Rehabilitation and Expansion of Iran's Oil Sector in the Post-Nuclear Deal Era: Programs, Problems and Uncertainties*

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Abstract

In the post-nuclear deal scenario, Iran has reformulated the terms of the oil contract model, called the Iran Petroleum Contract (IPC), to attract international investments and technology in field development. In addition, it has ramped up production and competitively priced its oil to Asia and Europe so as to recapture the market share lost during the sanctions period. Any further enhancement of production capacity, however, requires expansion of green fields and resuscitation of brown fields under the IPC. The success of this effort will depend upon Iran's domestic political stability as much as the international environment, where sanctions are held in abeyance and oil prices continue to rise to a level that unlocks the investment capital of the big oil companies. Nonetheless, in a scenario of increasing global commitment to adopt green energy, whether oil companies would still want to make long-term investments in large hydrocarbon projects in general, remains an open question.

Key Words

Iranian Nuclear Deal, International Sanctions, Post-Sanctions Dynamics, Iranian Oil Sector, Foreign Investment Scenario, Iran Petroleum Contract, Changing Global Energy.

Introduction

With an estimated 158 billion barrels of proven crude oil reserves, representing almost 10 % of the world's crude oil reserves, Iran's return to the global energy scene in the post-nuclear deal era is a big prize for oil companies and an event with long-term consequences for the global energy market. On 14 July 2015, the P5+1 (China, France, Russia, the United Kingdom, the United States, and Germany), the European Union (EU), and Iran concluded the Joint Comprehensive Plan of Action (JCPOA) or the nuclear deal, to ensure that Iran's nuclear program would be entirely peaceful. Under the JCPOA, Iran accepted curbs on its nuclear program in return for broad relief from international sanctions

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against its energy sector. Amidst the plethora of sanctions imposed on the Islamic Republic, an important distinction between the multilateral sanctions imposed by the United Nations Security Council (UNSC) and unilateral sanctions imposed primarily by the US and the EU is immediately discernable. While the UNSC sanction resolutions targeted individuals and organizations associated with Iran's nuclear or ballistic missile programs, sanctions levied by the US and the EU tightened restrictions on Iran's critical oil industry.

Energy-related sanctions emanating from US laws and executive orders placed prohibitions on a third-country (other than the US and Iran) that do business with Iran. Known as secondary sanctions for their 'extra-territorial' effect, these restricted the scope of financial transactions, international investments, and technology transfer vis-à-vis Iran's petroleum industry. Several provisions of the other energy-related sanctions made the export of Iranian oil difficult by placing restrictions on how much a country could import and how payment for such an import could be made.

One of the earliest energy-related sanctions on Iran was the Iran-Libya Sanctions Act of 1996, now known as the Iran Sanctions Act (ISA). It authorized sanctions on US and non-US businesses investing more than US$ 20 million a year in Iran's energy projects. Once the contentions over the Iranian nuclear program intensified, the US administration imposed several new secondary sanctions that have had a severe impact on Iran's energy sector. For instance, the Comprehensive Iran Sanctions, Accountability, and Divestment Act (CISADA), 2010, along with reaffirming the provision of the ISA, expanded the definition of investment to include pipelines to or through Iran as well as contracts that would lead to the construction, upgrading or expansion of energy projects.

An important Congressional measure aimed at restricting Iran's oil sales, which account for 80 % of the country's income, was Section 1245 of the National Defence Authorization Act (NDAA), 2012. It authorized

sanctions, such as denial of access to the US financial markets, on foreign banks that conduct oil-related transactions with the Central Bank of Iran, Bank Markazi.[1]

One of the earliest energy-related sanctions on Iran was the Iran-Libya Sanctions Act of 1996, now known as the Iran Sanctions Act (ISA). It authorized sanctions on US and non-US businesses investing more than US$ 20 million a year in Iran's energy projects.

The NDAA, 2013, included provisions that forced countries buying Iranian crude to use only the banks within their own borders to make payments. With this regulation, the consumers' banks were debarred from transferring that money to any bank overseas- in effect, compelling Tehran to buy local products, except precious metals, with the local currency from its crude sales.

Besides the above key legislations, sanctions on Iran were also imposed through executive orders. Executive Order 13608 of 1 May 2012 made violation of US economic sanctions against Iran or Syria a basis for the imposition of a range of sanctions, short of an asset freeze. In addition, Executive Order 13622 of 30 July 2012, replicated the banking sanctions available under the NDAA to cover a bank's transactions with the National Iranian Oil Company (NIOC) or its subsidiaries. Further, the Iran Threat Reduction and Syria Human Rights Act (ITRSHRA), enacted on 10 August 2012, forbids underwriting and insurance services for entities owned or controlled by the government of Iran.[2]

Pursuant to the European Council report on Iran's nuclear programme, in January 2012, the EU outlawed the import of Iranian crude into its zone. A measure that had an extraterritorial impact was the EU's ban on insurance and reinsurance to oil shipments from Iran. It was intended to deter a third country from importing Iranian oil.[3] A new set of sanctions in October 2012 prohibited all transactions between European and Iranian banks, hampering the Islamic Republic's oil transactions in Euros. Having already locked Iran out of transactions in dollars, this move was meant to make it more difficult for the Persian Gulf country to receive payments for its oil sales.

