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What is Behind the Steep Decline in the Crude Oil Prices: Glut or Geopolitics?

Mamdouh G Salameh| June 2015

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Introduction

The price of crude oil has declined 54% since September 2014, and there are no indications that it will stop at this level in the absence of a major production cut by Organization of Petroleum Exporting Countries (OPEC).

The reasons given for the steep oil price decline so far, has been a glut in the global oil market. Theories say this is caused by rising US shale oil production and over-production by some members of the OPEC beyond their production quotas, as well as a slowdown in economic growth in China and the European Union (EU), thus reducing the demand for oil. There may, however, be a second reason: the geopolitical impact of events in Syria, Iraq, Libya, and Yemen. While the impact of these events may have been eclipsed by rising US shale oil production and thus discounted by the global oil market, it must certainly be taken into account. As for the issue of glut, it was exacerbated by OPEC's very wrong decision not to cut production by at least 2 million barrels a day (mbd) to absorb the glut in the oil market. Had they cut their production, Russia and Mexico would have joined them and cut production by 500,000 barrels a day (b/d) and 300,000 b/d respectively, a total of 2.8 mbd capable of removing the glut and stabilizing the oil price. Russia and other non-OPEC producers would not cut their production without OPEC leading the way. It is not too late for OPEC to reverse their earlier decision and cut production.

Still, a glut in the global oil market estimated at 1-2 mbd and a slightly slower economic growth in China and the EU should not have led to such a steep decline in oil prices. The global economy suffered harsher and direr crises in the banking and economic sectors simultaneously during the period of 2008-2011 and oil prices never declined as steeply or for such a long time.

It has always been the case in the past that when oil prices fell steeply OPEC would decide immediately to cut production as a way to bolster oil prices. This time, at its 166th meeting on the 27th of November 2014, OPEC decided under strong pressure from Saudi Arabia not to cut production. Circumstantial evidence suggests some political collusion between Saudi Arabia and the United States behind the steep decline in oil prices aimed against Iran and Russia. Saudi Arabia took advantage of the low oil prices to inflict damage on Iran’s economy and weaken its influence in the Middle East in its proxy war with Iran over its nuclear programme. At the same time, the United States

took advantage of the low oil prices to weaken Russia's economy and tighten the sanctions against Russia over the Ukraine.

Saudi-US Collusion

History is repeating itself. Early in the 1980s, Sheikh Ahmad Zaki Yamani, the veteran, former oil minister of Saudi Arabia, suddenly awoke to Saudi Arabia's need for market share. He flooded the market with oil causing the oil price to collapse to $10/barrel. It later transpired that the Saudi need for a market share was just a cover for a CIA-Saudi conspiracy to expedite the downfall of the Soviet Union.[1] At virtually the same time the United States, under former US president Ronald Regan's administration, started an arms race with the former Soviet Union. Hampered by the very low oil prices engineered by Saudi Arabia and the United States in the early 1980s, the Soviet Union wasted all its available financial resources in a futile arms race, thus hastening its own collapse.

Today, the Saudi oil minister Ali al-Naimi is waking up to the same need. Al-Naimi has followed in footsteps of Yamani. He suddenly remembered at the 166th meeting of OPEC the need for Saudi market share. This is probably a cover for a new collusion between the United States and Saudi Arabia to lower the oil prices, and thereby conspire against Russia and Iran. Whilst the key players have changed, the strategic objectives have remained the same. [2]

Impact of Low Oil Prices on the Global Economy

A continuation of low oil prices could damage the global economy in many ways. Whilst oil consumers around the world may enjoy low crude oil prices for a short while, eventually global consumption will overtake global production and push oil prices up steeply. The plunge of crude oil prices has already fuelled a big jump in US petrol

[1] Seyed GholamHosein Hassantash, "Naimi in Yamani's Attire; Are Authorities in Riyadh Witless or Lying? History is being Repeated," IAEE Energy Forum, 1st Quarter of 2015,p .21.

[2] Ibid

demand.[3] Current low oil prices could be planting the seeds for a damaging oil crisis in the next two to three years.

The global economy can't reconcile itself with sustained low oil prices, because global investments driven by the oil industry and the economies of the oil-producing countries will be undermined. A curtailment of global investments—particularly the oil and energy sectors—would prove a major challenge, as would sustained damage to the global oil industry. Essentially, the 'easy' oil is running out and replacing that production is getting ever more expensive. Exploration and production costs have risen 11% a year since 1999, while oil production has fallen.

The seven major oil companies—Royal Dutch Shell, BP, Exxon Mobil, Chevron, Total, ENI and Statoil— need a price of $125-$135 US/barrel to balance their books. They also need certainty about the future trend of oil prices before committing to huge investments in exploration and production. As a result of declining prices, the oil majors have already started to sell some of their production assets and reduce future investments, which will translate in two years' time into a smaller share in global oil production. This will be reflected in steeper oil prices. A Bloomberg News analysis of 61 US shale oil drillers early this year found that shale debt has almost doubled over the past four years while revenue has increased by just 5.6%. The oil industry is doing its best to keep face, but it can't outrun the problems of its business model. The reality is that low prices threaten the oil industry.

In January 2015, a clear message came from the reported 25%-30% drop in spending by the North American customers of Schlumberger, Halliburton, and Baker Hughes; the three largest international service companies that support oil and gas producers with activities such as drilling, completing and analysing wells. There was also a drop globally, dipping 10-15% in the rest of the world. Data published by Baker Hughes show a 51% drop in the number of rigs drilling for shale oil in the US. Where there were 1,609 rigs in October 2014, by the following march there were only 788. A survey of oil companies' capital spending intentions published by Barclays Bank in February 2015 painted a similar picture. Already $35 bn has been slashed from planned 2015 spending. Barclays' survey said budgets for North America were expected to be cut by 30% or more if the price of oil were to stay below $50. North America's more rapid downturn is partly explained by the higher costs of US and Canadian shale production compared with oil from the Middle East. A break-even price for US shale oil production

[3] Ed Crooks & Gregory Mayer, "Crude's Plunge Fuels Jump in US Petrol Demand", *Financial Times*, 16 January, 2015, p, 28.

was estimated at $70-85/barrel. While some efficient shale oil drillers could live with an oil price of $50-60 a barrel, many of them are fracking themselves into bankruptcy.

While the global slide in oil prices has focused on the relatively new American shale oilfields, it is the mature, high-cost fields such as those in the North Sea that seem likely to suffer most. At prices much below $75 a barrel, some of the North Sea reserves might be too expensive to develop. BP, Chevron, BG Group, PLC, and Statoil are already reassessing capital-spending decisions that might have helped extend the oil province's life. Without their investment, there is a growing risk that some of the UK North Sea's remaining economically-recoverable resources—estimated at between 15 and 16.5 billion barrels (bb) of oil and natural gas— will end up as so-called stranded assets -hydrocarbons that are simply too expensive to develop.[4] Even when oil prices were more than $100 a barrel, some 1.5 bb of remaining North Sea oil were too expensive to develop according to the international consultancy Wood Mackenzie. Now, with Brent crude just above $50 a barrel, a further 1.4 bb currently being considered for a final investment decision could be under threat.

Companies already deep in the red when the price of Brent was at $109 a barrel in 2014 have had to redraw business plans for prices as low as $50. According to Morgan Stanley analysts, the seven oil majors ran a collective deficit of $55 billion (bn) in 2013.[5] With the seven majors having sold assets worth $150 bn over the past four years, they are gradually turning from super-majors to mini-majors: still among the biggest companies in the world, but no longer behemoths able to bend prices so they fit their investment cycle. Indeed**,** oil production by the seven majors has declined from 11.5 mbd (or 14.5% of global production) in 2003 to 9.5 mbd (or 10.4% of output) today.

Impact on the Arab Gulf Oil Producers

In defending OPEC's earlier decision not to cut production, the Saudi oil minister seems to be acting contrary to the best interests of the oil market. This was not, however, how he justified the action. In an interview with Middle East Economic Survey (MEES) on December 21, 2014, he said Saudi Arabia and OPEC were defending their market

[4] Ed Crooks & Gregory Mayer, "Crude's Plunge Fuels Jump in US Petrol Demand", *Financial Times*, 16 January, 2015, p, 28.

[5] Ron Bousso & Dmitry Zhdannikov, "Price Fall Hastens Decline of Big Oil as Western Majors Retreat", *Reuters* 9 October, 2014.

share; "If they have cut their production, the price will go up and the Russians, the Brazilians and US shale oil producers will take [the] Saudi and OPEC share." While this logic may hold for one producer, if every producer tries to defend its market share, they all end up exacerbating the glut in the market and all will lose out. A second logic was applied by the minister, who claimed that Saudi Arabia wanted to tell the world that high-efficiency producing countries are the ones that deserve a market share. This suggests that countries with proven reserves but high costs of production should leave the arena open for more efficient producers.[6] This would, of course, not go down too well with high-cost producers. Saudi Arabia, however, seems entrenched in its plan, claiming that even if the oil price declines to $20 a barrel, Saudi Arabia will not cut production. This is more bravado than common sense, however, since it came with the admission that the Saudi budget will have a deficit as a result of declining oil prices. The oil minister said the country plans to borrow from the banks and use some of the country's financial reserves to cover the deficit. While Saudi Arabia seems to have a plan in place, it does not make any economic sense to sustain a deficit in your budget when it is within your power to prevent it in the first place. If oil prices continue at $50/barrel for a year, Saudi Arabia will lose an estimated $128 bn.

The Saudi oil minister continues to try and persuade his fellow OPEC members that low oil prices will lead to a collapse in rising US shale oil production. The flaw in his argument is that, while it is true that very low prices will harm US shale oil production in the short term, the damage to OPEC economies will be higher. Furthermore, shale production will resume its upsurge once oil prices start to rise. What will hamper shale oil production in the long term is geology and the rising costs of rigs. The fast depletion of shale oil wells amounting to 70%-90% in the first year of production and the eventual rise in the cost of rigs will be the decisive factors to eventually undermine US shale oil production; not any efforts by OPEC. Leading US oil figures have insisted that any slowdown in US shale oil production will be a temporary phenomenon. They have rejected claims by Saudi Arabia that its plan was succeeding in squeezing US shale oil producers, adding that Saudi Arabia should be a little less swift to gloat.[7] Forecast to

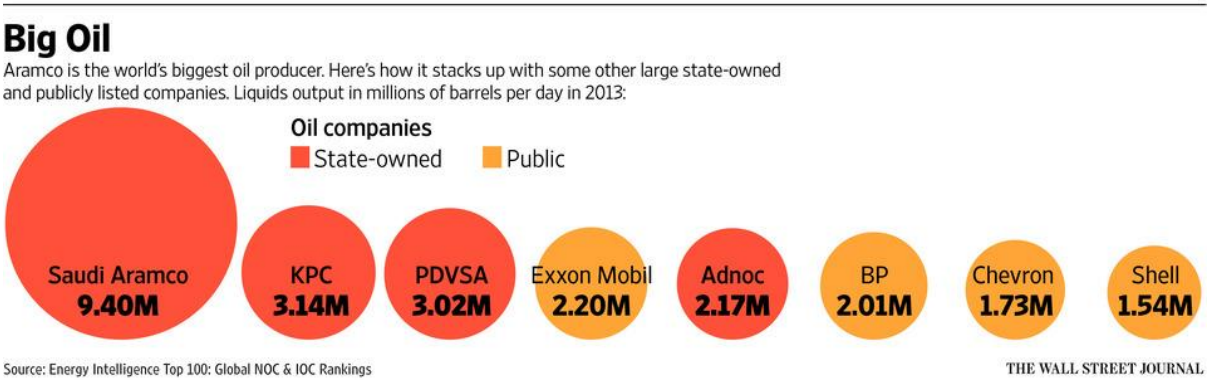
[6] Interview of Saudi oil minister Mr Ali al-Naimi with Middle East Economic Survey (MEES) as reported by *Petroleum Review* in February, 2015, p. 4.

[7] ED Crooks & Barney Jopson, "US OIL Veteran Rejects Saudi Shale Claims", *Financial Times*, 15 May 2015, p. 17.

reduce state expenditure to $229 bn this year, down18% from 2014, a clear sign of the impact the slump in crude prices is having on its finances. It will end up with a $38 bn deficit amounting to 6% of GDP. As a result, Saudi Arabia's non-oil economy is expected to contract by 5% this year.[8]

Weakened oil prices have resulted in a ratings downgrade for Saudi Arabia by American rating agency Standard & Poor (S&P), which earlier warned of slower growth across the Gulf Cooperation Council (GCC). In a report, the agency said, "We view Saudi Arabia's economy as undiversified and vulnerable to a sharp and sustained decline in oil price, notwithstanding government policy to encourage non-oil private sector growth." Saudi Arabia's petroleum sector accounts for 44% of its GDP, and the non-hydrocarbon sector relies heavily on government spending, which in turn depends greatly on revenue from the oil and gas sector. About 85% of exports and 90% of government revenue stem directly from the oil sector, according to S&P. The Saudi government has even advised Saudi Aramco, the largest oil producer in the world, to slash its future spending on production and exploration by as much as 25% from $40 bn to $30 bn (see Figure 1). Saudi Aramco, which usually bases its investment on oil supply and demand, is trying to execute some of its projects at lower costs, while deferring others until a picture of the oil market becomes clear.[9]

Figure 1



[8] Financial Times, 16 January, 2015, p. 5.

[9] Summer Said & Benoit Faucon, "Oil-Drop Pain Spreads to Saudi Arabia's Behemoth", *Wall Street*, February 19, 2015.

In December 2014, Saudi Aramco asked oil-services companies, including Baker Hughes Inc., Halliburton Co. and Schlumberger Ltd., for discounts of up to 20% on services such as well-testing procedures. Combined, the companies do about $6 bn a year in business with Aramco. Baker Hughes offered a small discount, but Aramco has held out for 20%. Perhaps as a result of these requests, Halliburton said it anticipated "headwinds" in the Middle East. Recently, Saudi Arabia has created a new 10-member Supreme Economic Council for state-run Saudi Aramco, headed by the Saudi King's son and deputy crown prince Mohammad Bin Salman. The Supreme Economic Council replaced the Supreme Petroleum Council, which used to help set the Kingdom's oil policy.[10] The Council had approved a restructuring of Saudi Aramco that included separating it from the oil ministry. Some claim the move will bring more flexibility to the company, so it could make decisions on a commercial basis and keep full financial control.[11] Others, however, see the move as paving the way for a member of the royal family to replace oil minister Naimi, while leaving Aramco to be run by technocrats. However, the restructuring could also be seen as a tacit admission that oil minister Naimi's policy not to cut production in the face of steeply falling oil prices, was wrong. This policy has cost Saudi Arabia and fellow OPEC members billions of dollars in lost revenues.

The measures demonstrate some of the risks OPEC countries took when they decided not to cut production to boost prices. The Saudi-backed decision has hurt large publicly listed companies such as Royal Dutch Shell PLC, and Chevron Corp., but is now ricocheting and hitting national oil companies. However, Saudi Aramco isn't the only big state-owned oil company seeking to cut costs. UAE oil minister Suhail bin Mohammed al-Mazroui said during a January energy event in Dubai that his country, along with other producers, would squeeze oil contractors' costs to adapt to lower oil prices: "We will need the service companies and contractors to understand the cycle of the oil market." Qatar Petroleum and Royal Dutch Shell PLC have called off plans to build a $6.5 bn petrochemical plant. In Oman, state-owned Petroleum Development of Oman (PDO) postponed the award of a $1 bn contract to supply and manage oil-production pumps for seven years t0 2021. The government informed bidders they would have to wait for a year to see how oil prices are evolving before committing to major projects.

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[10] *Saudi Aramco Restructured*, published by the *Saudi Gazette* on May 2, 2015.

[11] Ibid. Reuters, January 13, 2015.

Last month, S&P warned that further declines in oil prices could dampen economic growth in the GCC countries, where about 46% of nominal output derives from oil.

