



PANGEA INTERNATIONAL

EUROPEAN INVESTMENT:
PETROCHEMICALS INDUSTRY IN THE PERSIAN GULF
NOVEMBER 2015



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Executive Summary

The European chemical industry is facing the dawn of a new reality. While the industry worldwide is still reeling from the current cyclical downturn and the recent global recession, chemical companies in Europe are faced with the ongoing rise of new competition in the Middle East. These factors appear to be driving an inexorable shift eastward in the global chemical industry, particularly at the bulk / commodity end of the sector.

At the same time, Middle Eastern chemical producers continue to seek expansion along the value chain into higher value-add solutions. These Middle Eastern entities are often cash-rich and backed by government support.

To stay ahead of the game and save the dying industry, Europeans know they need to form strategic relationships with the Middle East and the Middle East need the foreign investment to achieve their goals.

Banks are looking for well-structured and well-priced projects and are more inclined to more creative financing structures such as project bonds to finance the Middle East projects.

Bearing in mind investors are risk averse in this region, we gather now is the best opportunity to reach out to European investors for Joint Ventures, Project Financing and Partnerships.

TABLE OF CONTENTS

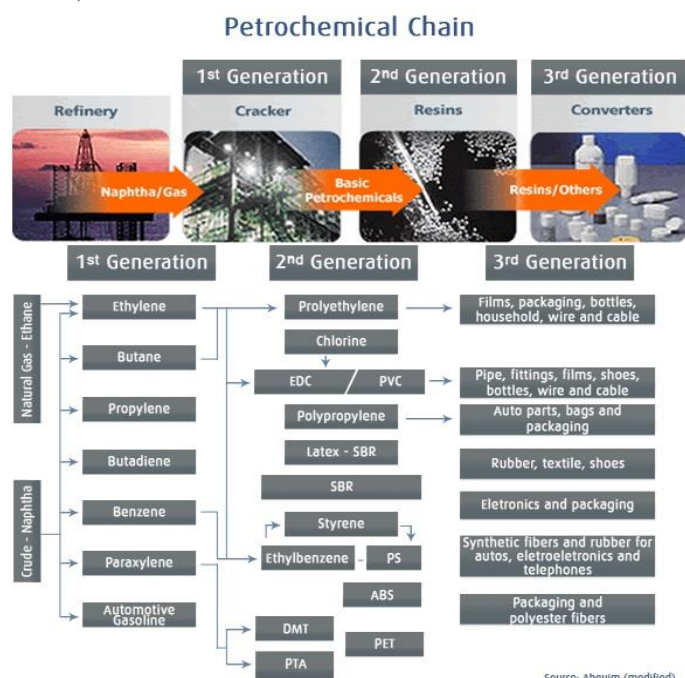
1	Introduction.....	6
2	Petrochemicals: Industry Overview.....	6
3	The Middle East.....	7
3.1	Kingdom of Saudi Arabia.....	8
3.1.1	Production.....	8
3.1.2	Saudi-Kuwait Neutral Zone.....	9
3.1.3	Refining/Petrochemicals.....	10
3.1.4	Overseas Refining Investments.....	10
3.1.5	Major Ports.....	11
3.1.6	Major Domestic Petroleum Pipelines.....	12
3.2	State of Kuwait.....	12
3.2.1	Refining.....	14
3.2.2	Clean Fuels Project and Al-Zour.....	15
3.3	United Arab Emirates, UAE.....	15
3.3.1	Imports and Exports.....	17
3.3.2	Refining.....	17
3.4	Republic of Iraq.....	18
3.5	State of Qatar.....	20
3.6	Islamic Republic of Iran.....	24
3.6.1	Sanctions.....	26
4	Europe.....	28
5	Joint Ventures.....	32
6	Investment: Opportunities in Middle East.....	33
6.1	Iranian Petroleum Contract.....	33
6.2	Iranian Projects.....	34
6.3	European Interest in Middle East.....	34
6.4	Private Equity, Investment Banks and Private Sector Participation.....	35
7	Conclusion.....	38

1 Introduction

An analysis on whether now is a good time to seek out European investors for Middle Eastern petrochemical projects. What happened to Europe, which was supposedly the historical hub for the petrochemicals industry? This report highlights developments in the Middle Eastern petrochemical industry, with a focus on European investment and participation. The European petrochemical industry is taking a turn for the worst while in the Middle East the future is looking bright for the industry with the exception of sanctions impeding the growth of the industry in the East. This report will explore the why now is the golden opportunity for Middle Eastern companies in the petrochemical industry to look for European investors.

2 Petrochemicals: Industry Overview

The petrochemical industry alters a variety of feedstocks into widely-used industrial and consumer goods. The primary input is naphtha, which is a by-product of the oil refining process, and ethane, which is a by-product of the natural gas condensation process. However, propane and butane, natural gas and coal may also be used. These chemicals are further refined, converted and combined with other chemicals to form the final product. The petrochemical chain is as follows:



Basic petrochemical producers are often referred to as “crackers” because they breakdown, or “crack” naphtha, ethane, propane or butane into basic petrochemicals. The basic petrochemicals produced by crackers include:

- Olefins – Ethylene, Propylene and Butadiene
- Aromatics – Benzene, Toluene and Xylene
- Fuels, Solvents and other products

The table below sets forth production capacity of Europe and Middle East of these products.

Production Capacity			
Region	Ethylene	Propylene	Benzene
<i>(thousands of tons per year)</i>			
Western Europe	24,228	9,853	22,056
Central Europe	2,404	1,321	2,379

Source: CMAI, 2010.

Basic petrochemicals are commodity products that are sold in commodities markets. Prices of these products are influenced by global macroeconomic factors, the cost of feedstock and demand and supply trends in the industries that consume these products.

The petrochemical industry continues to be impacted by the globalisation and integration of the world economy. Several factors influencing world petrochemicals are:

- **Product Integration** – Petrochemical companies forming strategic partnerships to improve operating efficiency
- **Economies of Scale** – Less efficient world-scale petrochemical plants built over 20 years ago are being shut down
- **Price of Crude Oil** – Oil production in non-OPEC countries rose and global demand fell. Prices crashed by 2014
- **Environment** – Concerns over fossil fuel supply and consumption have led to legislation that will affect production
- **Technology** – Manufacturing processes introduced in recent years have resulted in raw material replacement
- **Shale Gas Development**
- **Regional Production**
- **Political Uncertainties** – Situations in all parts of the world – Middle East, Africa, Eastern Europe, and South America have growing global implications for the demand/supply for petrochemicals and raw materials
- **Economic Growth and Demand** – Overall expansion of the individual purchasing power and demand increases
- **Balance with Energy Demand** – Lower crude oil prices and lower energy consumption will lead to higher petrochemical demand and vice versa

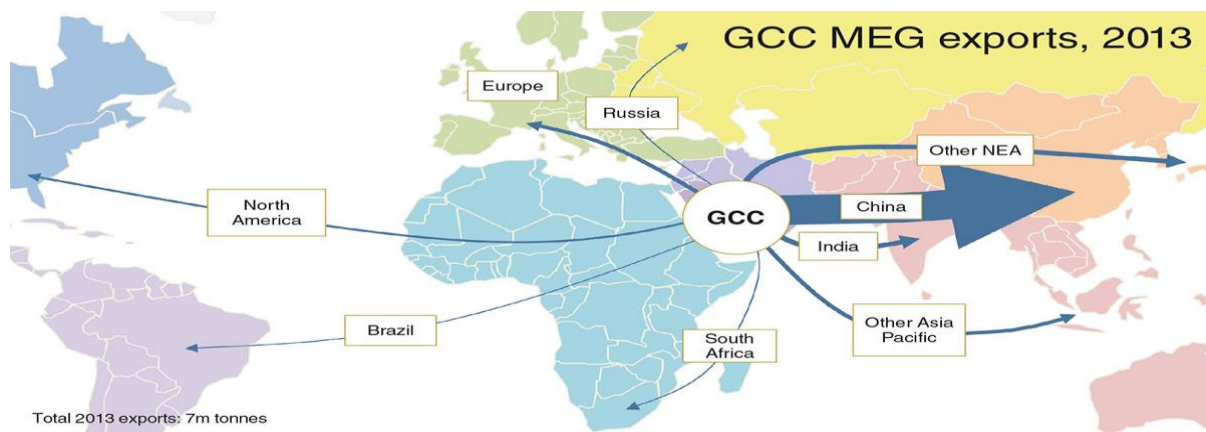
The recent industry scenario has been characterized by structural changes that range from the commissioning of new petrochemical complexes to the formation of new global groups made up of strategic alliances, acquisitions and/or mergers. The pursuit for feedstock availability, cost competitiveness and presence in large commodity consumer markets has driven the industry restructuring at the global level.

In recent years, the use of ethane as a feedstock for the production of ethylene has increased as a result of the divergence between the cost of natural gas and naphtha, especially in the Middle East and United States.

In 2015, the global ethylene capacity is estimated at 165 million tons. Between 2015 and 2019, several petrochemical companies have announced plans to build additional capacity of ethylene, mainly in Asia, Middle East and North America, totalling 24 million tons, with 9 million tons in China and 8 million tons in USA. However, expansions of ethylene capacity are frequently subject to delays and it is not possible to predict when, and if, the planned additional capacity will be commissioned.

3 The Middle East

The Middle East petrochemical industry has come very far, very fast. Over the past 30 years the industry has seen spectacular growth based on the availability of low-price gas feedstocks. From the first joint-venture plant in 1981, the industry has expanded to a total annual petrochemical production of 121 million tons in 2012. Capturing the gas flows associated with oil production that were previously flared and instead channelling those flows as very low-priced feedstock for chemical production has made it possible to build an immense and highly profitable industry. The Gulf Cooperation Council (GCC) countries contributed 11% of global petrochemical-capacity growth over the past 10 years and are now a leading global producer and supplier to world markets of ethylene and derivatives and methanol.



3.1 Kingdom of Saudi Arabia

Saudi Arabia has 16% of the world’s proved oil reserves, is the largest exporter of total petroleum liquids in the world, and maintains the world’s largest crude oil production capacity.

Saudi Arabia is the world’s largest holder of crude oil proved reserves and was the largest exporter of total petroleum liquids in 2013. In 2013, Saudi Arabia was the world’s second-largest petroleum liquids producer behind the United States and was the world’s second-largest crude oil producer behind Russia. Saudi Arabia’s economy remains heavily dependent on petroleum. Petroleum exports accounted for 85% of total Saudi export revenues in 2013, according to the Organization of the Petroleum Exporting Countries (OPEC)’s *Annual Statistical Bulletin 2014*.

With the largest oil projects nearing completion, Saudi Arabia is expanding its natural gas, refining, petrochemicals, and electric power industries. Saudi Arabia’s oil and natural gas operations are dominated by Saudi Aramco, the national Oil and Gas Company and the world’s largest oil company in terms of production. Saudi Arabia’s Ministry of Petroleum and Mineral Resources and the Supreme Council for Petroleum and Minerals have oversight of the oil and natural gas sector and Saudi Aramco.

More than half of Saudi Arabia’s oil reserves are contained in 8 fields. The giant Ghawar field, the world’s largest oil field with estimated remaining reserves of 75 billion barrels, has more proved oil reserves than all but 7 other countries.

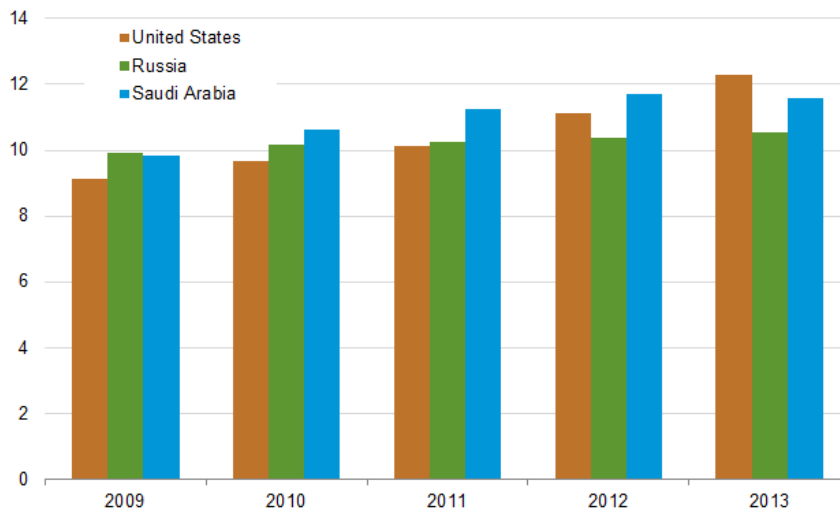
3.1.1 Production

Saudi Arabia produced on average 11.6 million bbl/d of total petroleum liquids in 2013, of which 9.6 million bbl/d was crude oil production and 2 million bbl/d was non-crude liquids production. Total petroleum liquids production declined 0.13 million bbl/d from 2012, the first decline since 2009. Saudi Arabia decreased its crude oil production in 2013 to accommodate non-OPEC production growth, mainly from the United States and, to a lesser extent, Canada.

