Guest Column

Lessons for Managing Unconventional Resources

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Political Review

The West and the Rest on Egypt's Crackdown

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EGYPT OIL&GAS NEWSPAPER

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Emerging Players in Shale Exploration and Development

P.16

Unconventional Resources

As Egypt surpassed its peak oil output the country has become heavily reliant on its natural gas resources, which likewise have a finite life span. Faced with a colossal domestic demand for energy the government must begin planning for the future and looking for new resources to meet domestic needs. Recognizing the need to explore new resources Egypt Oil and Gas will be hosting a roundtable next month on the future of unconventional oil and gas in Egypt. The event will bring together prominent players in Egypt's oil and gas sector, including EGPC chairman Tarek El Molla, to discuss the potential of unconventional resources here in Egypt. The event will provide an opportunity to hear from Dr. Moustafa Oraby of Halliburton who will be speaking on companies' assessment of Egypt's unconventional reservoirs.

As a precursor to the roundtable, in this issue of Egypt Oil and Gas we explore various types of unconventional resources as well as the success and failures of countries that are developing unconventional reservoirs. We include in-depth coverage of the emergence of shale gas in the US and around the globe, and we examine the tight oil boom in the US. Our guest column provides a comparative analysis, which highlights the crucial roles that policy and regulation play in developing unconventional resources. Reflecting on recent turmoil, this issue includes an analysis of international reactions to the crackdown on pro-Morsi protestors by the Egyptian Military as well as the potential consequences of suppressing the Muslim Brotherhood.

Julie Herrick Editor in Chief

Prices

Bullion Market		Oil Prices	
GOLD	SILVER	BRENT	NYMEX Crude
1285.60	19.64	107.55	104.70
		USD/BBL	USD/BBL
-4.70%	-7.40%	4.00%	9.37%

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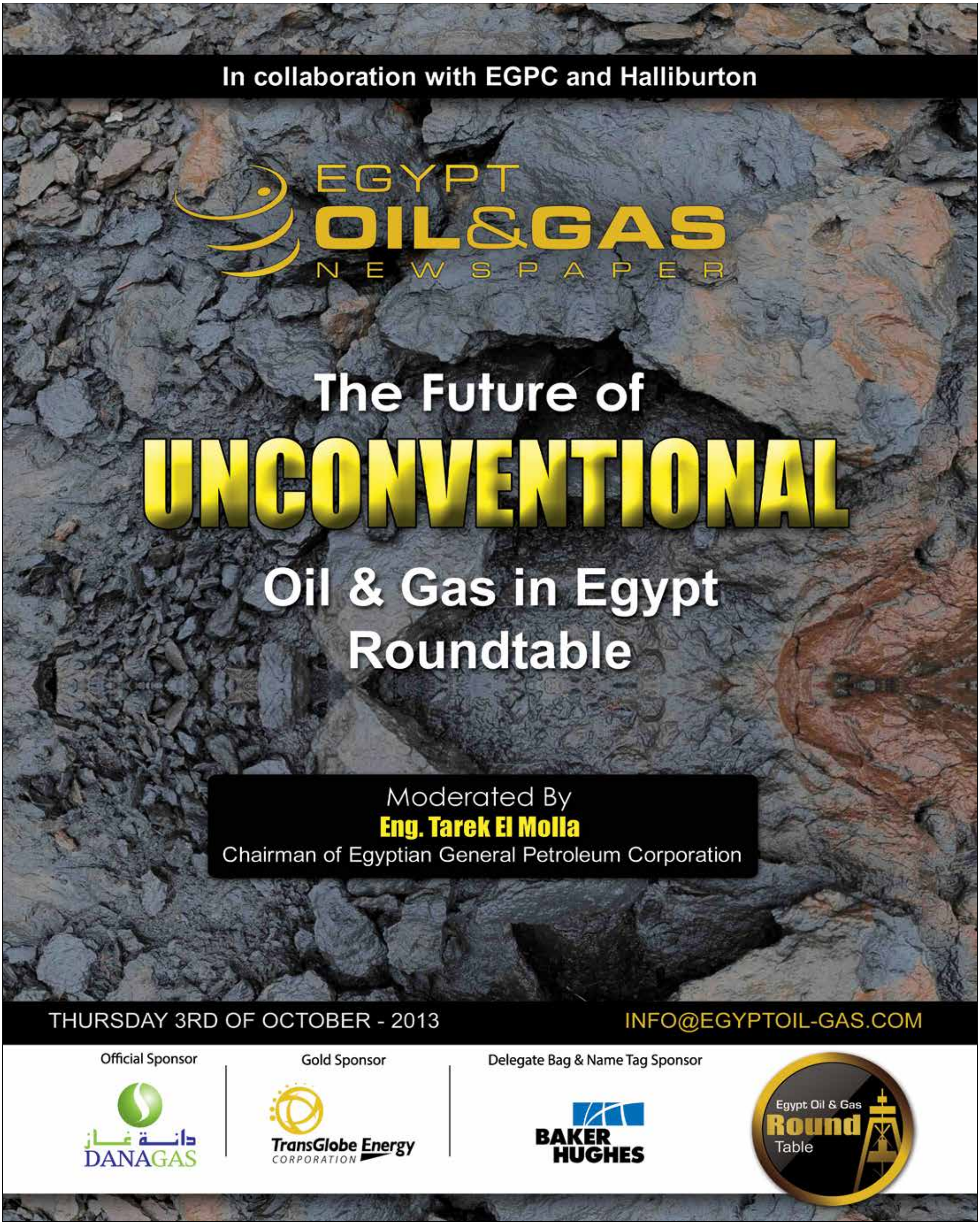
In collaboration with EGPC and Halliburton
EGYPT
OIL&GAS
NEWSPAPER
The Future of
UNCONVENTIONAL
Oil & Gas in Egypt
Roundtable
Moderated By
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BAKER HUGHES
Egypt Oil & Gas
Round
Table

Qarun Completes Developmental Wells

Qarun Petroleum Company, a joint venture between EGPC and Apache Corporation, recently drilled a new exploratory well and completed three new developmental wells in its concession area in the Western Desert. Qarun's production rate of crude oil reached 1,432,566 barrels in July 2013.

WON C-2
The WON C-2 oil producing exploratory well was drilled to a depth of 11,790 ft utilizing the EDC-17 rig. Investments surrounding the drilling process are estimated at USD 3.948 million.

ED-58
The ED-58 oil producing new developmental well was drilled to a depth of 6,400 ft utilizing the EDC-64 rig. Investments surrounding the drilling process are estimated at USD 656,000.

KARAM NW-7
The KARAM NW-7 oil producing new developmental well was drilled to a depth of 8,190 ft utilizing the EDC-47 rig. Investments surrounding the drilling process are estimated at USD 1.253 million.

KARAMA-18
The KARAMA-18 oil producing new developmental well was drilled to a depth of 8,350 ft utilizing the EDC-47 rig. Investments surrounding the drilling process are estimated at USD 1 million.

Khalda Drills Four Wells

Khalda Petroleum Company, a joint venture between EGPC and Apache Corporation, recently drilled a new exploratory well and three new developmental wells in its concession area in the Western Desert.

PEPI NE-1X
The PEPI NE-1X oil producing exploratory well was drilled to a depth of 14,334 ft utilizing the EDC-48 rig. The well was permanently abandoned. Investments surrounding the drilling process are estimated at USD 2.434 million.

M.RZK-106
The M.RZK-106 oil producing developmental well was drilled to a depth of 7,126 ft utilizing the EDC-66 rig. Investments surrounding the drilling process are estimated at USD 200,000.

KHALDA SW-4
The KHALDA SW-4 oil producing developmental well was drilled to a depth of 12,080 ft utilizing the EDC-8 rig. Investments surrounding the drilling process are estimated at USD 2.226 million.

MRZK-103
The MRZK-103 oil producing developmental well was drilled to a depth of 6,805 ft utilizing the EDC-65 rig. Investments surrounding the drilling process are estimated at USD 430,000.

PGNiG Drills an Exploratory Well

Polish Oil & Gas Company (PGNiG) recently drilled a new exploratory well. The drilling operations occurred in the company's concession area in the Western Desert. The BAH A-1X oil producing exploratory well was drilled to a depth of 7,945 ft utilizing the NAFTA-1 rig. The well was permanently abandoned. Investments surrounding the drilling process are estimated at USD 2.354 million.

GUPCO Drills a Developmental Well in the Gulf of Suez

GUPCO, a joint venture between EGPC and BP, recently drilled a new developmental well. The drilling operations occurred in the company's concession area in the Gulf of Suez. The OCT.J-6 ST-3 oil producing developmental well was drilled in 229 days to a depth of 14,950 ft utilizing the BENNEVIS rig. Investments surrounding the drilling process are estimated at USD 23.441 million. GUPCO's production rate of crude oil reached 1,997,988 barrels in July 2013.

Cartoon

Agiba Drills Four Developmental Wells

Agiba Petroleum Company, a joint venture between EGPC, Mitsui (10%) and IEOC (40%), recently drilled four new developmental wells in its concession area in the Western Desert. Agiba's production rate of crude oil reached 1,970,501 barrels in July 2013.

DEEP-10 ST
The DEEP-10 ST oil producing developmental well was drilled to a depth of 10,500 ft utilizing the ST-8 rig. Investments surrounding the drilling process are estimated at USD 3.658 million.

E.AGHAR-18
The E.AGHAR-18 oil producing developmental well was drilled to a depth of 6,500 ft utilizing the WF-161 rig. Investments surrounding the drilling process are estimated at USD 917,000.

ZARIF-43
The ZARIF-43 oil producing developmental well was drilled to a depth of 5,100 ft utilizing the PDI-104 rig. Investments surrounding the drilling process are estimated at USD 700,000.

ZARIF-42
The ZARIF-42 oil producing developmental well was drilled to a depth of 5,130 ft utilizing the PDI-104 rig. The well has crude oil, but it was temporarily abandoned. Investments surrounding the drilling process are estimated at USD 600,000.

Story Board

GPC/SCIMITAR Completes a Well in the Eastern Desert

GPC/SCIMITAR recently completed the drilling of a new developmental well. The drilling operations occurred in the company's concession area in the Eastern Desert. The ISS-127 oil producing developmental well was drilled to a depth of 1,560 ft utilizing the SHAMS-1 rig. Investments surrounding the drilling process are estimated at USD 108,000.

West Bakr Drills Two Wells in the Eastern Desert

West Bakr Petroleum Company, a joint venture between EGPC and EPEDCO, recently drilled a new exploratory well and a new developmental well in the company's concession area in the Eastern Desert.

HE-1X
The HE-1X oil producing exploratory well was drilled to a depth of 6,250 ft utilizing the EDC-62 rig. Investments surrounding the drilling process are estimated at USD 1.228 million.

M-19
The M-19 oil producing developmental well was drilled to a depth of 5,575 ft utilizing the EDC-62 rig. Investments surrounding the drilling process are estimated at USD 1.309 million.

Petrosilah Drills Two Exploratory Wells

Petrosilah Petroleum Company, a joint venture between EGPC and Merlon International, recently drilled two new exploratory wells in the company's concession area in the Western Desert. Petrosilah's production rate of crude oil reached 141,549 barrels in July 2013.

SILAH-20
The SILAH-20 oil producing exploratory well was drilled to a depth of 7,871 ft utilizing the EDC-49 rig. The well was temporarily abandoned. Investments surrounding the drilling process are estimated at USD 1.251 million.

W.TERSA-1X
The W.TERSA-1X oil producing exploratory well was drilled to a depth of 9,166 ft utilizing the TANMIA-1 rig. Investments surrounding the drilling process are estimated at USD 2.159 million.

BAPETCO Completes a Developmental Well

BAPETCO, a joint venture between EGPC and Shell, recently completed the drilling of a new developmental well. The drilling operations occurred in the company's concession area in the Western Desert. The SITRA 8-AD oil producing developmental well was drilled to a depth of 11,828 ft utilizing the EDC-72 rig. Investments surrounding the drilling process are estimated at USD 3.234 million. BAPETCO's production rate of crude oil reached 1,102,695 barrels in July 2013.

Petroshahd Completes a Developmental Well

Petroshahd Petroleum Company, a joint venture between EGPC, Sipetrol (25.25%) and Kuwait Energy (24.75%), recently completed the drilling of a new developmental well. The drilling operations occurred in the company's concession area in the Western Desert. The SHAHD SE-6 oil producing developmental well was drilled to a depth of 9,950 ft utilizing the ECDC-7 rig. Investments surrounding the drilling process are estimated at USD 3.250 million. Petroshahd's production rate of crude oil reached 675,395 barrels in July 2013.

NORPETCO Completes a Developmental Well

NORPETCO, a joint venture between EGPC and Sahari Oil Company, recently completed the drilling of a new developmental well. The drilling operations occurred in the company's concession area in the Western Desert. The ABRAR S-3 oil producing developmental well was drilled to a depth of 6,786 ft utilizing the ECDC-2 rig. Investments surrounding the drilling process are estimated at USD 2.500 million. NORPETCO's production rate of crude oil reached 192,670 barrels in July 2013.

Kuwait Energy Drills a Well in the Eastern Desert

Kuwait Energy recently drilled a new exploratory well. The drilling operations occurred in the company's concession area in the Eastern Desert. The S.SHUKHER-1X oil producing exploratory well was drilled to a depth of 5,659 ft utilizing the ECDC-1 rig. Investments surrounding the drilling process are estimated at USD 700,000.

DUBLIN/GPC Completes a Well in the Eastern Desert

DUBLIN/GPC recently completed the drilling of a new developmental well. The drilling operations occurred in the company's concession area in the Eastern Desert. The MESEDA H-5 oil producing developmental well was drilled to a depth of 5,535 ft utilizing the ZJ-45L rig. Investments surrounding the drilling process are estimated at USD 1.129 million.

Petrodara Drills a Developmental Well in the Eastern Desert

Petrodara Oil Company, a joint venture between EGPC and Dublin International Petroleum, recently drilled a new developmental well. The drilling operations occurred in the company's concession area in the Eastern Desert. The HANA-24 oil producing developmental well was drilled to a depth of 5,595 ft utilizing the ST-7 rig. Investments surrounding the drilling process are estimated at USD 1 million. Petrodara's production rate of crude oil reached 372,677 barrels in July 2013.

Apache Made Seven Discoveries in the Western Desert

Apache Corporation reported seven oil and gas discoveries in Egypt. "These seven discoveries are located in four different geologic basins and six different concessions," said Thomas M. Maher, Apache's Egypt Region Vice President and General Manager, in the company's press release. "All seven discoveries have been tested and Riviera SW-1X is already producing."

