

Arabs and the future of oil

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The discovery of shale oil and gas in North America (the United States and Canada) is considered a ‘game changer’ in the global petroleum industry. It provides an opportunity for the United States to achieve the energy self-reliance it has sought since the 1970s. It is also expected to allow the United States, the largest petroleum consumer and importer globally, to focus its attention on maximizing the economic benefits and comparative advantages of becoming a self-reliant energy state. It could also enable the United States to reprioritize its strategic interests, sharing responsibility for the security of the oil export routes in the Gulf with its European and Asian allies, rather than shouldering that task almost single-handedly, as is presently the case. However, realization of the advantages that North American shale oil and gas discoveries are purported to bring about will depend on whether the depletion rate can be slowed down and minimized and on whether the cost of production can remain competitive compared with that of conventional hydrocarbons. It will also depend on whether the United States will allow a large percentage of its shale petroleum to be exported, rather than be consumed domestically.

Keywords: shale oil and gas; fracturing; horizontal drilling; liquefied natural gas (LNG); US energy security; global LNG markets; gas price formulas; conventional oil

Introduction

The global oil industry has evolved since the early 20th century to become the main source of energy to the world. Despite a variety of challenges faced by the industry – regional and international wars, and local armed conflicts – it has been able to face up to these difficulties and continue to grow, to the extent that crude oil remains the main source of global energy.

Over the past half century, however, and especially after the October 1973 Middle East War and the subsequent Arab oil embargo, there have been a number of calls for alternatives to replace crude oil in the form of sustainable energy – such as solar, wind or nuclear power – aside from the competition to crude oil coming from two other hydrocarbon sources: natural gas and coal. Yet oil has remained at the forefront of global energy sources and has seen its lead cut back only slightly due to its dominant position in the transportation sector and its ease of use, transport and storage when compared with other energy sources, not to mention its price competitiveness with these.

There have been many reasons for the attempts to substitute other energy sources for oil. One of these was the issue of the safety of oil supplies, particularly from the

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Middle East and not least because so many tankers transit the Strait of Hormuz (around 17–19 million barrels of crude oil a day, plus liquefied natural gas (LNG) and petroleum products). Then there is oil's negative impact on the environment, as a result of the carbon dioxide emitted when the oil is burnt. In addition, consumers have sought to achieve energy independence by gradually breaking the dependence on imports from Arab countries, especially the Arab Gulf States – even though the percentage of crude oil imported from the Arab world has been, and still is, limited – in the range of 10–20% of total US oil consumption (1.5–2.5 million barrels a day, mostly from Saudi Arabia).

Geostrategic shifts in the oil sector

The United States has emerged as the most important global market for energy consumption in general and for crude oil in particular, and as such represents the most important market for crude oil. By the same token exporting states have concentrated on penetrating the US market. For its part, the United States, like all importing countries, had sought to rely primarily on domestic production. But this recourse has turned out to be insufficient over recent decades, leaving no choice but to resort to imports. Indeed, the number of countries exporting crude oil to the United States has at times reached 30 – but with around five tending to be at the fore, despite variations in the list from time to time, namely: Mexico, Canada, Saudi Arabia, Venezuela and Nigeria. The key point here, however, is that the United States predominates on the list of oil-importing countries, with attendant effects on global supply and demand and prices.

More than any industrialized nation, the United States has attempted to develop alternative energy to replace oil. US political parties since the end of the 1970s have adopted slogans advocating energy independence during presidential campaigns. But despite the political momentum this has generated and the practical support it received, this policy has failed to achieve any noticeable success. 'Energy independence' remains merely a slogan adopted by presidential candidates during election campaigns.

US oil companies have continued in their tireless efforts to explore and drill for oil in the United States and abroad, but it has become progressively more difficult to discover giant new oilfields, especially in the United States and in onshore areas in general. At the same time the potential is there to discover new giant fields in areas belonging to national oil companies. Furthermore, exploration and drilling ventures are turning their attention to offshore zones, drilling to a depth of about 20,000 feet under the surface of the sea, and developing sources of unconventional oil. This approach relies on improved technology and high oil prices – the factors that spur companies to pursue research in non-conventional oil sectors: tar sands, biofuels, very heavy oil, gas to liquids (GTL) and shale oil – plus exploration in the Arctic. All this has been accompanied by work on developing the gas industry, reducing the production and transportation costs, and discovering unconventional gas by, for example, extracting methane from coal seams.

