IRAN Petroleum
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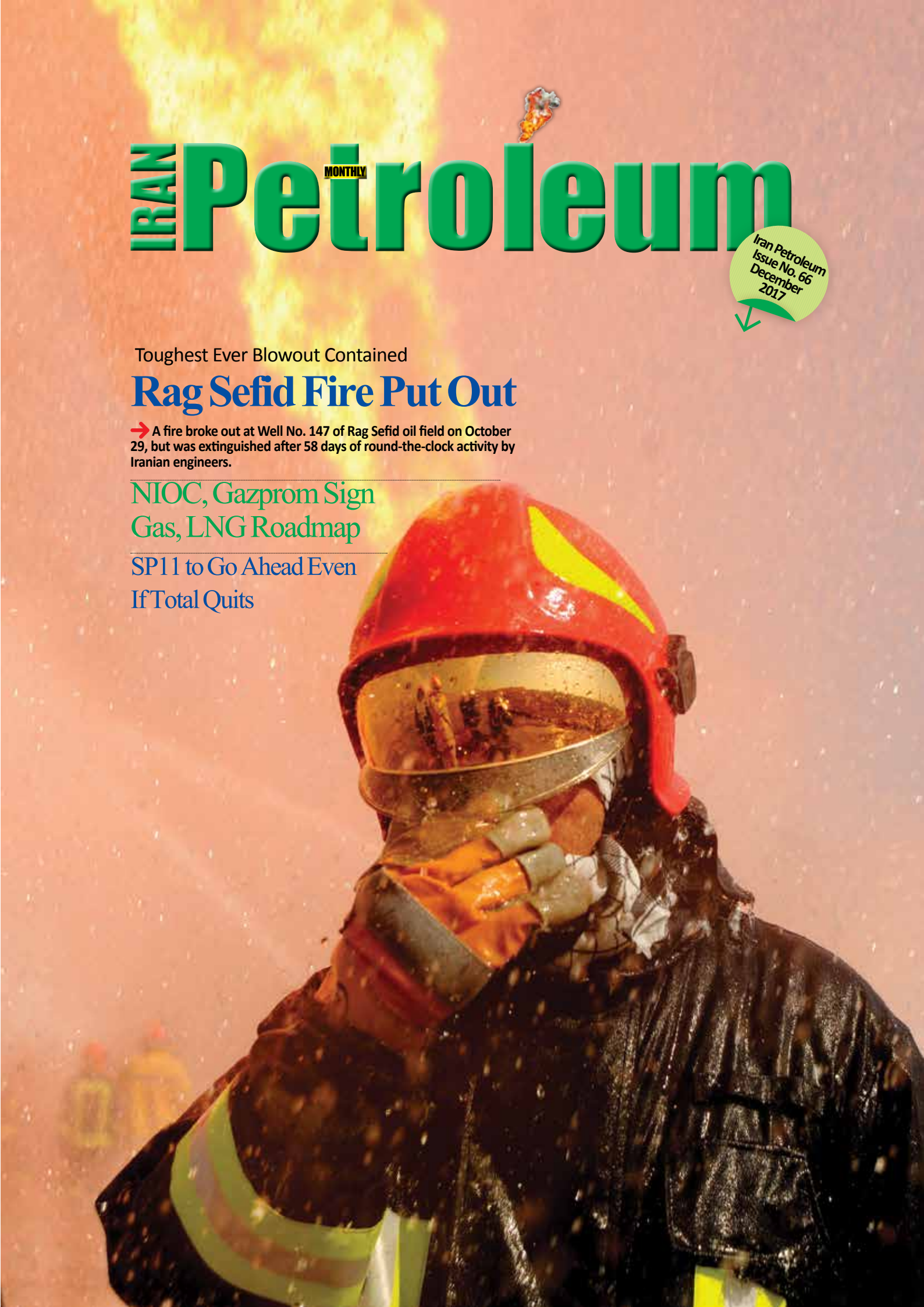
Toughest Ever Blowout Contained

# Rag Sefid Fire Put Out

**A fire broke out at Well No. 147 of Rag Sefid oil field on October 29, but was extinguished after 58 days of round-the-clock activity by Iranian engineers.**

## NIOC, Gazprom Sign Gas, LNG Roadmap

## SP11 to Go Ahead Even If Total Quits




# Iran Petroleum

monthly

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Petroleum Ministry - Public Relations

*Thank you for reading Iran Petroleum*

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# Iran Petchem Investment Secure and Profitable

Kasra Nouri
Director General of Public Relations

Iran's 6th Five-Year Economic Development Plan requires the country's petrochemical sector to attract upwards of $40 billion in investment to realize its objectives and projects. The macro-policies defined for Iran's petrochemical development plans envisage taking benefit from all existing potentialities. Access to low-cost feedstock, specialized and experienced workforce, effective and significant infrastructure, and access to high seas are among outstanding features of Iran's petrochemical industry that facilitate strong presence in international markets through reducing cost price of products.

The capital return, security and transparent financial regulations are among other advantages of investment in Iran's petrochemical sector. These potentialities are of high significance for proprietors of smart knowhow and technology and provident investors.

The expression of willingness by major petrochemical actors, including Germany's BASF, Royal Dutch Shell and France's Total, for future cooperation and partnership with Iran's petrochemical industry indicates the bright future of this sector in Iran.

Iranian petrochemical industry managers have set upgrading the standing of Iran's petrochemical sector at regional and international levels as the top priority of strategic policies in this arena. To that end, they recommend maximum use of domestic privileges and potentialities along with attracting foreign investment and applying state-of-the-art technologies.

Over recent years, despite illogical US sanctions, Iran's petrochemical industry has started up development projects to meet growing domestic demand and export petrochemicals and polymer products at significant levels.

From April to September this year, more than 31 million tonnes of petrochemicals were produced in Iran, nearly 10 million tonnes of which was used by downstream industries in the country. The remainder was sold on international markets.

According to assessments by international bodies, Iran is the only Asian country with all advantages of petrochemical development, including low-cost feedstock and lucrative markets. Every single advantage on its own can motivate investors and proprietors of technology to consider investment in Iran.

As it has been made clear time and again by the Petroleum Ministry and petrochemical industry policymakers, Iran has imposed no restrictions on negotiations with international companies and reliable investors, and it welcomes cooperation and partnership with prospective investors in this secure and profitable market.

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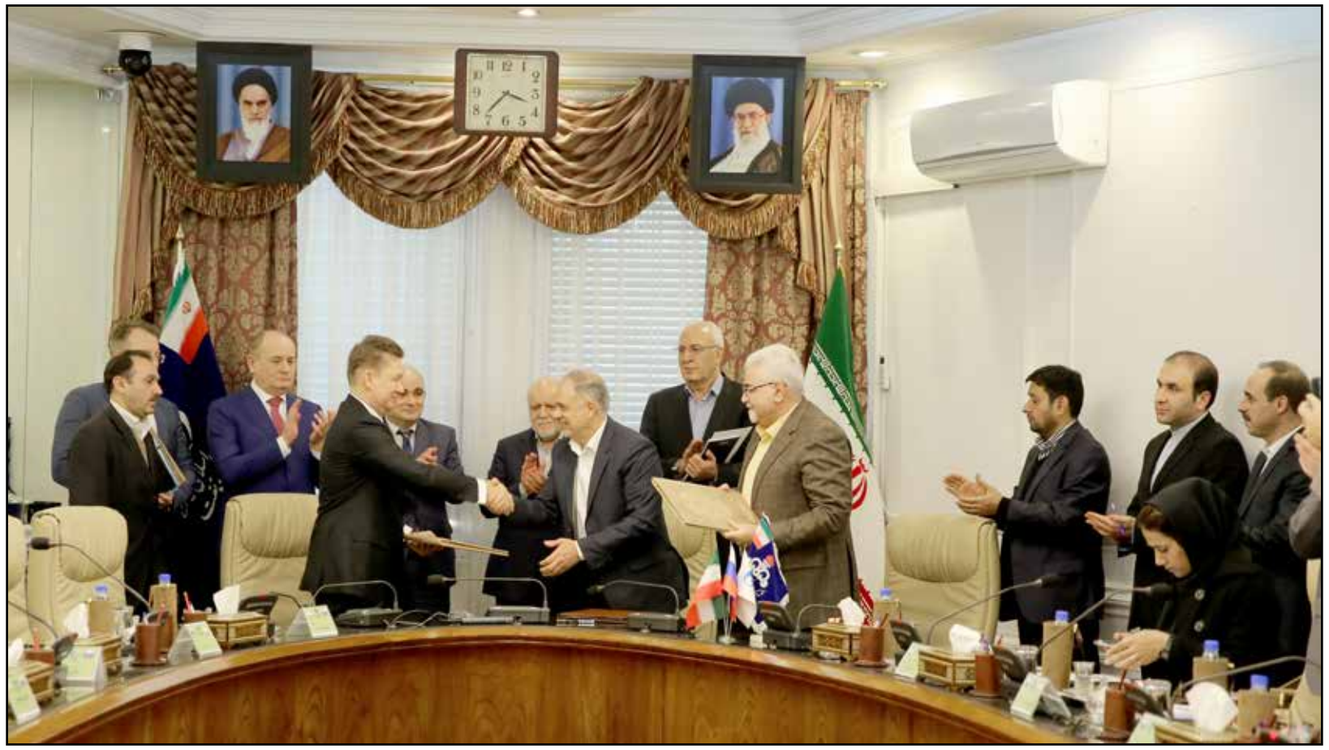
> Roughly $4 billion in investment is needed to complete the Iran LNG project, but we will know in coming months about the next phase of partnership



> Turkmenistan has not field any request for referring the issue to arbitration and they always prefer that the issue would not go to arbitration

# NIOC, Gazprom Sign Gas, LNG Roadmap



*The heads of National Iranian Oil Company (NIOC) and Russia's Gazprom have signed two memorandums of understanding focusing on a roadmap for gas cooperation and relaunching the Iran LNG project. The event, which was seen over by Iran's Minister of Petroleum Bijan Zangeneh, came one month after the NIOC signed six MOUs with Russian companies on the sidelines of a visit to Tehran of Russian President Vladimir Putin.*

Zangeneh said Iran-Russia cooperation in gas market was decisive. He referred to his useful talks with CEO of Gazprom, saying: "Over the past one year, the NIOC has signed numerous MOUs with Gazprom, but this MOU is for Gazprom to present its plan for the development of Kish, North Pars as well as Farzad A and Farzad B gas fields." He said that these development plans would target gas exports. He added: "Costs must be recouped from gas exports. For this reason, Gazprom, which is an experienced company, will envisage gas exports either via pipeline or via establishment of liquefied natural gas (LNG) plants." With the startup of new phases of South Pars gas field under the administration of President Hassan Rouhani, Iran's gas production capacity has increased to 850 mcm/d, but markets for Iran gas are not yet sufficient. Turkey and Iraq are buying gas from Iran, while Iran has gas swap deal with Armenia and Nakhichevan. Iran has widespread plans to develop its independent and also jointly owned gas fields and expand its export markets.

In addition to the NIOC-Gazprom MOU, NIOC and Oil Industry Pension Fund Investment Company (OPIC) – which are owners of Iran LNG – signed an MOU with Gazprom. Zangeneh said the Iran LNG company is incomplete plant with a production capacity of 10 million tonnes a year. The minister said Gazprom would conduct its financial and technical study on the project during a 6-month period before presenting its proposal for contribution to the financing of this plant. Zangeneh said the NIOC-Gazprom MOU was an important step for the Russian firm's presence in Iran's gas development projects, as well as gas-powered petrochemical plants. Asked about how much investment was needed for the project, the minister said: "Roughly $4 billion in investment is needed to complete the Iran LNG project, but we will know in coming months about the next phase of partnership."

In response to if Gazprom would be a partner with Iran in gas exports, Zangeneh said: "Every circumstance depends on future negotiations."

"Cooperation between Iran and Russia, which respectively hold the first and the second largest known gas reserves in the world, will be decisive in the world market," he said.

## Gas Fields Study Results in 2018

Alexey Miller, CEO of Gazprom, said the NIOC-Gazprom MOU was an important step for gas cooperation with Iran. "This company will present its development reports about Farzad A and B, North Pars and Kish gas fields during the first quarter of next year to the NIOC," he said. He added that Gazprom would also study details of presence in the Iran LNG project.

## 10 Oil Deals

Separately, Zangeneh said negotiations were under way for signing 10 oil contracts.

"As far as their conclusion is concerned I have to say that we are only one party to agreement and the other party constitutes companies we are negotiating with," he said. Zangeneh said the negotiations were going ahead seriously, "but both internal and external factors affect such issues that would be out of control of both parties." Asked about putting out to tender the Azadegan oil field, Zangeneh said: "The process of tender for this field is going ahead on schedule and there has been no delay. As I have already said in case everything goes ahead normally the result of this tender bid will be come out in summer 2018."

## Reformatting Contract with Norway's Helma

Zangeneh said the framework of Iran's contract to sell LNG to Norway's Helma is likely to change. "It may become like that our gas would belong to us and the Norwegian party would be remunerated for converting gas into LNG and delivering," he said. Zangeneh said the NIOC might have to consider such an option for certain reasons, adding: "I think the Norwegian company will accept to be remunerated. Meantime, we have to take care of marketing for LNG supply."

Iran signed first ever contract to export natural gas in the form of LNG, following months of negotiations. The contract was signed between the NIOC and IFLNG (jointly owned by Iran's Khark Gas Refining Company and Norway's Helma). Under the contract, Iran's natural gas will be converted to LNG in a floating LNG vessel (FLNG), belonging to Belgium's Exmar. The vessel called, Caribbean FLNG which is chartered by IFLNG Company, has the capacity to produce 500,000 tonnes of LNG per year. The 20-year contract will come into force within three months. The Caribbean FLNG is expected to dock at Pars Service port in Persian Gulf in mid-2018, in order to receive 2.3 mcm of natural gas per day from 7th South Pars Gas Refinery.

## Openness to Talks with Turkmenistan

Asked about Turkmenistan's decision to take its gas dispute with Iran to international arbitration, Zangeneh said: "Turkmenistan has not field any request for referring the issue to arbitration and they always prefer that the issue would not go to arbitration. However, if negotiations fail to yield results the issue will go to arbitration. But we have let the path to talks open." Turkmenistan signed a deal with Iran in 1997 to supply gas to some northern provinces in Iran. It halted its gas supply to Iran last January citing a price row. Turkmenistan had earlier done so in 2007 when a cold spell had hit Iran. As South Pars is developed further Iran will have no problem with its domestic gas supply. However, a 1,500-km pipeline is needed to be built to carry gas from South Pars to northern Iran, while a 100-km pipeline can deliver gas from Turkmenistan to northern Iran.

## Oil Revenues to Materialize

Zangeneh said Iran would reach the target of producing 5 mb/d of crude oil and gas condensate. "We will reach the target set in this regard," he added. Touching on oil revenues for the current calendar year to March 2018, he said: "According to what we said from the very beginning, more than 2.5 million barrels of oil was exported at $50 price and we will gain more than envisaged for" current calendar year."

> North Pars, which is situated 120 kilometers southeast of Bushehr Province at a depth of 3,500 meters and 10-15 kilometers away from land, holds more than 57 tcf of gas in place

> The production capacity of North Pars equals that of four phases of South Pars. At least 46 wells are needed to be spudded in North Pars to supply 3,600 mcf/d of gas



# Gazprom Eyes North Pars Development

*More than two decades has passed since Iran started gas recovery from the supergiant offshore South Pars gas field which it shares with Qatar. When Iran was engaged in the eight-year imposed war, Qatar had awarded attractive contracts to international companies to recover gas and condensate from the gas field. That is why pressure fall-off is seen in the Iranian sector of South Pars.*


Iran has sought assistance from France's energy giant Total which plans to build offshore pressure booster platforms. Until that time, plans are under way to develop North Pars gas field. The CEO of Pars Oil and Gas Company (POGC), which operates the South Pars development, has announced that North Pars is planned to be developed only in the offshore sector. The North Pars development bears significance because trading of gas, which is abundant in Iran, is among the important plans of the Iranian Ministry of Petroleum in coming years. North Pars, which is situated 120 kilometers southeast of Bushehr Province at a depth of 3,500 meters and 10-15 kilometers away from land, holds more than 57 tcf of gas in place. At an international conference in Tehran, Iran offered North Pars along with 50 others for development under the newly developed IPC model. The North Pars development is estimated to cost at least $16 billion, $5 billion for upstream sector and $11 billion for downstream sector (LNG plants). The discovery of gas in North Pars dates back to 1963 when 3D seismic testing revealed this field. After that, six exploration, appraisal and development wells were expected to be drilled for the development of the field. In the years leading to the 1979 Islamic Revolution, Exxon and Lands were in charge of designing and building facilities for the North Pars development. These activities were halted in the aftermath of the 1979 Islamic Revolution. At the time of exploration, North Pars was the largest proven gas reservoir in Iran and investment in it was done at high speech. But after the discovery of South Pars, North Pars became the second priority for investment. South Pars is in the final stages of development with domestic and foreign investment, and the time has come for the North Pars development. Iran recently signed a memorandum of understanding (MOU) with major Russian companies to study 10 oil fields. The Russian side has agreed to present the findings of its studies on North Pars and other fields in the first quarter of 2018. After signing an MOU with the National Iranian Oil Company (NIOC), CEO of Gazprom Alexey Miller said: "Today, an important step has been taken for gas cooperation with Iran." Gazprom is the largest producer of natural gas in the world. So far, 17 wells have been drilled at North Pars and 26 offshore platforms have been installed. However, production from this field has yet to start as the field remains untapped. The production capacity of North Pars equals that of four phases of South Pars.