At the conclusion of the JCPOA, secondary sanctions imposed on Iran in the context of the nuclear dispute were suspended. The deal also included the waiver and eventual repeal of most sanctions imposed under the ISA. On 16 January 2016, the IAEA certified

that Iran was compliant with all the nuclear-related obligations agreed in the JCPOA, giving a legal bearing to sanctions relief and providing a much-needed lifeline for the recovery of Iran's oil sector. However, most primary sanctions related to the US domestic trade embargo are still effective. US companies and banks are barred from any operation in Iran or with an Iranian entity in any other country.

With most energy-related sanctions under suspension in the post-deal scenario, Iranian authorities have developed a three-pronged program to rebuild and revive Iran's oil production and export potential. These include:

1. Identifying and prioritizing oilfields requiring recovery and development in order to increase production capacity.
2. Reformulating the oil contract model to attract foreign investment, technology, and expertise. For this, the Iranian government approved the new, investor-friendly Iran Petroleum Contract (IPC) to replace the buyback contracts.
3. Regaining global market share in crude oil export lost due to sanctions so as to maximize sales and revenue.

This paper argues that Iran's oil industry cannot reach its full potential without foreign investment and, more significantly, Western technological expertise, to recover its production capacity. In this situation, the removal of energy-related sanctions has improved the investment climate in Iran and raised investors' confidence. Further, the IPC provides a well-founded opening for Western oil companies to establish business in the Iranian oil industry and can be considered the first step towards the creation of conditions favorable to international investment. Such investments will further depend on Iran's internal challenges to attract investment. Equally, the continued existence of primary American sanctions will have a bearing on oil trade, transfer of technology and smooth operation of the foreign banks. Above all, investment will depend on how oil prices shape up in the near future.

This paper argues that Iran's oil industry cannot reach its full potential without foreign investment and, more significantly, Western technological expertise, to recover its production capacity.

Iran's long-term ability to defend its market share will also be contingent on investment in new capacities that

is not only subject to the appeal of the magnitude of the resource, but also the complex dynamics arising out of national and international politics. With tougher constraints on carbon emissions, Iran, among other oil producers, would face the impact of the global efforts to move away from fossil fuels to renewable energy.

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Identification and Prioritization of Oilfields for Development/Recovery

With an experience of more than a century in oil exploration and production, Iran's oilfields are in various stages of development. There are 102 oilfields and 205 oil reservoirs,[4] of which at least 15 are supergiant fields, containing more than 10 billion barrels of oil.[5] Several brown fields in Iran, producing for more than 50 years, have reached a production plateau or moved to a phase of declining production and, therefore, require advanced technical procedures such as enhanced oil recovery (EOR) for revival.

Given the local companies' lack of financing capacity and limited access to the best technology of the international oil companies (IOCs), mature fields have suffered a high natural decline rate of 8-13 % and low recovery rate of around 20-30 %.[6] In addition, fields discovered in the past 20 years, or earlier, have not been developed or only partially developed, primarily for the same reasons. Both brown and green fields, if restored or developed to their best capacities, can substantially add to Iran's production volumes in the coming years.

Iran also has cross-border or shared oilfields in both the brown and green field categories, whose reservoirs cross national boundaries. It shares at least 15 such onshore or offshore oilfields with Kuwait, Iraq, Qatar, the UAE, and Saudi Arabia (Tables 1a and 1b). According to the Managing Director of the NIOC, Ali Kardor, the Iranian oil industry requires a US$ 100 billion investment in the upstream sector during the period of the sixth five-year development plan (2016-2021) for optimal productivity in the coming years.[7]

Iran's Ministry of Petroleum has drawn up a list of upstream oil projects, central to its efforts to boost the country's oil production in the days ahead. The website of the NIOC[8] identifies 30 oilfields for development under the IPC framework, while the website of the Middle East Economic Survey (MEES) lists 28 oilfields.[9] There is also a discrepancy in the names of the fields: Some fields included by the NIOC do not appear on the MEES' list and vice-versa. Further, the list of MEES is more specific about the phases of the field proposed for development. This work considers both the lists for data as represented in Tables 1a and 1b.

The selected oilfields will be made available through the tendering process under the IPC. Indicating that not every foreign company active in the oil industry can participate in Iranian oil tenders, the NIOC in early January 2017 released a list of 29 foreign firms that pre-qualified to participate in the upcoming first bidding round for 11 oil and gas contracts.[10] According to the NIOC, shared fields and brown fields in need of EOR, are priorities in the oil sector rehabilitation program.[11]

Iran has lagged behind in the development of shared oil fields as compared to its neighbours, raising the fear of resource depletion. Experts say if one side "continues to develop the border-straddling resources at a slower pace than its neighbors…it risks losing significant reserves, as the remaining oil and gas in a reservoir naturally move towards the more exploited side."[12] For instance, Iran shares a large number of oilfields with Iraq given the long border between the two neighbors. Iraq has made great strides in the development of shared fields that now account for 50 % of its production increase over the past seven years.[13] Iranian officials have spoken of plans to increase production at the country's shared fields with Iraq to as high as 700,000 barrels per day (bpd) by March 2019 from the average 225,000 bpd output in July 2016.[14] That goal requires an inflow of capital and advanced oil field technology envisaged under the new contract model.

