FUTURE OF ISRAEL GAS EXPORT UP TO 2050 & TURKEY

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INTRODUCTION

Despite its small population and territory, Israel is one of the most influential countries in the region. This is mostly due to global lobbying achievements, strong economy, high technology and military products, having support of ultra-rich Jewish people around the world and additionally being a natural strategic partner of USA.

"Until the last decade, Israel's name could not be associated with energy resources although she has owned the same features above and the strong influence in the region. After some discoveries such as Tamar, Leviathan, Tanin and Karish inside its offshore boundaries, Israel has started to be introduced as the future's important gas exporter in the region."

Until the last decade, Israel's name could not be associated with energy resources although she has owned the same features above and the strong influence in the region. After some discoveries such as Tamar, Leviathan, Tanin and Karish inside its offshore boundaries, Israel has started to be introduced as the future's important gas exporter in the region.

From the sight of international affairs between Turkey (who is also another strategic partner of USA) and Israel; after the 2009 Davos statements of the Turkish President (as a result of Israel's cruelties in Palestine) and Mavi Marmara irruption of Israel, relations come to a rupture.

After the end of 2015, while Turkey's relations were strained with Russia and naturally, gas import security raised alerts. And by adding this situation some other political reasons, Turkey and Israel have taken steps forward to reestablish good relations (by the way, it has been claimed that Israel also needs Turkey for an economic gas export to the due markets).

Before the coup, Israel has agreed to pay compensations to the families of the Mavi Marmara victims. And after the coup, this step and other due items have been negotiated and accepted by both governments.

With this alteration in the affairs between Israel and Turkey, energy, as it is stated, has become the most important issue that prepared both sides to have been eager to solve the problems in between. And now there are quite different scenarios, claimed by the experts, about the Israel's gas export route to Turkey and EU. In addition to these scenarios, unfortunately, the solution for the long-lasting Cyprus matter that stands against Turkish red lines, might find a ground to be asserted according to some Turkish experts.

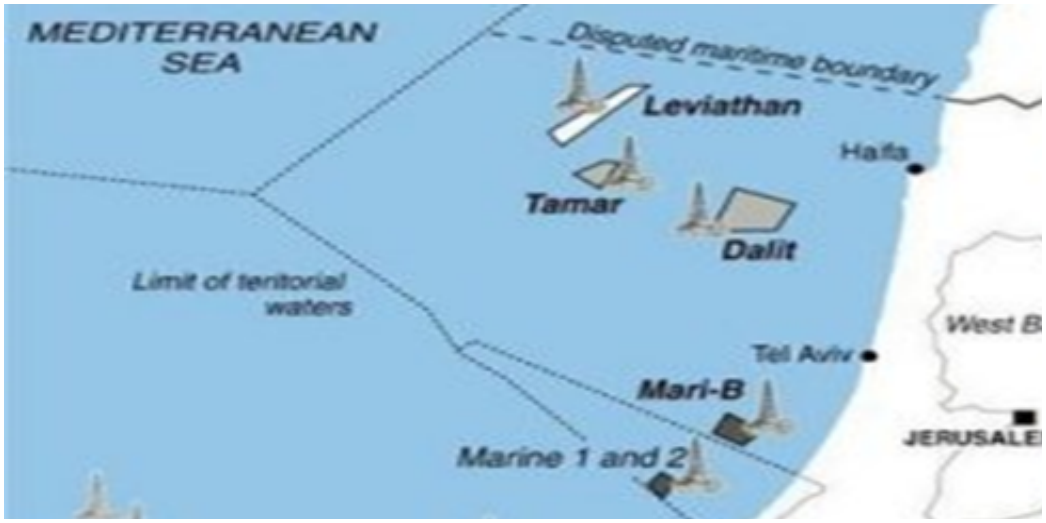
However, are these scenarios coherent from the point of reserves, export potentials, economics and other sights? What might happen in the future? For a possible gas transit or gas sales situation, may a country allow its red line policies to be relinquished?

In this study, after analyzing the reserves, export potential of Israel, and possible export options, Turkey's positioning, Cyprus matter and sales to EU conditions are tried to be detailed with the technical and economical sights in addition to politics.

RESERVE AND RESOURCE POTENTIAL?

Currently, there are 4 main producing gas fields in Israel, which are: Tamar, Mari, Noa and Zohar (onshore). Total current production is estimated to be around 10 bcma. It is estimated to have around 1 tcm (possible

and probable) gas reserves, as seen in Table 1.



Map 1: Some gas fields in Israel offshore. (Source: http://www.politicsforum.org).

Type	Field Name	Reserves (bcm)
Producing	Tamar	283
Producing	Mari	12
Producing	Noa	20
Producing	Zohar	2,5
Development	Leviathan	623
Development	Tamar Southwest	25
Development	Tanin	17
Development	Karish	36
Development	Dalit	14
Development	Hanna	No data available
TOTAL	ALL FIELDS	1032,5

Table 1: Main Fields & Reserves of Israel.

