DATE: April 15, 2012  
TO: Secretary of State Hillary Clinton  
FROM: Team 14  
SUBJECT: Goliath Gas Field Discovery: Proposal for Joint Development Zone

### The Situation

Given the strategic location of Goliath Natural Gas Field and the nature of relations between Lebanon, Israel, Turkey, and Cyprus it is in the U.S. interest to provide a way forward for all involved. We recommend the following for immediate action:

- A moratorium on exploration and development of the Goliath natural gas field.
- The initiation of negotiations, located in a neutral country and mediated by Turkey, directed towards establishing the field as a Joint Development Zone (JDZ). (See Appendix B)

The moratorium seeks to prevent the negative repercussions of unilateral development of Goliath field in the short-term, while Turkish-mediated negotiations will allow benefits to accrue for all parties in the medium and long-term.

The development and utilization of the Goliath field is subject to the following factors: a complex and lengthy history of disputes in the Eastern Mediterranean region, the acute economic and energy needs of the countries involved, the shadow of multiple claimants over the investment potential of the field, and the risk of violent conflict. In this case, the JDZ model is the institutional arrangement most likely to succeed. The intergovernmental, cooperative nature of this provisional arrangement is designed for the purposes of timely exploitation of undersea resources in disputed maritime zones, without the need to resolve intractable boarder disputes.

The JDZ approach focuses on functional issues, considering operational, logistical, and economic variables while tabling the sovereignty dimensions of the dispute. Separating economic, cultural and political issues in entrenched regional disputes is difficult; the Turkish-mediated JDZ approach allows sufficient space for drilling to proceed, while allowing all parties to save face by not backing away from long held public positions regarding the more intransigent sovereignty disputes.

Through the JDZ mechanism negotiations shift from a “zero-sum” process, to one in which all parties may benefit, thus reducing the likelihood of hostilities. Additionally, U.S. interests in the region can be accommodated without ignoring the interests or positions of Israel, Lebanon, Turkey, and Cyprus. The remainder of this memo examines these interests, explores in depth the process of establishing a JDZ, and maps the inducements, penalties, and mechanisms necessary to bring the conflicted parties to the negotiating table.

### U.S. Interests

The U.S. has several overarching interests in this situation, including promoting regional stability and securing the free flow of energy to global markets. There is a significant danger in Israel unilaterally developing the field and, conversely, that of Turkey attempting to block any drilling in Cypriot waters. The first situation may lead to open hostilities and the second a continuing economic malaise. The main U.S. interests are as follows:
1. Promoting stability in the Middle East.
   a. Preventing unilateral exploitation of Goliath field.
   b. Preventing Turkey or Lebanon from halting development for extended periods.
   c. Focusing negotiating efforts on functional issues and tabling sovereignty disputes, allowing for development without damaging domestic perceptions of national positions vis-à-vis competing states.
2. Promoting energy diversification and supply security for U.S. allies.

**Stage 1: Proposal for Short-Term Action**

The first phase of a comprehensive (See Appendix C) effort to bring a satisfactory resolution to the dispute will last six months to two years. Informal dialogue (Track-Two diplomacy) should begin immediately during Stage I and pave the way for formal negotiations during Stage II. Formal negotiations will be held in Switzerland and mediated by Turkey. We believe Turkey will serve as primary mediator in these discussions, especially between the governments of Lebanon and Israel, as it helps Turkey fulfill their proclaimed role as a regional leader of the Eastern Mediterranean. Additionally it is more likely that the government of Lebanon will cooperate with Turkish mediators versus U.S. mediators, as there are fewer domestic political implications.

The goal of Stage I is to prevent an outbreak of armed conflict in the region and set the stage for formal negotiations. A first step is to insist all parties observe a moratorium on drilling and exploration while a third party performs a delimitation of the Goliath field. A Turkish Special Envoy may be necessary to help prepare all parties for formal negotiations in Stage II. The focus on functional issues in these negotiations will make them easier for parties to accept.

The acceptance of the steps outlined above is based on the following assumptions. First, that Turkey views itself as a regional leader in the Eastern Mediterranean, and will thus strongly consider the option to be seen publicly in a mediator role, even if Turkey holds contrary interests regarding the development of gas resources vis-à-vis Cyprus. Second, that Lebanon will agree to begin Stage I and Stage II discussions because it is in their interest to stall any unilateral attempt by Israel to conduct drilling and recovery operations. And Third, that Israel will not refuse to participate in the negotiating process and simply unilateral develop the field. The Economist recently reported that Israel intended to initiate maritime border dispute resolution talks with Lebanon through the UN.

