ABSTRACT
Since 2009, Noble Energy and its partners have discovered more than 30 TCF of gas in the challenging, deep water environment of the Levant Basin, a region where the USGS estimates there is a total of 122 TCF of recoverable gas. The discoveries, which far exceed the needs of the local market, are well positioned to serve geographically diverse export markets. A surplus of gas in the Middle East and North Africa has led the region to become a major LNG exporter. However, rapidly increasing gas demand in the domestic markets of many traditional exporters means that their era of increasing exports is coming to an end. The Levant Basin is set to make a major contribution to reversing this decline. Developing the Eastern Mediterranean gas resources will involve innovative solutions. Governments are grappling with the difficult issues of how to balance domestic gas requirements with exploiting export opportunities, while attracting new investors to a new upstream province. Finding mutually beneficial solutions to address these factors requires creative approaches by both governments and project developers. Noble will discuss the export projects it is developing in the Eastern Mediterranean, showing how its deep water experience is helping to address the unique technical, commercial and political challenges. In particular, it will share how the results of its conceptual, Pre-FEED and FEED studies in the region are providing a solid basis for Noble and its partners to rapidly bring the gas to market.

INTRODUCTION
Noble Energy, Inc. is honored to speak at LNG 17. Until recently, few in the LNG industry were aware of Noble Energy, even though we have been in the oil and natural gas business since 1932. Like many of our industry compatriots, we have focused on upstream exploration and production, building a solid base in the United States (US). Then in the late 1990s, we took our deepwater Gulf of Mexico experience overseas to safely and responsibly create exceptional opportunities in other countries. We utilized our deepwater drilling expertise to find and develop oil and natural gas resources offshore West Africa and in the Eastern Mediterranean. In the Eastern Mediterranean, Noble Energy has discovered 35 Tcf of gross natural gas resources, more than enough to cover local demands in Israel and Cyprus for the next several decades. These discoveries have also created the opportunity to export LNG from the region. This opportunity has presented Noble Energy with an exciting new challenge: commercializing natural gas via LNG exports, while working with host countries to address their energy security, economic, environmental and geopolitical interests.

Given the magnitude of these projects and our goal to broaden our experience in the LNG business, we are willing to partner with experienced industry partners to bring projects to fruition. This is evidenced by our announcement last December to partner with Australia’s Woodside Energy Ltd. to develop the Leviathan discovery offshore Israel. In addition, we are examining the possibility of employing step-out technologies such as floating LNG production at Tamar, another offshore Israel find, and Leviathan. This option could be utilized as an alternative, or complement, to conventional onshore liquefaction.

Noble Energy Inc.
Before we examine our LNG options, a brief introduction to Noble Energy is in order. Noble Energy, Inc. is an established US independent energy company based in Houston with almost 2,000 employees and a market capitalization of almost $18 billion at year-end 2012. Our global oil and natural gas production has reached 240,000 Boe/d, and we expect output to grow steadily into the future as we explore and develop prospects in the US and abroad.

In the US, Noble Energy’s operations are focused in three core areas: the deepwater Gulf of Mexico, the DJ basin in Colorado, and the Marcellus Shale in Pennsylvania and West Virginia. In the DJ basin, which has evolved into a top-tier US oil play, Noble Energy is accelerating its Niobrara drilling program to 500 horizontal wells per year by 2016 and is targeting net production of 175,000 Boe/d by 2017. The company is
transferring its horizontal drilling expertise to the Marcellus shale in the U.S. Northeast and is targeting liquids-rich plays to achieve higher price realizations.

In the deepwater Gulf of Mexico (GOM), Noble Energy has six producing locations including Galapagos and South Raton, which were brought onstream in 2012. The company is appraising its largest GOM discovery at Gunflint. It is in the GOM that we have honed the deepwater expertise that spurred Noble Energy’s diversification move overseas in the 1990s. Noble Energy is willing to take risk in investing in the long term and has proven that exploration is a true value creator. These traits are exemplified by our activity in West Africa and the Eastern Mediterranean.