In addition to current producing fields, there are discovered new fields in the country. Which are mainly: Leviathan, Tamar Southwest, Tanin, Karish, Dalit and Hanna.

All the fields' reserves (proved and possible reserves) are calculating and given in Table 1.

As seen from Table 1, Leviathan and Tamar are the biggest reserve containing fields in Israel. And Israel seems to have around 1 tcm gas reserves.

While estimating the production profiles of these fields by benchmarking with the current producing fields and the due plans for each project below assumptions are made:

- For each field, production is assumed to be done technically in full capacity. No market, transportation limitations taken into consideration.
- Development plans and plateau rates are evaluated to reach the recovery rates between 70% and 85%. In addition, some public statements about the due projects are to be taken under consideration.
- Decline rates are assumed by benchmarking the current producing fields in the region. And for bigger structures (reserve volumes) decline rates are assumed to be lower.

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- For smaller fields (except Tamar, Leviathan) plateau periods are assumed to be lower, hence, less investment is expected to keep the plateau period longer.
- Commercial – political – security and international oil & gas price issues to be able to produce these fields are not taken into consideration.
- All fields are assumed to be produced up to the life of the field by not considering the economical limitations to abandon or license periods.
- Leviathan second phase is assumed to be in production with the beginning of 2030.
- Only Hanna license is not taken into consideration due to lack of information and a not approved discovery.

"With the activation of Leviathan field, Israel will be able to have a gas export volume."

"Only Tamar and Leviathan fields are strategically important."

As a result of these general assumptions, with the limited data those can be reached from the internet and the suitable benchmarks, showing each important potential gas fields' production forecast, is shown in Graph 1.

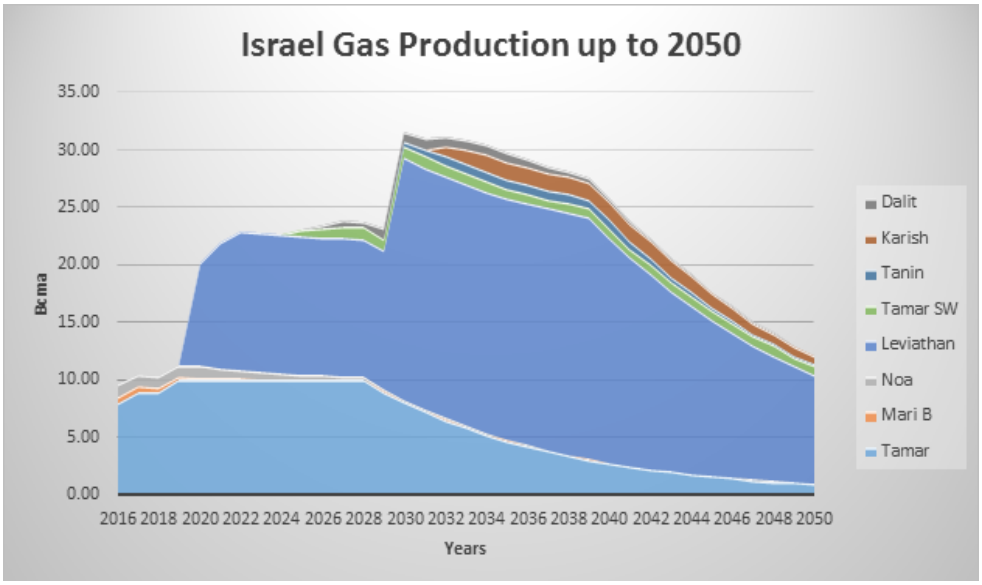
As shown on the graph:

- With the activation of Leviathan field Israel will be able to have a gas export volume.
- Only Tamar and Leviathan fields are strategically important.
- While comparing the time gap between the discovery and first production date of the fields seems longer than the international standards. This is mostly due to the lack of infrastructures to reach the available markets and Israel's tiring legislations (including anti-trust commission) which means a worse investment environment. So, some precautions have to be applied in order to take the first production dates of the fields to an earlier stage.