Riviera SW-1X, located in the Abu Gharadig Basin, is producing at restricted rates of 2,000 barrels of oil per day while gas rates continue to be monitored. The well test-flowed 5,800 barrels of oil and 2.8 million cf of gas per day. Drilling and completion costs for the well were USD 5 million. Apache has a 100% contractor interest in the WD 30 Development Lease where the well is located

Narmer-1X, located in the Faghur Basin, test-flowed approximately 1,200 barrels of oil and 400,000 cf of gas per day with a trace of water. Thanks to its proximity to existing infrastructure, the well is expected to start producing relatively quickly following development lease approval. Drilling costs were USD 3.1 million, with completion pending. Apache has a 100% contractor interest in the Khalda Offset Concession where the well is located.

Jade N-2X is located in the western Matruh Basin. The zone was perforated and tested over a 74-foot interval, producing up to 146 barrels of condensate and 11.2 million cf of gas per day at original reservoir pressure. Drilling and completion costs were USD 2.6 million. Apache has a 100% contractor interest in the Matruh Concession where the well is located.

WKAL-T-1X and **WKAL-N-3X** are located in the Faghur Basin. WKAL-T-1X was tested in one of three zones of Upper Safa sandstone that flowed 2,900 barrels of oil and 2.8 million cf of gas per day. Drilling and completion costs for this well were USD 5 million. WKAL-N-3X flowed on test at a rate of approximately 3,500 barrels of oil and 3.2 million cf of gas per day. Development lease applications have been submitted to EGPC for both of these future producers. Apache has a 100% contractor interest in the West Kalabsha Concession where the wells are located.

SIWA-R-1X, located in the Faghur Basin, test-flowed 1,900 barrels of oil per day. This discovery is 3.5 miles south of the nearest production and is expected to go into production immediately after EGPC has approved a development lease. Drilling costs were USD 4.8 million with final completion pending. Apache is the operator and has a 50% contractor interest in the Siwa Concession where the well is located, with the state-owned Tharwa Petroleum Company holding the remaining 50%.

Buchis W-2X, located in the Faghur Basin, test-flowed approximately 1,700 barrels of oil per day. Drilling costs were USD 4.7 million with USD 400,000 estimated for completion. Apache has a 100% contractor interest in the Buchis Development Lease where the well is located.

Falak NW-1X, located in the Shushan Basin, test-flowed 1,200 barrels of oil and 6.1 million cf of gas per day. Drilling costs were USD 3.5 million with USD 1 million estimated for completion.

Choice Words

"The fact of the matter is they (protesters calling for the reinstatement of Mohamed Morsi) were not peaceful. Before the assault was taken they announced in loud speakers asking people to come peacefully out and there are some exits for them, no one would be held responsible. ... We announced that telling them this cannot continue, that this is bad, we are open for dialogue but they insisted and they had weapons.

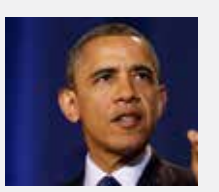
Hazem El-Beblawy, Egypt's Interim Prime Minister

"As you know, I saw that there were peaceful ways to end this clash in society, there were proposed and acceptable solutions for beginnings that would take us to national consensus. It has become difficult for me to continue bearing responsibility for decisions that I do not agree with and whose consequences I fear. I cannot bear the responsibility for one drop of blood.

Mohammed ElBaradei, Egypt's former Interim Vice President

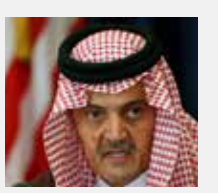
"The United States strongly condemns the steps that have been taken by Egypt interim government and security forces. We deplore violence against civilians. … We don't take sides with any particular party or political figure. We want Egypt to succeed. … Going forward, I've asked my national security team to assess the implications of the actions taken by the interim government and further steps we may take as necessary with respect to the U.S.-Egyptian relationship.

Barack Obama, US President



"In regards to the negative international stances toward Egypt, it was inevitable to the Kingdom of Saudi Arabia to stand up for Egypt because it considers it the biggest and most important Arab country. … King Abdullah demanded non interference in Egypt's internal affairs and to let the people of Egypt and its leadership make their own decisions about their country's affairs.

Prince Saud Al-Faisal, Saudi Arabia's Foreign Affairs Minister



Petro Amir Completes a Well in the Eastern Desert

Petro Amir Petroleum Company, a joint venture between EGPC and Vegas Oil & Gas, recently completed the drilling of a new developmental well. The drilling operations occurred in the company's concession area in the Eastern Desert. The ALAMIR SE-17 oil producing developmental well was drilled to a depth of 9,905 ft utilizing the ST-9 rig. Investments surrounding the drilling process are estimated at USD 1.336 million. Petro Amir's production rate of crude oil reached 357,776 barrels in July 2013.

EGPC's New Chairman is Tarek El Molla

Egypt's Ministry of Petroleum announced on August 22 that Tarek El Molla would replace Tarek El Barkatawy as the chairman of EGPC. "Tarek El Molla, who is (EGPC's) vice chairman for foreign trade, will carry out the duties of chairman of EGPC," stated officals from the Ministry of Petroleum. Barkatawy had become the chairman of EGPC in May this year. According to Reuters, Molla is a veteran at EGPC and his appointment is likely to encourage the foreign oil companies operating in Egypt, who have complained about the lack of communication and decision-making since the 2011 Revolution.

Apache May Sell its Egyptian Assets

Apache recently stated the company was in the process of assessing the value of its Egyptian interests, which analysts see as a sign that a sale of assets is probable. "The most important thing about Egypt is it generates a tremendous amount of cash flow," Apache's Chief Executive Steve Farris explained on a conference call with investors, according to Reuters. "And we just need to figure out a way to validate that value without giving up that value." Last year, about a fifth of Apache's oil and gas production and 27% of its revenue came from Egypt. At the end of 2012, 7% of the company's oil and gas assets were in Egypt, worth about USD 854 million. Analysts say that it is difficult to estimate the current value of its Egyptian assets due to turmoil in the country. Apache's production has not been affected by the unrest in Egypt, but its shares decreased by about 5% between July 3 when the former President Mohamed Morsi was ousted and the end of August. Apache has 9.7 million acres in Egypt, of which it has so far developed only 18%. It is estimated that the company employs about 200 expatriates and 10,000 locals in Egypt.

Dana Gas Makes 2-Year Production Record in Egypt

Dana Gas recently announced that its production in Egypt had reached 200 million cf per day (41,500 boepd), which is the highest level since August 2011 and 29% above to the average output of the last year.

Patrick Allman-Ward, the General Manager of Dana Gas Egypt and incoming Group CEO, explained that the company had successfully drilled and tested three developmental wells over the last six months. The activities of Dana Gas in Egypt have not been affected by the turmoil in Egypt, according to the company.

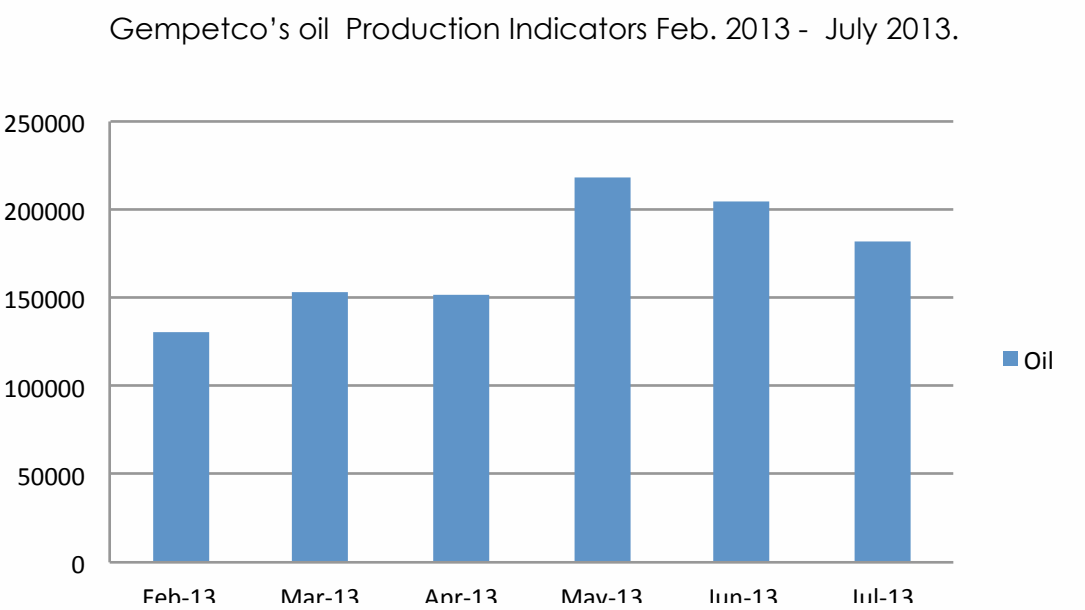
"We are working towards further increasing the production to 50,000 boepd in the foreseeable future," said Allman-Ward. "This requires further investments in the fields and early resolution of the long-pending receivables will greatly assist in accelerating our capital investment decision."

The projects to be executed in order to raise output further include multi-wells appraisal drilling programs, adding gas compression facilities for the El Basant field as well as a new pipeline connecting Salma and Tulip discoveries to the El Wastani plant, reports AMEinfo.com.

According to Dana Gas, the investments in these projects can be carried out after the successful resolution of the issue of long-pending receivables, which are now in the order of USD 270 million. The company said that it was in talks with the Egyptian authorities about solving the issue and expects "an early resolution", informs Upstream.

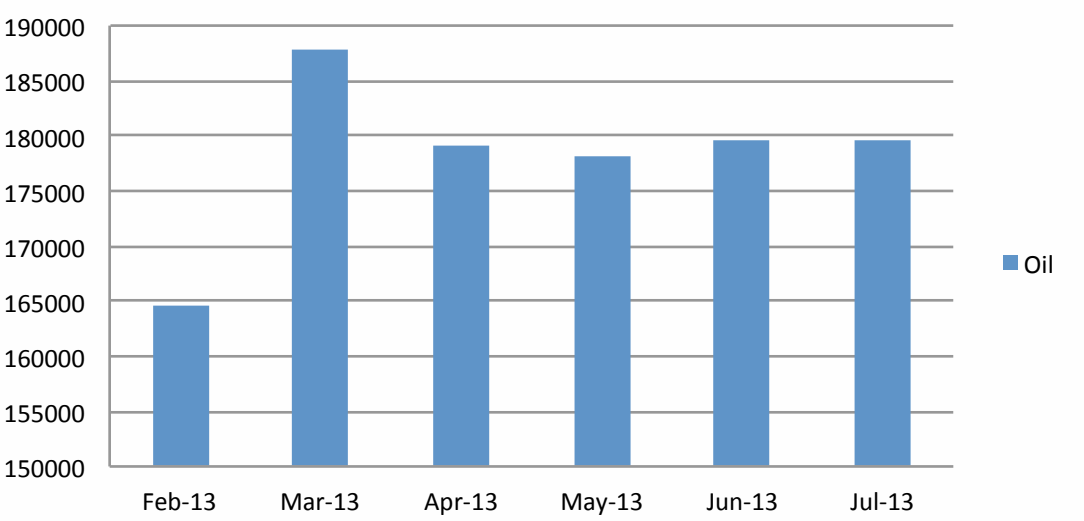
To date, Dana Gas has invested USD 2 billion in Egypt and employs 1,000 people there, including the staff of its WASCO joint venture with EGPC.

GEMPETCO's Oil Production Fluctuating



The oil output of GEMSA Petroleum Company (GEMPETCO) has been fluctuating considerably in the past few months. From 130,185 barrels in February it increased by 17% to 152,503 barrels in March and maintained a similar level in April. In May the production made a big jump, increasing by 44%, reaching 218,168 barrels. However, in the following two months the output decreased. In July production was at 181,517 barrels, down 17% from May, but still 20% higher than in April.

PETROGULF's Oil Production Stabilizes



The oil output of Petrogulf Misr (PETROGULF) saw fluctuations in spring, but has been relatively stable in recent months. From February to March production increased from 164,488 barrels to 187,892 barrels, marking a 14% increase. In April output decreased by 5% to 179,192 barrels. Since then production has been relatively stable at slightly below 180,000 barrels, which is about 9% higher than February's production rate.

PETROBEL Completes Wells in the Mediterranean Sea and Sinai

PETROBEL, a joint venture between EGPC and Eni, recently completed five new developmental wells in the Mediterranean Sea and in Sinai. PETROBEL's production rate of crude oil reached 3,755,760 barrels in July 2013.

SETH E.DEEP
The SETH E.DEEP gas producing developmental well was drilled to a depth of 11,483 ft utilizing the KS MEDT rig. The drilling operations occurred in the company's concession area in the Mediterranean Sea. Investments surrounding the drilling process are estimated at USD 35.431 million.

112-153
The 112-153 oil producing developmental well was drilled to a depth of 8,097 ft utilizing the ST-3 rig. The drilling operations occurred in the company's concession area in Sinai. Investments surrounding the drilling process are estimated at USD 2.027 million.

112-155
The 112-155 oil producing developmental well was drilled to a depth of 8,563 ft utilizing the ST-12 rig. The drilling operations occurred in the company's concession area in Sinai. Investments surrounding the drilling process are estimated at USD 2.367 million.

113-M-114
The 113-M-114 oil producing developmental well was drilled to a depth of 11,100 ft utilizing the COMET rig. The drilling operations occurred in the company's concession area in Sinai. Investments surrounding the drilling process are estimated at USD 11.528 million.

113-192
The 113-192 oil producing developmental well was drilled in 39 days to a depth of 10,853 ft utilizing the ST-1 rig. The drilling operations occurred in the company's concession area in Sinai. Investments surrounding the drilling process are estimated at USD 2.209 million.

Gas Shortage Forces Jordan to Raise Power Prices

Jordan's government plans to raise power prices for the second time this year due to the disruptions of gas the supply from Egypt, which some say may lead to serious civil unrest. Jordan normally generates 80% of its electricity from the Egyptian gas. However, attacks on pipelines have reduced the gas supply from Egypt considerably and forced Jordan's power plants to switch to more expensive fuels. The Jordanian National Electric Power Company lost an estimated 1.19 billion dinars (approx. USD 1.68 billion) last year due to the imports of heavy fuel. Currently, the power costs in Jordan are already 10 times higher than in Egypt, reports National. The external debt of the Jordanian government has exceeded USD 23 billion. It recently doubled taxes on mobile phones to 16% and plans to raise the price of electricity by 15%. Last November, the government's decision to raise fuel prices by up to 53% sparked nationwide protests and calls for King Abdullah II to step down.