**Stage II: Dispute Resolution Plan**

Goals of Stage II are to move from Track-Two Diplomacy to formal negotiations, agree on the delimitation of the development zone, build local capacity — for Lebanon — and finally, to agree to the apportionment of future royalties derived from licensing and development of the JDZ to private International Oil Companies (IOC). Stage II will last between two and five years.

The first step to accomplish Stage II objectives is the organization of working groups to address the issue of the delimitation of the development zone. Additionally, Lebanon will need assistance in building expertise for oversight of gas field development and utilization. It is appropriate to retain the services of third party consultants to act as instructing experts. Next, the working groups will need to address the apportioning of future benefits derived from field development.
These discussions may be contentious as the future spoils of Goliath are at stake. We believe that achieving the fairest and most equitable distribution of royalties from the field is possible by dividing the royalties according to territorial percentages. Cyprus will likely be entitled to 25% of the future royalties derived from the JDZ, assuming third party delimitation confirms Noble Energy’s claim that 25% of the field falls in uncontested Cypriot waters. Israel is entitled to a proportion of royalties equal to the territory of the field falling with in undisputed Israel waters plus 50% of the disputed territory. Finally, Lebanon will share royalties equal to 50% of the disputed territory.

Figure 1 shows how this method might look following a hypothetical delimitation. In this example Cyprus would be entitled to 25% of total royalties from the development of the field. Israel would be entitled to 40% (the area of the JDZ falling within undisputed Israeli territory) plus an additional 17.5% (50% of the disputed portion of the field) for a total of 57.5% of the royalties from development. Lebanon would thus be entitled to 17.5% of the royalties.

In addition to determining the exact proportion of the royalties that each state would receive it is also necessary to determine the rate at which the developing IOCs would have to pay royalties. We propose that the government share of oil and gas revenues derived from the field be between 52% and 62%.

The acceptance of the steps outlined above is based on the following assumptions. First, that Turkish objection to the participation of Cyprus in the Goliath JDZ can be overcome. If Turkey accepts the role of mediator of the multi-party talks, and the US offers some well-placed carrots, Turkish leaders are likely to table their ongoing dispute with Cyprus for the sake of increased prestige in the region and other diplomatic gains. Potential incentives include, an “option of participation” for the Turkish state-owned BOTAŞ Petroleum Pipeline Corporation on any possible future pipeline project that brings Goliath gas to market. See Appendix F for a fuller discussion of this topic and a selected list of Turkish interests and U.S. encouragements.

Second, we assume that Cyprus agrees to the third party delimitation of Goliath, and to long-term talks held in Switzerland, even if Turkey is the mediator. If Turkey tables the Cyprus border dispute for its own benefit, Cyprus will likely agree to negotiations for its own benefit. Third, that Lebanon will want a percentage share of the output of the JDZ, and will participate in Turkish led discussions. Given that Lebanon faces either conflict with Israel or stalled development of the field—each less profitable outcomes—it is likely they will opt to participate. Fourth, Israel will agree to participate in discussions because timely gas field production is in their best interest and a successful JDZ will add additional export options for gas.

**Stage III: Structure for Success**

The goals of Stage III are the establishment of the Joint Development Authority (JDA) and Joint Development Corporation (JDC). The JDA is composed of two or three members each from Israel, Lebanon, and Cyprus, with Turkey given observer status (an additional inducement to drop the Cyprus boarder dispute). The JDA will collect royalties and oversee the JDC, which is responsible for the exploration and recovery operations on the Goliath field. The JDC is
strategy.

The success of Stage III assumes the continued productive involvement of Turkey, which seems likely given its observer status on the JDA. This position affords it the opportunity to influence the midstream and GTM strategy. Success also depends on the continued involvement of Lebanon, Cyprus, and Israel, which given the lack of domestic energy companies capable of raising the capital required to build an LNG terminal or build a transnational pipeline, seems likely. It is assumed therefore that they will continue involvement to maximize field potential.