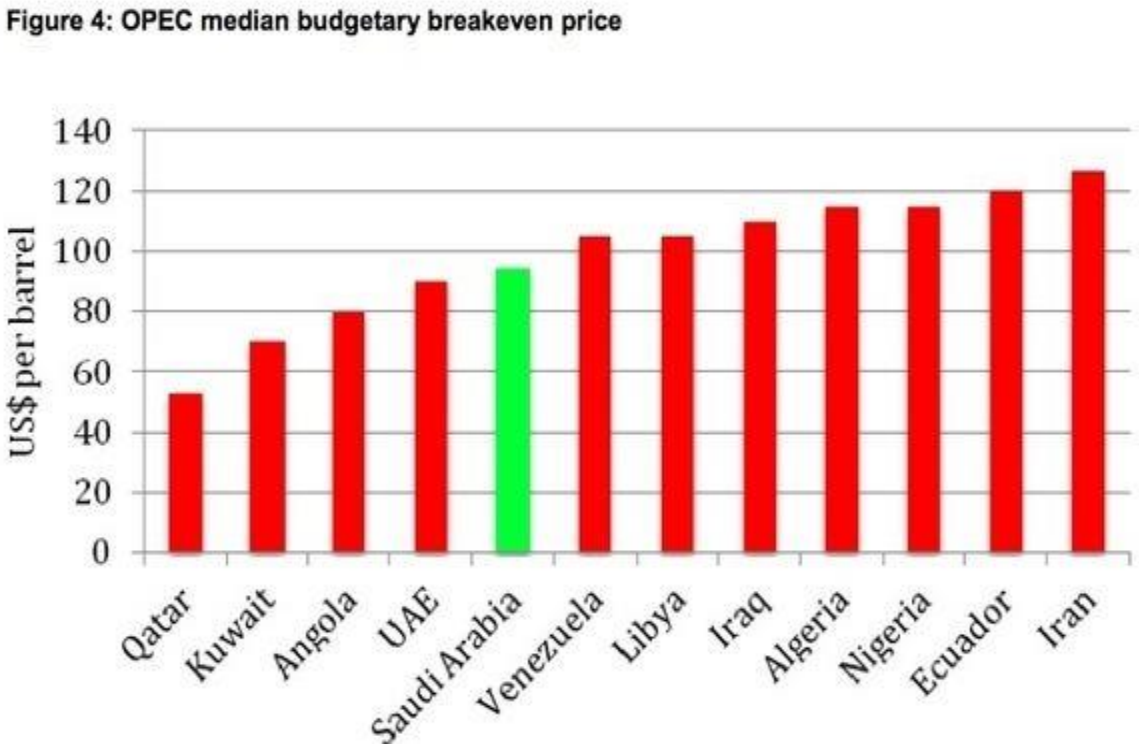
Unlike most of its neighbours, oil constituted only 30% of UAE's GDP. For most other OPEC countries, oil revenues are even more essential. Oil revenue in recent years helped Oman maintain a strong economic position. Oil accounted for just less than half of the country's GDP last year. Now Omani crude oil is forecast to average approximately $80 a barrel over the next two years, down substantially from S&P's previous assumption of $95 a barrel. "This has a negative impact on our assessment of Oman's fiscal and external position given the country's high dependence on revenues from hydrocarbons, oil in particular," the ratings agency said. S&P now expects that Oman's current account surplus, which was equivalent to over 10% of GDP in 2012, will turn to a small deficit by 2017. Some OPEC countries need very high prices to "break even" on government spending. Iran for instance, needs prices at around £130 a barrel while Saudi Arabia needs an oil price of US$106/barrel in 2015 to fiscally break even, up from $98 a barrel in 2014, according to the International Monetary Fund (IMF) (see Figure 2).

In January, Iranian President Hassan Rouhani said that countries behind the fall in global oil prices would regret their decision, warning that Saudi Arabia and Kuwait would suffer alongside Iran from the price drop. He added that "If Iran suffers from the drop in oil prices, other oil-producing countries such as Saudi Arabia and Kuwait will suffer more than Iran. In 2013 oil accounted for roughly 90% of Saudi Arabia's overall budget income and 92% of Kuwait's according to Reuter's calculations based on official data. On the other hand, only a third of Iran's budget is based on oil sales, with an estimated 60% of the country's exports tied to oil".[12]

[12] Ibid. Reuters, January 13, 2015.

Figure 2

OPEC Median Budgetary Breakeven Price



Source: OPEC "Break-even" Prices (Matthew Hulbert/European Energy Review).

The Arab Gulf oil producers earned a net $574 bn in oil export revenues in 2013.[13] Producers earned an estimated $452 bn in 2014, down 21% from the year before, a figure that is expected to drop to $340 bn in 2015 based on an average oil price of $60/barrel throughout 2015 (see Table 1). The Arab Gulf oil producers will be vulnerable to declines in the price of oil as long as they continue to depend on oil

[13] Mamdouh G Salameh, "Impact of US Shale Oil Revolution on the Global Oil Market, the Price of Oil & Peak Oil" (a paper given at a Symposium of Peak Oil, 2-4 April, 2013, Doha, Qatar.

export revenues—currently 85%-90%—[14] and fail to diversify their economies. This has been the predominant case since the discovery of oil in the early twentieth century, and makes economies vulnerable to the volatility of oil prices, and the steeply-rising domestic oil consumption for power generation and water desalination. This pattern of consumption began with subsidies, which in 2011 amounted to $523 bn, due mainly to increases in the Middle East and North Africa in the aftermath of the Arab Spring.[15]

Table 1
Net Oil Export Revenues of the Arab Gulf Oil Producers
(US$ bn)

Countries	2013	2014	2015
Iraq	86	74	55
Kuwait	92	72	54
Qatar	42	34	25
Saudi Arabia	274	208	156
UAE	53	42	31
Oman	27	22	19
Total	574	452*	340*

Source: US Energy Information Administration's (EIA) 2014 Short-term Energy Outlook (STEO) / Author's projections for earnings in 2014 & 2015*Based on an average price of oil of $60/barrel in the second half of 2014 & 2015.

In 2015, the Gulf Cooperation Council (GCC) countries are projected to consume 6.38 mbd, or 33% of their oil production, much of which will be used to generate electricity and power water desalination plants. At present there are 199 desalination plants of different capacities in the GCC countries, and there are plans to add another 38 (see Table 2). Most of the desalination plants are powered by oil.

[14] Ibid

[15] Mamdouh G Salameh, "Impact of US Shale Oil Revolution on the Global Oil Market, the Price of Oil & Peak Oil" (a paper given at a Symposium of Peak Oil, 2-4 April, 2013, Doha, Qatar.

Table 2

Existing & Planned Water Desalination Plants
In the GCC Countries

	UAE	Saudi Arabia	Kuwait	Qatar	Oman	Bahrain	Total
Existing	47	97	6	8	35	6	199
Planned	8	11	2	2	14	1	38
Capacity (mm3)	1776	1721	702	391	168	246	5004

Source: Courtesy of International Journal of the Environment & Sustainability (IJES), Vol. 1 No.3.

This means that the Arab Gulf countries will have to cut their domestic oil consumption drastically or replace oil with nuclear power and solar energy in electricity generation and water desalination. Failing to do either would relegate the states to minor crude oil exporters by 2030, and by 2032 they could cease to export altogether (see Table 3). Thus, the drive toward using solar or nuclear power for electricity generation and water desalination should be pursued earnestly in the GCC countries.

Table 3

Combined Current & Projected Production, Consumption &
Export of Crude Oil Exports in the Arabian Gulf Countries, 2010-203
(mbd)

Year	Production	Consumption	Net Exports / Imports
2010	16.65	4.59	12.06
2011	18.70	4.77	13.93
2012	18.92	5.35	13.57
2013	19.07	5.99	13.08
2015	19.51	6.38	13.13
2020	20.90	9.64	11.26
2025	19.83	13.19	6.64
2030	**18.55**	**17.06**	**1.49**
2031	18.44	17.91	0.53
2032	**18.33**	**18.81**	**- 0.48**
2035	17.79	21.78	- 3.99

Sources: US Energy Information Administration (EIA), Oil Outlook 2013 / OPEC Annual Statistical Bulletin 2014 / BP Statistical Review of World Energy, June 2014 / Author's projections.

Diversification: Challenges and Opportunities

With proven reserves of 645 bb, or 39% of the world's proven reserves and a combined GDP exceeding $1.9 trillion at current prices, the Arab Gulf countries could be a formidable economic bloc. However, continued dependence on oil export revenues makes this difficult. By 2035, the Arab Gulf oil producers could be earning more than $1 trillion (in US$ 2011). This would give them great economic clout, but also huge geopolitical leverage in world politics. It could also make them very vulnerable to any decline in the price of oil. The vulnerabilities, discussed in the previous section, would need to be forestalled. To do this, the Gulf countries would not only have to accelerate diversification and the transition to renewable and nuclear energy, but also become smarter in their investments.

The proposed mode of economic diversification for the Gulf states is not industrialization, because the Gulf countries would never be able to compete with the top industrial nations in the world though some form of industrialization in petrochemicals has been taking place particularly in Saudi Arabia. Nor does it mean investing in real estate, but rather in food production projects, for instance in the Sudan, and also in thriving and futuristic industries worldwide. With a global food shortage predicted, food prices could in the future rival, if not, exceed those of crude oil. Investments in the Sudan, which has the land and the water resources not only to become the food basket of the GCC countries but also a great source of food export revenues for them, will save the GCC countries an estimated $20 bn in food imports from the United States.

Intensive investment in renewable energy is also advisable, particularly solar power, nuclear energy and water desalination technology. Solar power along with nuclear energy could meet all the electricity needs of the Gulf countries. Solar energy could also power an extensive network of water desalination plants along the Arab Gulf coastlines extending from the Arabian Gulf to the Arabian Sea and the Red Sea, providing not only water for drinking but also for irrigation. Moreover, solar electricity could eventually be exported to Europe, earning a sizeable income for the Gulf countries.

Impact of Sanctions and Declining Oil Prices on Iran

To balance its budget, Iran needs to sell oil at $130 a barrel. The international sanctions against Iran and the steep decline in the price of oil have adversely affected the value of its currency and reduced its oil exports from 1.81 mbd in 2012 to 1 mbd in 2014 (See Table 4).

Table 4

Iran's Current & Projected Crude Oil Production,
Consumption, Exports & Sustainable Capacity, (2009-2030)
(mbd)

	2009	2010	2011	2012	2013	2014	2015	2020	2030
Production	3.56	3.54	3.58	3.74	3.56	3.15	3.17	3.40	3.35
Consumption	2.01	1.87	1.91	1.93	2.00	2.15	2.17	2.57	3.39
Net exports/Imports	1.55	1.67	1.67	1.81	1.56	1.00	1.00	0.83	-0.04

Sources: IEA's World Energy Outlook 2014 / BP Statistical Review of World Energy, June 2014/ OPEC Annual Statistical Bulletin 2014 / Author's Estimates.

The decline of crude oil prices has led to speculation about the financial position of Iran. However, a closer look at government finances and trade shows that Iran's vulnerability to oil price fluctuations is reduced enormously. The current Iranian budget has been based on an average crude oil price of $60 a barrel and a daily export of 1mbd. This translates into $36 bn budgeted for crude export revenue for the year ending March 20, 2015. The budget included the export of 297,000 barrels per day (b/d) of gas condensate, as well as the sale of gas to domestic petrochemical units. The total budgeted hard currency revenue for the government had been projected as $51.5 bn with 20% of that revenue going to the National Development Fund (NDF) and the rest to the treasury.[16] Before the recent fall in oil prices, Iran was selling its crude at an average price of $105-$110/barrel. At $60/barrel, the government will face a shortfall of about $14-$16 bn, or 27%-31% of total planned government revenue.

[16] Ibid

Even if oil prices drop further and Iran faces a greater shortfall, the government can always access the NDF, which has been set aside to assist the economy by extending loans to address investment needs. The latest available statistics show that the Fund's resources exceed $62 bn.[17] Iran's budget for the next fiscal year will be based on an oil price of $75/barrel. If higher crude oil prices don't materialize, Iran could compensate some of the export revenue loss by increasing natural gas exports. Iran's natural gas production has increased by 60 million cubic metres (mcm) since March 2014 and this trend would continue, providing more gas exports.[18] Still, low oil prices will have some adverse impact on Iran's economy, though the effect would be manageable in the short and medium term.

Oil and Iran's Nuclear Programme: Impact on Oil Prices

Oil is at the heart of Iran's nuclear programme. Iran needs nuclear energy to replace the crude oil and natural gas currently being used to generate electricity, thus allowing more oil and gas to be exported. Without nuclear power, Iran could cease to remain a major crude oil exporter and be relegated to the ranks of small exporters as early as 2020. This would have catastrophic implications for its economy and also the global price of oil.[19]

The Iranian nuclear programme is under attack from the US and the European Union (EU), with Tehran being accused of using its nuclear programme as a smokescreen to conceal the development of nuclear weapons. The US government has argued strongly that a country so apparently well-endowed with oil and natural gas as Iran cannot have any legitimate need to develop nuclear energy. However, when the Shah started Iran's nuclear energy programme in 1974, nuclear power could not be justified in economic terms, as Iran's population was less than half its present 78 million, oil production was 6 mbd, almost double the present production of 3.15 mbd and energy consumption was less than a quarter of consumption today. Unlike now, Iran's oil reservoirs were not in decline. The question is: since the United States strongly encouraged the Shah to build nuclear power plants in 1974, why is it objecting now to Iran pursuing a nuclear

[17] Ibid

[18] Mamdouh G Salameh, "Impact of US Shale Oil Revolution on the Global Oil Market, the Price of Oil & Peak Oil" (a paper given at a Symposium of Peak Oil, 2-4 April, 2013, Doha, Qatar.

[19] Ibid

programme? The answer is that in 1974 the Shah of Iran was a great friend of Israel while in the first decade of the twenty-first century, Iran is no longer friendly with Israel.[20]

Security, too, plays its part in Iran's nuclear program. Though energy is a top priority, Iran would certainly not be averse to possessing nuclear weapons. Their logic is that if Israel, India, Pakistan and North Korea can possess arsenals of nuclear weapons, why not Iran? Neither sanctions nor the threat of war against Iran could force it to relinquish its nuclear programme. Even direct negotiations between the United States and Iran will not shift Iran an iota from its determination to acquire nuclear weapons. Iran is determined to acquire nuclear weapons and will face down the United States, the European Union, Israel, and the world community to get them. Its leverage is that, if attacked, Iran could plunge the world in the biggest oil crisis in history. This leaves the US and its allies with no militarily or economic leverage. It is also possible that the US and its allies including Israel will end up acquiescing to a nuclear Iran and might even end up forming an unholy alliance to siphon off the oil and energy resources of the Arab gulf countries.

For a country with what is estimated to be the fourth largest proven crude oil reserve in the world, and the fifth largest oil exporter, the prospect of ceasing to be a major oil exporter by 2020 might seem like a nightmare. Already, however, Iran is taking a critical look at the future of its oil industry. In the face of steadily declining production in its major onshore oilfields, deteriorating well reservoirs from past over-production, fast-rising domestic consumption, and a shortage of reserves and investment funds, Iran is under mounting pressure to remedy the situation if it is to avoid being relegated to the ranks of small oil exporters in the next decade.

In the furore about Iran's nuclear programme, one important fact is being overlooked – Iran's oil resources may not be sufficient to supply its rapidly growing population without major cuts in exports. Iran's proven reserves have been greatly overstated to the extent that it may actually need nuclear power to fuel its economy and remain an oil exporter. Iran's oil industry – hampered by years of mismanagement, war and US

[20] Mamdouh G Salameh, "Impact of US Shale Oil Revolution on the Global Oil Market, the Price of Oil & Peak Oil" (a paper given at a Symposium of Peak Oil, 2-4 April, 2013, Doha, Qatar).

sanctions – is a mess; the country hasn't been able to make its OPEC quota since 2000. Plans to raise output are well behind schedule, and long-term plans for expanding production capacity may have to be scaled back as well because of insufficient reserves. Against this background, it is perhaps not so surprising that one of OPEC's leading members should want to develop a nuclear energy.

Struggling to Raise Production Capacity

From a peak production of 6 mbd and crude oil exports of 5.7 mbd in 1974, Iran in 2014 was struggling even to produce 3.15 mbd and export 1.00 mbd of crude. If the current trend continues, Iran will cease to be an oil export altogether by 2030. Political and economic pressure from the United States and other Western governments has frozen foreign investment, and is squeezing the fragile Iranian energy industry, a problem that is in many ways at the heart of the nuclear controversy involving Iran. The squeeze comes at a time when consumption is booming, adding strains to a government burdened by sanctions and wary of prompting discontent.