Libya's Oil Production Hit by Protests

Libya's oil production has hit its lowest level since the 2011 civil war due to pay strikes and other protests, which have caused the government threaten the use of military force in order to bring order to the country's petroleum sector.
There have been protests since June at Libya's two largest ports as well as at its oilfields. Since the end of July, the armed guards in charge of protecting the Libyan oil industry, which include the rebels who helped topple Muammar Gadaffi in 2011, have been striking because they think that the government has awarded petroleum export contracts illegally. According to the National Oil Corporation, such claims will be investigated, reports AFP. Due to the protests, Libya's oil production fell from 1.5 million bbd to 330,000 bbd by the end of July. In the middle of August, the strike had cost Libya USD 1.6 billion in lost export revenues. Normally, hydrocarbons account about 80% of the country's GNP and up to 97% of its exports. "If the blockade of the oil terminals continues, the state will be obliged to use all means at its disposal, including those of the army," warned the Prime Minister Ali Zeidan.

Israel's Delek in Talks to Export Gas to Egypt

After discovering large amounts of gas off Israel's Mediterranean coast the Delek Group recently announced that it was in advanced talks with companies in Turkey, Egypt, Jordan and the Palestinian Authority about exporting natural gas. Israel already has a pipeline to Egypt, but would require additional pipeline in order to distribute gas to Turkey, Jordan and the Palestinian Authority. The gas shipped to Turkey would probably be transported further to Europe, reducing the continent's dependence on the Russian gas, reports Reuters.
According to the Delek spokesperson, deals could be signed soon depending on the outcome of a court case over the amount of exports allowed. In June, Israel's government decided to limit gas exports to about 40% of reserves.
Two of the world's largest offshore gas fields discovered in the past decade are located in Israeli waters. The Tamar filed has gas reserves at estimated 280 billion cm. Production commenced in March. The Leviathan field, estimated to have 530 billion cm, is scheduled to come online in 2016 or 2017.

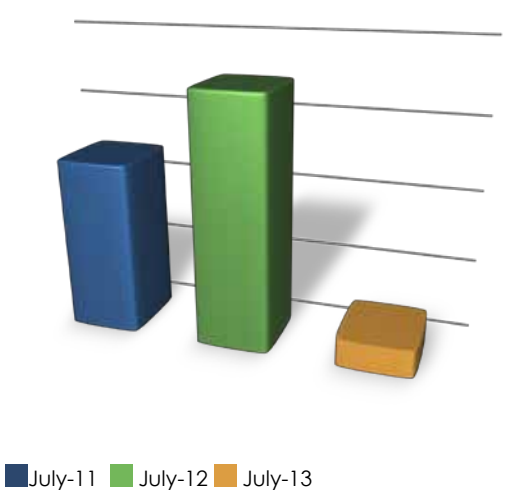
Another Attack on Iraq-Turkey Oil Pipeline

An attack on August 16 halted the flow of crude oil through a pipeline running from Iraq's Kirkuk oil fields to the Ceyhan port in Turkey. "Attackers planted a roadside bomb near a section of the pipeline," according to an official speaking to Reuters. Two days later, Iraqi officials said that oil flows had resumed after the damaged section of the pipeline was replaced. Militants have bombed the 900-km pipeline around 30 times since the beginning of the year. The pipeline has a capacity of 1.6 million bbd, but it usually carries just 500,000 bbd due to attacks and technical problems. Iraq recently invited international companies to build a back-up to the pipeline that would also link the Kirkuk fields to Turkey, reports Al Arabiya.

SeaBird Won a USD 10.5 Million Contract

SeaBird Exploration

SeaBird Exploration announced that its 2D seismic vessel Northern Explorer has been awarded a contract in the Mediterranean with a value of about USD 10.5 million. The estimated duration of the contract is 150 days, including the vessel's mobilization from South Africa. SeaBird is a provider of marine acquisition for 2D/3D and 4D seismic data as well as associated products and services to the petroleum industry. In the second quarter the company's contract revenue was estimated at USD 36.2 million and its total revenue amounted to USD 40.2 million.



Equivalent Gas			Oil		
July-11	July-12	July-13	July-11	July-12	July-13
22,788,750	23,576,071	21,285,536	N/A	N/A	N/A

Liquefied Gas			Condensate		
July-11	July-12	July-13	July-11	July-12	July-13
269,095	385,522	435,076	1,356,139	1,163,770	1,386,356

Mediterranean Rig Count 2013	Total	Percentage of Total Rigs
	8	7 %

Saudi Arabia Offers Incentives to Russia

Saudi Arabia recently offered Russia economic incentives if Moscow scales back support for the Syrian President Bashar al-Assad. At a meeting with the Russian President Vladimir Putin in the beginning of August, the Saudi intelligence chief Prince Bandar offered to ensure that Gulf gas would not damage Russia's position as the main gas supplier to Europe, said Middle East sources and Western diplomats according to Reuters. Among other incentives, the prince offered to buy Russian weapons for up to USD 15 billion. In return, Saudi Arabia wants Russia to reduce its support for Assad, which has come in the form of arms and diplomatic cover throughout the civil war, and to agree not to block any future UN Security Council Resolution on Syria. Putin's initial response to Bandar's offer was inconclusive.

Lukoil to Move its Overseas Division Headquarters to Dubai

Russian company Lukoil plans to move its overseas division headquarters from Moscow to Dubai by the end of this year. "We will establish the headquarters of Lukoil in Dubai in order to be closer geographically to our main projects," stated a Lukoil spokesperson. Lukoil has oil production operations in several countries of the region, such as Iraq, Turkey and Cyprus. As a part of the relocation, Lukoil's staff in Dubai will increase by another 400 employees who need to leave their Moscow office.

Kuwait Energy Sees 52% Increase in Revenue

Kuwait Energy earned revenue of USD 77.6 million in the second quarter, which is 52% higher compared to the same period of the last year. The company's average daily production increased by 37.7% to 23,221 barrels of oil equivalent per day, reports AMEinfo. The revenue and production increase is due to new contributions from the Shahad SE field in Egypt and Kuwait Energy's 15% interest in Yemen's Block 5. Increased production was also recorded at wells Yusr-38 ST and Yusr-60 in Egypt. Kuwait Energy spent USD 51.9 million on development and exploration during the second quarter. The development activity focused on Egypt, Yemen and Oman.

Qatar Sold First Cargo of LNG to Malaysia

In July, a Qatari cargo of LNG was sold to Malaysia for the first time as a part of a long-term agreement signed in 2011. Qatargas 2, a joint venture between Qatar Petroleum, ExxonMobil and Total, sold the cargo that contained 3.1 trillion Btu of LNG to Malaysia's state-owned Petronas. According to the Gulf Times, the cargo was delivered to the country's first LNG receiving terminal located in Melaka, which started operating recently. In 2011, Qatargas agreed to supply Petronas 1.5 million tons of LNG annually for at least 20 years starting from 2013. Qatargas has also sold LNG to Thailand and Singapore. "Qatargas sees the Southeast Asian LNG market as an increasingly important growing regional market where it intends to strengthen its business activities," the company said recently.

Qatar to Buy a Stake in Germany's SolarWorld

The shareholders of the Germany's largest solar company SolarWorld recently approved a restructuring plan that foresees Qatar Solar obtaining a 29% stake in the firm. The holders of the company's convertible bonds, worth USD 732 million consented to the plan in order to decrease SolarWorld's debt, reports Reuters. SolarWord got into financial trouble due to the removal of government renewable energy subsidies in Germany and also because of the sharp fall in solar panel prices since China entered the global solar panel market in 2010.

Saudi Arabia Plans a World-Class Maritime Yard

The Singapore-based Sembcorp Marine recently announced that it had signed a memorandum of understanding with Saudi companies regarding the development of a world-class maritime yard in Saudi Arabia. The memorandum was signed by Sembcorp, Saudi Aramco and the National Shipping Company of Saudi Arabia (Bahri). The planned maritime yard will offer engineering, manufacturing as well as repair services related to rigs, platforms, commercial vessels and offshore service vessels. According to Bahri, a decision whether to proceed with the development of the yard will be made in the next 15 months.

Iraq Blames Shell for a USD 4.6 Billion Delay

The Iraqi government recently sent a letter to Shell, blaming it for delays that have cost the country USD 4.6 billion. The letter, seen by Reuters, concerns the delayed start-up of the Majnoon field, which holds 12 billion barrels of oil and is developed by Shell, with Petronas being a minority partner. "The safety of our people and assets remains our top priority in Iraq, so we have been working on getting the facilities back to an acceptable condition and ensure a safe and reliable operation," said a Shell spokesman, when asked to comment on the letter, adding that the company still aims to produce 175,000 bpd at Majnoon before the end of 2013. The revival of Iraq's oil industry has slowed this year because of infrastructure and security problems. In July, the country's oil output was below 3 million bbd.

Saudi Arabia and UAE Seek USD 1.5 Billion for Solar Investments

Saudi Arabia and UAE recently launched a joint venture that aims to invest more than USD 1.5 billion in solar energy projects. The countries seek to obtain funds by the end of 2014 in order to add a total of 1,000 MW of solar capacity in several countries, including Jordan. Such a capacity would be enough to electrify 200,000 homes, reports the Gulf Times. Saudi Arabia, the world's largest oil exporter, plans to invest more than USD 100 billion to generate about 41,000 MW, a third of its total power output, from solar energy by 2032. Currently, the country has around 16 MW of solar capacity. Saudi Arabia is trying to reduce its dependence on oil. In another attempt to reduce its domestic oil consumption, which has been outpacing the increase of oil production capacity, the country plans to spend USD 22 billion for building the first metro system in its capital Riyadh. Last year, renewables investment in the Middle East and North Africa rose by 40% to USD 2.9 billion. There are more than 100 renewables projects under development, including solar, wind and geothermal power facilites.

Indian Ship Accused of Dumping Oil into Persian Gulf

Deliberate oil dumping by the Indian tanker Desh Shanti has caused an oil slick 10 miles long in the Persian Gulf. According to coastal authorities the tanker, managed by the state-owned Shipping Corporation of India, was caught dumping oil near Iranian waters. Bahrain's coastal authorities were also on alert following the spill. Director General of the Marine Emergency Mutual Aid Centre Captain Abdulmunem Janahi recently stated, "the law currently has to punish the violating ship." Iran could fine the ship up to USD 1 million.

Qatar Sends Free LNG to Egypt

Qatar sent four shipments of LNG to Egypt in August as a part of a deal with the the government of the former President Mohamed Morsi in June. The deal foresees Qatar delivering five cargoes of LNG to Egypt as a gift. The Gulf country sent the first two cargoes in the beginning of August. The third and the fourth shipment were sent on August 22. According to Reuters, the delivery demonstrates that Qatar is abiding to the deal despite the removal of Morsi from power and the violence that followed, even though Doha has requested for the release of jailed Muslim Brotherhood leaders and has condemned the clearing of pro-Morsi sit-ins that left hundreds dead.

Arabtec Diverts from Petroleum Engineering Expansion

Arabtec Holding is considering a merger with the two biggest construction companies in the Gulf, which analysts see as a diversion from its strategy to aggressively expand into oil and gas engineering. Bloomberg reported that the two firms are Saudi Oger and Combined Group Contracting Company. Loic Pelichet, an analyst at NBK Capital, wrote that although the merger would improve Arabtec's access to Saudi and Kuwaiti markets, it would also "fly in the face of the strategy the company has proclaimed since its takeover by Aabar, namely to push for aggressive expansion into oil and gas engineering" since neither of the two firms are involved in that sector. According to Taher Safieddine, an analyst at Shuaa Capital PSC, the merger would be very complicated and it would make more sense for Arabtec to expand its capabilities in oil and gas, infrastructure, and power.

International News

Iran, Russia, Qatar Agreed to Keep Gas Prices from Falling

Iran, Russia and Qatar have agreed to stabilize gas prices and prevent them from falling during the second summit of the Gas Exporting Countries Forum held in Moscow. Prices have decreased sharply due to the shale gas production in the US. Yet, the Iranian Deputy Oil Minister who informed about the agreement called the unconventional gas production a "showcase" and said that his country was not concerned about it, reports Trend News Agency. The cartel of major gas exporters, created de-facto by Iran, Russia and Qatar, owns about 60% of the global gas reserves.

Pakistan to Ask Full Financing from Iran for Pipeline

Pakistan recently asked the Iranian government to fully finance the USD 1.5 billion bilateral gas pipeline. Iran previously informed the Pakistani government that it would provide a loan of USD 500 million for the project. Pakistan was expected to raise the remaining amount from international financial organizations. Iran has completed its 900-kilometre segment of the 2,700-km pipeline, to be finalized in December 2013. The pipeline is expected to deliver 21.5 million cm of gas from the South Pars field to Pakistan, which is grappling with serious energy shortages. Pakistan's Prime Minister Nawaz Sharif said the US had again warned that the pipeline may trigger sanctions on Pakistan in the future, according to OilPrice.com. The US has imposed sanctions on Iran over its nuclear program.

US Accuses BP of Manipulating Gas Market

US regulators recently accused BP of gas market manipulation and threatened the company with USD 29 million worth of fines. The Federal Energy Regulatory Commission (FERC) claims that the alleged offences took place in the Houston Ship Channel from September to November 2008. The FERC argues that BP used transportation capacity uneconomically in order to increase the value of its financial position, according to the BBC. BP denies any wrongdoing. "BP is disappointed that the FERC has brought this action and we will vigorously defend against these allegations," said Geoff Morrell, BP vice-president and head of US communications. Last month, FERC settled a power market manipulation case with JPMorgan Chase for USD 410 million. It recently also fined Barclays USD 453 million for manipulating the US energy markets. Barclays has vowed to take the case to court, according to Digital Journal.

EIA: Global Energy Consumption to Rise 56% by 2040

Global energy consumption will rise by 56% between 2010 and 2040, says a report by the US Energy Information Administration. The report states that world's energy demand will increase to 820 quadrillion Btu in 2040 from the 524 quadrillion of 2010, with China and India accounting for half of the gain. According to Bloomberg, the demand in non-OECD countries will increase by 90%, whereas the demand in the member countries of the organization will rise just by 17%. Brent crude will average USD 106 a barrel in 2020 and USD 163 in 2040, valued in 2011 dollars. Renewables and nuclear will be the fastest-growing energy sources, rising on average 2.5% a year. Gas will be the fastest-growing fossil fuel.