WEST AFRICA DISCOVERIES

Noble Energy has been active for more than 15 years in West Africa. We are major shareholders in Atlantic Methanol and a non-operating partner in the Alba natural gas project offshore Equatorial Guinea. November 2011 marked a defining moment for our West African operations with the start of oil production offshore Equatorial Guinea at the Aseng Field in Block 1. First-year production at Aseng averaged 60 MBbl/d gross. Knowledge gained at Aseng, together with our advanced deepwater technology, is contributing to the rapid commercialization of nearby resources, including the Alen Field, which is nearing completion as I speak.

Alen is a complex development, which includes processing and liquids separation. The gas is reinjected into the reservoir, and the condensate is moved to the Aseng FPSO via subsea pipelines for offloading. Well operations are completed and platform installation is planned for the second quarter of 2013, with first production of 40 MBbl/d (18 MBbl/d net) expected in the third quarter. The Aseng FPSO will function as a regional oil hub to process other fields such as Carla, an oil discovery lying beneath Alen. Noble Energy has also found significant natural gas resources in West Africa that could potentially supply new liquefaction capacity either at Equatorial Guinea LNG or at a new facility in Cameroon. A firm monetization plan for Noble Energy’s regional natural gas finds has not yet been determined. From an oil perspective, Noble Energy’s investments in West Africa are providing Noble Energy with a handsome return. We continue to work on solutions for gas monetization, including LNG options.
LEVANT BASIN HISTORY

Noble Energy hopes to achieve our first LNG success in the Eastern Mediterranean’s Levant basin. So far, our drilling results in the basin have been outstanding. Noble Energy-led drilling efforts have found natural gas fields totaling 28 Tcf offshore Israel waters and another 7 Tcf offshore Cyprus. With an acreage position of more than 730,000 net acres offshore Israel and almost 600,000 net acres offshore Cyprus, Noble Energy is exploring for resources beyond those already found.

Noble Energy drilled its first well in the offshore Levant basin in 1999. Mari-B, in which Noble Energy has a 47 percent interest, was discovered one year later. Production from the field, estimated to hold more than 1 Tcf of recoverable reserves, began in 2004 – a turn-around cycle of just four years. Mari-B has also proven to be a strategic development for the State of Israel, providing a cost-competitive foundation for the nation’s natural gas market.

In 2009, Noble Energy and its Israeli partners found the world class Tamar Field with 9 Tcf of gross natural gas resources. This large field has enough natural gas to supply Israel’s domestic needs for the next 20-25 years. In 2010, the even larger, 17 Tcf Leviathan Field was found, providing an extra layer of security for Israel’s domestic market and setting Israel on the path to becoming a natural gas exporting nation.

Extending a remarkable drilling success record to six consecutive discoveries in the Levant Basin, Noble found more natural gas with the Cyprus Block 12 A-1 discovery well in December 2011. Early gross resource estimates for the Block 12 A Field range from 5-8 Tcf. This quantity of natural gas is adequate both to cover Cypriot domestic natural gas demand for an extended period and to supply a 5 MTPA liquefaction train.

DOMESTIC VS. EXPORT - ISRAEL’S TZEMACH COMMITTEE REPORT BOLSTERS EXPORT CASE

Both Israel and Cyprus have set out to establish policies that balance the need to provide energy security to the domestic market with the needs to encourage continued exploration and to maximize state revenues through natural gas exports. While the Cypriot government has moved more quickly in this regard, the Israeli government has yet to adopt an export policy. We believe, however, that it is in the country’s best interests to do so. The alternative, which is to use existing and new discoveries solely to supply the domestic market, would result in a very slow ramp up in field production and would present huge commercial challenges for upstream field developments. Indeed, such an approach could undermine the overall economic viability of field commercialization, potentially curtail the development of a smooth growth in domestic natural gas supply, and forgo considerable value to both producers and the State of Israel that could otherwise be realized.
In August 2012, an inter-ministerial committee led by Shaul Tzemach, the Director General of the Ministry of Energy and Water Resources, released a final report that bolsters the case for natural gas exports while prioritizing the fulfillment of Israeli domestic demand. The final report sets the amount of natural gas for export at 500 BCM and the amount of natural gas to be reserved for domestic consumption at 450 BCM.

