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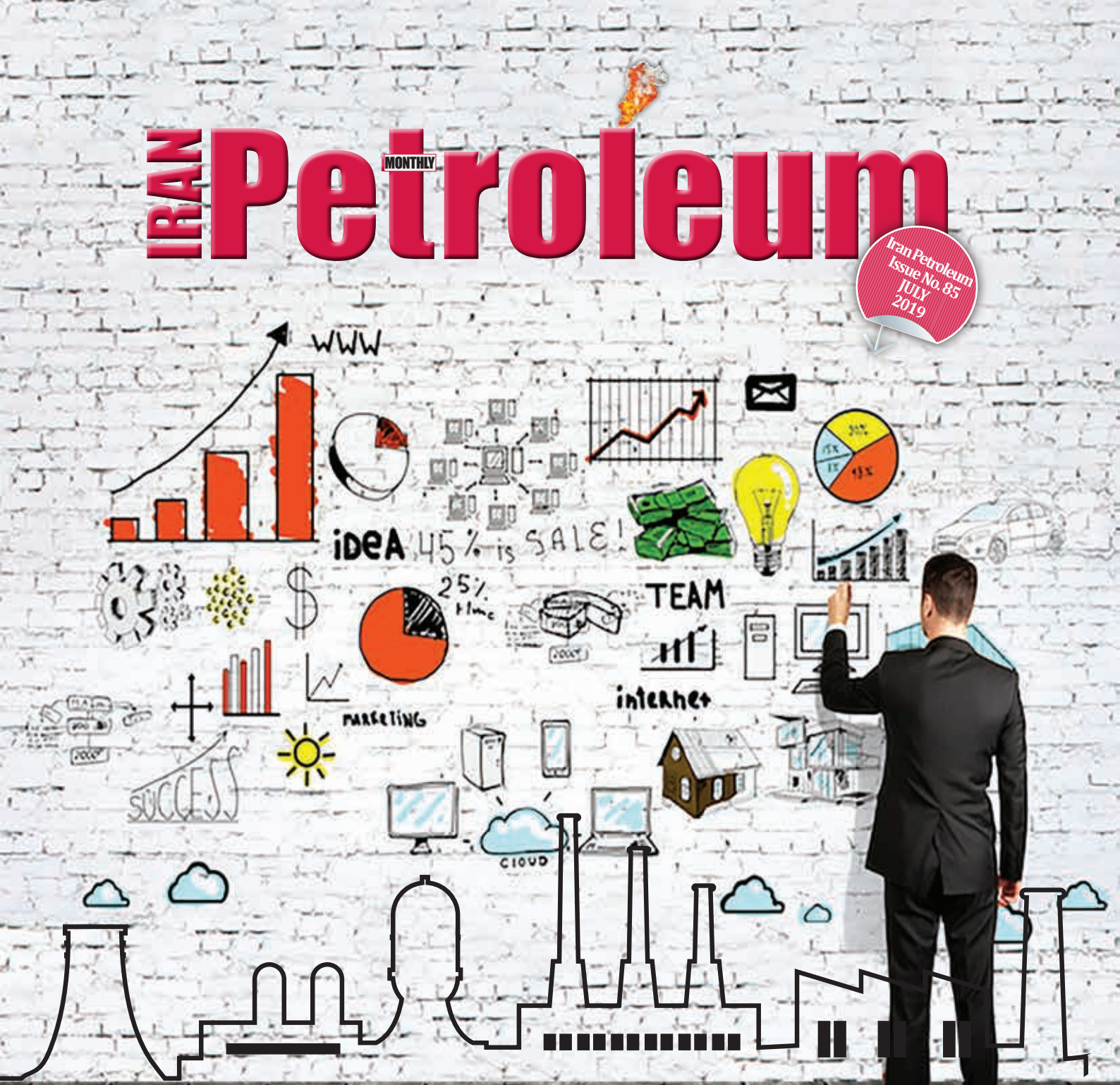

West Karoun Output Hike Plans under Way

Iran Petroleum Ministry Focuses on Startups

Unilateralism and Moral Obligations

Kasra Nouri
Director General of Public Relations

As the proverb goes, What Satan means for evil, God will use for good. That applies to US oil sanctions against Iran.

Iran's petroleum industry has experienced toughest ever US sanctions over the past four decades and managed to transform threats into an opportunity for domestic manufacturing. Iran has thwarted the plots hatched by sanctions imposers, and opened doors to self-sufficiency and self-reliance.