Foreign investors in Iran's oil development have been scarce since the Islamic Revolution in 1979, and the oil industry has now suffered decades of economic, political and technical problems. Iran has signed no firm oil or natural gas contracts with foreign investors since June 2005 when Mahmoud Ahmadinejad was elected president and began flaunting Iranian nuclear ambitions and renewing tensions with the West.[21] With crude oil production currently close to 3.17 mbd –some 2.83 mbd below its highest level of 6 mbd recorded in 1974— and despite ambitious plans to raise production to levels well in excess of the 1974 level, Iran has struggled to increase its output. However, far from achieving its ambitious long term aims, Iran may well find that its crude oil production is likely to fall well below current levels. Each year Iran has to find ways to make up for production declines ranging from 200,000 b/d to 500,000 b/d out of a total output of some 3.17 mbd. Due to growing domestic oil demand and an inability to expand its production capacity, net oil exports have been steadily declining. Some analysts say that if this acute imbalance between production and demand at home continues unchecked, Iran will have little oil left over to export by about 2020.

[21] Mamdouh G Salameh, "Iran May Need Nuclear Power to Improve Its Oil Outlook" (A paper given at the 27th North American Conference, 16-19 September, 2007, Houston, USA).

A major stumbling block in Iran's attempts to raise capacity is its reservoir management practices, which were used to achieve the record levels of the 1970s. During this period, the re-injection of gas into oil reservoirs was greatly increased. In less than 10 years, crude oil production rose from under 2 mbd to 6 mbd. This proved too much for some large reservoirs and output began to fall sharply. By 1978, it was down to 5.2 mbd. The same year, a series of strikes by workers in the upstream sector led to a period of turmoil during which reservoir management suffered considerably. In 1979, output was down to 3.2 mbd. The following year, the war with Iraq helped push production below 1.5 mbd and it did not rise above 3 mbd until 1990. Since then, Iran has only been able to add about 1 mbd to its production capacity.[22]

Problems compounded. To maximize its production capacity – or even maintain it – Iran needs huge amounts of cash, yet the current situation does not allow for such vital investments. These either have to be postponed or paid for by committing Iran's future oil production. The excesses of the 1970s and the neglect of the 1980s-90s have left Iran with pressure problems and water encroachment in several of its oilfields. Billions of barrels of reserves have probably been lost as a result, despite attempts to step up gas injections in recent years.

Iran's Oil Reserves

Iran claims to have proven reserves of 157 bn barrels (bb).[23] While the *Oil & Gas Journal* (O&GJ) and the *BP Statistical Review of World Energy* seem to concur, a number of international experts have disputed the figure (see Table 2).

Table 5
Iran's Remaining Proven Oil Reserves, 2010
(bb)

Oil & Gas Journal	BP Statistical Review 2006	Samsan Bakhtiari	Mamdouh Salameh	Ali Saidi

[22] BP Statistical Review of World Energy, June 2014, p. 6.

[23] ASPO Newsletter # 62, February 2006.

157.0	157.0	36.0	30.0	37.0

Sources: Oil & Gas Journal / BP Statistical Review of World Energy, June 2014/ Author's calculations.

Whereas *O&GJ* and *BP* rely mainly on published 'official' figures (which are usually bloated and highly political), two retired National Iranian Oil Company (NIOC) experts: Dr Ali Samsan Bakhtiari and Dr Ali Muhammed Saidi, estimated Iran's proven reserves at between 36 bb and 37 bb respectively.[24] However, starting with a reserve base of 59 bb in 1985 (as reported by OPEC's Annual Statistical Bulletin 1989), taking into account Iran's production of 34 bb during the period 1985-2014, and allowing for the addition of 5 bb of recoverable reserves from the Azadegan oilfield, Iran's actual proven reserves can be estimated at no more than 30 bb. Moreover, Iran's four largest onshore oilfields (Gachsaran, Marun, Ahwaz and Agha Jari) are well past their peak. They were probably producing around 3.93 mbd in 1974, since when their collective output has sunk to about 1.21 mbd in 2014 (see Table 6).

Table 6

Comparative Oil Production by Iran's Largest Onshore Fields
1974 vs. 2014 ('000 b/d)

Oilfield	1974	2014	Rate of Decline
Ahwaz-A	872,900	580479	- 33
Ahwaz-B	83,000	54842	- 34
Agha Jari	1,009,643	127319	- 87
Gachsaran	911,526	142691	- 84
Marun	1,053,503	306362	- 71
Total	3,930,572	1,211693	- 69

Sources: Official report by the Oil Service Company of Iran (OSCO), 1974 / Author Calculations

[24] Mamdouh G Salameh, "Oil & Iran Nuclear Programme: Impact on Oil Prices & the Global Oil Market" (A presentation given at the Energy Workshop organized by the Arab Centre for Research & Policy Studies, 11 April, 2015, Doha, Qatar).

Iran is one of nine top oil producers whose oil production has peaked. Production in the United States peaked in 1971, Canada (1973), Iran (1974), Indonesia (1977), Russia (1987), UK (1999), Norway (2001), Mexico (2002) and Saudi Arabia (2005) (see Table 7).

Table 7

The Peak & Depletion of Conventional Crude Oil

Country	Date of Peak Discovery	Date of Peak Production	% Discovered	% Depleted	Ultimate Production (bb
Canada	1950s	1973	95	76	25
Iran	1960s	1974	94	76	130
Indonesia	1950s	1977	93	65	31
Mexico	1950s	2002	94	55	55
Norway	1970s	2001	93	48	33
Russia	1940s	1987	94	61	200
Saudi Arabia	1950s	2005	96	60	210
UK	1970s	1999	94	63	32
USA	1930s	1971	98	88	195
The World	1962	2006	94	56	2100

Sources: Association for the Study of Peak Oil's (ASPO) website www.peakoil.net / IEA /Petroleum Review / OPEC.

Future Plans for Capacity Expansion

Iran will find it hard to increase oil production capacity over the next decade or so whatever the size of its reserves. It has not always managed to attract the foreign investment it needs to raise capacity substantially, and where foreign companies have been tempted in, there have sometimes been delays in bringing important projects into production.

US companies are excluded from Iran under the terms of the Iran Libya Sanctions Act of 1996 (ILSA), and many other companies have found Iran's upstream terms unattractive or the levels of political risk too high. There have also been problems with buy-back contracts in some fields. The rising capital cost of developing Iran's oilfields has cut the rate of return on projects, and some companies are reported to be trying to renegotiate terms. In other cases, companies have asked for higher rates of return than

those generally on offer. Among the projects said to be affected are the Azadegan and Yadavaran oilfields. Azadegan was supposed to go onstream by 2012, and is estimated to hold some 26 bb of reserves, of which between 5 bb and 6 bb are thought recoverable. NIOC is reportedly looking for new partners on the $2 bn development of the southern sector of the Azadegan oilfield after Japan's Inpex lost the contract awarded seven years ago.

China has been involved in at least ten projects valued over $32 bn in Iran. These projects, in various phases of discussion, contracting, or construction, focus primarily on natural gas and oil extraction efforts in the Gulf, particularly the North and South portions of Azadegan and Pars fields. The Yadavaran contract is still under negotiation. The two field complexes are slated to produce more than 550,000 b/d. The rate of depletion is such that Iran needs to replace at least 300,000 b/d of capacity each year simply in order to maintain output at existing levels. That is why Iran has not been able to meet its OPEC production quota for the last 15 years. The maximum that Iran can produce at present is only about 3.17 mbd. This could even fall slightly in the short term as output from the older fields continues to decline. Even if sanctions are lifted and Iran was able to import the latest American oil technology, it could add no more than 200,000-300,000 b/d a day to its production. [25]

Nuclear Power to Rescue?

Given the problems in its oilfields, Iran may struggle to maintain production at current levels. The development of South Pars condensate could provide an extra 0.5 mbd or so over the next decade. Still, there appears to be little prospect of achieving a capacity level beyond 3.4 mbd, and it is more likely that Iran's production capability will be far below that level. Under these circumstances, nuclear power may have an important role in restricting the consumption of hydrocarbons in Iran and allowing more oil and gas to be exported.

In 2012, Iran produced 355 bn kWh of electricity (30.27 million tonnes of oil equivalent) (See table 8), but used the equivalent of 610,000 b/d of oil and natural gas to generate electricity, a figure expected to rise to 770,000 b/d this year. Generating nuclear electricity will enable Iran to replace at least 93% of the oil and gas used in electricity

[25] US Department of Energy (DOE): Independent Statistics & Analysis 2013.

generation in 2030. Based on these figures, Iran's quest for nuclear energy seems justifiable.

Table 8

Iran's Current & Projected Electricity Generation, 2012-20130

Volume	2012	2015	2020	2025	2030
Billion kWh	355	447	657	965	1418
Mtoe	30.27	38.11	56.00	82.28	120.91
mbd	0.61	0.77	1.12	1.65	2.43

Sources: IEA World Energy Outlook 2014 / BP Statistical Review of World Energy, June 2014 / US Energy Information Administration (EIA) Iran's Energy

Data: www.eia.doe.gov/cabs/background.html / World Bank Sources.

Iran's Ministry of Energy estimates that the country will have to increase its electricity-generation capacity to 60 gigawatts by 2015. It is in this context that the Iranian government justifies the one-gigawatt Bushehr nuclear reactor and suggests seven more such reactors with similar capacity by 2020. The Iranian government argues that seven gigawatts of nuclear power generation would free up 190 million barrels of oil per year (520,000 b/d), equivalent to 16% of the country's current production, or $14 bn.

Iran's domestic demand for electricity has been growing at an annual rate of 8%. If this trend continues –if crude oil is not replaced by another source of energy and if crude oil production does not increase significantly—Iran will become a net oil importer within the next two decades. This would be a huge catastrophe for a nation that obtains 85% of its total export earnings from oil. By 2021, 10% of Iran's electricity is supposed to be supplied by nuclear power, 20% by hydro-power, 5% by other sources and the remaining 65% by natural gas, thus eliminating the country's reliance on oil.[26]

The Geopolitics of Iran's Nuclear Issue

[26] Fleet Street Publications, London, 21 December 2009, pp.1-2: www.fleetstreetinvest.co.uk/nuclear-energy-/Iran-needs-nuclear-running.

There are three major reasons why Iran needs nuclear power: Oil, water, and security. Iran has to develop nuclear power because it is running out of oil according to Iranian oil expert Dr Bakhtiari, who is on record saying that Iran's claim of having "massive" proven oil reserves is false. He made that reality crystal clear to Iran's leaders a few years ago when he told the former Iranian president Ahmadinejad that Iran's proven oil reserves are closer to 36 bb and not the claimed 157 bb. That is why Iran needs nuclear power, because its oil industry is struggling to raise oil production level close to 4 mbd and it is only going to get worse. That is also why Iran will never give up its nuclear programme.[27]

The second reason is water. With a population of 78 million, 70% of whom are under 30 years of age, and heading towards 100 million by 2025, and with Iran projected to cease to be a major oil exporter by 2020, the Iranian state will have no major source of revenue to support a growing population. With such rapid population growth, Iran's water needs have grown enormously. That is where nuclear power comes in. Water desalination is an extremely energy-intensive operation, but nuclear plants can be used for the dual purpose of generating electricity and producing desalinated water.[28]

Security is also a factor. Despite Iran's adamant denials that it does not seek to acquire nuclear weapons, this seems to be the case. Iran looks with envy at the great oil resources of its Arab neighbours across the Gulf and hopes that one day in the near future it can get its hands on them, or at least derive some share from the revenue. A nuclear Iran desperate for oil could grab some of its Gulf neighbours assets, for example the Majnoon oilfield straddling the Iraqi/Iranian border (with estimated proven reserves of 20 bb), the Saudi Safaniya offshore oilfield (the biggest offshore field in the world) or Qatar's offshore gasfields (the third biggest in the world). It could also hold its Gulf neighbours to ransom by threatening to block their oil exports through the Straits of Hormuz unless wealth is shared. The United States would certainly not come to the defence of its Arab allies against a nuclear Iran.

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[27] Ibid, p.2

[28] Elvin Mirzayev, "Sanctions & Oil Prices Bring the Russian Economy Near Collapse", January 21 2015, accessed on 2 February 2015 at : www.investopedia.com.

In assessing the current situation, it is important take into account that Iran is a hegemonic power by nature. Under the Nixon administration it had the support and co-operation of the United States to establish itself as the policeman of the Gulf. A nuclear Iran aspires to resume that role independently from the United States. That is where a clash of national interests between the nations may arise. Iran has pursued its nuclear programme behind the shield of high oil prices, and so far the policy has worked. At the United Nations Security Council not a single member, including the United States, has proposed boycotting Iranian oil. The mullahs, who are first and foremost interested in the survival of their regime, have wagered that eventually they can replace their oil shield with a nuclear one – and meanwhile the petro-dollars will just keep rolling in.

Impact on Global Oil Prices of Lifting Iran Sanctions

There is no doubt that a nuclear deal between Iran and the six major powers could lead to a relaxation of global tension particularly between Iran and the United States.

If a deal is struck, then sanctions against Iran would be expected to be lifted in whole or in part. This means that Iran could eventually import advanced American oil technology such as enhanced oil recovery (EOR) and attract foreign investment to repair its damaged oil industry and virtually depleted oil reservoirs.

Even if sanctions were lifted today, however, it would take more than two years to deploy the EOR technology and try to increase production. Even then it might only limit the fast depletion in its oilfields rather than increase production. If a final deal is reached, it's likely to be at least a year before international sanctions are lifted, so no physical market impact is expected before 2016. Given current market conditions, moreover, only limited international investment will likely be available to help increase Iran's production. At today's oil prices, investors are cutting back everywhere. Such realities cast major doubt on Iranian oil minister Bijan Zanganeh's recent claim that if sanctions were to end, "Iran will double its oil exports within two months."

A nuclear deal will not enable Iran to flood the oil market with oil. The decline in Iran's oil exports over the last few years was not solely due to tighter sanctions, but rather mainly due to fast-depleting old oilfields whose reservoirs were damaged in the 1970s. Since then Iran has not had the chance to repair its oil industry. If sanctions were lifted and Iran was able to import the latest American oil technology, it could add no more than 200,000-300,000 b/d a day to its production, and even this may not translate into added exports due to steeply-rising domestic consumption.

Lifting sanctions against Iran would thus hardly affect global oil prices or the global oil market in the long-term. Any initial impact could be the result of Iran releasing some of its alleged stored crude oil on tankers or floating containers, but the impact would be short-lived and limited. Iran might, however, benefit from the development of its huge natural gas reserves.

Impact of Sanctions and Declining Oil Prices on Russia

Sanctions were imposed on Russia in the aftermath of its intrusion into the Ukraine in February 2014 and the ensuing annexation of the Crimea. However, the Russian intrusion has been prompted by energy and geopolitical factors. In terms of energy, 50% of Russia's gas and oil supplies to the European Union (EU) are piped through the Ukraine. It is in Russia's interests to make sure that these gas and oil pipelines are well defended not only against sabotage but also against any attempt by the Ukraine to make use of the gas without paying for it. Ensuring that there is a pro-Russian government in the Ukraine thus becomes critical.

There is also a geopolitical dimension. The Ukraine has become a pawn played by the United States and EU in its chess game with Russia. At the heart of the Ukraine-Russia crisis are the EU's attempts (incited and abetted by the United States) to draw the Ukraine away from Russia into the EU and eventually into NATO, thus bringing NATO to the borders of Russia. Having failed to achieve their aim, the EU supported by the US instigated internal strife in the Ukraine, which ended with the ousting of the legally-elected president and eventually the annexation of the Crimea.

If the conflict between the US/EU and Russia continues to escalate, an oil and gas embargo could considered as a tool against Russia. Even before the current tension over the Ukraine, Russia was in the process of reorienting its energy needs to Asia with emphasis on China, India, Japan, and South Korea in view of the growth in energy demands and the likely stagnation or decline of demand in Europe over the next few decades. The combination of sanctions and falling oil prices has adversely affected the Russian economy by sending it into recession and causing the Russian currency to lose 40% of its value against the dollar. However, the Rouble has recovered some ground of late, a signal that the worst is virtually over.

