

IRAN UNDER SANCTIONS



U.S. Sanctions and
Iran's Energy Strategy

SARA VAKHSHOURI



ABOUT IRAN UNDER SANCTIONS

Iran's economy has been under sanctions in one form or another since the 1979 revolution. Yet little systematic knowledge exists on the short- and medium-term impacts of sanctions on the growth patterns of the Iranian economy, the general welfare of its people in the cities and rural areas, societal dynamics, civic space, and the country's environment. The focus has often been on a few metrics that flare up with tightening of sanctions: currency depreciation, inflation, and recession, which are then followed by increases in unemployment and poverty. But the more comprehensive picture is lost in political cacophony around the policy's merits. This is the gap that SAIS is filling with its Iran Under Sanctions project, which is a 360-degree in-depth view on the implications of sanctions on Iran. This first-of-its-kind research provides for an instructive case study on the use of sanctions as a tool of statecraft. For any questions or feedback on the project, please reach out to Ali Vaez at avaez2@jh.edu.

ABOUT THE AUTHOR

Sara Vakhshouri is the founder and president of SVB Energy International, a strategic energy consulting firm with offices in Washington, DC, and Dubai. She has more than two decades of experience working in the energy industry and has extensive experience in global energy market studies, energy strategy, energy security, and geopolitical risk. She has consulted with numerous public and private entities, as well as policy leaders and international organizations, including the International Monetary Fund, the World Bank, the International Energy Agency (IEA), and the US Energy Information Administration (EIA).

Vakhshouri has been based in Washington, DC, since 2009 and has advised US, European, Indian, Japanese and GCC governments, investment banks, financial institutions, law firms, and international corporations. She is currently a member of the Energy Task Force of the Cyprus Climate Initiative, which was launched and initiated by the president of the Republic of Cyprus.

She has worked with multiple think tanks and educational organizations such as the Oxford Energy Institute; Harvard University's Kennedy School; the Energy, Economics, and Security Program at the Center for a New American Security (CNAS); and the Atlantic Council's Global Energy Center. She is a professor of energy security at the Institute of World Politics and also a member of the Middle East Petroleum Club.

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- Sara Vakhshouri

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EXECUTIVE SUMMARY

After years of weathering nuclear-related sanctions and limitations on its oil exports, Iran reached an agreement in 2015 with the five permanent members of the UN Security Council plus Germany over its nuclear program, the Joint Comprehensive Plan of Action (JCPOA). In May 2018, President Donald Trump announced U.S. withdrawal from the agreement and – despite Iran’s compliance with the JCPOA – implemented a “Maximum Pressure” tight sanctions policy aiming, inter alia, at “zero oil export”. Exports of oil and condensate -- a byproduct of natural gas mostly produced from Iran’s South Pars field – have fallen to under 1 million barrels per day (mb/d), down from 2.5 mb/d in the pre-sanctions era. Iran has been forced to reduce crude oil production, but natural gas production remains rather unchanged, propped up by huge domestic demand and exports to neighbors. If the sanctions continue, they can potentially impact that natural gas production, however, unless Iran either secures customers for its condensate or

increases its domestic condensate refinery capacity.

This report examines the impact of the new U.S. sanctions on Iran’s oil and condensate production and exports and their potential impact on natural gas production and export capacity. It then analyzes Iran’s strategies to weather these sanctions and its long-term oil and gas strategy. It finds that if sanctions are lifted, Iran will face few technical obstacles to returning oil production to pre-sanctions levels. However, it will be difficult to recover lost market share, because the global oil market is glutted due to U.S. shale growth and lower demand growth due to COVID-19. Iran would thus do better to use its oil domestically, while exporting other energy products, thus maximizing its broader economic benefits and energy strategy.

I. ENERGY SANCTIONS IN THE HISTORICAL CONTEXT

Iran's energy sector was the target of multilateral and unilateral sanctions long before the Trump administration launched its "maximum pressure" strategy. In 1951, the British government imposed an oil embargo, after Iran attempted to nationalize the Anglo Iranian Oil Company (AIOC, future British Petroleum). The embargo starkly revealed to Iranians a major vulnerability: they were unable to transport their own oil to global markets. Today Iran has one of the largest oil transport companies in the world, with at least 42 Very Large Crude Carriers (VLCCs). The National Iranian Tanker Company (NITC) had a vital role in transporting Iranian oil to international markets during the Iraq-Iran War (1980-1988) and in circumventing the European Union (EU) and U.S. export sanctions between 2006 and 2016.¹

A second shock to Iran's oil industry occurred in the immediate aftermath of the 1979 Islamic Revolution, when the U.S. stopped importing Iranian oil, and Tehran halted exporting crude oil and products to Israel, a once close friend and customer.² Revolutionary chaos saw oil production drop from 6 mb/d in 1974 to 1.3 mb/d in 1981. This was also when a shift began in the oil trade's flow from Western markets toward Asian. In 1996, Washington's Iran-Libya Sanctions Act (ISA) limited investment and technology transfer to Iran's energy industry.³ While it did not completely prevent non-U.S. firms from investing in the energy industry, due to the EU's resistance to the extraterritoriality of the sanctions and Washington's reluctance to enforce measures that could alienate European allies, it limited Iran's ability to attract much needed foreign technology

and capital.⁴ As a result, the National Iranian Oil Company (NIOC) maintained oil production capacity in the 4 mb/d range in the early 2000s (with average export volume of 2.5 mb/d), but never recovered its pre-revolutionary capacity.

Another shock came in 2012, as U.S. and EU sanctions aimed at curbing Iran's nuclear program slashed oil production to below 2.7-3 mb/d and exports to around 1-1.5 mb/d.⁵ This caused a severe recession in Iran, where oil revenue was responsible for some 80 per cent of total export earnings and about 60 per cent of government revenue.⁶ By end 2015, average production of crude oil was about 2.9 mb/d, and production of condensate and natural gas liquids (NGLs) was 692,000 to 710,000 b/d.⁷

On 14 July 2015, Iran, the U.S., Russia, China, Britain, France and Germany (the P5 + 1) signed the Joint Comprehensive Plan of Action (JCPOA). Upon its implementation in January 2016 and removal of oil export sanctions, NIOC was able to reboot oil production remarkably close to pre-2012 levels. Within months, Iran regained most of its lost market share, as exports returned to pre-nuclear sanction levels. Nevertheless, despite Iran's compliance, President Trump on 8 May 2018 announced U.S. withdrawal from the JCPOA, re-imposed the nuclear sanctions and imposed new sanctions targeting the economy and energy sector. On 4 November 2018, after a six-month grace period aimed at helping

remaining oil customers wean themselves off Iranian crude, the sanctions targeting the energy sector came back into force.