It is worth mentioning that for decades much has been known about certain unconventional oil resources, such as shale oil extraction. But the development of this industry has enjoyed a spurt recently thanks to the initiative of independent oil companies in the United States, benefitting from flexible laws and ample investments. The industry has faced difficulties and challenges, such as the copious amount of water required in exploration and production, and the leakage of contaminated water into underground potable water basins. But it has succeeded in overcoming these difficulties to

become a major energy source for the United States, providing back-up for the traditional oil industry and reviving hopes that the United States might achieve the energy independence that it has sought for around two decades by 2030, according to the latest BP (2013) report *Energy Outlook 2030* (Platts 2013). The BP report adds that the United States will be able to produce 99% of its domestic consumption by 2030 compared with only about 70% in 2005. Furthermore, US production will exceed that of Saudi Arabia by 2030, but Saudi output will return to the number one position 15 years after that date because of a gradual decline in the United States. For its part, Saudi Arabia has repeatedly confirmed its ability to maintain its current production capacity of 12.5 million barrels a day until 2035. The BP report adds that the production of various unconventional oils (tar sands, shale oil and biofuels) will supply all the net growth in global oil supply until 2020, and more than 70% of growth to 2030. BP Chief Executive Officer (CEO) Bob Dudley said the report:

shows the degree to which once-accepted wisdom has been turned on its head. Fears over oil running out – to which BP has never subscribed – appear increasingly groundless. The US will not be increasingly dependent on energy imports, with energy set to reinvigorate its economy. (Platts 2013)

There are wide disparities in the speed and success of efforts to develop unconventional oil resources. For example, the discoveries in the Arctic, which constitutes a new source of oil reserves for the future, are still in their early stages, delayed for a long time because of disputes and negotiations between the countries bordering the Arctic waters over each state's borders, aside from opposition from non-governmental organizations (NGOs) over potential environmental risks arising from exploration work there. There is also a fear of industrial accidents of the sort faced by companies during recent months because of difficult natural conditions and bad weather (e.g. Shell's recent experience in the North Alaska waters). The GTL industry has also faced a number of challenges over soaring costs and the volumes of gas required to produce it, when compared with the volumes of liquid produced. For this reason and despite the fact that the industry has been developed for some time, commercial production thus far has been limited. Shell is expected to start producing liquids from its Qatar project in 2013 (at a projected cost of US\$19 billion, with design capacity of 140,000 barrels a day). The development of very heavy oil fields has also been limited thus far – in particular the Orinoco field in Venezuela (with reserve estimates of around 297 billion barrels) because of the difficulties of marketing this type of oil and because of long and arduous negotiations between the Venezuelan national oil company (PDVSA) and international companies. But despite these difficulties and delays, the potential remains to develop these industries rapidly in future because of the availability of reserves and the cost of producing this particular unconventional oil compared with global oil prices (around US\$100–110 per barrel for Brent crude in 2012–2013).

The BP report referred to above adds that the North American continent will produce about 65% of the increase in oil production to 2030: oil extracted from tight reservoirs (tight oil – around 5.7 million barrels a day); tar sands (2.7 million barrels a day); biofuels (1.8 million barrels a day); plus the expected increase from discovered fields. The report also states, based on the available information, that oil production in the North American continent will exceed that in the Middle East by 2030, with production capacity in North America rising to approximately 33 million barrels a day from 24 million barrels a day in 2011.

BP's Chief Economist, Christof Ruehl, when presenting the 2030 report in London, pointed to the geostrategic implications of the figures:

I don't see a US president facing a problem in 2030 if he hears that a political crisis has erupted in the Middle East. His response would be that he wasn't concerned by this problem, for he could make up for the slight shortfall in supplies from Mexico. (BP 2013)

But the report itself notes in this regard that the United States will remain an importer of crude oil until 2030, though imports will fall by 70% between 2011 and 2030, meaning that it will need to cover around 20% of its oil needs through imports.