Russian international reserves also decreased from $510.5 bn to $386.2 bn during 2014. The combined effect of sanctions and low oil prices has resulted in downside pressure on Russia's GDP, which grew by only 0.7% in the third quarter of 2014 (see

Figure 3). Thus, based on an average oil price of $78/barrel in 2015, the World Bank forecasts real GDP contraction of 1.7%.[29]

Figure 3

Still, bilateral trade between Russia and China will provide support for the Russian economy. China is already Russia's largest single trading partner with bilateral trade flows of US$90 billion in 2013. The neighbours aim to double the volume to US$200 bn by the end of the decade,[30] and intend to use their national currencies to settle more energy deals in order to guard against instability in a world energy market dominated by the US dollar. As President Putin said in a speech at the Asia-Pacific Economic Cooperation Summit on 10 November 2014, "If we can settle large deals in this way, it will mean the influence of the petrodollar in global oil markets will decrease.

[29] Mamdouh G Salameh, "Turning the Gaze towards Asia: Russia's Grand Strategy to Neutralize Western Sanctions" (A USAEE Working Paper No: 14-168, posted on 19 July, 2014).

[30] Christopher J. Schenk, "An Estimate of Undiscovered Conventional Oil and Gas Resources of the World, 2012, US Geological Survey, Fact Sheet 2012-3042.

The petrodollar came into existence in 1973 in the wake of the collapse of the international gold standard under the Bretton Woods agreements, which established the new global economic order and the US dollar as the leading global currency. Former US president Richard Nixon and his then foreign secretary Henry Kissinger understood that the collapse of the gold standard system would cause a decline in the global demand for the US dollar. Maintaining an "artificial dollar demand" was vital for the US economy, so a deal was struck with Saudi Arabia in 1973 that saw every barrel of oil purchased from the Saudis denominated in US dollars. Under this agreement, any country that sought to purchase oil from Saudi Arabia would be required to first exchange its own national currency for dollars. Under the terms of the agreement, the Saudis would be required to agree to price all of their oil exports in US dollars, and be open to investing their surplus oil proceeds in US debt securities. This increased demand for the dollar and US debt securities and allowed the US to buy oil with a currency it can print at will. Thus, maintaining the petrodollar is America's primary goal, since without it, the US dollar would collapse.

In exchange for Saudi Arabia's willingness to denominate oil sales exclusively in US dollars, the United States offered weapons and protection of Saudi oilfields from neighbouring countries including Israel. In 1975, all of the OPEC nations agreed to follow suit. However, as the US dollar continued to lose purchasing power, several oil-producing nations began to question the wisdom of accepting increasingly worthless paper currency for their own oil exports. Today, several countries have, or are attempting to move away from the petrodollar. Examples include Iraq under Saddam Hussein, Iran, Syria and Venezuela. Additionally, other nations are choosing to use their own currencies for oil, including China, Russia and India. The petrodollar created an immediate demand for the US dollar globally, artificially enhancing its value, so that as global oil demand increased, so did the demand for the dollar.

Last month, China and Russia agreed on a currency swap worth 150 bn Yuan ($24.5 bn), a move widely viewed as an effort to reduce the dollar's influence in both bilateral and international trade and also as a signal that the Yuan is making sound progress toward becoming an established international currency. While international sanctions against Russia have had little effect on the Russian economy so far, it is declining oil prices that have had the biggest impact. Russia will be able to withstand not only the onslaught of sanctions, declining oil prices, and currency depreciation by increasing its oil exports, combined with its trump card, China's energy needs and financial support.

Russia's oil and gas industry is one of the largest in the world. It has the largest global gas reserves, is the largest exporter of natural gas, has the second largest coal reserves, the eight largest oil reserves, and is the largest producer of oil. It is also the third largest energy user. Russia is also likely to have the world's largest volume of still-undiscovered natural gas, estimated at 6.7 trillion cubic meters. The USGS estimate Russia's undiscovered oil amounts to 22 bb, second in the world only to those of Iraq.[31] Revenues from these reserves contribute in large part to the national budget; more than 45% in 2013. The bulk of this comes from oil, as oil revenues reached $191 bn, and gas $28 bn in the same year, providing 68% of Russia's export revenues. In 2014, Russian oil production averaged 10.71 million mbd. Russian oil exports amounted to 7.36 mbd consisting of 5 mbd of crude and 2.36 mbd of refined products, which go mainly to the European market (see Table 9).

Table 9

Russia's Current & Projected Crude Oil Production, Consumption & Exports (2013-2035)
(mbd)

	2013	2014	2015	2016	2017	2020	2025	2030	2035
Production	10.79	10.71	10.73	10.76	10.78	10.37	10.00	9.51	9.00
Consumption	3.31	3.35	3.45	3.55	3.65	3.70	3.70	3.70	3.80
Net Exports	7.48	7.36	7.28	7.21	7.13	6.67	6.30	5.81	5.20

Sources: BP Statistical Review of World Energy, June 2014 / OPEC World Oil Outlook 2014 / Energy Information Administration (EIA) / IEA Annual Energy Outlook 2013.

In 2014 Russia also produced 605 billion cubic metres (bcm) of natural gas, exporting 191 bcm, mostly to the European Union (see Table 10).

Table 10

Russia's Current & Projected Natural Gas Production, Consumption & Exports (2013-2030)
(bcm)

	2013	2014	2015	2016	2017	2020	2025	2030	2035

[31] BP Statistical Review of World Energy, June 2014.

Production	604.8	605.0	614.1	623.3	632.6	658.3	691.9	709.4	727.3
Consumption	413.5	413.8	415.9	418.0	420.1	426.4	436.8	447.8	459.1
Net Exports	191.3	191.2	198.2	205.3	212.5	231.9	255.1	261.6	268.2

Sources: BP Statistical Review of World Energy, June 2014 / IEA Annual Energy Outlook 2013 / Author's estimates.

Amid tensions with the EU and US over the annexation of Crimea, Russia has been trying to expand its energy exports to the Asia-Pacific region, in particular India, China, South Korea, and Japan.

When Energy-Starved India meets Oil-Rich Russia

India and Russia are genuine and natural strategic partners. They are the only two major powers in the annals of international relations that have never had a clash of interests. A pillar of their strategic partnership is defence cooperation, with 70%-85% of India's Air Force, Army, and Navy equipped with military hardware of Soviet or Russian origin. Energy is second only to this. As India and Russia try to diversify their energy focus – India as importer and Russia as exporter – both nations are at an interesting confluence, with India's energy needs growing exponentially.

India is the fourth-largest crude oil consumer and the twelfth-largest natural gas consumer in the world. However, India is not endowed with great hydrocarbon resources; its proven oil reserves amount to 5.7 bb whilst its natural gas reserves amount to 47.8 trillion cubic feet (tcf).[32] In 2014, oil consumption amounted to 3.92 mbd against a production of 0.87 mbd, thus necessitating the importation of 3.05 mbd, mostly from the Middle East. Consumption is currently growing at 5% per annum and is projected to reach 5.36 mbd by 2020 rising to 7 mbd by 2025 (see Table 11).

Table 11

India's Current & Projected Oil Consumption & Production (2010-2030)
(mbd)

2010	2011	2012	2013	2014	2020	2025	2030

[32] Russia outdoes the West in terms of nuclear cooperation with India," *Voice of Russia*, 26 March, 2014, http://voiceofrussia.com/2014_03_26/Russia-outdoes-the-West-in-terms-of-nuclear-cooperation-with-India-9910/

Production	0.87	0.90	0.89	0.89	0.87	0.82	0.78	0.74
Consumption	3.32	3.49	3.69	3.73	3.92	5.36	7.00	9.37
Net Imports	2.45	2.59	2.80	2.84	3.05	4.54	6.22	8.63

Source: BP Statistical Review of World Energy, June 2014 / OPEC Annual Statistical Bulletin 2014.

According to the International Energy Agency (IEA), India will be the third largest energy consumer in the world by 2025, coming in after the US and China. Moreover, Indo-Russian energy cooperation is expected to get a boost in the coming years. This is because, while many countries have condemned Russia's actions in the on-going Crimea crisis, India is the only Asian power that has backed Moscow; India's policy makers are trying to promote energy cooperation based on political understanding. New Delhi feels there is a clear compatibility between India's needs and Russia's resources. Though traditionally, the Indo-Russian strategic partnership has been built around defense and civil nuclear energy, an economic component has grown in importance with both countries setting a target for US$20 bn in bilateral trade by 2015. There has already been an increase: bilateral trade between both countries in 2012 grew by over 24% to $11 bn.

Within this increase, the energy sector is an important area. However, it is nuclear cooperation that is shows even more promise. The Kudankulam Nuclear Power Project with two units of 1000 MW each is a good example. At the end of March 2014 Moscow and Delhi signed the agreement for the construction of the 3d and 4th reactors.[33] During Putin's visit to India for the 13th annual summit, a cooperative civilian nuclear energy road map was agreed on. Running until 2030, the deal will see sixteen to eighteen new reactors installed, with a capacity of 1000 MW each, at a total cost of $45 bn.

There are a number of strategic reasons why India chose Russia for a nuclear energy partner. Experts in New Delhi believe an overdependence on the US might lead to interference, and view Russia as a much more reliable strategic partner— unlike the US and its allies. India has worked to create a more multi-polar world by giving prominence to strategic coalitions like the BRICS (Brazil, Russia, India, China and South Africa) nations where Russia is a key player. Whether it is the building of additional nuclear power plant units, the laying down of pipelines from Russia to India, or ideas to jointly

[33] DebidattaAurobinda Mahapatra, Russia & India Report, January 8, 2014.

explore energy resources, Indo-Russian cooperation in the energy sector increased in 2014.[34]

Investment opportunities in Indian oil and gas fields are huge: only $16 bn has been invested in the last 15 years.[35] As Russia impresses on the West its capability to exploit multiple trade options in case of harsher sanctions, India will certainly be a viable choice. However, one of the major barriers to greater energy cooperation between India and Russia, particularly for crude oil, is the lack of infrastructure to transport the product. This is why India and Russia decided to set up a working group to explore building pipelines.

Russian-Indian Crude Oil Pipeline across China

Russia is changing its energy export policy vector as demand for hydrocarbons in both China and India continues to grow. The recent unease in both the US and Europe over Putin's March 17 annexation of Crimea has only added to Moscow's efforts to diversify its markets beyond Europe. Today, Russia and India are planning to construct a $30 bn oil pipeline through China's Xinjiang province.[36] The groundwork for the project was laid on October 21, 2013, during former Indian Prime Minister Manmohan Singh's visit to Moscow for the 14th India-Russia Annual Summit.

Political support in Russia for the Xinjiang pipeline project has increased in the wake of worsening relations with the US and EU over Crimea. The pipeline also has political support in China, since it would allow the country to become an oil transit hub in addition to its status as a recipient of Russian oil. The pipeline project will also strengthen India's intention to become a member of the Shanghai Cooperation Organization (SCO), of which Russia and China are charter members. The pipeline still faces substantial hurdles, aside from its astronomical price tag. Up to 35% of its route runs through mountainous terrain, a factor that has set back completion schedules to 2020-2022.

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[34] Jhinuk Cchowdhury, "When Energy-starved India Meets Oil-rich Russia", posted on RT on May 14, 2014

[35] Nivedita Das Kundu, Russia & India Report, October 11, 2012.

[36] Gal Luft, "Will Korea be the Next Ukraine?" The Institute for the Analysis of Global Security (IAGS).

A Gas Pipeline Connecting Russia's Sakhalin to South Korea

South Korea, much like Japan, is an energy-starved Asia-Pacific nation close enough to Russia's Far East to make stronger energy ties completely palatable. This would be especially true if Moscow were able to get the two Koreas to agree to pipelines that would deliver Russian oil and natural gas to South Korea via the north.

In a swift move to conquer another square on its geopolitical chess board, Russia recently wrote off 90% of North Korea's debt, a gesture estimated to be worth $10 bn, in exchange for Pyongyang's agreement to build a natural gas pipeline that would run from Sakhalin through North Korea to South Korea. The move would help supply South Korea, the world's second largest importer of natural gas, with 10 bcm of gas annually, potentially raising its dependence on Russian gas from 6% to 30%. While the US invests a great deal of political capital on reducing Ukraine's gas dependence on Gazprom, its key ally in Asia might soon be heading in the opposite direction.[37]

Moscow's sudden "act of generosity" toward North Korea indicates that Russia's diversification policy has kicked into higher gear. For the United States this might spell a new geopolitical setback. Keeping North Korea in a box is an important component of President Obama's Strategic Pivot in Asia-Pacific. Putin is throwing North Korea the key to the box.[38] There is also a commercial aspect. As the United States angles to become a major exporter of LNG by the end of the decade, South Korea, a country with which the United States has a free trade agreement, is seen as a prime destination. For the South Koreans, piped-gas from Russia will forever be more competitive than LNG from the United States. Russia's recent ploy could therefore pull the rug from under America's aspiring gas exporters, particularly those currently taking the multibillion dollar risk of building new LNG terminals in the US. For now, the Russia-Korea pipeline remains uncertain, much needs to happen before steel meets ground, but Russia's new bargain with North Korea sheds light on what is likely to be its next move.

Russia's Expanding Energy Cooperation with Japan

In March 2014, CEO of the Russian oil giant Rosneft Igor Sechin visited Japan, India, South Korea, and Vietnam. While in Tokyo, Sechin sought to woo Japanese investors,

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[37] Ibid

[38] John Daly, Oilprice.com *Energy Intelligence Report*, 23 April, 2014.

hinting at the potential for billions of dollars in deals between Japan and his company alone. He told Russian state media, that, "The prospects for bilateral co-operation expansion are huge," adding, "We are interested not only in attracting partners to certain projects. We are ready to look into joint investments into all the technological chain: in output, infrastructure, refining and transportation of energy." Sechin made his remarks in Tokyo even after Japan had announced that it was imposing some sanctions on Russia for its actions in the Ukraine. Russia already has fairly substantial energy ties with Japan, which are almost certain to grow in the coming years as Tokyo's needs increase, and the fact that the warming of the Arctic will ease logistical constraints. According to *Russia Today*, last year Japan was Russia's seventh largest trading partner, with bilateral trade reaching nearly $33 bn. Energy makes up a substantial portion of this trade with Rosneft alone accounting for 10%.

Vietnam, on the other hand, is also attractive to Russia for a number of reasons. Vietnam's coast is accessible from ports in eastern Russia. For this reason, Russia sees Vietnam as an attractive energy partner not only in its own right but also as a gateway for Russian exports to other Southeast Asian nations. Using Vietnam as a corridor to Southeast Asia would allow Moscow to avoid becoming overly dependent on China for its energy export needs.

Why China and Russia Make a Perfect Energy Match

As the United States pivots towards Asia, China and Russia are pushed closer together. The two countries seem like natural partners for a deal on energy supplies, with Putin telling a press conference in Shanghai in May 2014, that, "China is our reliable friend," adding "To expand co-operation with China is undoubtedly Russia's diplomatic priority."[39]

When it comes to energy, the two countries are an almost perfect match: the world's largest net energy exporter and its second largest net energy importer with a long land border. China is already Russia's largest single trading partner with bilateral trade flows of US$90 bn in 2013, and the two neighbours aim to double the volume to US$200 bn

[39] "Warmer Friendship in the Pipeline," *South China Morning Post,* 20 May, 2014

by the end of the decade.[40] Russia's political disagreements with the United States and its allies over Ukraine and China's territorial disputes in the South China seas have left both isolated, searching for friends to counterbalance Washington's network of alliances in Europe and the Pacific. It is classic balance-of-power politics: my enemy's enemy is my friend.

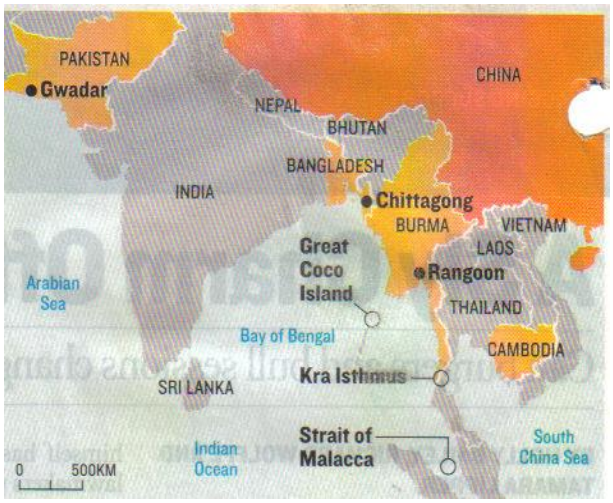
There are no real obstacles to a diplomatic rapprochement between Beijing and Moscow; no significant territorial disputes at land or sea. China's disputes are all far to the south. Moreover, the nations have a common foe in Japan, against which both are pitted in territorial disputes over the Kurile and Senkaku islands respectively, giving them an element of common interest. Both have reason to be wary of the active foreign policy of Japan's rightist prime minster Shinzo Abe's administration.