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A Government Accountability Office Report of the US government sums up the state of Iran's oilfields and their requirements as such:

Table 1a: List of Green Fields Identified for Development under the IPC

Cross-border Fields			Exclusive Fields		
Name of the Field	*Offshore/ Onshore*	*Year of the first production*	*Name of the Field*	*Offshore/ Onshore*	*Year of the first production*
Arash (shared with Kuwait)	Offshore	Yet to begin	**Band-e-Karkheh**	Onshore	Yet to begin
South Pars Oil layer Ph 1 (shared with Qatar)	Offshore	Yet to begin	**Jofayr**	Onshore	Yet to begin
Esfandiar Ph 1 (shared with Saudi Arabia)	Offshore	Yet to begin	**Sepehr**	Onshore	Yet to begin
Changuleh (shared with Iraq)	Onshore	Yet to begin	**Susangerd**	Onshore	Yet to begin
North Azadegan Ph2 (shared with Iraq)	Onshore	Yet to begin	**Zagheh**	Onshore	Yet to begin
South Azadegan Ph1 (shared with Iraq)	Onshore	2008	**Sumar**	Onshore	2012
Arvand (shared with Iraq)	Onshore	Yet to begin	**Darquain Ph 3**	Onshore	2002
Sohrab (shared with Iraq)	Offshore	2012	---	---	---
Yadavaran Ph2 (shared with Iraq)	Onshore	Yet to begin	---	---	---
Aban Ph2 (shared with Iraq)	Onshore	2010	---	---	---

Source: NIOC at http://en.nioc.ir/; *Foundation for Defence of Democracies* (Washington, D.C.), at http://www.defenddemocracy.org/map/ (last visited 8 September 2016).

Iran particularly needs technological assistance to increase the level of oil production in fields where oil reserves have declined over time …Iran requires increasingly modern and advanced oil recovery technologies in order

Table 1b: List of Brown Fields Identified for Development under the IPC

Cross-border Fields			Exclusive Fields		
Name of the Field	*Offshore/ Onshore*	*Year of the first production*	*Name of the Field*	*Offshore/ Onshore*	*Year of the first production*
Dehloran Ph 2 (shared with Iraq)	Onshore	1978	**Danan Ph 2**	Onshore	1993
Foroozan (shared with Saudi Arabia)	Offshore	1974	**Mansuri Ph2**	Onshore	1974
Naft Shahr (shared with Iraq)	Onshore	1947	**Ahvaz**	Onshore	1961
West Paydar (shared with Iraq)	Onshore	1995	**Abuzar**	Offshore	1976
Salman (shared with UAE)	Offshore	1968	**Chashmeh Khosh**	Onshore	1977
---	---	---	**Dalpari**	Onshore	1999
---	---	---	**Reshadat**	Offshore	1968
---	---	---	**Doroud**	Offshore	1965
---	---	---	**Norouz**	Offshore	1967
---	---	---	**Paydar**	Onshore	Unknown
---	---	---	**Ab-Teymur**	Onshore	1967
---	---	---	**Soroosh**	Offshore	Unknown
---	---	---	**Resalat**	Offshore	1968

Source: NIOC, http://en.nioc.ir/; *Foundation for Defence of Democracies* (Washington, D.C.) at http://www.defenddemocracy.org/map/ (last visited 8 September 2016).

to stop natural declines of oil production but has found advanced technology difficult to import due to international sanctions and high costs. As a result, Iran depends upon older methods to maintain oil recovery from its mature oil fields, such as injecting massive quantities of natural gas into oil reservoirs…

> Due to lack of investment, the natural decline of oil reserves and other factors [sanctions, for instance], Iran has been unable to continue producing oil at its peak level of over 5 million barrels per day since 1978.[15]

Iran Petroleum Contract

The IPC outlines the basic structure of all future petroleum contracts in Iran, replacing the 'buyback model' introduced in the 1990s. The latter was so unpopular with the IOCs that it dissuaded them from the Iranian market even before US and EU sanctions firmed up in 2012. A comparison between the general terms and conditions of the buyback contracts and the IPC reveal the vastly improved terms and conditions of the new model.

Operator and Operation of the Field

The buyback model was a short-term service contract concluded between the NIOC or its subsidiary and an IOC or foreign investor. As the operator of the field, the IOC invested capital and expertise during the exploration and development phases of the project, but at the onset of commercial production or after the completion of an agreed 'scope of work', the field went back to the Iranian partner .[16] In many instances, the NIOC could not provide minimum standards for field operation and decline set in rather quickly.

On the contrary, the IPC requires the establishment of a joint venture company (JVC) between one or more IOCs and an Iranian entity, where the latter would hold majority stakes.[17] The NIOC has pre-qualified ten Iranian entities who can serve as joint venture partners.[18] The joint venture, as the contractor under the IPC, is not only involved in exploration and development but also the production phases of a project. This modification "aims to rectify issues with field decline rates by including the IOC in the production and recovery phases while optimizing technology and knowledge transfers"[19] in order to develop "fully functional stand-alone entities that can operate fields both domestically and internationally."[20]

Capital Cost Recovery, Term of Contract and Remuneration

The buyback contract usually set out a ceiling on the capital cost that could be recovered by the foreign investor based on that estimated before the development of the project. There was little flexibility to deal with unanticipated costs, such as those caused by force majeure events or events beyond the control of the foreign investor.[21]

The buyback contract usually set out a ceiling on the capital cost that could be recovered by the foreign investor based on that estimated before the development of the project.

In addition, the term of the contract for both the development phase (2-4 years) and the production phase (5-10 years) was very short, placing a potential limitation on full cost recovery. There was also no provision to allow recovery of costs after the end of the contract term.

Further, the investor could only partake up to a maximum of 50 % of the revenue generated from production to recover its capital costs and receive the remuneration fee. In some contracts, the NIOC adjusted the remuneration fee downwards, if the production from the field dropped rapidly or did not match the estimated production mentioned in the master plan.