At least 46 wells are needed to be spudded in North Pars to supply 3,600 mcf/d of gas. This amount of gas could be produced from South Pars for 25 years. After that, the field would be able to produce gas for a decade. The recovery rate of the field is estimated at 61%. The North Pars gas would be used to feed gas refineries in South Pars. A senior Iranian oil official recently said that financing and hiring new workforce would constitute Iran's post-sanctions priorities. The development of South Pars is envisaged in four phases, each with an output of 1.2 bcf/d. The output from all four phases would be 4.8 bcf/d. The liquefied natural gas (LNG) produced from one phase of this field was agreed to belong to Iran, while the foreign investor would be in charge of marketing LNG produced in two other phases. Another phase will inject gas into national trunkline for domestic consumption.

# SP11 to Go Ahead Even If Total Quits

*The CEO of Pars Oil and Gas Company (POGC) has reiterated that the development of Phase 11 of South Pars gas field will go ahead as planned.*
*"In the contract for the development of Phase 11 of South Pars, a mechanism has been worked out so that nothing would go wrong with the project even if Total happened to pull out," Mohammad Meshkinfam said. France's energy giant Total has signed a nearly $5 billion deal to develop Phase 11 of South Pars.*

> The envelopes have been opened and are being examined by Total. We will soon announce the name of the winner



**Roya Khaleqi**

"We hope that Total would stay in Iran," Meshkinfam said amid speculation that US President Donald Trump may seek to impose fresh sanctions on Iran.He made the remarks when asked to comment on the Chinese CNPCI's alleged expression of readiness to take over Total's share in case the French company pulls out.

"It means that if Total pulls out of this project CNPCI and Petropars are still present," he added.

Last July, a $4.879 billion IPC-style contract was signed between the National Iranian Oil Company and a Total-led consortium which also includes China's CNPCI and Iran's Petropars for the development of Phase 11 of South Pars. Total has a 50.1% share in the project, CNPCI 30% and Petropars 19.9%.

The development project is expected to produce 56 mcm/d of rich gas to be transferred to the refineries of Phases 6-8 and Phase 12 of South Pars.

Asked how the project was going on, Meshkinfam said: "Total's work in this phase is going ahead on schedule and in some certain cases ahead of schedule."

He said all projects often start with delay, adding: "The tender papers have been distributed and EPC contractors' envelopes have been opened and the process of choosing Iranian contractors is under way."

Meshkinfam said Phase 11 has no onshore sector. He added: "We plan to pump 1 bcf (28 mcm) of gas produced in this phase to Phases 6-8 of South pars and 1 bcm to Phase 12. Therefore, there is practically nothing to do onshore."

## an Opportunity to Benefit From the Latest Savvy With Total

Meshkinfam said Total's departure would depend on international conditions. "However, With the Total present in this project we will naturally stand the chance of benefiting from state-of-the-art technology," he added. Asked if CNPCI and Petropars would be able to build pressure booster platforms if Total leaves, he said: "The main issue in the construction of pressure booster platforms is their design which Total is doing now. In parallel, it is putting it at Iran's disposal."

He expressed hope that Total would remain in Iran until the end of the project and would manage to operate a platform in Iran completely for the first time.

Meshkinfam said that four Iranian companies participated in a bidding round for the construction of the Phase 11 platform. "The envelopes have been opened and are being examined by Total. We will soon announce the name of the winner."

He said that the financial proposals have been examined at the same time and an EPC contract would be signed for the project in the near future.

Meshkinfam said POGC staff have over the past two decades worked in line with the objectives and mission of the company.

"As the company has grown and been upgraded, domestic contractors and manufacturers that have been involved in the South Pars projects have improved as well," he added. Meshkinfam was speaking on the sidelines of an exhibition showcasing the achievements of POGC at its 20th anniversary.

Recalling that Iranian contractors dreamt of implementing a pipeline project at the start of South Pars development,

## Zoom

Meshkinfam said that four Iranian companies participated in a bidding round for the construction of the Phase 11 platform. "The envelopes have been opened and are being examined by Total. We will soon announce the name of the winner

> The production of ethane, as the most important refined product with a value-added 200 times the gas, has reached 5 million tonnes a year

> The most important issue in the negotiations with the Indian company over Farzad B gas field is the purchase of gas from this field



Meshkinfam said: "Iranians have now laid out more than 3,000 kilometers of pipeline. Furthermore, 26 platforms have been built by domestic contractors and the Iranian Offshore Engineering and Construction Company and been installed offshore."

## Iran on Par with Qatar

Meshkinfam said that Iranian contractors have grown in the Iranian side of South Pars, while top oil and gas companies have been present in the Qatari side. "But despite this [big gap], we are both on equal footing in daily recovery," he added. Meshkinfam said that floating production storage and offloading (FPSO) had been installed in the oil layer of South Pars.

"With a wellhead platform and seven wells, 25,000 b/d of oil is being recovered from this layer, which is planned to reach 150,000 b/d," he said.Meshkinfam also referred to the South Pars products, saying: "The completed South Pars projects are currently delivering 456 mcm/d of light gas to national trunkline. Meantime, 45 mcm/d of sour gas is being injected into oil fields."Meshkinfam said gas condensate production from South Pars had reached 808,000 b/d. "The production of ethane, as the most important refined product with a value-added 200 times the gas, has reached 5 million tonnes a year."

Furthermore, he added, 7.9 million tonnes of liquefied petroleum gas (LPG) is produced for exports, while 3,750 tonnes a day of sulfur is being supplied.

## Tough Winter

Meshkinfam said $72 billion had so far been invested in the South Pars development, adding that the project is estimated to cost a total $87 billion. "All state organs have over the past 10 years shown cooperation for providing the necessary finance and national cooperation was seen for the South Pars development," he added.

Meshkinfam said accumulated gas production from South Pars had reached 1,162 bcm, adding: "If we consider 18 cents for each cubic meter of gas, the products would be valued more than $200 billion."

He also said that four platforms would be built and loaded out this winter. "Platform 14A has been built in ISOCIO (Bandar Abbas) Yard and will be transferred to its destination in January. On February 11, we plan the trial run of the first train of refineries of Phases 22-24. Later, three platforms built in SADRA Yard (Bushehr) will be moved towards destination," he said. Meshkinfam also said that the first row of the refinery of Phase 13 is to come online on a trial basis before the end of the current calendar year on March 20.

## Maersk Likely to Develop Oil Layer

Meshkinfam said that a number of companies were in talks for the development of the oil layer of South Pars gas field. "But negotiations with Maersk [of Denmark] are progressing well and we hope to make good progress in coming months," he added.

Meshkinfam predicted that the second IPC-style deal would be signed with Maersk for the development of the South Pars oil layer.

Asked if there was any conflict of interests if Maersk is acquired by Total, he replied: "Maersk's tie-up with Total has yet to be finalized and at the moment Maersk is independent. Necessary arrangements have been made for possible merger between Maersk and Total. In fact if we reach agreement in technical and financial issues the Maersk-Total merger will cause no problem." He said that the agreement for the oil layer development would be signed this calendar year if negotiations continued at its current pace. Meshkinfam said Maersk had yet to choose its Iranian partner for the project, as required by Iran's foreign investment law. The oil layer of South Pars, roughly 100 kilometers off Iran's Persian Gulf coasts, is located along Iran-Qatar maritime border. The oil layer is estimated to hold between 1.5 billion and 4 billion barrels of oil in place in its Madoud, Upper Dalian and Lower Dalian formations. The API gravity of oil in this field is approximatively 21.

## No Problem Over Farzad B

Meshkinfam also touched on negotiations with an Indian company for the development of Farzad B gas field. "The most important issue in the negotiations with the Indian company over Farzad B gas field is the purchase of gas from this field. They suggested that the NIOC purchases the gas extracted from this field, but due to sufficient gas in the country we don't need the gas recovered from this field," he said.

Meshkinfam said Iran had no technical problem with the Indians over the development of this field. He added that negotiations had also started with some other companies, including Russia's Gazprom, for the development of this field. Farzad A and Farzad B gas fields, in Farsi block, are located along Iran-Saudi Arabia border and 15 kilometers from Farsi Island.

The offshore facilities of this project are located 100 kilometers from the coastal strip and onshore facilities are 80 kilometers east of Bushehr.

## $20bn Needed for Sustainability

Meshkinfam said arrangements were under way for the sustainability of gas production from the South Pars field. He added that the priority for now was to boost pressure in the field. Meshkinfam put South Pars production at upwards of 550 mcm/d the, which would reach 700 mcm/d when new phases have been developed.

"To avoid pressure fall-off in the South Pars reservoir in coming years, we have already made planning to sustain the production," he said. Meshkinfam said that nearly $20 billion in investment was needed to guarantee the sustainability of gas production from South Pars.

He said that the POGC would concentrate its efforts mainly on the sustainability of gas production from South Pars over the coming 20 years.

South Pars, known as North Dome in Qatar, is jointly owned by Iran and Qatar. The Iranian side is 3,700 square kilometers, of a total 9,700 square kilometers. South Pars holds 14.2 tcm of gas in place (8% of world's total reserves and 47% of Iran's proven gas reserves), 19 billion barrels of condensate, 7.5 billion barrels of crude oil in oil layers, and big volumes of helium.

## SP11 Subcontracts

The manager of SP11 project also said subcontracts for the project are to be signed by the end of the current calendar year (20 March 2017).

Regarding platforms for Phase 11, Rasoul Fallahnejad said that six to ten months was needed for the basic design of platforms, choosing a consultant, carrying out environmental studies and taking care of preliminary affairs. After that, he added, the process of bidding will start to choose subcontractors. That, he said, would take six to eight months. "On average, 15 to 16 months after the signature of the main contract, subcontracts will be signed and executed," he said. Fallahnejad said that Total would supervise equipping factories which would be set up by EPC companies to build jackets and platforms.

He said that technical packages have been submitted and financial packages have been examined. "Given the country's financial conditions, after the opening of financial envelopes, the issues of transfer of hard currency, opening of banking accounts and banking guarantees would take time so that the parties would reach agreement on the mode of payment. After that, agreements will take effect," he added. Fallahnejad added that plans were under way for the awarding of all subcontracts for Phase 11 before the end of the current calendar year.

He said that production was expected to start 40 months after the awarding of the contract; however, "we are already ahead of schedule."

## WEP Petchem Plants Raise Output

1

The director of control at National Petrochemical Company (NPC) has said that petrochemical plants located along the West Ethylene Pipeline (WEP) have raised their output.

Ali-Mohammad Bosaqzadeh said that the increase in output was due to a 20-30% more injection of ethylene into the pipeline.

"In addition to the increase in polymer production with various grades, petrochemical units on the route of this pipeline have increased their output from a year ago," he said. "For instance, Lorestan Petrochemical Plant has for the first time produced at more than 117% of its rated capacity, which is due to feedstock and catalyst supply, changes in the production process and installation of parallel reactors," said Bosaqzadeh. He added that Mahabad Petrochemical Plant was also running at 105% of its nominal capacity. Under normal conditions, he said, a petrochemical unit could produce at up to 110% of its rated capacity. He added that production at more than 125% of rated capacity required changes in equipment and upgrading devices.

Bosaqzadeh said that the petrochemical plants along the WEP route were willing to maximize output through sufficient investment. He said empty petrochemical depots constituted a success for Iran, adding: "This issue shows broadened domestic and foreign marketing. These units have managed to sell out their products."

## Russian Firms Submit Study Results

2

Russian companies Tatneft and Zarubezhneft have submitted the findings their studies about the development of Shadegan oil field to the National Iranian South Oil Company (NISOC).

NISOC signed a memorandum of understanding with Tatneft last March and a memorandum with Zarubezhneft last July to study Shadegan. Both Russian companies submitted their findings in December.

Furthermore, Pasargad Energy Development Company presented the results of its study on Shadegan to NISOC, while Oil Industries Engineering and Construction Company (OIEC) submitted its study on Sepehr to the National Iranian Oil Company (NIOC).

A single master development plan (MDP) will be made of the studies conducted by different companies to be combined with an MDP earlier drawn up by NISOC to serve as the basis of development of Shadegan.

## Gasoline Evaporation to Be Cut

3

The managing director of National Iranian Oil Products Distribution Company (NIOPDC) has said that efforts were under way to minimize gasoline evaporation rate."Gasoline evaporation is higher in summer than in winter, and due to this evaporation we compensate gas station owners 45 liters for reach 10,000 liters," Mohammad-Reza Mousavikhah said. "This evaporation rate has a scientific basis and has been calculated based on scientific findings," he added.Mousavikhah added that NIOPDC would follow the findings of new research conducted in such prestigious universities as Sharif University of Technology and Tehran Polytechnic University.

He said that formation of chain companies to distribute fuel was a policy pursued in many countries in the world. He added that the Kermanshah, Tabriz and Shiraz refineries had formed chain companies. "The Shiraz refinery will soon supply its products to places under its cover and it will no longer need to use the NIOPDC depots. That can help cut distribution costs," said Mousavikhah.

## Annual Gas Supply to Hit 400bcm

4

The Iranian Gas Transmission Company (IGTC) is expected to bring its gas supply levels to 400 bcm by 2025, CEO Saeed Tavakoli has said.

"The number of pressure booster stations will reach 130 from the current 79 and the amount of gas transmission will reach 400 bcm by 2025 (from the current 240 bcm)," he said.

Tavakoli noted that the IGTC ranked the first in Asia in terms of volume of installations, and stood fourth in the world after Russia, the US and Canada.

He said that gas transmission in the final month of the third quarter was up 52mcm to 746 mcm year-on-year. "We have currently 36,000 kilometers of high-pressure gas transmission pipeline, which is expected to increase 26% to 45,000 kilometers by 2025," said Tavakoli.

He said that smart mechanisms and modern technologies were needed for inspecting the pipeline. "We must be also able to act based on the general parameters of safety in order to have a sustainable and reliable network."

Tavakoli said that gas supply to power plants had reduced pollution from liquid fuel by 17 to 22%.

## Assaluyeh Supplies 70% of Iran Gas

5

The deputy managing director of Pars Oil and Gas Company (POGC) for operations and logistics has said the company is ready to supply 570 mcm/d of gas in the second half of the current calendar year to March 2018.

"The South Pars installations are thoroughly ready for the arrival of winter," Yahya Rashidi said.

He touched on the start of production from Phases 2 and 3, adding: "So far 27 gas platforms have become operational in this giant field."

"Currently, around 555 mcm/d of gas is being recovered from the jointly owned South Pars reservoir. As soon as restrictions on gas supply from the South Pars refineries have been removed, this figure can increase to 570 mcm/d," he said.

Rashidi recalled that 70% of Iran's gas is being supplied by South Pars. He added that South Pars gas output would plateau by March 2020.

He said that every year POGC presents an overhaul plan for pipelines and offshore platforms to the Directorate of Supervision on Production. He added that HSE tests, repairs and technical inspections are done regularly.

Rashidi said gas supply commitments for winter would be met in full following overhaul of gas platforms of South Pars in the first half of the year.

He said that POGC had signed an agreement with a domestic company which is a Malaysian partner for remotely operated vehicle (ROV) pipeline inspection. That came following a rupture in the pipeline of Phases 16 and 19.

He said the project would become operational next March, adding that all pipelines and offshore installations in South pars would be inspected.

# Zangeneh Meets With Hungary, China, Iraq Officials

Iran's Minister of Petroleum Bijan Zangeneh met separately with Hungarian Finance Minister Mihály Varga, Wang Yanguo, vice chairman and secretary-general of China International Chamber of Commerce for the Private Sector, and Iraqi Deputy Oil Minister Hamid Younis Salih. The Hungarian minister said that his country was willing to increase its oil purchase from Iran.

He said negotiations had been held for Iran and Hungary to enhance their financial and banking ties.

"We agreed to upgrade financial relations between the two countries. We will also try to remove barriers to investors," said Varga.

Separately, Wang referred to growing cooperation between Iran and China, and said: "Iran and China may cooperate with each other for investment in the oil and petrochemical sectors."

He said that Tehran and Beijing could realize the $600 billion trade level envisaged by Iranian and Chinese presidents. "China's private companies are willing to directly invest in Iran's petroleum industry, and I hope cooperation between the two countries in this sector will expand," said Wang.

The Iraqi deputy oil minister said Iran had achieved valuable experience in the gas sector, adding that Iraq needed to broaden its cooperation with Iran to realize its objectives. "We will benefit from the experience of Iranian contractors, both in investment and joint Iranian-Iraqi companies, to develop Iraq's gas industry," said Younis Salih.

6

## Hungary Oil Firm Ready to Work in Iran

After his meeting with Varga, Zangeneh said Hungary's oil and gas company MOL was willing to invest in Iran's energy sector. "Iran has expressed readiness for Hungarian companies to invest in Iran's oil projects," he added. Zangeneh said Hungary was willing to cooperate with Iran in the Pakistani section of a gas pipeline Iran is building to its eastern neighbor. "Pakistan has yet to make up its mind about agreement on gas imports from Iran," he said. "Hungary has experienced working in Pakistan's gas sector, including exploration and production, and has long been active in this country," he added.

## Decision Expected on 2 NISOC Fields

The fate of two oil fields administered by the National Iranian South Oil Company is to be decided before the end of the current calendar year.

Hamid Doris, director of technical affairs at NISOC, said agreements were expected to be signed for the development of Karanj field in January and for Shadegan by March.

That field along with Rag Sefid and Parsi is to be developed under the newly developed Iran Petroleum Contract (IPC) model. Studies on Karanj have been carried out by "MAPNA Power Plants Management Company" and Pergas consortium. These studies have been assessed by geologists, reservoir engineers, processing and drilling experts.

"Drawing up a master development plan for the development of Shadegan field is on the agenda of five companies. The final report of Pasargad Energy Development Company has been submitted and other companies are to do so shortly," Doris said.