The policy pursued by the Islamic Republic of Iran and its oil industry over recent years has been based on global interaction and cooperation, and enhancing regional and international ties based on mutual respect and interests. Iran has, however, not backed down from its principles in the face of unilateral, irrational and unjust US sanctions. Furthermore, it has shown that it can nullify sanctions by relying upon its own capacities and own forces' experience. One of the major steps taken towards using Iranian knowledge in the oil sector was the establishment of "Council Supporting Knowledge-Based Companies" in the Petroleum Industry with a view to planning to activate startups.

That can certainly accelerate access to modern technology, boost competitive power and serve as an effective instrument in countering challenges caused by sanctions imposers.

Iran's Minister of Petroleum Bijan Zangeneh has said time and again that politically motivated meddling would have no place in Iran's economic and industrial trends.

Iranian officials believe that global economic growth and boom depends on free and economic interaction between all countries. Unilateral acts adopted by the US target each and every single person in the world.

Iran is resisting the US's unlawful sanctions; however, countering such selfish unilateralism would be a moral obligation upon every free thinker in the world.

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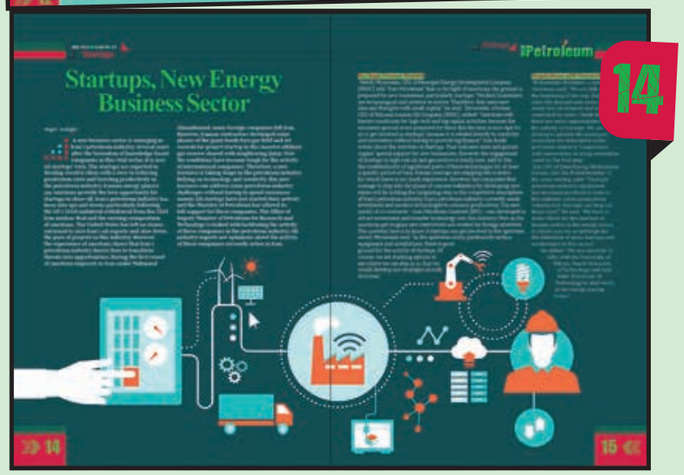

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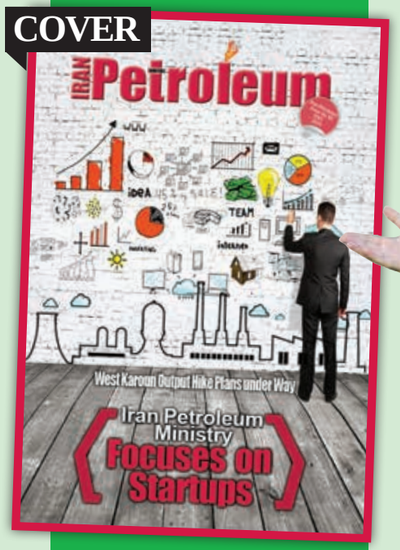

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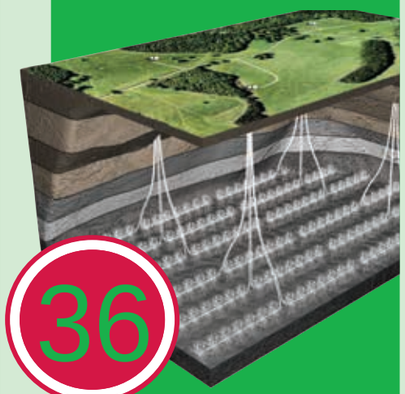

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No Country Can Fill Iran Oil Void

Iran's Minister of Petroleum Bijan Zangeneh has said no country could supplant Iran in the oil market as US sanctions target Iran's oil exports. Asked if Saudi Arabia, the United Arab Emirates and Iraq would be able to fill Iran's void due to US sanctions, Zangeneh said: "No country can fill our oil [void], but they have their own production."

In response to a question if decline in Iran's oil exports would harm oil wells, he said: "The wells will not be damaged, but if production halt lingers on, time and money would need to be spent for their reactivation."

Zangeneh said the oil tanker incidents in the Persian Gulf had not yet affected Iran's oil exports. "But we have to monitor all these conditions. We are faced with tanker restrictions. The US and its allies are making us face restrictions," he added.

Zangeneh was also asked about the non-dollar European trade mechanism Instex. He said: "I'm not aware of the latest developments, but Instex will not be effective without oil money deposited in." The minister said the Committee of Contracts had to undergo necessary training by the Office of Deputy Minister for Engineering, Research and Technology so that successful bidders would be chosen rightfully. He said vaguely-worded contracts would cause problems. "We have to resolve issues before they emerge; otherwise, any problem has to be resolved soon."