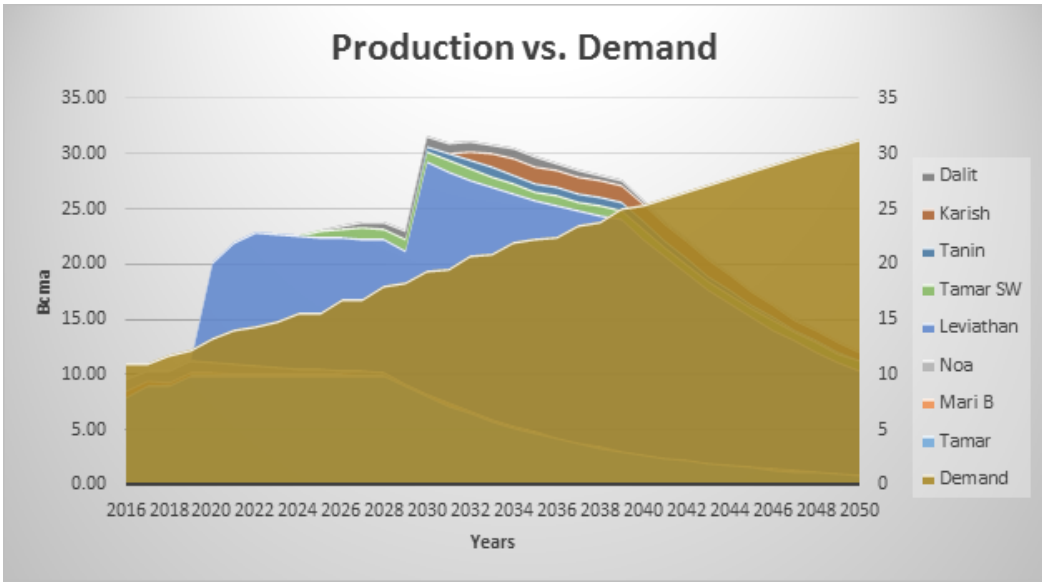
After evaluating the reserves potential and future production profiles of the important fields in Israel, by considering the demand profile, export potential have to be analyzed.

WHAT IS THE EXPORT POTENTIAL UP TO 2050?

To be able to evaluate the gas export potential of Israel, domestic gas demand scenario should be characterized. Generally, difference between the production capacity and the domestic demand will give the export



Graph 1: Israeli gas production forecast up to 2050.



Graph 2: Israel's production vs. demand profile.

potential (by not taking any possible imports into consideration).

For future demand profile, a study of Israel's Ministry of Energy and Water Resources, named "Israel's Natural Gas Demand Forecast 2011-2040" is used. Between the years 2041 to 2050, average incremental rate of the existing forecast (0,6 bcma) is added to the previous year's value.

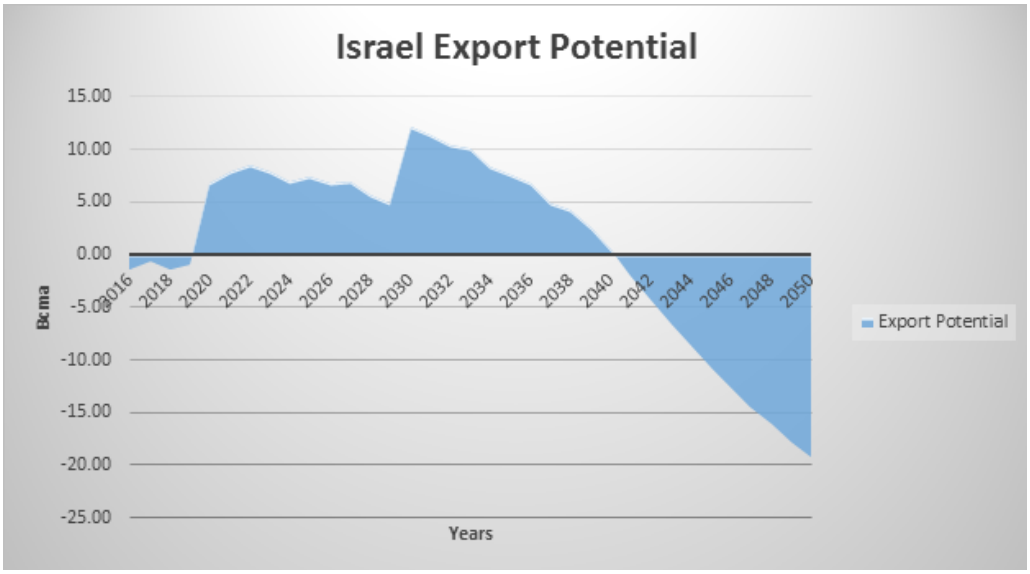
As a result, as shown in the Graph 2, production values in Graph 1 and the 2050 demand profiles are combined.

As seen from the Graph 2:

- Israel will have a gas supply capacity to the world markets only between 2020 and 2040.
- Only if some new giant discoveries can

"Israel will have a gas supply capacity to the world markets only between 2020 and 2040."

"Only if some new giant discoveries can change the scenarios."



Graph 3: Israeli export potential up to 2050.

change the scenarios.

By checking the possible export volumes in a clearer way, Israel's export potential can be calculated (See Graph 3).

According to the Graph 3:

- As mentioned above; Israel will only have a chance of 20 years to be a gas exporter in the region.
- Export volume potential, in comparison, is not as high and important as of the other gas exporters in the region.
- By putting a downside limit for long term gas sales agreements; as shown with the orange line in Graph 3, 5 bcma is available for Israel to make such contracts (from the sales of Leviathan). In the next sections, the possibility of constructing a pipeline with this volume of gas will be studied.
- The extra volume of gas, which can be accepted as the upside potential after extracting the 5 bcma long term volume, can be sold in spot markets or with short term agreements.
- Export potential graph proves that; Israel cannot be an important gas supplier for neither Turkey nor EU, by considering the export potentials and demand volumes.
- There is no chance for Turkey to import gas from Israel before 2020.
- After 2040 Israel will have to check for solutions to fill the gap of its gas demand.