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## Austrians Eager for Academic Cooperation with Iran

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An Austrian delegation attending Iran-Austria Joint Energy Committee has expressed interest in joint academic activities related to petroleum industry including drilling and enhanced recovery.

The Office of Deputy Minister of Petroleum for Research and Technology announced that the fourth session of the energy committee was attended by Austria's ambassador to Tehran, as well as managers and representatives from the Austrian companies BMWFW, OMV, VOWC, ILF and RAG.

During the meeting, which was held in the central city of Isfahan, manufacturing of ten groups of commodities and the second phase of strategic equipment were discussed. Austria is already cooperating with Iran in energy efficiency, energy generation from renewables, banking sector, and oil field projects. Furthermore, an Austrian bank has released a $1 billion credit line for financing projects in Iran.

## Iran, Italy Seal €34mn Petchem Deal

Italy's Techint Group has entered into a €34 million contract with Iran's Ardebil Petrochemical Company under which the Italian engineering and construction firm will help build a propylene plant.

The project will take the form of gas-to-propylene or gas-to-olefins, and will target a capacity of 500,000 tonnes per year. Techint will designate a licensor, as well as training local human resources.

The total project cost was named as €1.6 billion by Chairman of Ardebil Petrochemical Company Bahram Shahsavari. He also said the project would create 1,500 direct and 10,000 indirect jobs in Ardebil Province.

He said that negotiations with the Italian company had started at the start of the second half of the current calendar year.

Shahsavari said that indigenization of engineering knowhow and training specialists would be among the achievements of this agreement.

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## Three Foreign Firms Study Cheshmeh-Khosh

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The Committee of Consultants at the Reservoirs Directorate of National Iranian Oil Company (NIOC) has reviewed development models proposed by Russia's Gazprom Neft, Austria's OMV and Malaysia's Petronas for the development of Cheshmeh-Khosh oil field. The proposals submitted by Gazprom Neft and OMV are aimed at sustaining the production ceiling of this field, while Petronas has raised the possibility of enhancing output from Cheshmeh-Khosh. The NIOC Directorate of Corporate Planning announced that Cheshmeh-Khosh is a big oil field with two reservoirs in Asmari and Bangestan formations. The Asmari reservoir is comprised of sandstone layers with favorable reservoir features, while Bangestan formation is more than 700 meters thick. For the moment, the Amsari reservoir is the only one producing oil in Cheshmeh-Khosh. The preliminary plan on Bangestan formation is based on the assessment of the reservoir to prepare the way for raising output to 20,000 b/d.

France's Total, Germany's Linde and BASF, France's Air Liquide, Royal Dutch Shell, Japan's Sojitz Corporation, South Korea's Hyosung and China's Hui Xiang have signed MOUs with the NPC

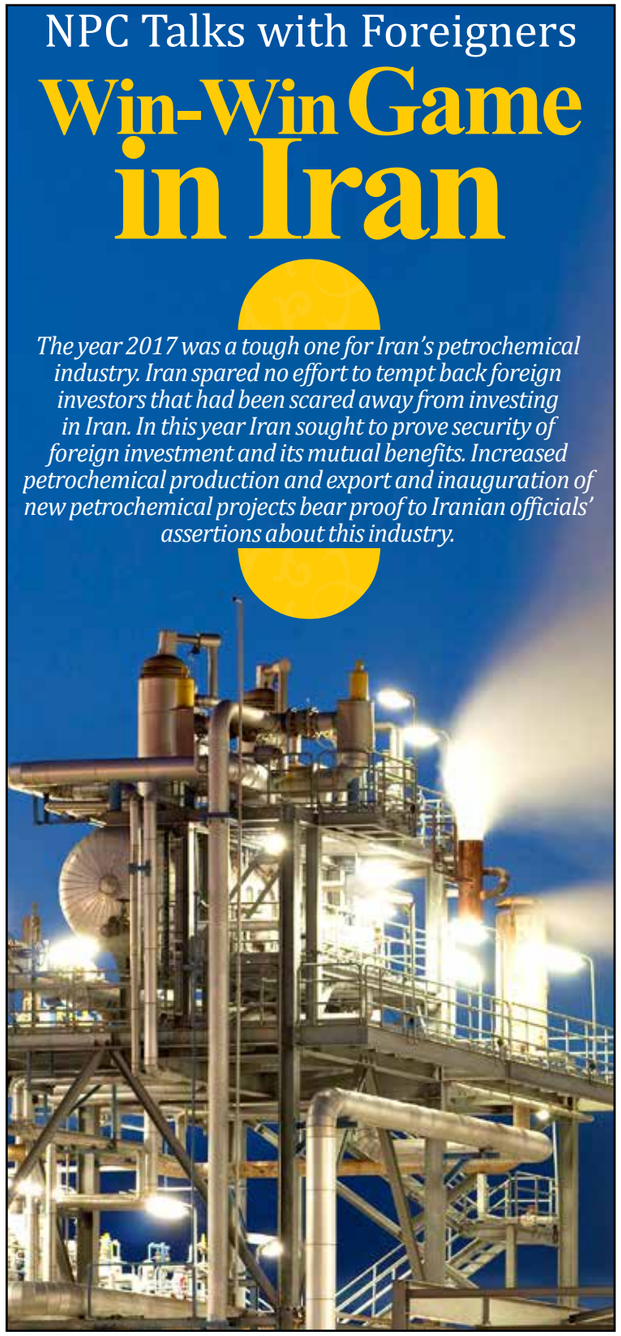


We are trying to remove barriers and bring these companies closer to the private sector, and the NPC would make planning and detect the development of industry

NPC Talks with Foreigners

# Win-Win Game in Iran

*The year 2017 was a tough one for Iran's petrochemical industry. Iran spared no effort to tempt back foreign investors that had been scared away from investing in Iran. In this year Iran sought to prove security of foreign investment and its mutual benefits. Increased petrochemical production and export and inauguration of new petrochemical projects bear proof to Iranian officials' assertions about this industry.*



**Negar Sadeqi**

Reza Norouzzadeh, CEO of Iran's National Petrochemical Company (NPC), said Iran sought, in 2017, to encourage foreigners to invest in Iran's petrochemical sector. "Alongside attracting foreign investment, we are seeking to use modern technologies in the development of petrochemical industry," he said. Norouzzadeh said foreign investors had been coming to Iran in the wake of signature of Iran's landmark nuclear deal officially known as the Joint Comprehensive Plan of Action (JCPOA) with six world powers in 2015. "We are in talks with renowned companies for investment," he added. Iran's full compliance with the JCPOA has neutralized US President Donald Trump's threats to penalize foreign companies willing to invest in Iran. As Iranian officials have indicated, no negative feedback has been seen in the talks between Iran's petrochemical industry and foreign companies. Iranians have learned to turn threats into opportunities. Startup of numerous projects in South Pars gas field and inauguration of petrochemical projects during years of sanctions are cases in point. So far, 11 memorandums of understanding and agreements have been signed with foreign companies in petrochemical sector. France's Total, Germany's Linde and BASF, France's Air Liquide, Royal Dutch Shell, Japan's Sojitz Corporation, South Korea's Hyosung and China's Hui Xiang have signed MOUs with the NPC. Furthermore, two financing agreements have been signed with Japan's Itochu and Marubeni. Iran faces no restrictions in negotiations with foreign companies, but Zionist regime companies are the only redline in economic talks. Hossein Ali-Morad, director of foreign investment at NPC, said: "We hope that in the early 2018, we would sign foreign direct investment with [renowned European firms]." If an agreement is reached, European companies will participate in a petrochemical project in Iran.

## Iran Petchem Potential

Ali-Morad said the major challenge faced by the NPC in 2017 was to promote Iran's petrochemical industry in the world, following the removal of sanctions. "Unfortunately sanctions caused foreign companies to leave Iran and remain unaware of strategies of development in Iran," he added. The sanctions slowed down the trend of development of petrochemical industry, but this move was never halted. The implementation of the JCPOA opened doors to foreign investment and negotiations with foreign companies were held in rapid succession. However, the main point is that many companies were unaware of growth and development of Iran's petrochemical industry during years of sanctions. "Many foreign companies wanted us to introduce our strategies for development of petroleum industry, particularly petrochemical sector, and our development plans in this sector to them. It took us a long time," said Ali-Morad. He said the NPC had been quite successful in doing so, expressing hope that the endeavors made in 2017 would come to fruition next year. "We hope that in 2018 foreign companies, having got familiar with Iran's petrochemical sector, would directly invest in Iran's petrochemical industry, and leading European banks and top international institutes would effectively contribute to financing projects," he added.

## Int'l Firms Ready to Invest in Iran

Ali-Morad said this year, leading foreign companies like Shell, BASF, Total, Air Liquide and Linde expressed their readiness for contributing to the development of Iran's petrochemical industry. "That shows the attractiveness of the industry for foreign investors," he said. Iran's sixth Five-Year Economic Development Plan stipulates that Iran's petrochemical industry needs around $40 billion in investment for development. Foreign financial institutes and European banks are expected to make contribution. For this reason, NPC officials have been attending international seminars in order to introduce the projects of this industry and promote Iran's petrochemical industry. Iran hopes to encourage foreign investors to bring cutting edge technologies into Iran and convince foreign banks to finance petrochemical projects. Investment and financing of projects are two separate issues. In the financing of projects, after banking facilities and loans are granted to applicants, the loans would be reimbursed from revenues of projects. But when investment is at stake, companies are directly involved in funding or operating projects. Ali-Morad said Chinese companies had expressed willingness to finance Iranian petrochemical projects due to the profitability of projects and assurances about the repayment of loans.

"Although the US has yet to respect its obligations under the JCPOA European companies have shown stellar performance. That is why banking relations between Iran and foreign countries are growing from day to day." Ali-Morad expressed hope that a consortium of European banks and international financial institutes would be established in 2018 to finance one petrochemical project.

"If that comes true, it could be the starting point for the financing of petrochemical projects in Iran," he said.

## Request for Investment in Iran Petchem

Ali-Morad said number of requests for direct investment in Iran's petrochemical industry was increasing. "Due to their assurance about the NPC, foreign companies are willing to have this company as partner in their projects. Meantime, we are willing for Iran's private sector to be involved in the projects and have a prominent role. That is why we are witnessing long drawn-out talks between foreign companies and the private sector," he added. "For example, two renowned foreign companies that are willing to invest in industrial gas production in Assaluyeh and new zones like Qeshm and Parsian believe that NPC partnership with them would be an advantage that would reduce risks," said Ali-Morad. "But we still insist that foreign companies negotiate with Iran's private sector. We are trying to remove barriers and bring these companies closer to the private sector, and the NPC would make planning and detect the development of industry. However, foreign companies see the state sector's presence the key to development."

## From Far Asia to America

Access to low-cost feedstock, access to high seas, specialized manpower and low-cost workforce are among advantages of Iran's petrochemical industry that help reduce the cost price of petrochemical products in Iran. This advantage has been taken into consideration by investors. Ali-Morad said surveys by the NPC and European companies had found that Iran was the only country in Asia to have access to proper feedstock. "In light of neighboring countries, Iran is also faced with a growing market and it can help attract foreign investment."

# Bushehr Petchem Plan to Start up Next Year

*The implementation of Iran's nuclear deal with six world powers and the ensuing removal of sanctions on the country, gave a new lease of life to Iran's petrochemical industry. Many projects that had started six years ago are close to completion. One of them is Bushehr Petrochemical Plant (BPP), which is part of Phase II of Assaluyeh petrochemical projects. Once operational, it would add 6.6 million tonnes of chemicals and polymer products to Iran's petrochemical output.*

Located in the Pars Special Economic Energy Zone (PSEEZ), BPP is being operated by private sector for €1.9 billion plus IRR 2,500 billion. It is owned by Armed Forces Social Security Investment Company (60%) and Maroun Petrochemical Company (40%). BPP is being developed in three phases and includes eight processing units plus utilities. Gholam-Reza Mostajab ad-Daveh, CEO of BPP, told "Iran Petroleum" that Phase 1 of BPP includes sweetening and ethane and methanol recovery, Phase 2 consists of olefin, glycol, and polyethylene units, and Phase 3 comprises acetic acid and vinyl acetate monomer units. According to plans, utility units are expected to become operational by next March, while sweetening and methane recovery units would come online later next year. The CEO of BPP expresses hope that the three units of sweetening and methane and methanol recovery would come online before June. "According to our plans, BPP will run at 70% of capacity and we will soon reach 100%," he said.

## Financing Framework

Implementation of this project dates back to 2011. The primary agreements for the establishment of these units were sealed. A year later, the agreements for the engineering unit were executed. At present, engineering, purchase and installation of equipment are more than 90% complete. Since BPP is privately-owned, the financing of the project was to be partly handled by equities of stakeholders. Mostajab ad-Daveh said that China had provided the entire €1.9 billion for the project in 2015. Private shareholders would provide 15% of the financing, and the Chinese financer would account for 85%. But the IRR 2,500 billion would be provided by the private shareholders.

## Sanctions and Restrictions

Ministry of Petroleum was concentrating on the development of petrochemical industry, while tough restrictions had been imposed on Iran. The sanctions had posed a serious challenge to financing and purchase of equipment. "The sanctions were like a double-whammy sword as they had restricted purchase of parts from Europe and receiving license from Europe," said Mostajab ad-Daveh.

"Nonetheless, we did not wait for the Europeans' financing or license, but we decided to remove the obstacles in one way or other.

We made our purchases from China, but we received our technical knowhow from European countries either directly or indirectly," he said. "For example, we obtained our technical knowhow for the methanol unit from Swiss Casale." "As long as we had not found a financer we were using the equities of our shareholders, but as of March 2015 when the Chinese finance started the construction operations began," he said.

## Products Sold Out

Iranian petrochemical units are currently able to supply most of domestic needs thanks to the diversity of their polymer and chemical products. They are also able to increase their exports.

Development of petrochemical market is not an easy job due to tough competition.

Mostajab ad-Daveh said any company producing petrochemicals is a rival for BPP. "However, we are not worried at all about selling our products, because based on my experience in Iran's petrochemical industry over the past 20 years we will definitely market our products," he said.

"During years of sanctions when tough conditions were governing Iran's petroleum industry we managed to sell our products. Naturally our conditions have now improved," he added. Separation is one at the gas sweetening unit to produce methanol or ethylene. Some of this ethylene is used as feedstock for glycol units and the entire methanol produced could be exported. Ethane is supplied to ethylene units, but other products like propane, butane and sulfur are exported. Most commodities used in the development of BPP are supplied domestically. China, South Korea and West Europe are also among suppliers of commodities. Iran plans to make optimal use of all existing advantages and complete the supply chain of petrochemical industry. For the National Petrochemical Company (NPC) officials, the top priority in Iran's strategic petrochemical policies is to upgrade the standing of this industry in the region and the world through enhancing the production capacity of petrochemical products and being present in world markets.

Since the turn of Iranian calendar year in March, 31 million tonnes of petrochemicals has been supplied by Iranian plants, 10 million tonnes of which has been sold domestically and the rest has earned Iran $6.5 billion. The startup of BPP is expected to help Iran win a greater share of petrochemical market and enhance its petrochemical exports significantly.

# Propylene, Key to Iran Petchem Chain Development

*One of the most important elements of dynamic economy in Iran is development of petrochemical industry. Since there is suitable infrastructure in Iran, this industry could grow into one of the most profitable industries in the country. In a bid to realize the objectives envisaged for the development of this industry, in addition to new investment and completing incomplete projects, selling raw materials must stop while the basket of petrochemical exports must be diversified.*

Plans are also needed for new upstream projects and enhancing petrochemical production output. Meantime, downstream petrochemical sector is the best and most suitable alternative to crude oil exports and upstream petrochemical products. That must be taken into consideration more than before because of its revenue generation.

Iranian petrochemical industry officials have paid due attention to downstream petrochemical sector in the past one decade because balanced development in upstream and downstream sectors of petrochemical industry would bring a halt to raw material sales and generate high value-added.

Regardless of existing challenges, particularly during years of sanctions, Iran's petrochemical industry has been seeking a balanced development and completion of value chain. Now in the post-sanctions era, this industry needs national determination along with participation of all actors of this value-generating industry to experience the second cycle of its growth.

Already on the path of growth and development, Iran's petrochemical industry needs to complete its value chain. Therefore, along with the development of its upstream sector, its downstream sector must be also taken into consideration as a national strategy.

In the wake of the removal of sanctions following the implementation of Iran's landmark nuclear deal with six world powers, the ground is prepared for the downstream sector to grow proportionate with the upstream sector. Cutting edge technologies and new foreign investment may be used for completing the value chain of petrochemical industry at a higher pace. Energy experts maintain that investment in downstream industry would be safe and profitable because of high value-added. However, weak points must be removed and new planning is required.

Many years ago, the National Petrochemical Company (NPC) and the Iran Small Industries and Industrial Parks Organization (ISIPO) decided to build petrochemical parks in a bid to prepare the ground for the growth and development of downstream petrochemical industry. It was recently decided that downstream industries be established in industrial parks and not be independent. Industrial parks are endowed with all advantages required for the presence of downstream petrochemical industries. Development of these parks, particularly in border provinces, could accelerate the development of national petrochemical industry.

Due to its suitable position in the region, Iran can export products of its downstream petrochemical industries to neighboring countries with a market of around 600 million. Border provinces are instrumental in the development of downstream petrochemical industries, and by expanding border markets and setting up special export zones, national security would be boosted while volume of downstream industrial products would increase. In the 6th Five-Year Economic Development Plan, extensive planning has been made for the development of downstream industries. The national development plan has been formulated with a view to sustainable and balanced development. Along with reducing the sales of raw materials, plans have been formulated for the development of downstream petrochemical industries.

Undoubtedly, not selling raw materials and instead completing the value chain of petrochemical industry would help the goals envisaged in the national development plan materialize.

Access to new markets and diversification of the basket of products are among achievements of development of downstream petrochemical industries and will significantly enhance the production capacity of this industry in coming years.

