in the South of Europe'.<sup>33</sup>

The text fell short from proposing a specific policy action that would commit EU funds to any specific implementation project and did not seem to differentiate between the EU's established Southern Gas Corridor Strategy and the resources of the Eastern Mediterranean. This all changed a year later as a result of the greater emphasis put on the construction of common energy infrastructures that would further ameliorate intra-EU interconnectivity as well facilitate the commercial linkage between EU markets and non-EU energy suppliers.

The Connect Europe Facility (CEF) financial instrument was set up in order to materially support enhanced interconnectivity through the promotion of several Projects of Common Interest (PCI). Simultaneously, at the Commission and Council levels, a more detailed strategy focused on specific areas of interest for the Union's emerging Energy Security Strategy that would serve the overarching strategic priority of supply diversification. The EU's Energy Diplomacy Action Plan (*EU EDAP*), published in July 2015, singled out 'the strategic potential of the Eastern Mediterranean region' as 'a key priority' for the EU's 'diversification of sources, suppliers and routes', where the EU should 'focus its diplomatic support on'.<sup>34</sup> The EU's Energy Diplomacy

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32 I. Taranic, 'European energy policies and their relevance to the Eastern Mediterranean', *Energy Cooperation and Security in the Eastern Mediterranean: A seismic shift towards peace or conflict?*, ed. A. Giannakopoulos (Tel Aviv: Tel Aviv University Press, 2016), 109-123.

33 European Commission, *Communication from the Commission to the European Parliament and the European Council: European Energy Security Strategy*, SWD(2014) 330 final}, (Brussels: Office of the Official Publications of the European Communities, 2014, May 28), 16.

34 European Council, *Council conclusions on Energy Diplomacy*, 10995/15, CFSP/PESC 414, (Brussels:

Action Plan clearly distinguished the Eastern Med from the Southern Corridor, indicating that it would prefer an independent development of those reserves.

More importantly, in what could be perceived as an indirect warning to Turkey, which is questioning the right of the Republic of Cyprus (RoC) to explore the waters of its demarcated Exclusive Economic Zone (EEZ), the policy document underlined that the EU's 'Energy partnerships and dialogues...should also ensure that the sovereignty and sovereign rights of the Member States to explore and develop their natural resources are safeguarded'.<sup>35</sup> Two major projects emerged with strong EU backing, under the PCI framework, promising to tap into the region's strategic potential: the high voltage electricity interconnector project, EuroAsia, and the East Med Gas Pipeline (EMGP) project.

EuroAsia aspires to transfer up to 2 GW (gigawatt) of electricity from Israel and Cyprus to Attica in Greece over a distance of 1518km. Although the project may find it difficult to find a market in Greece (or beyond Greece) and could duplicate a project promoted by ADMHE, the Greek Electricity TSO (Transmission System Operator) to connect Attica to Crete, it would significantly enhance the security of electricity supply for the RoC by terminating its energy isolation while progressively connecting it to the EU grid via Greece.

In 2015, Euroasia Interconnector received from the CEF €1.325 million to complete all necessary design, technical implementation and environmental assessment studies, which it finished in late 2016. In April 2017, the project was upgraded to the next level of planning maturity that allowed it to secure €14.5 million from CEF to complete its final FEED (Front End Engineering and Design) study. The study is expected to be completed by 2020, and it will allow the investors to take the FID (Final Investment Decision) that will lead to the construction of the first 1GW underwater cable by 2022. CEF has covered 50% of all associated costs of the project so far.<sup>36</sup> The second and even more important project is the construction of the ambitious EMGP, which aspires to transport, by 2025, between 10-16 bcm/y of East Med Gas to Greece and then to Italy, which is promoted by the Greek-French-Italian consortium, IGI Poseidon.

In May 2015, the EMGP received €2 million to complete its pre-FEED studies which confirmed the technical and financial viability of the project, although serious challenges remain regarding its eventual implementation.<sup>37</sup> Nevertheless, these

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European Council, (2015, July 20), 3.

35 European Council, *Council conclusions on Energy Diplomacy*, 4.

36 European Commission, *Connect Europe Facility*, (2017), available at <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/projects-by-country/multi-country/3.10.1-0028-cy-s-m-14>.