"Export potential graph proves that; Israel cannot be an important gas supplier for neither Turkey nor EU, by considering the export potentials and demand volumes."

"There is no chance for Turkey to import gas from Israel before 2020."

After defining the export potential of Israel up to 2050, in the next section possible export options will be evaluated.

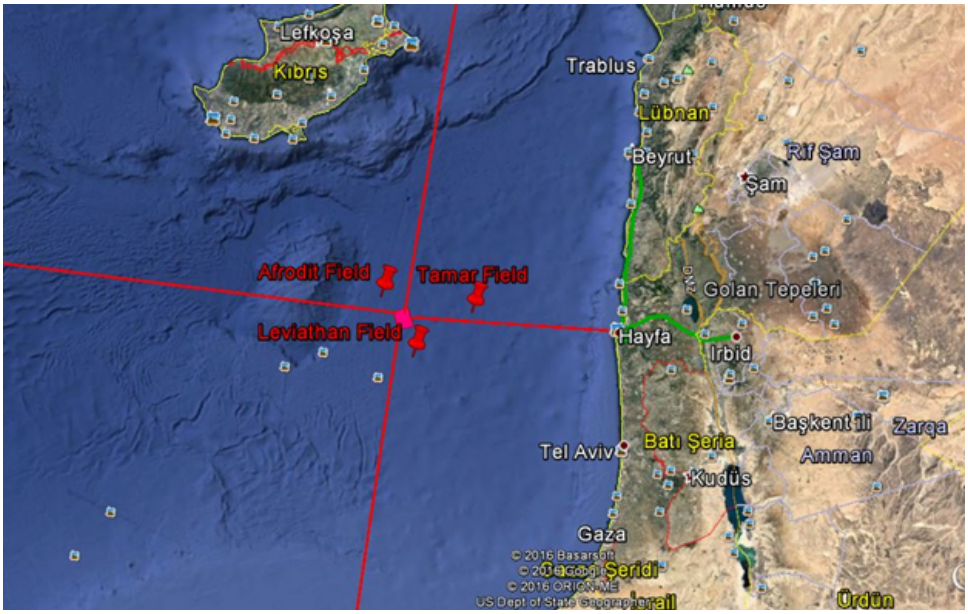
EXPORT OPTIONS

After specifying the annual export volumes of Israel up to 2050, some export options in different phases can be evaluated as follows:

- Keeping the produced gas in existing phase.
- Exporting the gas after liquefying to LNG.
- After producing electricity in the power plants and making electricity export via cables.

In the concept of each phase, export destination and the due markets will also be analyzed.

Map 2: Middle East (Source: Google maps).



Map 3: Possible offshore & onshore production plants and due export pipelines. (Note: Google Earth is used to prepare the map).

EXPORTING AS NATURAL GAS

Export as natural gas means; pipeline structures will be used for transportation but to which destinations?

Notes & Some Assumptions:

- For this scenario, hence, transportation is going to be done by the pipelines and such investments are more feasible with higher volumes and longer term contracts. That's why, in addition to Israel's 5 bcma downside gas potential after 2020, Aphrodite field's possible production is also assumed to fill the free volume of the pipeline. And the pipeline is assumed to have 10 bcma capacity. Although for some specific periods Israel fields and Aphrodite may have more production capacity but hence, those volumes will not be sustainable for minimum 20 years, for economic considerations 10 bcma capacity will be the best solution.
- In the below scenarios, possible risks as resource potential, market, infrastructures, commercial and political issues will be evaluated.
- For the commercial evaluations, costs – tariffs – market prices are estimated as oil prices are assumed to be around 70 $/bbl levels and according to this price level, (although will change according to the balances in the region) generally, gas prices are estimated to be 350 $/1000 m^3 and LNG prices to be 500 $/1000 m^3.
- Average unit production cost is assumed as 120 $/bbl for Leviathan field in 2020 with the 70 $/bbl oil prices (by considering the water depth), and the same with Leviathan for Aphrodite and other closer fields also.
- For cost estimations of the pipelines, due offshore pipeline cost with the due oil prices are benchmarked.
- For tariff calculations, pipeline project is assumed to have an IRR equal to 10.

FIRST SCENARIO:

By constructing an offshore floating production facility near the Leviathan Field, where Aphrodite, Tamar and other near fields will

"First scenario: By constructing an offshore floating production facility near the Leviathan Field, where Aphrodite, Tamar and other near fields will have chance to be linked, exporting the gas to Turkey, Egypt and Greece will be studied."