In contrast, the IPC does not fix a ceiling on cost recovery. Instead, it will be structured through the "annual work program and budget" approved by a joint venture development committee (JDC) made up of representatives from the partner companies. This is a critical change, as the fixed cost recovery model "meant that cost for projects going above budget couldn't be recovered, thus eroding profitability."[22]

The contract term under the IPC will be significantly longer. These terms are expected to be as follows: (i) an exploration and appraisal period (four years with a potential two-year extension) and (ii) a development and production period (20 years plus a likely five-year extension for EOR).[23] By allowing the contracts to last for 20-25 years, the IPC will present foreign firms with greater certainty and increase the prospect for cost recovery, accompanied by an assured return on investment. Capital costs incurred prior to production are amortized over a period of five to seven years from the date of the first production.

As with the buyback contract, the contractor is only entitled to a maximum of 50 percent of revenues generated from total production to recover costs. The remuneration fee would be a fee per barrel of oil produced, which in turn will depend on the applicable 'R factor' (the ratio of cumulative revenue to cumulative costs) and production rates. The remuneration fee can be adjusted based on the market price that may be the average annual export oil price from Iran.[24] In other words, the investors would be entitled to larger profits in case of oil price rises. The remuneration fee will also be linked

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to the complexity of each field. For example, EOR projects and brown field development will be rewarded with a higher rate of remuneration as compared to reservoirs with relatively simple geology and less arduous operating conditions.[25]

Local Content Requirement and Transfer of Technology

In the IPC, the foreign investor is "obliged to maximize the utilization of the technical, engineering, manufacturing, industrial and operational capabilities of the country" in accordance with the 'Maximization Law' of 2012.[26] The said law requires that at least 51 % of the value of the contract, excluding the value of any immovable property, must be allocated to the works performed by domestic manufacturers inside Iran.[27]

Local content requirements, increasingly a common feature of oil and gas regimes in the region, were a part of the buyback contract and are retained in the IPC. Although local content requirements range from 51 to 90 %, it is likely that the local content figure would more frequently be on the higher side, given the NIOC's requirements that IOCs deploy the latest field development technology.[28] However, given the fact that modern E&P [exploration and production] companies employ copyrighted technology, it is unclear how technology transfer will actually take place in practice.[29]

Resolution of Disputes

Any dispute arising under the IPC will be "resolved by an escalation dispute resolution clause which provides for arbitration as the final resolution method (which was also the case under the buyback structure)."[30] The parties select by mutual agreement an arbitral institution with a seat in Iran and applying Iranian law. It could either be the Arbitration Centre of the Iran Chamber of Commerce or the Tehran Regional Arbitration Centre.[31] Many IOCs may not feel comfortable with arbitration inside Iran and perhaps prefer international arbitration.

Types of Contracts

Three basic types of contracts are envisaged in the IPC: i) a contract involving exploration, development, and production or Exploration Terms; ii) a contract to develop existing fields or Development Terms; and iii) a contract for improved oil recovery at existing fields or Enhanced Oil Recovery Terms.[32] Given Iran's desire to increase production rapidly, the NIOC is more focused on deals based on Development Terms and EOR Terms. This approach is also advantageous for the IOCs, as securing investment for exploration deals in the contemporary low oil price environment can be daunting.[33]

IOCs' Interest in Oilfields under the IPC

Several IOCs have signed agreements with the NIOC to conduct field studies in advance, and have an edge in the bidding process. By November 2016, Iran had signed nine confidentiality agreements with France's Total, Indonesia's Pertamina, Russia's Lukoil, Gazprom Neft, Zarubezhneft and Tatneft, Austria's OMV, Germany's Wintershall, Poland's Polish Oil & Gas Company (PGNiG), and Norway's DNO ASA. The agreements grant access to confidential material and information about the fields to the companies, who, in turn, are obliged to present the results to the NIOC. A majority of the oilfields picked up for the study were the NIOC's priority fields, that is, those shared fields with Iraq, including South Azadegan (Total), Changuleh (DNO ASA and Gazprom), Dehloran (Tatneft), and West Paydar and Aban (Zarubezhneft).

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Restoring the Market Share

Since the lifting of sanctions on Iran in January 2016, Iran has been aiming to boost production and recover buyers lost to Saudi Arabia and Russia after the US and EU tightened sanctions on oil sales in 2012. Iran has been aiming to increase the volume of its crude oil production to its pre-sanctions level of 3.74 million bpd, and escalate it above 4 million bpd to boost exports.

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and the Organization of Petroleum Exporting Countries (OPEC), Iran was able to ramp up production to 3.56 million bpd in May 2016- a rate last reached in November 2011 (Table 2), before the sanctions were tightened.[34] Since then, Iran's crude oil production steadily rose to 3.69 million bpd in October 2016, exceeding the pre-sanctions level (Tables 2 & 3). On the export front, sales that dropped from about 2.10 million bpd in 2011 to almost 1.22 million bpd in 2013, soared to 2.3 million bpd by April 2016, led by strong gains in Asia and Europe.[35]

From January 2016, when sanctions were lifted, to May 2016, Iran's crude oil exports steadily rose from 1.5 million bpd to 2.6 million bpd, almost tripling from November 2015 (Table 4). Notably, the September exports of 2.8 million bpd were the most since mid-2011.[36] The additional supplies from Iran balanced supply disruptions from the fire in Canada's oil sands, a series of attacks on Nigerian oil facilities, power outages and inclement weather in the Basra Gulf (Iraq), sabotage along the Kirkuk-Ceyhan pipeline, and political unrest in Libya in the first half of 2016. Disruptions tied to political disputes or conflicts accounted for nearly 90 percent of unplanned disruptions for the first five months in 2016,[37] while unplanned global oil supply disruptions averaged more than 3.6 million bpd in May 2016 alone. [38]