**Stage IV: Beyond Year Five**

Yearly output from Goliath will depend on subsurface geography and other factors. Once experts determine realistic annual production estimates for the fields, and the successful establishment of the Goliath JDZ, JDA and JDC the U.S. might realize several long-standing interests in the region, including: a non-Russian gas supply option for Europe, additional stable sources of gas for the global markets and greater opportunity for U.S. IOCs in the Levantine Basin.

A sensitivity analysis of key variables is an important part of a midstream and GTM strategy. An obvious variable is the price of gas, which is not as fungible as oil. There are new technological developments, such as hydraulic fracturing, that appear to point towards a long-term increase in supply of gas. If adequate delivery systems are developed to transport gas or LNG to high demand locals, the price could decrease greatly, which would influence the strategic GTM options.

The immediate markets for Goliath gas are domestic, first Israel and then Lebanon and Cyprus as these economies gasify. Immediate exports to Jordan through existing pipelines are also possible. Sufficient production levels would also make export of gas to Egyptian LNG liquefaction terminals a real possibility. If production from Goliath exhausts these outlets further export options include the construction of a LNG liquefaction terminal in Cyprus or a pipeline to Turkey. Appendices F, J, & K explain in greater detail these export options, as well as the price and production levels necessary to justify certain capital investments.

**Conclusion**

To avoid an outbreak of hostilities, we recommend an immediate moratorium on drilling in the Goliath field, and then a systematic process to form a joint development authority that can effectively and fairly oversee the operation of Goliath. As a regional power Turkey has the ability to stall either negotiations or field development. Furthermore, Israel might believe a unilateral approach to field development best meets their interests. Lebanon could simply refuse to participate given longstanding political and social issues with Israel. Given these possible roadblocks to field development, as well as U.S. interests in the region the most productive way forward is joint development of Goliath.
Endnotes

1 Cyprus refers to the Republic of Cyprus and is not to be confused with the Turkish Republic of Northern Cyprus, which will be referred to by name when necessary.

2 Unilateral development of the Goliath Field on the part of Israel by Noble Energy and its partners is the scenario most likely to lead to conflict. Israel is in a position of power vis-à-vis Lebanon as it has greater military power, ability to raise capital for the expensive development of the field and more existing oil and gas expertise. Given these variables it is possible for Israel to precede with unilateral development, and make extensive use of horizontal drilling (See: U.S. Department of Energy. “Drilling Sideways – a Review of Horizontal Well Technology and Its Domestic Application.” April 1993. ftp://ftp.eia.doe.gov/petroleum/tr0565.pdf)

3 Lebanon will likely be suspicious of U.S and Israel proposals out of fear that the West/Israelis objectives are aligned with a motivation detrimental to Arab interests. By having Turkey moderate negotiations some of these fears may be mitigated.


5 Currently development of natural resources in the Eastern Mediterranean has been limited as a result of the tenuous nature of the area’s politics. Large IOCs have mostly stayed away from the area believing the political risks too high to warrant committing the capital necessary to explore and exploit. (See: Ian Bremmer. The Fat Tail: The Power of Political Knowledge in an Uncertain World. May 13, 2010.)

6 Violent conflict may result from unilateral development of Goliath and will likely involve two or more of the following parties: Turkey, Israel, Lebanon, Hezbollah, Cyprus, and the Turkish Republic of Northern Cyprus. Additionally regional conflict has the potential to drag in U.S. forces as well as Syrian, and or Iranian forces.
JDZ agreements are typically signed for a particular period of time, 25 to 50 years for examples. This has the added benefit of emphasizing that the JDZ delimitation and exploitation of resource in no way constitutes a maritime boarder establishing precedent.

It is of the utmost importance that all parties involved in Goliath be able to maintain domestic support for JDZ activities. In order to do this no side should be seen as being dominated by another party in the negotiations. Lebanon cannot be seen in public as repeatedly conceding to Israel demands, or else Hezbollah may react in a violent and or counter productive way. Likewise Israel cannot be seen as conceding to every demand the Lebanese put forth. This means that the public narrative surrounding Goliath in each country will likely diverge, often dramatically, from the actual proceedings. The language of friend and foe is very important in Middle Eastern culture and in order for these negotiations to be successful all sides should ignore the domestic commentary of their counterparties and allow political will to overcome political narrative. (See: Nancy Snow. Routlege Handbook of Public Diplomacy. Chapter 8-Operalizing Public Diplomacy, Pg.69. 2009. & Project Syndicate, Ann-Marie Slaughter. “Saving Face and Peace in the Gulf.” January 9, 2012. http://www.project-syndicate.org/commentary/saving-face-and-peace-in-the-gulf)

Although preventing violent conflict is the most pressing concern allowing for development is also important. An endless stalemate that leaves Goliath field undeveloped for many years is a very real outcome. This is a situation that is likely tolerable for Turkey, Israel and Cyprus, as they lack the pressing economic issues of Lebanon, but an outcome far less favorable to Lebanese interests than mutual development of the field.