Identification of opportunities for investment is a major strategy pursued by the Downstream Industries Development Office, and by developing required infrastructure, the selling of raw materials will stop and a high value-added would be

generated.
The main mission assigned to Iran's economy for the coming ten years is job creation, providing welfare for people and increasing the economic strength of the country. To that end, the petrochemical industry will be instrumental both in the upstream and downstream sectors.
Nonetheless, over the past decades, development of value chain in this industry has been slow. Over recent years, converting ethane produced in southern Iran has accelerated. Since 60-70 percent of ethylene produced in the world is converted to polyethylene and glycol, and the rest being converted to non-polyethylene polymers, there is sufficient polyethylene in Iran. Therefore, polyethylene-dependent industries in Iran have been developed while propylene-based chemical industries have yet to be developed. That is while this group of products constitutes raw materials in the value chain of downstream industries.
Products achieved from propylene and polypropylenes are more diverse than those produced from polyethylene and ethylene. Therefore, many Iranian and foreign experts believe that shortage of propylene is the cause of non-development of propylene-based downstream industries.
Propylene is the second widely consumed raw material for petrochemical industry in the world, just behind ethylene. More than 92 million tonnes a year of propylene hit the market.
Propylene is a key petrochemical product used as feedstock for polymer and mid-stream products. The main derivatives of propylene are polypropylene, acrylonitrile, propylene oxide, phenol, acrylic acid, isopropyl alcohol and oligomers. They are used in electronics, car manufacturing, building and packaging.
Olefins are the most valuable petrochemical product. Ethylene and propylene, having an extended value chain and used for diverse purposes, are the most valuable petrochemical products. In Iran, important measures have been taken for the production of these two materials. For a variety of reasons, ethylene has overtaken propylene in production and there is a daily growing demand for propylene. Under the present circumstances, downstream production units whose raw material is polypropylene have in certain periods faced the shortage of this product.
With an annual output of eight million tonnes a year of propylene, the Middle East region stands fourth after Northeast Asia (China, South Korea, Japan and Taiwan), the European Union and North America.
The Iran Value Chain Studies Center says the Middle East region, particularly Iran, are lagging behind in propylene production. This issue must be taken into serious consideration in future planning.
Iran's rated propylene production capacity currently stands at 1.115 million tonnes a year. This capacity is fully based on low-output methods. Ninety-five percent of propylene produced in the country is converted to polypropylene and only the remaining five percent goes to Shazand Petrochemical Plant to be transformed into 2-ethylhexanol. This is while other valuable products are not manufactured due to various reasons including shortage of propylene in Iran.
Given the diversity of gas and liquid resources and the location of spots where petrochemical industry can grow in Iran, precise studies are needed to be conducted on choosing the suitable process for propylene production in Iran. Over the coming five years, Iran's methanol output is expected to increase 25 million tonnes. Kaveh, Marjan and Bushehr methanol projects are currently in their final stages. The completion of these three projects, which have had 97%, 80% and 60% progress respectively, would enhance the country's methanol production capacity by a total of 5.61 million tonnes over two years, which will exceed 10 million tonnes.
Iranian experts believe that completing the country's petrochemical value chain would have no other solution than developing the value chain of olefins and manufacturing such products as polyurethane, polyol, ethoxylate, ether glycol, and acrylate.

Methanol-to-Propylene

Iran's petrochemical industry is expected to become propylene-based ; therefore, no more licenses are issued for the establishment of methanol units unless a company decides to launch new grades in Iran, as has been the case with the French oil and gas major Total.
Iran plans to supply 25 million tonnes of methanol on the market over five years, while the market can absorb only up to 16 million tonnes.
Concerns are growing about the future of methanol market, but by converting methanol to propylene and then to polypropylene, high value-added could be generated.
Currently, Iran has enough capacity to covert natural gas to methanol. At the Petrochemical Research and Technology Company (PRTC), the demo for converting methanol to propylene in Mahshahr with an annual capacity of 120,000 tonnes has been executed successfully.
At the Arak unit of PRTC, a plan is on the agenda to convert propylene to polypropylene. PRTC experts and managers hope to launch the propylene unit of this center with a capacity of 130,000 tonnes next March. The project, which is currently in the pre-start up stage, will help complete Iran's petrochemical industry value chain.
PRTC has managed to produce propylene with a purity rate of 99.6% at Mahshahr research center. This type of propylene is the petrochemical product of the highest value and the widest use.

## Toughest Ever Blowout Contained

# Rag Sefid Fire Put Out

*A fire broke out at Well No. 147 of Rag Sefid oil field on October 29, but was extinguished after 58 days of round-the-clock activity by Iranian engineers. Iran's petroleum minister, Bijan Zangeneh, delivered a message of appreciation from President Hassan Rouhani to Iranian engineers and service workers who managed to put out the blaze and cap the blowout.*



Zangeneh, who had also visited the site of the fire on the first days, said: "During that visit it became clear to me that the team tasked with capping Well 147 of Rag Sefid is skillful and knows how to plan for extinguishing the fire. We have just to trust them."

Since the very start of the fire, safety issues were highlighted by Minister Zangeneh who had said: "We don't want the least harm to anyone involved in containing this fire."

The minister said when crisis management is concerned, the team in charge must be trusted in while no stress should be created. "Stress, panicking and frustration are of no use under such circumstances and the skillful team must be given the chance to accomplish the mission."

Zangeneh referred to blowout containment by a small group of companies in the world, saying: "Praise be to God, you have done a great job."

Mohsen Paknejad, deputy head of the National Iranian Oil Company (NIOC) for production affairs, said the accident was one of the toughest onshore oil and gas blowouts.

Two people were killed in the blowout which followed an explosion at Rag Sefid, administered Gachsaran Oil and Gas Production Company which is affiliated with the National Iranian South Oil Company (NISOC). The victims were employees of National Iranian Drilling Company (NIDC). Drilling equipment was also set afire in the accident.

Immediately after the explosion, the crisis management committees of NIDC and NISOC called emergency meetings. Specialized teams from these companies joined specialists from Gachsaran Oil and Gas Production Company and Aghajari Oil and Gas Production Company to contain the fire.

In addition to Pakenjad, Sepehr Sepehri, CEO of NIDC, and Bijan Alipour, CEO of NISOC, were present at the scene.

Paknejad said the blowout was bottom-killed by drilling directional wells.

"Fath-93 rig crossed caprock after 34 days of incessant drilling and it reached the main well."

The Raft Sefid bottom kill operation was one of the most difficult in 40 years due to high-pressure and voluminous gas

dome, inaccessible area, rock structure and 2400 psi pressure.

During the first days of the fire, cuttings from drilling by the rig, which amounted to 450 tonnes of steel, had plugged the well. The steel cuttings had been intertwined due to integrated heating and that had caused challenges to Iranian service workers. Therefore, Iranian engineers had to take the most effective tools and carry out such operations as road construction, pool construction and water supply for 28 days to clear the surroundings of the well.

Paknejad said the main idea was not to extinguish the fire, but to stop the blow-out of oil and gas fluids.

"In order to guarantee the bottom kill success, in addition to directional drilling sophisticated equipment, a team of most qualified drilling, geology and monitoring experts were hired in the drilling of directional wells," he added.

The well has been capped and safety operations have started, he said. "The extinguishers combined pace and precision and made special arrangements to reach the depth of 2,342 meters after 34 days of drilling. Such a depth had been normally reached by Fath-95 rig in more than 70 days."

The success of this operation despite all difficulties and complexities is indicative of the unique specialty of Iranian experts in this field.

"This success demonstrates the capability, expertise and experience of Iranians in controlling high-pressure well blowout. It was recorded in the history of Iranian petroleum industry," said Paknejad.

Ove the past two months, Iranian oil managers and service workers endured the most difficult environmental conditions at Rag Sefid due to their exposure to fire and smoke and pollutants.

The chain of production from oil and gas fields and reservoirs – exploration, drilling, extraction and production – requires specialty and technical knowhow. Drilling is the first step following geology and petrophysics in the identification and discovery of reservoirs. Without that, sustained production would be impossible.

Drilling, which itself needs special planning and engineering, is one of the most hazardous field operations in the petroleum industry in the world. These hazards include well blowouts and big fires which often lead to human deaths and inflict damage on equipment.

"The blowout and fire in Well 147 of Rag Sefid-2 was unique because of high pressure of gas in the Rag Sefid oil field," said Sepehri. "Containing this fire needed precise engineering and technical calculations. Petroleum industry experts at this company and the NISOC managed to take advantage of existing potentialities in terms of technical knowhow, operation and logistics to make that happen."

"Building stingers, preparation of wagons and other equipment needed for top kill, and preparing the installation of Fath-93 and Fath-94 drilling rigs to spud relief wells and conduct bottom kill were done in quite shorter time than thought. It was remarkable and significant," he said. "The use of stingers in tough conditions due to the volume of blowout and high temperature started in safe conditions, but failed to yield results despite efforts by operating teams. The blowout was finally contained after the drilling of a relief well at the borehole," he said. "By reliance on the expertise, commitment and experience of Iranian specialists and thanks to cohesion and empathy between containers, a rare oil and gas blowout was controlled in the country and in the region," said Sepehri.

A total 13 operations were carried out to contain the fire. Geologists, drilling experts, reservoir engineers and mechanical engineers closed ranks and shared views to design necessary tools and reach the borehole in the shortest possible time.

Alipour highlighted the pace of activities in drilling the wells and said: "Only in two weeks' time, two locations for the installation of rigs 93 and 94, two 130,000 and 170,000-barrel water pool for cooling, 250 kilometers of water supply line to carry water from surrounding rivers and nearly 10 access routes to Well No. 147 were established. Under normal conditions, it would take more than six months."

Photo: HASSAN HOSSEINI

# Iran Eyes 10% Share in Global Gas Trading

*Some experts argue that gas market parameters have changed drastically over the past decades. First and foremost for them is the change in price. As a result of normalized prices, new suppliers like the United States have stepped into gas market. Until 2005, the US was a leading importer of gas in the world. Now it is a major gas exporter whose consignments have come even as far as the Persian Gulf region, which is a hub of oil and gas in the world. Other countries like Australia, which used to be insignificant producers, are now among to suppliers of gas.*
*Australia is set to overtake Qatar which is currently the largest producer of liquefied natural gas (LNG).*

The new players have created a new space in the market, and have changed the import-export balance. For example, Japan is currently the largest importer of gas in the world; however, within upcoming years it will become the fourth largest importer behind countries like China and India. The gas market is currently dominated by tight competition. Gas contracts in Europe have been modified significantly because Europe is winning more customers due to its focus on LNG. Environmental issues and energy supply security concerns are among factors affecting global gas market. Except the US, all countries agreed under the Paris climate agreement – COP21– to shift from a high-carbon society to a low-carbon one. Gas remains the cleanest fossil fuel whose contamination rate is 40% of oil contamination. Gas is introduced as a clean fuel in the world because it is accessible and affordable when compared to other fuels. Last year, Europe granted $106 billion in subsidies to encourage people to use clean fuels like gas.

Iran holds around 485 tcf of gas, which is estimated by BP to be the largest in the world. However, only 191 tcf of Iran's gas is recoverable. Therefore, investment in this gas fields in Iran could be logical, as Iran is a potentially big player in gas market, as well. The country is following up on gas pipeline projects alongside its LNG projects.

Merely having gas resources could not transform a country into a producer and exporter of gas. Therefore, the volume of gas extracted and produced is a determining factor. In recent years, gas has been recovered from the supergiant offshore South Pars gas field which Iran jointly owns with Qatar in the Persian Gulf. Many projects have been under way for increasing gas recovery from South Pars; however, the country still envisages development of export infrastructure like the Iran Gas Trunkline 6 (IGAT6) and gas pressure booster stations in order to enhance its share of gas trading market, particularly in neighboring countries.

IGAT6 is one of the most strategic gas trunklines in Iran. The trunkline, which is in the final stages of production, is expected to come online in January.

The 1,200-kilometer-long project would carry 110 mcm/d of gas from Assaluyeh to western and northwestern provinces. IGAT6 would facilitate gas exports to Iraq via Shalamcheh and Naftshahr.

Iran is currently exporting 50 mcm/d of gas to neighboring states, up 64% year-on-year. The Ministry of Petroleum plans to raise Iran's share of global gas trading to 10% by 2021. That would see Iran's share of gas trade increase seven-fold.

Iran holds around 485 tcf of gas, which is estimated by BP to be the largest in the world

## Turkey, Sustainable Gas Market

In the wake of the 1979 victory of the Islamic Revolution, as soon as Iran's gas export to the Union of Soviet Socialist Republics (USSR) was halted Turkey was considered as the first market for Iran's gas exports. Therefore, Turkey is the oldest buyer of Iran's gas. Iran signed an agreement with Turkey in 1996 for selling gas. Under the agreement, Iran can reduce the flow of gas to Turkey in winter when domestic consumption increases.

Gas export to Turkey is carried out through the extension of IGAT-2, which is the main source of supply to Fajr-e Jam gas refinery. This pipeline is extended as far away as Qazvin before going to West Azarbaijan Province to be extended to Turkey via the Bazargan border post.

Iran is currently exporting 30 mcm/d of gas to Turkey. Last year, Iran's gas exports to Turkey totaled 8 bcm.

According to Petroleum Ministry plans, annual exports to Turkey are to reach 70 bcm by 2021, up from the current 10 bcm. Pipeline would handle 52 bcm and the rest would be in the form of LNG.

## Iraq Overtaking Turkey

Iran's gas exports to Baghdad is set at 7 to 25 mcm/d. Iran started pumping gas to Baghdad via Naftshahr in June and has so far delivered 1.2 bcm of gas to its neighbor. Two border terminals in Naftshahr and Shalamcheh are designed to export natural gas to Iraq. For that purpose, two pipelines which branch out from IGAT6 – one 231 kilometers long and one 141 kilometers long – have been designed and laid out.

Currently, 14 mcm/d of gas is pumped from the Ilam and Kermanshah network to Baghdad power plants. Any possible increase in this amount depends on domestic consumption.

As per Iran-Iraq gas agreement, after the completion of IGAT6, gas export will start from 7 mcm/d and could reach 35 mcm/d.

The Shalamcheh terminal is planned to deliver gas to Basra. Like the Baghdad agreement, it can pump up to 35 mcm/d of gas.

In the first year of agreement, the National Iranian Gas Company (NIGC) would be required to export 7 mcm/d of gas to Iraq. Upon the request of the Iraqi side, this amount would double in hot season.

Iraq plans to take delivery of 20 bcm of gas a year from Iran. Gas exports to Iraq has already begun and construction of infrastructure for gas export via Khorramshahr and

Shalamcheh is under way.

By signing two agreements, Iraq would be importing 40 to 70 mcm/d of gas from Iran. Therefore, it would overtake Turkey in gas imports from Iran.

## Iran Gas to Europe?

Iran's priority for gas exports must be its neighboring countries; however, negotiations have been held in recent years for exporting gas to Europe.

By building up to 200 kilometers of pipeline, Iran would be able to pump gas to the Persian Gulf states. Due to lower costs, shorter route and time, these countries must be Iran's top priority due to profitability. But at the same time, gas exports to Europe would be a factor for Iran to increase its share of global gas trading. Natural gas accounts for 22-23% in the European Union's energy basket. According to studies conducted by the European Parliament, 12 countries could export gas to Europe. Among them Iran is the best potential supplier of gas.

Iran is able to export 25 bcm to 30 bcm a year of gas to Europe via eight routes. The Iran-Iraq-Syria, Iran-Turkey with several options including Black Sea via Azerbaijan and Georgia, and Armenia-Georgia-Black Sea are among these options. To that effect, gas trunklines for gas delivery in big volumes and under high pressure are among the NIGC plans. So far more than 9 pipelines have been laid out across Iran.

Meantime, in light of the gas industry's plans to enhance its share of global trading, IGAT9 and IGAT11 are on the agenda to increase the capacity of gas transmission and exports.

## 1 mcm/d Gas Exports to Nakhichevan

Last year, the Republic of Azerbaijan and Nakhichevan signed a swap agreement, based on which Iran received less than 1 mcm/d of gas from Astara for consumption. In return for the gas, Iran would deliver an equal amount to Nakhichevan. Under such circumstances, in exchange for every time of gas transmission, the parties to the contract are factored. Therefore, this project would be profitable for Iran and would establish a bilateral gas transaction.

If any problem occurred in the Astara area or IGAT1, requiring overhaul, a source from Azerbaijan would supply gas in order to prevent any disruption in the flow.

Saeed Takavoli, CEO of Iran's Gas Transmission Company, says: "When we receive gas from a country under swap we have no obligation to deliver the same received gas to destination." "For example, we receive gas from Turkmenistan and consume it domestically, but we deliver an equivalent amount to another country," he said.

Iran is currently exporting 1 mcm/d of gas to Nakhichevan. Gas exports to Nakhichevan totaled 250 mcm during the first eight months of the Iranian calendar year which started on March 21, 2017.

## 250 mcm Gas Exports to Armenia

Iran and Armenia signed a 20-year gas-for-electricity agreement in 2004. Under this agreement, Iran would supply gas to Armenia as feed of its power plants and in return Iran would receive electricity from Armenia. Armenia started importing gas from Iran in mid-2009.

Iran's Minister of Petroleum Bijan Zangeneh recently said that Iran would raise its gas exports level to Armenia from the current 1 mcm/d to 3 mcm/d by late 2018.

For a short period of time when Armenia had problems with importing gas from Russia, Iran exceptionally supplied 3 mcm/d of gas to Armenia as a neighborly gesture.

In return for each cubic meter of gas, Iran imports 3kwh of electricity from Armenia, which currently stands at 3.2 kwh.