Warmer Friendship in the Pipeline

When it comes to energy, there is a clear convergence of interests. Russia needs to diversify the markets for its oil and gas; while China needs energy supplies that do not have to pass through transit choke-points like the Strait of Malacca (see Figure 4).

[40] Rakteem Katakey, "Crimea Crisis Pushes Russian Energy to China from Europe," *Bloomberg*, Mar 25, 2014.

Figure 4
The Malacca Strait



Source: Courtesy of Newsweek, March 28, 2005.

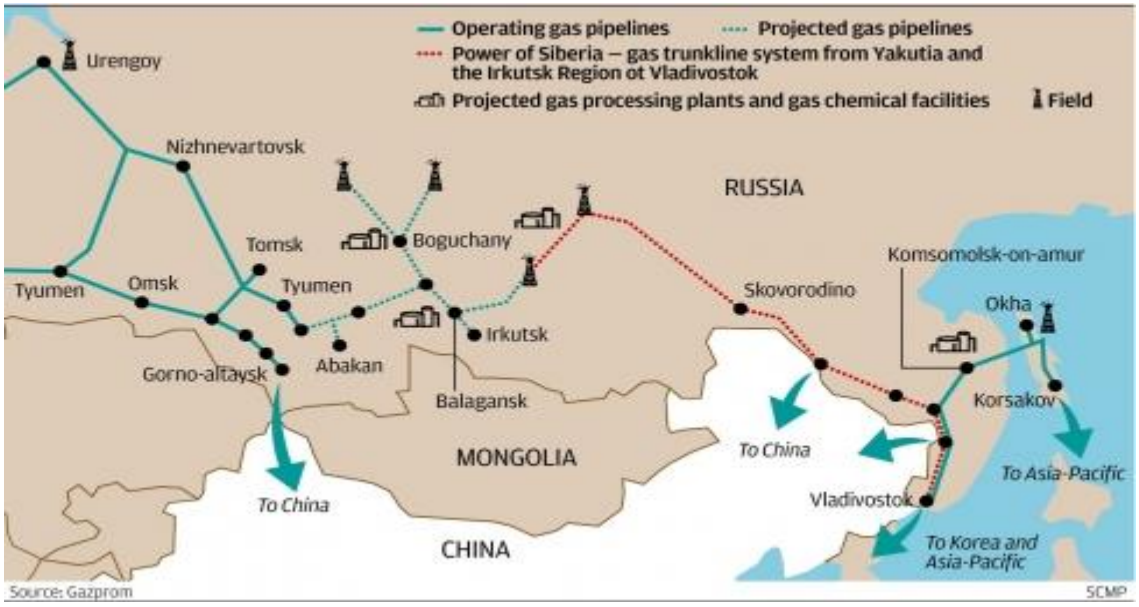
In other parts of the world including Africa, the Middle East, and Latin America, there are no significant issues on which they are on opposite sides. For the most part their interests coincide or are in different areas, which make it easy to maintain cordial relations. By contrast, there are plenty of issues on which they find themselves on the opposite side from the United States.

Even without the crisis over Ukraine, Russia has been depending too heavily on oil and gas exports to Europe, leaving it vulnerable to pricing disputes with customers, pipeline disputes with transit countries, falling European demand and shifts in European energy policy. Europe accounted for 80% of Russian oil exports in 2012, while just 18% went to Asia, according to the US Energy Information Administration. Most of Russia's gas exports went to European countries in 2012, with just 19% delivered elsewhere. Relying so heavily on customers in Europe makes no sense either strategically or commercially; just as consumers need a diverse source of suppliers, producers need the security that comes from having multiple customers.

Given Russia's strategic location between Europe and Asia, the two major energy-importing regions in the 21st century, there is a strong strategic case for it to develop a more balanced approach, increasing the proportion of oil and gas that it exports to fast-growing markets in Asia. China too has reasons to increase energy imports from Russia, especially gas. At the moment, China's economy relies heavily on domestic coal and imported oil. Coal-fired power generation is causing severe pollution and boosting greenhouse emissions, while almost all oil imports transit through the Strait of Malacca

and across the South and East China seas. China's navy cannot guarantee the sea lanes will be kept open in the event of conflict with the US and its allies. Bringing oil and gas via pipelines from Russia would strengthen China's energy security. It would cut the amount of oil and gas that must arrive along vulnerable transit routes (see Map 1).

Map 1



Whilst China and Russia have struggled for more than ten years to reach an agreement on the most important aspect of the negotiations— price— recent events have pushed both sides toward a deal. Russia badly needs to demonstrate that it has other export options while European ministers contemplate cutting gas imports. Meanwhile, China needs to develop new allies as its relations with US allies in Asia rapidly worsen. Closer relations between presidents Xi Jinping and Putin, as well as the broader strategic context, suggest the time is ripe for a gas deal.

Crimean Crisis Pushes Russian Energy to China from Europe

The Crimean crisis is poised to reshape the politics of oil by accelerating Russia's motives to send more barrels to China, leaving Europe with pricier imports and boosting US dependence on fuel from the Middle East.

China has already agreed to buy more than $350 bn worth of Russian crude in coming years, [41] and Russia's oil exports to China now represent 12% of China's crude imports.

[41] Katy Barnato, "China & Russia's Gazprom Sign Key Gas Agreement", broadcast by CNBC, 21 May, 2014.

Russia's state-owned Gazprom signed what may be described as the deal of the century on May 21, 2014, to supply gas to China.[42] Under the terms of the deal, Gazprom- the world's largest producer of natural gas – would supply 38 bcm of gas to China for 30 years under a contract valued in excess of $400 bn. On February 22 2015, there was a new landmark in Chinese-Russian relations following the signing of a $400 bn deal for the construction of a pipeline linking Russia's Siberia and north-western China that will supply 30 bcm of natural gas a year to China.

As the world's largest oil producer, Russia exported about $160 bn worth of crude, fuels, and gas-based industrial feedstock to Europe and the US in 2012 (according to the International Trade Centre's Trade Map, sponsored by the World Trade Organization and the United Nations). European members of the Paris-based International Energy Agency (IEA) imported 32% of their crude oil, fuels, and gas-based chemical feedstock from Russia in 2012. Europe will face higher gas prices if Russia successfully curtails pipeline supplies and diverts volumes to Asia, as more expensive shipments of the heating-and power-plant fuel arrive by tanker at European ports.

Impact on US Shale Production

Much has been written about the United States shale oil revolution. Some sources, like the IEA, went as far as predicting that the US would overtake Saudi Arabia and Russia to become the world's biggest oil producer by 2020, and would be energy self-sufficient by 2030.[43] Others called US oil production a game changer, prompting a new balance of power to emerge in the global oil market. Yet others claim that the world oil industry won't be the same in the wake of shale. When it comes to the economics of US shale oil development, the drilling and completion costs for a horizontal shale oil well currently range from $4 to $6 million. This relatively high cost arises from the steep first year decline rate of 70% - 90% for the wells.[44] It is certainly clear that these resources will play some role in non-OPEC supply prospects. However, the situation begs the questions: What is the potential contribution of shale oil to the future global oil supply?

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[42] The International Energy Agency's (IEA's) Annual Energy Outlook 2012.

[43] OPEC's World Oil Outlook 2012, p.122.

[44] EIA's Annual Energy Outlook 2013 Early Overview (AEO2013), released on 5 December, 2012, p.8.

Will the high development costs, and environmental impacts and challenges affect this potential? And, will it be possible to replicate the US success story globally?

Total US oil production is projected to plateau at 8.0 mbd in 2019 (see Table 12 & Figure 5). After about 2020, production is projected to begin declining gradually to 6.1 mbd by 2035 as producers develop 'sweet spots' first and then move to less productive or less profitable drilling areas.[45] Oil imports declined from 65% of consumption in 2012 to 55% in 2014 but will resume their rise in 2015 reaching 72% by 2035.

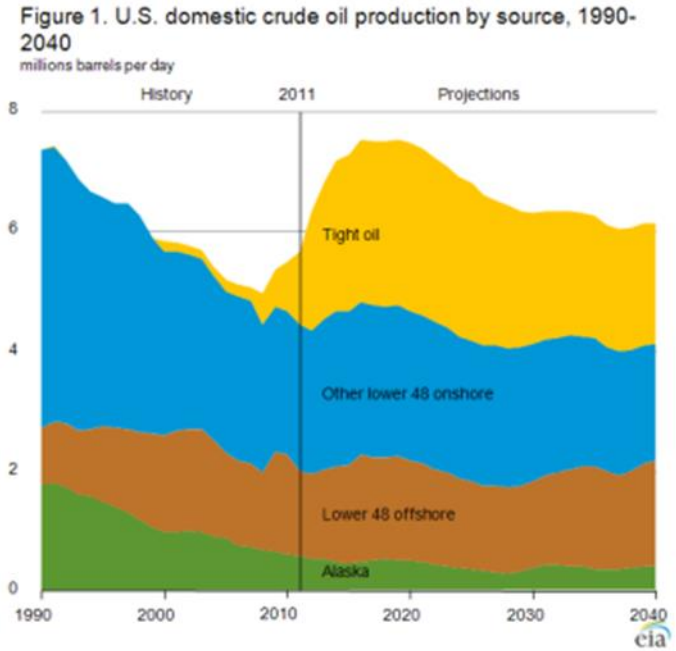
Table 12

US Current & Projected Crude Oil Production,
Consumption & Imports, 2012-2035
(mbd)

	2012	2013	2014	2015	2016	2019	2020	2025	2030	2035
Production*	**6.48**	**7.44**	**8.50**	**8.25**	**8.00**	**8.00**	**7.80**	**6.93**	**6.49**	**6.10**
Consumption	**18.54**	**18.90**	**19.00**	**19.20**	**19.39**	**19.98**	**20.18**	**20.95**	**21.47**	**22.00**
Net Imports	**12.06**	**11.46**	**10.50**	**10.95**	**11.39**	**11.98**	**12.38**	**14.02**	**14.98**	**15.90**
As a % of Consumption	**65%**	**61%**	**55%**	**57%**	**59%**	**60%**	**61%**	**67%**	**70%**	**72%**

Sources: OPEC World Oil Outlook 2014 / BP Statistical Review of World Energy, June 2014 / EIA Early Overview of Annual Energy Outlook 2013 (AEO2013) / Author's Estimates.

[45] Jeff Rubin, "When Shale Oil Won't Save You at the Pumps", *The Globe & Mail*, [Toronto], November 22, 2012.



Source: EIA, Annual Energy Outlook 2013 Early Overview

US Shale Oil Contribution to Global Oil Supplies

In 2012, US shale oil production accounted for 1% of global oil supplies. This is projected to rise to 2% in 2015 possibly reaching 3% by 2025 (see Table 13).

Table 13
World Oil Demand (2013-2040)
(mbd)

	2013	2014	2015	2016	2020	2025	2030	2040
World Oil Demand	91.33	91.10	92.30	93.43	96.90	101.30	104.80	111.10
World Oil Supply	90.00	91.50	92.60	93.40	93.20	92.23	91.68	91.50
Non-OPEC	53.17	55.00	56.60	57.60	56.00	53.90	52.38	51.40
OPEC	36.83	36.50	36.00	35.80	37.20	38.33	39.30	40.10
Demand / Supply Deficit	- 1.33	+ 0.40	+ 0.40	- 0.03	- 3.70	- 9.07	-13.12	-19.60
% Shale oil contribution								

To global demand	1%	1%	2%	2%	3%	3%	3%	2%

Source: OPEC: World Oil Outlook 2014 / IEA, World Energy Outlook 2015 / BP Statistical Review of World Energy, June 2014 / EIA, Energy Outlook.

The surge in US shale oil production over the past five years has been truly phenomenal, but the notion that it will usher in a new age of global abundance is exaggerated. One need only look at the trend in the number of rigs drilling for oil in the US — as published weekly in the benchmark Baker Hughes Survey –to see that the shale oil industry is now in severe crisis. The rig count is a leading indicator of US supply, and given the dramatic cutbacks in capital expenditure announced by shale oil operators in response to declining oil prices, it is currently one of the most closely watched indicators in world oil markets. The US rig count has been on a downward trend since peaking in early October 2014 at 1,609.As of October 2014, it was down by 821 units to 788 rigs (51%). In the historical Baker Hughes data stretching back to July 1987 there is no precedent for a drop of this severity.[46] This is significant because US shale oil has been, for the past few years, the main driver of global supply growth, which has increased from only 0.6 mbd in 2008 to reach an estimated 3.5 mbd in 2014. Without US shale oil, global crude oil output would have been lower in 2014 than it was in 2005.[47]

Based on 2015 supply data from the US Energy Information Administration's (EIA) most recent Short Term Energy Outlook, the total world crude oil supply increased by 3.5 mbd over 2005-2014, rising to 77.3 mbd from 73.8 mbd. However, after discounting out the impact of rising US oil production, the global crude oil supply actually declined by some 1m b/d over the period, to 72.6m b/d from 73.5m b/d.[48] This means the outlook for continuing growth in global crude oil output over the next few years depends crucially on the outlook for continuing growth in US shale oil production. This is a problem, as the decline rates of shale oil wells are much higher than for conventional oil wells, which means a large number of new wells must be drilled every year simply to offset natural decline. This drilling treadmill gives rise to a capex treadmill, whereby constant infusions of new capital are required to enable the drilling to continue.

[46] James Hamilton, "How Shale & Tight Oil Have Changed the Look of US Oil Production" accessed 17 December, 2012 at http:/oilprice.com/market-intelligence-report.php.

[47] IEA's Medium Term Oil Market Report 2015 as reported by Reuters on February 10, 2015.

[48] Ibid

The implications of shale oil treadmill dynamics have until now been largely overlooked by the market. Declining oil prices have prompted a sharp drop in the US rig count. However, once the impact of a dramatically lower rig count starts feeding through into shale oil supply from the middle of the year, prices should start to rally on a more sustained basis, with Brent likely to be back at $75 a barrel by year-end. The shale model simply does not work without high prices, and the market is starting respond to this reality. In a way, oil companies in the US are perpetuating the crash by continuing to drill and push up US oil production. Rather than pulling back in hopes of slowing supply to try and boost prices, drillers are instead operating at full tilt and pumping oil as fast as they can.

In part as a result of lower non-OPEC output, the IEA predicts that global demand for OPEC crude will rise in 2016 to 29.90 million mbd, after holding at 29.4 million mbd this year.[49] The IEA now expects global growth in oil demand to accelerate by 1.13 mbd in 2016 from 910,000 b/d in 2015. However, it still saw the price decline as having a marginal impact on demand growth for the rest of the decade.[50]

Can OPEC Disrupt the US Shale Oil Production Surge?

OPEC's ability to push prices lower and disrupt new emerging sources of supply is constrained by members' higher fiscal break-evens; a result of the social turmoil unleashed by the Arab Spring.[51]

OPEC members need prices at least as high if not higher than the ones that shale drillers need to sustain their businesses. Saudi Arabia needs oil prices above $100/barrel to sustain the extra spending. Other Arab Gulf producers are in a similar situation. At the same time, US shale developments need prices of $70-$85/barrel to break even, according to industry estimates. The shale boom is thus not in danger of an OPEC attack. Whether crude costs $60/barrel or twice that, the US is going ahead with shale oil production. Even if US benchmark West Texas Intermediate (WTI) oil drops 30% from the previous oil price of $100/barrel, oil companies will boost production as

[49] Ibid

[50] Javier Blas, "OPEC Unlikely to Disrupt US Shale Boom," *Financial Times*, December 12, 2012.