37 European Commission, *Connect Europe Facility* (2017), <https://ec.europa.eu/inea/en/connecting-europe-facility/cef-energy/projects-by-country/multi-country/7.3.1-0025-elcy-s-m-15>.

challenges did not discourage the Italian government or the EU's Energy Commissioner, Miguel Arias Cañete, from joining the original promoters of the project in Tel Aviv in April 2017 to sign the first quadrilateral political framework agreement in support of EMGP's implementation.<sup>38</sup> In their joint declaration the energy ministers of Italy, Greece, Cyprus and Israel stressed that they supported 'the establishment of the Eastern Mediterranean as another corridor for gas supplies to Europe', underlining that the project 'represents a strategic priority for exporting into Europe part of the current gas reserves of the Eastern Mediterranean'.<sup>39</sup> Commissioner Cañete, who said that EMGP is eligible for additional financial assistance from the CEF in order to reach its FID level, noted that EMGP 'is an ambitious project, which as the Commission, we clearly support, as it will have a high value in terms of security of supply and diversification targets'.<sup>40</sup> He also added that 'in the next decades, gas flows from the Eastern Mediterranean region will play a vital role in the energy security of the European Union'.<sup>41</sup> In January 2018, in another indication of tangible support for the project from the EU, the European Commission granted another €34.5 million to EMGP developers<sup>42</sup> to complete their FEED study and to cover all licencing and permit expenses for the project in Cyprus and Greece. The signing of an IGA (intergovernmental agreement) between Italy, Greece, Cyprus and Israel is expected in the first quarter of 2019, once the text is finalized. Such an IGA, though, will constitute only the end of the beginning in the project's path towards materialization.

### **Assessing Alternative Export Options: How Will the EU Benefit the Most and the Quickest?**

Although much of the focus of the potential exportation of natural gas from the region has been put on the construction of new LNG facilities in either Cyprus or

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38 S. Udasin, 'Israel, European states advance plans for world's largest underwater gas pipeline', *Jerusalem Post* (2017, April 3).

39 Republic of Cyprus, Press and Information Office, 'Joint Declaration of the East Med Pipeline Ministerial Summit in Tel Aviv', Press and Information Office of the Republic of Cyprus (2017, April 3), available at <https://www.pio.gov.cy/moi/pio/pio2013.nsf/All/3E481E83C28B5163C22580F7004DD29C?OpenDocument&L=E>.

40 M. Tanchun, 'EU Backs Israel to Italy pipeline to alter East Med energy chessboard', *Hurriyet Daily News*, (2017, April 13), available at <http://www.hurriyettodaynews.com/eu-backs-israel-to-italy-pipeline-to-alter-east-med-energy-chessboard.aspx?pageID=238&nID=111949&NewsCatID=3962017>.

41 IEMED, 'Italy, Greece, Cyprus and Israel agree on implementing a gas pipeline through the Eastern Mediterranean', *Iemed* (2017, April 3), <http://www.iemed.org/actualitat/noticies/03-04-italy-greece-cyprus-and-israel-agree-on-implementing-a-gas-pipeline-through-the-eastern-mediterranean>.

42 Kelakos, 'The European Commission will fund the technical studies and permitting costs of the East Med with €34,5 million', *Energy Press* (2018, January 18), available at <https://energypress.gr/news/me-345-ekat-eyro-i-komision-hrimatodotei-tis-tehnikes-meletes-kai-tis-adeiodotiseis-toy-eastmed>.



Israel, the option of building a new liquefaction plant in the Eastern Mediterranean had been taken off the table several years ago due to the following reasons:

(a) If one were to add the existing net export capacity of Israel (360 bcm) and Cyprus (120 bcm), there is more than enough gas to theoretically build a new two-train LNG export facility capable of liquefying anywhere between 10-14 bcm/y for global markets. Unfortunately for both Cyprus and Israel, LNG liquefaction plants have become extremely costly to develop, even for the Israelis, who do have enough reserves to build a two-trains LNG export facility, to the detriment of one or more of their regional pipeline export options to be analyzed below.

If Israel's net export capacity is limited by its own domestic regulation, signed in June 2013, to 360 bcm, or 40%, of its existing proven reserves of 900bcm, then it would need to commit at least 10 bcm/y out of the 18 bcm/y it has available for 20 years in order to finance a commercially viable two train LNG facility in Israel. The government there, which has the right to approve all export deals made by companies developing its natural gas reserves, has excluded the possibility of liquefying its gas reserves outside areas of its sovereignty ever since the inter-ministerial Zemach Committee Report of September 2012. By this decision, it has effectively ruled out, since at least 2013, the construction of a joint Israeli-Cypriot LNG facility in Vassilikos that would be partially fed by Israeli gas. Cyprus never had enough gas to self-finance a commercially viable LNG option.