Table 2: Iran's Crude Oil Production and Export (2011-2016) (million bpd)

Year	Production	Export
2011	3.58	2.54
2012	3.74	2.10
2013	3.58	1.22
2014	3.12	1.11
2015	3.15	1.08
2016 (May)	3.56*	2.3**

Source: OPEC Statistical Bulletin, 2015;

* OPEC Monthly Oil Market Report, August 2016

** "Iran's May Oil Exports Set to Surge Nearly 60 Percent from A Year Ago: Source", Reuters, 18 May 2016.

Table 3: Iran's Crude Oil Production (June-October 2016) (million bpd)

Month (2016)	Jun	Jul	Aug	Sept	Oct
Production	3.62	3.62	3.65	3.66	3.69

Source: OPEC Monthly Oil Market Reports, August 2016, September 2016, October 2016, and November 2016.

Table 4: Iran's Crude Oil Exports (November 2015-May 2016) (million bpd)

Month	Nov 2015	Dec 2015	Jan 2016	Feb 2016	Mar 2016	Apr 2016	May 2016
Export	0.9	1.1	1.5	1.5	1.9	2.3	2.6

Source: "Iran's Oil Exports have Tripled Since Late 2015", CNN Money, 16 July 2016.

Iran's export strategy to recapture the lost market share has been two-pronged: First, Tehran targeted traditional and voracious energy consumers in Asia, where sales agreements are already in place; and, secondly, it introduced aggressive pricing vis-à-vis other crudes in the market to lock in buyers.

Exports to Asia

Iran's export to China, India, Japan and South Korea went up by a huge margin from January 2016. Overall exports to Asia were 1.7 million bpd out of the total of 2.3 million bpd in April 2016, which was about a third higher than a year before and the highest since 2011.[39] The four major buyers in Asia bought 61.1 percent more oil in July 2016, in what was a whopping year-on-year increase, and marked the biggest percentage gain since April 2014. Between January-July 2016, the four

Iran's export to China, India, Japan and South Korea went up by a huge margin from January 2016. Overall exports to Asia were 1.7 million bpd out of the total of 2.3 million bpd in April 2016, which was about a third higher than a year before and the highest since 2011.

Asian consumers bought 33.2 percent more oil than during the same period in 2015.[40] Iran continued to gain, as export to four major buyers in Asia more than doubled from a year earlier in October 2016. The two largest buyers, India and China, bought nearly 800,000 bpd each. On the whole, the big four in Asia imported 1.99 million bpd in the same month, up 147.9 % year-on-year.[41]

Iran's biggest customer, China, imported nearly 840,000 bpd in April 2016 and 619,300 bpd in May.[42] However, the January-July 2016 period recorded an average import of 595,518 bpd, a year-on-year increase of 1.4 percent, underscoring the fact that China had continued to buy crude from Iran despite the sanctions.[43] China's purchase from Iran surged to 773,860 bpd in October 2016, a year-on-year increase of 128.8 %.[44] During the signing of a long-term MoU on oil cooperation in Tehran in May 2016, Deputy Administrator of China's National Energy Administration Zhang Yuqing emphasized his country's willingness to purchase 50 percent of Iran's oil exports.[45]

Iran's exports to India climbed from 190,000 bpd in January 2016 to 506,000 bpd in March of the same year, overtaking Nigeria as the third-largest oil exporter to the country. India's state-owned and private refiners together agreed to buy at least 400,000 bpd of Iranian oil starting the fiscal year that began on 1 April 2016, which brought the Iranian overseas sales above its short-term target.[46] India shipped in 523,100 bpd of Iranian oil in July 2016, nearly 143 % more than the 215,400 bpd imported a year before. For the first seven months of 2016, India imported about 368,300 bpd of oil from Iran, up 71 % from the same period the previous year.[47] Iran overtook its regional rival Saudi Arabia in oil supply to India, exporting over 789,000 bpd in October 2016 surpassing the Saudi supply of 697,000 bpd. However, over the January-October period, Saudi Arabia remained India's overall top supplier, Iraq was second and Iran came in third.[48]

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Similarly, oil exports to Japan surged by 32.1 % in October 2016, as compared year-on-year to October 2015. The first ten months of 2016 saw Japan take in 224,166 bpd of oil which accounted for a 31.8 % rise over 170,093 bpd in the

same time period in 2015. Iran became Japan's fourth largest oil supplier, behind Saudi Arabia, the United Arab Emirates, and Qatar. As the fifth-largest crude oil importer from Iran, South Korean oil imports registered a 124.8 % year-on-year jump between January-October 2016, as compared to the same period in 2015, touching 278,882 bpd from a mere 124,036 bpd. If Korea's October 2016 import is compared to the same month in 2015, oil intake from Iran increased by 73.2 %. [49]

Competitive Pricing

Determined to regain its market share, Iran priced its crude competitively in relation to Saudi and other crudes, especially for the European markets. Tehran had been unable to sell crude to the European region when the EU imposed sanctions over its nuclear program in July 2012, completely depriving it of a market that accounted for one-third of its exports, and making it dependent on limited shipment to Asian buyers. However, while the Asian buyers retained their right to buy Iranian oil, they progressively reduced their purchases to avoid US third-party sanctions and the difficulties in oil trade due to EU sanctions on insuring tankers carrying Iranian oil. Therefore, competition for market share with rival suppliers has been less intense in Asia, which retained the right to purchase Iranian oil during the period covered by sanctions.