As for conventional oil production to 2030, the report expects non-Organization of the Petroleum Exporting Countries (OPEC) states to increase output by 8.5 million barrels a day and OPEC by 7.6 million barrels a day on 2011 production. This means that OPEC must be ready to reduce its production ceiling and plan on the basis of lower prices due to increased supply in the market.

Even so, the BP report also expects demand for oil to increase by about 36% to 2030, with most of this rise coming from developing and emerging nations, particularly China and India. Expected, too, during this period is a reduction in US oil demand to about 16.5 million barrels a day, meaning that China becomes the largest oil-consuming state. Its oil consumption is reckoned to rise by around 7 million barrels a day to 2030, reaching 17 million barrels a day. Demand in other Asian nations, India in particular, will rise to very high levels of around 6 million barrels a day.

BP's view is that global demand for oil will increase gradually over the next two decades, recording an average annual rise of about 0.8%. This means that the total global consumption of oil will rise to 104 million barrels a day by 2030.

Under this BP scenario, fossil fuels – oil, natural gas and coal – will retain their dominance, with each accounting for 26–28% of total fuel used by 2030, while the share of renewables (sun and wind power) plus nuclear energy will rise to around 6–8%, up from 2% in 2011.

The importance of shale oil in changing the US energy balance

The discovery of shale oil and gas and the drilling for it together represent the key factor in the on-going change in the United States' energy balance. Despite the importance of other alternatives (listed above), the huge and rapid success achieved over the past few years in the field of shale oil, more than any of the others, has revived US hopes of the possibility of becoming energy independent – despite the multiplicity of alternative sources listed above.

The importance of shale oil lies in the fact that it is found in a relatively wide area of the United States. Laws and regulations in the United States have enabled companies to move faster and with more freedom than in other countries to press ahead with exploration and production, before selling their assets and property in the fields at a very high price to realize the desired profits. Sales contracts have been signed with giant US, European and Asian oil companies.

Shale gas production constitutes at present around one-third of US gas production. Shale oil output, meanwhile, continues to rise. The US Energy Information Administration (EIA) of the US Department of Energy at the end of November 2010 published new data for US hydrocarbon reserves (EIA 2010). What is striking about these

statistics is the noticeable increase over one year in both gas and oil reserves.¹ Gas reserves rose to around 283.9 trillion cubic feet at end-2009, compared with about 255 trillion cubic feet at end-2008. The EIA confirmed that unconventional gas discoveries were the main cause of this increase, in particular shale gas, the reserves of which rose by approximately 29.3 trillion cubic feet. As for crude oil reserves, the EIA announced in the same report that there was also a significant rise – standing at 22.3 billion barrels at end-2009, up from 20.6 billion barrels one year earlier. This rise, too, was attributable to oil shale discoveries.

Moving on to production, EIA forecasts indicate an increase in US crude oil output during 2013 and 2014 of around 1.61 million barrels a day, mostly from increased shale oil production. The expected increase in oil production until 2014, along with the actual increase since 2008, is estimated at 4.09 million barrels a day. BP, for its part, in the report quoted above expects the rate of US shale oil production to rise to about 5 million barrels a day by 2030.

The effects of shale oil production on global oil markets

A fundamental change is under way in the trends of crude oil trading, in particular the transformation of the biggest and most important market in the world from a reliance on oil imports towards one that is becoming self-sufficient. In the event that the United States is forced to import energy, then it can turn to neighbouring states like Canada and Mexico. There is even the possibility, too, of transforming this market into one capable of exporting quantities of oil.

These changes mean that the United States' role and importance in global oil trading will be radically transformed. Instead of being forced to import about 50% of its crude oil needs, it can reduce this figure dramatically, to the extent that imports account for a tiny fraction of its requirements. So one should expect to see important and positive changes that benefit the US balance of payments.