Saudi Arabia maintains the world’s largest crude oil production capacity, estimated to reach about 12 million bbl/d at the end of 2014, and the country is subject to OPEC production quotas. Of this capacity, about 300,000 bbl/d is Saudi Arabia’s share of the production in the Neutral Zone. Non-crude liquids, which are not subject to OPEC quotas or production targets, are produced at full capacity. There are currently no plans to increase oil production capacity. Saudi Arabia’s long-term goal is to further develop its lighter crude oil potential and maintain current levels of production by offsetting declines in mature fields with newer fields.

Petroleum and other liquid fuels production

million barrels per day



Source: U.S. Energy Information Administration, International Energy Statistics



Note: Total petroleum and other liquid fuels include crude oil and lease condensate, natural gas plant liquids, other liquids, and refinery processing gain.

3.1.2 Saudi-Kuwait Neutral Zone

The Saudi-Kuwait Neutral Zone (also called the Divided Zone) is an area of 2,230 square miles between the borders of Saudi Arabia and Kuwait. The Neutral Zone contains an estimated 5 billion barrels of total proved oil reserves that are divided equally between the two countries.

According to the *Arab Oil and Gas Journal*, total crude oil production in the Neutral Zone is about 520,000 bbl/d. Total crude oil production capacity in the Neutral Zone is estimated to be 600,000 bbl/d. Within the Neutral Zone, Japan's Arabian Oil Co. (AOC) traditionally operated the two offshore fields of Khafji and Hout, but in February 2000, AOC lost the concession, and Aramco took over operation of the former AOC fields. Currently the Khafji field produces about 300,000 bbl/d of crude oil, while the Hout field has not been operational since 2005. Saudi Arabian Chevron and Kuwait Gulf Oil Company (KGOC) operate the Wafra, Humma, South Fuwaris, and South Umm Gudair fields in the Neutral Zone. The first phase of a steam injection project currently in discussion to boost crude oil production in Wafra by 80,000 bbl/d will cost \$5 billion. The project is expected to increase crude oil production by a total of 500,000 bbl/d when it is completed, according to the Middle East Economic Survey.



Source: U.S. Energy Information Administration, Central Intelligence Agency *World Factbook*

3.1.3 Refining/Petrochemicals

According to OGJ, Saudi Arabia has eight domestic refineries, with a combined crude throughput capacity of about 2.5 million bbl/d (of which Aramco's share is approximately 1.8 million bbl/d). Saudi Arabia continues to integrate its refinery projects with large petrochemicals complexes, in what has been described as the creation of petrochemical cities.

Planned domestic refineries or refineries under development include:

- Yanbu Aramco Sinopec Refining Company (YASREF) Limited, a joint venture with Chinese Petrochemical Corporation (Sinopec), will be able to process up to 400,000 bbl/d of Arab Heavy crude oil from the planned Manifa oil development by the third quarter of 2014.
- Saudi Aramco is developing its 400,000 bbl/d Jazan refinery project in southwest Saudi Arabia. It will be able to process Arab Heavy and Arab Medium crude oil by late 2016.
- Saudi Aramco is studying an expansion of its integrated Petro Rabigh Refinery and petrochemical joint venture, which currently has a capacity of 400,000 bbl/d.

Saudi Arabia has also initiated a number of clean fuels projects to provide more ultra-low sulfur diesel fuel. The Yanbu refinery, jointly owned by Saudi Aramco and Mobil Yanbu Refining Company (a subsidiary of ExxonMobil), was upgraded to produce cleaner fuels. Similar upgrades were completed on the Jubail refinery jointly owned by Saudi Aramco and Shell Saudi Arabia Refining.

3.1.4 Overseas Refining Investments

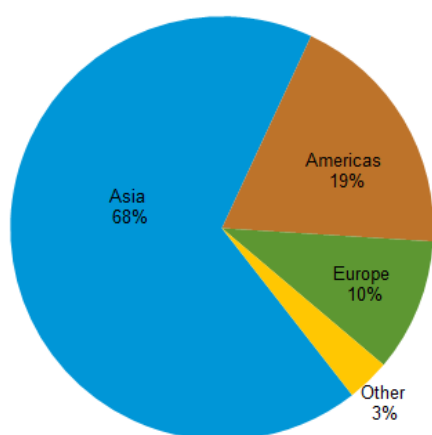
Saudi Arabia has 2.4 million bbl/d of refining capacity overseas through joint and equity ventures in facilities in the United States, China (in Fujian Province with ExxonMobil and Sinopec), South Korea (with S-Oil), and Japan (with Showa Shell). Saudi Aramco's share of overseas ventures is 0.9 million bbl/d. In the United States, Saudi Aramco and partner Royal Dutch Shell own three Motiva joint-venture refineries in Louisiana and Texas. The three facilities currently have a total capacity of about 1 million bbl/d. Saudi Aramco owns 50% of Motiva through a subsidiary, Saudi Refining. According to the Middle East Economic Survey, Saudi Aramco is expected to invest \$100 billion domestically and overseas to expand its refining capacity to 8-10 million bbl/d.

Name	Company	Crude distillation capacity (thousand bbl/d)
Ras Tanura	Saudi Aramco	550
Yanbu	Saudi Aramco	250
Riyadh	Saudi Aramco	122
Jeddah	Saudi Aramco	85
SATORP Jubail	Saudi Aramco, Total S.A.	400
Petro Rabigh	Saudi Aramco, Sumitomo Chemical	400

Name	Company	Crude distillation capacity (thousand bbl/d)
SAMREF Yanbu	Saudi Aramco, Mobil Yanbu Refining Company Inc. (ExxonMobil)	400
SASREF Jubail	Saudi Aramco, Shell Saudi Arabia Refining, Ltd.	305

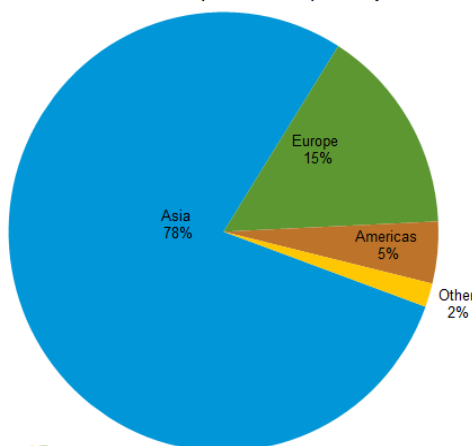
Source: Saudi Aramco, *Oil and Gas Journal*

Saudi Arabia crude oil exports by destination, 2013



Source: Global Trade Information Services

Saudi Arabia refined products exports by destination, 2013



Source: Global Trade Information Services

3.1.5 Major Ports

Saudi Arabia has three primary oil export terminals:

- The port of Ras Tanura on the Persian Gulf has an average handling capacity of 3.4 million bbl/d, and it handles most of Saudi Arabia's exports.
- The Ras al-Ju'aymah facility on the Persian Gulf has an average handling capacity of about 3 million bbl/d, and because of the availability of various Single Point Mooring buoys, the largest oil tankers can be accommodated for crude loadings.
- The Yanbu terminal on the Red Sea, from which most of the remaining volumes are exported, has an average handling capacity of 1.3 million bbl/d.

In addition to these primary export terminals, Saudi Arabia has other smaller ports including Ras al-Khafji, Jubail, and Jeddah.

3.1.6 Major Domestic Petroleum Pipelines

Saudi Aramco operates more than 12,000 miles of crude and petroleum product pipelines throughout the country, including two major pipelines:

- Saudi Arabia has the 746-mile-long East-West Pipeline, also known as Petroline, which runs across Saudi Arabia from its Abqaiq complex to the Red Sea. The Petroline system consists of two pipelines with a total nameplate capacity of about 4.8 million bbl/d. The 56-inch pipeline has a nameplate capacity of 3 million bbl/d, and its current throughput is about 2 million bbl/d. In recent years, the 48-inch pipeline had been operating as a natural gas pipeline, but Saudi Arabia moved to convert it back to an oil pipeline. The switch could increase Saudi Arabia's spare oil pipeline capacity to bypass the Strait of Hormuz from 1 million bbl/d to 2.8 million bbl/d, which is only attainable if the system is able to operate at its full nameplate capacity.
- Running parallel to the Petroline is the 290,000-bbl/d Abqaiq-Yanbu NGL pipeline, which serves petrochemical plants in Yanbu.

A 236-mile multi-products line between Dhahran in the Eastern Province and Riyadh and a smaller 220-mile multi-products line between Riyadh and Qassim to the north were also built in the 1980s.

Saudi Arabia major oil and natural gas infrastructure



Source: U.S. Energy Information Administration, IHSEDIN

3.2 State of Kuwait

Kuwait was one of the world's top producers and net exporters of petroleum and other liquids in 2013.

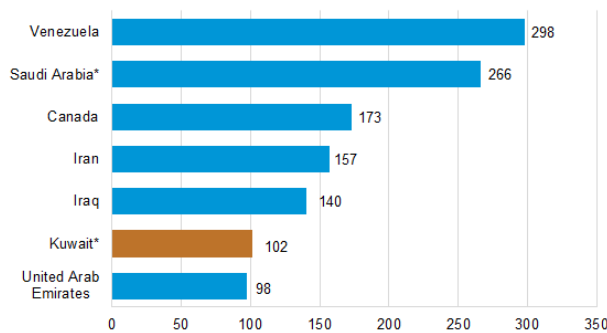
As a member of the Organization of the Petroleum Exporting Countries (OPEC), Kuwait was the world's 10th largest petroleum and other liquids producer in 2013. Despite being the second smallest in land area among the OPEC member countries, Kuwait exports the fifth-largest volume of crude oil and condensates following Saudi Arabia, the United Arab Emirates, Iraq, and Nigeria.

Kuwait's economy is heavily dependent on petroleum export revenues, which account for nearly 60% its gross domestic product and about 94% of export revenues, according to OPEC and IMF data. EIA estimates these revenues were \$92 billion in 2013. Kuwait attempts to remain one of the world's top oil producers as the country targets crude oil and condensate

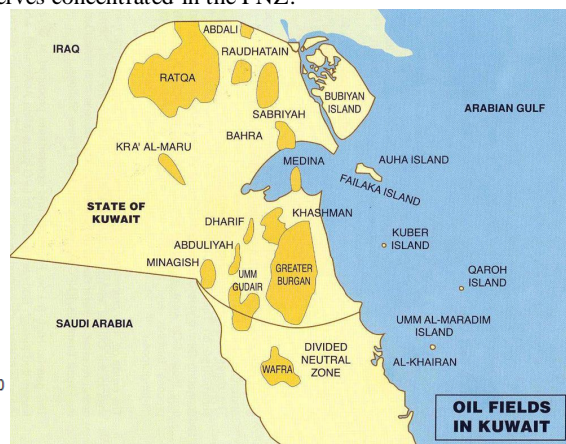
production of 4 million barrels per day (bbl/d) by 2020. However, Kuwait has struggled to boost oil and natural gas production for more than a decade because of upstream project delays and insufficient foreign investment. To diversify its oil-heavy economy, Kuwait has increased efforts to explore and develop its non-associated natural gas fields, which currently make up a small portion of its natural gas production. Greater natural gas production would increase Kuwait's feedstock for its struggling electricity sector, which frequently cannot meet demand in peak times. Kuwait has increased the share of natural gas in its primary energy consumption from 34% in 2009 to 42% in 2012, while the remaining share, consisting solely of petroleum and other liquids, has declined.

According to the *Oil & Gas Journal* (OGJ), as of January 2014, Kuwait had an estimated 102 billion barrels of proved oil reserves, roughly 6% of the world total and sixth among all countries. Additional reserves are held in the Partitioned Neutral Zone (PNZ), which Kuwait shares on a 50-50 basis with Saudi Arabia. The PNZ holds 5 billion barrels of proved reserves, bringing Kuwait's total oil reserves to 104.5 billion barrels. Kuwait's oil reserves include approximately 13 billion barrels of heavy oil, located primarily in northern Kuwait, with other reserves concentrated in the PNZ.