[51] Leonardo Maugeri, "Oil: The Next Revolution," Belfer Centre for Science & International Affairs, Harvard Kennedy School, June 2012, pp. 59-60.

new technology allows them to extract crude from shale. Saudi Arabia and other Arab Gulf producers can't afford a decline of that magnitude. US shale producers can't lose.

So will US shale oil producers frack their way into bankruptcy? That's a real possibility now. The US natural gas industry ran through the same cycle a few years before, with companies getting themselves into trouble by flooding the market with gas, crashing the price and themselves in the process. By mid-2012, the price of natural gas became too cheap to drill. The number of natural gas rigs in the field still isn't anywhere close to returning to the number of a few years earlier. However, the biggest obstacles to an expansion of US shale oil production would be a backlash against its adverse impact on the environment and rising costs of production resulting from the steep first year decline rate of 70%-90% for new wells. Without prices exceeding $90/barrel, no one would be chasing shale oil.

The Environmental Problems Looming over US Shale Oil Prices

Shale oil and gas are extracted by pumping water, sand, and chemicals into the ground at high pressure to crack rocks open, a process known as hydraulic fracturing, or "fracking." This process is increasingly perceived as contributing to water and land contamination, causing natural gas infiltration into fresh water aquifers, and even triggering earthquakes. The intensive use of water is expected to impose additional costs and could threaten the viability of projects for shale oil and gas. A shale well requires between 4 and 5 million gallons of water (15-19 million litres),[52] which may exacerbate water shortage in states where water availability is already a problem. Chemicals are also controversial, with demands for the full disclosure of chemicals used to be made public. That they may produce earthquakes is a question that should be thoroughly investigated. All of these raise questions about the future of shale oil.

Unless the oil industry develops technological solutions to minimize water use, minimize and report chemical use, and carefully monitor production sites, governments may respond with more onerous regulations that impact production.

Can the US Shale Success be Replicated Elsewhere?

US shale success cannot be easily replicated in other areas of the world – at least in a short period of time. This is due not only to the huge resource base of shale / tight oil plays existing in the US, but also to some unique features of the US oil industry and market.[53]

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[52] Ibid, p.45

[53] Ibid, p.46

First of all, individuals and companies in the United States can own property rights on mineral resources, while in most parts of the world these rights belong to states only. This gives a huge incentive to land owners to lease their property rights to the oil industry to lease or buy. In the US and Canada, the presence of thousands of independent oil companies ranging from very small to multibillion dollar has historically played a role in pioneering new high-risk and high-reward frontiers. The presence of several financial institutions, funds, capital ventures, and equity firms eager to fund independent companies, oftentimes by becoming their equity partners, also contributes to the uniqueness of the field, as does the fact that the US and Canadian hydrocarbon arena has access to broad availability and a flexible market of drilling rigs and other essential tools of exploration and production. For instance, the US and Canada have about 65% of all drilling rigs existing in the world.[54]

All these features are foreign to other parts of the world, they make the US and Canada a sort of unique place for experimentation and innovation, as in US shale oil and gas or the Canadian tar sands.

Crude oil is one of the hardest markets to predict, having so many conflicting crosscurrents that affect price. From supply and demand, to the health of the global economy, geopolitics, and the global monetary and regulatory environment, a bevy of factors contribute to the final cost of crude. One predictable factor, however, is that whenever a conflict occurs in an oil-producing country, oil prices rise. While it is possible to forecast global oil production with some degree of certainty given the production capacity of major producers and their production trends over a number of years, it is virtually impossible to forecast an accurate price of oil. The standard way to make forecasts of almost anything is to look at recent trends and assume that this trend will continue, at least for several years. The trend for global oil production trends slightly upward. However, examining the situation more closely, an unstable situation becomes apparent. The top ten oil-producing countries in the world face a variety of problems (see Table 14).

Table 14

Top Ten Crude Oil & Condensate Producers
First Quarter 2014

Rank	Country	Production (mbd)	Prospects

[54] NATIXIS Oil Review 2014.

1	Russia	10.1	Decline
2	Saudi Arabia	9.8	Decline/Unstable
3	United States	8.1	Bubble
4	China	4.2	Flat/Decline
5	Canada	3.5	Flat
6	Iraq	3.3	Unstable
7	Iran	3.3	Decline/Unstable
8	UAE	2.8	Unstable
9	Kuwait	2.7	Unstable
10	Mexico	2.5	Decline

Source: EIA.

Relatively low oil prices are part of the problem. Oil production costs are rising much faster than the selling price of oil and the gap is widening. In fact, the selling price hasn't really risen since 2011 because consumers can't afford higher oil prices amid stagnating economies (see Figure 6). A virtually flat oil price could lead to political instability in oil-producing countries particularly in the Arab Gulf region, which needs higher oil revenues to fund the social programmes that have pacified their people in the wake of the Arab Spring (such as food and fuel subsidies, water desalination and employment). Low oil prices also make the plight of oil exporters with declining production including Mexico and Venezuela, worse. Indeed, Mexico's crude oil production is projected to decline by 200,000 barrels a day (b/d) by the end of 2015.[55] Thought Venezuela may have the largest crude reserves in the world, acute economic mismanagement is preventing the country from achieving even a fraction of its energy potential. Venezuela's finances are currently being propped up by Chinese credit in return for the supply of cheap crude exports to China.[56]

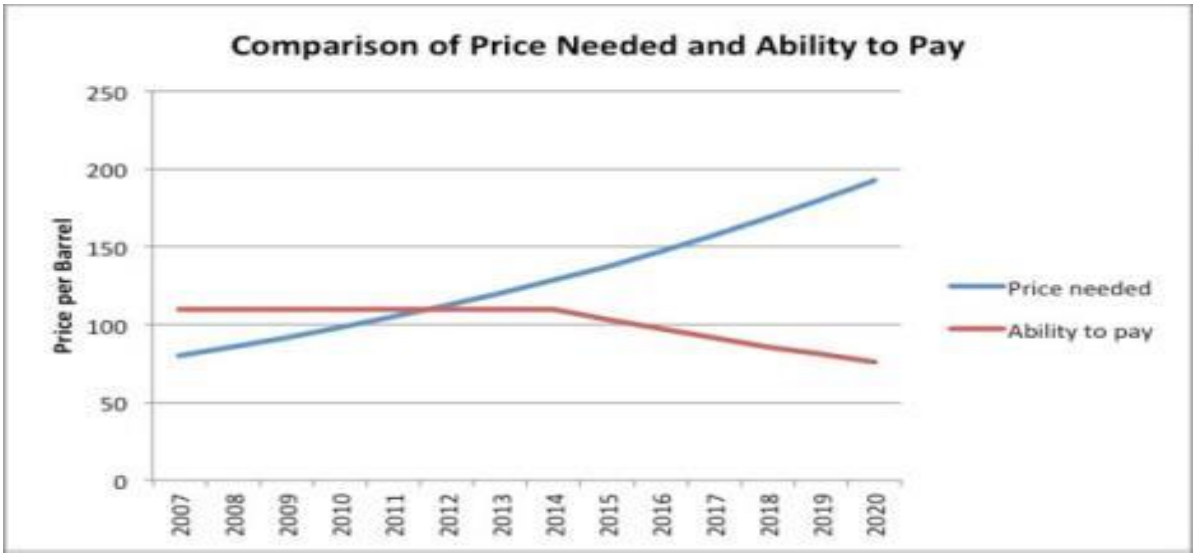
Many judge the future of oil supply by the size of remaining reserves or, alternatively, by the energy return on energy invested (EROEI). None of these are able to take into account the real limiting factor, however, which remains the health of the global economy. Reserves are plentiful and the EROEI of Middle Eastern oil is generally high. Regardless of the availability of reserves, instability could still bring a collapse of the global economy through steeply rising oil prices as witnessed in 2008. So could the

[55] Mamdouh G Salameh, "Venezuela: A Key to Future US Energy Security" (a paper published by the USAEE Working Papers Series No:14-154, 19 February, 2014).

[56] NATIXIS Oil Review 2014.

bursting of the US shale oil bubble through higher interest rates or more stringent lending rules.

Figure 6

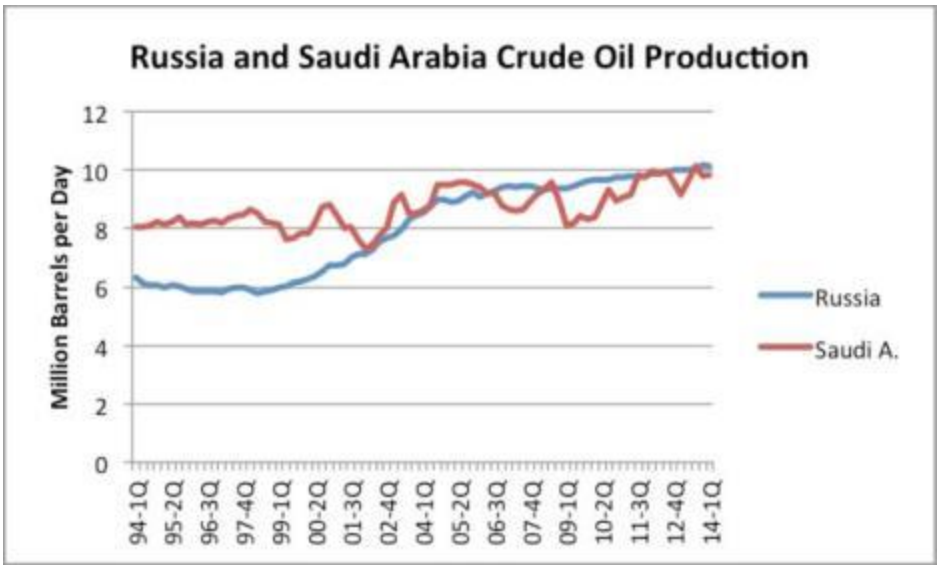


Source: Based on EIA data.

The Top Two Crude Oil Producers: Russia and Saudi Arabia

Russian oil production has been higher than Saudi Arabia's since 2006 (see Figure 7). Both nations, however, face problems ahead.

Figure 7



Source: EIA Data.

Russia's oil production has hit a peak and is projected to fall, causing financial difficulties. Russian finances are heavily dependent on energy taxes; in particular mineral extraction taxes, export duties, and excise duties on oil and oil products. Facing a possible downturn in crude output, the government is seeking a balance between higher energy taxes and fiscal incentives to encourage investment in new output.

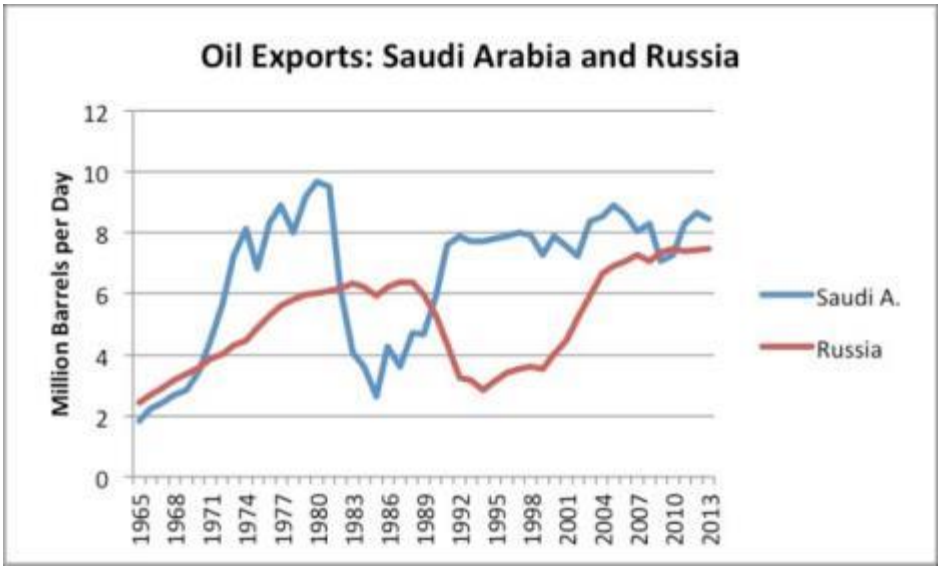
Growth in conventional output will slow before moving into reverse around 2016 as depletion rates at Russia's mature fields begin to exceed additions of new capacity. To boost crude output over the medium term, Russian energy companies must invest in unconventional oil: Arctic, shale and deep-water reserves. This will require extensive financing and the application of new technology.[57]

Saudi oil production, for its part, is quite erratic compared to that of Russia. Part of the reason for this is that Saudi Arabia prolongs the life of its oilfields by periodically relaxing (reducing) production from them. It also reacts to oil price changes. For Saudi Arabia, the tendency to manipulate oil production gives the illusion that it has spare production capacity, though this is doubtful, as Saudi Arabia has not been able to increase oil exports significantly for years (see Figure 8).

Figure 8

Comparison of Russian & Saudi Arabian Oil Exports

[57] BP Statistical Review of World Energy, June 2014, pp.8-9.



Source: EIA.

Back in the 1970s and 1980s Saudi Arabia gained a reputation for being able to increase exports at will in order to stabilize oil prices, and has since been able to rest on its laurels. Its large proven reserves (which have never been audited and are doubted by many) add to the illusion that it can produce any amount it wants. For Saudi Arabia, however, the flame of oil will not be eternal. The horizon carries signs of peak oil production, probably by 2025 if current economic, demographic and security trends continue.

In 2013, Russian oil exports of 7.48 mbd exceeded Saudi exports, showing that the world has become as dependent on Russian oil exports as on Saudis'. This fact remains little known, however.[58] The current instability in the Middle East has not yet hit Saudi Arabia, but there is increased fighting around the whole region, and Saudi Arabia is not immune to the problems of its neighbours. Indeed, there are occasional reports of a hidden uprising in the eastern part of the country.

US Shale Oil Production: A Bubble Waiting to Burst

The US is the world's third largest producer of crude and condensate. Thanks to shale/tight oil production, US production in the first quarter of 2014 rose to an

[58] NATIXIS Oil Review 2014

estimated 8 mbd. The new crude is much lighter than traditional crude; according to the *Wall Street Journal,* light and ultralight oil now accounts for almost two-thirds of US crude oil production. However, new "tight oil" production comes with problems:

1- The new oil production is so "light" that a portion of it is not usable powering cars and trucks. The very light "condensate" portion (similar to natural gas liquids) is especially a problem.

2- US oil refineries are not necessarily set up to handle a crude with so much volatile material mixed in; it tends to explode if not handled properly.

3- These very light fuels are not flexible the way heavier fuels are. With the use of "cracking" facilities, it is possible to make heavy oil into medium oil (for gasoline and diesel). Conversely, using very light oil products to make heavier oil products is a very expensive operation, requiring "gas-to-liquid" plants.

4- Because of the rising production of tight oil, the price of condensate has fallen in the last three years. If more tight oil production takes place, prices of condensate are likely to drop even further. It may then make sense to export the "condensate" portion of tight oil to other parts of the world where prices are likely to be higher. Otherwise, it will be hard to keep the price of tight oil high enough to encourage more production.

5- Tight oil production is a "bubble." The increase in US oil production since 2009 has taken place against a background of relatively high oil prices and very low interest rates. If interest rates should rise, or if oil prices should fall, the bubble will burst. Investment in US Oil E&P will remain strong as long as US oil prices remain above $85-$90/barrel.[59]

[59] Matt Mushalik, "US Will Always Remain a Crude Oil Importer," *Crude Oil Peak*, October 31, 2013.

6- Oil companies may eventually hit their borrowing limits, prohibiting the drilling of more wells to maintain production. Without US oil production, world crude oil production would have been on a plateau since 2005.

The US shale oil boom has enabled the United States to reduce its net oil imports from a peak of 12.48 mbd in 2005 to 6.27 mbd in 2013. With its oil production projected to rise to 8.25 mbd by 2015, whilst Canada's sand oil production is projected to reach 3.9 mbd in 2015 much of which will be exported to the United States.[60] Despite this, the United States will remain dependent on foreign oil imports for the foreseeable future.[61]

US oil production is one of the main reasons why global oil prices have remained relatively flat over the past several years, despite the upheavals of the Arab Spring that led to an 80%-decrease in Libyan oil production alongside other disruptions. Without the US production to stabilize the market, oil prices could have soared beyond $120/barrel. If the US shale oil boom were to continue in the next few years, it could exert further pressure on crude oil prices. This has created a sense of optimism, however, sooner or later the world will realize that shale is an industry of diminishing returns. Shale oil extraction is a very capital-intensive business that relies heavily on cheap credit to survive. Shale oil wells experience much faster decline rates than conventional oil wells, which means that energy companies must drill at a furious pace just to maintain production –a very costly proposition that is typically funded by significant debt. Oil companies should replace 40%-45% of the current production each year to maintain production. The US will need more than 9,000 wells, at a cost of more than $50 bn, to counterbalance production declines.[62]

In addition to cheap credit, shale oil production is predicated on relatively high oil prices. Were the price of oil to drop below $70-$80 per barrel, many shale energy companies would quickly fail as the industry goes bust. Ironically, this shale energy bust scenario would ultimately lead to even higher oil prices in the longer run after the world realizes that shale oil doesn't quite live up to its hype.