Iran's energy sector was the target of multilateral and unilateral sanctions long before the Trump administration launched its "maximum pressure" strategy.

II. OIL PRODUCTION AND EXPORT UNDER TRUMP SANCTIONS

In November 2018, concerned about a sharp rise in oil prices, the Trump administration granted 180-day waivers to import Iranian oil at reduced volume to India, China, Japan, South Korea, Greece, Italy, Turkey and Taiwan. Despite Iran's JCPOA compliance, all EU countries (including Greece and Italy) halted their imports of Iranian oil due to concerns from refiners and financial institutions about incurring U.S. sanctions. Taiwan also imported no Iranian oil during the waiver period. Japan and South Korea stopped imports in September 2018, even before the sanctions' implementation, though Japan resumed imports from January to April 2019, and South Korea imported reduced volumes (mostly condensate) from December 2018 to April 2019.⁸

In April 2019, upon expiration of the 180-day waiver, President Trump announced

that the U.S. would not issue any new waivers for Iranian oil. Japan, South Korea and India halted and China significantly reduced purchases. Iran's formal and direct oil exports dropped from 2.5–2.7 mb/d in early 2018 to 380,000 b/d in June 2019, and production was reduced from nearly 4 mb/d prior to re-imposition of sanctions to 2.3 mb/d.⁹ Oil exports fluctuated, in some months as low as 200,000 b/d, in others as high as 500,000 b/d until January 2020.¹⁰ From January 2020 to October 2020, Iran's average oil export was about 478,000 b/d and its average oil production was about 2 mb/d.¹¹

Brian Hook, then the U.S. State Department's Special Representative for Iran, noted in an August 2019 interview that: "US sanctions caused Iranian crude exports to fall to 300,000 b/d in June and about 100,000 b/d in July, down from roughly

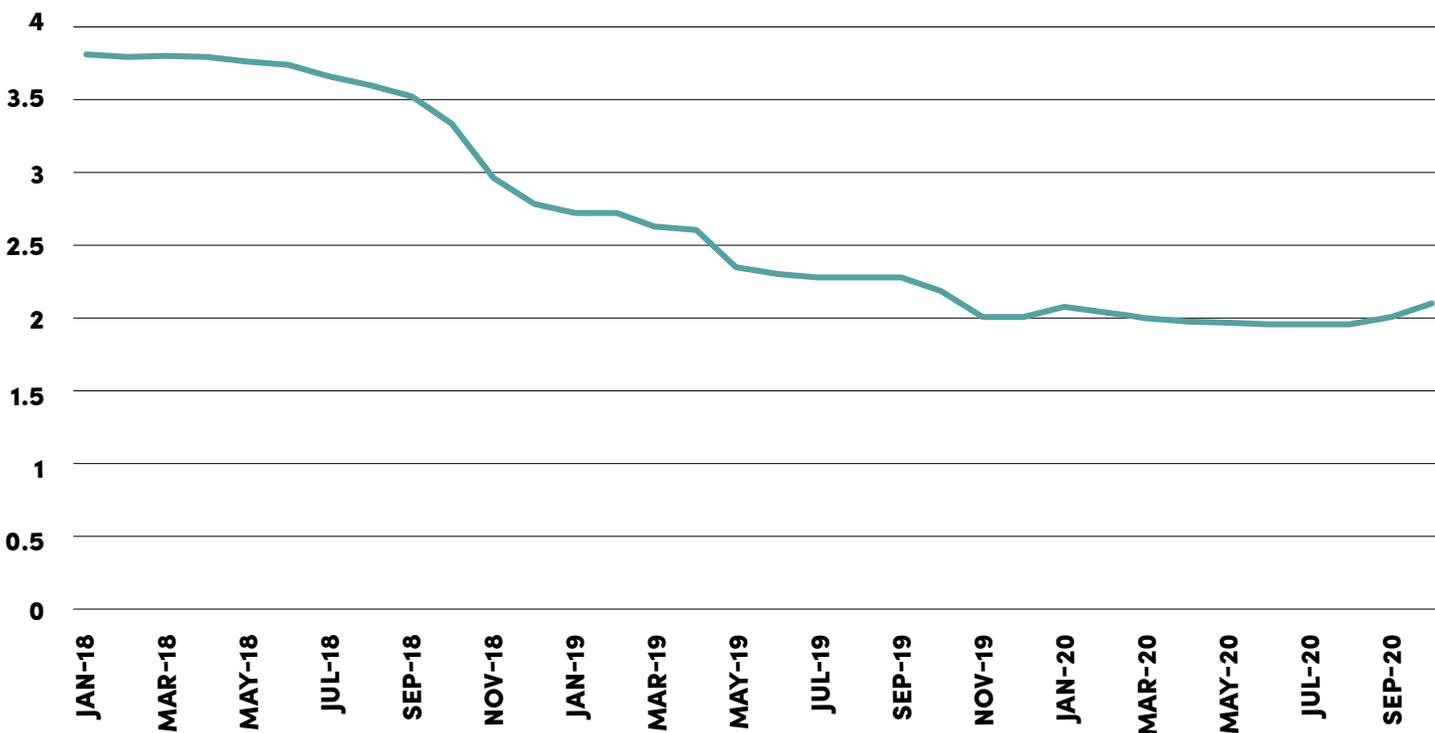
II. Oil Production and Export under Trump Sanctions

2.5 million b/d a year earlier".¹² In January 2020, Commander Rahim Safavi (ex-chief commander of the Islamic Revolutionary Guard Corps (IRGC) and currently an adviser to Iran's Supreme Leader) said, "Iran's oil export has fallen under 700,000 b/d".¹³ In October 2020, Iran's Parliament Research Center announced that oil sales in the first six months of the Persian Year (21 March 2020 to 21 September) were less than \$ 2.5 billion.¹⁴

The oil demand shock caused by COVID-19 inflicted additional downward pressure on Iran's oil exports due to three main factors: 1) oversupply in the market and drop in oil

prices; 2) consumers' lower demand and storage capacity; and 3) increased transportation costs as tanker rates temporarily rose. All these reduced the appetite and demand for Iran's discounted oil. During this time, most of Iran's oil sales were directly between the government and China, while the private sector had little luck. Due to lack of storage capacity, China started to hold its purchases in floating and onshore storage in Malaysia and Singapore. This resulted in a drop in direct imports of Iranian oil that had cleared China's customs and were reported by its port authorities.