Top proved world oil reserves, 2014
billion barrels



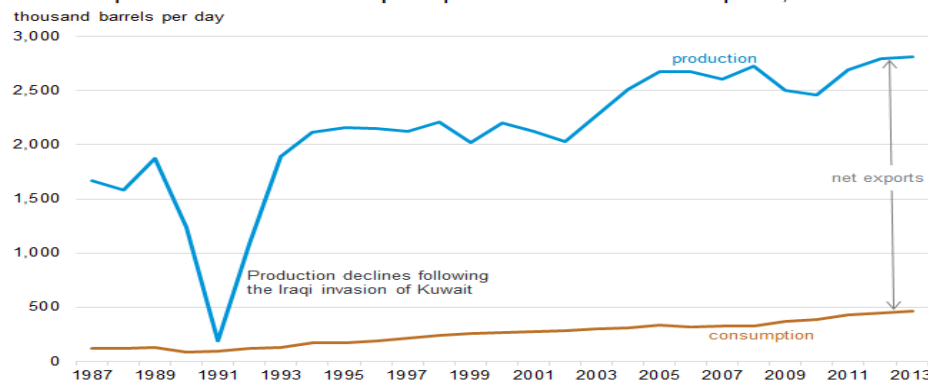
Source: *Oil & Gas Journal*
*Does not include Partitioned Neutral Zone



Source: Kuwait's Ministry of Oil

In 2013, Kuwait's petroleum and other liquids production was approximately 2.8 million barrels per day (bbl/d), including its share of approximately 250,000 bbl/d of oil production from the PNZ.

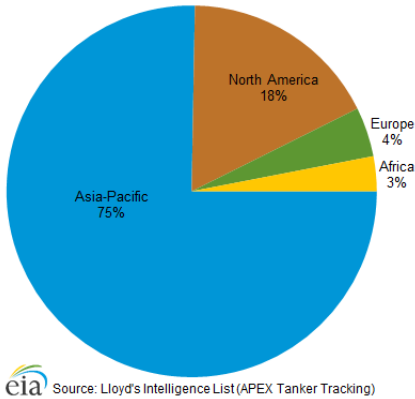
Kuwait's petroleum and other liquids production and consumption, 1987 - 2013



Source: U.S. Energy Information Administration

Kuwait consumes only a small portion of its total petroleum production. The country consumed a total of 467,000 bbl/d in 2013, leaving most of its production available for exports. According to OPEC, Kuwait exported 805,000 bbl/d of petroleum products in 2013, the highest level among OPEC members. However, domestic oil consumption has been steadily increasing, partially as a result of increased petroleum-fired electricity generation.

Kuwait's crude oil exports by region, 2013



3.2.1 Refining

Kuwait maintains refining and marketing interests in Europe and looks to expand into Asia, particularly China, Vietnam, and Indonesia.

The OGI reports nameplate refining capacity in Kuwait at 936,000 bbl/d in 2014. This production capacity is derived from three refinery complexes: al-Ahmadi, Abdullah, and al-Shuaiba. All of the refineries are located near the coastline, about 30 miles south of Kuwait City and are owned and operated by Kuwait National Petroleum Company (KNPC). The largest refinery, Mina al-Ahmadi, was built in 1949 and has a capacity of 466,000 bbl/d. Mina Abdullah and al-Shuaiba have nameplate capacities of 273,000 bbl/d and 190,000 bbl/d, respectively.

Kuwait Petroleum International (KPI) manages KPC's refining and marketing operations internationally. Its operations include approximately 4,000 retail stations across Belgium, Spain, Sweden, Luxembourg, and Italy. KPI has interests in two refineries, owning an 80,000 bbl/d refinery in Rotterdam, Netherlands and a 50-50 joint venture with Italian oil major ENI in the 240,000 bbl/d capacity refinery in Milazzo, Italy.

Kuwait is seeking to cultivate downstream interests in markets with high potential demand growth, the Asian market in particular, specifically China, Vietnam, and India. In China's Guangdong Province, KPC is negotiating a refinery and petrochemical joint venture with China's Sinopec. The plant will feature a 300,000 bbl/d capacity refinery, which will also have an ethylene steam cracker with the capacity to produce 0.8 million tons per year of ethylene and its derivatives. In March 2011, China's National Development and Reform Commission (NDRC) gave final approval to the project, making Kuwait the second Arab oil producer behind Saudi Arabia to have a major downstream facility in China. The project's equity shares are still under discussion, and it is unclear to what extent KPC will play a role. The refinery is under construction, although Sinopec delayed the commissioning date by a year to 2017.

Kuwait Petroleum International (KPI) joined with PetroVietnam and Japanese Idemitsu in April 2008 to construct a 200,000 bbl/d refinery in Nhi Son, Vietnam. The project began construction in 2013 and is expected online by 2017. KPI currently holds a 35% stake, and Kuwait has an agreement to supply the terminal with crude oil. To forge stronger ties with Indian purchasers, KPC proposed buying a stake in the Paradip refinery scheduled to come online by the end of 2014. The talks are at an initial stage, and no decision has been made.

3.2.2 Clean Fuels Project and Al-Zour

In June 2011, Kuwait's Supreme Petroleum Council approved two long-delayed projects: the Clean Fuels Project and the al-Zour refining facility. These two projects have an estimated combined cost of about \$28 billion and will serve an increasing domestic oil demand, especially for the petrochemical sector, and for higher-quality products with lower sulfur content in Kuwait's traditional export markets.

The Clean Fuels Project (CFP) is slated to upgrade Kuwait's existing refineries and raise overall capacity to 800,000 bbl/d by 2018. The planned overhaul of Kuwait's refining sector includes building a new Al-Zour refinery, shutting down the al-Shuaiba refinery, and retiring old units and installing new components at the remaining refineries. A crude distillation unit will be taken out of commission at the Mina al-Ahmadi, and Mina Abdullah will lose a number of components, but its overall capacity will increase by 184,000 bbl/d.

The al-Zour refinery was originally put out for bids in 2008, but political opposition led to the cancellation of the bid round. This opposition forced KPC to compensate those companies who had spent resources preparing their bids, placing the entire project on hold. KNPC received the final approvals necessary to develop the Al-Zour project in 2012 and retendered the contracts in 2014. The new refinery is expected to add another 615,000 bbl/d of capacity by around 2020.

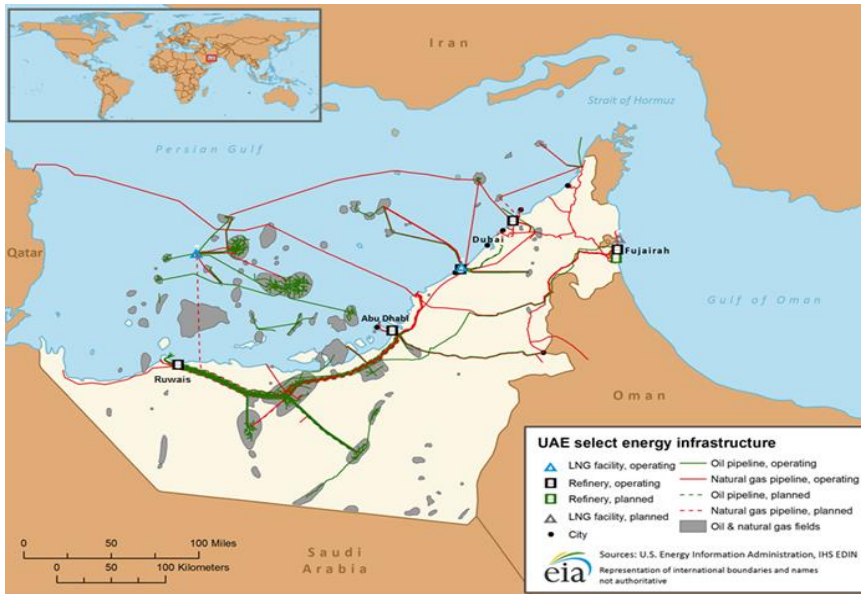
Refinery	Current capacity (bbl/d)	Planned capacity (bbl/d)
Existing LNG terminals		
Mina al-Ahmadi	466,000	346,000
Mina Abdullah	270,000	454,000
Al-Shuaiba	200,000	0
Al-Zour	0	615,000
Total capacity	936,000	1,415,000

Sources: OGI, FACTS Global Energy, IEA, MEES, MEED

3.3 United Arab Emirates, UAE

The United Arab Emirates (UAE) is among the world's 10 largest oil producers and is a member of the Organisation of the Petroleum Exporting Countries (OPEC) and the Gas Exporting Countries Forum (GECF).

The UAE—a federation of the seven emirates of Abu Dhabi, Ajman, Al Fujairah, Dubai, Ras al Khaymah, Sharjah, and Umm al Qaywayn—has relied on its large oil and natural gas resources to support its economy. The UAE is currently the 6th largest petroleum producer in the world.



The UAE is a major oil producer and exporter. In 2014, the country produced an average of 3.5 million barrels per day of petroleum and other liquids, the 6th highest total in the world.

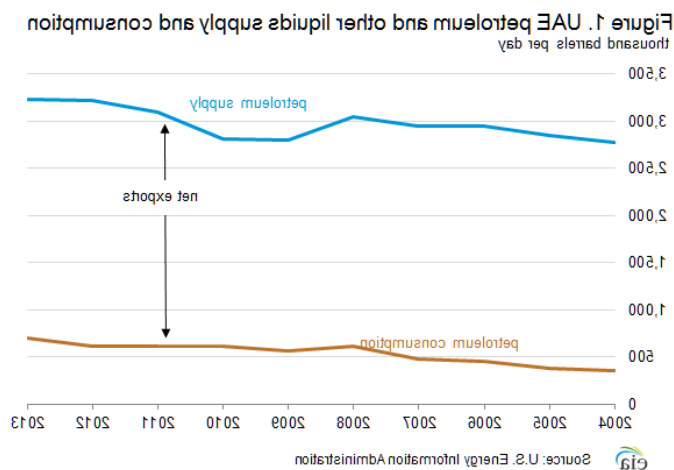
Country	Billion barrels
Venezuela	298.4
Saudi Arabia	265.8
Canada	173.2
Iran	157.8
Iraq	144.2
Kuwait	101.5
United Arab Emirates	97.8
Russia	80.0
Libya	48.3
Nigeria	37.1

Source: U.S. Energy Information Administration, *Oil & Gas Journal*

The UAE produced 3.5 million barrels per day (bbl/d) of petroleum and other liquids in 2014, of which 2.7 million bbl/d was crude oil and the remainder was non-crude liquids (condensate, natural gas plant liquids, and refinery processing gain), ranking them second in petroleum production in OPEC behind Saudi Arabia. The UAE was the fourth-largest crude oil

producer in OPEC in 2014, behind Saudi Arabia, Iraq, and Iran. The UAE plans to increase crude oil production by 800,000 bbl/d to 3.5 million bbl/d in 2020. With limited prospects for major discoveries, production increases in the UAE will come almost exclusively by using EOR techniques in Abu Dhabi's existing oil fields. However, EOR projects are typically based on oil prices around \$100 per barrel, which may prove these projects uneconomic at current price levels.

One region that may help the UAE boost oil production is the Zakum petroleum system. ZADCO—owned jointly by ADNOC, ExxonMobil, and the Japan Oil Development Company—manages production from UAE's Upper Zakum field, which currently produces about 590,000 bbl/d. In July 2012, ZADCO awarded an \$800-million engineering, procurement, and construction contract to Abu Dhabi's National Petroleum Construction Company—along with French firm Technip—with the goal of expanding oil production at the Upper Zakum field to 750,000 bbl/d by 2016. Production from the Lower Zakum field—operated by the Abu Dhabi Marine Operating Company (ADMA-OPCO)—should also increase, with oil production eventually reaching 425,000 bbl/d, increasing from the 345,000 bbl/d it currently produces.



3.3.1 Imports and Exports

The UAE is both a major exporter and consumer of petroleum liquids. The U.S. Energy Information Administration (EIA) estimates that the UAE exported more than 2.5 million bbl/d of crude oil in 2014, with most of it going to markets in Asia. In addition to being a major global petroleum exporter, the UAE domestic market relies heavily on petroleum product imports to meet energy demand. Most of the UAE's petroleum imports are of residual fuel oil, with limited imports of motor gasoline and diesel fuel.

3.3.2 Refining

The UAE has five refining facilities, the largest of which is the Ruwais facility, which was recently expanded from 400,000 bbl/d to 817,000 bbl/d and is expected to be fully operational in the first half of 2015. With this new expansion, total refining capacity in the UAE will approach 1.1 million bbl/d, making UAE the Persian Gulf's fourth-largest refiner. Additionally, there are plans to invest in a new Fujairah refining complex, with a targeted capacity of 200,000 bbl/d by 2020.

The UAE and neighboring Oman plan to build a jointly-operated refinery in the Duqum special economic zone that would have a capacity of 230,000 bbl/d by 2018. DSCE also signed a memorandum of understanding (MOU) with China Sonangol to build a refinery in Dubai, but capacity and schedules have not been released.

3.4 Republic of Iraq

Iraq has the 5th largest proved crude oil reserves in the world, and it is the second-largest crude oil reserves in the world, and it is the second-largest crude oil producer in OPEC.