The Tzemach recommendations boost prospects for a small-scale FLNG project targeting the Tamar Field, since it sets aside 50 percent of the Tamar resource for export. The Tzemach Committee recommendations also enhance the likelihood of a larger, land-based plant for the Leviathan Field by allocating 75 percent of its reserves for export, on the condition that another discovery can meet Israel's domestic needs. At the same time, the final Tzemach report provides flexibility to decision makers to approve construction of an LNG facility on territory not controlled by Israel.

Startup of the LNG import buoy facility off Hadera, which includes a 4 BCM/y floating storage and regasification unit to be supplied by Excelerate Energy, is also cited as a priority. In addition, the committee recommends an overhaul of the domestic distribution network, creating new grids and more entry points. It makes explicit the need for a second entry point to the Israeli market beyond the current southern landing point in Ashdod to avoid infrastructure bottlenecks. This is likely to be in the north, where natural gas demand is growing and distant from the existing onshore facility to which Mari-B and Tamar natural gas flows. The committee says the northern entry point will need to be fed from another of the offshore fields. Most importantly for the global market, the report emphasizes the need to permit natural gas exports as a way of encouraging the development of additional resources and the entry into Israel of additional E&P companies.

**TAMAR ON FAST-TACK DEVELOPMENT SCHEDULE**

The cessation of natural gas supplies from Egypt to Israel last year highlighted the need for Israel to fast-track natural gas supply alternatives. Mari-B reserves are depleting, creating a need for quick action to fill a supply gap. Noble Energy has already developed several small nearby fields to supplement Mari-B, and an offshore LNG import buoy facility has recently been commissioned off Hadera to bolster the nation’s natural gas supplies.

As part of the longer-term domestic resource-based solution, Noble Energy and its Israeli partners have also fast-tracked development of the Tamar Field. The jacket and topsides were completed late in 2012 and the world’s longest subsea tieback in early 2013 – leading to a short four-year development from discovery to commercialization. This is also just 2.5 years from project sanction, a testimony to Noble Energy’s expertise
in bringing complex deepwater projects to fruition on extremely tight time lines. First production is expected to average 700 MMcf/d with a peak of 1 Bcf/d. Future expansion phases are expected to increase deliverability to a peak capacity of 1.5 Bcf/d using compression at the onshore terminal along with a combination of system optimization and storage at Mari-B.

On Schedule and on Budget
- Start-up April 2013
- $3.25 B gross investment

Industry Leading Cycle Time
- 2.5 years from sanction

World’s Longest Subsea Tieback
- 93 miles tieback, 5,505 ft. water depth

Initial Capacity Already Contracted

Figure 3: Tamar Project – Online Four Years from Discovery

TAMAR FLNG

In addition to providing critical supply to the domestic market, first Israeli LNG exports could also be sourced from Tamar. Levant LNG, which is led by Korea’s Daewoo Shipbuilding & Marine Engineering, is advancing on a fast-track, 3.4 MTPA FLNG project based upon Tamar reserves. Pre-FEED has been completed, and FEED has been kicked off with a view to completing it by the end of this year. DSME, with a significant contribution by the upstream Tamar partners, will bear the costs of the FEED. Tamar FLNG could be commissioned in 2018.

LEVIATHAN DEVELOPMENT

The Leviathan Phase 1 development concept includes offshore processing at an FPSO, with a production capacity of 1.6 Bcf/d and a capability to serve both domestic and export markets. In Phase 2, a second FPSO is expected to have a similar production capacity and capability. Production to the domestic market could begin as early as 2016. Sites in Israel are being evaluated for a land-based liquefaction project. The pre-FEED study for a land-based LNG project is expected to be completed by mid-2013. After that, FEED and EPC contracts will be put out to competitive bids. A pre-FEED for a Leviathan floating liquefaction unit is also underway as a possible alternative to an onshore plant.