IRAN OIL PRODUCTION (MILLION B/D) JANUARY 2018- OCTOBER 2020



Source: SVB Energy International ¹⁵

II. Oil Production and Export under Trump Sanctions

Oversupply in the oil market helped soften the blow from the Trump administration's aggressive sanctions policy against Iran's oil exports on the broader market and prices. By May 2019, after the expiration of the waivers, the market already expected additional global supplies (particularly from the U.S.). Russia and OPEC members such as Saudi Arabia, the United Arab Emirates and Iraq filled the gap left behind by Iran's reduced exports. Also, U.S. production from the Eagle Ford field replaced Iran's condensate market share in South Korea.¹⁶

That U.S. sanctions under the Trump administration have been particularly successful in curtailing Iran's oil exports.

IRAN OIL EXPORT (MILLION B/D) JANUARY 2018 - OCTOBER 2020



Source: SVB Energy International¹⁷

That U.S. sanctions under the Trump administration have been particularly successful in curtailing Iran's oil exports is due to several factors:

1. Washington was willing to enforce its sanctions much more aggressively, so had much higher expectations for cuts from importers of Iranian oil. During the nuclear sanctions under the Obama administration, the U.S. expected a "significant reduction" in oil imports from Iran by customers every 180 days. While the reduction was never clearly articulated, it averaged close to 20 per cent in each cycle. The Trump administration's expectation, however, was that importing nations, with rare exceptions, would have to reduce imports to zero.
2. The U.S. developed more accurate means for tracking Iranian exports and enhanced its surveillance capabilities. Using this information, the administration even sanctioned a specific Chinese shipping line (COSCO) for violating its sanctions.¹⁸ Targeting shipping companies was effective in disrupting Iranian efforts to store and transfer oil to different destinations.
3. Major oil producers, such as Saudi Arabia, the UAE and other OPEC members (alongside Russia), increased their supplies and moved quickly to sign contracts with importers to substitute Iran's oil. The market was much better-supplied, and prices were lower since the late-2014 crash, unlike the 2012-2015 Obama-era sanctions, which coincided with oil market disruptions such as the Libyan revolution and civil war and the ISIS insurgency in Iraq.
4. The complementary sanctions re-imposed in August 2018, which limit and restrict any financial transactions with Iran or insurance of Iranian oil, have contributed to a more effective implementation of oil sanctions.

III. CONDENSATE PRODUCTION UNDER THE SANCTIONS

Iran's condensate and gas liquid output has increased over the past decade. The former is a byproduct of natural gas, about 90 per cent from the giant South Pars field. Despite U.S. sanctions, this natural gas and condensate production and refinery capacity has increased over the past few years. From March 2017 to March 2018, Iran produced around 259 million barrels of condensate (about 709,580 b/d) and exported about 430,000 b/d.¹⁹ By end 2019, condensate production is estimated to have increased by 9 million barrels a year (about 25,000 b/d) and reached 734,246 b/d.²⁰

Unlike the 2012–2015 nuclear sanctions, current sanctions include condensate export alongside crude oil exports. Not being able to export its condensate excess capacity means that Iran had to adjust and cut back its overall natural gas pro-

duction. Reducing gas production could have severe implications, as domestic demand for natural gas is high, and natural gas has a considerable, if not strategic, share in power generation and feedstock to petrochemical factories, as well as residential and industrial use.

As a result of limitations on condensate export, Iran lost almost all its condensate market share, sold mostly to South Korea and some to Japan. Tehran, however, had made expansion of condensate processing capacity a priority even before the re-imposition of sanctions. This meant that Iran started to expand its condensate refinery capacity and was able to mitigate the risk of sanctions by consuming more condensate domestically. This not only made it self-sufficient in production of gasoline and other light distillates, but also created a new gasoline export ca-

capacity. This helped Iran to maintain its natural gas production under the shadow of U.S. sanctions.

Completion of the Persian Gulf Star Refinery helped by adding 360,000 b/d of domestic condensate processing capacity. Each processing unit has a capacity of 120,000 b/d, and the refinery's total capacity is estimated to be 360,000 b/d. To cope with the new U.S. sanctions on its condensate export, Iran was able to process beyond the nominal capacity of this refinery up to about 400,000–420,000 b/d.²¹ Besides the Persian Gulf Star Refinery, oil refineries such as Lavan, Bandar Abbas and Shiraz have been processing condensate as their feedstock. However, this domestic refining capacity is insufficient to process all the condensate, so Iran has been struggling to maintain its domestic natural gas production. Yet, despite the limited condensate export capacity, Iran resisted reducing condensate production, as that would have required cutting gas output. Instead, it stored unsold condensate in domestic tanks and bonded storages in China and also expanded domestic condensate refining capacity. By November 2019, condensate stocks had reached 98.9 million barrels.²²

Iran has also come up with new strategies to maintain its condensate production by increasing domestic use. It has experimented in new ways to blend condensate with heavy crude oil ("synthetic oil"), a tai-

lored-made cocktail to be used as a feedstock for its oil refinery and petrochemical factories. This "synthetic oil" could potentially be used as a feedstock for Iran's power plants, freeing up some natural gas share in its power generation. Iran has also changed the allocation of some of its oil storage tanks to handle condensate and unsold gasoline, especially during the first few months of the COVID outbreak, when domestic gasoline consumption plummeted due to lockdowns. It also used some of its tanker fleet as floating storage for unsold condensate.