Iraq was the second-largest crude oil producer in the Organization of the Petroleum Exporting Countries (OPEC) in 2014, and it holds the world's fifth largest proved crude oil reserves after Venezuela, Saudi Arabia, Canada, and Iran. Most of Iraq's major known fields are producing or in development, though much of its known hydrocarbon resources have not been fully exploited. All of Iraq's known oil fields are onshore and the largest fields in the south have relatively low extraction costs owing to uncomplicated geology, multiple supergiant fields, fields that are typically located in relatively unpopulated areas with flat terrain, and the close proximity to coastal ports.

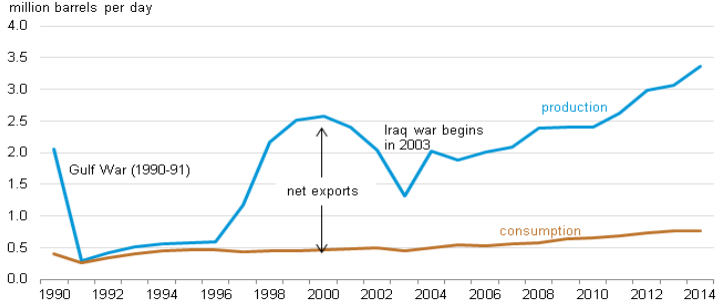
Iraq is re-developing its oil and natural gas reserves after years of sanctions and wars. Iraq's crude oil production grew by 950,000 barrels per day (bbl/d) over the past five years, increasing from almost 2.4 million bbl/d in 2010 to almost 3.4 million bbl/d in 2014. These production estimates include oil produced in the Iraqi Kurdistan Region, the semiautonomous northeast region in Iraq governed by the Kurdistan Regional Government (KRG). Despite this growth, Iraq's production has actually grown at a slower rate than Iraq had expected because of infrastructure bottlenecks in the south, supply disruptions in the north, and delays in awarding contracts.

The Iraqi government has set ambitious oil production targets. The government is currently renegotiating field production targets set in Technical Service Contracts (TSCs) previously signed with international oil companies (IOCs). Based on some of the target revisions that have already been announced, the Energy Intelligence Group estimates that Iraq is now aiming for crude oil output of 9.0 million bbl/d by 2020. Key challenges the Iraqi government faces to achieve this target include expanding southern export infrastructure and storage capacity, building a large common water supply and re-injection system in the south, passing a hydrocarbon law, a slow administrative process of doing business, and less favorable contract terms to attract IOCs to invest in new projects. Also, political instability, sectarian violence, and the threat of the Islamic State of Iraq and the Levant (ISIL) spreading to other areas of Iraq pose significant uncertainty for Iraq's future.

According to the *Oil & Gas Journal*, Iraq held 144 billion barrels of proved crude oil reserves as of January 1, 2015, representing almost 18% of proved reserves in the Middle East and almost 9% of global reserves, ranking fifth in the world. Iraq's resources are not evenly divided across sectarian-demographic lines. Most known oil and natural gas resources are concentrated in the Shiite areas of the south and the ethnically Kurdish region in the north, with few known resources in control of the Sunni minority in central/western Iraq.

Iraq has five super-giant fields (defined as holding more than 5 billion barrels of oil reserves) in the south that account for about 60% of the country's total proved oil reserves. An estimated 17% of oil reserves are in the north of Iraq, near Kirkuk, Mosul, and Khanaqin. Control over rights to reserves is a source of controversy between the ethnic Kurds and other groups in the area. The International Energy Agency (IEA) estimated that the Iraqi Kurdistan Region contained 4 billion barrels of proved reserves. KRG's estimate is much higher because it is a resource estimate that includes unproved resources. The KRG recently increased its oil resource estimate from 45 billion barrels to 60 billion barrels, although this has not been independently verified and this number likely includes at least some resources in disputed areas—especially Kirkuk.

Figure 1. Iraq's total petroleum and other liquids production and consumption

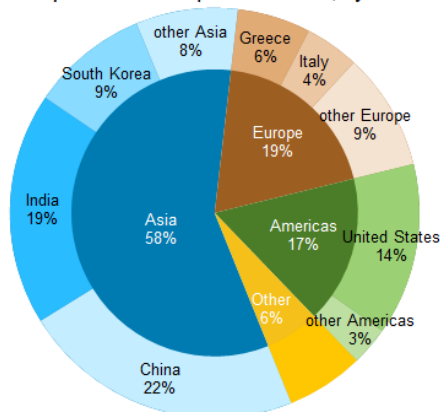


Source: U.S. Energy Information Administration

In 2014, Iraq consumed 760,000 bbl/d of petroleum and other liquids. Iraq's oil consumption, which has increased by two-thirds since 2003, slightly declined in 2014 mostly because of the attacks in Iraq by ISIL that led to the shutdown of Iraq's largest refinery and fuel shortages in northern Iraq. Most of Iraq's petroleum consumption derives from its domestic oil refineries, which are fueled by domestically produced oil. Iraq also imported roughly 100,000 bbl/d of petroleum products in 2013 and 2014. Iraq burns crude oil for power generation, averaging about 70,000 bbl/d in 2013 and 2014.

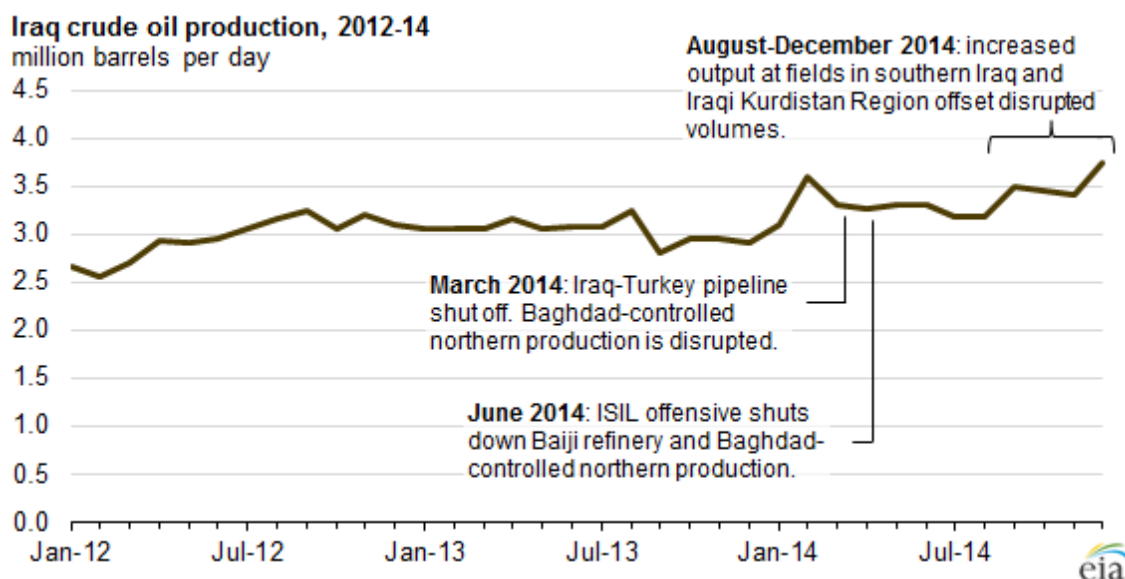
Iraqi refineries produce heavier fuel oil than is needed domestically and not enough of other refined products, such as gasoline. Iraq plans to build four new refineries and expand capacity at some existing refineries to alleviate domestic product shortages and to eventually export refined products. The planned new refineries and capacity expansions would add 800,000 bbl/d of refining capacity. Most of these projects will probably come online sometime after 2018. The KAR Group, a private company that operates the largest refinery in the Iraqi Kurdistan Region, is planning to build a new refinery in the Ninewa province with a planned design capacity of 60,000 bbl/d.

Figure 2. Iraq's crude oil exports in 2014, by destination



Note: Total exports are 2.6 million bbl/d. Exports only include oil transported via pipeline to a seaport, not crude trucked to a seaport.
Source: U.S. Energy Information Administration based on Lloyd's List Intelligence (APEX tanker data)

Iraq's crude oil production, which averaged almost 3.4 million barrels per day (bbl/d) in 2014, was 330,000 bbl/d above 2013 levels, despite the heightened security threat from the Islamic State of Iraq and the Levant (ISIL) and disrupted production in Northern Iraq.



3.5 State of Qatar

Qatar is the largest exporter of liquefied natural gas (LNG) in the world with 31% market share in 2014, and the country’s exports of LNG, crude oil, and petroleum products provide a significant portion of government revenues. The U.S. Energy Information Administration (EIA) estimates that Qatar earned \$38 billion from net oil exports in 2014.

The growth in Qatar’s natural gas production, particularly since 2000, has also increased Qatar’s total liquids production, as lease condensates, natural gas plant liquids, and other petroleum liquids are a significant (and valuable) by-product of natural gas production.

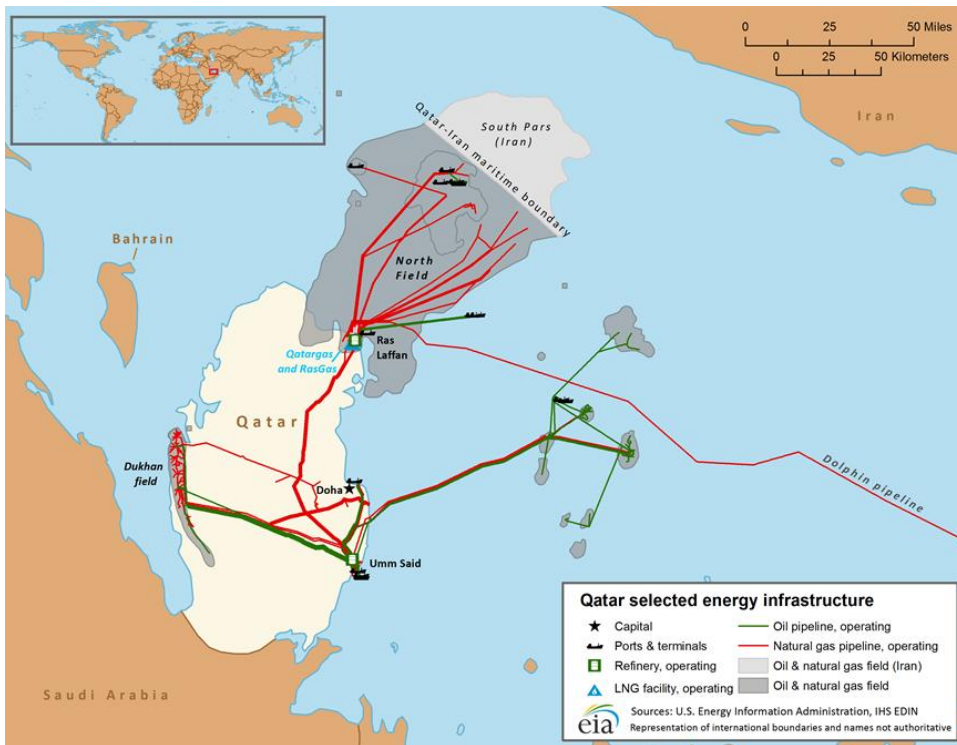
Qatar produced 2.1 million barrels per day (b/d) of petroleum and other liquids in 2014, of which 1.5 million b/d was crude oil and the remainder was non crude liquids. Although Qatar is a member of the Organization of the Petroleum Exporting Countries (OPEC), the country is the second-smallest crude oil producer among the 12-member group. Natural gas meets most of Qatar’s domestic energy demand, so the country is able to export most of its liquid fuels production. Given its small population, Qatar’s energy needs are met almost entirely by domestic sources.

Qatar’s fiscal year 2014-15 budget assumed an oil price of \$65 per barrel.