Iran resumed its crude exports to the EU in February 2016 after a four-year (since mid- 2012) hiatus, amidst intense competition from Russia, Saudi Arabia, and Iraq- the traditional suppliers- not counting the US, which started exporting crude in 2015.[50] In the initial months of the lifting of sanctions, issues related to insurance and banking compounded problems for Iranian oil shipment. International shipping companies found it difficult to secure insurance and reinsurance cover to transport oil from Iran due mainly to some US financial restrictions on Tehran that continued to forbid any trade in dollars or the involvement of US firms, including banks and reinsurers.[51] International shipping of Iranian oil resumed when the International Group of Protection and Indemnity (P&I) Club- which represents the world's top 13 ship insurers- raised the reinsurance cover from US$ 80 million to US$ 580 million per tanker as 'fallback' protection for the missing US reinsurance cover.[52]

Again, the prohibition on US banks and financial institutions from providing "credit, deposit, collection, clearing, and payment services" to Iranian entities[53] has been a major obstacle to oil trade since sanctions were lifted. Nonetheless, the NIOC's willingness to accept barter

deals such as swap exports of crude oil for imports of refined fuel, along with some transactions in Euros and other currencies eased the situation on the payment front.[54] The continuous rise in Iran's sale of oil since January 2016 suggests that the country managed to overcome the tanker shortage that threatened to derail attempts to recapture the market.[55]

Iran moved swiftly to reclaim its European customers, securing new sales agreements with big international oil traders such as Swiss-based Vitol and Glencore, besides energy majors, such as Repsol of Spain.[56] Between January-March, 2016, Tehran sold 14 million barrels of crude oil to European countries. France's Total bought 11 million barrels, while Spain's Cepsa and Russia's Litasco purchased 2 million and 1 million barrels of crude oil respectively.[57] Growing imports into the Netherlands, France, Turkey, Spain, and Greece showed the arrival of Iranian crude grades into the European market. These countries imported about 330,000 bpd in April, 355,000 bpd in May, and close to 450,000 bpd in June 2016- steadily approaching the 800,000 bpd volume of pre-2012.[58]

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Iran's NIOC offered deep cuts on oil prices for the European and Asian regions, as compared to other crudes in the battle to corner the largest market share. In one of the deepest cuts, Iranian officials announced that Iran Heavy, one of the country's main export grades, would cost US$ 1.25 a barrel less than Saudi Arabia's most similar crude in March 2016 for the European region. With Iran's heavy crude selling at US$ 5.15 a barrel, Saudi comparable Arab Medium grade sold at US$ 6.40 a barrel. In Asia, the NIOC's offer at US$ 2.60 a barrel below the average of Oman and Dubai grades for March in the same year set the crude at a discount of 20 cents a barrel to comparable Arab Medium from Saudi Arabia.[59]

By September 2016, Iran had regained its pre-sanctions market share in Europe and Asia, signifying the return of the Iranian economy into the global market.[60] In a noteworthy development, while OPEC members at the Vienna meeting on 30 November 2016, agreed to drop oil production to shore up falling prices, Iran negotiated an exemption citing losses during sanctions. According to the Vienna Agreement, Tehran's reference

production quota- the base against which production cuts are measured- has been set at just below 4 million bpd, which is effectively the pre-sanctions level.

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Iran will try to defend market share and increase output, as oil prices gain on cuts. However, the Islamic Republic may have reached its production limits, and to boost capacity after producing 3.7 million bpd will require investment in oil field development- a process requiring drilling and reservoir rehabilitation.[61]

Problems Facing Foreign Investment in the Iranian Oil Sector

Iran's ability to attract foreign investment in the oil sector will depend on a host of external and internal factors. US restrictions on trade with Iran, together with sanctions on the Iranian Revolutionary Guard (IRG), pose several difficulties for international firms to operate comfortably in the Iranian energy market. The Islamic Republic's internal drawbacks relate to the lack of a regulatory framework for commercial transactions, bureaucratic difficulties, corruption risk, and issues with the IPC's terms.

US Domestic Trade Restrictions

US companies and financial institutions "continue to be broadly prohibited from engaging in transactions or dealings with Iran or its government."[62] Although secondary sanctions have been suspended, European banks and companies that also operate in the United States, are concerned that they could still be subject to trade restrictions under the primary sanctions, unless and until they can completely separate the European and American divisions of their business. Further, US domestic trade restrictions debar most transactions with Iran in US dollars – the world's prime business currency and currency of choice in the global oil market. Iranian banks have been severely constrained by the dollar embargo to process international money transfers and finance trade. Since the nuclear deal, Iran has also faced difficulties in repatriating billions of dollars of its oil revenues that were frozen in foreign accounts.[63]

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Sanctions on the IRG

The IRG is subjected to two types of sanctions:

- First, according to US laws, the IRG is a Specially Designated National (SDN), meaning that US persons are prohibited from engaging in any transactions or dealings with the organization. Furthermore, non-US persons are restricted from providing 'significant' support to the IRG under the Iran Freedom and Counter-proliferation Act, which authorizes secondary sanctions against persons that provide significant support to SDNs.
- Secondly, the Iran Threat Reduction and Syria Human Rights Act, authorizes secondary sanctions against non-US persons who materially assist or support, or engage in significant transactions with, the IRG or its designated officials, agents, or affiliates.[64]