US Approves Third LNG Terminal for Shale Gas Export

The US Department of Energy recently approved the third LNG terminal to export gas to the countries that do not have free trade agreement (FTA) with the US. The proposed terminal at Lake Charles, a joint venture between BG Group and Energy Transfer Partners' Southern Union, got a green light for shipping 15.3 million tons annually over 20 years. It is expected to begin exports in 2018.

The US government approved the first LNG export terminal in 2011, allowing Cheniere Energy and its partners to ship 18 million tons a year from Sabine Pass. This terminal is expected to begin exports in 2015. In May this year, Freeport Energy got approval for exporting 10.7 tons of LNG a year from Quintana Island. The company hopes to begin exports in 2018. All three terminals can export LNG only to non-FTA countries. In Asia, solely Singapore and South Korea have signed FTAs with the US, so the terminals are free to export LNG to the countries such as China, Japan and India. The US government is considering a handful of other LNG export proposals. Several LNG export terminals have been also proposed for the Canadian Pacific coast.

Unconventional News

Fracking Yields Success in Chile

Chile's state oil company ENAP said it used fracking to discover commercially viable quantities of tight gas and condensates in the country's Arenal block. The company, which operates the block independently, said the find was made in the vertical exploration wells drilled in late 2012 and early 2013. The initial flows reached on average 393,600 cf a day per well, in addition to small levels of condensates. During the experimental stage, a 25-mile pipeline will channel the gas to the residents of nearby areas. "We must wait for the results of the technical and commercial assessment which we will have once the wells are connected to the collector pipeline with output stabilized and quantification of productivity," said ENAP's Chief Executive Officer Ricardo Cruzat.

Colossal Trans-Canada Pipeline Planned for Tar Sands Oil

TransCanada recently announced that it plans to build a pipeline connecting Alberta's tar sands oil fields with the refineries in the country's east. The USD 12 billion, 2,700-mile Energy East Pipeline would carry 1.1 million barrels per day. The project is a third larger than TransCanada's Keystone XL project which is currently underway and is intended to transport tar sands oil from Canada and the northern US to the Gulf Coast of Texas. If the Energy East Pipeline gets regulatory approval, it could be in service by late 2017 for the deliveries to Quebec and by 2018 for New Brunswick. The project will probably meet a lot of opposition from environmentalists who argue that Canada should develop clean energy instead of tar sands oil.

Gazprom Expands Shale Oil Research in Siberia

Gazprom Neft has approved continued study of shale oil reserves at the Bazheno-Abalaksky complex of the Krasnoleninskoye field in western Siberia. Four inclined wells will be drilled to a depth of 2,700-2,800 meters by summer 2014. Thereafter, the company will decide whether to start drilling commercial production wells, reports Oil & Gas Journal. The Krasnoleninskoye field is Gazprom Neft's second foray into shale oil after its joint venture with Shell that is developing the Bazhenov formation of the Verkhne-Salymskoye field in western Siberia. Rosneft and ExxonMobil are also developing shale oil in the region at Rosneft blocks that cover part of the Bazhenov as well as the Achimov formation.

Shale Boosts US Oil Reserves to a New Record

The US Energy Information Administration (EIA) recently announced that the country's proven oil reserves made their biggest gain ever in 2011, increasing by 15% to 29 billion barrels, which is the highest level since 1985. 3.6 billion barrels of the 3.8 billion barrel gain comes from tight oil. Horizontal drilling and hydraulic fracturing have continued to increase the country's oil and gas reserves, commented Adam Sieminski, an administrator at the EIA. With its 29 billion barrels, the US ranks the 12th in the world by proved oil reserves, reports CNN.

Fracking off Coast California Scrutinized

Energy companies have used fracking to unlock unconventional hydrocarbons off the coast of California and now regulators are investigating whether the technique should fall under stricter environmental review. US government documents, released to AP, reveal that fracking has been used off the coast California at least 12 times since the late 1990s and that a new project that involves this technique was approved just recently. Currently fracking has an exemption from the US clean water laws that allows companies to use this technique offshore without filing a separate environmental impact report. Now this practice is under investigation. Fracking efforts off the coast of California have yielded mixed results. Out of the nine attempts of Nuevo Energy, one was considered very successful. The technique has been more fruitful in the North Sea and the Gulf of Mexico where the porous nature of formation makes it easier to extract oil.

High Levels of Arsenic Discovered Near Fracking Sites

A recent study found elevated levels of arsenic and other heavy metals in groundwater near natural gas fracking sites in the US Barnett Shale. "We found that there were actually quite a few examples of elevated constituents, such as heavy metals, the main players being arsenic, selenium and strontium. And we found each of those metals at levels that are above EPA's maximum contaminate limit for drinking water," stated Brian Fontenot of the University of Texas at Arlington. According to Fontenot, long-term exposure to arsenic can cause skin damage and problems with circulatory system as well as increase the risk of cancer.

Alternatively, an additional study conducted by the US National Energy Technology Laboratory in the Marcellus Shale shows no evidence that the chemicals used in fracking fluids moved up to contaminate drinking water, reports the AP. Fracking fluids tagged with unique markers were injected more than 8,000 feet below the surface, but were not detected in the monitoring zone 3,000 feet higher. This means the fluids stayed about a mile away from drinking water aquifers.

Thousands Have Sued Chevron over Refinery Fire

More than 11,000 people have sued the oil company Chevron over a fire at its US Richmond refinery last year. Charges against Cheveron were filed in in Contra Costa County Superior Court on behalf of more than 5,000 residents. Chevron is accused of "reckless conduct" that led to the fire. An interim investigation report filed by the US Chemical Safety Board stated that Chevron neglected warnings from numerous inspectors concerned about Chevron's use of old and corroded piping in its crude unit number four. Chevron has already paid more than USD 10 million for damages to residents, hospitals impacted by the fire. According to Reuters, police recently arrested more than 200 demonstrators for trespassing on Chevron's property during recent protest aimed at the proposed Keystone XL tar sands pipeline.

Myanmar-China Pipeline Started to Deliver Gas

The Myanmar-China pipeline recently began delivering gas to China; a similar crude oil pipeline is under construction. The pipelines will be operated by two joint ventures between the national oil companies of China and Myanmar and four other firms from India and South Korea. The annual throughput of the 793-km gas pipeline is 12 billion cm. The throughput of the 771-km oil pipeline, which is expected to carry crude from the Middle East, shipped via the Indian Ocean, will be 22 million tons per year. The two pipelines will meet only a small proportion of China's oil and gas needs, but they are strategically important for Beijing. The gas pipeline offers a nearby source of gas, and the oil pipeline will enable the importation of crude from the Middle East without tankers having to pass through the crowded Malacca Strait between Malaysia and Indonesia. In China, more than 2,000 people, worried about air and water pollution, protested in May against a planned petroleum refinery related to the pipeline project.

Russia Wants to Reverse Oil Flow through Azeri Pipeline

Azerbaijan's national energy company SOCAR and Russia's state-owned oil firm Rosneft are in talks about reversing the flow of oil through the Baku-Novorossiysk pipeline. A portion of the oil transported from Russia through the pipeline would be processed in Azeri refineries and some of it would be shipped to Turkey via the Baku-Tbilisi-Ceyhan pipeline where it could be delivered to refineries in Italy and Germany. The Baku-Novorossiysk pipeline has been used for years for exporting Azeri oil to Europe via Russia. Recently only half of the BP-led pipeline's 5-million bbd capacity has been used since Azeri Caspian Sea oil fields are getting depleted. In May, the Russian government terminated the 2006 contract, which regulated Azeri oil transit via the pipeline, saying it had suffered considerable losses because the agreed upon quantities had not been shipped.

Uganda's First Oil Refinery on Stream by 2018

The Ugandan government recently stated that the country's first oil refinery would come on stream by 2018 with a capacity of 30,000 bbd. According to the government, the capacity of the USD 2 billion refinery, located in the Hoima district, will increase to 60,000 bbd before 2020, reports Dow Jones. The international firms involved in the project include Ireland's Tullow Oil, France's Total and China National Offshore Oil Corporation. The refinery is expected to supply petroleum products to the domestic market as Uganda wishes to slash its imports. Approximately 7,000 residents from 13 villages will be displaced to enable the construction of the refinery. The government is expected to pay up to USD 27.4 million in compensation. Uganda's newly found oil reserves are estimated at 3.5 billion barrels.

Total to Purchase Chevron's Egypt Retail Network

Total recently announced that it had agreed to purchase the Egyptian retail network of Chevron, thereby creating its biggest marketing and services subsidiary outside Europe. Total bought the network together with its Egyptian partners Beltone Capital and Beltone Private Equity (BPE) Energy. The purchase still needs an approval by the relevant authorities, reports Reuters. The Chevron network includes 66 service stations, two oil depots as well as the aviation fuel operations at Cairo and Marsa Alam airports. It has sales of over 1.4 million tons a year. In May, Total agreed to buy the Egyptian retail assets of Royal Dutch Shell. The company said that after the Shell and Chevron purchases, the annual sales of its Egyptian subsidiary would be over 3 million tons through 218 service stations, which represents a 14% market share.

CO2 Could Be Vast Source of Energy

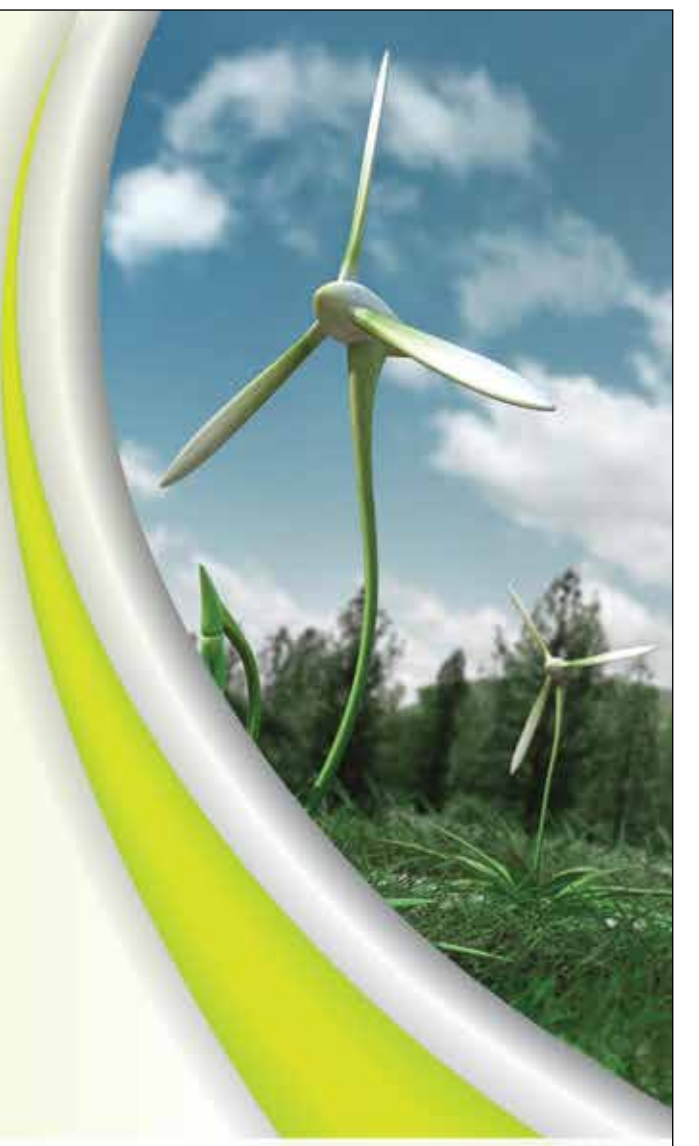
Researchers have devised a technique for producing electricity by using the CO2 emitted from power plants and other industrial facilities. The technique involves mixing water or another liquid with combustion gas containing a high concentration of CO2 and pumping it between specialized membranes. Berth Hamler from the Center of Excellence for Sustainable Water Technology in the Netherlands recently explained that electric current is generated from the concentration gradient between the combustion gas and air. The technique could produce 1,570 billion kWh from CO2 released by industrial activities around the world, reports NBC News.

Solar Energy Booms in Japan

Japan's renewable energy incentive law has spurred the construction of so many solar power stations that experts predict the country will become the world's leading solar energy market this year, surpassing China and Germany. The law that came into force in 2012 ensures that the generators of renewable electricity are paid above-market rates. The rate paid for solar photovoltaic power is 42 yen (approx USD 0.43) per kWh, nearly twice as much as households pay in Tokyo. As of February, the renewable energy capacity of Japan amounted to 1.662 million KW, more than 90% of which was solar. This year, the country's solar power market is expected to grow by 120%. In order to integrate solar energy onto the grid in Hokkaido, where many of the country's solar power stations are located, Japan's Ministry of Economy, Trade and Industry plans to invest USD 294 million to install a storage battery by March 2015. The battery is expected to be the world's largest with a storage capacity of 60 MW.

Europe's Biggest Battery to Boost UK's Renewables

A trial of the largest battery in Europe is due to start in the UK, reports the Guardian. Proponents of the project hope the battery will increase the use of renewable energy by being able to store and release huge amounts of volatile solar and wind power. The new technology could save the UK 3 billion pounds (approx. USD 4.7 billion) a year. When finished, the battery should have a capacity of 6 MW. The first results of the £18.7 million project – of which £13.2 million comes from the UK taxpayer – are not expected until 2016.



Renewable Energy

By EOG

Shale Gas

Shale gas refers to natural gas that is trapped in small pores inside shale rock. Since the pores are not connected and shale is relatively impermeable, it is not possible to extract large amounts of shale gas by using conventional technologies. Therefore shale gas is called an unconventional hydrocarbon. The emergence of cost-effective technologies for extracting shale gas has caused a surge in its production in the US over the past few years. There is no precise estimate of how much shale gas exists world wide, but the US Energy Information Administration (EIA) estimates that the US and the 41 other countries have a total of 7,299 trillion cf of technically recoverable shale gas. This represents 37% of the world's total technically recoverable gas resources.

By Laura Raus and Maya Moseley

Shale Gas Extraction

Shale gas extraction became cost-effective thanks to two inventions: horizontal drilling and hydraulic fracturing, also referred to as fracking. Using horizontal drilling technologies, a typical shale gas well extends hundreds of meters vertically and up to 2,000 meters laterally. Hydraulic fracturing is a technique whereby the reservoir rock is cracked in order to increase the flow of gas or oil to wellbore. In order to fracture the formation, a fluid containing mostly water and sand or other granular material but also various chemicals is injected to well under high pressure. Sand holds fractures open and chemicals are used to kill bacteria, inhibit corrosion, and reduce friction. A perforating tool is used to create holes in the casing of well through which fluid can flow to formation and later gas can flow inward during production phase.