Oil

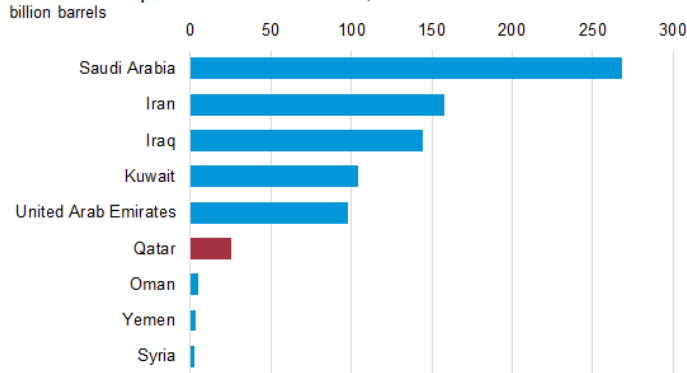
Proved reserves, 2015 (million barrels)	Total oil supply, 2014 (thousand b/d)	Total petroleum consumption, 2013 (thousand b/d)
25,244	2,055	230

Source: U.S. Energy Information Administration, *Oil & Gas Journal*



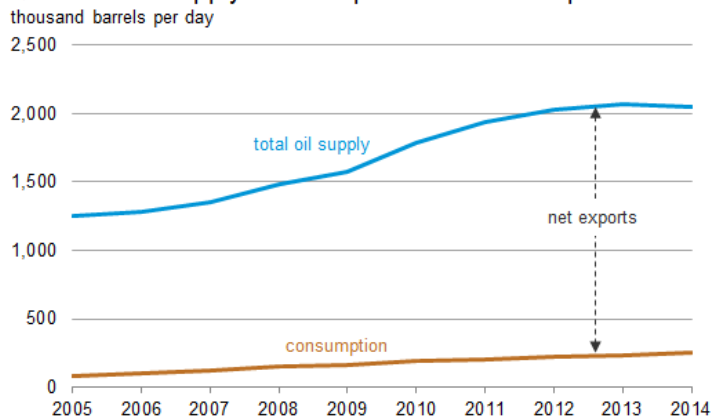
Qatar has been a member of OPEC since 1961. With proved reserves of crude oil estimated at 25.2 billion barrels by the *Oil & Gas Journal* (as of January 2015), Qatar holds the 9th largest reserves in OPEC and 13th largest in the world. Qatar's crude oil and lease condensate production ranks 17th in the world, with most of the country's production sent abroad as exports. Crude oil represented 35% of petroleum and other liquid production in Qatar in 2014, down from 44% in 2010.

Middle East proved reserves of oil, 2015



Source: U.S. Energy Information Administration, *Oil & Gas Journal*

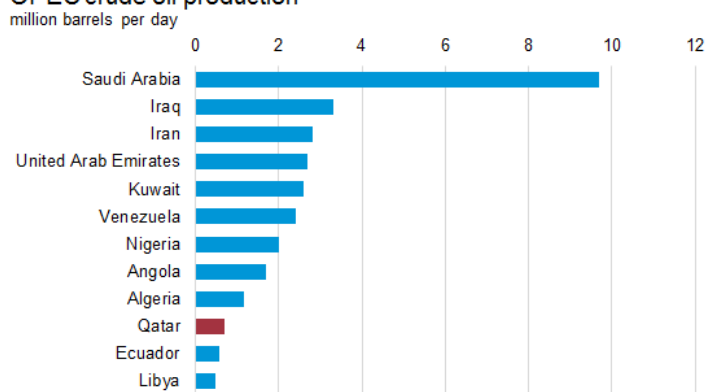
Qatar total oil supply and total petroleum consumption



Source: U.S. Energy Information Administration

Qatar's petroleum and other liquids production, which includes crude oil, condensates, natural gas plant liquids, and other liquids, was 2.1 million b/d in 2014, a slight decline from 2013, but up 64% since 2005. Qatar produced more than 1.5 million barrels per day (b/d) of crude oil and condensates in 2014, according to estimates from the U.S. Energy Information Administration (EIA).

OPEC crude oil production



Source: U.S. Energy Information Administration, *Short-Term Energy Outlook September 2015*

According to the OPEC *Annual Statistical Bulletin 2015*, Qatar exported 595,000 b/d of crude oil and 522,000 b/d of refined petroleum products in 2014. In 2014, Qatar sent all of its crude oil refined product exports to Asian countries, according to OPEC estimates. Most of Qatar's refined products (60% or more) go to Japan.

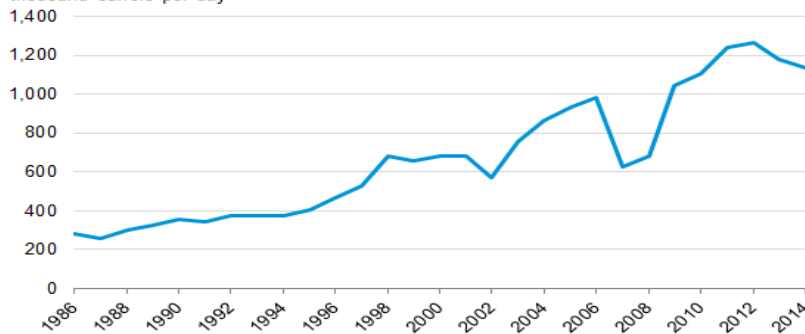
Qatar has three main crude streams: the Qatar Land, Qatar Marine, and Al Shaheen. The Qatar Land and Qatar Marine blends are both lighter crudes, while the Al Shaheen is slightly heavier. The Qatar Marine and Al Shaheen streams have high sulfur content, while the Qatar Land's sulfur content is slightly lower.

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Qatar crude oil exports 1986-2014

thousand barrels per day

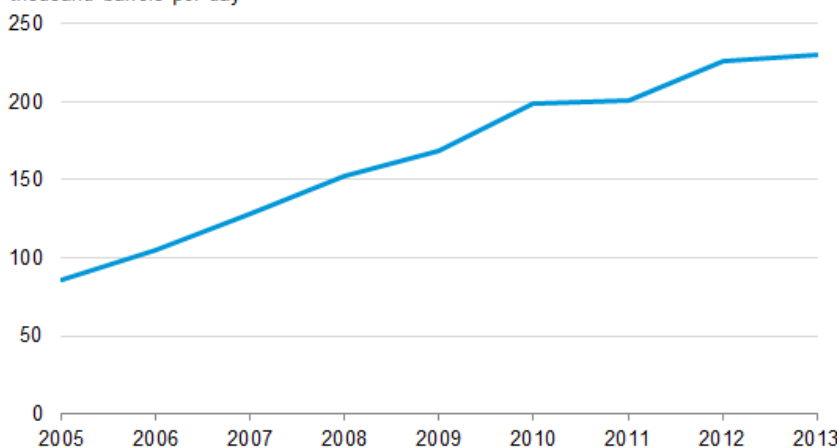


Source: U.S. Energy Information Administration, *International Energy Statistics*, Lloyd's List APEX

Petroleum consumption in Qatar rose from 82,800 b/d in 2004 to 230,000 b/d in 2013. Qatar has two operating refineries with a combined crude oil refining capacity of 338,700 b/d, according to the *Oil & Gas Journal*. The combined output is more than enough to meet Qatar's domestic demand. That surplus output enables Qatar to export refined products, and both refineries are near major oil export terminals, one at Umm Said and the other at Ras Laffan. There are plans to expand refining capacity at Ras Laffan with a 146,000 b/d condensate splitter by the third quarter of 2016.

Qatar petroleum consumption

thousand barrels per day

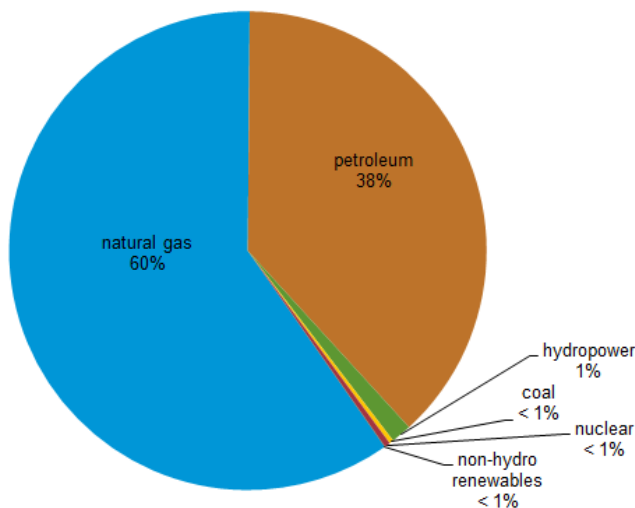


Source: U.S. Energy Information Administration

3.6 Islamic Republic of Iran

Iran holds some of the world's largest deposits of proved oil and natural gas reserves, ranking as the world's fourth-largest and second-largest reserve holder of oil and natural gas, respectively. Iran also ranks among the world's top 10 oil producers and top 5 natural gas producers. Iran produced almost 3.4 million barrels per day (b/d) of petroleum and other liquids in 2014 and an estimated 5.7 trillion cubic feet (Tcf) of dry natural gas in 2013.

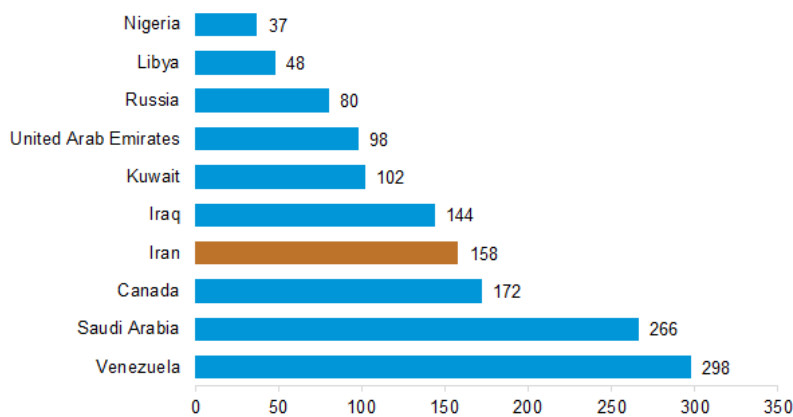
Iran's total primary energy consumption, share by fuel 2013



eia Note: Chart does not include traditional biomass and waste, such as burning firewood and waste.
Source: BP Statistical Review of World Energy 2014.

Largest proved reserve holders of crude oil

billion barrels

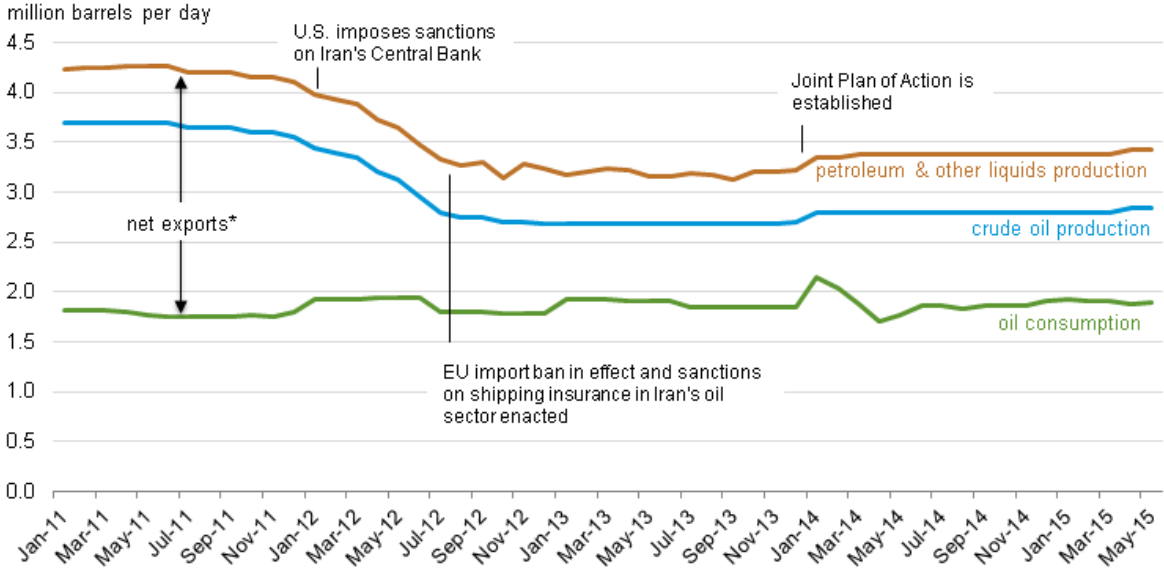


eia Source: Oil & Gas Journal, January 2015.



Source: U.S. Energy Information Administration, IHSEDIN

Iranian petroleum and other liquids production and consumption



*Net exports is petroleum and other liquids production minus consumption. It encompasses crude oil, condensate, natural gas plant liquids, and refined oil products.

Note: Iran's petroleum and other liquids production includes crude oil, condensate, and natural gas plant liquids (NGPL). The difference between petroleum and other liquids production (blue line) and crude oil production (brown line) is mostly condensate and a smaller volume is NGPL. Oil consumption includes petroleum products and a small volume of direct crude oil burn.



Source: U.S. Energy Information Administration.

In addition to crude oil and condensate, Iran also exports petroleum products. According to FGE, Iran exported almost 300,000 b/d of petroleum products in 2014, more than 50,000 b/d higher than in 2013 but about 100,000 b/d lower than in 2011 because U.S. and EU sanctions affected Iran's ability to sell petroleum products as well. Iran mostly exports fuel oil, LPG, and naphtha to Asian markets.