According to Iran's Ministry of Energy, Iran received 300 MW of electricity from Armenia and 150 MW from the Republic of Azerbaijan last summer.

Based on Iran-Armenia gas-for-electricity deal, 250 mcm of gas was exported to Armenia during the first eight months of the current calendar year.

Iran pumps gas to Armenia via a 110-kilometer pipeline stretching through Tabriz.

The CEO of Iranian Gas Transmission Company has said that Iran exported 365 mcm of gas to Armenia in the calendar year to March 2017. The pipeline can handle up to 2.3 bcm of gas exports a year.

Gas exports, which are among priorities in Iran's 6th Five-Year Economic Development Plan, have in recent years been on the agenda of the Ministry of Petroleum.

Iran is currently in contract with Turkey, Armenia, Azerbaijan, Turkmenistan and Pakistan in gas exports, imports and swap. Furthermore, negotiations are under way with Afghanistan, Oman, Kuwait and other Persian Gulf Arab states. Iran hopes to partly realize its major objective of exporting gas to neighboring countries. By increasing production from the South Pars gas field, Iran would have a capacity to export 200 mcm/d of gas. Other enhancement projects would raise the figure to 350 mcm/d.

Iran, which currently has around 34 tcm of proven gas reserves, constitutes only 1.5 percent of global gas trade. The figure is expected to change significantly thanks to plans and prioritizations in the gas sector.

# Sumar Field Up for Investment

*Sumar oil field, which was discovered in 2009 in the western province of Kermanshah, is jointly owned by Iran and Iraq. Sumar holds 475 million barrels of crude oil in place, 70 million barrels of which is recoverable. Iran plans to develop this field based on the new model of oil contracts: the IPC.*

Sumar is a newly discovered field, but since it is shared with neighboring Iraq, the National Iranian Oil Company (NIOC) has prioritized its development.

when Iran decided to develop it, its petroleum industry was under international sanctions and it had to award the contract under an EPCF agreement to Iranian companies. The contract envisaged drilling two wells, building stations for transmission and separation of oil and gas, pumping and gathering systems. Production from Sumar was initially expected to start two years after the start of operations with Phase 1 output at 5,000 b/d and Phase II output at 10,000 b/d, but this objective was not achieved.

However, the Iranian Central Oil Fields Company (IOFC), which administers Sumar, drilled one well which produced 3,000 b/d. The oil produced from this field is being carried via a 23-kilometer pipeline to Naftshahr production/desalting unit.

In preliminary assessment report on Sumar oil field in 2009 and 2010, development of the field in Asmari Formation with an initial output of 5,000 b/d from four wells was envisaged.

In the study conducted for the transfer of oil from Sumar oil field to Naftshahr production and desalting unit, installation of multiphase pumps, and a single-phase transmission system including a separator, pump and compressor fitted with OLGA and PIPESIM were envisaged.

The preliminary studies indicated that at most 5,000 b/d of pre-salt oil could be processed at Naftshahr production and desalting unit. But as long as non-salt oil is being produced the processing of the entire oil is possible in the old unit.

Drilling of three new vertical fields in Asmari Formation, workover on an oil production well, installing a 25-kilometer offshore streamline stretching from wells to manifold, acquisition of land and drilling of well, setting up manifold and two-phase separation system, purchase and installation of single-phase pumping system with a capacity of 10,000 b/d, 123 horsepower and 550 pam external pressure, laying out 23-kilometer pipeline to carry 10,000 b/d of oil to Naftshahr production and desalting unit, installing 48 kilometers of power supply lines and a 1.5MW electricity station stretching from Naftshahr to satellite manifold and Sumar wells are among the most important equipment and facilities needed for Phase 1.

After Iran signed a landmark nuclear deal with the six world powers, Poland's PGNiG signed a memorandum of cooperation with the Department for Development and Engineering Affairs of NIOC in November 2016 to study Sumar. The CEO of PGNiG said at the time that cooperation with the NIOC would clear the way for more cooperation in oil extraction.

The Sumar recovery rate currently stands at 15% and it holds light oil. Four new wells are expected to be drilled in Sumar for a daily output of 4,500 b/d.

PGNiG submitted the findings of its studies to the NIOC in December. The report has been reviewed by the Committee of Advisors at the NIOC Directorate of Reservoirs. A final decision is to be made on the development of Sumar, soon.

# $500mn Envisaged in Dey, Sefid Zakhour

*The Dey and Sefid Zakhour fields in Iran are among newly discovered gas reservoirs. The close distance between the two fields has led officials to consider their development together. The duo currently needs investment and state-of-the-art technology. Iran has offered Dey and Sefid Zakhour for investment.*

The Sefid Zakhour anticline is located north of the Dey anticline, 150 kilometers southwest of the southern city of Shiraz. Dey and Sefid Zakhour are estimated to hold 6.2 tcf and 6.5 tcf of gas in place, respectively. The two fields were discovered in 2005 and were said to contain a 11.4 tcf of gas. With a recovery rate of 75%, 8.5 tcf of gas may be extracted from them.

In order to complete exploration data in this field, 2D seismic testing was conducted in 2003 and the results were analyzed and interpreted. The Sefid Zakhour anticline was said to have potential for production. Drilling operations started and the first exploration well was spudded at a depth of 5,271 meters. The Exploration directorate of the National Iranian Oil Company (NIOC) explored sweet gas in different layers of Kangan Dalan. Sefid Zakhour is estimated to hold 205 million barrels of condensate in place with a recovery rate of 35%. According to the NIOC Exploration Directorate forecasts, if 17 wells are drilled 30 mcm/d of gas may be recovered.The Sefid Zakhour anticline is located around 30 kilometers south of the city of Qir. The planned development of Dey and Sefid Zakhour fields in Fars Province is expected to provide 15.1 mcm of gas and 10,000 barrels of condensate.

Wellhead equipment, stream pipelines, green space and processing unit are envisaged in the development projects.

Establishment of a center for gathering and separation, laying out pipelines, installations for Farashband processing unit and drilling projects are among activities considered for this project. The next objective sought by these projects is to develop the Farashband refinery to create a gas processing capacity of 21 mcm/d. The refinery processing capacity is planned to increase 5 mcm/d, while the produced gas would be injected into the Iran Gas Trunkline 2 (IGAT2). Meantime, gas condensate will be transferred to the Shiraz refinery.

A refinery is envisaged for the two fields in two phases under engineering, procurement, construction (EPC) framework. Phase 1 is already complete and Phase 2 is under way.

Acquisition of land for laying out pipelines and drilling wells, completing the existing two wells, drilling and completion of 11 new fields, purchase of commodities and activating wellhead installations, laying out wellhead pipelines, setting up a gas and condensate separation center, installation of two pumps to transfer condensate from Sefid Zakhour, purchase and installation of pigging system, installation of line break valves, establishment of logistics camps, power supply, acquisition of land for the refinery, development of Farashband refinery including dehydration and gas condensate stability units, hydrocarbon dew point regulation unit, low-pressure gas recovery compressors, and installation of pumps to carry liquids from the refinery to Taheri Port are among the most important equipment needed in the upstream and downstream sectors of this project. According to initial estimates, Dey and Sefid Zakhour would need IRR 8615.4 billion plus $519.5 million in investment. Due to the decline in the flow of feedstock into Fajr Jam refinery and the plan to get feedstock from neighboring fields, delivery of gas produced in Sefid Zakhour to Fajr Jam refinery is among the most important plans for domestic gas supply.

Photo: Hassan Hosseini

# Shale Oil Competition with OPEC, Non-OPEC

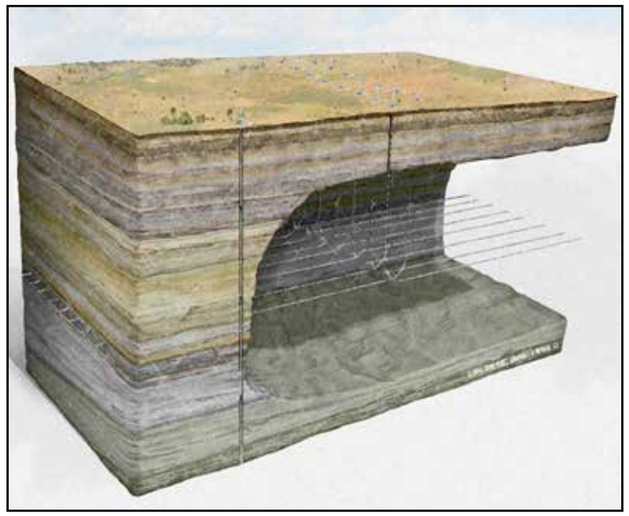
*Shale oil and gas extraction in the United States has commanded headlines in recent years. Thanks to its shale oil extraction technology and benefiting from shale resources, the US has sketched out a positive economic perspective for itself. Entering the oil market, the US is able to change global energy equations. That would leave significant political, economic and security impacts on the market and would affect the OPEC and non-OPEC deal for cutting oil output. Therefore, it would be important to study the current conditions of shale oil production and make forecasts for its future in light of the impact of OPEC and non-OPEC decisions on world markets.*

Shuaib Bahman

When OPEC and non-OPEC partners like Russia reached a quota cut deal and extended it, they temporarily realized their objective of causing reduction in the shale oil output. The US Energy Information Administration (EIA) reports indicate that American oil production declined for some time. The major impact of the OPEC decision was seen in reduced investment in shale oil fields due to the decline in oil prices. That affected the oil production levels of the US, which is the most important producer of shale oil in the world.

Under such circumstances, some countries like Saudi Arabia felt the threat of increase in the shale oil production. They believed that when OPEC countries cut their production, shale oil production will have to decline. However, the turn of time showed that such a thing had not happened because as soon as oil prices edged up, some idle rigs were reactivated in shale oil plays. That would not only drive oil prices further down, but also would pose challenges to the oil production cut deal. According to the EIA outlook report, the average oil production in the US was at 9.2 mb/d in 2017, which will reach a record 9.9 mb/d in 2018. OPEC estimates show that the US will continue to boost its oil production. According to OPEC, the US will have increased its output by 3.8 mb/d in 2022. The figure equals 75% of total oil supply increase by 14 non-OPEC oil producers that account for one-third of crude oil production.

Shale oil will be definitely instrumental in the US output growth. What strengthens speculation on this issue is the recent oil price hikes that could positively affect investments



in shale oil fields. In fact, when prices are close to $60 a barrel, the US oil output could go beyond expectations because in most estimates about shale oil extraction, the new technologies used for recovery are forecast to cost $60 to $80 a barrel. Therefore, shale oil and gas production in the future will have economic ground in case oil prices go beyond $100 a barrel.

## Key Factors in Shale Oil Future

As far as the future of shale oil and its impact on world markets is concerned, several key factors must be taken into consideration:

There are no precise estimates about how much shale oil will be supplied on markets; most estimates vary between 500 tb/d and 2 mb/d

The raid growth of shale oil production will remain an exclusively American phenomenon and other regions in the world do not have such a perspective for a significant growth rate. Despite the increase in shale oil production over recent months, extraction and production of this source of energy remain costly, and high cost prices could push many major oil companies towards extracting and producing conventional oil.

Oil price hikes in world markets are not unfavorable for shale oil producers because in light of high costs of shale production, low oil prices would not be cost-effective. Therefore, the US and other countries involved in shale oil production do not favor any significant drop in oil prices.

The OPEC non-OPEC deal on reducing oil output continues to remain an effective tool for regulating oil market and prices; however, the US is largely expected to use shale oil industry as a tool to control prices. Depending on circumstances, the US is likely to either increase or decrease its shale oil output.

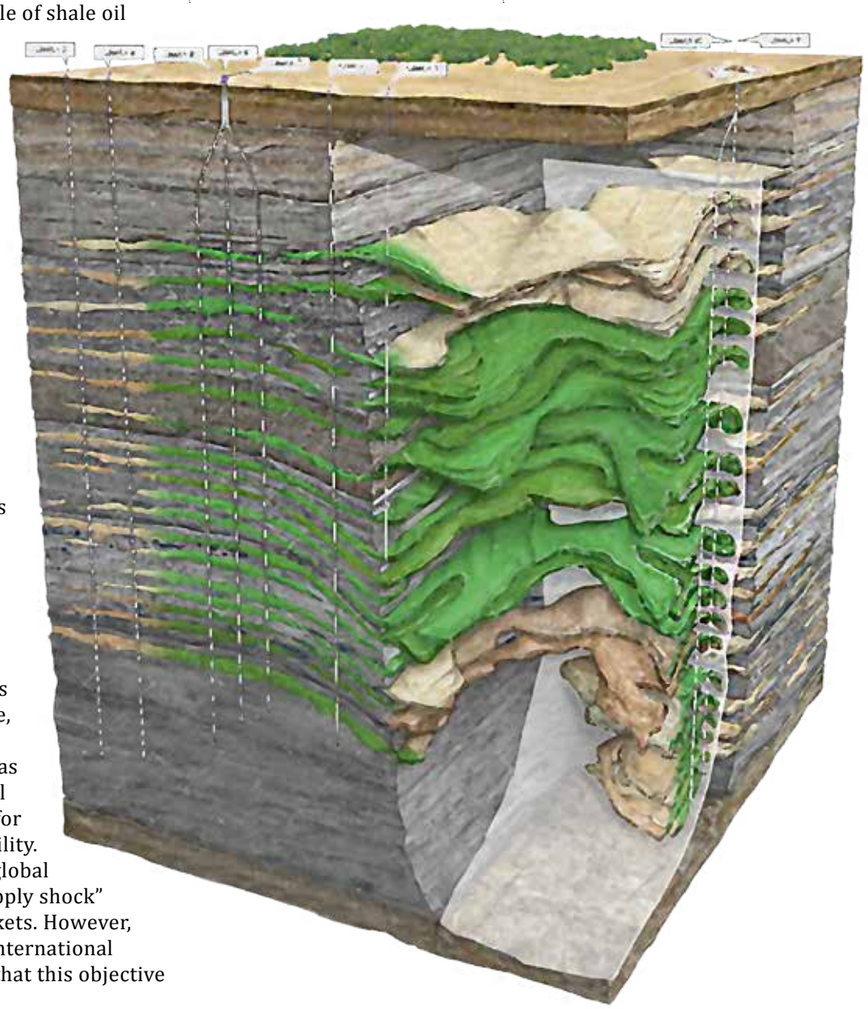
In light of the regulatory role of shale oil and US energy policies, shale oil production could significantly influence OPEC decisions in the future. For instance, the duration of extension of the OPEC-led quota cuts in the future may depend on the estimates about shale oil supply by the US and rival producers.

Estimates show that US shale oil production has seen an upward trend over the past decade. Therefore, even periodical decline in oil prices could not prevent the US from pushing ahead with its plans for oil production increase. Nonetheless, despite the fact that Eagle Ford and Bakken shale oil fields can help the US boost its production capacities, shale oil production in other fields is largely difficult. Meantime, developed fields are likely not to be profitable forever as in the past Royal Dutch Shell put its assets in Eagle Ford for sales due to lack of profitability. The US shale oil entry into global markets could trigger a “supply shock” which would engulf all markets. However, estimates provided by the International Energy Agency (IEA) show that this objective would be achieved only if it is supported by Canada’s crude oil supply. Therefore, any increase in US oil output could not make this country independent of world oil. Furthermore, it is still unclear if Canada would be able to carry oil to South America refineries in the Gulf of Mexico.

## Conclusion

Many believe that shale oil and gas could change energy equations in the world; however, these changes would not be as important as many may imagine.

The US energy strategy shows the most important objective sought by this country is to wean itself off oil imports. Therefore, even if shale oil extraction turns out to be uneconomical due to low oil prices, the Americans will continue to safeguard this industry through paying subsidies and applying tax exemptions. Consequently, even if the shale oil influence on global markets remains trivial, the Americans will go ahead with their strategy of enhancing shale oil output.



## Petrobras Sets Presalt Oil Production Record

Petrobras' presalt oil production offshore Brazil reached a new peak of 1.45 MMbbl on Nov. 30.

The company's monthly presalt output averaged 1.65 MMboe/d, 1.5% up on October, due mainly to higher production from the Lula field through the P-66 platform.

Petrobras' oil production outside Brazil fell by 2.8% last month, mainly because of operational issues at the Lucius and Cascade fields in the Gulf of Mexico.

The company's gas production was down 6.8% following further issues at the Hadrian South field in the same sector.

## Zohr Delivers First Gas Offshore Egypt

Eni has produced first gas from the Zohr field offshore Egypt in the Mediterranean Sea, less than two and a half years since the discovery. Located in the Shorouk block about 190 km (118 mi) north of Port Said, the deepwater Zohr field has potential resources of more than 30 tcf of gas in place (about 5.5 Bboe). Discovered in August 2015, the project obtained the investment authorization in February 2016.

## VNG Outlines Plan for Fenja Offshore Norway

VNG Norge, on behalf of the licensees in PL586, has submitted to the Ministry of Petroleum and Energy the plan for development and operation for the Fenja field in the Norwegian Sea. Fenja (previously named Pil/Bue) will be developed with two subsea templates with six wells (three producers, two water injectors and one gas injector) tied back to the Njord A platform for processing and storage and export via the Njord B FSO. Discovered in 2014, the Fenja field is located at Haltenterassen in block 6406/12 about 120 km (75 mi) north of Kristiansund, and about 30 km (19 mi) southwest of the Statoil-operated Njord field.

## CNOOC Starts Up Weizhou Project

CNOOC has started production from the Weizhou 12-2 oil field Phase II project in the Beibu Gulf in the South China Sea. Water depths average around 35.7 m (117 ft). Development, which is linked to existing facilities on the Weizhou 12-2 oil field, called for construction of a wellhead platform. Seven wells are currently in service, producing around 6,400 b/d. CNOOC expects to attain peak production of 11,800 b/d during 2018. The company operates Weizhou 12-2 oil field Phase II with a 100% interest.