The U.S. has an interest in diversifying European energy supplies if possible to lessen dependence on Russian natural gas (See: Harvard Kennedy School, Megan O’Sullivan. IRD Study Group Lecture Notes. April 13, 2012)

Track-Two Diplomacy is informal and unofficial interaction between influential private citizens or groups of people within a country or from different countries who are outside the formal government power structures with the goal of developing strategies to influence public opinion and to help resolve an inter- or intra-state conflict. (See: Wilfried Bolewski. Diplomacy and International Law in Globalized Relations. 2007. Pg. 39.)

There is currently a power gap in the broader Middle East. There are no overwhelming powers and most countries are inward looking (stable but intent on maintaining stability, Saudi Arabia), fractured (Syria) or political outcasts (Iran). In such an environment Turkey, as a stable, democratic and relatively wealthy country views itself as an emerging regional power. Just as Turkey tried to achieve this status with the 2010 Brazil-Turkey-Iran Nuclear deal, the role as chief mediator in a potential JDZ between Cyprus, Lebanon, and Israel would likely accomplish a similar goal and firmly establish Turkey as the well-respected senior statesmen of the region. (See: Stratfor. “The Geopolitics of Turkey: Searching for More.” August 2, 2010.)

It is assumed, based on the case, that Lebanon has a government of some kind that other countries can work with, the instability of the 2011-2012 period, in which Lebanon lacked a parliament, has presumably passed. (See: HKS. “New Finds of Energy in the Eastern Mediterranean: Cause for Conflict or Cooperation.” Pg 8. April 6, 2012.)

The JDZ system requires IOCs to pay royalties to the participating states, these royalties are in essences the income taxes the individual states would have levied against the IOCs had they been developing NatGas fields that are wholly within the states maritime boundary. The rates proposed in this memo are the rates suggested by a committee directed by Israel’s Minister of Finance. These rates represent a significant increase in the government share of the oil and gas revenues but are not only rates desired by the current government of Israel but are levels that are more inline with the rates other Oil and Natural gas producing countries charge IOCs (See: Congressional Research Service, Michael Ratner. “Israel’s Offshore Natural Gas Discoveries Enhance its Economic and Energy Outlook.” January 31, 2011.)

The level of gasification will greatly impact the available gas for export. Multiple variables have to be taken into account when converting an economy to gas including the stable availability, risks involved in over reliance. A recent RAND study suggests that, at least in the case of Israel, over gasification is as dangerous as over reliance on imports. The best solution is a robust mix of energy sources. Our analysis assumes this robust approach will be taken by Israel, Lebanon and Cyprus. Additionally it is worth pointing out that 100% gasification of the economy is not possible as transportation is still heavily reliant on gasoline. Any thought of un-tethering Israel’s energy policy from some reliance on its oil-producing neighbors is fantasy. (See: RAND, “Natural Gas and Israel’s Energy future: A Strategic Analysis Under Conditions of Deep Uncertainty.” 2009. http://www.rand.org/pubs/technical_reports/TR747.html).


Appendix A: List of Appendices

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Appendix B: Introduction to Joint Development Zone Theory

There is no hard and fast definition of a Joint Development Zone (JDZ). At this time it is a concept that has been employed in several places and in several different ways. At its simplest it can be defined as “an inter-governmental arrangement of a provisional nature, designed for functional purposes of joint exploration for and/or exploitation of hydrocarbon resources of the seabed.”\[^1\] Missing from this definition is the specific nature of the arrangement between the governments involved, yet it is clear that the primary topic for negotiation is how best to extract resources for mutual benefit, rather than the delimitation of a disputed maritime boundary.