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IV. SANCTIONS' IMPLICATIONS FOR IRANIAN NATURAL GAS

At 17 per cent, Iran has one of the largest proven natural gas reserves in the world, estimated at 33,899 billion cubic meters (bcm), more than one third of OPEC's reserves and the second largest after Russia.²³ Iran is also the world's third-largest dry natural gas producer, after the U.S. and Russia.²⁴ Historically, the success rate of natural gas exploration is very high in Iran, usually above 60 per cent compared to a global average of 30–35 per cent.²⁵ In the past 20 years, most exploration in Iran resulted in discovery of gas reservoirs. About 40 per cent of these are in onshore regions; the remaining 60 per cent are offshore. South Pars, an offshore gas field in the Persian Gulf shared with Qatar's North Dome field, is estimated to have about 40 per cent of Iran's proven natural gas reserves. About 80 per cent of Iran's gas reserves are from non-associated gas fields.²⁶ North Pars, Sardar Jangal, Forouz

B, Aghar, Kish, Golshan, Pazan, Charak, Khartang and Kangan are other major non-associated fields, holding, together with South Pars, a significant amount of condensate.²⁷

With the 2015 JCPOA, Iran introduced a new type of upstream contract in the hope of creating incentives for international oil companies to invest in its upstream oil and gas industry. In both exploration and development, NIOC's highest priority was to focus on oil and gas fields shared with neighboring countries. But the type of upstream contracts Iran offered were not originally profitable compared to risks international companies would have to undertake, and negotiating periods were too long.

South Pars, the giant gas field shared with Qatar, received particular attention and

priority for diverting capital and investment. Natural gas production increased even during the Obama era nuclear sanctions. Almost all the production rise was from South Pars. Domestic contractors, with the help of Chinese and Russia firms, furthered the development process of different phases of South Pars, along with the construction of gas refineries to process the produced gas and condensate. Nevertheless, the attempt to attract Western energy companies' capital and technology was dashed by U.S. sanctions after 2018.²⁸ Before then, Iran signed a single

contract with the French company Total and China's CNPC. Total left immediately after announcement of new U.S. sanctions in 2018; CNPC withdrew in October 2019.

Iran's sixth Five Year Economic Plan anticipated that gas production would reach 1,300 mcm/d by March 2021, almost double the 2016 level.²⁹ Because of sanctions, however, Tehran was not able to achieve its goals, though it was successful in increasing natural gas production, mostly from South Pars. Gas production from gas caps and associated gas, on the other hand, remained largely unchanged.

If U.S. sanctions continue long term, and Iran cannot access international capital and technology, it will not be able to increase natural gas production significantly. South Pars, responsible for 80 per cent of Iran's natural gas output, has already peaked.

If U.S. sanctions continue long term, and Iran cannot access international capital and technology, it will not be able to increase natural gas production significantly. Production levels may even start to decline. South Pars, responsible for 80 per cent of Iran's natural gas output, has already peaked. According to Pars Oil and Gas Company, South Pars gas production will face a natural decline from 2023, estimated to be equal to the annual output of a producing phase, about 28 bcm a year.³⁰ If Iran is forced to reduce its condensate production, this could potentially have a significant impact on natural gas production. Tehran could avert this if it either finds customers for its unsold condensate or gradually increases domestic condensate refinery capacity.

V. STRATEGIES TO WEATHER THE NEW SANCTIONS

The Islamic Republic has a long history of dealing with unilateral and multilateral sanctions. The main current challenge is that the U.S. has identified most previous solutions for circumventing oil export sanctions. Additionally, international tanker trackers have already started following Iranian oil tankers with very high accuracy using satellites. But it is important to stress that Iran may find new ways to continue “unofficial” oil sales. Many smaller traders lack direct or indirect trade/business relations with the U.S. and would profit from purchasing Iranian discounted oil and “re-selling” it internationally. There are also countries that reject the legitimacy of the unilateral sanctions and are willing to confront the U.S. A good example was Iran’s gasoline exports to Venezuela in summer 2020. Also, Iran could raise income from fields shared with neighbors by granting extraction permissions to the

other side. This is likely taking place already in the Caspian Sea.

Discounts

To keep customers interested and increase incentives, Iran reduced export prices and gave further discounts per barrel on delivery. Intermediaries who sell and purchase Iranian oil, condensate and petroleum products have also received a percentage of sales as commission. Selling oil in the importing country’s local currency or selling in return for goods or services are among other strategies in Iran’s toolkit. NIOC traditionally has not offered significant crude oil price discounts but rather discounts on delivery, as well as longer payment terms. Iran agreed with India on a “free delivery” of oil upon implementation of sanctions. Nevertheless, oil price discounts and

even steeper condensate discounts did not add much to its oil exports. Almost all its oil and condensate customers -- India, Japan and South Korea -- officially halted oil purchases due to the Trump "maximum pressure" policy. China's official formal import was only what Iran owed as part of the "debt repayment" agreements for Chinese investment and services in its energy industry. Still, China imported additional Iranian oil and condensate through ship-to-ship transfers in international waters or via Malaysia and Singapore. Importantly, low oil prices, due to oversupply of both oil and condensate, have helped the U.S. to reduce Iran's exports significantly. The COVID-19 induced global demand shock and crash of oil prices were additional factors in reducing the appetite for Iranian oil. All this limited the effect of "discounts".

Turning off the Tankers' Geolocators

Another NITC tactic is to turn off its ships' Automatic Identification System (AIS) so as to deliver cargoes "off the grid". This is done mostly to conceal cargoes and destinations. Iran has used its tanker fleet to carry oil and condensate directly to final destinations, or to international waters where it transferred cargo to other tankers by a ship-to-ship (STS) method. Nevertheless, most Iranian tankers were detected and identified by satellites. Turning off AIS systems did not help conceal them from U.S. surveillance. On other occasions, for example when Iran exported gasoline

to Venezuela, it did not turn off AIS, in order to signal that it was not intimidated by the U.S.