## Australia Woodside Awards New Contracts

Woodside has awarded Wood two new contracts to deliver engineering and rig modification services offshore Australia and a concept definition study for the Julimar Phase 2 project. The engineering and rig modification services will be executed under a three-year non-exclusive outline agreement, which has two one-year extension options and is effective immediately. The concept definition study is for the subsea flowline and umbilical system for the Julimar Phase 2 project, comprising the Julimar and Brunello fields off Western Australia, and is also effective immediately.

Norway

Egypt

China

Brazil

Australia

VIEW

VIEW

VIEW

# Fight over Alaska Arctic Drilling

Senator Lisa Murkowski, an Alaska Republican, won a decades-long battle to open part of an Arctic wildlife reserve in her state to oil and gas drilling, but Democratic senators and conservationists vow the war has only begun.

The tax bill passed by Congress contains language pushed by Murkowski and supported by President Donald Trump to hold two lease sales in the 1.5 million-acre (600,000-hectare) 1002 area on the northern coastal plain of the Arctic National Wildlife Refuge, or ANWR.

Democrats and environmentalists deplore the prospect of development in ANWR, home to polar and grizzly bears, 200 species of birds, and where Gwich'in natives depend on migrating herds of porcupine caribou. Senator Maria Cantwell, a Democrat, said the fight over the drilling was not over. "In fact I would say today is the beginning," said Cantwell adding that Democrats would make sure the Trump administration follows all environmental laws before allowing drilling. Murkowski said ANWR oil would provide jobs, reduce U.S. imports of crude and help fill the Trans-Alaska Pipeline, a source of oil for the U.S. West Coast.

The pipeline is now operating at a quarter of its capacity, after Alaskan production slumped in recent years. Trump, expected to quickly sign the tax bill into law, said he had not been aware that fellow Republican politicians had long been trying to get at the oil in ANWR. "A friend of mine who is in the oil business said: 'I can't believe it. ANWR. They've been trying get it for 40 years,'" Trump said at the start of a Cabinet meeting. Trump said opening ANWR, a move supported by some members of the native Iñupiat tribe, would put the country, already the world's top oil and natural gas producer, at a new level.

NEWS

## Norway's Statkraft Targets Onshore Wind, Hydropower

Norwegian utility Statkraft will use some of the proceeds from its divestment of offshore wind parks to invest in onshore wind farms and hydropower plants, it said. The state-owned firm sold to a Chinese-led consortium its last stake in an offshore wind park, Britain's Dudgeon, bringing its total 2017 cash divestment proceeds to 1.2-1.5 billion pounds. "We have a plan to invest in maintaining our hydropower dams and build more renewables, such as solar and onshore wind. We will be active with Scottish wind farms and keep looking in South America," said company spokesman Lars Magnus Gunther. Statkraft is Norway's largest power producer and the third-largest in the Nordics. It has 376 power plants across 16 countries, mostly hydropower dams in Norway, but is seeking to expand its international activities further.In October, Statkraft partnered with Airvolution, a British wind farm developer, to build or acquire up to 300 megawatts of onshore wind capacity within two years in Scotland.

NEWS

## BP and Kosmos Partner on Ivory Coast Oil Blocks

Ivory Coast has awarded partners BP and Kosmos Energy five new offshore oil blocks under an agreement with state oil company Petroci, government spokesman Bruno Kone said. Petroci will maintain a 10 percent stake in blocks CI-526, CI-602, CI-603, CI-707 and CI-708. Kone did not give a breakdown of Kosmos' and BP's stakes.Elsewhere in West Africa, BP and New York-listed Kosmos are partners on oil and gas blocks off the coast of Senegal and Mauritania. Natural gas discoveries there contain sufficient reserves to warrant two LNG projects, they said.





# Canadian Offshore Oil Interest Grows

Canada's offshore oil industry, a sliver of the country's crude sector, is drawing rising investment interest due to an aggressive push by Newfoundland and Labrador as prices plummet in oil-rich Alberta due to pipeline problems. Offshore interest in the Atlantic province stands in contrast to Western Canada's oil fields, where foreign companies have sold some $23 billion worth of assets this year, due to depressed prices. ExxonMobil's Hebron off Newfoundland, Canada's easternmost province, became the country's first new producing offshore oil project in 12 years last month. Newfoundland's offshore petroleum board has also issued exploration licenses worth nearly C$2 billion ($1.6 billion) in promised spending since 2015, its biggest-ever three-year total. The next round, to be held in autumn, has attracted a record-large 38 nominations for parcels to be made available for exploration in a single region. Winning a bid entitles a company to explore the parcel for six years. Offshore interest comes as western Canadian pipeline and rail capacity fills up, driving prices to four-year lows. The volume of crude in storage has hit record levels in western Canada driven by increased supply and a leak on TransCanada Corp's Keystone export pipeline last month. Oil flowing from offshore Newfoundland by contrast is priced similar to Brent crude at a rich premium over western Canadian oil. The investment spilling into Canada's icy waters is at least partly due to an aggressive promotional push by Newfoundland's energy corporation, Nalcor, and frustration with western transportation problems, said Paul Barnes, a Newfoundland-based director with Canadian Association of Petroleum Producers. Oil companies "are likely taking some of that money that may have been earmarked for Alberta and putting it into offshore," Barnes said.

NEWS

## France to End Oil/Gas Production by 2040

France's parliament passed legislation requiring all oil and gas exploration and production on French territories to end by 2040, the first time any country has taken such a step. The bill, presented to cabinet in September, bans the renewal of any existing concessions beyond that date. New exploration permits will no longer be granted from now. The decision is largely symbolic because France produces only about six million barrels of hydrocarbons a year, about one percent of its consumption. It will continue to import and refine oil. President Emmanuel Macron, elected in May, has sought a leading role for France in the fight against climate change and stressed at a summit last week that not enough was being done. Macron's bid to breathe new life into a landmark accord on climate change reached by nearly 200 nations in Paris two years ago came after U.S. President Donald Trump said he was pulling out of the deal.

NEWS

## Oil Cut Deal Hurts Russia Industrial Output

Russian industrial output shrank more than expected in November, hurt by Moscow's agreement with other major oil producers to limit global crude output, the economy ministry said. Major oil exporter Russia joined OPEC and other producers in an agreement to cut oil output from January by a combined 1.8 million barrels per day (bpd) to end a supply glut. For Russia that will mean a 300,000 bpd reduction from its October 2016 levels. The country's industrial output slumped 3.6 percent year-on-year in November, the Federal Statistics Service said last week. The slump was "much worse than the expectations of both the market and the Economy Ministry of Russia," the ministry said in a report.

# PDVSA at Risk of Losing Bonaire Terminal

Venezuela's PDVSA could lose its license to operate an oil storage terminal it owns on the Dutch Caribbean island of Bonaire if it does not soon fulfill maintenance demands by regulators, a government spokeswoman said.

The terminal is a key part of PDVSA's logistics in the Caribbean, and its closing could hurt shipments to customers in Asia at a time when the OPEC-member country is desperate for export revenue. Reeling from low oil prices, high inflation and a four-year-long recession, the country last month proposed to restructure its $60 billion in debt.

Cash-strapped PDVSA, which provides the bulk of Venezuela's export revenue, has struggled this year to retain contracts for storage tanks and docks in the Caribbean due to past payment delays and disagreements with U.S. firms Buckeye Partners and NuStar Energy, which operate terminals in the Bahamas and St. Eustatius.

In neighboring Bonaire, where PDVSA owns the Bonaire Petroleum Corp (BOPEC) terminal with a 10-million barrel storage capacity and deep water docks that can load large vessels, the firm recently received a warning from the Dutch government. "We've given them an ultimatum to come up with a solid plan to ensure ... more secure and safe" operations by Jan. 5, Danielle Rebel, a spokeswoman for the Dutch Human Environment and Transport Inspectorate (ILT), said.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BOPEC has a backlog of items needed to achieve international standards, she said. If it does not deliver the plan and the funding requested by the ILT, it will have to start emptying the terminal in early February, she said, and ceases operations.

Its operating license could ultimately be withdrawn, she added. The dispute between Bonaire and PDVSA started a year ago when a remediation plan for the terminal, including improvements to tanks, pipelines, piers and electrical equipment, was demanded by the government amid an accumulation of environmental liabilities, according to two sources close to PDVSA.

NEWS

# PTTEP Plans $3bn Expenditure

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Yhai oil company PTT Exploration and Production Pcl said it was planning total expenditure of $3.1 billion in 2018, up a touch from the $2.9 billion it earlier estimated for expenditure in 2017. That comes after the company, part of the energy giant PTT Group, in November reported a $264 million loss for its third quarter after writing down its investment in Canada.

Capital expenditure will account for $1.77 billion of the 2018 total, with operating expenditure making up the other $1.33 billion, PTTEP said in a statement. Nearly 60 percent of capital expenditure will come in Thailand, the firm said, where it will maintain production levels at existing projects including the Bongkot, Arthit and S1 developments. PTTEP said that projects in other Southeast Asia countries would account for 32 percent of next year's capital expenditure, with a focus on its Myanmar assets, where it will also look to maintain production levels. Projects in Australia, Africa and the Americas will account for 9 percent of capital expenditure. These include the PTTEP Australasia project and Mozambique Rovuma Offshore Area 1, where a final investment decision is under consideration. The company estimates exploration expenditure for next year at $232 million in Thailand, Myanmar, Malaysia and Australia.





# Premature to Discuss Changes in OPEC-Led Pact

Saudi Arabia's energy minister said it is premature to discuss any changes to the OPEC-led supply cut pact as market rebalancing is unlikely to happen until the second half of 2018 even with the current outage of the North Sea Forties pipeline. Any potential exit from current cuts would be done gradually once the market returns to balance but drawing down inventories will still take more time, Khalid al-Falih told Reuters. "We haven't seen any major declines in inventories that we didn't expect. As we said last month, we still have approximately 150 million barrels of overhang, and it is going to take the second half 2018 to draw that down," Falih said. "We expect the first few months of 2018 to be either flat or a build (in inventories) as it is typically the case with the seasonality with the oil market especially on the demand side," he said in an interview in Riyadh. "So I think it is premature to discuss any potential changes in our course, and the earliest opportunity to assess where the market is in a major way would be in June." OPEC and 10 other producers led by Russia last month extended an agreement to cut oil production by 1.8 million bpd until the end of next year. The alliance is targeting the elimination of an oil glut to bring global oil inventories back to the industry's five-year average. Falih, who holds the OPEC presidency this year, said he does not expect the shutdown of the key North Sea pipeline to affect supply significantly. Russia, which this year reduced production significantly with OPEC for the first time, has been pushing for a clear message on how to exit the cuts so the market doesn't flip into a deficit too soon, prices don't rally too fast and rival U.S. shale firms don't boost output further.


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Falih said he is in continuous discussions with his Russian counterpart Alexander Novak and that "Russia sees the benefit of continuing to cooperate."

"All producers – whether companies and countries – have benefited significantly from the course of action that we have taken and therefore they would benefit from continuing the course but not beyond reaching balance," Falih said.

NEWS

# Qatargas to Deliver LNG to Austria's OMV

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State-run Qatargas agreed a sale and purchase deal with Austrian oil and gas group OMV to deliver up to 1.1 million tonnes of liquefied natural gas annually for five years.

From January 2019, the gas will be provided by Qatar Liquefied Gas Co, a venture between Qatar Petroleum and Shell. It will be delivered to the Gate LNG Terminal in the Netherlands on board Qatargas' chartered LNG vessels. Facing threats to its market share in Europe from a wave of new U.S. supply and in Asia from new Australian plants, Qatar has sealed similar deals with Uniper, RWE Supply and Trading, Centrica and Petronas UK to secure access to northwest European import terminals. The deals, many of which give Qatar discretion to divert supply elsewhere, provide a valuable fallback option in case demand in its main market, Asia, declines.

They also head off potential competitive threats from exporters in the United States targeting Europe as a destination by preserving Qatar's market access.

Just this month OMV agreed to import LNG from Cheniere Energy's Sabine Pass liquefaction plant in Louisiana, underscoring the brewing market share battle for European terminal access rights.

# Condensate Refinery Supplies Euro-4 Gasoline

*The CEO of National Iranian Oil Refining and Distribution Company (NIORDC) says the Bandar Abbas Gas Condensate Refinery in southern Iran is currently producing the highest quality gasoline in Iran. Ali-Reza Sadeq-Abadi said at a press conference that Euro-4 gasoline production had reached 12 million liters a day (ml/d) from 3.5 ml/d over four months.*

"Currently, the highest quality gasoline is being produced at the Persian Gulf Star refinery," Sadeq-Abadi said. The refinery is known as Persian Gulf Star because it is owned by the Persian Gulf Star Oil Company.

According to latest official data, Iran's gasoline production capacity has reached 78 ml/d, and Persian Gulf Star refinery's share is 12 ml/d.

Phase 1 of the condensate refinery was started up in April by Iranian President Hassan Rouhani. Phase 1 produces 12 ml/d of Euro-4 gasoline, 4.5 ml/d of Euro-4 gasoil, 1 ml/d of Euro-4 kerosene and 1.3 mb/d of Euro-4 liquefied petroleum gas (LPG).

"Phase 2 of the Persian Gulf Star project requires €100 million [in investment] and Phase 3 less than €100 million," said Sadeq-Abadi.

He said that there was nothing to worry about in the financing of the project because the figures are not high.

"We plan to prepare Phase 2 of the Persian Gulf Star refinery for early production and launch three units," he added. Sadeq-Abadi said the treatment facility had a big share in Iran's gasoline production, adding: "This project will generate good revenue after the Phase 2 startup, which could help fund the next phase." "All necessary equipment has been ordered and received," he added.

Once fully operational, the refinery would be producing 36 ml/d of Euro-4 and Euro-5 grade gasoline, bringing total gasoline production in Iran to over 100 ml/d. That would end gasoline imports in Iran and boost the quality of domestic fuel. Meanwhile, Iran would join the club of gasoline exporters.

## Gasoline Output at 78 ml/d

Sadeq-Abadi said Iran's gasoline production was around 78 ml/d, adding: "In case we consider average gasoline production at 75 ml/d, it can be said that we can cover domestic gasoline production for the second half of the year, which is 75 ml/d." He said that during the first eight months of the current calendar year (started March 21) Iran imported on average 13 ml/d of gasoline. "Over the past two months, imported gasoline has been mainly used to increase the volume of strategic stocks," said Sadeq-Abadi. "Strategic reserves in the country need to hold 15 to 16 million liters in stocks," he said. Sadeq-Abadi said strategic reserves were needed for some days in the year when gasoline consumption sharply increases. He said that in the final month of Iranian calendar year and during first two weeks of every year, gasoline consumption hits 110 ml/d "which urges us to dip into our strategic reserves".

Average gasoline consumption in the second half of the year is normally less than that of the first half due to cold weather and fewer travels. Sadeq-Abadi said average gasoline consumption in Iran stands at 81.7 ml/d during the first half of the year, which is down to 75 ml/d in the second half.

"Of course it does not mean that we don't need to import gasoline because sometimes certain measures like overhaul of refineries may cause a decline in gasoline production in the country," he added. "Gasoline imports will be halted in the proper sense of word when we have become an exporter of gasoline."

## Euro-4 Gasoline Capacity at 41 ml/d

Sadeq-Abadi said Euro-4 grade gasoline was being produced at the Arak, Tabriz, Isfahan and the Persian Gulf Star refineries.

"Currently, the Euro-4 gasoline production capacity at these refineries is around 41 ml/d, 23 ml/d of which being distributed in big cities," he said. He also said that the Tehran, Arak, Isfahan, Lavan and Persian Gulf Star refineries had a production capacity of 32 ml/d of Euro-4 gasoil. "Roughly 11 ml/d of Euro-4 gasoline produced at these refineries is distributed in big cities." Sadeq-Abadi said all gasoil and gasoline distributed in Tehran was Euro-4 grade.

He added that the NIRODC had met its commitment with regard to inflammable gas suspended in the air.

## LPG Exports at 100 Tonnes/Day

Sadeq-Abadi also touched on the NIORDC plan for LPG exports, saying: "There is currently the capacity to negotiate with the private sector for exporting LPG and opening new markets for cooperation."

Mohammad-Reza Mousavikhah, CEO of National Iranian Oil Products Distribution Company (NIOPDC), said: "The markets around us were saturated with LPG this year. "Therefore, export of this product has been down from 700 tonnes day to 100 tonnes a day" this calendar year," he added. Mousavikhah also said that gasoil exports, which were 14

"Phase 2 of the Persian Gulf Star project requires €100 million [in investment] and Phase 3 less than €100 million"

"Over the past two months, imported gasoline has been mainly used to increase the volume of strategic stocks"

> The Siraf financers are private and they are free to manufacture products in downstream sector based on their financial resources and guarantees which they can offer

> Currently, around 600,000 liters of alkylate gasoline is being produced, which will soon reach 1 million liters




ml/d in the last calendar year, were recorded at 8 ml/d during the first three quarters of the current calendar year.

He said that fuel oil exports have been down from 46 ml/d in the last calendar year to 45 ml/d in the current year.

Sadeq-Abadi also referred to the capacity of fuel distribution companies that had applied for branding, adding: "Most of these companies have been involved in fuel supply and distribution and have been fully evaluated."

"Of total 85 companies established for this purpose, 9 are refining companies," said Mousavikhah.

"Three LPG companies, 13 transportation companies, five CNG companies and 47 fuel distribution companies have applied for this project," he added. Mousavikhah said all financial documents had been assessed by an independent auditing company, noting that the approved companies were facing no legal problems.

"No rente has been created in the fuel distribution chain companies and we are ready to present documents in this regard," he added.

## Siraf Waiting for Factorage

Sadeq-Abadi also said negotiations were under way on the Siraf gas condensate refineries project for acceptance of factorage and signature of individual credit agreements.