This leaves around 8 bcm/y, of which Leviathan's developers already agreed in September 2016 to sell 3bcm/y from Phase 1 of Leviathan's production to the Jordanian market, which is a deal valued at \$10 billion and that has been approved by the Israeli state.<sup>43</sup> The remaining 5 bcm/y are not enough to finance a 10 bcm/y pipeline to Turkey but could be exported to Egypt through a joint Cypriot-Israeli export pipeline that links Aphrodite and Leviathan to the Egyptian grid or its two idle LNG liquefaction terminals in Damietta and/or Idku. *An LNG option for Israel, in short, is commercially detrimental for an offshore pipeline to Turkey, but not to Egypt.*

(b) Existing Israeli developers do not have the necessary financial capacity and technical expertise to shoulder alone the costs of a major LNG export project that could easily surpass the \$8 to \$10 billion price tag on top of the \$4 to 5 billion they need to finance the first phase target of gas production from Leviathan or the additional \$5 billion that the development of the second phase of Tamar and Leviathan after 2020 will cost. The cost of the upstream phase alone for Leviathan forced the developers (Noble, Delek and Ratio) to reduce the initial production target of Phase 1 from 21 bcm/y to 16 bcm/y when they submitted revised Field Development Plan (FDP) to

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43 S. Udasin, 'Israel to supply gas to Jordan in \$10 billion deal', *Jerusalem Post* (2016, September 26).

the Israeli government in February 2016.<sup>44</sup>

By the time the FDP started to be implemented in February 2017, the production target set to be achieved by the end of 2019 had again shrunk to 12 bcm/y because the developers could only mobilize \$3.75 billion for its financing. The plan includes the construction of two 120km offshore pipelines connecting the field with the existing Israeli grid in the northern part of the country, which will absorb three-quarters of the entire output with the remaining quarter exported to Jordan.<sup>45</sup>

*An LNG option was simply impossible to finance without the participation of a major IOC.* No major IOC tried to join the Leviathan consortium since Woodside's attempted purchase of a 30% share ended in failure back in May 2014.<sup>46</sup> If an LNG is off the table, does this mean that the region's entire export potential will be consumed intra-regionally without any exports reaching the EU? Not necessarily. Pipeline options do exist that, in conjunction with existing liquefaction facilities, could monetize the region's proven reserves in ways that could have a significant positive effect on the EU's import diversification strategy as early as 2021.

Theoretically there are three pipeline options allowing Europe to import East Med gas: (i) the East Med Gas Pipeline (EMGP) connecting Israel, Cyprus and Greece to Italy; (ii) a pipeline connecting Israel with Turkey, with a potential extension to Turkey's EU border and from there towards Europe either via TAP or the construction of a new 'Nabucco' pipeline to Hungary and Austria; and, (iii) one or two pipelines connecting Aphrodite, Tamar and Leviathan reserves with Egypt's idle liquefaction plants in Idku and Damietta. From these three options, the third one appears to be the most feasible in the medium-term and it is already being implemented through Israel's export of gas to the Egyptian trader Dolphinus, part of which will be exported to EU markets via the Damietta liquefaction plant as early as 2019.

### ***The East Med Gas Pipeline to Italy via Greece***

Although the option of a direct pipeline linkage between the East Med and the EU markets has been revived by the improvement of deep-offshore pipe-laying technology and the signing in April 2017 of a preliminary framework agreement between Israel and the three EU states (RoC, Greece, Italy) championing the project, its implementation

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44 OGL Editors, 'Revised plan pushes Leviathan development', *Oil & Gas Journal*, (25 February 2016), available at <http://www.ogj.com/articles/2016/02/revised-plan-pushes-leviathan-development.html>

45 Noble Energy, 'Noble Energy Sanctions Leviathan Project Offshore Israel', *Globes*, (23 February 2017), available at <https://globenewswire.com/news-release/2017/02/23/926886/0/en/Noble-Energy-Sanctions-Leviathan-Project-Offshore-Israel.html>.

46 J. Paton, 'Woodside Scraps \$2.6 Billion Israeli Gas Deal as Talks Fail', *Bloomberg*, (21 May 2014), available at <https://www.bloomberg.com/news/articles/2014-05-20/woodside-scraps-2-6-billion-leviathan-gas-deal-after-talks-fail>.

remains debatable. The EMGP, estimated to cost around €7 billion, may be cheaper to build than a twin-train LNG liquefaction plant, but its construction will prove very challenging.