The above changes will also mean a more important role for US oil in setting global oil prices, so that it becomes a marker calculated on the basis of the prices of other crudes, regardless of the quantities produced or the extent to which it penetrates international markets (as is the case at present with oil benchmark crudes: Brent, Dubai and US Light). US crude oil will resume its role in influencing global prices, contributing to the dynamism of oil and financial markets (London, New York and Singapore) and to the role of companies in entering these markets in order to maximize their profits. US pricing calculations could also greatly influence global ones. We have recently begun to see this role being played in gas price calculations. In Japan, the calculation is based on a comparison of the gas price with the price of crude oil; while in Europe it is based on a comparison of gas prices with petroleum product prices. In both those cases the prices are higher than those of gas imported from the United States, where gas pricing is based on its comparison with gas rather than with crude oil or petroleum products, making it cheaper there than elsewhere in the world. These price differences have already started to have an effect on the limited quantities of LNG exports to European countries, even before the planned start of exports to Asian markets where consumers are asking for a change in price calculations to follow the US method. Japanese companies are also calling for changes to the ways in which LNG prices are calculated.

Needless to say, the shift in the markets is still in its infancy, and things will evolve faster and in a broader way with the start of shale oil and gas production in various other countries. Information in this respect points to the presence of hydrocarbon reserves in

China that exceed those in the United States. Furthermore, a number of experts predict a slowdown in the shale oil industry beyond the borders of the North American continent. Success in the United States and Canada does not necessarily mean success at the same speed and on the same scale in other countries. The global oil industry is widely experienced in taking risks into account, whether they be natural or security ones. We can see, in this regard, the interest that a number of countries (Australia, China, Jordan and Morocco) have shown in signing contracts with international oil companies to develop shale oil industries. We can also note the reservations and opposition expressed in other countries regarding this industry because of the quantity of water needed in exploration and development (France). Experience tells us that it is very difficult these days to restrict the industrial technology needed to one state, as it will be transferred to other countries. This has been mentioned in Fagan and Rajan's (2012) report *Taking the Shale Gale International: Lessons from North America* published on the IHS Cambridge Energy Research Associates (CERA) website (<http://www.ihs.com/about/glance/index.aspx>) as of 9 October 2012. This is especially true if the latter feel that they require it or if international companies are convinced that that they can reap profits by transferring technology and investments there. Many countries are trying to achieve as great a degree of energy independence as possible, if the geological factors are right, to attain various economic and security goals, or if the legal and economic factors are positive for foreign companies to work in a relatively free and transparent climate. So it is possible to imagine the spread and expansion of this industry in the coming decades. We should recall for one moment here that the global oil industry has taken more than a century to reach its current level of development. We should not ignore either the growing demand for oil, which is currently around 90 million barrels a day. Also, despite the emergence of this industry in the United States, in Pennsylvania in particular, the production of conventional oil in the country has reached a ceiling that will be hard to exceed. Also, Pennsylvania's prosperity has faded to a certain extent in comparison with that of Texas. But it is also true that Pennsylvania could return to the fore as an important region for the production of shale oil. Nonetheless, the questions remain: for how long? And for whose benefit in the long run?

US energy independence: myth and reality

The US media has recently given prominent coverage to the prospect of shale oil becoming an alternative to traditional oil. The attention is focused on the possibility of the United States achieving energy independence through these discoveries, thus 'liberating' its Middle East policies from the 'extortion' of Arab oil-producing countries, as is claimed. This would mean an end to the need to provide security cover for these states and for the Gulf region as a whole, and in particular protection for tankers passing through the Strait of Hormuz. This is the message that has been proclaimed in most of the US media. But US strategic expert Anthony Cordesman deviated from this line of thinking in an important and critical study published recently by the Center for Strategic and International Studies in Washington, DC (Cordesman 2013).

Imported Arab oil constitutes approximately 20–30% of total US oil consumption. The United States could dispense with these imports, if it wanted, either by a rapid draw-down of its own reserves or by replacing Arab oil with other sources – if they are available. But the United States, as a superpower, has been careful to build up abundant oil reserves for the future, especially as the production costs of foreign oil is less –

not to mention the fact that Arab oil reserves are far greater than those other countries could provide, particularly at times of crisis. Arab countries – Saudi Arabia, the United Arab Emirates (UAE) and Kuwait in particular – have spare production capacity that is not available in other oil states that produce to the maximum in order to reap the highest possible profits.