Washington in a clarification note stated that US statutory sanctions focused on Iran's support for terrorism, human rights abuses, and missile activities will remain in effect and these will be enforced against certain members and actions of the IRG.[65] Given the IRG's overweening influence in several sectors of the petroleum industry, sanctions will complicate the process of import of US-origin machines, equipment, and technology.[66]

Precarious Investment Climate

One of the most fundamental issues in the business climate of any country is the provision of suitable legal conditions to firms and companies. International law firms are not allowed to operate in Iran and the domestic law firms are too small to handle cases involving a large investment. While Iran is open for business, foreign businesses will need qualified legal service for the security of investments.[67]

Another issue is Tehran's damaged financial sector. Iranian banks face several economic challenges, including a large number of non-performing loans and weak central bank liquidity. An obvious lack of transparency on financial support for military operations abroad has complicated financial disclosure and due diligence process of the banks. The Iranian regime's

willingness to facilitate money-laundering schemes is another factor discouraging overseas investment, as is the absence of a unified exchange rate that is often manipulated by powerful interests.

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International companies also fear being impeded by the notorious maze of Iranian bureaucracy and high risk of corruption. In the World Bank's Ease of Doing Business Index (2016), Iran ranks 120th out of 183 countries,[68] and 130th out of 168 countries in Transparency International's Corruption Perceptions Index (2016),[69] undesirable markers for a country trying to attract major investment for economic development. Since governmental control of the economy is pervasive- from public services, investment, resources, to subsidy, and food rationing- the bureaucracy has become extremely unwieldy. Setting up a business not only involves monumental paperwork and going from one office to another but also small extra payments to civil servants at every level to speed up the process.[70] Ahmad Tavakoli, an Iranian conservative politician, anti-corruption activist, and member of Majlis (Iranian Parliament), has warned that the perceived corruption in Iranian society could even lead to the downfall of the political establishment.[71]

Problems with IPC Terms

The background of sanctions and the constant threat of them being re-imposed make the IPC less attractive than what it could have been. The IPC does not contain a 'release clause', whereby foreign operators could withdraw from their contractual obligations should Iran once again become the target of international sanctions. Further, foreign companies must partner with local companies from a pre-selected list. This implies that the foreign investors are not free to choose the most profitable and proficient local entity suited to their requirements. In the arrangement for profit sharing under the IPC, the local Iranian partner being the majority stakeholder in the JVC would be potentially entitled to higher profits than the foreign company, notwithstanding the latter's critical inputs such as technology and know-how into the project.

Investment may not start flowing into Iran just because the contractual terms have been improved. Many other energy-rich states from Mexico,

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Russia, and Saudi Arabia to the US are offering attractive terms to foreign participants, and have a more stable political environment to ensure the security of investments than that in Iran. Russia and the US even have a particularly attractive open market for ownership of resources.[72]

Uncertain Future

Iran's oil sector faces an uncertain future due to at least three factors. First, a low oil price environment since June 2014 has meant that IOCs have put long-term capital investment on hold. While firming up of prices from $46 per barrel to $51 per barrel following the Vienna Agreement implies that projects of several large oil companies could be approved in the near future, US shale producers would easily supply the market, undermining the OPEC's capacity to boost prices.

Secondly, investors are apprehensive of the internal Iranian tension between reformists and hardliners, the latter supported by the IRG that has significant business interests in the petroleum sector and is averse to competition from Western investors. Therefore, the hardliners in conjunction with the IRG have depicted the new model as sell-out of Iran' resources cheaply to the West. This has already stalled the implementation of the IPC for more than a year, making investors wary of the incessant delays stemming from political squabbles in the country.

Thirdly, like other oil producers, Iran is vulnerable to the rapid development of renewable sources of energy. Nations are committing themselves to global climate change agreements, which call for limiting greenhouse gas emissions caused by burning of fossil fuels. This trend does not bode well for oil producers and development of their resources.

Reduction in Capital Investment

Iran has sought to assure the IOCs of profitable contractual terms on their

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investment. Nevertheless, low oil prices have meant that major oil companies are looking to reduce capital costs in the medium term. "Lower prices mean lower profit margins- or even losses. Lower profit margins mean less money for investment in new projects and production methods- and, in some cases, cutting back on existing operations."[73] According to consultant Wood Mackenzie, the oil and gas industry will cut US$ 1 trillion from planned spending on exploration and development between 2015-2020 because of the slump in oil prices.[74]

Political Difficulties

The IPC has been under attack by the powerful segments of the Iranian political establishment. Iran's Supreme Leader, Ayatollah Khamenei, and his hardline followers drawn from the clerics and IRG are highly suspicious of Western businesses.[75] The dynamics of tension between liberals and hardliners in Iran over the operations of Western companies can stall sharing of international best practices, technology transfer, and public-private partnerships needed to boost the economy's health.[76]

The hardliners have criticized Rouhani's outreach to the West in the light of Iran's continuing difficulties with banking, investment and dollar transactions. Despite the nuclear deal, Washington still maintains a host of financial sanctions- and the potential threat of more restrictions- that continue to deter international investors and constrain business and trade.[77] Hardliners, backed by the guards who control large portions of the economy and use national resources as a source of patronage, will probably challenge Rouhani in the majlis, construing the issue of petroleum contract as concession to the western companies. Their disapproval of Rouhani's move to open the country to the West will prolong the climate of uncertainty and exacerbate investors' anxieties, even as the reformist president gets a strong mandate through the recently concluded elections to go ahead with the much-needed economic reforms.