Shale Gas in the US

In 2011, 7.994 trillion cf of shale gas was produced in the US, mostly in the plays of Haynesville, Barnett and Marcellus[1]. Whereas in 2000, shale gas accounted for only 4.1% of the US natural gas production, in 2012 it reached almost 40%[2]. As a result of the shale boom, the mining, oil and gas industry was the fastest growing US sector in 2006-2011. According to EIA forecasts, 16.7 trillion cf of shale gas will be produced in the US in 2040, which will account for 50% of the country's total gas production. It has also been predicted that the US may overcome Saudi Arabia as the world's bigger supplier of hydrocarbons by 2020 and surpass Russia to become the largest gas producer[3].

The shale boom has made the US self-sufficient in natural gas. Additionally, the country's dependence on oil imports has dropped from 60% to 39% since 2005 as it has partly shifted from oil to gas.[4] According to a BP forecast, the western hemisphere will become virtually self-sufficient in energy by 2030, largely thanks to growth in shale supplies.[5] Some experts have labeled the surge of shale production in the US a "shale revolution". The shale industry has received the firm support and praise of US President Barack Obama.

According to a report by IHS, shale gas production created more than 600,000 jobs in the US in 2010 and contributed to the country's GDP by more than USD 76.9 billion[6]. By 2015, IHS forecasts these numbers to grow to 870,000 and USD 118.2 billion respectively. According to IHS, for every direct job created in the shale gas sector, more than three indirect jobs are created. This occurs as abundant gas supplies result in lower prices, which benefit manufactures and industries reliant upon gas.

Thanks to shale gas replacing other fuels such as coal, the US has seen its greenhouse gas emissions diminish. The energy-production related CO2 emissions increased almost every year from 1990 to 2007, but since 2007 have fallen by an estimated 13%[7]. Nevertheless, many environmentalists oppose shale extraction, due to risks associated with hydraulic fracturing, including groundwater contamination and small earthquakes.

Recently, the US government approved three LNG export terminals that are permitted to export gas to countries that do not have a free trade agreement with the US. At full capacity, the three terminals can handle 8% of US gas production[8]. It is hoped that gas exports will improve the country's poor trade balance, especially since gas prices are much higher abroad.

Even though US LNG exports have not yet begun, the country's shale boom has significantly impacted the global energy market. Many foreign companies are investing in the country's shale sector. Additionally, decreased US gas imports have freed some Qatari gas for Europe, reducing its dependence on Russian gas. Europe's dependence was further reduced by the fact that the shale boom allowed the US to export more coal at a reduced price, starting what some have called a "coal renaissance" on the continent[9]. With Europe less interested in Russia's gas, the country has decided to focus more on the Asian market in the future.

Shale Gas Worldwide

At present, only the US and Canada commercially produce shale oil and gas despite vast shale resources worldwide. According to the EIA, China has the world's largest technically recoverable shale gas reserves (1.115 trillion cf), followed by Argentina (802), Algeria (707), Canada (665) and US (573). In Canada, production is still small, but there are several shale gas projects in the early stages of development. Due to environmental concerns, the province of Quebec has imposed a moratorium on fracturing.

Outside of North America, countries are seeking to develop their own shale resources. In July, Argentina's national energy company YPF signed a USD 1.24 billion deal with Chevron to develop the country's shale resources. Additionally, energy majors such as ExxonMobil, Apache and Total have exploration rights in Argentina's giant Vaca Muerta shale field. By 2017, YPF expects to produce ca 106 million cf of gas per day from the field .[10] Other Latin American countries have significant shale resources, including Chile and Mexico, who have expressed interest in developing their shale gas reserves.

In the EU, some countries such as France have imposed a moratorium on fracking, but the European Parliament has rejected a union-wide ban. Other EU countries have promoted shale exploration. Poland seems to be the strongest shale supporter, having given more than 100 exploration licenses to companies, including Chevron. However, no company has been able to extract shale at an economically viable rate. Some companies, including ExxonMobil, have suspended shale exploration in the country, citing difficult geology and regulatory hurdles. The UK is also seeking to develop the country's shale resources. The government lifted a ban on fracking in December 2012 and in July proposed a tax reduction on shale gas profits from 62% to 30%[11].

The Ukraine is eager to develop its large shale resources in order to reduce dependence on Russian gas. In January, the Ukrainian government signed a USD 10 billion 50-year Yuzivska shale gas field development and production sharing agreement with Shell. According to Ukraine's energy minister, ca 250-700 billion cf of shale gas could be produced from the field in 2018[12]. Chevron and ExxonMobil are in the process of concluding similar deals.

Doubts Cast on Shale Potential

Despite the noted benefits of shale gas, concerns have been raised over the long-term potential. The EIA admits that there is considerable uncertainty regarding the size of shale gas resources. This is reflected by the fact that the agency recently downgraded the US's technically recoverable shale resources by 43%, to 665 trillion cf from the 1.161 trillion of 2011. Such uncertainty is largely caused by the fact that only limited proportions of shale formations have been extensively production tested. Additionally, it is unknown what part of the technically recoverable reserves can be extracted cost effectively as this hinges on future innovations.

Recently, concerns have been raised that US shale potential has been overrated. A report by Post Carbon Institute points out that 88% of the US shale gas production comes from just six plays, concluding that high-productivity shale gas plays are not ubiquitous[13]. It also highlights that shale gas field production rates typically decline very quickly. Due to the low natural gas price, most shale gas producers are losing money, "states a report by the Energy Watch Group. It is very likely that the shale gas boom in the USA has reached its peak and that the excessive development of wells will decline. Recent drilling statistics indicate that this slowdown has already started[14]."

Reports by the Post Carbon Institute and Energy Policy Forum accuse Wall Street of promoting shale gas in order to profit from mergers, acquisitions, and other transaction fees. According to the Post Carbon Institute, the shale boom was partly caused by "held-by-production" arrangements, which required companies to produce in order not to lose their land even when it was not perhaps economical due to low gas prices. Thus far, Shell is the only major producer to announce a significant shale write-down in the US. The company wrote down about USD 2 billion, mainly associated with the shale gas projects that do not produce liquids as a byproduct and are hence uneconomical. Shell is also considering selling some of its US shale properties. Some analysts predict that several other companies need to write down their shale assets too.

Conclusion

Although many countries are trying to unlock their shale gas resources, experts are increasingly skeptical that they will succeed in the near future. The International Energy Agency, which in its 2011 report suggested that the world is entering a "golden age of gas", recently said that gas growth will be slower than previously estimated because countries across the Atlantic are failing to replicate North America's shale gas success[15]. Even in the US, the future of shale gas remains unknown, as Shell has written down its shale assets. Despite the uncertainties, many countries are seeking to develop their shale resources so there is no doubt that shale gas will continue to play a vital asset in the energy sector for years to come.

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US Tight Oil Boom:
Domestic and Global Implications

The US is currently in the midst of what has been dubbed an energy renaissance. This renaissance was spurred by the country's ability to tap unconventional oil and gas. Unconventional oil lacks a standard definition, but it is generally characterized as more difficult and expensive to extract than conventional oil. The conventional/unconventional categories are fluid, as some types of oil currently considered conventional were once labeled as unconventional.

By Maya Moseley

Following decades of decline in the US, oil production has been on the rise since 2009. Part of this growth comes from significant increases in tight oil production. Light tight oil (LTO) is considered by some experts to be unconventional while others classify it as conventional or transitional. LTO, not to be confused with oil shales, is a liquid form of light crude oil contained in sedimentary rock formations with low permeability. Tight oil resources can be produced from shales, low-permeability siltstones, sandstones, or carbonates that are in close proximity to shale rock formations.

Tight Oil Extraction

Many tight oil formations in the US have been known about for decades, but commercial productivity remained elusive until producers took the knowledge gained from shale gas extraction and applied the technologies to tap tight oil. Similar to shale gas, LTO extraction generally requires the combined use of horizontal drilling as well as hydraulic fracturing. While these technologies were utilized for shale gas extraction since 1998 it was not until the mid 2000's that producers began using them for tight oil exploration and production in the US. Despite the higher production costs of tight oil extraction, it remains profitable due to high oil prices.

For tight oil extraction, vertical wells are drilled to a depth of 1,000 m to 3,000 m, then the horizontal section is added, extending the well up to 4 km. Hydraulic fracturing, or fracking, is then utilized to stimulate the well. Hydraulic fracturing is the process of pumping highly pressurized fracturing fluids into the well. Fracturing fluids are generally water-based, with chemical additives and proppants, generally sand. The injection of the fluids creates fissures in the shale which are then held open by the proppants, allowing for oil to flow. Once hydraulic fracturing is completed, conventional production methods are utilized. Beyond the general approach to tight oil extraction, the specific technologies for well completion and hydraulic fracturing vary according to each play's geology.

Tight Oil in the US

Extraction of tight oil has been a game changer for the US. In 2012, 24% (2.1 mb/d) of the US's oil production was from tight oil. Production in the US is expected to expand to 7.05 mb/d in 2013. According to the US Energy Information Administration (EIA), by the end of 2014, the crude production rate in the US will be 2 mb/d higher than imports. If this rate is achieved, it will be the first time that US production will exceed its imports since 1995.

Notable tight oil plays in the US include the Bakken play in the Williston Basin that stretches through parts of Montana, North Dakota and into Canada, the Eagle Ford play in Texas, and the Miocene Monterey play in the San Joaquin Basin of California. Other potential tight oil plays have been identified in the Rocky Mountain region, the Gulf Coast and in the northeast US. It is important to note, that despite vast amounts of tight oil reserves, only a fraction is actually recoverable, ranging from 1 to 2 percent. The Bakken and Eagle Ford are currently the most developed plays, responsible for over 80 percent of the tight oil production in the US. The Bakken is the largest "continuous" oil play that the US Geological Survey (USGS) has ever assessed. Estimates of recoverable tight oil in the Bakken play range from 3.65 billion barrels (bb) to 4.3 bb.

According to Andy Lipow of Lipow Oil Associates, in 2012, "the most attention certainly came from the North Dakota Bakken, but actually growth [in] oil production in Texas exceeded that [of the Bakken] over the last 12 months."[1] In February 2013, Texas's Eagle Ford shale Basin produced a record yield of 471,258 b/d, according to the Texas Railroad Commission, which monitors oil and gas production in the state. The rate signifies a 74% increase compared to February 2012, when production was at 271,521 b/d.

Following the success of production in the Bakken and Eagle Ford, companies are seeking to explore other potential tight oil plays. The next big LTO producer may be the Denver-Julesburg (DJ) Basin located within Colorado's Niobrara Basin. Nobel Energy announced plans to drill 300 horizontal wells in the basin in 2013. Nobel is expected to invest USD 1.7 billion in drilling operations in the basin. The Niobara Basin has a history of oil production but has failed to meet expectations. In 2012, the basin's output was estimated at 116,000 b/d. Tight oil extraction may change production in the basins. According to Bentek Energy, the production in the DJ Basin alone should rise to 140,000 b/d in mid-2013.

In addition to improving US energy independence, tight oil has been praised for job creation at the local level. North Dakota, the hub of the Bakken play, currently has the lowest unemployment rate out of any state in the US. However, the rapid growth of the industry in the state has contributed to traffic problems as well as a rising homicide rate. Concerns have also risen over the potential contamination of groundwater supplies due to the environmental risks associated with hydraulic fracturing. John Auers, analyst at Turner Mason, cautioned that the lack of pipelines, possible government restrictions on shale drilling and the costs of hydraulic fracturing may impact production in the Bakken next year[2].

Global Effects of Tight Oil

The rapid production of tight oil in the US is expected to exceed growth in global demand over the next few years, according to the International Energy Agency (IEA)[3]. It is expected that this will weaken the demand for oil exports from members of the Organization of the Petroleum Exporting Countries (OPEC) during the next five years. US imports from West Africa have already begun declining. Thus far, Nigeria and Algeria are suffering the worst due to the curb in exports to the US[4]. In 2012 exports from Nigeria, Algeria, and Angola dropped 41 percent from 2011 due to US production growth. In contrast, Saudi Arabia and other Gulf Countries remain relatively unaffected by US production. The uneven impact stems from the differences in crude that the countries produce. Nigeria has been hit the hardest, as its light low-sulfur crude oil is similar to the tight oil the US is producing. By contrast Saudi Arabia's crude is heavier and more sulfurous.

The uneven impact on OPEC members may cause divisions within the organization. Recent tensions have emerged over prices, as countries including Iran, Venezuela and Algeria require high oil prices to cover spending and offset decreases in production, whereas Gulf countries have the flexibility to withstand lower prices. OPEC is reportedly reviewing studies on the impact of US tight oil production. During a meeting on May 31, OPEC agreed on maintaining its current output quota of 30 mb/d despite rising production in the US. According to some OPEC delegates, a collective response was unlikely, as it would have required Gulf countries to cut production to support prices[5]. Countries such as Venezuela have expressed concern over "excessive production" by other OPEC members that contributes to price drops[6]. Analysts have voiced similar sentiment as John Kildfuff of Again Capital LLC who cautioned, "They needed to cut back, given rising supplies and the demand outlook." The issue will likely be revisited during OPEC's next meeting on December 4.

Boom or Bust?

Commercial tight oil extraction remains concentrated in the US, making the future of LTO outside of the country unknown. According to British Petroleum (BP), it is estimated that there is 240 bb of recoverable tight oil worldwide. BP predicts that tight oil will grow to 7.5 mb/d by 2030 with rapid growth occurring during the current decade, primarily in the US, and slowing to a moderate pace after 2020. Similarly, the EIA's 2013 Energy Outlook predicts a decline in tight oil production after 2020.

The growth of tight oil production in the US continues to be debated among producers and scientists. According to industry proponents, a few months of horizontal drilling and hydraulic fracturing creates tight oil wells that are productive for 20 to 40 years[7]. However, some scientists remain skeptical over the promises of shale gas and tight oil. The Post Carbon Institute reports that tight oil wells have steep decline rates, between 81-89 percent within the first two years[8]. This means that 40 percent of production must be replaced annually simply to maintain current production rates. Research by J. David Hughes, of the Post Carbon Institute, indicates that tight oil production will peak between 2015 and 2017 at a rate of 2.3 mb/d.[9] At this point, all possible drilling locations in both the Bakken and Eagle Ford will have been used. According to Hughes' research, by 2019 tight oil production will fall back to 2012 levels, and by 2025 production will be down to 0.7 mb/d. The lifespan of America's energy renaissance remains undetermined, however, we do know it is finite. While LTO can diminish the country's energy dependence in the short run, it must be recognized that LTO is a non-renewable resource and thus a temporary solution.