Pre-selling Oil

In July 2019, Vice President Eshagh Jahangiri said that "any powerful country that is willing to work with Iran can pre-purchase Iranian oil".³¹ He alluded to a potential market for countries pre-purchasing its oil for future deliveries in return for a line of credit, investment, goods or services. "Pre-selling oil for future deliveries" was designed to protect customers from violating U.S. sanctions. It would allow Iran to circumvent sanctions on oil exports, while helping it either to raise money or receive oil-backed lines of credit. As mentioned, by July 2019 oil exports had dropped below 300,000 b/d. Iran hoped that pre-selling would help it to raise not only the required revenue for its fiscal budget, but also cash for importing goods for which it needed to export 500,000 b/d. The budget for the Persian year March 2019 – March 2020 was set on an expected export of 1.5 mb/d of oil at \$55 per barrel. The share of oil export in the budget of the current Persian year assumes lower oil export, down to 1 mb/d at a barrel price of \$50.³²

Nevertheless, oil exports in 2019–2020 so far have been much lower than the fiscal budget requires. Iran hopes that China, Japan, India and the EU will allocate funding and credits directly or in escrow accounts,

allowing the government to purchase its needs from them. Conceivably this could help Iran adjust actual oil exports with its need to export to sustain the economy. The particular advantage is that it would help Iran sustain future market share by receiving oil-backed loans with the prospect of future delivery. This could also be a potential solution for Iran and EU countries negotiating over the JCPOA, helping Iran's economy to function in the face of U.S. sanctions. Aside from the direct ban on oil and energy export, restrictions on financial transactions have also been a major obstacle for the energy industry. Pre-selling oil would thus not necessarily bring in requisite cash, but instead extend a line of credit for Iran to purchase goods and services. But crucially, with markets oversupplied, no one has thus far shown an appetite to pre-purchase.

Pre-selling Oil in the Stock Market

Iranian officials announced that they will introduce contracts to presell oil for delivery in two years.³³ The goal is to assist the government's budget deficit while the economy has been hurt significantly by U.S. sanctions and COVID-19. It is both difficult and politically infeasible for the Rouhani administration to raise its budget via taxes. This preselling plan, though neither finalized nor announced, has become a political football.

Changing the Allocation of Storage Tanks

Domestic gasoline consumption dropped significantly between April and May due to COVID-19 and national lockdowns. Gasoline consumption in May was about 55 million liters/day compared to 75 million liters/day in November 2019.³⁴ By end May, in order to create storage capacity for its unused gasoline, Iran had transferred 770,000 barrels of crude oil from its storage tanks in the northern oil terminal Neka to the Tehran Oil Refinery. As officials were hoping for gasoline demand to pick up again in the summer, domestic consumption of gasoline started to grow.³⁵ Lower domestic consumption due to COVID-19, higher gasoline production from the Persian Gulf Star Refinery and export limitations due to U.S. sanctions have all swelled Iran's gasoline inventories.

As mentioned, the capacity of the Persian Gulf Star Refinery has increased from 360,000 b/d of condensate to 420,000 b/d. This refinery produces 45 million liters/day of gasoline -- less than half of Iran's gasoline production capacity -- and 17 million liters/day of gasoil. The petroleum ministry plans to increase gasoline production from South Pars to 54 million liters/day by October 2020. Since the March 2020 drop in domestic gasoline consumption, Iran has added 120 million liters of capacity for storing gasoline produced from the Persian Gulf Star Refinery. Another 40 million liters of gasoline stor-

age capacity was added in Tehran. These additional capacities were achieved by changing the allocation of storage tanks from crude oil to gasoline. NIOC is in the process of allocating another three crude oil storage tanks, each with 120 million liters capacity and in the Naeeen crude oil transportation center, for storing gasoline produced by the Persian Gulf Star Refinery. Iran has also started diluting crude oil storage tanks in Kharg port by gradually adding condensate.

Iranian Gasoline Export to Venezuela

In May 2020, Iran exported about 1.5 million barrels (210,000 mt) of gasoline to Venezuela in five NITC tankers.³⁶ Venezuela's oil production in April was about 622,000 b/d, down from 1 mb/d in 2018 and early 2019, before U.S. sanctions. Its gasoline production is all used domestically, as refining capacity has dropped from 1.3 mb/d to 626,000 b/d. Reportedly, Iranian tankers were also carrying catalysts to help Venezuelan refineries produce higher yields of gasoline. The Venezuela trade has had a number of positive features for Iran:

- Due to lower domestic gasoline consumption (as a result of COVID-19), it was able to export its excess gasoline capacity instead of continuing to reduce its oil and refinery production.
- Finding new markets in an era of sanctions is crucial. Since Venezuela

has been disconnected from U.S. and global trade and financial markets, it is difficult for Washington to block exports by threatening loss of U.S. business.

- Since March, most Iranian tankers carrying oil to China (and all tankers heading to Venezuela) have flown the Iranian flag and had their AIS turned on. This strongly suggests that the government is no longer concerned about its exports being tracked. Officials stated clearly that they would respond to any threat against their tanker movements in international waters.

Synthetic Oil

In order to increase domestic consumption beyond its condensate refinery capacity (which is lower than Iran's condensate production capacity), NIOC introduced "synthetic oil". This blended product is a cocktail of condensate and Iran's ultra-heavy crude oil produced in the West Karun oil fields, made to be used as a feedstock for the northern refineries.³⁷ Iran is also studying the possibility of using this it as feedstock for both its petrochemical factories and power generation. The condensate produced in South Pars is received by the Bahregan operational unit, then sent to the Marun 2 operational unit and from there to the refineries in Isfahan, Tehran and Tabriz. The petroleum ministry is building new pumping stations and

other logistical infrastructure for this process. Overall, 40,000–45,000 b/d of synthetic oil is to go to the three named refineries via a pipeline from the southern oil fields. Some 35,000 b/d is condensate, the rest ultra-heavy and sour crude oil. The Isfahan refinery, with a 360,000 b/d capacity, is to receive about 20,000 b/d of the synthetic oil. The rest is to be used as feedstock for the Tehran and Tabriz refineries.³⁸

The Lavan, Bandar Abbas and Shiraz refineries also process a blend of crude oil and condensate. They consume 428,000 b/d of feedstock, of which about 45,000–52,000 b/d is condensate, 296,000 b/d is Kharg's heavy crude oil, and 75,000 b/d is heavy oil from the Gachsaran/Sarvestan, Saadat Abad, Salman/Abazar and Lavan oil fields. The condensate feedstock for these refineries is Bandar Abbas (20,000 b/d to 25,000 b/d); Lavan (15,000–20,000 b/d); and Shiraz refinery (6,000–8,000 b/d).³⁹ The synthetic oil used as feedstock for these refineries would add about 77,000 b/d total condensate processing capacity to Persian Gulf Star Refinery's 420,000 b/d processing capacity.