"The Siraf financers are private and they are free to manufacture products in downstream sector based on their financial resources and guarantees which they can offer," he said.

## Alkylate Gasoline at Abadan Refinery

Sadeq-Abadi also said that Abadan oil refinery was producing alkylate gasoline, which is high-octane gasoline with low sulfur content.

"Currently, around 600,000 liters a day of alkylate gasoline is being produced at the Abadan refinery, which will reach 2 ml/d by the end of the current calendar year," he said.

He said the alkylation unit of the Abadan refinery was instrumental in the production of Euro-4 gasoline at the facility. "The acid unit is a requirement for the alkylation unit, which is currently under repair due to longevity and corrosion. That has caused a reduction in the alkylate gasoline production at this refinery," he added.

Sadeq-Abadi said alkylate gasoline was known as green gasoline, adding: "This gasoline is white, smells spearmint and has no aromatic or olefin base."

He said activities had started in November for launching this unit and resolving the acid unit problems. "Currently, around 600,000 liters of alkylate gasoline is being produced, which will soon reach 1 million liters," said Sadeq-Abadi.

## Support for Domestic Manufacturing Conditional

Like other affiliates of the Iranian Ministry of Petroleum, the NIORDC supports domestic manufacturing and technology. However, Sadeq-Abadi insists that such support should not lead to products that would not have any positive economic effects. "We are ready to listen to proposals of manufacturers and we support proposals that would lead to cost-effective production," he said. "We also expect domestic manufacturers to produce up-to-date commodities. Domestic manufacturing of a commodity should not continue while there is no improvement and coordination with world market." "For instance, catalyst is not so expensive alone, but is instrumental in the refinery output and margin. Therefore, we have to support its production," said Sadeq-Abadi.

"The NIORDC has shown support in this regard and currently catalysts are being manufactured domestically for many facilities, the last of which was at the isomerization unit of the Persian Gulf Star refinery," he said.

## Fuel Oil Reduction Envisaged

Article 25 of "Energy Consumption Reforms Law" requires fuel production at refineries to fall below 10% by 2020. For this purpose, the NIORDC considers projects to boost the quality of output at Iranian refineries.

"At Isfahan and Abadan refineries, projects for fuel oil output reduction have led to agreements," said Sadeq-Abadi.

"Meanwhile, in Phase 2 of the Abadan refinery, China is accounting for financing. The Letter of Credit has become effective and preliminary design is under way," he said.

"At the Isfahan refinery, an agreement has been signed and financing is in the final stage."

He said that Bank Mellat and the stakeholder of the project for fuel oil reduction at the Isfahan refinery have signed agreements, adding that an agreement was to be signed between Bank Mellat and EXIM bank. "It would be impossible for us to transform the fuel oil production units of refineries to light product units in two years," he said. This project would need at least four to five more years because "this process needs preliminary design, purchase of technology, bidding and financing" which would not be possible in the short term, he added.

"Currently, these two projects (Isfahan and Abadan refineries) are in good conditions and are ahead of other refineries," said Sadeq-Abadi. "Currently, we are holding meetings with the Institute of Petroleum Engineering, Office of Deputy Minister of Petroleum for International Affairs and Trading, and the Research Institute of Petroleum Industry on how to reduce fuel oil production at Iranian refineries. We hope that we can present our plan for the 2020 horizon," he said.

Sadeq-Abadi said that Iran was not the only country to face difficulties with regard to reducing fuel oil output by 2020. "This target is likely to be reconsidered because many other countries, like Iran, may fail to implement their fuel oil reduction plans in two years."

## Pipeline Planned If Kirkuk Swap Continues

Abbas-Ali Jafari-Nasab, CEO of the Iranian Oil Pipeline & Telecommunications Company (IOPTC), said a deal had been signed with Iraq for swapping crude oil produced at Kirkuk fields. "According to the agreement signed, the Iraqi side is required to transfer 30,000 to 60,000 b/d of crude oil to Darreh-shahr by tankers, which is guaranteed by the Iraqi party."

"In case this swap deal continues and reaches more than 60,000 b/d, an oil pipeline stretching from Kirkuk to Tang-e- Fanni with a capacity of 250,000 to 400,000 b/d will be established," he said. Jafari-Nasab said modifications at the Darreh-shahr depot to receive crude oil were not costly.

# Ruggedly Mountainous Maroun-Isfahan Pipeline Route

*An oil pipeline in Iran comes second after trans-Alaska pipeline in terms of the difficult routes they cross. In Iran, a more than 800-kilometer pipeline, 430km of which crossing the Zagros Mountains connects Maroun to Isfahan. The Maroun-Isfahan pipeline transmits 550,000 b/d of crude oil and petroleum products. It accounts for nearly 20% of Iran's crude oil distribution without experiencing any halt in hot or cold seasons.*

Iran's oil and gas condensate production averaged 4.7 mb/d by the end of the third quarter in the current calendar year on 21 December 2017. This amount of oil and gas is partly exported and partly consumed domestically. A significant portion of this amount is carried to refineries through pipeline before refined products are sent to power plants and other consumers. According to official statistics, Iran is among countries with long oil pipelines. Twelve oil distribution centers in Iran take care of crude oil and petroleum products distribution via 14,000 kilometers of pipeline. Iran has also 36,000 kilometers of gas pipeline. The country is ranked the first in Asia in terms of equipment and installations for gas transmission. Globally speaking, Iran is ranked the fourth in the world, after the United States, Russia and Canada.

Among 12 centers distributing crude oil and petroleum products, the Isfahan zone is highly significant. One reason is that a 430-kilometer pipeline has to cross the three provinces of Khuzestan, Isfahan and Chahar Mahal Bakhtiari. Another reason is that the route of this pipeline is ruggedly mountainous and therefore difficult.

## Pipeline Route

Transfer of oil in the Isfahan era is handled by the Maroun-Isfahan pipeline. Construction of this pipeline started in 1976 and ended three years later. This pipeline has been used for carrying crude oil for nearly 40 years.

Crude oil transmission begins from Maroun in oil-rich southern Iran then goes to the Omidieh oil distribution center. Omidieh is where the highest temperature in Iran has been recorded. Then, crude oil is carried in pipeline through Ramhormoz, Bagh Malek, Izeh, Dehdoz and Gandomkar distribution centers in the provinces of Khuzestan and Chahar Mahal Bakhtiari to reach Shahid Beheshti oil distribution center in Isfahan. After that, it goes to the Isfahan refinery with surplus going to the Tehran and other oil refineries.

Meanwhile, the petroleum products imported from other countries and those produced at Bandar Abbas oil refinery are received and transported 538 kilometers to be stored at Shahid Montazeri distribution center in Isfahan Province.

In addition to that, the fuel oil received from the Isfahan refinery is delivered to Abnil terminal after feeding Eslamabad power plant before being sent for consumption via railroads.

This zone has a total of eight oil distribution centers, two final installations and 800 kilometers of pipeline with diameters ranging from 8 to 36 inches.

All these operations are handled by 18 turbopumps, 18 turbogenerators, 12 diesel generators, 6 turbines, 24 booster pumps and 8 electropumps.

## 550,000 b/d Transferred

Mojtaba Besharatian, director of the Isfahan zone of the Iranian Oil Pipeline and Telecommunications Company (IOPTC), said: "This pipeline transmits more than 550,000 b/d of crude oil, 370,000 b/d of which is delivered to the Isfahan refinery with the rest being pumped first to refineries in Tehran and then to the Tabriz refinery."

The crude oil storage capacity in the Isfahan zone stands at 5.5 million barrels. The 18 turbocompressors, made by MAN Diesel & Turbo, are running in the six oil distribution centers of the Isfahan zone. The Isfahan zone of IOPTC is tasked with the maintenance of the turbocompressors.

"The Isfahan zone transfers 2.6 billion liters monthly, i.e. more than one billion tonnes/kilometers of crude oil and petroleum products within its area of service," said Besharatian.

Twelve crude oil and petroleum product distribution centers in Iran handle a total of 56 billion tonnes-kilometers of crude oil and petroleum products. The Isfahan branch accounts for 20%.

"50% of crude oil fed into refineries in the country is supplied by the Maroun-Isfahan pipeline," said Besharatian.

Crude oil and petroleum products in Iran are transmitted via 14,000 kilometers of pipeline. The pipes have to cross the Zagros Mountains, two dams on Karoun River and treacherous mountainous routes like Avend, Lir, Zereh and Kaseh-Kaseh. That poses challenges to the transfer of oil operations. The problems become more critical in autumn and winter due to rainfall or snowfall which cause problems for possible maintenance. The transfer of equipment and heavy machinery to the zone would take long time and become difficult. In addition to unblocking snow-stricken routes, heavy machinery and equipment need to be transferred to the region.

## Steep and Rugged Routes

Bahram Mohammadi, director of Shahid Marzban oil distribution center,

accompanies us along one of tough routes of Maroun-Isfahan pipeline. This route is rugged and the road is zigzagged. Crossing the Avend ravine is fraught with risks. From time to time, the vehicle that was running along the route could not move due to steep route and it veered off the route; however, the driver's skill brought us peace of mind about reaching the destination.

Mohammadi touched on winter during which rain and snow abound, saying: "Whenever the pipelines need repairs, heavy vehicles have to cross rugged and difficult mountainous areas, which are often blocked due to heavy downpour and concomitant flooding. Vehicles are likely at any moment to plunge into ravine."

After crossing the Avend ravine, we reach Karoun 3 and Karoun 4 dams.

"We have to be careful so that oil would not penetrate into these dams," said Mohammadi.

When we reach Lir, he relates a memoir which is now 10 years old. "Due to rock fall, the pipeline was ruptured at this ravine, letting oil flow into the Karoun 3 dam. It took us several months to make a total cleanup. Those were very tough says because the route was not easily accessible and transfer of heavy machinery lasted hours."

Besharatian said transfer of crude oil and petroleum products through pipeline is among tough jobs. He noted that this problem takes up added significance in Isfahan. This pipeline partly lies in Khuzestan Province. Pipeline repair in Omidieh needs to be done in summer under 55 degrees Celsius temperature and in humid conditions. That is while in Iran, offices are shut when the temperature crosses the 50 mark. But oil pipeline activity and repairs never stop and they continue round the clock.

"Sometimes we have to repair some turbines very close to other turbines whose exhaust pipes emit heat which is more than 500 degrees Celsius," said Besharatian.

## 12 Items Replaced in 72 Hours

Smart pigging operations were carried out in the Isfahan zone in the calendar year to March 2015. By that time, some parts and equipment were replaced. Due to the sensitivity of job, oil service workers were active round the clock there. Two years later, they replaced 12 components in less than 72 hours. Although these activities were under way, suspension in the Maroun-Isfahan work was minimized.

As Besharatian indicated, transfer of crude oil via this route is done in full safety.

Noting that replacement of pipeline is among the most difficult operational activities in the world, Besharatian said: "These activities become highly sensible when we take into consideration the fact that the replaced pipeline is supposed to carry crude oil."

In case safety measures not observed, accidents and even pipeline explosion become likely.

We continue our route by crossing Khuzestan Province to reach Chahar Mahal Bakhtiari where Shahid Zare oil distribution center (No 6) is located. Abdol-Jalil Gholami, head of this distribution center, said: "Shahid Zare oil distribution center is located at an altitude of 2,054 meters. It is fitted with three 39,000-horsepower Sulzer turbines, two solar turbines and one 500,000-barrel storage tank. It is one of the largest storage tanks with double ceiling. A Sulzer turbine is being overhauled by one of local engineers. It will be out of operation for 40 days."

"Each turbine, pumps 1,800 cubic meters per hour of crude oil," he said.

When asked if manufacturing companies had been present during overhaul, Gholami said: No! The technical and operational section of the center handles all activities pertaining to overhaul."

Gholami also related a story about a 2016 visit to the center by a delegation from the Swiss company manufacturing the turbines.

"This oil distribution center started work in 1975 and turbines have since been operating without any problem. In 2016, a number of delegates from the Swiss manufacturer of these turbines came here for a visit. Before they had seen the turbines they had said they would not like to continue cooperation with us. But after they unpacked the turbines and saw they were running at such a quality after so many years they congratulated us. They said that they could never imagine that the turbines would even be switched on after nearly 40 years."

Simon Arzet, who is currently head of operation at MAN Diesel & Turbo, had come here to visit the turbines. He said: "I was here when the turbines were installed and I was a junior employee, now I've become the head of operation."

The location of the pipeline in a mountainous area and its route along historical monuments and natural and intact areas of Chahar Mahal Bakhtiari requires more precision in operations.

Tang-e Zereh is the highest point in the Maroun-Isfahan route at an altitude of 2,800 meters. Due to its 60-degree slope, daily visits are conducted. Possible repairs in the pipeline are facing difficulties, as well.

## Biggest Storage Tank in Iran

After visiting Tang-e Zereh, we go towards Shahid Beheshti oil distribution center in Isfahan, which is No. 7. It took us 48 hours to travel through a 430-kilometer distance.

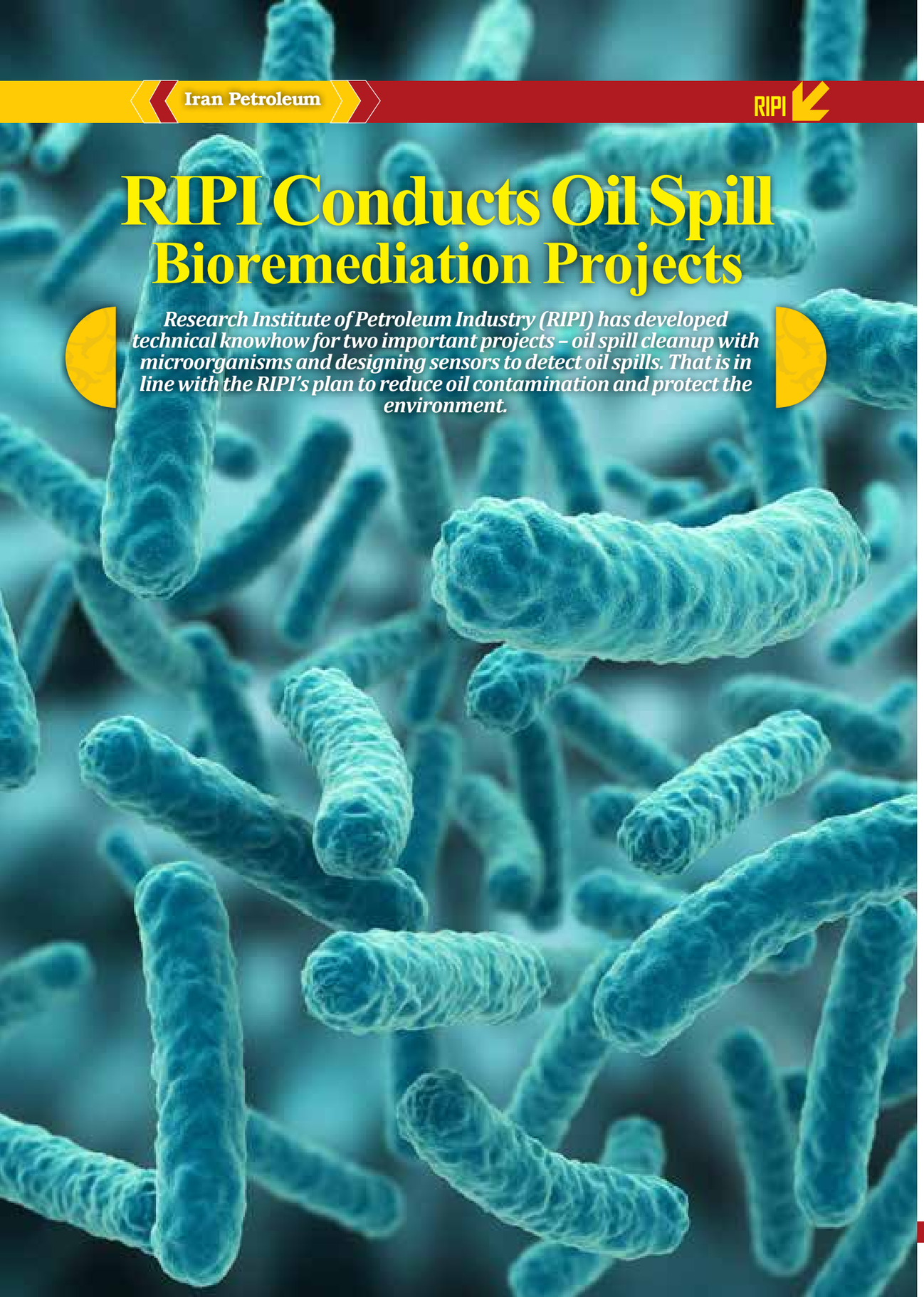
Heshmatollah Amiri, head of this center, said it received 550,000 b/d of crude oil to be transmitted to the Isfahan refinery. The surplus goes to the Tehran refinery.

This center is also able to carry 240,000 b/d of crude oil to the Tehran refinery via an oil pipeline with 24-inch diameter. Furthermore, through an 18-inch diameter pipeline, products of the Isfahan refinery (kerosene, gasoil, motor gasoline, premium gasoline, Euro-4 gasoline, etc) are moved to Tehran at the rate of 120,000 b/d.

"It is also possible for us to deliver products from Bandar Abbas oil refinery to the National Iranian Oil Products Distribution Center's storage facility in Isfahan at the rate of 120,000 b/d via a 16-inch pipeline," said Amiri, adding that the products could be sent back from the Isfahan refinery to Naein in Yazd Province and Rafsanjan in Kerman Province.