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The West and the Rest on Egypt's Crackdown

The removal of Egyptian President Mohamed Morsi from power on July 3 and the consequent crackdown on his supporters and other members of the Muslim Brotherhood has caused political turmoil, chaos and left over 1,000 dead within Egypt. Outside of Egypt, the military's bold course of action provoked a wide range of responses from regional and international actors. An analysis of the varied responses to the crackdown on the Muslim Brotherhood provides insight into the interests of major international and regional actors.

By Robert Mogielnicki

The Background

On July 3, the Egyptian armed forces removed President Mohamed Morsi from power following mass protests against the former president and the Muslim Brotherhood. The story had all of the makings of a political tragedy. Abdel Fattah al-Sisi, the Minister of Defense who was appointed by Morsi, led the ousting of the former president a year after his appointment as defense minister. The military gave the president a 48 hour deadline to respond to protesters' demands and negotiate with the opposition. Morsi responded with a defiant speech in which he asserted his electoral legitimacy as the first democratically elected president of Egypt. The speech was the last straw for the military generals who seized the opportunity to rid Egypt of what many considered to be a failed experiment with Islamist rule. They placed Morsi under house arrest in a secret location and set to work installing an interim government.

The anti-Morsi crowds in the street were jubilant after the military's removal of Morsi. Yet many observers pointed out the fickleness of celebrating the return of Egypt's invasive military institution to the center of political life. Ahmed Maher, founder of the April 6 Youth Movement, wrote in the Washington Post, "Our support for the transitional road map to new elections was predicated on the military's pledge that it would not interfere in Egypt's political life. The expanding role of the military in the political process that we are nonetheless witnessing is disconcerting." In either case, many Egyptians believed the military's move was a necessary restart that would get the country back on track to a different and better style of democracy. But there was still one major, unresolved problem: not everyone wanted Morsi gone.

Removing the president was only the beginning of the military's problems, and this became extremely clear in the days following Morsi's removal. Pro-Morsi protesters demonstrated throughout the country; however, the majority of protesters in Cairo organized sit-ins in Rabaa Al-Adawiyya Square in Nasr City and Nahda Square in Giza. These protesters claimed that they would not leave the sit-ins until Morsi was reinstated as the president of Egypt. While the armed forces had used former protests to legitimize their removal of both Hosni Mubarak and Mohamed Morsi, it is clear that they did not agree with the messages being promoted by the Muslim Brotherhood in these sit-ins. Rather, the military believed that the protests were hindering the new political roadmap and consequently announced their intention to break up the sit-ins. The military justified their decision because they believed that pro-Morsi and Muslim Brotherhood supporters were inciting violence and destabilizing the state.

On August 14, the armed forces stormed the two squares hosting sit-ins in Cairo with bulldozers. When the smoke cleared on the following morning, as many as 525 people were estimated dead, the military declared a state of emergency and leading members of the Muslim Brotherhood were rounded up and arrested. Mohamed ElBaradei, vice president of the interim government and a leading human rights activist, resigned over the military's crackdown on protesters and international and regional actors were quick to weigh in on the violence.

Weighing In

The military crackdown on the Muslim Brotherhood leaves the United States in a tricky diplomatic position. On the one hand, the United States does not want to outwardly support the former, Islamist regime and their proponents. American diplomacy tends to favor those in power, and while it may not always be fair, this phenomenon is nevertheless a result of pragmatic politics. Given the extreme unlikelihood that Morsi will be reinstated as president, the United States must focus its diplomatic efforts on the military generals and the interim government. Any unnecessary catering to the Morsi camp may hamper U.S. efforts to work with Egypt's new government going forward. On the other hand, the United States cannot condone over 1,000 dead protesters and Egypt's slow backslide into martial law. The civilian death toll, whether or not attacks were provoked, is simply too high for the United States to accept as a justified use of military force.

In response to the crackdown, Josh Earnest, principal deputy press secretary for the Obama administration, released this statement on the crackdown in Egypt:

"The United States strongly condemns the use of violence against protesters in Egypt...We have repeatedly called on the Egyptian military and security forces to show restraint, and for the government to respect the universal rights of its citizens, just as we have urged protesters to demonstrate peacefully....We also strongly oppose a return to a State of Emergency law, and call on the government to respect basic human rights such as freedom of peaceful assembly, and due process under the law."

It is important to note that the statement only generally refers to "protesters" rather than mentioning the pro-Morsi camp which received the lion's share of the violence. While the statement condemns the military's actions, it also calls on protesters to demonstrate peacefully. This leaves open for interpretation the Egyptian military's assertion that the protesters were not peaceful but rather actively engaged in terrorist operations against citizens and the state. Finally, the statement opposes the state of emergency imposed by the military because it is not indicative of the promised democratic transition.

The United States also took other, more substantive measures in responding to the crackdown. First and foremost, the U.S. cancelled September's Bright Star Exercise, a bi-annual military operation where thousands of U.S. troops train in various Egyptian locations. By canceling the exercise, the United States distanced itself from Egyptian security forces at a time when hundreds of protesters were being killed. On a related note, President Obama postponed the delivery of F-16 fighter jets to Egypt, a decision which many believed was a precursor to a larger reconsideration of U.S. aid to Egypt.

Another major issue related to the July 3 removal of Mohamed Morsi and the consequent military crackdown concerns U.S. military aid to Egypt. Each year, the United States provides Egypt with $1.23 billion in U.S. Foreign Military Financing, and $585 million of that annual budget has yet to be dispersed. This aid, though, is not unconditional, but rather U.S. law dictates that aid must be cut off to any country that experiences a military coup. The Obama administration has not officially recognized the removal of Mohamed Morsi as a military coup nor have they announced a decision to cut off aid. That being said, it appears that the remainder of the annual aid to Egypt will remain

in limbo until U.S. officials reassess the relationship with Egypt. Secretary of Defense Chuck Hagel summarized the administrations position by saying, "The Defense Department will continue to maintain a military relationship with Egypt, but I made it clear that the violence and inadequate steps towards reconciliation [with the Muslim Brotherhood] are putting important elements of our longstanding defense cooperation at risk."

For their part, the European Union has agreed to halt all sales of military equipment and weapons to Egypt. The 28 members of the union also agreed to review EU aid to Egypt. The European Union's response to the crackdown was announced by Catherine Ashton, the EU's foreign policy chief, who said, "We strongly condemn all acts of violence and we do believe the recent actions of the military have been disproportionate." This past November, the EU pledged $6.7 billion in aid and loans to Egypt; however, that European assistance has been jeopardized by the unrest in Egypt. That being said, the EU ministers did not go so far as to impose comprehensive economic sanctions on Egypt. "We will review assistance to Egypt but assistance to the most needy will remain," Ashton explained.

The regional response was varied, with some actors criticizing and others supporting the military's crackdown on Muslim Brotherhood protesters. The Turkish Prime Minister, Recep Tayyip Erdogan, called for an urgent meeting of the UN Security Council to discuss a "very serious massacre". The Turkish prime minister's condemnation of the Egyptian military's operation was unsurprising given that his country recently witnessed massive protests against what many Turks viewed as an increasing Islamization of Turkey. As the head of an Islamist government himself, Erdogan has an incentive to pay close attention to how Egypt's military treats Islamists who were formerly in power. It is also in his interest to smear the crackdown so as to dissuade secular elements in Turkey from being inspired by the ouster of an Islamist president.

On the other side of the debate, the United Arab Emirates and Bahrain agreed that the Egyptian military's need to restore order was justified. Given that both of these Arab countries highly value foreign investment and continued economic growth, they have an interest in maintaining political stability. In 2011 and 2012, Bahrain faced significant economic setbacks as a result of political unrest, and Bahraini authorities are uninterested in additional political turmoil. These statements in support of the Egyptian military can be viewed as a warning to potential protesters in the Gulf who threaten stability in their countries.

The Aftermath

The recent crackdown is troublesome not only because of the hundreds of dead protesters but also because of the dangerous consequences it may have for Egypt. Over thirty years ago, an Egyptian Islamist named Ayman Al-Zawahiri was imprisoned and tortured for his alleged participation in the assassination of Egyptian president Anwar Sadat. When he was released from prison, an angry and radicalized Zawahiri made his way to Pakistan and was introduced to Osama bin Laden. Today, Zawahiri serves as the acting leader of al-Qaeda, and he is one of the most outspoken critics of the Muslim Brotherhood precisely because of the group's insistence on participating in democratic processes. Zawahiri believes that Islamist groups must abandon political participation and seize power by force.

The Muslim Brotherhood, for the most part, have eschewed the terrorist tactics used by groups like al-Qaeda and has been actively engaged in Egyptian politics even when the group was ostensibly banned from the political scene. The height of the group's political activity came in 2012 when a Muslim Brotherhood member became president in what many international observer organizations viewed as free and fair elections. There is no doubt that the removal of President Morsi and the consequent bloody crackdown on his supporters has angered, marginalized and radicalized a significant portion of Egyptians who feel betrayed for playing their part in Egypt's democratic process. What is more worrisome is the potential for some of these marginalized Islamists to give up hope and start thinking that Zawahiri was on to something.

Unconventional Gas Beyond the US:
Emerging Players in Shale Exploration and Development

Technological developments in the US have recently opened access to unconventional forms of natural gas. Types of unconventional gas include shale gas, tight sands, and coalbed methane. Shale gas is currently the most discussed unconventional gas as it has been credited as revolutionizing the energy sector in the US. Through the combined use of horizontal drilling technologies and hydraulic fracturing, Mitchell Energy was able to extract shale gas at an economically viable rate in 1998.

By Maya Moseley

Partnerships between the US federal government and the gas industry were key to developing the technologies that allow for commercial extraction of shale. The US is projected to become energy self-sufficient by 2030 due to shale gas production.[i] According to British Petroleum's (BP) projections, shale gas will continue to grow 7 percent per annum. Initial growth is expected to be concentrated in the US until 2020 and then spread to China and other countries. The success of shale gas in the US, has spurred interest worldwide. In April 2010 the US Department of State launched the Unconventional Gas Technical Engagement Program (UGTEP), aimed at promoting unconventional gas, particularly shale, production abroad.

The ability to replicate the success that the US has achieved in shale gas production remains debated. According to Joseph Geagea, corporate Vice President of Chevron, other countries will face difficulties replicating the unconventional gas boom that the US achieved [ii]. Geagea explained that in the US, drillers already had the seismic data necessary to know where to drill. That pre-existing knowledge combined with established infrastructure and government regulation, provided the US with the necessary foundation for its shale gas revolution. "It'll be a long time before it's replicated," Geagea informed. Despite the challenges, countries such as Algeria, India, China, and South Africa have all begun exploring potential development of shale gas.

Algeria

According to the US Energy Information Administration (EIA), Algeria holds 231 trillion cubic feet (tcf) of recoverable shale gas. As the country's conventional oil and gas reserves pass their peak output levels, Algeria has begun exploring opportunities in shale gas. In an effort to attract investors to the country's unconventional reservoirs the government amended the existing tax law on hydrocarbons in February 2013. Under the revised legislation, royalties will be adjusted based on production rates and revenue taxes will factor in risk and difficulty of exploration. State-owned Sonatrach is still allotted a majority stake in all joint ventures under the law.

Eni SPA (ENI), Royal Dutch Shell Plc (RDS), and Talisman Energy Inc (TLM) have signed agreements with the Algerian government on shale exploration. According to Djaouid Djelloul Bencherif, Sontrach's director of deposits, over 400 test wells must be drilled in order to determine if production of shale gas in the country is economically viable.[iii] ENI began exploratory drilling in 2012, while Shell and Talisman are expected to start soon. Sohbet Karbuz, hydrocarbons director at Observatoire Mediterranee de l'Energies (OME), stated that shale gas could almost double the country's gas production by 2030. However, Algeria's Energy Ministry said that the country does not expect to begin commercial shale production before 2020.

Production of shale gas in Algeria could also benefit Europe, as the country is already connected to Italy and Spain via trans-Mediterranean pipelines. An increase in production would provide the EU with an alternative to Russia.

Despite new legislative incentives to attract investors to explore unconventional gas, Algeria will face challenges in developing the sector. The January 2012 terrorist attack on BP in Amenas highlights the security risks of operations in the country. Additionally, the environmental risks of hydraulic fracturing, which is necessary for shale extraction, has raised concern among environmentalists. Hydraulic fracturing is a water-intense process that many believe also poses a threat of water contamination.

India

India holds an estimated 63 tcf of recoverable shale gas reserves according to the EIA. However, Schlumberger Asia reports that the country's shale reserves could be as high as 2,000 tcf.[iv] India's Cambay, Krishna Godavari, Cauvery, and Damodar Valley regions are all prospective basins for shale gas extraction. The Oil and Natural Gas Corporation (ONGC) discovered shale gas during exploratory drilling in January 2011 in the Damodar Basin. Commercial production is at least five to seven years away but first more drilling must be completed in order to determine the economic viability of shale gas production in India.[v]

The US government is actively assisting India's development of its shale resources. In November 2010, the US Department of State and India's Ministry of Petroleum and Natural Gas signed a memorandum of understanding (MoU) on Shale Gas reserves. Under the MoU, the US Geological Survey will assist in assessing India's shale reserves and provide training to Indian nationals in resource assessment. With assessments underway, legal frameworks are also in development. In April 2012, the Directorate General of Hydrocarbons (DGH) proposed a draft policy on shale gas exploration to the Ministry of Petroleum and Natural Gas (MoPNG). India is expected to launch bidding for shale gas exploration licenses at the end of 2013.

According to Akshaya Gulhati and William Dusek, the real challenge for India will be resource management, particularly water, which is already problematic in terms of human consumption.[vi] Additionally, land access may also present a challenge, as protests over land seizures have turned violent in the past.[vii]

China

Until recently, China's exploration into unconventional gas has primarily focused on coalbed methane gas. In addition to its coalbed methane development, China also has plans for confirming and assessing the country's shale gas reserves. The EIA reports that China has the largest reserves with 1,275 tcf of recoverable shale gas.