It would be the longest pipeline, crossing over 1900km, ever to operate at depths close to 3000m (Tagliapietra).<sup>47</sup> Due to its length and depth, it needs a minimum booking capacity of 10 bcm/y, although it could be scalable to 20 bcm/y. The pipeline may end in mainland Greece, but Greece is not its principal market; Italy is, and currently there is no pipeline connection between Italy and Greece. Therefore, project developers would need to construct another offshore pipeline across the Ionian Sea to reach Italy and, via Italy, the central EU markets. More importantly, Cyprus does not have additional reserves to commit to the project, whereas Israel, which has additional reserves, understands that a 10 bcm/y commitment to the EMGP will eliminate any chances for exporting gas to Turkey.

Should Israel decide to book 100% of EMGP's initial capacity, an unlikely probability in the absence of new discoveries, it would still be able to export 3 bcm/y to Jordan over 15 years *and* book almost 50% of Egypt's idle liquefaction capacity, estimated at 16.59 bcm/y. In this scenario, Israeli companies could export 2.8 bcm to Idku if Cyprus exports its 7 bcm/y from the Aphrodite field to the big Egyptian LNG terminal. Alternatively, Israel can cover all of Idku's capacity by exporting an additional 147 bcm to Idku over a period of 15 years, between 2025 and 2040 if Cypriot gas is unavailable.

In any case, Noble and Delek will export 5 bcm/y to Damietta via independent gas operators like *Dolphinus*, provided they use *in reverse* the EMG Ashkelon-El Arish pipeline that links Israel and Egypt across the Eastern Med seabed. In September 2018, Delek and Noble bought the EMG and are currently working on reversing its flow. The pipeline has a throughput capacity of 7 bcm, but could be scaled to transport over 10 bcm/y,<sup>48</sup> indicating future plans to increase exports to Egypt.

If Cyprus exports all of its gas reserves to the Idku LNG terminal, it would have no other gas to offer to the EU other than the volumes to be liquefied in Idku, although it cannot control the final destination of these exports. This is not the case for Israel. Even if Israel reserves in 2025 a 15-year contract to cover all of the liquefaction capacity in Idku from Leviathan Phase 2, it will still have around 100 bcm available in 2025 to commit to the construction of the East Med Gas pipeline to the EU.

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47 S. Tagliapietra, 'Is the East Med gas pipeline just another EU pipe dream?', Bruegel (10 May 2017), available at <http://bruegel.org/2017/05/is-the-eastmed-gas-pipeline-just-another-eu-pipe-dream/>.

48 O. Eran, 'Israel's Stake in the Egyptian Natural Gas Pipeline: Strategic and Economic Benefits', *Insight* No.1098, (Tev Aviv: INSS, October 2018), available at <http://www.inss.org.il/publication/israels-stake-in-the-egyptian-natural-gas-pipeline-strategic-and-economic-benefits/>.

These 100 bcm would cover 67% of the pipeline's initial throughput capacity, estimated at 10 bcm/y, for a period of 15 years. If Cypriot gas from Aphrodite does not end up in Idku in 2023, then Nicosia would have no other option but to be export Aphrodite's reserves via the EMGP in 2025, thereby increasing gas availability for the pipeline to 13-14 bcm/y over a 15-year period. This would make the project bankable. For any additional volumes, the EMGP will depend on future gas supplies from the drillings expected in Blocks 10 and 7 of the Cypriot EEZ. Both of these potential sources of supply will not be available before 2024-2025, at the earliest.

### ***The Israeli-Turkish Gas Pipeline***

The second option is that of the Leviathan-Ceyhan Gas Pipeline (LCGP), which given its depth (1500-1800m) and length (500-550km) would also need a minimum gas commitment of 10 bcm/y to become financially viable over a period of 15 years. Since Israel would sell 45 bcm to Jordan and 65 bcm to Egypt, a LCGP pipeline, estimated to cost anywhere between \$2 and \$4 billion,<sup>49</sup> would leave another 110 bcm for the Egyptian LNG plants and Egypt's domestic market, which is enough to cover Idku's liquefaction capacity for 10 years. Such an option is viable provided that no Israeli gas is committed to the EMGP and no Cypriot gas is exported to Idku, although the Egyptian government is unlikely to support it.