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[60] Steve Austin, "Shale: High Depletion Rates in Bakken," Oil-Price.Net, 4 September, 2013.

[61] Author's projections based on figures of US shale oil production since 2009.

[62] Joe Carrol, "Oil Sands at Biggest Risk from Falling Crude Price: Study,"

Bloomberg, 15 August, 2014.

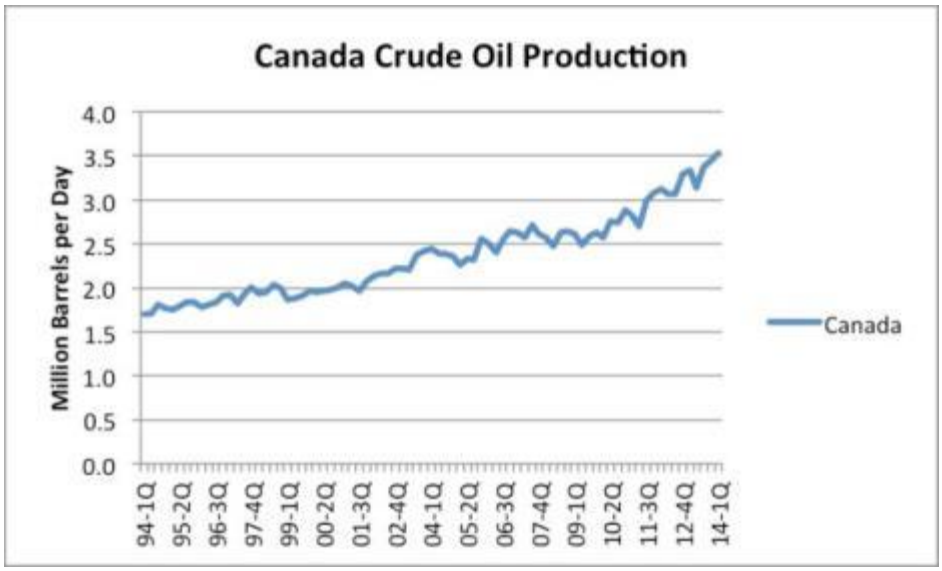
Canadian Oil Production

The other recent success story with respect to unconventional oil production is Canada, the world's fifth largest producer of crude and condensate. Canadian oil production has more than doubled since the beginning of 1994 (see Figure 9). However, falling crude oil prices are also the biggest threat to Canadian sand oil production. International oil companies operating in Canada such as ConocoPhillips, Exxon Mobile, and Royal Dutch Shell need crude oil prices as high as $150 a barrel to turn a profit from Canada's oil sands, which is one of the costliest petroleum projects in the world.[63] New oil sands projects require $60 to $100 crude to make financial sense, and returns may not be stellar compared to some other projects, though they are steady.

There are also environmental issues with respect to oil from both the oil sands and US tight oil. As the North American oil industry scrapes the bottom of the barrel, it ends up with the less environmentally desirable types of oil. This remains a problem, and one reason why production is reaching its limits.

Figure 9

[63] Tom Therramus, "Oil Price Volatility on the Way?" Oil-Price.Net, 7 October, 2013.

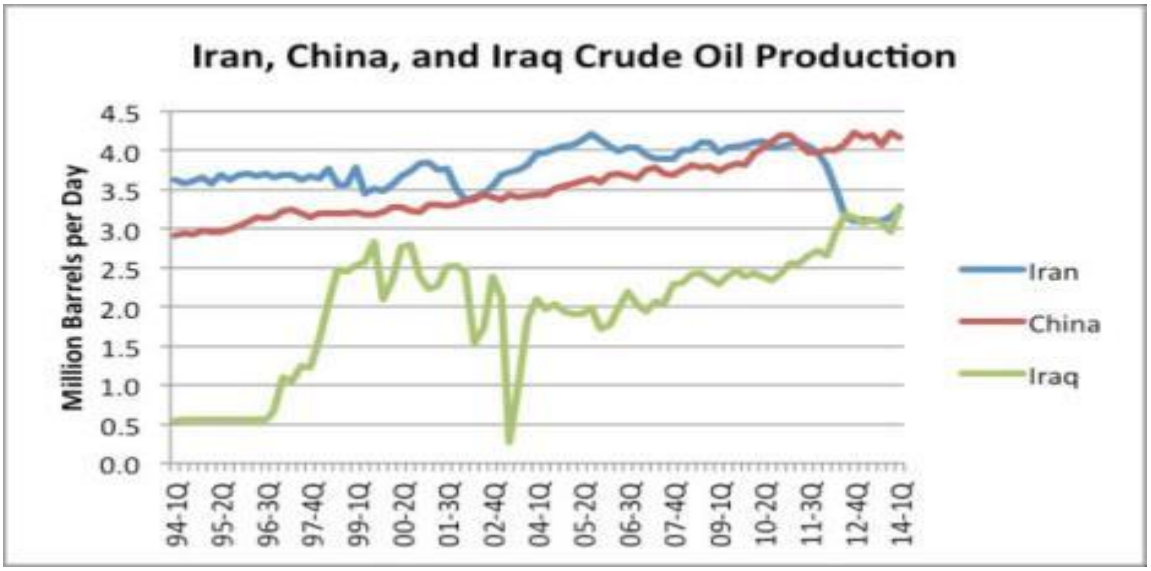


Source: EIA Data.

Oil Production in China, Iraq and Iran

In the first quarter of 2014, China was the fourth largest producer of crude oil. Iraq was sixth, and Iran was seventh. In 2010 Iran was the fourth largest producer of crude oil, but in the first quarter 2014 production was 870,000 b/d less than in 2010. If sanctions are removed, oil production could theoretically rise by one third (see Figure 10).

Figure 10



Source: EIA Data.

China's oil production is relatively more stable than Iran, but its production has been virtually flat since 2010 and it is not clear whether China will be able to maintain its current level of production. Indeed, the lack of growth in China's oil supplies may be behind its recent belligerence in dealing with Vietnam and Japan vis-à-vis the disputed islands in the South China Sea.

Thanks to improvements in oil production in Iraq and sanctions against Iran, Iraq has overtaken Iran in oil production to become the second biggest oil producer and exporter in OPEC after Saudi Arabia. However, given Iraq's current problems with an ISIS insurgency and with Kurdistan, oil production is expected to be erratic.

Forecasting Oil Price Volatility

Frequency analysis shows oil price volatility is periodic and repeats itself every 32 months. From the mid-2000s, changes in oil price were marked by a single dominant frequency that peaked at 2.8 years.[64]In a confirmation of the potential emergence of a long-term rhythmic pattern, oil price variance spiked again in April 2011, precisely 32

[64] Mamdouh G Salameh, "China's Omnipresence in the Global Oil Market" (a paper given at the 14th European Energy Conference, October 28-31, 2014, Rome, Italy).

months after the last major round of volatility had topped out in July 2008. It is coming up on 30 months since the now largely forgotten market turbulence of mid-2011. If oil price volatility is oscillating in a repeating two-to-three-year cycle, another wave of instability in oil prices would be expected in 2014, which is precisely what happened in September of that year.

Winners and Losers: China

While the steep decline in crude oil prices has adversely impacted the global economy, global investments, the world oil industry, and the economies of the oil producers around the world, one oil importer is benefiting from the low prices: China.

This benefit can't be sustained, however, since low oil prices hurt the global economy of which China is a major part. If low oil prices continue, any benefits will eventually be offset by a further slowdown in the global economy, which will, ultimately affect Chinese economic growth and exports. A continuation of low oil prices leaves no winners, only losers. This does not change the fact that the single most important driver of shifting dynamics in world oil markets is China. It alone will continue to account for most of the world demand growth throughout this decade and probably the next. In 2013, China overtook the United States to become the world's largest importer of crude oil (according to the US Energy Information Administration's (EIA) August 2013 Short-term Energy outlook) (see figure11).

Figure 11

Net Oil Imports for China & the United States

(mbd)

Source: Courtesy of EIA Short-term Outlook, August 2013.

In order to satisfy its thirst for oil, China has aggressively used its financial reserves to offer billions in development credit, underwritten with oil, especially in Africa, Latin America, and even Russia. From an energy security point of view, one of the biggest threats to maintaining a stable oil price in the long run will be satisfying the growth in Chinese demand, since this is what will exert pressure on oil prices in the future.[65]

China's steeply-rising oil demand, its search for new sources of oil and its acquisition of oil assets around the world will ultimately give the nation the final say on the oil price globally. It is the new factor in global politics and economics. The much-heralded advent of China as the other superpower is now a reality. On issue after issue, China has become the second most important country on the planet. Since 2007, China has been contributing more to global growth than the United States, the first time another country had done so since the 1930s. It has also become the world's largest consumer, eclipsing the United States in food, primary energy, and industrial commodities. China's economy stood at $9.24 trillion in 2013 in market exchange rates.[66] It is the second largest economy in the world after the United States. However, based on a purchasing

[65] IMF Global Economic Outlook database, 2014.

[66] Mamdouh G Salameh, "The Changing Oil Fundamentals: Impact on the Global Oil Market & Energy Security" (a paper given at the ECSSR 17th Annual Conference, November 1-2, 2011, Abu Dhabi, UAE).

power parity (PPP) used by the World Bank and the IMF, China's GDP will overtake the United States' in 2014 to become the biggest economy in the world by 2020 using market exchange rates. China's real GDP is projected to increase by 5.7% annually between 2011 and 2035.[67]

The global oil market is at a crossroads. Current global trends in oil supply and demand are patently unsustainable environmentally, economically, and socially. It is no exaggeration to claim that the future of global economic growth and, indeed, the future of human prosperity depend on how successfully the two central challenges of today are handled: oil supply security, and the pace at which we develop alternatives to oil. Cumulative investment of more than $13 trillion is needed between now and 2030 in oil exploration and expansion of production capacity worldwide,[68]and the projected increase in global oil production hinges on adequate and timely investment. Some 64 mbd of additional capacity –the equivalent of almost seven times the current Saudi oil production– needs to be brought on stream between now and 2030. This figure makes allowance for the annual oil production depletion.

On the supply side, conventional oil supplies are depleting as evidenced by a major drive into the exploitation of high-cost deep-water oil reserves and unconventional oil resources such as shale/tight oil and Canada's oil sands. So what are the potential solutions? Managing both oil supply and demand is not a short-term game. However, the key buyer, China, with the greatest demand growth and the biggest user, the United States, seem to have been reading from different scripts. China is taking a long-term view, making massive investments in both conventional and renewable energy to meet its burgeoning demand while at the same time aiming to improve energy efficiency. With a GDP growth of 7.4% in 2014, this seems the only real option. In the future, China may have to outbid the rest of the world for oil supplies, forcing up oil prices as a result.

The oil markets remain in the horns of a dilemma. The global economy needs a price of oil around $100/barrel. However, it seems that the only way demand can be restrained is by prices far greater than $100/barrel and the present disarray in OPEC suggests that will be the case. The pressure on the price of oil will continue unabated due to the growing global demand and dwindling proven oil reserves. Although a steeply-rising price will restrain demand for a short time, the price will resume its surge in the absence of new supplies. The global economy will still need oil to function normally no matter what the oil price is, albeit at a reduced economic growth rate.

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[67] *Petroleum Review*, July 2011, p.2

[68] BP Statistical Review of World Energy, June 2014, pp. 8-9.

China's Oil Fundamentals

The single most important driver of the shifting dynamics in world oil markets remains China, having been in the past, and certainly into the future, directly and indirectly responsible for driving global production gains.

China's spectacular economic growth has significantly altered its position in the global oil market. In 2013, China accounted for more than 12% of global oil consumption compared to 5% in 1996, whilst its share of global production only amounted to 4.8%.[69] Since it became a net oil importer in 1993, China has greatly increased its oil imports from 20,000 b/d then to 7.30 mbd in 2014, accounting for 63% of consumption, which is projected to rise to 76% by 2020 and 84% by 2030 (see Table 15).

Table 15

China's Crude Oil Production, Consumption & Imports
(mbd)

	2011	2012	2013	2014	2015	2020	2025	2030	2035
Production	4.07	4.16	4.18	4.20	4.20	4.00	3.80	3.60	3.40
Demand	9.87	10.37	10.76	11.50	12.30	15.70	19.10	22.14	25.05
Net Imports	5.80	6.21	6.58	7.30	8.10	11.70	15.30	18.54	21.65
Imports as % of demand	59	60	61	63	66	76	80	84	86

Sources: BP Statistical Review of World Energy, June 2014 / OPEC World Oil Output 2013 / OPEC Annual Statistical Bulletin 2014 / Wood Mackenzie Forecasts as reported by the Financial Times on 21 August, 2013.

This rise in consumption and in oil imports is the result of several factors, including rapid GDP growth of about 9%-10% a year over the past two decades, urbanization, improving standard of living, and a sharp increase in the number of vehicles on the country's roads (projected to rise from 60 million in 2010 to 130 million in 2020).[70] Another factor is the building of strategic petroleum reserves (SPR) with the intention of

[69] Mamdouh G Salameh, "China's Global Oil Diplomacy: Benign or Hostile?" (A paper presented at the 31st IAEE International Conference, June 18-20, 2008, Istanbul, Turkey).

[70] According to the International Energy Agency (IEA) as reported by *Bloomberg* News on 14 May, 2013.

stockpiling 50 days' imports or 500 mb by 2015, and 90 days' imports or 1053 mb by 2020.[71] Oil imports already account for 63% of total demand, and Chinese production is projected to decline from 4.20 mbd in 2014 to 3.40 mbd by 2035. By 2020, more than 76% of its oil demand will have to be imported rising to a projected 86% by 2035.

Wood Mackenzie has stated that China is on track to spend $500 bn a year on crude oil imports by 2020, exceeding the peak in US oil import bill of $335 bn. Analysts at the Edinburgh-based consultancy, one of the most respected analysts of the oil market, said Chinese net oil imports would rise to 9.2 mbd by 2020.[72] That is significantly higher than the 8 mbd of net imports forecast by the IEA in its world energy outlook late last year, or by the EIA in its annual energy outlook in April. Though Wood Mackenzie factors in fuel efficiency measures, it expects the number of cars in China to grow so much that it will overwhelm efficiency measures. Wood Mackenzie expects the Chinese economy to grow by almost 8% a year in the decade to 2020, compared with the IEA's scenario of 7% growth.

The Oil Price

From an energy security point of view, one of the biggest threats to maintaining a stable oil price in the long run will be satisfying growth in Chinese demand. That is what will exert pressure on prices. It is helpful to the extent that Chinese companies are investing in additional production capacity.

China needs to work very hard to secure enough oil to fuel its economy. Most global demand growth will be Chinese, and as such, it will drive global prices. China will continue securing supplies through oil-for-cash development projects and investments, a model it has successfully implemented for decades. As much as China has driven demand, it has also stimulated –directly or indirectly— huge investments in production throughout the world. Even when its companies are not involved, China's demand will continue driving investments throughout 2020 and beyond.

The global economy can at most sustain oil prices that represent just about 6% of GDP translating into $130 a barrel of Brent crude in 2012, $138 by 2015, $157 by 2020 and $239 by 2035 (see Table 16).

Table 16

[71] IEA, EIA and other projections.

[72] Andreas Cala & Michael J. Economides, "America's Blind Spot," Continuum International Publishing Group, p. 89.