Iran's Largest Oil Fields



Source: U.S. Energy Information Administration, IHS EDITION

3.6.1 Sanctions

Iran averaged production of more than 5.5 million b/d of oil in 1976 and 1977, with production topping 6.0 million b/d for most of the period. Since the 1979 revolution, however, a combination of war, limited investment, sanctions, and a high rate of natural decline in production of Iran's mature oil fields has prevented a return to such production levels.

In recent years, a series of sanctions targeting the oil sector have resulted in cancellations of new projects by a number of foreign companies, while also affecting existing projects. Following the implementation of sanctions in late-2011 and mid-2012, Iranian production dropped dramatically from almost 3.7 million b/d in 2011 to 2.7 million b/d in 2013. Although Iran had been subject to four earlier rounds of United Nations sanctions, the tougher measures imposed by the United States and the EU severely hampered Iran's ability to export its oil, which affected Iran's oil production.

The U.S. and EU measures targeted Iran's petroleum exports and imports, prohibited large-scale investment in the country's oil and gas sector, and cut off Iran's access to European and U.S. sources for financial transactions. Further sanctions were implemented against institutions targeting the Central Bank of Iran, while the EU imposed an embargo on Iranian oil and banned European Protection and Indemnity Clubs (P&I Clubs) from providing Iranian oil tankers with insurance and reinsurance.

In 2014, Iran produced almost 3.4 million b/d of petroleum and other liquids (total oil), of which roughly 2.8 million b/d was crude oil, and the remainder was condensate and natural gas plant liquids (NGPL). Iran's total oil production level in 2014 was nearly 200,000 b/d higher than in 2013, but still about 800,000 b/d lower than the production level of 4.2 million b/d in 2011. Sanctions and unfavourable contractual terms have impeded the necessary investment needed to increase Iran's production capacity.

There were a number of new exploration and development blocks announced over the past several years that could provide Iran with an increase in its crude oil production capacity, but sanctions have negatively affected the Iranian oil industry. Virtually all western companies have halted their activities in Iran, although some Chinese and Russian companies are still participating. The sanctions and lack of international involvement have particularly affected upstream projects, as the lack of expertise, technology, and investment has resulted in delays and, in some cases, cancellations of projects. Nonetheless, development of a few projects continues, albeit at a much slower pace than originally planned.

Status of new upstream crude oil projects

Project	Developer	Plateau output (000 b/d)	Est. plateau year
Yadavaran phase 1	Sinopec	85	2016
Yadavaran phase 2	Sinopec	95	2019-20
Yadavaran phase 3	Sinopec	120	post 2020
Azar phase 1	NIOC subsidiaries	30	2016
North Yaran	Persian Energy	30	2016
South Yaran	NIOC subsidiaries	55	2018
North Azadegan phase 1	CNPC	75	2016-17
North Azadegan phase 2	CNPC	75	2019
South Azadegan phase 1	no developer	150	NA
South Azadegan phase 2	no developer	110	NA
Forouzan	NIOC subsidiaries	100	2017-18
South Pars (oil layer) phase 1	PEDCO	35	2017-18

The Yadavaran, South Azadegan, and Forouzan fields are currently producing crude oil, but below their plateau levels. CNPC is China National Petroleum Corporation. PEDCO is PetroIran Development Company. Sinopec is China Petroleum & Chemical Corporation.

Source: Facts Global Energy

Over the past couple of years, there has been progress made during negotiations between Iran and world powers over Iran's nuclear program and international sanctions. On November 24, 2013, a Joint Plan of Action (JPOA) was established between Iran and the five permanent members of the United Nations Security Council (the United States, United Kingdom, France, Russia, and China) plus Germany (P5+1). Implementation of the JPOA started in January 2014. Under the JPOA, Iran agreed to scale back or freeze some of its nuclear activities during negotiations in exchange for some sanctions relief. The JPOA did not directly allow for additional Iranian oil sales.

On April 2, 2015, Iran and the P5+1 reached a framework agreement to guide the next months of negotiations, which targets a comprehensive agreement by June 30, 2015. Under the framework, if a comprehensive agreement is reached, then U.S. and European Union nuclear-related sanctions (which include oil-related sanctions) would be suspended after the International Atomic Energy Agency verifies that Iran complied with key nuclear-related steps.

Iran's crude oil and condensate exports started increasing in late 2013 and averaged 1.4 million b/d in 2014, almost 150,000 b/d above the 2013 level, according to U.S. Energy Information Administration (EIA) estimates. These estimates are based on data from Eurostat, Global Trade Information Services, Lloyd's List Intelligence (APEX), and trade press reports. Exports to China and India accounted for almost all of the increase.

International sanctions have affected Iran's energy sector by limiting the foreign investment, technology, and expertise needed to expand capacity at oil and natural gas fields and to reverse declines at mature oil fields. Iran has had to depend mainly on local companies to develop oil and gas fields in recent years.

The comprehensive sanctions put in place in 2012 to comply with United Nations resolutions, including by the European Union, hurt not only Iran's petrochemical industry but also industries in the EU that were dependent on cheap Iranian petrochemicals to compete.

After sanctions were put in place, trade in polymers and methanol dropped by about a third from their peak in 2010, which led to big price disparities between Asian countries such as China and India, which could still access cheaper Iranian petrochemicals, and the US, the EU and other countries that were restricted. Petrochemicals exports to the EU began to recover a little in 2014 after a partial and temporary easing of sanctions to reward Iran agreeing to restrict uranium enrichment.

After the framework deal was agreed in March 2015 between Iran and international negotiators, the state run Far News Agency reported that the Director of Iran's Petrochemical Employers Association claims that the industry is ready to supply US\$5 billion of additional petrochemicals to Europe once sanctions are lifted.

Meed Projects states that the number of energy projects in Iran could double over the next 5 years to nearly 400 once sanctions are gradually lifted.

Of all the country's export sectors, petrochemicals is expected to get the quickest boost from the agreement to lift nuclear-related sanctions on Iran, which was reached early June 2015 by the United States and five other countries involved in negotiations.

Along with lowered sanctions, Iran's ability to produce additional petrochemicals at competitive international prices will be boosted by significantly larger quantities of natural gas feedstock coming on-stream from its sizeable South Pars offshore gasfields this year.

The impact of lifting sanctions on the petrochemical sector are as follows:

- Growth in petrochemical production and export resulting from higher profitability due to removal of limitation on financial transactions
- Access to foreign financing and joint ventures would help complete petrochemical projects and provide easy and cheap access to key technologies and equipment
- Share of Iran's petrochemical industry in the European markets is predicted to grow by at least 10-15% following the implementation of JCPOA
- Predicted growth in the import of capital goods and industrial investments by at least \$5 billion

4 Europe

Europe's petrochemical industry is facing huge challenges from outside and within. As it stands, Europe is now one of the most expensive places in the world to make petrochemicals. There are no cheap feedstocks in Europe. USA and Middle East feedstocks costs are rock bottom. While in USA and Middle East there are petrochemical expansions, Europe announce closure after closure. In the UK alone, 22 chemical plants have closed since 2009.

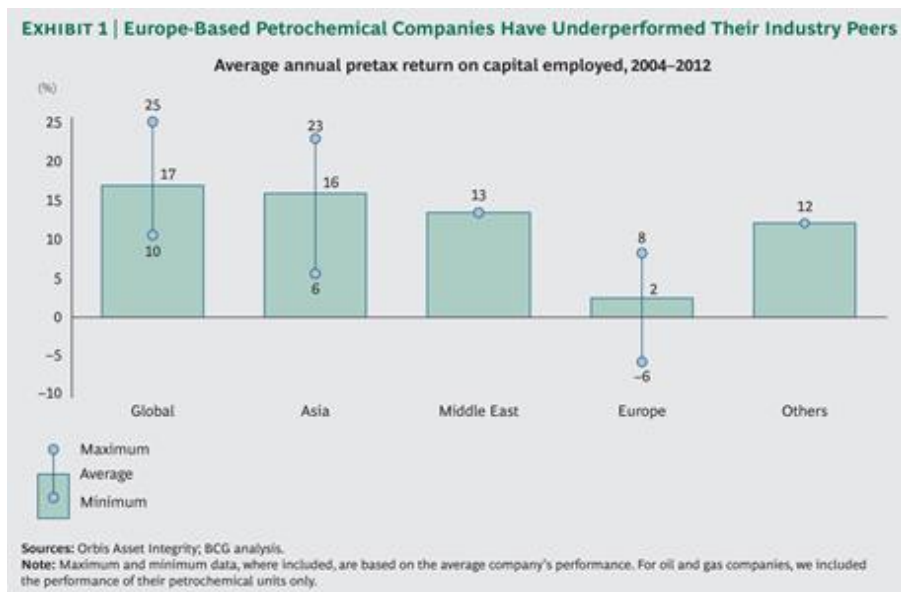
Chemicals depend upon competitive energy and feedstock costs. Whilst intensely technical as an industry, and one of the reasons historically that Europe has been so successful, technology alone will not save it and the industry could be wiped out within a decade.

Chemicals and automotive share top billing with \$1 trillion revenues in Europe each and so Europe cannot afford to watch the industry be wiped out as economically speaking, the chemical industry is one of Europe's jewels in the crown.

The chemical industry in Europe currently employs 1 million people directly and 5 million others indirectly.

The global petrochemical sector has been under pressure since the start of the financial crisis in 2008. After 2008 and 2009, which were particularly tough, the sector began to recover slowly, albeit with some additional hiccups, such as in the first half of 2012, when the European sovereign-debt crisis increased in severity.

The effects of the ongoing recovery have been uneven by region, however. Most notably, Europe-based companies have experienced far less of a lift than their Asian and Middle Eastern peers and global players. This has extended Europe-based companies' protracted period of underperformance: from 2004 through 2012, Europe-based petrochemical companies had an average annual pretax return on capital employed (ROCE) of only 2 percent, compared with returns of 16 percent, 13 percent, and 17 percent for Asian, Middle Eastern, and global players, respectively. (See Exhibit 1.)

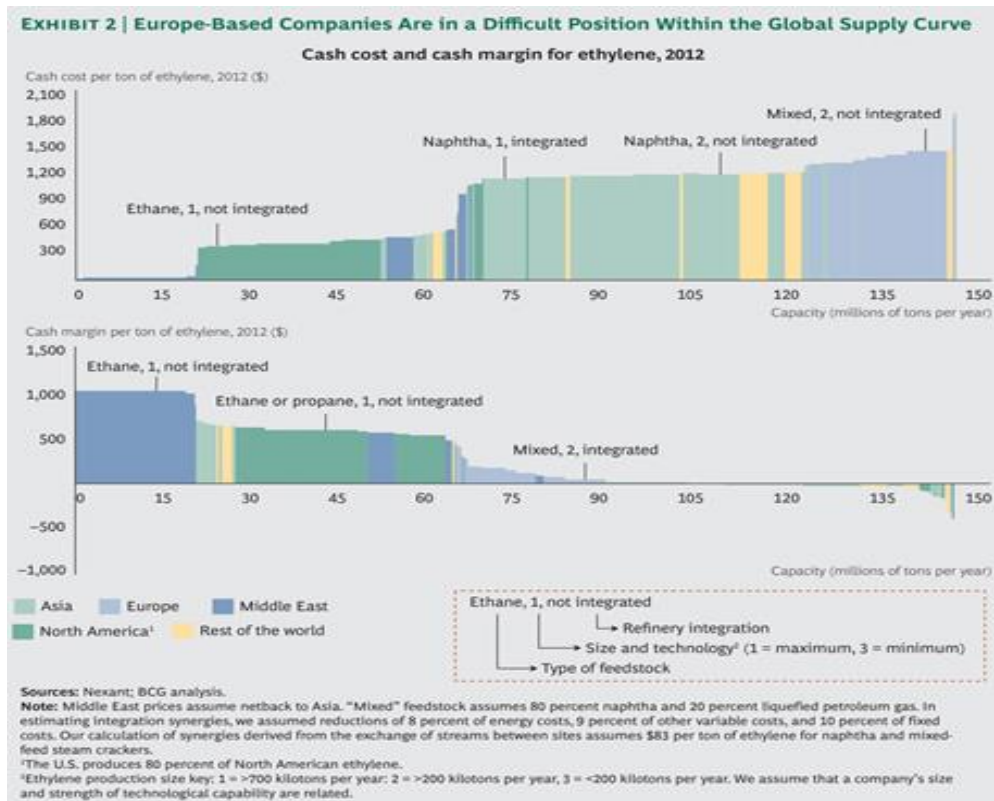


There is much evidence suggesting that Europe-based companies' woes will persist. They face significant challenges on both the supply and the demand fronts. Some of the challenges are listed below:

- Europe is squeezed between feedstock-advantaged regions, including the Middle East and, now, the U.S.
- Europe-based players also face substantial cost challenges that are not feedstock related. Their plants are, in general, subscale and old. Furthermore, Europe's energy costs are well above those of both the U.S. and the Middle East. In 2013, for example, the price of natural gas in Europe was approximately \$10.60 per million British thermal units versus \$3.70 in the U.S. and \$0.75 in some countries in the Middle East.
- European demand for petrochemicals remains weak, weighed down by the lingering effects of the euro crisis. In Western Europe, annual demand for polyethylene increased by less than 1 percent from 2008 through 2012, compared with 8 percent in Asia and 7 percent in the Middle East.