Also, the expression ‘energy independence’ gives the false impression that, by achieving this, the United States would not need to import any oil. This is not the case, since it will need to import oil from neighbouring countries (Canada and Mexico). More important than that, the expression suggests incorrectly that the United States would not be affected by fluctuations in oil prices and global markets, for any threats to the security of Gulf oil will impact global oil prices, including those of the United States. The United States’ political allies and economic partners, which would continue to rely on Arab oil, would find their economies affected by tremors emanating from a Gulf security threat. As the US economy interacts to a large extent with these countries, it would be affected in turn by price fluctuations. Cordesman, for his part, adds that the United States each year imports large quantities of Asian goods and commodities, with Gulf oil constituting a major factor in their production. Therefore, a threat to Gulf security would mean an increase in oil prices, followed by a rise in the price of goods that the United States imports from Asian countries, which would damage the US economy.

Cordesman emphasizes the need for a clear and explicit debate in the United States about the importance of the concept of energy security – with some people seeing it as a way of ending the need to take responsibility for Gulf security. The main thing that Cordesman points out in this regard is a need for the US administration and the Pentagon to review its future strategies and the types of weapons to be developed. Cordesman goes on to stress the geostrategic importance of the Gulf region, now and in the future, with the threat that Iran poses to the countries bordering the Arab Gulf. This creates a threat to the safety and security of Arab oil supplies to global markets which, according to Cordesman, are important today and will continue to be in times to come.

The Gulf’s strategic importance at present stems from the reserves available in the countries of the region, their current production capacities and their huge future surplus capacities – aside from the fact that these three factors are not to be found in any other geographic region in the world. Even if we were to assume that the United States could achieve energy independence, the current signs point to a big rise in demand for oil in China, India and other emerging Asian nations, plus an increase in the production of Gulf States from around 25 million barrels a day in 2008 to 35 million barrels a day in 2035. The EIA (2010) report indicated that Gulf production will rise from approximately 28% of global output in 2010 to around 31% in 2025, despite rising oil production in other countries and the increase in liquid petroleum output worldwide.

Shale oil: a game changer?

The boom in shale oil and gas production is already having market impact in North America and beyond, according to John Mitchell (Mitchell 2013), adding that the trend ‘of increasing US dependence on oil imports has been reversed. This is due to a fall in domestic oil demand and increases in production driven by the growing application of horizontal drilling and hydraulic fracturing’. Mitchell projects that oil imports are predicted to decrease for at least a decade, ‘reflecting continuing falls in consumption driven by recent tightening of Corporate Average Fuel Economy (CAFE) standards

for automobile fuel efficiency as well as further development of the oil accessed by new technologies'. The trend will continue beyond 2020, with another round of stricter fuel efficiency standards, as well as the possibility of the continued increase of non-conventional oil production. But, according to Mitchell, there is also the possibility that the production of non-conventional fuels may reach a plateau or fall. It is this precise possibility that dampens optimism about the competitiveness of non-conventional oil and how reliable it is to allow the United States become energy self-sufficient.

The current increased trends of utilizing non-conventional oils are having several consequences according to Mitchell (2013). Energy is turning away from being a liability to the US economy to a source of economic strength and energy security. A new competition is arising between US and Canadian gas producers over building LNG terminals, pipelines and market share. The new supplies of non-conventional gas will provide less expensive energy to US power stations and industries. US goods will be more competitive in global markets. Meanwhile, as US oil imports from the Middle East fall, oil from the Middle East will head more towards Asian markets. In particular, US imports of Middle Eastern crudes will be reduced, such that gradually these will be limited to Saudi crudes which will feed Saudi-owned refineries in the United States. Accordingly, and notwithstanding the arguments advanced by Cordesman and cited above, US commitment to defend Gulf oil routes can be expected to be less of a priority than it is currently. The United States will also reduce its obligations to hold strategic stocks, as required by the International Energy Agency (IEA) Emergency Response Mechanism. Yet, the United States will continue to have an economic interest in global energy security. It will also remain an oil importer, albeit mainly from Canada and Mexico. Consequently, as a result of external factors, US oil prices will rise and fall sharply in accordance with the variations in global oil markets.

The availability of commercial supplies of non-conventional oil will allow the United States to focus on new economic and climate priorities, rather than on security, argues Mitchell (2013). International oil companies may not focus their exploration on frontier areas such as the wilderness and the offshore, despite the costs incurred and environmental hazards.