Exploration Starts in KopehDagh

The Exploration Directorate of National Iranian Oil Company (NIOC) has in partnership with an Iranian-European consortium embarked on gravimetric and magnetometric data gathering in Eastern KopehDagh in Khorasan Razavi Province.

Ali Moallemi, deputy CEO of NIOC for exploration, said: "These operations were undertaken following instructions from the Minister of Petroleum and the Supreme Council of Exploration regarding decision-making about sedimentary pools. Such issues as acquiring basic information, completing exploration data and the significance of gas exploration for energy supply to northeast Iran underline the strategic significance of this project in light of distance from the main gas production centers."

Referring to the details of the project, he said: "The contract for this project was awarded to an Iranian company following a tender. In a bid to benefit from modern methods and new systems, this company has taken a European partner."

Drilling Costs Halved

CEO of National Iranian South Oil Company (NISOC) Ahmad Mohammadi has said drilling costs have been cut by 50% through composing management.

He also expressed hope that this biological method of waste management would expand in the drilling industry.

Mohammadi said seven drilling rigs owned by National Iranian Drilling Company (NIDC) had been equipped with zero discharge system. He added in the environmentally preferred zones, zero discharge equipment was used to allow the drilling of 100 wells without causing any pollution in urban and protected drilling areas. "The composting project is being operated for the first time in Iran. It will eliminate drilling pollutants and accelerate cleaning of contaminated soil. Compared with zero discharge, it is less expensive," he said.

Gas Supply to Industries to End in March 2021

CEO of National Iranian Gas Company (NIGC) Hassan Montazer Torbati has said that gas supply to industries will be over in Iran by March 2021. He also said that 97.2% of Iran's urban population had access to natural gas.

"Currently, 1,148 cities across the country are connected to the natural gas network. Meantime, the number of villages connected to gas would reach 3,062 by" the end of the current calendar year, he said.

Torbati said the gas supply penetration rate in Iran's rural areas was about 79%, adding: "In addition to urban and rural gas supply, gas supply to industries and power plants is of high significance. We have currently over 102,000 industrial customers. Therefore, most major industries in the country have access to natural gas. The remaining industries are those with gas consumption below 5,000 cubic meters per hour."

South Pars Platforms Overhaul Nearing Completion

CEO of Pars Oil and Gas Company (POGC) Mohammad Meshkinfam has said that the overhaul of the giant South Pars gas field platforms would be over before autumn. He said the offshore gas field, which Iran shares with Qatar, was supplying about 75% of Iran's gas needs. "Under such circumstances, we will try our best for supporting this strategic sector," he added. Recalling the accident on platform 9 of South Pars, he reiterated the need for the precise monitoring of all South Pars platforms. He said: "In light of reports we have received, we hope that necessary arrangements would be made at South Pars platforms before winter in order to guarantee sustainable supply in winter." Regarding SP14, Meshkinfam said: "SP14 is the last and the most prioritized South Pars project. It is currently producing 28.2 mcm/d from two of its platforms. Two more platforms would be installed and become operational ahead of winter."

'Friendly' Nations Asked to Buy Iran Oil

Iran's First Vice President Es'haq Jahangiri has called on "friendly" countries to buy oil from the Islamic Republic despite US sanctions.

"Well mindful of friendly countries like China are facing some restrictions, we expected friendly countries to be more active in buying Iran's oil," Jahangiri said in a meeting with Song Tao, head of the International Liaison Department of the Communist Party of China, in Tehran.

He said China remained Iran's main trading partner and oil buyer, adding: "The US's imagination is that it can reduce our oil sales to zero by pressuring buyers of Iran's oil in a bid to cause the Iranian economy to collapse."

Jahangiri added: "But fortunately although one year has passed since the US imposed its oil embargo, Iran's economy enjoys acceptable stability." He said: "Gas is the most significant source of energy for the future. Iran sits atop the world's largest gas reserves and we are ready to export gas to China via the Iran-Pakistan pipeline."

He said that the obstacles ahead of Iran-China financial transactions have to be removed as soon as possible, and a financing mechanism needs to be established between the two countries.

Jahangiri said delegates from Iran's Ministry of Economy and Central Bank of Iran would travel to China to hold talks about establishing a mechanism for financial transactions between the two countries. He said the US was threatening security in the Middle East and the Persian Gulf region. He added: "Iran's foreign policy is to support multilateralism and counter US hegemony. We are ready to cooperate with China on regional and international issues." Song said Iran and China had ancient civilizations "and the Chinese side has always attached great significance to the development of ties with the Islamic Republic of Iran". He said China held a strategic view of its ties with Iran for the long term, adding: "Despite regional and international development, Beijing's willpower for preserving friendly ties with Tehran will not change." Song said the US was bullying both Iran and China. "Tehran and Beijing should exchange views and coordinate their moves in a bid to find new methods and approaches for resolving their problems and safeguarding common interests," he added.