This is the strength of the JDZ method, the tabling of intractable issues of sovereignty – bound up as they often are with social, cultural and political dynamics – and a focus on economic issues of significance. Furthermore, as a corroborative method of resource exploration and exploitation it is particularly well suited to oil and natural gas fields given their fluid nature. Although an oil or natural gas field cannot be exploited from a single well, and the entire reservoir drained as if the field were a glass of water being drunk through a straw, extraction in one area does damage the potential of other extractors.\[^2\] Maximizing field potential relies on cooperation between drillers to avoid the migration of the resource and decreases in field pressure. It is thus essential in disputed territories to employ a JDZ approach, lest over-eager countries rush to unilaterally exploit, and in doing so damage the fields potential.

There are a few key ideas essential to the success of the joint development of a resource, and they are: the joint management of the entire field or resource regardless of the borders, co-management and distribution of resources according to a pre-determined formula, third party investigations of the resource, and “joint-investigation and resolution of the inevitable cross-border disputes according to peaceful and friendly manners.”\[^3\] Building upon these ideas D.M Ong outlines the following three models for JDZ schemes:

1) One-state management of a resource in a disputed territory, examples include: the 1958 Saudi Arabia-Bahrain arrangement and the 1969 Abu Dhabi-Qatar arrangement.

2) Equitable division of a disputed territory into zones which states can develop independently, examples include: the 1974 Japan-Republic of South Korea agreement and the 1974 Convention in the Bay of Biscay between France and Spain.

3) Joint management of resources through a supra-national government authority that retains licensing and regulatory power over the resources. Examples include: the 1989 Timor Gap Zone of Cooperation Agreement and the 1979-1990 Malaysia-Thailand Joint Development Agreements.\[^4\]

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1 Maritime Briefing, Vol 2. No 5, Masahiro Miyoshi. *The Joint Development of Offshore Oil and Gas in Relation to*


The Joint Development Zone also benefits from limiting downside political risk to potential investors. Given the high cost of developing natural resources for extraction, private companies are often gun-shy of committing the capital necessary absent a more stable political environment. As noted by Jenagir Alam Khan in his doctoral dissertation *The International Law of Joint Resource Development with Special Reference to its Functional Role in the Management and Resolution of Boundary and Territorial Disputes Involving Natural Resources*:

The economic rational for international joint resource development regime, then, is that it permits the current development of resources for the immediate benefit of both claimant states alike. From the point of view of the local and international private sectors, which might actually finance and undertake the joint resource development program itself, it represents moreover a means for reducing the otherwise insurmountable political risk that would invariably prevail in the absence of such a consensual agreement between the states concerned.5

A cooperative approach thus allows private expertise safer entry into previously untenable areas, with decreased political risk; this will likely result in decreased borrowing costs and greater financial benefits for all parties.

Although joint development is not the only method to resolve maritime boundary disputes involving liquid natural resources, it is certainly one that allows for the timely exploitation of resources. When a boundary dispute resolution is most pressing, as when a valuable natural resource is at stake, resolution is often most difficult, as each side attempts to secure for itself the most benefit. A JDZ avoids this predicament, turning what is perceived to be a zero-sum fight into mutually beneficial negotiation.6

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# Appendix C: Complete Outline of Proposal

<table>
<thead>
<tr>
<th>Stages &amp; Objectives</th>
<th>Steps</th>
<th>Themes</th>
</tr>
</thead>
</table>
| **Stage I**<br>Track Two<br>Diplomacy | - Moratorium on exploration of field.  
- Third party delimitation of field boundaries.  
- Start Get-Every-One Involved-Meetings. | - Field survey and delimitation  
- Identification of needs or readiness of participants to engage in negotiations and development projects |
| | - Agreement on JDZ boundary.  
- Negotiations on apportionment of royalties from field development.  
- Education and capacity building programs. | - Holistic assessment of stakeholder interests  
- Developing local capabilities.  
- Public Diplomacy: Local and region promotion, public relations and education. |
| **Stage II**<br>Working Groups & Negotiations | - Establish Joint Development Authority & Joint Development Corporation.  
- Determine JDC composition. | - Develop institutional mechanisms and protocol for JDA oversight of field development.  
- Determine projects and scope of field development by IOCs. |
| | - Export Gas to domestic markets of Israel, Cyprus and Lebanon.  
- Determine Go-To-Market strategy for excess gas. | - Workout financing of field development.  
- Analyze economic & geopolitical dimensions for long term strategy |

www.deza.admin.ch/ressources/resource_en_186721.pdf
Appendix D: Map of Region & Gas Field, and Disputed Boundaries