The Abadan refinery is the next currently in a reconfiguration process so as to receive and process synthetic oil. It is planned to receive and process 20,000–30,000 b/d of synthetic oil.⁴⁰ However processing synthetic oil has changed the quality of the final products in these refineries. They now produce more light distillates like gasoline

and naphtha, the domestic and global demand for which have been hit significantly by COVID-19 and lockdowns.

Making a New Cocktail & Capillaries Export Strategy

Another often employed tactic is to change the DNA and specifications of Iranian crude oil. Recalling the cliché of oil as a fungible commodity, Iran has attempted to hide its origin and render its new oil “cocktail” unidentifiable. It started to blend different crude types at terminals or blend its crude oil with neighboring crudes (such as Iraqi oil) in order to change its specification and prevent identification. This, along with changing certificates of origin and swapping oil from one tanker to another on the high seas, makes Iranian oil tough to track. But the volumes of this exported cocktail mix -- what the petroleum minister has called a “capillaries export strategy” -- are very low.⁴¹

The main current challenge for Iran is that the U.S. has identified most previous solutions for circumventing oil export sanctions.

VI. LONG-TERM STRATEGIES

Expanding downstream capacity

The IRGC and its subsidiary companies have played a crucial role in circumventing U.S. sanctions and increasing Iran's resiliency. Achievement of self-reliance in domestic gasoline production is a testament to this policy. Iran today produces about 105 million liters of gasoline per day, 40 per cent in refineries built by the IRGC's Khatam-al Anbiya Construction Headquarters.⁴² Gasoline production capacity surpasses domestic needs, creating the possibility of some export at a time when crude oil and condensate exports are under sanctions.

Ending Condensate Exports by 2021

The petroleum ministry announced that it plans to expand domestic condensate refinery capacity and stop exporting condensate by March 2021.⁴³ All of Iran's production will then be used as refinery and petrochemical feedstock to produce

naphtha and gasoline. Persian Gulf Star and Siraf are two refineries that will process condensate. The former currently processes 420,000 b/d into gasoline. Siraf, announced in 2014, is not yet in operation. It has six units with 360,000 b/d capacity. Its main final product is to be naphtha. Due to export limitations, Iran has also used about 130,000 b/d of condensate as feedstock in its petrochemical plants. Another 80,000 b/d was used in its oil refineries, apart from the Persian Gulf refinery. Iran currently produces about 700,000 b/d of condensate from South Pars, but this can theoretically increase to 1 mb/d.

Condensate to Power; Electricity Export and Water Desalination

In May 2020, Oil Minister Bijan Namdar Zanganeh announced that Iran is preparing to make more domestic use of gas condensate by stopping its direct export.⁴⁴ The hope is that this will create resistance to sanctions and other international pres-

sure on the economy, particularly its oil and gas exports. It would also increase the value of non-oil exports and provide value added to the chain of domestic production, lower energy consumption and greater economic self-reliance. Special emphasis is to be on exporting downstream products (such as refined petroleum products) and petrochemical products, as well as converting part of Iran's natural gas into electricity for export.

As mentioned, production of condensate has increased from the South Pars field along with gas production there.⁴⁵ The U.S. sought to curtail natural gas production by sanctioning condensate export, but Iran came up with creative ideas to boost domestic demand for its condensate. Expanding condensate refinery capacity and using the product in its petrochemical factories and to generate power are strategies that could help Iran diversify and expand power generation capacity.⁴⁶ In early February, Zanganeh said that about 130,000 b/d of gas condensate is used as feedstock for Iran's petrochemical plants. A further 80,000 b/d goes to domestic refineries, apart from the 420,000 b/d of condensate feedstock used by Persian Gulf Star.⁴⁷ The energy ministry is considering using gas condensate to replace natural gas in power plants.⁴⁸ The condensate-to-power project was announced in March 2020 as a strategic plan to increase resiliency against U.S. oil and condensate export sanctions. Preliminary ministry studies indicated that the cost of

generating electricity for Iranian power plants from gas condensate is not much different from generating it from natural gas.

Officials realize that it is harder for the U.S. to implement sanctions on electricity exports, which directly involve the end-users, than on crude oil, condensate or natural gas. Electricity exports also help Iran strengthen trade ties and diplomacy with neighbors, many of whom lack adequate power supply sources. Electricity exports are not foolproof against sanctions, however. According to the former Iraqi electricity minister, Luay al-Khatteeb, Iraq imports 1,200 MW of electricity per year and up to about 1.2 billion cubic feet a day (bcf/d) of natural gas during peak consumption.⁴⁹ Overall Iraq needs more natural gas and power generation imports to fill the gap between supply and demand.⁵⁰ Thus, though Washington has given it waivers to import Iranian gas and electricity, Iraq is still under continuous U.S. pressure to find alternatives. The period of the waivers has been shortening, and Baghdad may reduce its imports if it finds sources that are competitive in price and volume.