Propylene Production Capacity Up

CEO of National Petrochemical Company (NPC) Behzad Mohammadi has said that Iran would increase its propylene production capacity by 3 million tonnes with the startup of seven new projects.

He said: "In the event of propylene output hike, attention must be shifted onto diversification in the chain of propylene and its derivatives to result in higher resilience for production units."

"Currently more than 900,000 tonnes of propylene is being produced by two refineries and six petrochemical plants.

Almost all this propylene is consumed in the country," said Mohammadi.

He said the Salman Farsi, Hirsa Polymer and Kourosh projects were located in the Mahshahr Special Economic Petrochemical Zone while the Entekhab, Mehr Petro Kimia, Sazeh Sanati Azaran and Naft-o-Gaz Razavi are located in Kangan and Assaluyeh.

Mohammadi highlighted the attractiveness and significance of the propylene industry, saying it would largely help the economy and create jobs in the downstream industry.

He said the second phase of the Mahshahr petrochemical zone had to be developed in harmony with the region's spatial planning.

Iran Oil Tanker Seizure Violating JCPOA

Iran's Foreign Affairs Ministry spokesman has said the British Marines' seizure of an Iranian oil tanker in Gibraltar was in violation of the Joint Comprehensive Plan of Action (JCPOA).

Abbas Mousavi said the issue had been discussed during the JCPOA Joint Commission in Vienna. "One of the issues discussed in the JCPOA Joint Commission meeting was the seizure of the tanker carrying Iranian oil. We believe that it constituted a violation of the JCPOA. They present their own arguments, but Iran views this move as illegal and an act of piracy," he said.

Mousavi said Iran had about 1,500 miles of coasts in the Persian Gulf, adding the Strait of Hormuz waterway was mainly adjacent to Iran. "Therefore, we are in charge of security there." "We believe that if other countries want to guarantee the security of the region and the Persian Gulf, they have no option but to cooperate together. All insecurity and problems are rooted in the interference of extraterritorial forces who are meddling with our region while they are thousands of miles away from their own land," he added. Referring to Europe's non-dollar mechanism for trading with Iran, Mousavi said: "The Europeans claim that Instex was launched for Iran to sell oil.

Equipment Supply Self-Sufficiency at 97%

The head of Instrument Self-Sufficiency Committee of Shahid Hasheminejad Gas Refining Company, Hessamoddin Alaei, has announced 97% self-sufficiency in the supply of equipment and instruments at this gas facility.

He said: "This success was achieved to support domestically manufactured commodities and in favor of manufacturing prosperity."

He said the 97% self-reliance in equipment manufacturing had been achieved through reliance on the commitment and expertise of domestic manufacturers.

"Some of this equipment like extensive control system, fire alarm and video surveillance that are high-tech and highly significant for the oil and gas industry were manufactured for the first time in partnership with knowledge-based companies and installed at the Shahid Hasheminejad gas refinery," he added.

Alaei said: "The objectives set in economic resilience and domestic manufacturing will have advantages for the oil and gas industry and all other industrial sectors." "That is a result of the refinery's support for domestic potentialities and reliance on the knowledge of Iranian oil and gas experts," he said.

Siemens Turbines Repaired in Iran

CEO of Iran Gas Transmission Company (IGTC) Saeed Tavakoli has said the company's engineers have mastered the knowhow for repairing the vibration section of Siemens gas turbines.

He referred to preventive and basic gas turbine reparations by Iranian contractors, saying the rotors of SGT600 gas turbines would be repaired by Iranian engineers. He added that doing such reparation in Iran would save the country € 350,000. "Some of these turbines were out of use for years due to thermal vibrations. But with reparations done by Iranian experts, they are being used anew," said Tavakoli. He said that preventive maintenance optimization (PMO) and condition-based monitoring (CBM) of turbines had helped increase the life of rotary equipment.

"This achievement in different turbines has cut reparation costs in the predetermined time intervals," he added.

Tavakoli said local knowhow could be transferred to other gas transmission areas, adding: "Under the present circumstances, nearly 300 turbines are operating in the gas transmission network. By applying modern methods, we can increase the functionality of turbines while reducing costs."

"Furthermore, we have seen big events in the logistics systems. For instance, after reforming the financial procedures we saved IRR 1,780 billion," he said.