Map of Region & Gas Field

Cypriot Waters

Lebanese Waters

Disputed Territory

Goliath Joint Development Zone

Israeli Waters

Appendix E: Structure of JVA & JVC

Goliath Joint Development Zone Authority (JDA)
The Goliath Joint Development Zone Authority is a supra-national organization that maintains legal and jurisdictional control over the shared resources of the Goliath JDZ. The JDA is composed of 6 members, 2 each from Israel, Lebanon and Cyprus. The primary responsibilities of the JDA are to oversee the initial issuance of exploration/exploitation shares in the JDC to each countries chosen third party developers. Additionally, the JDA acts as oversight ensuring proper management, utilization and profit maximization of the JDZ.

Goliath Joint Development Corporation (JDC)
The Goliath Joint Development Corporation is the privately held organization that maintains the concessionary rights to drill and develop the JDZ. Its membership is composed of three entities, one each from Israel, Lebanon and Cyprus, selected by each countries respected governments/JDA representatives. The JDC acts together as a single joint operation developing a single field. There is an opportunity for multiple organizations to be represented in a single nations JDC participant, for example it is expected that Noble Energy, Delek Drilling and Avner will jointly serve as the holders of the Israel shares in the JDC, as they were the initial partners in the exploration of the field.

Source: Team 14 Analysis.
Appendix F: Decision Matrix for Export Options

A possible solution for the use of gas could include combining the production of three large fields, Goliath, Leviathan, and Aphrodite. Then, depending on annual gas production, which will depend on undersea geological and other factors, there are several realistic go-to-market (GTM) strategies that the JVA will want to consider.

We see Israel, Lebanon, Cyprus, and Jordan further gasifying their economies to the extent practical. For example, it is difficult to replace oil used in transportation functions. Additionally, gas could be liquefied and exported using spare capacity of the Egyptian LNG terminal – and this capacity is expected to increase over the next decade. If production is high enough, which is one reason to combine output of the three fields if politically and diplomatically feasible, a Turkish pipeline or Cyprus LNG plant are two options evaluated below that might provide for value maximization. Below is an evaluation exercise of different midstream and GTM options.

### LNG & Pipeline Options with Evaluating Criteria

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Pipeline Israel &amp; Arab Network</th>
<th>LNG Egypt</th>
<th>Pipeline Turkey</th>
<th>LNG Cyprus</th>
<th>LNG Israel</th>
<th>Pipeline Greece</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost</td>
<td>Low – existing network</td>
<td>Low – Existing capacity</td>
<td>Medium – build pipeline</td>
<td>High – build liquefaction plant</td>
<td>High – build liquefaction plant</td>
<td>High – longest undersea pipeline</td>
</tr>
<tr>
<td>Diplomatic</td>
<td>Jordan could be intermediary</td>
<td>New regime in Egypt question</td>
<td>Incentive as negotiation tool, Cyprus concerns</td>
<td>Turkish objection</td>
<td>Arab resentment</td>
<td>Turkish, Arab objection</td>
</tr>
<tr>
<td>Geopolitical</td>
<td>Israel improved position, possibly more reason for stability with neighbors</td>
<td>Israeli – Egyptian ties, options for LNG exports</td>
<td>Turkey needs gas for domestic use / re-export to Europe</td>
<td>Many options for LNG exports for JVA, near and Asian markets</td>
<td>Israel vulnerable to attack – other options diversify risk</td>
<td>Gas supply for EU, no money to Greek-EU pipelines</td>
</tr>
<tr>
<td>US Interest</td>
<td>Increase local stability</td>
<td>LNG exports to Spain, Italy, Turkey</td>
<td>Turkey participation in talks / Russian influence</td>
<td>LNG supplies on global market</td>
<td>LNG on global market / increased risk</td>
<td>Gas supply to EU / Russian influence</td>
</tr>
</tbody>
</table>

Source: Team 14 Analysis.