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EGYPT

Distance to Destination	250 km
Volume	10 bcma
Pipeline Diameter	28”
Estimated Cost	4,1 billion $
Estimated Tariff	65 $/1000 m^3
Resource Risks	To decrease the economic risks, capacity of the pipeline is selected as 10 bcma. However, without Aphrodite, Israel cannot fulfill such a pipeline capacity from 2020 to 2040. So, by considering the risk of Aphrodite not to be developed and taken into production in 2020’s there seems a low risk in this scenario.
Market Risks	Hence, transporting the gas to Egypt LNG ports means there is going to be a chance to liquefy and then export the gas, there is no market risks.
Political Risks	Although there are some political disputes with Egypt, those may not affect the commercial projects with the current government.
Commercial Risks	Transportation of the gas up to the Egypt’s ports does not have any commercial risks however, after adding the liquefaction and storage costs, the total LNG price of Israel gas in the Egypt’s ports will naturally have the risk of price competition with other suppliers. By the way gas price @ Egypt LNG Facility = 120 + 65 = 185 $/1000 m^3. By adding an average 120 $/1000 m^3 liquefaction and storage costs (by assuming to use existing facility’s capacity) then the price will be 305 $/1000 m^3. For the estimated LNG prices in 2020, again the scenario can be commercially feasible.
Results	In addition to the small risks, this option has a chance to be successfully applied.

TURKEY

Distance to Destination	400 km
Volume	10 bcma
Pipeline Diameter	28”
Estimated Cost	6,5 billion $
Estimated Tariff	95 $/1000 m^3
Resource Risks	To decrease the economic risks, capacity of the pipeline is selected as 10 bcma. However, without Aphrodite, Israel cannot fulfill such a pipeline capacity from 2020 to 2040. So, by considering the risk of Aphrodite not to be developed and taken into production in 2020s, there seems to be a low risk in this scenario.
Market Risks	There is no market risks in Turkey. In 2020s, Turkish gas demand is expected to be around 60 bcma. In addition, if the commercial environment and the capacity of TANAP will be suitable there may be a chance to transport Israel gas to EU (Source: Turkiye Gas Denklemi 2050, O. Akyener, TESPAM).
Political Risks	The main obstacle in this scenario is the political issues. Hence, for such a pipeline to be constructed Lebanon, Syria, both governments of Cyprus and Turkey have to officially agree on. The dispute with Lebanon over maritime boundaries and the war in Syria are ongoing. From the sight of Turkey, although some conflicts have solved and the relations turn into a normal level with Israel, Cyprus will still hold its position on being another subject that seems not easy to solve because, Turkey cannot leave the Northern Cyprus Turkish Republic Government to the bloody hands of Southern Cyprus and Europe all alone. That’s why, without the solution of Cyprus and Lebanon conflicts and having a stable Syria, politically, construction of such pipeline does not seem to be applicable. In addition no one will aim to solve these issues only for 10 bcma gas capacity. Some other reliable reasons have to encourage all the parties to work on the solutions.

Commercial Risks	From the commercial sight, by assuming gas price in Turkish market is around 350 $/1000 m^3 and in such condition, net back unit price is 350 – 120 (unit production cost) – 95 = 135 $/1000 m^3; project commercially is feasible.
Results	From the resource, technical, commercial and market sights, project has low or no risks. However, multinational political issues are mainly the obstacles. By the way, as being claimed in the international affairs terminology: There is always an open gate to solve the political disputes.

GREECE

Distance to Destination	1000 km
Volume	10 bcma
Pipeline Diameter	28”
Estimated Cost	16,5 billion $
Estimated Tariff	210 $/1000 m^3
Resource Risks	To decrease the economic risks, capacity of the pipeline is selected as 10 bcma. However, without Aphrodite, Israel cannot fulfill such a pipeline capacity from 2020 to 2040. So, by considering the risk of Aphrodite not to be developed and taken into production in 2020’s there seems a low risk in this scenario.
Market Risks	By only considering Greece, there are market risks while considering the gas demand volume.
Political Risks	There are no political risks if the route of the due pipeline does not go through the maritime boundaries of Turkey.
Commercial Risks	Total gas price @Greece = 120 + 210 = 330 $/1000 m^3. However, by considering the transportation cost inside the due EU markets, project will not be economically feasible.
Results	Due to economic obstacles, there is no chance this project to be realized.

SECOND SCENARIO:

Directly transporting the gas to the onshore and by constructing an onshore facility in Hayfa, exporting gas to Jordan and Lebanon. However, in this scenario, the main obstacle is the market. Hence the estimated market capacity in Jordan is 1 bcma in 2020 and 0,7 bcma in Lebanon. So, there is no market to sale the gas with this option even if this scenario is studied to enrich the concept. In addition, for its own consumption and for the upside volumes, shown as the orange line in the Graph 3, gas sales to Jordan and Lebanon can be the most economic options for Israel.