Reportedly, Iraq has held separate talks with Saudi Arabia, Jordan and Turkey to "import electricity not only to supply Baghdad but also [the] northern part of Iraq as pathway to other countries."⁵¹ In August 2020, General Electric and the Iraqi electricity ministry signed two agreements worth over \$1.2 billion to expand

Iraq's power generation capacity and enhance its electricity transmission network. Capturing associated gas and using it as feedstock for power generation is a specific part of this agreement, which aims to capture 30–40 per cent of the associated gas that is currently flaring and to generate 3.3 GW of electricity.⁵² In July 2020, Iraq completed its side of a 1 GW link to Kuwait, which is to enable it to tap into the GCC grid.⁵³

Al-Khatteeb, Iraq's former minister of electricity, believes it will take three to four years' timeline for Iraq to develop its power sector and implement the economic reform and tariff reform, and also to develop its gas network and capabilities.⁵⁴ Nevertheless, to reduce its energy independence to Iran and to expand its domestic natural gas and electricity production, Iraq has a serious hurdle to face. According to former minister Al-Khateeb, "achieving this goal requires an uninterrupted and clear government program. My statement on the three to four years of required timeline is a conditional statement because now the government of Iraq is changed and we are out, so the whole plan could be interrupted and could be compromised."⁵⁵ Iraq has now an interim government and will have an early election in June 2021, hence not only has the whole economic reform been interrupted but also the economic situation in Iraq has changed and COVID-19 has changed the whole game across the globe. Therefore, many things have to be restructured

in order for economic reform to move forward. "This requires a stable government with full term not something that changes every twelve months. Otherwise it will be impossible to fix the electricity sector", former Iraqi electricity minister Al-Khateeb noted.⁵⁶ Noteworthy that a stable government is a key requirement for Iraq to be able to attract international investment in its energy sector and Iraq might remain dependent on natural gas and electricity imports from Iran. However this could change in the long-term and Iran's market share in Iraq could shrink eventually.

Converting condensate to Power, exporting electricity and expanding its water desalination industry are key long-term strategies that will help Iran use its condensate domestically instead of searching for a market share in an oversupplies market.

In future, Iran could also use electricity to expand its desalination industry, thus helping with the water crisis. Water desalination capacity beyond domestic needs might also “potentially” build an export capacity to supply water to its neighbors.

Oil Exports to China

The latest figures in China’s customs data indicate that trade has reached a new low, imports from Iran dropping 61 per cent in the first four months of 2020 compared to the same period in 2019. The main reason is the substantial fall in Iran’s direct oil exports: for example, only \$115 million in March, down 89 per cent year on the year. The data further indicate that China is buying on average 70,000 barrels of Iranian crude per day, a tenth of the volume before U.S. sanctions were re-imposed in 2018.⁵⁷ Non-oil exports to China remained stable in March at \$384 million, but this is the lowest value of Iran’s declared monthly oil exports to China in 20 years.⁵⁸

Nevertheless, as noted, Iranian contracts indicate that Chinese oil purchases are, upon closer inspection, far more than what has been officially declared in customs. Iran has been selling oil to China through alternate ways:

- from its bonded storages inside China, mostly in Dalian;
- increasingly in past months via Malaysia, from where it is exported as Malaysian; and

- recently by discharging cargoes in Singapore, where China buys them, or in floating storages rented and held by Beijing.

On 8 July 2020, Vice President Eshaq Jahangiri announced that “any powerful country that is willing to work with Iran can pre-purchase Iranian oil”. Iran is actively trying to convince traditional customers, particularly China and India, to buy in advance for future deliveries in return for investment, goods or services that can help it keep market share while providing short-term assistance to the economy and key industrial projects that otherwise lack funding. Most infrastructure projects, particularly in the energy sector, are presently idle due to lack of money and access to crucial technologies.

Iran and China announced a few months ago a 25-year strategic partnership that Tehran hopes will reinforce a strategic and political alliance as a counterweight to U.S. pressure. The deal may open the door to more Chinese investment and technology, but due to sanctions, Chinese companies have generally not met their commitments to existing Iranian energy projects over the past few years. A specific cooperative element is establishment of an Iran-China bank, with branches in both countries, to facilitate bilateral transactions. One of the more controversial components is China’s investment in upgrading and strengthening Iran’s military systems, particularly via naval cooperation. Despite their supposed “closeness”, however, China is unlikely to

jeopardize its economic and trade relation with Iran's rivals: the U.S., Israel, the UAE and Saudi Arabia. There is thus a large gap between the expectation and rhetorical value Iran attaches to the long-term agreement and the value China places in it.

Bypassing the Strait of Hormoz

On 25 June 2020, Petroleum Minister Zanganeh announced that Iran would start crude oil exports from the Jask terminal by end of the Persian year (20 March 2021). The Goreh-Jask Pipeline requires, he said, an investment of \$850 million. Reportedly, \$300 million has been invested thus far, and the project is 40 percent complete.⁵⁹

While Saudi Arabia and the UAE have put much effort into re-directing exports to bypass the Strait of Hormoz, Iran sees its dependency on this chokepoint as a vulnerability. The export facility is thus a key strategic project for the Rouhani administration that will theoretically allow Iran to export its liquid products via the Sea of Oman. It includes a 42-inch, 1,000 km pipeline connecting the oil processing facility in Goreh (Bushehr Province) to Fars Province, then Hormozgan and western Jask and on to the Makran region. The plan is to build the largest oil export terminal after Kharg in the region, which, beside crude oil, would export 600,000-700,000 barrels daily of processed gas condensate in the Persian Gulf Star Refinery via Jask.⁶⁰

While Jask port does not directly impact Iranian oil export volumes, its importance lies in its ability to function as an alternative export route should the Strait of Hormoz be blockaded. Iran has repeatedly "threatened" to close the strait in response to attacks on its oil tankers and geopolitical strife within the region. This encouraged other Persian Gulf countries dependent

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on the strait for exports to find alternative shipping routes. Riyadh has primarily focused on expanding its East-West crude pipeline stretching from its Gulf Coast to Yanbu in the Red Sea; Abu Dhabi has invested in the Abu-Dhabi Crude Oil Pipeline that transports crude oil from Habshan to Fujairah in the Gulf of Oman. Both these pipelines can circumvent Hormoz, thus providing some flexibility in the event of a blockade. Jask port, therefore, could give Iran the same flexibility and eliminate what would otherwise be a geostrategic disadvantage.