WOODSIDE SELECTED AS STRATEGIC PARTNER AT LEVIATHAN

Noble Energy and its partners concluded that development of Leviathan would benefit from the addition of a strategic partner to provide additional resources and LNG expertise. On December 2, 2012, we and our partners announced that we had agreed in principle on a proposal to sell a 30 percent working interest in the Leviathan licenses to Woodside Energy Ltd. The transaction is subject to the negotiations and execution of definitive agreements between the parties, as well as customary approvals, prior to closing. The addition of Woodside’s extensive experience in LNG projects will further unlock value in the world-class Leviathan resource and further highlights the global importance of the Levant Basin.

CYPRUS LNG

Even though the Block 12 A Field is the latest major find in the Levant basin, Cyprus LNG is on its way to developing its liquefaction project ahead of other potential projects in the region. The project, in 1,700 meters of water, would be comprised of subsea producing wells, a deepwater host to process natural gas and handle liquids and a subsea pipeline to deliver the processed natural gas – predominantly methane – to shore. The government of Cyprus is a strong supporter of creating an LNG export project, and the site at Vasilikos where the liquefaction plant would be built is already owned by the government. A feasibility study
conducted by Technip indicates the site can accommodate at least three 5 MTPA liquefaction trains. The initial plant scope would likely include two storage tanks and a jetty capable of accommodating two LNG berths. Technip is currently executing the Select engineering phase in preparation for issuing a competitive RFP for the project FEED. A feasible subsea pipeline route from Block 12 to the onshore site at Vasilikos has been identified, so there is every expectation from a technical standpoint that the project can proceed quickly and efficiently.

Figure 4: Possible Layout of Cyprus LNG Plant in Vasilikos – Onshore Facility to Liquefy Gas for Export

COMPETITIVE LNG PROJECT DEVELOPMENT AND SHIPPING

Feasibility studies completed for our potential Eastern Mediterranean LNG plant sites show that several can likely be developed at highly competitive costs per unit of liquefaction capacity. When compared with recent costs reported for ongoing projects in Australia, Eastern Mediterranean estimated costs of approximately $1,000 per MTPA (in 2012 US$) for a two train, 10 MTPA plant represent a major opportunity to implement the cost reductions necessary to secure a place in highly competitive LNG markets. In addition to potential sales into Europe, we believe that Eastern Mediterranean LNG will provide supply diversification for Asian buyers as it is strategically located at the Suez Canal entrance or exit, depending on your view. The ability of Eastern Mediterranean projects to viably source supplies to Asia has already been demonstrated by LNG exports from Egypt. This has enabled delivery of cargoes at attractive prices to outlets in both the Atlantic and Pacific basins.

The ability to develop Eastern Mediterranean LNG export projects at very competitive EPC costs creates a market opportunity for Levant basin LNG exports late in the decade. Meanwhile, European utilities are looking for competitively priced alternatives to Russian pipeline gas, but whether Eastern Mediterranean LNG can fulfill this role remains to be seen. Based on a 2015 final investment decision, Noble Energy considers 2019 a feasible date for first LNG exports from the first 5 MTPA train at Vasilikos. Additional trains can be built at the site as new reserves are found in Cypriot waters or even from nearby fields in Israeli waters if the two governments can agree.
SUMMARY AND CONCLUSIONS
Noble Energy believes that we can be successful in the Eastern Mediterranean by following a three-step recipe:

1. Transfer appropriate upstream technology from other parts of the world to ensure use of best practices at highly competitive costs. This would take advantage of skills where Noble Energy is an established industry leader, mitigating much of the upstream risk in the development projects.

2. Where feasible, use available midstream technology, expertise and construction practices from others to assure compact project schedules at attractive costs.

3. Where needed, bring in financially and technically capable partners that have the required development skills to assure project success.

In summary, Noble Energy is tremendously excited about the LNG opportunities presented by its natural gas finds in the Levant basin. Many challenges remain as we extend our technological, marketing and financial skills into the LNG industry, and navigate through national politics. These new natural gas finds are critical to the energy futures of both Israel and Cyprus and are extremely high profile in national energy discussions. We are convinced that LNG exports from the Levant basin will be a strategically located part of the global LNG supply portfolio. We look forward to working with many of you to make this a reality. Thank you for your time and attention.