This scenario would also entail a complete reversal of Israel's current alliance building policies with Greece and Israel and a return to a pre-Mavi Marmara state of strategic cooperation with Turkey. An 8 bcm/y LCGP would provide around 12% of Turkish demand that is expected, according to the projection of the Turkish Energy Ministry, to reach around 65bcm in 2023 when Leviathan's second production phase is expected to come on stream. Turkey's private gas traders who are lobbying for the project, led by Turcas, may even offer a higher price to Israeli producers compared to Egyptian importers in order to improve the pipeline's commercial attractiveness.

Turkey's domestic market makes economic sense for Israeli exporters; an attempt to transit via Turkey to the EU does not make any economic sense, and that is something which even leading Turkish developers of the LCGP admit. As *Platts* noted in an interview with Batu Aksoy, the CEO of Turcas, the leading developer of the Leviathan-Ceyhan consortium on the Turkish side, 'While previous reports have said that if Israeli gas was brought to Turkey, the bulk of it would be transited on to Europe. In moderate to high growth cases, most of the gas to be imported to Turkey may be for local Turkish consumption.'<sup>50</sup> Israeli exports to Turkey will only

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49 H. Cohen, 'Gas execs see Israel-Turkey gas deal by 2017', *Globes* (2016, June 28), available at <http://www.globes.co.il/en/article-gas-execs-see-israel-turkey-gas-deal-by-2017-1001135479>.

50 European Gas Daily, (2016, April 21), 2.

benefit Turkey and Delek/Noble and would not serve EU strategic energy objectives. It would only increase Europe's transit dependency on Turkey.

There are those who claim that Israeli and/or Cypriot gas could merely transit to Europe via Turkey via the TANAP/TAP pipeline system, and in the process resolve all regional problems including, inter alia, the Cyprus Question. The proponents of a Turkish transit option for East Med gas<sup>51</sup> (Bryza) fail to take into account the following facts which severely complicate the feasibility of such a project, even if its materialization served both priorities of the EU's energy security strategy:

(a) There is no connection between TANAP and the Ceyhan region. It would need a dedicated pipeline to connect Ceyhan to the main EU-bound export pipeline for Israeli gas to approach EU markets, but this would be the beginning, not the end for the transit of Israeli gas to the EU.

(b) TANAP, with the exception of 5 bcm/y, is fully booked for the transportation of Azeri gas exports from Shah Deniz 2 and from other Azeri fields in the Caspian Sea, which will come on stream by the mid-2020s.

(c) There is no free capacity in TAP for East Med Gas for the same reasons.

(d) There is no pipeline system presently available to carry the gas from the Turkish-EU border to its final EU market destinations.

(e) The irresolution of the Cyprus Question would mean that the construction of the LCGP through the RoC's EEZ would seriously damage the multifaceted cooperation between Israel and the RoC. This cooperation is something that many political forces inside Israel may value more than the commercial interests of Leviathan's developers.

In any case, under current conditions the EU has nothing to gain from increasing its transit gas dependence on Turkey and that is partly why the EU has refrained from expressing any support for a Turkish transit option compared to its very public and very tangible support of the EMGP.

### ***The Egyptian LNG Options***

The lack of sufficient resources to build its own LNG plant, the continued irresolution of the Cyprus Problem and the immaturity of the EMGP have left the RoC with essentially one realistically attainable option that did not even exist as late as 2013, Egypt's LNG facilities. Cypriot Energy Minister George Lakkotrypis<sup>52</sup> has also mentioned Egypt's domestic gas market and Jordan as potential export destinations, although both alternatives are highly unlikely since Jordanian demand will be covered

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51 M. Bryza, 'Eastern Mediterranean Natural Gas: Potential for Historic Breakthroughs among Israel, Turkey, and Cyprus', *Energy in the Eastern Mediterranean: Promise or Peril?*, eds. D. Koranyi and S. Andoura, (Brussels: Academia Press, 2014), 39-46.

52 S. Henderson, *Jordan's Energy Supply Options: The Prospect of Gas Imports from Israel* (Washington D.C: German Marshall Fund of the United States. 2015), 7.

by Israeli exports<sup>53</sup> and the discovery of Zohr has minimized prospects for direct imports to the Egyptian market by the time Aphrodite or Leviathan Phase 2 may come on stream. Egypt is expected to eliminate its imports as early as 2019.