As defined in this scenario, Israel is going to transport all its offshore gas production to the onshore facility in Haifa. No gas from Aphrodite is accepted into the system. After Haifa, gas can be sold to West Bank, Gaza, Jordan and Lebanon. However, all the demand volumes of these regions are estimated to be lower than 3 bcma. So, there is an important market obstacle. Then the remaining volume may be transported to Egypt’s LNG facilities for export, by using (after some maintenance works) the existing old pipeline network (El Arish to Ashkelon Pipeline and additional pipeline system in Egypt).

Distance to Destination	150 km to Haifa (offshore) + 35 km to Lebanon border (onshore) + 70 km to Jordan Border (onshore)
Volume	8 bcm up to Haifa + 1 bcma to Lebanon + 1 bcma to Jordan
Pipeline Diameter	22” to Haifa + 12” to Lebanon and Jordan
Estimated Cost	2,5 billion $ to Haifa + 200 million $ to Lebanon + 350 million $ to Jordan
Estimated Tariff	35 $/1000 m^3 to Haifa + 8 $/1000 m^3 to Lebanon + 16 $/1000 m^3 to Jordan
Resource Risks	No risks in resources. Hence, only Leviathan is going to be developed.

“Second Scenario: Directly transporting the gas to the onshore and by constructing an onshore facility in Hayfa, exporting gas to Jordan and Lebanon.”

Market Risks	If there is no chance to transport the remaining volume of gas to Egypt's LNG facilities for LNG export, after the Jordan-Lebanon-West Bank sales, there is a high market risk in this option.
Political Risks	Hence, the sales are related with the countries which have political disputes with Israel, such project politically has medium level risks.
Commercial Risks	From the commercial sights, cumulative gas price @Haifa = 155 $/1000 m^3, @Jordan Border = 171 $/1000 m^3, @Lebanon Border = 163 $/1000 m^3, @ Egypt LNG Facilities (for 5 bcma volume, before liquefied and by using the existing pipeline structure with an average length of 400 km) = 195 $/1000 m^3. So, all cases are commercially feasible.
Results	This option is very complex and risky by considering the market and political issues.

THIRD SCENARIO (COMBINED SALES):

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In this scenario, Turkey option of the first scenario and the second scenario will be combined. So, only downside level of the export potential of Israeli gas, which is 5 bcma under the orange line in Graph 3, and Aphrodite gas will be transported to Turkey between the years 2020 – 2040. And the remaining portion of Israeli gas is going to be exported to Jordan – Lebanon – West Bank and Gaza as described in Second Scenario.

By this scenario, although being more complex and politically difficult, better commercial savings and higher influence of Israel in the region is expected or gained.

RESULTS OF THE THREE GAS PHASE SCENARIOS

As a result, the main milestones are political issues, commerciality and the market demand. After eliminating the first scenario's Greece option, which has no chance to be applied,

- According to political issues: First Scenario, Egypt option is the best.
- According to commercial issues: Third Scenario and the First Scenario Turkey options are the best.
- According to overall results: First scenario, Turkey option seems as the best applicable and commercial selection. However, there are huge political obstacles and milestones on the way.

EXPORTING AS LNG

Export as LNG means; by constructing a floating LNG facility in the same location (linked with the offshore production facility) marked with pink color in map3 between the Leviathan – Aphrodite and Tamar Fields, and then exporting produced LNG to the world markets. In addition, with a smaller capacity floating LNG facility, Israel also has a chance to export its gas without bearing of the Aphrodite field. However, in this scenario, 10 bcma capacity is studied. Hence, while capacity doubles, the unit costs decrease.

Volume	10 bcma
Estimated Cost	11 billion $
Estimated Unit Transportation Cost	This cost consists of liquefaction & storage (180 $/1000 m^3) + transportation & insurance (60 $/1000 m^3) + regasification (80 $/1000 m^3) costs. And as total = 320 $/1000 m^3 (for Turkey markets). For other markets transportation costs will differ.

Resource Risks	Low risks due to the wait for Aphrodite field development. However, by decreasing the capacity to the Leviathan limits, this risk can easily be handled.
Market Risks	No market capacity risks. All EU and Turkey are possible markets to reach.
Political Risks	No political risks.
Commercial Risks	Huge investment needed. Furthermore, by considering the total gas cost for the nearest market Turkey; 120 + 320 = 440 $/1000 m^3 is an acceptable LNG price by considering the assumed 2020 conditions. By comparing with the LNG sales in Egyptian port, LNG cost at such facility is 120 + 180 = 300 $/1000 m^3, seems a little more economic option. Note that: Hence, it was assumed that in Egypt option, existing capacities of the due facilities are going to be used, liquefaction and storage costs of Egyptian port assumed lower than this scenario. From another point, hence, being floating and moveable, such facility can be sold to another producer and can be used for future projects.
Results	Hence, has lower political and commercial risks, seems conceivable. However, while thinking the extra huge costs, seems unpreferable.