The challenges facing Europe-based players appear unlikely to ease through the medium term. Local demand will remain weak for the foreseeable future: BCG expects that demand for polyethylene, for example, will grow at an annual rate of only 0.6 to 0.9 percent from 2012 through 2022, depending on the scenario. Compounding these difficulties, additional production capacity is being built in the U.S. Furthermore, other gas-producing countries—such as Russia, Kazakhstan, Azerbaijan, Colombia, and some West African nations—are stepping up their efforts to produce their own chemical industries, taking advantage of their abundant natural-gas supplies.

These forces place Europe’s petrochemical companies in a difficult position within the global supply curve. (See Exhibit 2, which depicts global supply curves for ethylene.) In fact, on the basis of these dynamics, BCG estimates that Europe currently has between 0.7 million and 2.5 million tons of excess ethylene capacity, which is equivalent to 3 to 10 percent of the region’s total ethylene capacity. Whether, and to what degree, Europe-based companies ultimately reduce capacity remains to be seen, however. In the past, quite a few forecasts that called for significant reductions in European capacity proved excessive. In fact, only 1 million tons of ethylene capacity has been taken off the European market since 2008, which is equivalent to 4 percent of total capacity.



Also, the reality is that even though Europe-based players have the highest ethylene-production costs in the world, Europe’s product prices, which are higher than those in Asia, make Asian capacity, not European capacity, the marginal producer for ethylene and polyethylene supply, providing only a limited amount of protection to European plants. This rather counterintuitive situation is caused by the logistical costs of trade between the Middle East and Europe—costs that are higher than those between the Middle East and Asia—and reflects differences in the fluidity of the respective trade routes. Another contributing factor is the relative strength of Europe-based petrochemical companies’ innovation capabilities and application technologies.

However, KPMG believes that the death knell of the European chemical industry has been sounded prematurely. This remains an industry that employs over 1.2 million people and contributed in 2007 to a European Union (EU) trade surplus in chemicals of EUR35.4 billion. There is no doubt that the shape of the global chemical industry is changing, but the industry in Europe can continue to play a significant role in this new reality if it can:

- Make hard choices now to rationalize unprofitable facilities that might not be able to compete with newer, more efficient plants being built outside of Europe

- Ruthlessly identify which chemical clusters will remain competitive on the global stage and focus resources and investment in these areas to ensure their long-term survival
- Capitalize on its historic advantage in innovation to stay ahead of the competition, especially in terms of sustainable solutions which will be increasingly in demand
- Leverage its long-standing customer relationships to develop more specialized, higher-performance solutions
- Actively seek beneficial joint ventures and strategic alliances that provide access to both cheap Middle Eastern feedstocks and growing Asian markets

An example of this is Russia and Iran looking to strengthen ties with a bartering arrangement of oil for goods as both countries seek to overcome sanctions imposed by the West.

5 Joint Ventures

SUBSIDIARIES OF SAUDI BASIC INDUSTRIES CORPORATION

In Saudi Arabia, the dominant player is the state firm Saudi Basic Industries Corporation (SABIC), which accounts for 95 percent of domestic petrochemical output. SABIC is comprised of numerous subsidiaries, the largest of which are listed below:

Company	Location	Partnership	Feedstock	Products
ALBAYRONI Jubail Chemical Fertilizer Company	Jubail	A 50/50 SABIC joint venture formed in 1971 with Taiwan Fertilizer Company (Republic of China)	Methane, Propylene (supplied by PETROKEMYA)	Ammonia, Urea, 2-EthylHexanol, DOP
IBN SINA National Methanol Company	Jubail	SABIC (50%), CTE (50%, owned by Duke Energy and Hoechst Celanese, USA)	Methane, Butane	Chemical Grade Methanol, MTBE
IBN ZAHR Saudi-European Petrochemical Company	Jubail	SABIC (80%), Ecofuel-Italy (10%), Arab Petroleum Investment Corporation APICORP (10%)	Chemical Grade Methanol, Butane, Propylene	MTBE, Polypropylene
KEMYA Jubail Petrochemical Company	Jubail	A 50/50 SABIC joint venture with ExxonMobil (USA)	Ethylene (supplied by SADAF)	Polyethylene
PETROKEMYA Arabian Petrochemical Company	Jubail	A wholly-owned affiliate of SABIC	Ethane, Styrene, Propane, Butane, Natural Gas	Ethylene, Polystyrene, Butene-1, Propylene, Butadiene, Benzene
SADAF Saudi Petrochemical Company	Jubail	A 50/50 SABIC joint venture with Pecten Arabian Company, a subsidiary of Shell Oil Company (USA)	Ethane, Salt, Benzene, Methanol, Butane	Ethylene, Crude Industrial Ethanol, Styrene, Caustic Soda, Ethylene Dichloride, MTBE
SHARQ Eastern Petrochemical Company	Jubail	A 50/50 SABIC joint venture with a consortium of Japanese companies led by Mitsubishi Corporation	Ethylene (supplied by PETROKEMYA)	Linear Low Density Polyethylene (LLDPE), Ethylene Glycol
TAYF Ibn Hayyan Plastic Products Company	Jubail	SABIC affiliate IBN HAYYAN (57.17%), Saudi Industrial & Commercial Agencies Company (30.83%), Saudi Industrial Development Company (TATWEER 10%), Saudi Ceramic Company (2%)	Polyvinyl Chloride (supplied by IBN HAYYAN), Di-Octyle Phthalate (sourced from SAMAD)	Plastic Boards, Wall Covering, Artificial Leather, Book Binding Products

6 Investment: Opportunities in Middle East

Saudi Arabia opened its \$570 billion stock market to foreign investors on June 15, 2015 in what the Wall Street Journal qualifies as a “keenly awaited move” that will give the international investment community direct access to the Middle East’s biggest economy and the fastest-growing bourse in the region.

Iran has always represented a large projects opportunity. However, it’s only now with the impending lifting of sanctions that international companies have the opportunity to invest in the local projects market. Iran’s huge petrochemical sector could reap large rewards for nimble investors with the significant intestinal fortitude necessary to assume relatively high levels of legal uncertainty, and economic and political risks.

Iran is looking for US\$85 billion in investment for its petrochemicals sector and aims to increase production by a third this year. The government’s National Development Fund of Iran has already committed \$5bn to the sector, and a further \$2.5bn is needed to boost production from 45 million tonnes annually to 60 million tonnes. \$70bn is needed to finish the petrochemical projects that have already begun, which if completed would bring output capacity to 180 million tonnes annually, according to Abbas Shari Moqaddam, the head of National Petrochemical Company (NPC).

NPC had previously targeted a production rate of at least 50 million tonnes annually by next March.

NPC are attempting to provide infrastructure that will make returns on investment attractive for foreign companies and investors in the petrochemicals sector. The government needs to finalise both the feedstock pricing formula for petrochemical plants and the regulations that will apply to attract investment.

NPC states that another investment initiative is to offer feedstock discounts of up to 30 per cent for plants located in the more remote regions of the country.

If ROI, the pricing formula and the regulations are not attractive, investors will not be willing to do business with Iran. These 3 steps must be taken for foreign investors to return to the country.

6.1 Iranian Petroleum Contract

The Iranian constitution prohibits foreign or private ownership of natural resources, and all production-sharing agreements (PSAs) are prohibited under Iranian law. The government permits buyback contracts that allow IOCs to enter exploration and development contracts through an Iranian subsidiary. The buyback contract is similar to a service contract and requires the contractor (or IOC) to invest its own capital and expertise for development of oil and natural gas fields. After the field is developed and production has started, the project’s operatorship reverts back to NIOC or the relevant subsidiary. The IOC does not get equity rights to the oil and gas fields. NIOC uses revenue from the sale of oil and gas to pay the IOC back for the capital costs. The annual repayment rates to the IOC are based on a predetermined percentage of the field’s production and rate of return. According to Facts Global Energy (FGE), the rate of return on buyback contracts ranges between 12% and 17%, and the payback period between five and seven years.

Iran recently announced a new oil contract model called the Iranian (or Integrated) Petroleum Contract (IPC), although it is not yet finalized and is subject to change. The purpose of the new framework is to attract foreign investment with a contract that contains terms similar to a PSA. Some of the main criticisms of the buyback contracts include lack of flexibility of cost recovery and, in some cases, the NIOC’s limited expertise to reverse field decline rates in comparison to the IOC that developed the field.

Under a recent IPC draft, IOCs can establish a joint-venture agreement with the NIOC or a relevant subsidiary to manage oil and natural gas exploration, development, and production projects. IOCs will help manage the projects, but they will not

have ownership of the reserves. IOCs will be paid a share of the project's revenue in instalments once production starts, according to the Middle East Economic Survey.

IPCs will cover a longer time period of between 20 to 25 years, which is twice the amount of time permitted in the buyback contract. The IPC will encompass the exploration, development, and production phases, along with the possibility to extend into enhanced oil recovery (EOR) phases. This proposed contract model is different from the current buyback contracts, which only cover the exploration and development phases. This modification aims to rectify issues with field decline rates by including the IOC in the production and recovery phases, while optimizing technology and knowledge transfers. To help facilitate knowledge transfers and technology transfers, the IPC will require IOCs to fulfil Iran's local content requirement, which may be 51% of the contract.

These partial drafts of the new Iranian Petroleum Contract are significantly more generous than the types of deals used in the 1990s and 2000s. Unlike those contracts, which merely paid a set fee for the delivery of a project, the new agreements could give investors some share of a field's production which would probably make Iran commercially more attractive than regional competitors for international investment. Iran has yet to announce the new contract and terms could still change.

6.2 Iranian Projects

The number of energy projects in Iran could double over five years to nearly 400 once sanctions are gradually lifted, according to Meed Projects.

There are 197 energy projects – ranging from oil and gas to petrochemicals and utilities – under construction or planned representing a US\$167 billion opportunity for regional and international companies and the opportunities will only increase as new projects are added, according to data from the projects tracking service.

For the first time in a decade, international companies are close to re-establishing business relations with Iran, with the energy sector set to play a major role in the country's revitalisation.

The Dubai-based power provider Full Power Solutions expects its Iranian manufacturing arm, Electro Kavir, to ramp up production once sanctions are removed. The maker of electrical panels expects to increase operations threefold once sanctions fall. The electrical panels, or breakers, are the steel boxes that hold all the circuits that distribute power throughout a home – and in Electro Kavir's case, refineries and petrochemical plants. The company has already started receiving interest from international investors and has been approached by several western companies, mostly American and French but more competition is expected as a result of the market opening up.

Major future projects include the estimated \$4.5bn Kish Gas development, the \$3.2bn Anahita oil refinery, the \$3bn Nalco aluminium complex and the \$2.5bn Jask oil terminal project.

6.3 European Interest in Middle East

After an almost two-decade hiatus following the Islamic revolution, Tehran tried to lure back foreign oil companies in the early 1990s. It first turned to the US, reaching a \$1 billion deal with Conoco in 1995 that was almost immediately scrapped under pressure from the White House. After a false start with the American group, Tehran signed several deals with European majors including Total and Shell. The European companies withdrew later due to the nuclear sanctions.

The complexity of the industry in this day and age is reflected in the fact that Gulf producers have the backing of some parts of the European chemicals industry, specifically those that want access to its cheaper primary petrochemicals products. But it faces opposition from other parts of the industry, such as its direct competitors in Germany and elsewhere.

Mr Shari Moqaddam, Head of NPC, said that Iran had already begun to court international companies to invest in the petrochemicals sector. In July 2015, NPC held talks with 2 German international chemicals companies, BASF and Linde Group about potential investment.

Other international oil companies are already taking positions. Eni SpA, the Italian group that invested in Iran in the early 2000s, has declared its interest in returning to the Middle Eastern country if the nuclear sanctions are lifted.

At present, Persian Gulf Petrochemical Holding Co. (FARS) has secured 1 Billion EUR investment in development projects of the company in 2015-2016.

As of now, Europe is leading the race to grab a piece of the \$85 billion Iranian investment opportunity in its petrochemical sector with UK, France, Germany, Spain and Italy expressing their interest by visiting Iran so far this year. One analyst with a European bank was quoted saying, "Everyone wants to be prepared. Iran has a range of [petrochemicals] investment opportunities to offer. They range from upstream to downstream.

In private, the message from other companies is similar, they are interested in playing a role in developing Iran's energy potential.