Prospective Israeli exports may go to Egypt's domestic markets by Tamar Phase 2 or Leviathan Phase 1 *only* if pre-existing pipeline infrastructure is utilized to cut the final cost to the end consumer, as it is happening with the Dolphinous agreement and with Nobel and Delek's purchase of a controlling share in the EMG pipeline. This is not the case for Cypriot reserves, which need a new pipeline connection to be constructed in order to reach their market destination in either Idku or Damietta. Since the Dolphinous sales contract in February 2018 and Cairo's decision to release 2 bcm/y from Zohr's production for liquefaction in Damietta in September 2018 the Damietta option no longer exists for Cypriot gas.

Aphrodite gas can begin production within 36 to 42 months after the signing of a sales contract which can come in early 2019. This means that Cypriot exports can begin no sooner than late 2022. Idku and Damietta are not equally attractive options and require a different supply mix to become viable. The prospective export of Aphrodite's gas, estimated at approximately 7 bcm/y over 15 years, does not suffice to book all of Idku's liquefaction capacity but was more than enough to book the entire capacity at Damietta for 17 years. Damietta is also much closer to Aphrodite, at a distance of 200km, whereas the Idku facility is 400km away from the Cypriot field, thereby doubling the cost of the necessary offshore pipeline to around \$1 billion. Cypriot gas could have booked Damietta alone. For Idku an Israeli contribution is necessary.

Cyprus has decided to move for the more difficult option and is committing its entire net export capacity to Idku. Its options are dictated by the fact that Shell, which controls 35% of the liquefaction capacity in Idku, controls an equal share in the consortium that develops the Cypriot field along with Delek and Noble. The developers (Noble, Delek, Shell) have demanded the renegotiation of the 2008 Production Sharing Agreement in order to reverse the original profit distribution shares in favour of the developers, a process that could last several months into 2019. Its successful conclusion, though, is a precondition for any commercial agreement to be reached that would unlock the export potential of Aphrodite.

Once the gas is liquefied Cyprus and its national oil company, CHC (Cyprus Hydrocarbons Company), have no means of directing the gas to the EU. Market prices and the commercial decisions of the companies that will liquefy the gas will play a role in whether the gas ends up in Europe or Asia. These LNG volumes, part of which will be sold to the EU, may represent the first exports of Cypriot gas arriving in

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53 Henderson, *Jordan's Energy Supply Options*, 12-14.

EU markets a mere decade after Aphrodite's initial discovery in 2011. Egyptian LNG from Zohr and Israeli LNG from Leviathan Phase 1 will be available for exports from Damietta as early as 2019, although it is not yet clear how much of the 6.4 bcm/y of the Israeli gas sold to Dolphinos will be liquefied in Damietta.

If the Cypriot gas export contract materializes in 2019, then Aphrodite's gas will cover more than 70% of Idku's capacity, liquefying approximately 7 bcm/y by 2023 or 2025. Damietta is expected to come on line much earlier, by 2019, and is estimated to reach its full 6.8 bcm/y capacity by 2020. By 2023, the combined exports from Aphrodite and part of Leviathan Phase 1 will cover the full capacity of Idku, and by 2020, Israeli gas from Tamar and Leviathan Phase 1 will most likely cover all 6.8 bcm of Damietta's LNG liquefaction capacity.

As a result, despite Turkey's best efforts to the contrary, Cypriot and Israeli gas will be able to utilize the entire liquefaction capacity of Egypt in both Idku and Damietta, estimated at 16.59 bcm/y. The Damietta facility is a single-train LNG plant with a 6.8 bcm/y liquefaction capacity. Idku has two LNG-trains each with a 4.896 bcm/y capacity.<sup>54</sup> Historically these facilities commissioned in 2005 reached their peak utilization rate in 2010 with a total liquefaction volume of 9.7 bcm, while 48.6% of that LNG (4.72 bcm) was eventually consumed in the EU, primarily in Spain, which imported 2.62 bcm in 2010.<sup>55</sup> (BP 2011, 29).

If the facilities are indeed booked at capacity and the 2010 patterns are reconfirmed, then the EU may get easily 50% of the combined Damietta/Idku liquefaction capacity amounting to 7,93 bcm/y. These 8 bcm per year amount to 80% of the Southern Gas Corridor exports expected to reach the EU via TANAP/TAP between 2020-2025. Beyond 2023, if new gas is discovered in the Cypriot EEZ, the EMGP may become a more viable export option provided that the current Cold War relationship between Israel and Turkey endures and that EU gas demand continues to grow fueled by a rise in gas-fired electricity generation.

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54 International Gas Union, *World LNG Report-2017*, (Paris: IGU, 2017), 66.

55 BP, *BP Statistical Review of World Energy 2011* (London: BP, 2011).

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