EXPORTING AS ELECTRICITY

Export as electricity means;

- Directly transporting the gas to due onshore gas plants for electricity generation.
- After electricity is generated, by constructing electricity export lines to due customers and making sales.
- These customers may be its neighbors, other Middle East countries and Greece.

In this scenario:

- By giving a general approach "to generate 1 kwh in an average power plant, 0,01011 mcf gas is needed" (Source: https://www.eia.gov/tools/faqs/faq.cfm?id=667&t=3).
- While generating electricity from the stable downside potential of Israeli export volume, which is 5 bcma (not dealing with Aphrodite); then there is an average capacity of producing 17,5 billion kwh (after assuming the due demanded power plants are constructed).
- Then the targeted markets' electricity imports are (Source: CIA Factbook):
  - West Bank = 4,9 billion kwh
  - Jordan = 381 million kwh
  - Lebanon = 323 million kwh
  - Syria = 1,2 billion kwh
  - Iraq = 8,2 billion kwh
  - Greece = 4,7 billion kwh
- However, these values belong to 2013 estimations. So, the situations, production capacities, and demand volumes may differ from current estimations. Nevertheless, by excluding the political issues, there may be nearly enough market capacity by considering 17,5 billion kwh export capacity and all above markets accept to make all their imports from Israel. However, this idea seems unrealistic.
- That's why, supplying some of the generated electricity to West Bank and selling the other portion with an electrical line to EU markets may be a more suitable selection, by considering the market ob-

"Directly transporting the gas to due onshore gas plants for electricity generation by constructing electricity export lines to due customers and making sales."

stacles in the neighboring areas.

- However, again a huge investment is needed for gridding such an electricity line project. By considering the 2020 conditions, around 4,4 billion $ cost is estimated to be paid only for the underwater cable project, which is around 1150 km. This huge cost does not include the construction of due power plants needed to generate the electricity. After adding those items, the cost will be higher. Moreover, the increasing costs will augment the unit costs of the exported electricity prices. So, what this means for Israel as being an electricity supplier, with a higher unit cost she will have less advantage in price competition within the EU market.
- As a result, this scenario is also very complex and many related different items, such as the effect of gas power plant construction on the unit prices, unit tariffs of the underwater cable (by assuming such an investment to be unprofitable), other transportation – tax – extra costs in the EU markets and the unit sale prices in the targeted markets in EU have to be studied.

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RESULTS FOR EXPORTS

As a result after eliminating the weak market demand or commercially impossible scenarios,

- From the economical sight: Exporting in gas phase and export to Turkey option is the best.
- From the political sight: LNG export is the best.
- From the complexity sight: LNG export is the best.

So, decision makers are going to follow the political tendencies. If the due disputes with Turkey can be solved, then gas export via pipeline to Turkey will be the best selection. If not, LNG seems easier and less complex selection, although it is very expensive.

Electricity import, in addition to have lots of investment, is very complex to be able to manage.

SOME ANALYSIS

In this part, after defining the export potential of Israel and evaluating the possible export scenarios, some popular claims and questions related with these topics are tried to be analyzed.

KURDISH CORRIDOR AND ISRAEL AS A GAS & ELECTRICITY SUPPLIER?

There are some interesting theories regarding Israel becoming a gas and electricity supplier and an energy hub in the region, after achieving its plans on generating a Kurdish corridor starting from Western Iran, adding Northern Iraq and including Northern Syria.

"There are some interesting theories regarding Israel becoming a gas and electricity supplier and an energy hub in the region, after achieving its plans on generating a Kurdish corridor starting from Western Iran, adding Northern Iraq and including Northern Syria."

Those theories might be used for psychological manipulations on illiterate societies. However, such claims are inconsistent and can only be considered as a conspiracy theory under current circumstances.

Hence;

- Israel does not have so much export potential and huge reserves, by comparing with the other suppliers' potentials.
- There is no so much demand in the due region.
- In the concept of such a Kurdish corridor, Israel's boundaries are not the best location for the oil and gas exports for Iraq and Iran resources.
- In addition, while there are existing and cheaper transportation systems, none of the operators would make extra investment to follow another political route.

- Neither Turkey nor Iran – Iraq and Syria will not allow generation of Kurdish corridor.
- Even though ethnicity in the region has been tried to be changed by use of terrorist forces as Daesh and KDP, such corridor is never possible.

As a result, Israel may supply gas and electricity within the region. However, this will not have a huge potential.

TURKEY'S POSITION IN EXPORT BALANCES

As can be understood from the sections above, Turkey has no vital but an important role for Israeli and possible Southern Cypriot gas exports. By considering:

- More profitable net back prices from the sight of seller.
- Huge Turkish gas demand market.
- Turkey being a good customer, a stable and an honest country.
- Except the political sight, this scenario to have less complexity and low investments.

Turkish option seems to be the best selection. In addition to these properties, via TANAP or extension of TANAP, there is always a chance to transport the Israeli gas to EU.