Note: Gas field reserves need to be above 13TcF to justify LNG construction. Aphrodite could be combined with Leviathan and Goliath to create reserves approximately 48TcF.
Appendix G: Interests of Involved Countries

Israel

- **Regional stability.** Conflict with Lebanon or especially Turkey harms Israel significantly.
- **Domestic energy needs.** Israel needs additional supplies of gas to power its economy going forward, particularly given recent developments in Egypt.
- **Exporting energy for political interests.** Israel would gain political power in the manner of Russia or Azerbaijan if it supplied gas to its Middle Eastern neighbors.
- **Exporting energy for economic reasons.** Israel could earn substantial revenues by exporting gas to European or Asian customers using LNG technology. Further, if Israel has the infrastructure to export to Middle Eastern neighbors, European countries, and Asian customers, it strengthens its long-term position to achieve customer diversification and leverage.
- **Putting to work domestic energy companies.** Israel wants its domestic energy companies to make money exploiting petroleum products.

Lebanon

- **Domestic energy needs.** Currently Lebanon imports almost all energy and 95% of this is petroleum products. Lebanon would like to gasify economy to save significant sums of money, and furthermore, it needs diversification and stability of energy sources.
- **Economic Need of Cash –** Lebanon is running annual government expenditures of $12.6 billion with revenues of $8.5 billion. Poverty rate is 28%. Gas revenues would have significant development impact.\(^7\)
- **Sovereignty over disputed maritime triangle.** Hezbollah is a negative political risk factor.
- **Future gas production from Levantine Basin for domestic uses and export purposes.** Assisting Lebanon to achieve future hydrocarbon production from the Levantine Basin is a large carrot.
- **Manage Hezbollah and extremist threat.** Appearance of fairness in any deal may help mitigate belligerency on the part of Hezbollah.

Cyprus

- **Domestic energy needs.** Replace oil imports with gas from Aphrodite and share of Goliath field.
- **Export Energy for economic interests.** Cyprus wants to build an LNG plant so that gas exports can be sent to many different customers.
- **Relations with Turkish Republic of Northern Cyprus (TRNC) and Turkey.** Turkey could present a serious threat to Cyprus, though with Cyprus in the EU the situation is complicated.

Turkey and TRNC

- **Regional Power.** Turkey seeks greater respect and influence regionally and globally.
- **Economic interest of transiting gas to Europe**
- **Political interest of Cyprus boarder dispute.** Future development of Goliath field depends on Turkey tabling the Cyprus boarder dispute in exchange for diplomatic gains achieved through taking a lead role in mediations and possible carrots offered by the U.S.
  1) Participation “Options” for the State Owned BOTAŞ Petroleum Pipeline Corporation on any future pipeline projects that bring Goliath gas to market.
  2) Continued moves on the part of the US to improve trade terms with Turkey.
  3) Adjustment and amendments to perceived shortcomings of the 2008 U.S.-Turkey Agreement for Cooperation Concerning Peaceful Uses of Nuclear Energy. Potential adjustments include but are not limited to:
     - Revisions of limitations of transfer of Highly Enriched Uranium from the US to Turkey.
     - Revisions to the prohibited technology for export clauses.
  4) **Growth in US-Turkey Defense relationship**
     - Support the sale of arms to Turkey to counter the PKK, requests have historically included more helicopters and UAVs. UAVs have been requested multiple times since 2008 and should be offered. The sale of UAVs should be untethered from the Turkish stance on Iran.
     - Reestablish Foreign Military Financing Aid
     - Address Turkish concerns regarding modernizing their 240 existing F-16s as well as Turkish concerns regarding expense and technology sharing in the F-35 project.
  5) **Move forward of sale of Patriot Missiles to Turkey.**

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Appendix H: Precedent Cases

Sample Cases are derived from: *The International Law of Joint Resource Development with Special Reference to its Function Role in the Management and Resolution of Boundary and Territorial Disputes Involving Natural Resources* by Jehangir Alam Khan.

**Iran-Sharjah Joint Resource Development Regime, 1971**

1) The Territorial Dispute
   a. Occidental Petroleum discovered oil nine miles off the coast of Abu Musa, an island located in the Arabian Gulf 43 miles off the Iranian coast and 38 miles from the Emirate of Sharjah, in February of 1970.
   b. The Ruler of Sharjah issued a decree in late 1970 extending territorial waters of Sharjah to include the new oil find. Iran refuted the new boundary.

2) The Joint Resource Development Agreement
   a. Both nations agreed to a joint resource development agreement in 1971, the memorandum started with the following statement: **“neither Iran nor Sharjah will give up its claim to Abu Musa nor recognize the other’s claim.”**
   b. The agreement licensed Buttes Gas and Oil Company to explore and exploit the oil and natural gas resources in an around the island of Abu Musa, the revenues derived from the sale of resources were then to be divided evenly between Iran and Sharjah.