He said that one of the largest oil storage facilities in Iran was located at the center. "This storage tank has the capacity of 1.33 million barrels," he added. Our two-day visit to Maroun-Isfahan pipeline ended, but there are some monitors who have to visit this pipeline every day and take this difficult route under searing sun and in snowy conditions. Maintenance of these pipelines and protecting the environment are the most important issues assigned to the NIOPDC and IOPTC officials.

Despite all these difficulties, 550,000 b/d of crude oil crosses through this route in full safety and sustainability.



# RIPI Conducts Oil Spill Bioremediation Projects

***Research Institute of Petroleum Industry (RIPI) has developed technical knowhow for two important projects – oil spill cleanup with microorganisms and designing sensors to detect oil spills. That is in line with the RIPI's plan to reduce oil contamination and protect the environment.***



Ebrahim Alaei, head of the Energy and Environment Department of RIPI, said that four oil spill bioremediation projects have been carried out so far, using native microorganisms.

He said that hydrocarbon spill and its penetration into soil and underground water reservoirs were major challenges to the petroleum industry.

In Iran, where underground water is limited, this challenge must be dealt with more seriously and we need to develop the capacity to clean up possible oil spill. "One of the state-of-the-art technologies in the world in this regard is oil spill bioremediation. A variety of microbes which naturally exist in the environment are able to utilize petroleum hydrocarbons as a source of carbon or energy, and transform them into water and carbon dioxide while they are growing and reproducing," Alaei said.

## 10-Year Continuous Work

Dr. Mehdi Dastgheib, director of RIPI environmental projects, said: "We have focused on isolating and identifying native oil-degrading microorganisms for some 10 years. During the first step we managed to create a collection of microbes endowed with such capacity. The advantage of native microbes is that they are fully compatible with local conditions and their application is less costly."

"After success in the lab and pilot phases, we managed to clean up 2,000 tonnes of oil-contaminated soil in Siri Island using indigenous microorganisms by applying landfarming method and finally turning the contaminated site into a green space," he said.

He added that for achieving higher efficiency, landfarming can be replaced by biopiles. He mentioned that biopile technology using active aeration was developed and applied in the Khangiran area for cleaning up an oil-contaminated mud pit containing about 10,000 tons of soil and sludge. This mud pit, which was like a lagoon, changed into a green landscape a year later, said Dastgheib, adding that this project was rewarded at the 7th research festival of Iranian oil industry. Another similar project has been implemented at Gavzard area of Gachsaran district, where an oil spill had occurred due to the fracture and oil leakage in a pipeline. "We used biopile technology with passive aeration system there" he said.

"Meantime, our survey of local microbes in research projects led into identification of several new bacterial species" he said. One of them was introduced to the scientific world as P. sinuspersisi after the name of Persian Gulf.

Dastgheib said that oil spills in Iran usually affect surface areas, emphasizing that these contaminants may penetrate into water tables gradually, if not treated properly. That means, he said, spread of pollution and growing threats to human beings.

"Therefore, in order to estimate the amount of such contamination in groundwater we need to drill monitoring wells. My colleagues have determined the extent and volume of oil plume in a contaminated region in Assaluyeh, which is known as Iran's gas hub, by using engineered monitoring wells," he said.

"Currently, we are combining SVE (soil vapor extraction) and biostimulation technologies for cleaning up groundwater. By creating vacuum in the drilled wells and using native microbes we cleaned up contaminated water tables to some extent in three years." he said, adding that this project has been rewarded by the European Green Association.

"Due to various ecological and hydrogeological conditions in Iran, the level of water tables varies in different areas. Therefore, working on underground waters across the country needs more sophisticated and more advanced technologies," he said. Dastgheib continued as saying that RIPI is working on novel

technologies such as PRB (permeable reactive barrier) to clean up oil spills in deep ground waters but this technology is still in the pilot stage. An important point that must be taken into consideration is that Iran's technology in oil spill bioremediation is thoroughly based on local and domestic potentials. "At international exhibitions held in regional countries we have seen neighboring petro-states willing to use Iran's technology," said Dastgheib.

"Currently, RIPI's oil spill bioremediation technology has become well-characterized and established in a way that private knowledge-based companies can carry out such projects in large fields in collaboration with RIPI by using our know-how," he added.

"At RIPI, our applied research projects are aimed at serving the real needs of the industry. Therefore, our research achievements were not limited to the lab stage," he said. "We are now able to implement our environmental projects at different site conditions based on potentialities and budget earmarked by clients," said Dastgheib. He added that new projects were set to start in oil-producing areas in different parts of Iran in near future.

## Oil Pollutants' Detection Sensors

Another achievement of RIPI in the environment is designing and manufacturing sensors that would detect environmental contaminants.

Hamideh Samari Jahromi, senior researcher at RIPI, said 17 sensors had been designed and built by Iranian researchers to detect oil pollutants. "Alongside indigenization of technologies for removing contaminants from the environment, we need special tools and sensors to detect them," she said.

Samari Jahromi added that within the framework of the 4th Four-Year Economic Development Plan, a similar project had been carried out in cooperation with the National Iranian Oil Company's Directorate of Research and Technology. That project pertained to 17 sensors that could detect CO, NO, SO2, H2S, VOC, BTEX, O2,and methane in air, TPH and PAH in soil and Phenol, oil spill, TPH, COD and Heavy metals in water. "Of those 17 sensors, 12 sensors have been finalized as portable tools," she said.

Furthermore, she added, the precision and accuracy of these sensors have been tested at modern labs of RIPI in collaboration with Malek Ashtar University.

Samari Jahromi said the Environment Division of RIPI was tasked with monitoring different environmental contaminants. "In light of the obligation of this center and the requirement by the Iranian Department of the Environment for oil companies in Iran to protect the environment, we have developed necessary tools to detect and control oil contaminants."

In 2013, the Environment Division of RIPI formulated a project for building sensors to detect environmental pollution resulting from upstream oil operations. The proposal, which was based on advanced technologies, was submitted to NIOC.

Given the necessity of application of this technology, two NIOC subsidiaries – Iranian Offshore Oil Company (IOOC) and Iran Oil Terminals Company (IOTC) – were chosen as end-users of this project. The project started in 2014.

"At the beginning, in order to achieve our objectives more effectively, we moved to build and equip a lab to have everything for designing and manufacturing a sensor from A to Z," said Samari Jahromi. "After that we started detecting contaminants targeted by clients. In the end 17 contaminants were detected and registered. In the next stage, upon the request of the client the technology roadmap for these sensors was developed for NIOC subsidiaries."

"Then, required technologies and knowhow for building sensors of 17 contaminants were studied," she said. Ten sensors are to detect NO, CO, BTEX, VOC, SO2, O2, methane, H2S, and LPG, four sensors are aimed at being used in the liquid phase of heavy metals like mercury and cadmium, phenol compounds and COD and oil spills, and three sensors for PAH and TPH (in aqueous and solid phases). Samari Jahromi said that the client had given the affirmation for the project to go ahead after the successful field test of these sensors.

"In each sensor, some certain sort of technology is used. For example, in soil sensors, fiber optics is used. For air sensors, we build a portable device in which four sensors run simultaneously. This is the new solid state technology. In fact, we use nanotechnology to make sensors more capable and more sensitive. The foreign and commercialized prototypes of these sensors use microtechnology," she said.

Samari Jahromi said: "For hydrosensors we tested sensors of heavy metals, COD and aromatic compounds. Therefore, we are now ready to receive endorsement from domestic and foreign standard organizations for sensors."

She said that laser-based oil spill sensor was one of widely used sensors. This sensor is set to be installed early next year on Iran's largest oil export terminal in Kharg Island in cooperation with Malek Ashtar University. "In terms of environmental sensors, the US, Canada and Japan are placed from first to third in the world. Universities in Iran stepped into this sector years ago and so far have made some research achievements. However, these efforts have yet to reach the stage of manufacturing of a commercial device. RIPI has aimed to achieve this important objective in its sensor development roadmap. Currently, numerous sensors are annually used in Iran's gas, petroleum and petrochemical sectors in different models. That indicates the high profitability of working on sensors," the senior researcher said. Samari Jahromi said the National Iranian Gas Company (NIGC) had recently requested sensors from the RIPI in light of the distribution of biosensors roadmap in the petroleum industry. "The NIGC officials visited RIPI labs and filed requests for cooperation," she said. "Currently, in order to protect domestic manufacturing, many companies affiliated with the petroleum industry prefer Iranian sensors to foreign ones" added Samari Jahromi.

# MIS Judo Team Set to Fulfil Longtime Wish

*The Iranian Ministry of Petroleum has invested in judo over recent years as part of its sporting activities. The judo team of Masjed Soleyman (MIS) has managed to show off thanks to support by this ministry. The MIS judokas are now thinking of winning the championship title in national judo matches. They are also likely to win the Asian Judo Championship title. The following is a review of the history and current status of the MIS judo team:*

Amir Sadeqi-Panah

## History

Naft Masjed Soleyman Club is active in a variety of sport disciplines, including judo. The judo team started work seven years ago in Hafkel town near Masjed Soleyman. In the late 2000s, a group of young athletes in Haftkel decided to become professional judokas. Thanks to support by the Ministry of Petroleum, the Haftkel team was moved to Masjed Soleyman. After contesting the judo first league twice, it finally managed to find its way into the pro league matches. The MIS judo team is now experiencing its fifth year in a row in the pro league, and has turned out to be successful.

## Pro League Top Ranking

Naft Masjed Soleyman finished third twice; once in the pro league judo matches and once in the playoff cup. However, in the current season, as top judokas were hired the team is now on top in the pro league fixture and is hopeful to win the championship title. Although judo is not supported sufficiently in Iran, the judo teams affiliated with the Ministry of Petroleum have shown good performance in recent years and introduce themselves as powerful and successful teams.

## Veterans and Locals

Naft Masjed Soleyman judo team mainly comprises local athletes from Masjed Soleyman and other cities in Khuzestan Province. In Khuzestan Province, particularly in Masjed Soleyman, since the judo team started its activities a large number of young judokas have become engaged in judo in the hope of joining the MIS team.

In light of plans envisaged by the MIS judo club for youths and young adults, talented athletes in this city will be able to find the correct path easily and win high rankings in case they prove to be capable enough.

## National Judokas

In recent years, some national judokas have joined the MIS club; however, a good number of trainees in the MIS club have grown enough to join the national judo team. Judokas like Amir Hossein Khademian, Qasem Nourizadeh and Mehdi Fathipour have joined Iran's national judo team and appear in international events after shining in the MIS club. Since the ground is paved for the training and improvement of judokas in the Naft Masjed Soleyman club, many talented judokas in Masjed Soleyman have been invited to national training to experience good days.

## Asian Clubs Cup

The Asian clubs championship cup matches are expected to be held for the first time in Tehran. That has boosted the motivation of Iranian athletes. Naft Masjed Soleyman is largely hopeful to shine in the matches and win the chance to join the Asian matches after finishing at top or runner-up.

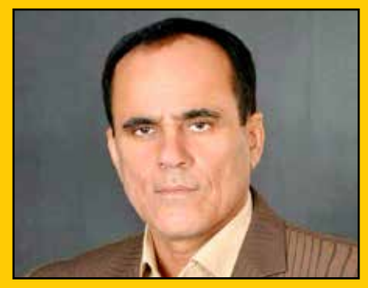
In case this team manages to reach such an important position after seven years of activity, it would be a great honor for Naft Masjed Soleyman and the Ministry of Petroleum. Undoubtedly, all members of Naft Masjed Soleyman have made a lot of efforts to continue their good days and record more success.

Exclusive Interview

Interview with Seyed Hossein Mousavi, MIS Judo Chief

# "I Hope to Make People Happy"

***Seyed Hossein Mousavi has been with the MIS judo team since its formation and is currently playing an important role alongside it. He is the director of the team and is sparing no effort to help the judokas make progress. The following is an interview conducted with Mousavi about the team and related issues:***



**Could you tell us about the conditions of Naft Masjed Soleyman judo team? Are you happy with its current circumstances?**

A: Hopefully we are in good and satisfactory conditions. For the first time this year we are bidding for championship and we will spare no effort to remain at the top. We have exhausted our efforts in order to register bid success and be able to defend the standing of Masjed Soleyman.

**How hopeful are you to experience presence in the Asian judo championship matches?**

A: This issue is really exciting for us. These matches are to be held in Tehran this year and the first and second teams of the judo pro league will represent Iran in the matches. We are very hopeful of winning this big success by pushing ahead with our current trend. It is not impossible as our team is in very good conditions and we have qualified judokas in our team. God willing, everything will go ahead as planned, and we will be able to fulfil our longtime wish.

**How have people in Masjed Soleyman shown support for the judo team of their city?**

A: Fortunately, we are warmly welcomed in Masjed Soleyman. In addition to athletes that become interested in judo for the Naft Masjed Soleyman club, ordinary people have shown sympathy with us through their massive presence as spectator. You can see that judo teams in Tehran are deprived of any spectator although they are in the capital. But in Masjed Soleyman we enjoy this benediction and we appreciate it.

**Have Naft Masjed Soleyman Club's managers supported your team?**

A: Our conditions are not bad. Not much money is spent on our team; however, we are in good conditions when compared with other judo teams. I would like to express my appreciation and gratitude to the CEO of Masjed Soleyman Oil and Gas Production Company, the director of sports affairs and Mr. Yazdi for supporting our team. Without such support we could not have achieved any good results. God willing, we will be able to respond to these esteemed officials' trust.

**Anything else you would like to add in conclusion?**

A: I have something addressed to Petroleum Ministry officials. Masjed Soleyman is an underprivileged city, which needs more support. Judo is not like football. A footballer can join a football club even at the age of 20. But we have to work a lot to reach a good status. I don't intend to make any criticism. That is only a request from Naft Masjed Soleyman. I hope that we will be able to make people happy again by participating in the Asian competitions.

Photo:saman goodarzi

# Rafsanjan, City of Pistachios

***Rafsanjan is a historical city in the southern Kerman Province. It is located on the route linking Kerman and Yazd cities. Iranian pistachio is known all across the globe under Rafsanjan brand. In addition to highly admired pistachios, the historical background of Rafsanjan adds to the significance of this southwestern city. Numerous monuments and tourist attractions stand in Rafsanjan.***

## Rafsanjan Pistachio

**Rafsanjan owes its international fame to the high quality of pistachio grown in the city. That is why nut freaks are fascinated by the Rafsanjan pistachio.**

**In Rafsanjan, pistachio is grown extensively. The city has a big share in Iran's pistachio exports. Pistachio gardens in Rafsanjan account for more than 70% of Iran's total pistachio production.**

**There is currently around 85,000 ha of land under pistachio cultivation in Rafsanjan. Pistachio gardens are mainly located in Noq area.**

## Haj Aqa Ali Adobe House

**Five kilometers southeast of Rafsanjan is located Qasemabad village which is home to a historical building known as "House of Haj Aqa Ali". This monument displays Iranian architecture of the Qajar dynasty. It is today one of the most beautiful and largest traditional adobe houses. It was built by Haj Ali Aqa Zaimollah Rafsanjani, a leading merchant of the Qajar dynasty. This building, which dates from the 12th century on the solar hegira calendar, has a built-up area of more than 7,000 square meters.**

Photo: POYAN SHAMELI

## Moin Windcatcher

Moin windcatcher is a tourist attraction dating back to the Qajar dynasty. This beautiful structure is made from such materials as adobe, wood, thatch and bricks. It is more than 16 meters tall. It may be interesting to know that this monument is a remnant of Moin edifice, which was restored in 2005 by the provincial office of cultural heritage organization.

Photo: POYAN SHAMELI





## Ragueh Ravine

Ragueh Ravine is a beautiful and captivating tourist attraction near the city of Rafsanjan. It is 20 kilometers long and 80 meters deep. In terms of tourism potential, it is compared by tourism experts with Shahdad Plain in Kerman Province. Natural decorations engraved on the walls of the ravine, which indicate ancient civilizations, the flow of Gyuudari River, clear sky, unique wildlife and exceptionally beautiful night are among the outstanding features of this natural phenomenon.

# Rafsanjan Hosts IOPTC Branch

The southeast zone of the Iranian Oil Pipeline and Telecommunication Company (IOPTC) is among strategic areas of the company. Launched more than 25 years ago, it has so far been successful in maintaining the sustainability of oil and oil products' supply.

Parviz Shiasi, director of the IOPTC southeast branch, says the department is located seven kilometers from Rafsanjan and along the Rafsanjan-Yazd highway.

"This area houses the 146-kilometer Bandar Abbas-Rafsanjan pipeline with a capacity of transmitting 48,000 cubic meters a day, the 413-kilometer Rafsanjan-Isfahan pipeline with a capacity to carry 32,000 cubic meters a day, the 635-kilometer Rafsanjan-Isfahan pipeline transmitting 19,000 cubic meters a day and the 215-kilometer Rafsanjan-Kerman pipeline

transmitting 16,000 cubic meters a day," he said.

Shiasi went on to refer to the geographical conditions of centers and facilities covered by the center, adding: "The Rafsanjan oil distribution center and facilities are located five kilometers west of the city and Shahrak-e Naft residential complex with 94 houses is located in the easternmost part of the center."

Regarding equipment and facilities available in southeast, he said: "This area has 48 cathodic protection statins and 99 valves to support the pipelines." He added that 77 light vehicles and 55 heavy vehicles are charged with steering operations.

He referred to the number of telecom stations, saying: "This area has 23 telecom stations. Fifteen of them that are the main stations are located in Rafsanjan-Kuh, Lashkar, Sirjan, Chahraz, Sami-Abad, Nain-Shahr, Haftadar, Nogonbad, Ardakan, Yazd Shahr, Qadir Abad, Shams, Bayaz, Kaboutar Khan and the central station. Eight stations which are auxiliary are Rafsanjan oil transmission center, Rafsanjan TCI, Yazd oil transmission center, Yazd TCI, Nain oil transmission center, Nain TCI, and old and new installations of Kerman."


2018
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