CYPRUS POLITICS

Although asserted that, solution of the disputes on Cyprus is necessarily an important milestone for the Turkish gas export scenario to be achieved, perhaps some back doors may be opened before trying to elaborate on difficult solutions.

For example:

- With the initial agreement of Turkey and Israel, both Southern and Northern Cyprus Governments may not claim an approval of the pipeline laid through their officially disputed and proposed exclusive economic zones (EEZ).
- Hence, Turkey will not be positive about Aphrodite gas field being developed and produced gas being transported to Turkey, but Turkey can be inserted as a partner to the project. By this way, Turkey will be in a position for transporting and selling its own gas.

"Turkey has no vital but an important role for Israeli and possible Southern Cypriot gas exports."

In addition to the sight of Turkey:

- It is clear that Israel's export potential is not too high and very important for Turkey.
- Turkey is aware of its advantage over Israel in any negotiations related with these topics.
- Opening a gate for Israel to export its gas means opening the gate also for Southern Cyprus.
- Cyprus for Turkey cannot be evaluated with any price and its rightful due disputes will not be relinquished for any project.
- From another point, Israel is not a stable country by evaluating its decisions, which provides investors with an unreliable environment. Israel, as easily changing items of the existing international exploration agreements signed with other countries, can be analyzed as an example of this situation. This fact also is the same for its international affairs. That's why both Turkey and other partners may act more gingerly about the joint projects with Israel.
- One another point: Israel is the only chance for Southern Cyprus to develop its discovered fields.

"Opening a gate for Israel to export its gas means opening the gate also for Southern Cyprus."

POSSIBLITY OF EU SALES

The most important issue for Israeli gas to

be sold to EU via Turkey is economics. And economics can be checked with very small estimations.

- As identified above, the total cost of Israeli gas in the Turkish border is estimated as being 215 $/1000 m^3.
- After this point, by assuming that 5 bcma of 10 bcma Israel + Aphrodite gas is sold in Turkish domestic market, then the half portion of 5 bcma is assumed to be transported to the western Turkish border for sale to EU markets via:
  - Existing free capacity in TANAP: This option seems not possible due to Azerbaijan's national strategies and the current agreement items. Nonetheless, if assuming there is a free capacity due to unexpected situations and some amendments made to use that free capacity to transport 3rd party volumes in the existing agreement, then estimated transportation cost is estimated as (including the possible costs to reach the TANAP): 120 $/1000 m^3.
  - A new standalone pipeline is constructed to transport Israeli gas: After such an investment, with 32" diameter and 1000 km length with 5 bcma capacity, cost of such pipeline will be 6 billion $ and the tariff is 65 $/1000 m^3.
  - Turkish gas distribution system is upgraded: In such a case, the tariff to pay the BOTAS is estimated as 30 $/1000 m^3 (without making investment in the upgrade operations).
  - So, third option is the best choice for such export volume according to economics.
- Then the total costs in Turkish western border with the 3rd option will be 245 $/1000 m^3. Gas from that point easily can be sold to Greece, Macedonia or Bulgaria. In addition, with other new projects can be transported to Baumgarten market with an additional cost of 60 $/1000 m^3. This means the total cost at Baumgarten is 305 $/1000 m^3. Which is feasible in assumed conditions.
- Moreover, for such export projects, Russian gas supply politics, Turkish Stream, EU's gas pricing policies & pricing tendencies and the markets' demand expectations have to be studied.

"The most important issue for Israeli gas to be sold to EU via Turkey is economics."

"As a result from the current view, it seems possible to export Israeli gas through Turkey to EU."

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CONCLUSION

Israel is one of the most important and influential countries in the Middle East. In addition, after the offshore gas discoveries in its maritime boundaries, she has asserted to be the shining energy hub and important energy supplier in the region.

However, was this assertions really coherent? What was the export capacity of Israel? Yes, some mid-level huge gas fields have been discovered, however is there a suitable environment to develop those fields and export the gas? Initially, these questions have to be answered.

While reviewing the literatures, there are many studies related to the export options of Israeli gas. However, there is not enough studies on how much export potential Israel has.

That's why in this study, after evaluating the production and reserve properties of the Israel fields, its export potential up to 2050 is tried to be estimated.

According to this export potential, several export scenarios are studied. According to the results of the studies, Turkish route is selected as the best option.

However, hence this route to have may political disputes, some other items such as Cyprus were adverted.

In addition, the possibility of exporting Israel gas to EU is also studied.

As a result, export and reserves potential of Israel is not so high while compared with that of the other important suppliers' in the region. Additionally, for better commercial solutions in their projects, both Israel and Southern Cyprus need Turkey to succeed their goals.

That's why Turkey has to keep these facts in mind during any negotiations with Israel & Southern Cyprus.

"Export and reserves potential of Israel is not so high while compared with that of the other important suppliers' in the region. Additionally, for better commercial solutions in their projects, both Israel and Southern Cyprus need Turkey to succeed their goals."