In 2009, the US and China launched the US-China Shale Gas Resource Initiative, which provides assistance and support on the assessment and development of shale gas. In 2010 China established a National Energy Shale Gas R&D Center (NESRC) under the National Petroleum Corporation (CNPC). Despite initiatives, progress on the assessment of shale in the country has been slow. At the end of 2012, only 80 shale exploration wells had been drilled.

Almost 80 percent of prospective shale deposits in China are located in conventional oil and gas blocks that are owned by the country's national oil companies (NOCs).[viii] The government permitted NOCs to develop shale gas on these blocks so long as they submitted a plan for each block before December 26, 2012. Despite the country's lack of established policies for shale gas exploration and extraction, in March 2013, Shell signed a production-sharing agreement with the Chinese government for the Fushun shale block in the province of Sichuan.[ix] Under the contract, Shell will spend a minimum of USD 1 billion a year on exploring shale gas resources in the country.

Extraction of shale gas is likely to be problematic. Due to the country's geological features, hydraulic fracturing alone is not expected to be adequate due to the deeper location of shale deposits. Lack of experience in producing shale and technology will also be a hurdle to the economically viable extraction of shale. Chinese companies have recently begun investing in the US shale gas sector, where they might be seeking improve their technical knowledge of shale extraction. In spite of the challenges faced, investors and the Chinese government appear committed to developing shale gas within the country.

South Africa

South Africa is believed to have an estimated 485 tcf of shale gas resources. The majority of the country's shale is located in the Karoo Basin. The Karoo Basin is 236,000 sq miles. The depth of shale gas in the basin is on average 8,000 ft, however, due to volcanic intrusions seismic imaging is not always possible.[x] According to Shell, it may take up to 10 years to achieve commercial shale production in the basin.

In April 2011, the country's cabinet placed a moratorium on shale gas exploration. Following a study on safety and environmental concerns, the government lifted the moratorium in September 2012. According to the Petroleum Agency of South Africa, there are currently five pending applications for exploration in Karoo Basin. Three of the applications belong to Shell, while Falcon Oil & Gas and Bundu Gas & Oil Exploration each have one.

Due to the potential dangers associated with hydraulic fracturing, shale gas exploration has sparked concern by environmentalist and landowners in South Africa. The Karoo Basin is a semi-arid region, home to many rare species, making environmentalist particularly worried over the potential damage hydraulic fracturing may cause to the water-scarce region. It is expected that environmentalists and other groups will appeal exploration licenses, making it unlikely that any licenses will be granted this year.

Conclusion: the Future of Shale Gas

The future of shale gas worldwide remains unknown. The US had favorable conditions that allowed for the development and growth of the industry. In order for other nations to capitalize on their shale gas resources, they must find solutions to existing infrastructure and technological gaps. Thus far, the US government and shale gas producers have offered support to countries hoping to tap their resources. However, each country will inevitably face unique obstacles, rather geographically or politically. The ability to overcome such challenges will ultimately determine each country's individual capability of producing shale gas at an economically viable rate.

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Lessons for Managing Unconventional Resources

Recently, a report produced by the US Energy Information Agency noted that Egypt has significant proven and prospective volumes of natural gas and sizeable deposits of crude oil. There are around 2 trillion cu meters of proven conventional natural gas reserves and nearly further 3 trillion cu meters in unconventional reservoirs. Egypt also has 4.4 billion barrels of proven crude oil reserves and around the same volume in unconventional deposits. Whilst these are not the highest figures in the world, if optimally managed, such resources could play a significant role in Egypt's economic development. Considering that Egypt is in the midst of sociopolitical change, it may be productive and forward-thinking to examine economic factors and options for development that can potentially serve as the foundation of a stable and prosperous economic future. Egypt has a long history in oil and gas and therefore has the institutional and infrastructural capacity to support unconventional oil and gas exploration and production. The pursuance of unconventional gas may be a productive medium-term option for future economic growth.

By: Grzegorz Pytel - Sobieski Institute, Partner, Futurisk LLP

Over the last 20 years the US and Canada have demonstrated that unconventional hydrocarbon resources are technically feasible, but can also provide the foundation for considerable industrial rejuvenation. Countries such as the US, Norway, Canada and Australia have provided examples as to how unconventional resources can be developed for a long term as a source of economic prosperity, industrial growth and high-quality jobs, especially for younger generations.

In developing upstream unconventional resources, governments and investors must bear in mind that 75% to 80% of risks stem from above ground. The development of unconventional gas in Europe, particularly Poland, has demonstrated that the presence of unconventional resources does not guarantee rapid and sustainable development, as there are always fiscal and technological challenges with the development of unconventional resources.

Egypt stands to gain much by branching out into the unconventional sphere. In consideration of the fact that, historically, oil and gas companies have demonstrated they are adept at pushing technical and technological boundaries, unconventional resources may be a viable option for the development of the Egyptian oil and gas sector. As resources are only part of the equation, Egypt must develop effective measures to mitigate "above-ground" risks if it seeks to fully tap its unconventional reservoirs.

Hard planning

Historically, the most efficient way to develop natural resources is through private companies in a competitive environment. "Resource nationalism" and/or state monopolistic approach guarantees state control, but has proved economically inefficient. State control of upstream activities frequently leads to resource mismanagement, waste and delayed development. Given the high cost of exploration and development, private companies should be paid a fair percentage as they bear all of the risk. From the state side, ideally, natural resource revenue should be invested in infrastructure, education, and health systems, to ensure a prosperous future.

The problem arises in balancing public and private risk and reward and determining "fair" percentages. Only a few countries such as the UK, Canada, Australia and Norway have developed systems that maximize national wealth and, simultaneously, attract foreign investment in oil and gas. Norway serves as a successful example of balancing private and public interests in the realm of oil and gas exploitation.

The Norwegian government's firm commitment to transparency (often defying bureaucratic convention) contributed to the successful development of Norway's oil and gas sector simultaneous to increased levels of foreign investment. Despite high taxes, companies know that the government will always adjust rules to the prevailing conditions, as the Norwegian economy is highly dependent on the oil and gas industry. If times are good, the pressure on taxes would be high, if times are not that good, the government will adjust the fiscal rules so the companies will be able to get through. While there is a preference for the local "champion", Statoil, the company is made to compete with private companies. So whilst it may not be exactly a level playing field, it is still quite fair to foreign companies. The Norwegian success is based on the fact that the government manages these elements very well. Ultimately, the government understands one thing: if it wants to keep private companies, it must let them be successful. Otherwise they would pull out and the ultimate loser would be Norway.

Amidst Norwegian successes, Poland has attempted to develop its unconventional gas resources. Initially Poland gave away, freely, nearly all its exploration licenses for shale gas thereby eliminating almost any competition amongst investing companies. In light of reserves estimated at 5 trillion cu meters of natural gas, numerous companies expressed interest including ExxonMobil, Chevron, ConocoPhillips, Marathon, Nexen, Talisman Energy, ENI, and Total. Despite such positive indicators, less than 50 wells were drilled over the past five years and very few - less than 10 - were fracked.

The limited exploration and development stems from a culmination of factors. While the licenses were huge, up to around 1000 sq km each, the obligations in terms of minimum investment were very low. Companies holding exploration licenses faced uncertainty concerning the availability and fiscal terms of production licenses, (i.e. they could have ended up taking exploration risks and another company would have reaped benefits of production). Existing regulations create additional challenges and delays. Up until June, an additional permit was required to extend wells by 1,000 feet. Approval of the permit would often take up to a year, causing serious disruptions in the drilling process. Regulations have also been criticized for being too stringent, including penalties on delays in work schedules. Concerns have also been raised over fiscal terms as the government is seeking to tax 40% of profits. Additional legislature has been proposed requiring a state-run company act as a shareholder in all production ventures, which would further increase the government's share of profits.

In addition to this, the environmental regulations (processes rather than rules themselves) were very unfriendly. Until recently environmental impact assessments were required for the entire concession area, rather than limited to drilling sites. Poland's unconventional sector remains further marred by the recent bribery charges against government officials and businessmen related to shale exploration licenses.

Contrary to the impression given in the worldwide media, the industry did not take off in Poland at all. In Poland, too much uncertainty increased long-term risk for the companies and practically led to a halt of shale gas exploration activities. This outcome can be attributed to two factors. First, the state authorities did not understand private companies, the way they operate and how they assess business risks. In many instances the state authorities were making decisions hoping they would be praised by the industry, but quite the contrary, they were met with disappointment. The second fact that contributed to the halt of shale activities can be attributed to a communication breakdown between private companies and the government. While the government is seeking to address some of the regulatory pitfalls in new draft legislation, it may be too little too late as companies such as ExxonMobil, Talisman Energy and Marathon decided to leave Poland. Those who remain keep their activities on very low level. Sometimes it seems that they only remain so as not to admit a failure.

The Polish and Norwegian experiences offer lessons for Egypt in terms of high resource potential and for successful development. Without optimal management, Egypt's full potential cannot be reached. Without a stable and predictable environment private companies will not commit any significant investment.

Drawing from experience

Egypt should not be afraid of drawing upon the expertise and experience of other countries currently pursuing unconventional resources. Egypt has a long history of dealing with international oil and gas companies. As such, the institutional foundations are in place in order to develop Egypt's unconventional resources. Egypt can draw from Poland and Norway's experiences by establishing a clear plan for the development of unconventional resources as well as gaining further knowledge of how international companies perceive risk and reward in the realm of unconventional exploration and production, specifically in an environment of political insecurity.

Only a small percentage of risk associated with oil and gas exploration and development stems from technical and technological challenges. The majority of risk stems from "above-ground" risk factors, including fiscal terms, broader stability, regulatory conditions and complexity of operational logistics. However, proper management and mitigation of "above-ground" are instrumental to success. For example, overly lenient environmental regulations can lead to devastation and too stringent regulations can discourage private investment. Low government percentage take can lead to wasted natural resources resulting in the loss of billions of dollars. An excessive government percentage take can lead to the death of the sector as private investors have little incentive to invest with minimal reward. As so much money is at stake, a high risk of corruption is also always present.

The way forward

Only a transparent and stable system designed in a way that it benefits from other countries' experiences can provide practical solutions to these very difficult problems. The aim is to maximize the development of Egypt's natural resources for the benefit of the country. Egypt has enough hydrocarbons resources, conventional and unconventional, to help with building its successful future. It requires learning from their own and other countries' experiences, a lot of careful planning and implementation. Contrary to conventional thinking the wealth of oil and gas is not only in the ground, it is mainly in the heads of those who manage the system and are responsible for it. Without their wisdom hydrocarbon richness can easily turn into yet another curse.

Modernization and Upgrades of Safety and Automation Systems (SAS)

SAS Solutions: Seamless System Expansions, Modernizations and Upgrades

ABB works closely with our customers to determine ways to optimize plant automation and safety. When system upgrade or modernization becomes necessary, we provide total Engineering, Procurement, Construction and Installation (EPCI) services to ensure smooth implementation of new SAS technology.

Maintaining efficient operations as production and processing requirements evolve presents many challenges to oil and gas operators. As a world-leading supplier of both SAS (Safety and Automation Systems) and total EIT (Electrification, Instrumentation and Telecom) solutions, ABB has the technology, expertise and capabilities to manage large modernization and upgrade projects from start to finish.

Modernization of Safety and Automation Systems may become necessary due to technological advancement, changing markets, operational requirements or more stringent safety and environmental regulations. When the time comes to update the existing SAS, ABB can provide analysis and recommendations for full or partial system replacement, implement the necessary hardware, software and infrastructure and implement a smooth migration.

A highly complex migration process

The modernization process for automation systems is highly complex, and may involve upgrades and/or replacement of items such as control hardware and I/O's, operator interfaces and work stations, monitors and displays, data and communication networks, documentation, control and communication software, work processes, data bases and electronic tags. To avoid unnecessary disturbance in production, this migration must be performed seamlessly and in accordance with HSE guidelines.

Total EPCI services for SAS upgrade projects

For more than 25 years, ABB has delivered automation solutions to offshore and onshore production and processing facilities. This long experience has provided us with a unique level of expertise in all areas necessary for providing total EPCI services for SAS modernization and upgrade projects, including electrification, instrumentation and telecom. The value-added benefits gained by placing total EPCI responsibility directly with ABB include significant cost savings, high project management efficiency and a fully optimized installation that is well-prepared for the future.

ABB's Engineering, Procurement, Construction and Installation services contribute greatly to successful oil and gas projects. From an early project phase, ABB Engineering Services design overall system solutions that are seamlessly integrated and highly optimized to meet all current and future project requirements.

Advanced engineering and simulation tools

Powerful engineering tools are used to build transparent applications that give operators, engineers, maintenance personnel and planners a single view into the entire installation. Advanced simulation tools and multi-discipline expertise reduces engineering efforts, risk and cost overruns resulting from interface challenges.

As the project matures, ABB Procurement Services ensure that items are selected, orders are placed and deliveries are received in the most timely and cost-efficient manner. To assure high HSE and quality standards, quality assurance and compliance requirements are tightly monitored and all documentation is specified to meet the same high standards and follow a unified format.

With expert Installation and Commissioning Services, ABB is a total project partner with our customers, providing single-source responsibility for both ABB- and third-party deliveries. Ongoing communication and coordination with all project contractors and sub-contractors helps assure timely, efficient project execution.

Value-added benefits gained by placing total EPCI responsibility directly with ABB include significant cost savings, high project management efficiency and a fully optimized installation that is well-prepared for the future.

Automation Technology for the Life of the Field: Several Generations Under One Roof

Implementing new automation technology is challenging in itself, but updating large existing automation systems with new control and HMI solutions - with no shutdown in operations and transparent operator interface changeover – presents many additional challenges.

For large oil and gas process plants, ABB is uniquely qualified to extend the lifecycle of delivered SAS solutions as modern operational demands require.

Ongoing upgrade capabilities

ABB automation and control solutions are based on open architecture to enable straightforward integration with previous generation automation products and to provide flexible interface possibilities for future automation technologies. This future-proof approach ensures that our automation technologies can keep pace with operational demands today, tomorrow and well into the future.

To ensure ongoing modernization capabilities, system levels may be updated independently. However, the Workstation and Server level must be the same generation or newer than the controllers. This level is normally upgraded first and can be modernized independent of the Controller level. New controllers may be added without upgrading all controllers in the installation.

800xA Automation System

System 800xA is ABB's award-winning Extended Automation System. System 800xA extends the scope of traditional control systems to include all automation functions in a single operations and engineering environment - enabling your plants to perform smarter and better at substantial cost savings.