Conclusions

Needless to say, the change in the energy balance in the United States during the next two decades will have an important impact on the oil industry in general, and on the Arab oil and gas sector in particular. It will also affect the economy of Arab countries as a whole, and the strategy of major and regional powers towards the area. However, due to the importance of this subject and the danger that it poses to the interests of Arab states, this opinion paper has been prepared as an initial attempt to address the whole issue. This needs to be followed later by detailed studies and research into the question. Also, specialized seminars need to be held to address various aspects of the topic (oil, economic, strategic). Arab and foreign experts from different schools of thought and disciplines should take part in order to carry out a thorough review and study of this possibly historic transformation of the global oil industry and the economy of the Middle East.

The non-conventional oil industry is still in its early days. What impact it will have in the long-term on the global oil industry and the energy security of the consumer nations is still a matter of conjecture. Many issues still need to be addressed, as follows:

- The possibility of a radical change in US energy policy during the coming two decades through research into the production of unconventional oil, or the exploitation of deep-sea and Arctic reserves, made possible by on-going technological progress as well as what has already been achieved. High oil prices have helped companies make progress in this field.
- The concern of all other consuming countries and international oil companies to promote unconventional oil industries in order either to utilize the maximum energy available in particular states, to restrict imports of oil supplies in order to improve the balance of payments of importing nations, or to strengthen national security by strengthening energy security. The profit and competitiveness factor is central to the thinking of international oil companies in pushing for non-conventional oil industries, in addition to the continued exploration and production of conventional oil.
- The interest in unconventional oil industries presents a new and important opportunity for Arab states to maximize their investments in them. For despite the competition that unconventional oil has created, it will prolong the oil era, unlike other energy alternatives.
- The widespread commercial production of unconventional oil is still in its infancy in the United States and elsewhere. It is not expected to present serious competition to conventional oil until the end of the current decade. This is an opportunity for Arab states, if there is sufficient knowledge and willpower, to confront the oncoming historic challenge.
- It is natural, given the future changes to oil, that important changes to the global oil industry should be expected. This does not mean, in light of available reserves and investments and the balance of global supply and demand, the marginalization of the Arab oil industry. Rather, it means changes in the possibilities of the marketing and pricing of oil.
- Arab political and economic data currently available do not indicate that Arab politicians are in a position to make adjustments to confront the historic changes that are around the corner. For given the recent and likely economic and political realities, it is difficult to adopt the bold ideas that are required to launch creative initiatives.
- Given the painful reality that the Arabs face, specialists and observers must continue objectively and honestly to study these changes and challenges, and in particular to concentrate on expected changes in oil markets, no matter how unpredictable they may be.
- The most important and most realistic option for Arab states today is to provide support to strengthen national oil companies by the hiring of a skilled and experienced workforce capable of dealing responsibly and knowledgeably with changing industries and markets. In the absence of strong and independent national oil companies that are immune from the pervasive climate of corruption in the region, it will be very difficult, if not impossible, to cope successfully with this historic change in the Arabs' most important economic source.
- As long as oil remains the most important energy source for global industry, the huge oil reserves in the Middle East will continue to be a matter of international concern, and therefore safeguarding oil supplies from the region will remain among the interests of the world's leading nations. The ways that these supplies are defended are likely to change. But despite the 'universality' of these interests, military dominance will change from time to time, in step with changes to global

power balances. Yesterday saw British hegemony, today it is the turn of the United States. It is very possible that in the near future hegemony will be shared by the US's Western and Asian allies, with competition from China or India – or both together. The problem lies in the continuation of armed crises among the countries of the region itself, in light of the vast disparity in the balance of power between them, and the continuing interference of one state in the affairs of another. Then there are the internal problems stemming from the absence of a social contract between the ruling political groups, on the one side, and the citizens, on the other. These factors as a whole, together with the great and continuing international dependence on the region's oil, provide the driving force for the role and importance of Arab oil globally, and in the concern of foreign countries to preserve their core interests in the region.

Note

1. The *International Energy Outlook 2010 (IEO2010)* presents an assessment by the EIA of the outlook for international energy markets through 2035. US projections appearing in *IEO2010* are consistent with those published in the EIA's *Annual Energy Outlook 2010 (AEO2010)* (April 2010).

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