According to the petroleum ministry, Iran has constructed all the equipment for the pipeline. The largest obstacle was gaining access to special, very wide sheets, the pipeline's most important component. Foreign suppliers abandoned signed contracts due to sanctions, so Iran had to use domestic producers: Mobarakeh Steel and Oxin Steel of Khuzestan. They were able to build the required sheets, a first in Iranian petroleum/energy history. Mobarakeh made the required slabs, delivering 320,000 tons of sheet metal from 420,000 tons; Khuzestan manufactured the wide sheets, 250,000 tons of sheets out of an anticipated 385,000 tons. Domestic pipe manufacturers have produced 440 of the 1,000 km so far, of which 350 km have been transported to sites and are being welded and laid. According to official sources, 50 huge pumps, with a capacity of 2.5 MW, are required, all to be built by three local companies. These pumps, estimated to be

worth \$50 million, have never previously been built in Iran. The port is designed to host twenty storage tanks, each with a capacity of 500,000 barrels.⁶¹

VII. RETURN TO THE OVERSUPPLIED OIL MARKET

Whenever sanctions are lifted, Iran is likely to begin working on exporting oil and condensate at a pre-sanctions level of 2.5 mb/d. It has increased production capacity in 2020 in anticipation of its return to the global oil market. While it certainly has the technical ability to produce and export oil at maximum capacity following removal of sanctions, exports would be limited by subdued demand.

The oil market glut and resulting low prices have created a serious challenge for Iran to find customers simply by offering discounts. Sanctions in an oversupplied market are a new hurdle not faced under President Obama's tenure. While other major producers have been competing to secure market share, Iran's hands have been tied. The U.S. shale boom compounded the market's glut, rendering Iran's, Venezuela's and Libya's oil redundant. Despite OPEC

and Russian production cuts in 2018-2019, prices are low.

In September 2019, a drone missile attack closed Saudi Aramco's oil processing facilities in Abiqaiq and Khurais, costing the global market about 5.7 mb/d, 5 per cent of crude oil worldwide. However, this significant supply interruption did not cause a market price shock. Global oil demand and consumption are not keeping up with supply growth, a trend COVID-19 has exacerbated.

Demand shock, coupled with disagreements among OPEC+ members in March 2020, led to a significant oversupply in the market that briefly caused negative oil prices due to a lack of storage capacity. OPEC+ failed to agree that month on deepening or even extending the production cuts initially agreed in December 2016

between OPEC and leading non-OPEC countries. Upon that failure and the announcement that producers would pursue free market competition from 1 April, oil futures fell by 40 per cent. On 21 April, for the first time in history, futures contract for U.S. WTI crude for May delivery dropped below \$0 a barrel. The May futures contract for WTI (the benchmark for U.S. crude oil prices) eventually settled at -\$37.63 a barrel.⁶² Ultimately OPEC+ and non-OPEC+ countries such as the U.S., Canada and Norway agreed to cut production. Nevertheless, global demand is still low due to COVID-19 and is projected to remain that way at least until mid-2021. Full recovery to pre-COVID levels is not likely before end 2021 or early 2022, depending on vaccine development.

Iran's market return would present many hurdles: for Iran to regain market share; for the global oil market and major producers to adjust to the new supplies. OPEC+ would need to prevent another price collapse. It has already cut production to historical lows, and the return of Iran could create havoc unless that return were incremental.

With Biden in the White House, oil market expects Iran's exports to increase when the US (likely) returns to the JCPOA in 2021. While common expectations are that Iran's exports will not increase immediately, we could expect an immediate rise of Iran's production and export from January 2021. Biden intends to return the US to the

JCPOA. It is a top priority for the new administration's first 90 days. This is particularly relevant because US withdrawal from the JCPOA was accomplished exclusively through easily rescindable Executive Orders. There is a strong willingness from the Biden administration to restart negotiations and encourage Iran to fully comply with the nuclear deal, which would start unwinding some US sanctions including, the ban on Iranian oil exports. The new administration might also try to unwind some of Trump's sanctions before the Iranian presidential election in June 2021. This is particularly important, as it would signal to Iranian voters the US willingness to work with a pro-diplomacy candidate close to the current administration, instead of a relatively more 'hardline' candidate.

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VII. Return to the Oversupplied Oil Market

Iran, in anticipation of a 'softer' approach from the new US administration, will start raising its informal exports from January without fear of US response. On the other side, Iran's oil customers (particularly China) will also anticipate less US pressure and enforcement. Under Obama's nuclear sanctions, China was still importing on average about 500,000 b/d of oil from Iran. The trade war with the US under the Trump administration, however, forced China to increase its compliance with US sanctions.

VIII. CONCLUSION

U.S. sanctions were intended to drop Iran's oil exports to zero. Under nuclear-related sanctions until 2015, Iran exported an average of 1.5 mb/d, a 1 mb/d loss, but the Trump sanctions have cut much deeper, with Iran's oil and condensate exports bottoming out at less than 500,000 b/d. Iran has tried several ways to circumvent sanctions and increase incentives for traders and traditional customers, but none have helped much. From the beginning of new sanctions in November 2018, Tehran has cut crude oil production to adjust production with export capability, and less crude oil has meant NGL production has also dropped.

However, it is a different story for condensate, a byproduct of natural gas. If it is to meet domestic demand, Iran cannot cut its natural gas output in order to reduce condensate production. It has stored condensate in domestic storages, floating storages and bonded storages (mostly in China). Condensate stocks totaled about 98.9 million barrels by November 2019. If U.S. sanctions continue, the rise of condensate production could ultimately constrain natural gas production, but Iran has resisted that so far by mitigating the sanctions threat with short and long-term measures. It is focused on processing con-

densate domestically and converting it to either fuel and petrochemical products, or using it directly to generate electricity.

To tackle economic hardship under sanctions and generate additional financial resources for the government, the Rouhani administration seeks to pre-sell oil, with delivery in two years, in return for purchase credits. Iran still faces many challenges, however, both to maintain its economy and to sustain oil, gas and condensate production, all of which are suffering from the U.S. sanctions and inadequate investment. While sanctions have almost completely slashed crude oil exports (those to China being the exception), Iran has maintained more of its market share in electricity sales to neighbors.

Iran would do better to use its oil domestically, while exporting other energy products, thus maximizing broader economic benefits and energy strategy.

VIII. Conclusion

Nevertheless, it has been unable to access a large amount of the energy revenue it has accrued through electricity exports to Iraq and Turkey.

If sanctions are eventually lifted, Iran will face very few technical obstacles to increasing oil production to earlier levels. However, it will be difficult to regain lost market share, due to the oversupplied market. In any case, Iran would do better to use its oil domestically, while exporting other energy products, thus maximizing broader economic benefits and energy strategy.

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