System 800xA Process Portal

The ABB System 800xA Process Portal is an extended operations environment that provides a single window to the process, a maintenance view to asset conditions and work processes, an engineering view to process performance and engineering tools, and a management view to overall productivity Key Performance Indicators (KPIs). It is an intuitive and easy-to-use system interface that gives direct access to process control equipment, smart field devices, asset optimization tools, information management systems, safety systems, Manufacturing Execution System (MES) applications and beyond.

Technology-driven control rooms

ABB provides complete control rooms that are designed for comprehensive and easy-to-use operator monitoring and control functionality. Control rooms include the ABB Extended Operator Workplace, which provides operators

a comprehensive overview of the process, enabling faster decision-making and action by the operator. The system is modular and flexible, making it possible to combine several workplaces with multiple monitors for more viewing space and better placement and location of important information.

Tailored solutions for better operator performance

To reduce operation errors, personalized process views can be created according to the operator's individual style and preferences. An extensive graphics library of standard process control components are available in the integrated 800xA Engineering environment, and custom graphics may be easily created. Quick, flexible and secure access to intelligible displays and information make monitoring and control actions efficient and accurate.

Compatible with the past, prepared for the future

As large oil and gas installations expand and evolve, aging process controllers and operator interfaces may become prematurely obsolete due to integration problems and discontinued product support by the manufacturer. A preferred solution is to extend the life span of the current system by running several generations of controllers in parallel with full integration and a common, shared HMI solution.

Based on open architecture, the System 800xA suppports earlier ABB automation technologies such as Harmony, Melody, MasterPiece and Advant systems as well as most major third-party controllers. The new AC800M process controller is also compatible with earlier-generation ABB controllers, providing transparent and trouble-free upgrades and modernizations.

In addition, ABB has developed a comprehensive product lifecycle management model that maximizes the value of the equipment by ensuring long-term availability of the product, spare parts and product support and expertise.

Egypt Statistics

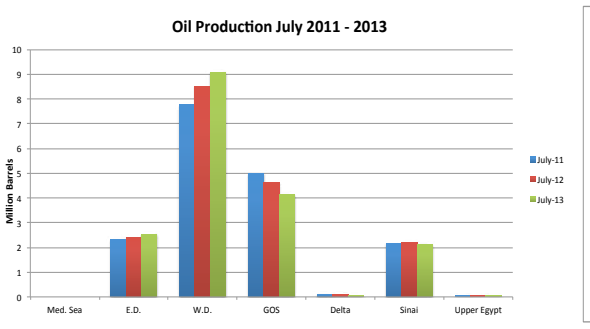
EGYPT OIL&GAS RESEARCH & ANALYSIS

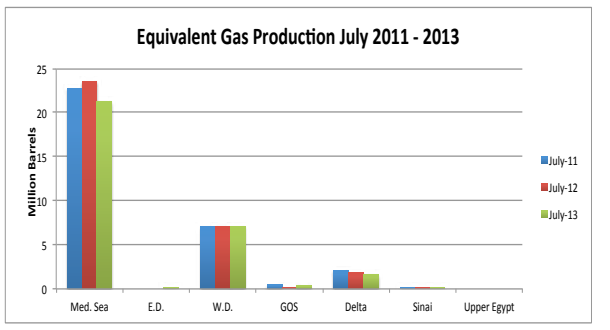
Table 1 Egypt Rig Count per Area – August 2013

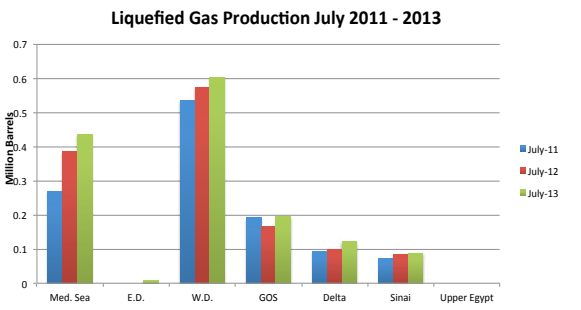
RIG COUNT

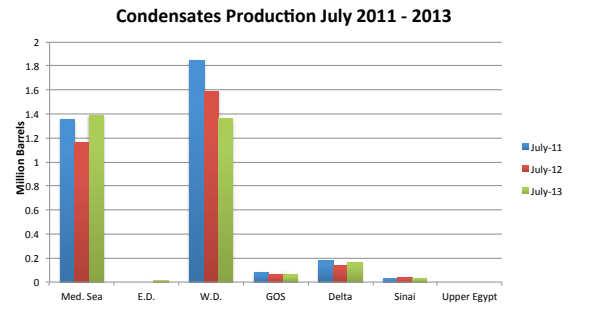
Area		Total	Percentage of Total Rigs
Gulf of Suez		10	9 %
Offshore	10		
Land			
Mediterranean Sea		8	7 %
Offshore	8		
Land			
Western Desert		79	68 %
Offshore			
Land	79		
Sinai		11	9 %
Offshore			
Land	11		
Eastern Desert		5	4 %
Offshore			
Land	5		
Delta		4	3 %
Offshore			
Land	4		
Total		117	100%

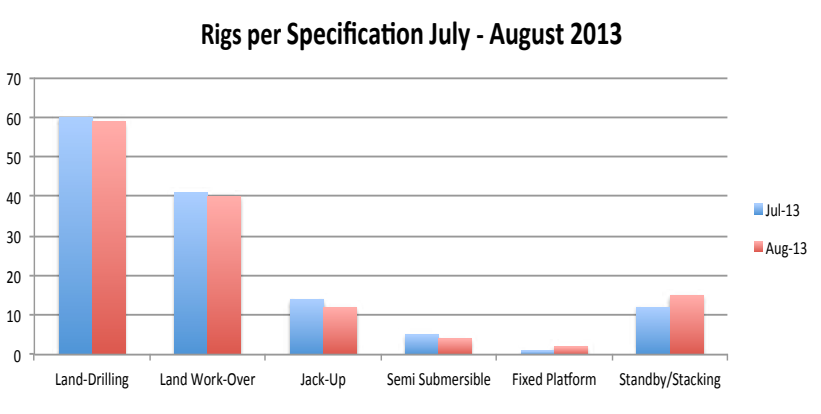
	Oil			Equivalent Gas			Condensate			Liquefied Gas		
	Barrel			Barrel			Barrel			Barrel		
	July-11	July-12	July-13	July-11	July-12	July-13	July-11	July-12	July-13	July-11	July-12	July-13
Med. Sea				22788750	23576071	21285536	1356139	1163770	1386356	269095	385522	435076
E.D.	2319772	2384423	2536708			63571			3357			8509
W.D.	7766209	8496579	9072923	7080893	7083214	7133214	1847510	1590211	1364241	535036	574058	603252
GOS	4978930	4620926	4157226	476964	188571	369464	81880	59398	61012	191514	165159	193942
Delta	113445	83934	62226	2107321	1810714	1683750	179876	140141	165881	92377	98616	122892
Sinai	2145338	2202605	2135587	21429	536	1429	33234	35634	33268	72880	84755	88239
Upper Egypt	20491	16850	16739									
Total	17344185	17805317	17981409	32475357	32659106	30536964	3498639	2989154	3014115	1160902	1308110	1451910

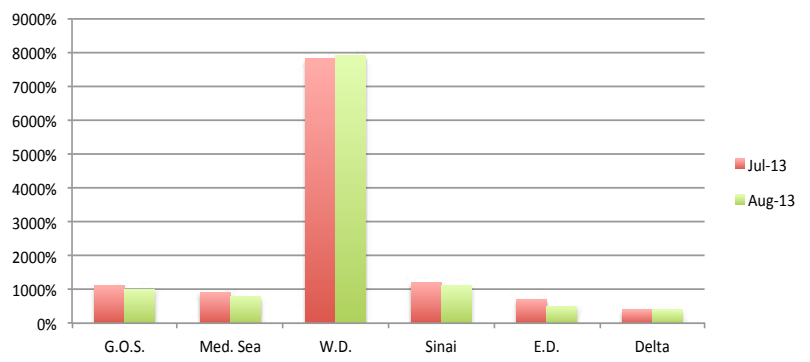


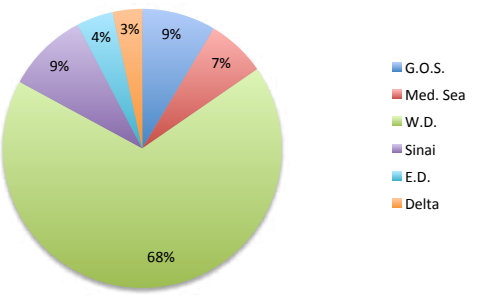


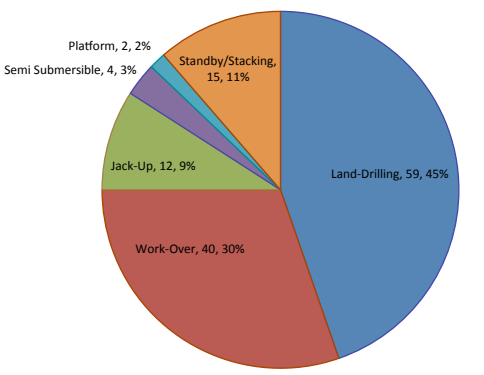


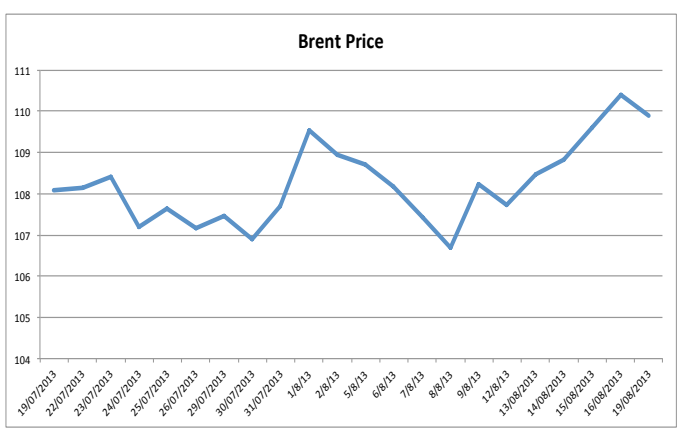


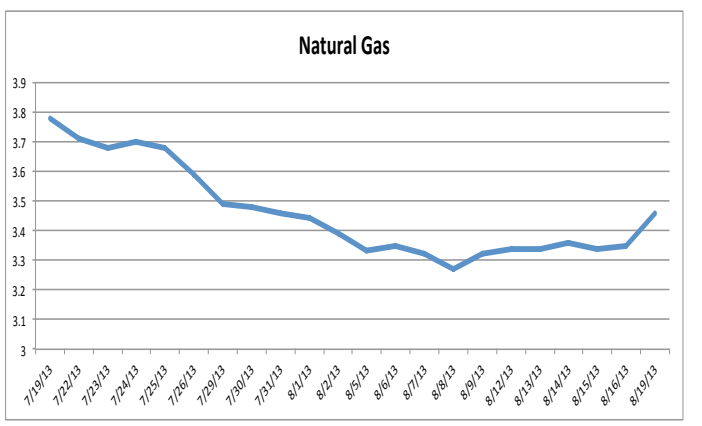


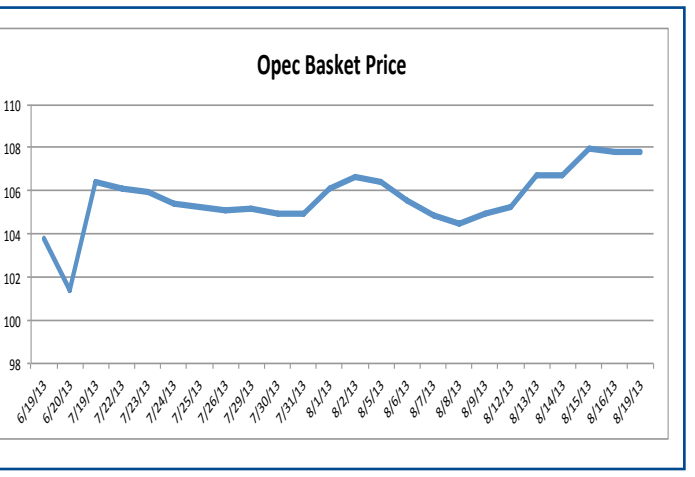












WHEN VERSATILITY COUNTS...

MV FUGRO NAVIGATOR

The Fugro Navigator is the only specialist geoscience survey vessel dedicated to the Egyptian market. The Navigator's multi-role capability allows her to undertake a wide range of survey activities, such as geophysical and geotechnical surveys for drill sites and pipelines, ROV surveys and inspections, and high resolution seismic surveys and environmental surveys.

As a specialist survey vessel, the Navigator offers significant advantages over vessels of opportunity by offering:

- Greater versatility
- Improved safety performance
- Reduced weather standby costs
- The ability to respond quicker to requests for projects
- Hull-mounted sensors produce that higher quality data
- Reduced turnaround time for reporting

The Navigator is permanently equipped with a wide range of geophysical equipment for deep and shallow-water operations while ROV systems and geotechnical and environmental equipment are mobilized to the vessel on a project-by-project basis. She has carried out an average of 15 survey projects each year since her introduction in early 2008, in water depths from as shallow as 10m to over 1300m.

...COUNT ON FUGRO

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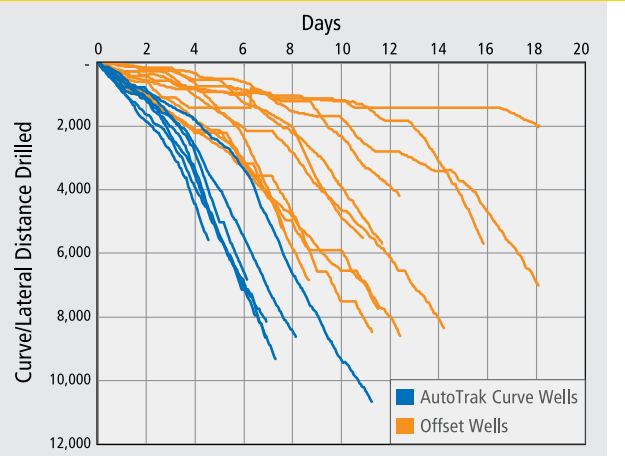
Maximize ultimate reserve recovery by exposing more of the reservoir with a rotary steerable system with a build-rate of 15°/100 ft (30.48 m). Three-pad steering capabilities keep the well in the target payzone and deliver a smooth, high-quality wellbore.

Advancing Reservoir Performance



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