The Link between Global GDP, Oil Demand & Maximum Sustainable Oil Prices

	2012	2015	2020	2025	2035
Global GDP (US $ trillion)	71.83	77.20	92.44	110.70	158.74
Maximum 6% of GDP on oil expenditure	4.28	4.60	5.51	6.60	9.46
Global Oil Demand (mbd)	89.93	91.80	96.30	100.70	108.50
Sustainable oil price (US$)	130	138	157	180	239

Sources: IMF World Economic Database 2012 / OPEC: World Oil Outlook 2013 / IEA, World Energy Outlook 2014 / BP Statistical Review of World Energy, June 2014 / EIA, Energy Outlook 2014 /Author's projections.
*Author's estimates of GDP growth during 2012-2035 based on an annual rate of 2.5%.

Looking to the future, global demand will outstrip supply during most of this decade (see Table 17). In the latest IEA medium term forecast to 2016, geopolitics and increasing demand couple to reduce spare capacity. Prices will be between $15 and $20 per barrel higher through 2016.

Table 17

World Oil Demand & Supply, 2013-2040
(mbd)

	2013	**2014**	**2015**	**2016**	**2020**	**2025**	**2030**	**2040**
World Oil Demand	91.33	91.10	92.30	93.43	96.90	101.30	104.80	111.10
World Oil Supply	90.00	91.50	92.60	93.40	93.20	92.23	91.68	91.50
Non-OPEC	53.17	55.00	56.60	57.60	56.00	53.90	52.38	51.40
OPEC	36.83	36.50	36.00	35.80	37.20	38.33	39.30	40.10
Demand / Supply Deficit	- 1.33	+ 0.40	+ 0.40	- 0.03	- 3.70	- 9.07	-13.12	-19.60

Source: OPEC: World Oil Outlook 2014 / IEA, World Energy Outlook 2014 / BP Statistical Review of World Energy, June 2014 / Author's projections.

The world's spare capacity is a good barometer. While non-OPEC producers are currently producing at full capacity, OPEC's spare capacity (the world's capacity) continued to shrink as a result of steeply rising domestic consumption particularly in the Arab Gulf countries and slow additions to capacity. Global spare capacity this decade will thus remain strained even while the oil industry runs at full steam. Even with huge additions in the Middle East, Canada, and Brazil. The fact that most of the global output

growth for the remainder of the decade is expected to come from Canadian oil sands, Brazilian, and Angolan deep-water offshore rigs, American shale/tight oil, and Venezuelan heavy oil, all of which are unconventional or cost significantly more to produce, augur a more bullish future for oil prices.

China's Oil Diversification Policy

China's diversification strategy is to limit its oil dependence on the Middle East, and it has aggressively used its financial reserves to offer billions in development credit, underwritten with oil, especially in Africa, Latin America, and even Russia. Chinese oil demand is already a challenge to US energy security, not in terms of securing volumes, but in terms of prices. Examples abound. Consider China's courtship of Canada. The Chinese oil company, Sinopec, has acquired a 40% stake in Synenco Energy's $4.5 bn Northern Lights Oil Sands project with projected output of 100,000 b/d, while CNOOC has acquired 16.9% stake in MEG Energy Corporation, which operates the Christina Lake project, near Fort McMurray.[73]

In Latin America, China secured long-term commodity supply deals while slowly taking up positions in production of everything from copper and coal, to oil. Around 90% of China's $45 bn invested so far in Latin America, with billions more already agreed, has gone to the commodities sector, mainly oil. Beijing offered cash-for-oil swaps in Venezuela, Brazil, Ecuador, and several more countries. Billions of loans were signed, underwritten with long-term oil supplies. Brazil and Venezuela received $40 bn combined. The money was critical and did not affect debt levels, as oil was the exchange currency.[74] China's presence in Latin America has aroused great concern and anxiety. In fact, China's interest in Latin America is not to challenge US dominance in the region, its "back-yard," but to promote economic cooperation with the continent. Naturally, as a region with large markets and an abundance of resources, Latin America is highly economically complementary with China. The most significant deals have been in Brazil. Early in 2011, Sinopec bought a 40% stake in the integrated Brazilian operations of Repsol, the Spanish oil major. Months later, Sinopec also bought a 30% stake in the Brazilian unit of Portuguese oil company Galp. China's Sinochem also agreed to buy a 40% stake in a Brazilian offshore oil field operated by StatoilHydro. China has become Brazil's largest export destination, primarily raw commodities – crude oil, iron ore and soybeans. Brazil's exports to China in the first seven months in 2011 totalled $24.4 bn, a 46% rise over 2010.[75]

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[73] Ibid., pp.144-145.

[74] Ibid., pp. 145-146.

[75] As reported by the Associated Press (AP), 5 November 2009, quoting sources at the Iraqi Oil Ministry.

China is now the biggest importer of Saudi oil, the second-biggest of Iranian oil, and the largest player in the Iraqi oil game. China's national oil company, CNPC, shares equally with BP the contract to develop Iraq's biggest oilfield, Rumaila, located in the country's south, with estimated proven reserves of 17.8 bb. This is the biggest contract signed by the Iraqi government so far.[76] China is putting a lot of money on the bet that having ownership of oilfields is a better guarantee of supply than buying oil on the open market.[77]

Chinese activity in Africa is also increasing at an exponential rate. According to the China-Africa Business Council, China is now Africa's third most important trading partner behind the United States and France. In 1999 the value of China's trade with Africa was $2 bn; by 2005 this grew to $39.7 bn. Sources at the Chinese Ministry of Commerce predict that trade volume between China and Africa could top $100 bn by the end of the decade.[78] Of particular interest to the US and the EU is China's growing expansion into Africa's oil markets. It should be pointed out that although oil is a major and obvious source of Chinese interest in Africa, it is far from being the only one. China is actively seeking resources of every kind: copper, bauxite, uranium, aluminium, iron ore, and manganese, among others.[79] Partly as a result of China's interest in Africa – particularly in African oil – the continent's annual growth rate has increased to 4.5%.

In Russia and the Balkans, China is equally active. In Kazakhstan, China is looking to secure more Kazakh oil supplies, having built an oil pipeline (nicknamed the 'new silk road') that brings crude oil from central Kazakhstan to its Xinjiang province. China has already agreed to buy almost a trillion dollar worth of Russian oil and gas supplies over the next thirty years. Its crude imports from Russia now represent 12% of its total.

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[76] Babak Dehghanpisheh, "China's Middle East Oil Lust," *Newsweek*, May 17, 2010, p. 8.

[77] Mamdouh G Salameh, "China's Global Oil Diplomacy: Benign or Hostile?"

[78] David Zweig, "The Foreign Policy of a Resource-Hungry State," Hong Kong University of Science & Technology.

[79] Christopher Pala, "China Pays Dearly for Oil & Goodwill in Kazakhstan," *Petroleum Review*, July 2006, pp. 22-23.

Measures of Managing the Financial & Oil Crisis in the Arab Gulf

In times of steeply declining oil prices, governments will have to reduce expenditure to cope with the reduction in revenues. This risks creating volatile situations, and warrants a great deal of caution. The following points should be taken into account:

1- Any cut in expenditure should not adversely affect the public, particularly in the reams of education, health and other public services.

2- To avoid drastic cuts in expenditure, the government could plug a temporary reduction in oil revenue by accessing resources from a pre-established sovereign fund.

3- It is inevitable that the price of oil will rebound, so any cuts in government expenditures should be temporary and not drastic.

Governments' strategy in coping with the declines in oil revenue should be based on both short- and long-term measures. For example:

1-Short-term measures

1- A reduction in government expenditure.

2-Reducing impact of a straight expenditure cuts by accessing a sovereign fund equivalent to the loss of oil export revenues.

3- Prioritizing future project investments. Projects already started could continue. Future projects that can wait should be paused or delayed.

4- Duties can be raised on refined products such as gasoline and diesel. This will go a long way to help offset the decline in oil export revenues and enhance the use of public transport with an added environmental benefit. It will also help enhance oil exports and prolong the life of oil.

5- Governments could alternatively eliminate subsidies on gasoline, electricity, and water over a period of five years. The savings could be used to implement programmes that help improve the standard of living without the wastefulness of subsidies.

2- Long-term measures

1- Diversification by GCC countries. Acting as a unit the GCC states could invest in Sudan's food production. Sudan could become not only the bread-basket for the GCC countries but will also provide them with revenue from the export of excess production.

2- Intensive investment in renewable energy (particularly solar and nuclear energy) for both electricity generation and water desalination; this will save oil and gas resources for export.

3- Converting all electricity generation and water desalination from oil into natural gas as a first step to be converted to solar energy at a later stage.

A Global Strategy to Manage the Oil Crisis and Declining Oil Prices?

The key to a management strategy is global economic growth. When the global economy is growing, it can absorb oil supplies so the issue of glut does not arise. When global economic growth shows signs of slowing down, however, the issue of glut becomes important and oil prices start to decline.

Unfortunately, in such a situation oil producers around the world instinctively try to cut each other in order to protect and, if possible, expand their market shares (as Saudi Arabia did when it cut the prices of its oil supplies to the United States and the Asia-Pacific region). This exacerbates the glut and all of them end up losers.

A global strategy to allocate market share to each producer according to production capacity will not work. While OPEC might be able to coordinate production cuts with Russia, Mexico and Brazil, the US and Canada would never agree.

Conclusions

A continuation of low oil prices could damage the global economy and inflict sustained damage on the global oil industry as well as the economies of the oil-producing countries. Moreover, low oil prices could plant the seeds of a severe oil crisis in 2-3 years' time. The Arab Gulf oil producers will be vulnerable to declines in the price of oil as long as they continue to be heavily dependent on oil export revenues. In addition to their vulnerability to price volatility, the greatest threat to oil-state economies comes from steeply rising domestic oil consumption. Subsidies costing billions of dollars are a major factor in this rise in consumption.

Diversification and the ultimate removal of subsidies are, therefore, the way forward for the Arab Gulf countries. The global economy can't reconcile itself with low oil prices for long, since it will quickly undermine a global economy (including global investments, the oil industry and the economies of the oil-producing countries). This is why oil prices will soon start to recover, reaching $70-$75/barrel by the second half of this year and recouping all their previous losses by 2016/2017.

Bibliography

Association for the Study of Peak Oil and Gas, Newsletter #62, February 2006.

Austin, Steve, "Shale: High Depletion Rates in Bakken," *Oil-Price.Net*, 4 September, 2013.

Barnato, Katy, "China and Russia's Gazprom Sign Key Gas Agreement", *CNBC,* broadcast 21 May, 2014.

Blas, Javier, "OPEC Unlikely to Disrupt US Shale Boom," *Financial Times*, December 12, 2012.

Bousso, Ron and Dmitry Zhdannikov, "Price Fall Hastens Decline of Big Oil as Western Majors Retreat," *Reuters*, 9 October, 2014.

BP, *Statistical Review of World Energy*, June 2014.

Cala, Andres, and Michael J. Economides, *America's blind spot: Chavez, oil, and U.S. security*. New York, NY: Continuum, 2012.

Carrol, Joe, "Oil Sands at Biggest Risk from Falling Crude Price: Study says," *Worldoil.com*, August 17, 2014.

Chowdhury, Jhinuk, "When Energy-starved India Meets Oil-rich Russia," *Russia Today*, May 14, 2014.

Crooks, Ed and Barney Jopson. "US OIL Veteran Rejects Saudi Shale Claims," *Financial Times*, 15 May 2015.

Crooks, Ed and Gregory Mayer, "Crude's Plunge Fuels Jump in US Petrol Demand," *Financial Times*, 16 January, 2015.

Daly, John, "Energy Intelligence Report," *Oilprice.com,* 23 April, 2014.

Das Kundu, Nivedita. "Energy cooperation between India and Russia: Policy and approach," *Russia and India Report*, October 11, 2012.

Dehghanpisheh, Babak, "China's Middle East Oil Lust," *Newsweek*, May 17, 2010.

Hamilton, James, "How Shale and Tight Oil Have Changed the Look of US Oil Production," *Oilprice.com*, 12 July, 2012.

Hassantash, Seyed Gholam Hosein, "Naimi in Yamani's Attire; Are Authorities in Riyadh Witless or Lying? History is being Repeated," *IAEE Energy Forum*, 1st Quarter of 2015.

International Energy Agency. *Annual Energy Outlook*, 2012.

International Monetary Fund, Global Economic Outlook Database 2014. http://www.imf.org/external/pubs/ft/weo/2014/02/weodata/index.aspx

Kajehpour, Bijan, "Iran takes steps to reduce economic risk of falling oil prices," *Iran Pulse*, November, 2014.

Katakey, Rakteem,"Crimea Crisis Pushes Russian Energy to China From Europe," *Bloomberg*, March 25, 2014.

Luft, Gal, "Will Korea be the Next Ukraine?," *Journal of Energy Security,* April 24, 2014

Mahapatra, Debidatta Aurobinda, "India-Russia cooperation set to rise in 2014," *Russia and India Report*, January 8, 2014.

Maugeri, Leonardo, "Oil: The Next Revolution," Belfer Centre for Science and International Affairs, Harvard Kennedy School, June 2012.

Mirzayev, Elvin, "Sanctions and Oil Prices Bring the Russian Economy Near Collapse," January 21, 2015.

Mouawad, Jad, "An Excess of Problems for Iranian Energy" *Herald Tribune Business*, 12 February, 2007.

Mushalik, Matt, "US Will Always Remain a Crude Oil Importer," *Crude Oil Peak*, October 31, 2013.

NATIXIS, *Oil Review 2014*, February 18, 2015

OPEC, *World Oil Outlook*, 2012

Pala, Christopher, "China Pays Dearly for Oil and Goodwill in Kazakhstan," Petroleum Review, July 2006.

Rubin, Jeff, "When Shale Oil Won't Save You at the Pumps", *The Globe and Mail*, November 22, 2012.

Said, Summer and Benoit Faucon, "Oil-Drop Pain Spreads to Saudi Arabia's Behemoth," *Wall Street*, February 19, 2015.

Salameh, Mamdouh G, "The Changing Oil Fundamentals: Impact on the Global Oil Market and Energy Security" (paper given at the ECSSR 17th Annual Conference, November 1-2, 2011, Abu Dhabi, UAE).

--- "China's Global Oil Diplomacy: Benign or Hostile?"(paper presented at the 31st IAEE International Conference, June 18-20, 2008, Istanbul, Turkey).

--- "China's Omnipresence in the Global Oil Market" (paper given at the 14th European Energy Conference, October 28-31, 2014, Rome, Italy).

--- "Impact of US Shale Oil Revolution on the Global Oil Market, the Price of Oil and Peak Oil" (paper given at a Symposium of Peak Oil, 2-4 April, 2013, Doha, Qatar).

--- "Iran May Need Nuclear Power to Improve Its Oil Outlook" (paper given at the 27th North American Conference, 16-19 September, 2007, Houston, Texas, USA).

--- "Oil and Iran Nuclear Programme," USAEE Working Paper No: 09-036, December, 2012.

--- "Oil and Iran Nuclear Programme: Impact on Oil Prices and the Global Oil Market" (presentation given at the Energy Workshop organized by the Arab Centre for Research and Policy Studies, 11 April, 2015, Doha, Qatar).

--- "Turning the Gaze Towards Asia: Russia's Grand Strategy to Neutralize Western Sanctions" USAEE Working Paper No: 14-168, July, 2014.

--- "Venezuela: A Key to Future US Energy Security," USAEE Working Papers Series No: 14-154, February, 2014.

Saudi Gazette. "Saudi Aramco Restructured," May 2, 2015.

Schenk, Christopher J., "An Estimate of Undiscovered Conventional Oil and Gas Resources of the World, 2012," *US Geological Survey Fact Sheet,* 2012.

South China Morning Post "Warmer Friendship in the Pipeline," 20 May, 2014

Therramus, Tom, "Oil Price Volatility on the Way?" *OilPrice.Net*, 7 October, 2013.

US Department of Energy (DOE): Independent Statistics and Analysis 2013.

US Energy Information Administration (EIA) data, July 24, 2014.

US Energy Information Administration, *Annual Energy Outlook 2013 Early Overview* (AEO2013), 5 December, 2012.

Voice of Russia "Russia outdoes the West in terms of nuclear cooperation with India," 26 March, 2014

Williams, Selina and Justin Scheck, "North Sea Region Is Hot as Oil's Tumble Persists," *Wall Street Journal*, January 16-18, 2015.

Zweig, David, "The Foreign Policy of a Resource-Hungry State," *Foreign Affairs*, 84(5), 2005.