**Malaysia-Thailand Resource Dispute, 1979**

1) The Territorial Dispute
   a. In 1968 Malaysia granted a concession to Esso Production Malaysia Inc to explore and drill in part of its continental shelf, subsequently in 1972 Thailand granted an overlapping concession to Triton Oil Company.
   b. Overlapping concessions occurred due to an inability to resolve who owned the rights to a triangular shape of outer continental shelf.

2) The Joint Resource Development Agreement
   a. Both nations agreed to a joint resource development agreement in 1979, the memorandum stated that it was: **“in the best interests of the two countries to exploit the resources of the sea-bed in the overlapping area as soon as possible” and that “they have agreed to set aside the question of delimitation in the Gulf of Thailand for a period of fifty years.”**
   b. The memorandum established a Joint Development Authority that over saw the selection of Triton Oil Company and PETRONAS as developers.

Appendix I: Expert Opinion Future Options for Israeli Gas

Brenda Shaffer of Haifa University performed research in 2010 where she outlined implications of additional Israeli gas discoveries. We used her work for several assumptions, including that the likely first two main uses of gas production would be increased gasification of the Israeli and nearby Arab countries, and an export option using Egyptian LNG spare capacity.

Brenda Shaffer, “New Natural Gas Producer in the Mediterranean”

Relevant Points

- Israel will continue gasification of economy with increased discoveries of gas.
- Border delimitation conflicts are likely.
- There will be expanded gas consumption in the entire region.

Hurdles in the Way of Israeli Gas Exports

- No national policy to allow exports.
- Glut in European gas markets.
- Many European countries (Greece for one) have no money to fund new pipeline projects.
- Often, European states do not want gas bound for them to pass through “transit states.”
- No spare capacity in Greece or Turkey to transmit large amounts of gas → Is this true?
- Europe’s gas pipelines are not interconnected enough throughout Mediterranean States.
- Russia would oppose efforts by Israel to enter gas markets in Southern Europe (Italy where Gazprom has big influence)
- Export via LNG with spare capacity in Egyptian liquefaction plant is option and if sufficient volume is found a new LNG plant may be built in Cyprus. Egypt is increasing its domestic consumption, (we also know from case and other sources that Egyptian gas fields are maturing). There is also an existing gas pipeline from Israel to Egypt.
- Israel could export gas to Jordan, who could re-export gas to Lebanon and Syria. Each of these countries would benefit from increased gasification of their economy.

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Appendix J: Gas Output and Option Thresholds

Source: Team 14 Analysis. KBR Report, Accessed 12 April 2012:

Note 1: The minimum annual production output is assumed to be 0.5% of the Goliath field reserves. The maximum annual production assumes a joint output of 3% of the combined reserves of Goliath, Leviathan, and Aphrodite fields. Actual yearly output depends on subsurface geological factors, political agreements, and other complex factors.

Note 2: There are limits to the gasification of the Israeli, Cypriot, Lebanese, Jordanian, and Syrian economies without significant infrastructure investments due to the necessity of oil as a transportation energy source. Source: Energy Lecture Meghan O’Sullivan, 13 April 2012, Harvard Kennedy School.

Note 3: Pipelines have wide variability of gas volume transport capacity. Before the viability from an economic viewpoint can be determined, a comprehensive discounted cash flow model of the pipelines would need to be done, along with a sensitivity analysis on variables such as the price of gas.
**Appendix K: Cost Structure of LNG System vs. Pipeline**

The Goliath field is expected to have reserves of 33TcF, meaning according to the chart below that building an LNG plant is cost effective. However, given the short distance from the gas fields to Turkey, a gas pipeline into Turkey for Turkey’s domestic use might also be a good solution. Additionally, the Cypriot Aphrodite field with reserves of 7TcF would need to be combined with additional fields in the area to justify building an LNG plant.


LNG plants are cost effective to transport gas to distant markets, where pipelines are cheaper for distances less than 500 to 2500 miles, depending on pipeline diameter.

Source: Ibid.
Appendix L: European Gas Usage and Supplier Data

Finland, Macedonia, Slovakia, the Czech Republic, and Serbia are dependent on Russia for 85% or more of their natural gas needs. Romania and France are less reliant on Russia natural gas pipelines for energy and heating needs.

Percentage of Russian gas supplies in terms of total consumption