6.4 Private Equity, Investment Banks and Private Sector Participation

Since the nuclear accord of 21 October 2003, European businesses had also been busy signing other important deals to develop the petrochemical sector. In July 2004 Danish company Haldor Topsoe had signed a contract with a subsidiary of NPC to develop a petrochemical plant that manufactured dimethyl ether, while at the same time Germany's Lurgi set up another similar project at Assaluyeh. In Vienna on 16 September, Repsol and Shell also signed a preliminary agreement with NIOC for a proposed liquefaction and export plant in Iran, while the British firm Simon-Carves negotiated a £182 million contract to build a polyethylene plant that was eventually signed in January 2005.

Iran's burgeoning petrochemical sector is also creating highly profitable opportunities for the banking sector that European businesses are increasingly keen to take. A few European-based banks have already begun funding companies involved in the wider Iranian oil and gas sectors, anxious to establish themselves in such a lucrative market.

One of the Western banks with a particularly strong presence in Iran is the London-based HSBC group, which began its operations in earnest in 1999. In February 2002 representatives of the HSBC Project and Export Finance Department signed a \$34 million export credit to Iran's Bank Tejarat, guaranteed by the ECGD, to help finance the construction of a petrochemical plant at Bandar Iman, and the following month made a deal to co-finance a \$155 million export credit facility with the Japanese Bank for International Cooperation and Iran's Bank Mellat to finance other operations in the petrochemical sector. Soon afterwards the bank made available a \$33.6 million export credit loan facility, also guaranteed by the ECGD, to finance a carbon monoxide plant that was being built by Italy's Snamprogetti on behalf of the NPC. But while the bank has subsequently funded several other similar schemes, by far its most important project has been to help provide a subsidiary of Iran's National Gas Export Company (NIGEC) with financing around \$2 billion to form a joint venture that could supply Asia and European markets.

In 2014, Iranian Deputy Oil Minister in Petrochemicals said a European bank will invest in building a gas-to-propylene (GTP) plant in Iran, which is estimated to cost 90 million EUR but did not reveal further details about the European bank. The GTP plant is projected to have 120,000 tons of output and will be established in a joint venture with the National Iranian Petrochemical Company.

Below is a table illustrating the wealth of European banks that can be tapped in for investment in Middle Eastern petrochemical projects as of June 2015.

Largest banks in Europe by total assets

Pro forma for recent and pending acquisitions

Current rank ¹	Previous rank ²	Current vs. previous	Company	Country	Total assets (€B)
1	1	-	HSBC Holdings Plc	UK	2,487.11
2	2	-	BNP Paribas SA	France	2,392.18
3	4	▲	Barclays Plc ⁶	UK	1,958.55
4	5	▲	Deutsche Bank AG	Germany	1,955.47
5	3	▼	Crédit Agricole Group	France	1,803.30
6	6	-	Royal Bank of Scotland Group Plc	UK	1,527.70
7	7	-	Société Générale SA	France	1,428.80
8	8	-	Banco Santander SA	Spain	1,369.69
9	9	-	Groupe BPCE	France	1,238.57
10	10	-	Lloyds Banking Group Plc	UK	1,174.56
11	13	▲	ING Groep NV	Netherlands	1,053.38
12	11	▼	UBS Group AG	Switzerland	1,005.57
13	12	▼	UniCredit SpA	Italy	900.65
14	14	-	Credit Suisse Group AG	Switzerland	867.07
15	18	▲	Nordea Bank AB	Sweden	725.85
16	19	▲	Banco Bilbao Vizcaya Argentaria SA ⁷	Spain	704.26
17	17	-	Intesa Sanpaolo SpA	Italy	682.42
18	15	▼	Rabobank Group ⁴	Netherlands	681.09
19	16	▼	Crédit Mutuel Group ⁵	France	658.62
20	20	-	Commerzbank AG	Germany	605.25
21	21	-	Standard Chartered Plc ⁴	UK	599.68
22	22	-	Danske Bank A/S	Denmark	491.44
23	25	▲	ABN AMRO Group NV	Netherlands	438.10
24	24	-	DZ Bank AG ⁴	Germany	402.54
25	27	▲	Cassa di Risparmio di Padova e Rovigo SpA ⁴	Italy	401.68
26	23	▼	OAO Sberbank of Russia	Russia	388.62
27	26	▼	CaixaBank SA	Spain	355.56
28	28	-	DNB ASA	Norway	322.49
29	29	-	Skandinaviska Enskilda Banken AB	Sweden	321.72
30	30	-	Svenska Handelsbanken AB	Sweden	315.22
31	31	-	Landesbank Baden-Württemberg	Germany	300.00
32	36	▲	Dexia SA	Belgium	268.13
33	35	▲	Nationwide Building Society ³	UK	265.43
34	34	-	KBC Group NV	Belgium	258.40
35	37	▲	Swedbank AB	Sweden	245.62
36	33	▼	Bayerische Landesbank	Germany	239.11
37	32	▼	Bankia ⁸	Spain	228.38
38	39	▲	La Banque Postale ⁴	France	212.84
39	38	▼	Norddeutsche Landesbank Girozentrale	Germany	202.91
40	40	-	Erste Group Bank AG	Austria	202.57
41	46	▲	Banco de Sabadell SA ⁹	Spain	202.48
42	42	-	OAO VTB Bank	Russia	199.38
43	43	-	Nykredit Holding A/S ⁴	Denmark	195.73
44	44	-	Belfius Banque SA ⁴	Belgium	194.41
45	45	-	Landesbank Hessen-Thüringen Girozentrale	Germany	192.52
46	41	▼	Banca Monte dei Paschi di Siena SpA	Italy	187.53
47	48	▲	Banco Popular Español SA	Spain	166.80
48	50	▲	Raiffeisen Gruppe Switzerland ⁴	Switzerland	156.69
49	47	▼	Raiffeisen Zentralbank Österreich AG ⁴	Austria	144.93
50	-	▲	Zürcher Kantonalbank ⁴	Switzerland	131.48

The banks are ranked by total assets for the most recent period available. Only one institution per corporate structure is included in the ranking. Rankings account for completed and pending bank deals in which the buyer or seller is located in Europe and the assets sold are in excess of €300 million or the deal value is in excess of €200 million.

All data reported in native currency and converted to euros using the end-of-period exchange rate.

Total assets are as of March 31, 2015, unless stated otherwise.

Previous rankings of ING Groep NV, CaixaBank SA, Bankia, UBS Group AG and Nykredit Holding A/S are based on total assets of ING Bank NV, La Caixa, Banco Financiero y de Ahorros SA, UBS AG and Nykredit Realkredit A/S, respectively. NRW.BANK was reclassified by SNL as a development bank and removed from the ranking.

¹ Pro forma for mergers as of June 10, 2015.

² Pro forma for mergers as of May 7, 2014.

³ Data is as of April 4, 2015.

⁴ Data is as of Dec. 31, 2014.

⁵ Data is as of Dec. 31, 2013.

⁶ Financial data adjusted for the pending sale of Barclays Bank Plc, Pakistan to Habib Bank Ltd.

⁷ Financial data adjusted for the acquisition of Catalunya Banc SA.

As shown above, the potential of European investment is significant with total assets at circa EUR 35,000Billion.

However, although banks still have an appetite for project finance, they are now being more selective in lending to finance projects as the project pipeline in the Arabian Gulf region stabilises. They are now not led by the product itself but by the requirements of the clients. Provided the projects are well structured and well-priced, banks have big eyes for the sector.

According to Meed Projects, project awards in the Gulf region this year are forecasted to rise slightly to US\$172.7bn (EUR160.67bn) from \$171.1bn (EUR159.74bn) last year.

One reason banks are eager to finance good projects is the vast liquidity they amassed during the years of strong oil prices. Although prices are down by some 40 per cent since last June, banks are still flush with cash. So far there has not been any material pressure on the banks' liquidity and pricing due to the decline in oil price in the project finance market. Gulf governments have also pledged to continue spending on infrastructure, a sign that encourages banks to continue to lend.

Nonetheless, lending to the oil, gas and petrochemicals sector, the biggest market for project finance, will decline this year because of the lower oil price and shelving of some projects. As an example, Qatar has cancelled two petrochemical projects, the \$6.4bn Al Karaana and the \$6bn Al Sejeel projects.

Factors which have led to a slowdown in oil and gas and petrochemical sector are:

- Major decline in oil price
- Major large developers have already built multibillions in assets and are now focusing on optimising their portfolio
- Specific to the petrochemical industry, limited availability of gas feedstock in the region

Per contra, a number of other factors are encouraging banks to lend. Many international banks that had gone out of project finance during the financial crisis are coming back to project finance, and that's an important source of liquidity. Export credit agencies are playing a role in project finance, especially the likes of JBIC and Kexim.

However, more and more banks are reluctant to lend for long tenors, especially with the phased implementation of Basel III banking standards, which are expected to make it more expensive for banks to lend long term. If sponsors are prepared to pay more pricing and/or agree to adopt more creative financing structures, the bank's appetite is likely to remain reasonably unchanged. But if they continue to create more competition among the banks and insist on 20-year financing tenors, then this may not be the case. They will need to offload some of the project finance debt in the future on the bond market and other takers of this asset class such as hedge funds, infrastructure funds and sovereign wealth funds.

In 2011, state-run Saudi Aramco issued a 3.75bn riyal (Dh3.67bn) project sukuk to finance a refining and petrochemicals joint venture with France's Total, the first time Islamic bonds were used for project financing.

Project bonds in the next 2 to 3 years is expected to increase in activity in a big way in the region as there are many sponsors looking at project bonds as they are a fantastic way to diversify funding sources while also freeing up bank lines for additional projects.

The advantages of project bonds is their long tenors and improved internal rate of return. Appetite for project bonds is also increasing because western investors are buoyed by the region's strong economies and projects. It is expected that pricing of project bonds, which are typically higher than bank lending, to be attractive because of the solid credit story of Middle East projects.

According to the Standard & Poor's credit analyst, banks have to start to reflect increased risk perception in higher pricing, which is good for the capital markets, because traditionally the issuers would differentiate between going down the bank route and capital market route primarily on the basis of price. But to the extent that bank pricing might go up as the banks start to see some impact on their deposit base in this current environment, then the capital markets become more competitive de facto.

For example, in Saudi Arabia bank deposits in the first quarter of this year grew 9.8 per cent over the first quarter of last year. Bank deposits grew 14 per cent in last year's first quarter compared with the first quarter of 2013.

In this region in particular banks are experiencing some pressures in terms of the deposit base because a lot of the deposits come from the big government entities, and sovereign wealth funds, so it only takes a few concentrated entities not generating as much money because of the oil and gas price dip and then the banks start to feel the pinch in terms of liquidity.

As of now, it is too early to take a definitive view because loan to deposits are at still very healthy at 100 per cent roughly, but there is some decline in the growth of deposits in Saudi Arabia and Qatar which ultimately is going to make it tougher for these banks to fund at the same price.

Banks, ultimately, will remain the main financiers of projects, given that sponsors look for cheap loans. There is some evidence of some entities being a little bit cautious in this region specifically where they are not very sure of market environment for issuing long-term and so they are preferring to deal in short fixes through banks and syndicated loans to deal with their refinancing risk and their infrastructure expansion risk.

7 Conclusion

In conclusion, based on the analysis in this report, we believe now is the best time to seek investment in Europe specifically for projects in the Middle East. This is because, unlike other continents, Europe is the continent that is struggling with the changing dynamics in the global petrochemical industry. One could suggest Europeans are fighting for their life to keep the industry alive and in order to do so they need to develop joint ventures and strategic alliances with competitors which would be partnerships in the Middle East to gain access to feedstocks.

However, although banks still have an appetite for project finance, they are now more selective in financing projects and look for well-structured and well-priced projects. With the phased implementations of Basel III banking standards, more banks are reluctant to lend long term unless sponsors discontinue to create competition among banks, settle for short financing tenors and agree to adopt more creative financing structures such as project bonds.

Project bonds have an improved internal rate of return and are a great way to diversify funding sources while also freeing up bank lines for additional projects. We expect to see activity in project bonds increase in the next 2 to 3 years as western investors are buoyed by the region's strong economies and projects and the pricing of project bonds to be attractive because of the solid credit story of Middle East projects.

Entities are risk averse in this region for issuing long-term and prefer to deal in short term fixes through banks and syndicated loans to deal with their refinancing and infrastructure expansion risk but ultimately, banks will remain the main financiers of projects.

Lending to the petrochemicals sector will decline this year because of the lower oil prices but we recommend looking beyond 2015-2016.

Europeans are actively looking out with a keen eye for opportunities in the Middle East with the largest European banks totalling at circa EUR 35,000Billion in assets for potential investment and therefore is the perfect time to reach out to European based investment banks, private equity firms and private sector participation.