The Transition away from Fossil Fuels

Like other large energy producers such as Saudi Arabia and Russia, Iran faces a threat of transition away from fossil fuels. As the cost of harvesting renewable energy goes down, oil may not remain the fuel of choice for consumers in many parts of the world. With most countries committed to measures aimed at reducing global warming under the December 2015 Paris Climate Accord, global consumption is expected to reach a peak in 15-20 years and then begin an inexorable decline.

Europe is already on the path of renewable energy, with the former accounting for nearly one-third of the electricity consumed in Germany in 2015.[78] Ireland, Denmark, and the United Kingdom are leading producers of wind energy in the world.[79] The United States occupies fifth place on the installed solar photovoltaic (PV) capacity global rankings and has the second highest installed wind energy capacity in the world.[80]

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Oil consumer giants such as China, India, and South Korea are also taking long strides towards deploying solar power in their respective national grids. China installed 20 gigawatt (GW) of solar power in the first half of 2016 and wants to add 20 GW annually through 2020, to bring the nation's solar power capacity to massive 150 GW.[81] India has 45 GW of clean energy currently but wants to raise it to an ambitious 175 GW by 2022, including 100 GW of solar power generation capacity.[82] South Korea is fast-growing GW-market for PV. In 2014, the country ranked among the world-leading top-ten installers of PV systems.[83]

Daniel Esty, a professor of environmental law and policy at Yale University, believes that the drop in prices of fossil fuels will push the developers of wind, solar and other alternative energy to cut costs and make their technologies more cost-competitive and thereby increase demand.[84] Similarly, a report on solar industry by the Deutsche Bank team asserts that despite the oil price drop, solar electricity will soon "become competitive with retail electricity in an increasing number of markets globally

due to declining solar panel costs as well as improving financing and customer acquisition costs."[85]

The director of the energy and sustainability program at the University of California (Davis), Amy Jaffe, suggests that growing urbanization combined with technological breakthroughs in renewable energy will dramatically reduce future demand for oil. Jaffe draws attention to the fact that China, the largest consumer of fossil fuels in the world, is "pushing itself to be the world's major exporter of solar panels and advanced vehicles, including the production of five million electric vehicles a year,"- a note of caution to those who forecast an incessant rise in oil demand.[86]

In a recent trend, big oil companies are backing non-fossil fuels and farming out renewable energy investments that could constitute their future energy portfolios. Major oil companies such as Shell, Total and Statoil have established separate divisions to invest in renewables, hit as they are by low crude prices and tightening climate change regulations. One of Britain's leading energy experts and fellow at Chatham House, Paul Stephens, has warned that major oil companies face a "nasty, brutish and short" end within a span of 10 years or so, if they do not change their business model and diversify into greener forms of energy.[87]

In this scenario, Former Saudi Oil Minister Zaki Yamani's famous quip that "the Stone Age did not end for lack of stone, and the Oil Age will end long before the world runs out of oil",[88] could ring true before long.

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Conclusion

With the lifting of international sanctions, Iran is focusing on the opportunities for trade and investment, particularly in its oil and gas sector. In order to revive old fields and develop new ones, Iran needs foreign capital and modern Western technology. The Iranian government is actively courting foreign investment with a new model contract that offers lucrative terms

for foreign investments. Several international oil companies have expressed their interest in returning to the Iranian oil market and some have started a preliminary study of oilfields to become better equipped before the bidding rounds. If Iran manages to conclude successful contracts for the development of its oil fields- similar to what Iraq did a decade ago- this would unlock the enormous wealth of its vast natural resources.

With the lifting of international sanctions, Iran is focusing on the opportunities for trade and investment, particularly in its oil and gas sector. In order to revive old fields and develop new ones, Iran needs foreign capital and modern Western technology.

However, one of the major risks of doing business with Iran is linked to the continuing unilateral US sanctions on Iran, which make it difficult for Western banks and companies to rekindle business with Iran without fearing punitive action from the American regulators. Foreign oil companies will also find it extremely difficult to navigate the overweening economic influence of the still-sanctioned IRG, and operationalize activities that involve the import of advanced technology and equipment required for the development of oilfields. Moreover, in a state-controlled economy with the high level of bureaucratization and alleged corruption, foreign companies may find it more problematic and less profitable to do business in Iran. Finally, a lurking apprehension of the foreign oil companies relate to the snap back of UNSC sanctions if Iran violates the terms of the nuclear deal down the road or the change in the stance of the new US administration towards the nuclear deal; then they stand to face a challenging scenario vis-à-vis their investments.

Iran has been able to circumvent a number of challenges in its efforts to restore oil production to pre-sanctions levels and reclaim its market share. In order to continue producing to the pre-sanctions level and ramp up to an ambitious 6 million bpd target, Iran would require that oil companies invest immediately once they enter into a contract to develop the field. In an era of depressed oil prices, IOCs are holding on to capital investment, so a rapid development of oilfields appears precarious in the near future. While the Vienna agreement over the reduction in OPEC's output could reverse the declining prices trend, it will still not restore prices to the height seen in

early months of 2014, mainly because of the possibility of additional supplies from the production of shale oil. In addition, globally-spreading 'green consciousness' and the constantly declining cost of renewable energy has started interrogating the very idea of the prevalent use of oil as a source of energy. That would have a telling impact on the fate of global oil industry, and Iran will not be outside the frame of this emerging picture.

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