Gasoline Output to Cross 100 ml/d

President Hassan Rouhani and Minister of Petroleum Bijan Zangeneh attended a ceremony to inaugurate three refining projects in East Azarbaijan Province.

The projects, worth IRR 54,150 billion, were about Euro-5 gasoline and gasoil, as well as lubricant production. Other projects included rural household and industrial gas supply.

Addressing the ceremony, Rouhani said: "The Ministry of Petroleum and all affiliated companies did a great job under [my] administration, the most important of which is self-sufficiency in gasoline and gasoil."

He added: "In gas, we were self-sufficient in summer, but we need imports in winter, but

now we are self-reliant in winters."

He said Iran's oil production and exports experienced a significant jump following the signature of Iran's nuclear deal with six world powers, known as the Joint comprehensive Plan of Action (JCPOA). "The important thing is that all these developments occurred within months," said Rouhani.

The president also touched on the Ministry of Petroleum's performance in developing jointly owned fields, saying: "We have managed to produce more than the countries with which we share those fields." Rouhani said that environmental concerns are highly significant, adding: "In this regard, we gradually stopped producing gasoline from petrochemical plants due to high pollution. We are currently producing gasoline and gasoil at various quality grades." For his part, Zangeneh said Iran's gasoline production had reached 107 million liters a day, more than double the 52 ml/d produced in 2012. He added that the gasoline output would hit 110 ml/d soon.

"In terms of quality, the Euro-grade quality gasoline production was zero in 2012, which is now hitting 74 ml/d," he said. Zangeneh said that Iran's gasoil production was 94 ml/d, which has recently risen to 115 ml/d. "In terms of quality, the Euro-grade gasoil production was zero in 2012, which hit 50 ml/d recently and will reach 60 ml/d by next March," he said.

SP14 Third Platform to Come On-stream in September

The third production platform at Phase 14 of the giant South Pars gas field is set to become operational in September. The hookup operation for this platform that had been recently installed by HL-5000 vessel is now over. The platform is set to produce 14.1 mcm/d of gas.

With the completion of offshore pipeline construction, gas production at Platform 14B would start in December. SP14 is currently producing 28 mcm/d of gas. The contract for SP14 development was signed between National Iranian Oil Company (NIOC) and eight contractors in June 2010. The design of this phase is similar to that of other South Pars phases. The accumulated recovery of 56 mcm/d of sour gas requires the drilling of 44 wells. Gas would be extracted from four platforms, including two main and two satellite platforms. The offshore gas carried to onshore gas treatment facilities and is processed there prior to being dispatched to consumers. This phase was initially set to be completed in 35 months, but due to the multiplicity of contractors, the project did not come online on schedule and it has been delayed by six years now. ,The offshore sector of this phase is currently in its final stages. According to NIOC plan, SP14 gas production would reach 5 mcm/d by next winter. Mohammad-Mehdi Tavasolipour, SP14 project manager, said: "With the commissioning of Platform 14B, in addition to sweet gas production, 20,000 b/d of gas condensate, 100 tonnes per day of sulfur, as well as 250,000 tonnes a year of LPG and 250,000 tonnes a year of ethane would be processed." He added that the gas production capacity at SP14 offshore facility would reach 42 mcm/d or 1.5 bcf/d. Platform 14B incorporates 80 kilometers of cable and 11 wells.Tavasolipour also touched on Platform 14D, saying: "This platform is the last platform in SP14, which is now 93% complete in the Iran Marine Industrial Company Yard in Bushehr." He added that Platform 14D would be installed on its predetermined location by October. He said that the drilling of 11 wells was over, while corrosion resistant alloy (CRA) pipes were being installed.

As President Hassan Rouhani took office in 2013, the Petroleum Ministry gave priority to the operation of remaining phases of South Pars which Iran shares with neighboring Qatar. Due to financial restrictions, the phases with a higher degree of physical progress were prioritized for financing and completion. Under the first round of administration of Rouhani, SP12, SP15&16, SP17&18, SP19, SP20&21 came online. SP13 and SP22-24 also became operational last March. Tavasolipour said due to the completion of the offshore phase of SP14, the onshore phase of this phase (refinery construction) would be prioritized for financing in the current calendar year.

$150mn Saved in SP Platforms

The Petroleum Ministry has in recent years implemented cohesive plans in order to boost domestic manufacturing and transfer technology into the country. The outcome of such plans has been the establishment of companies qualified in the implementation of offshore projects in the Persian Gulf. Iranian contractors are now able to build, install and launch platforms without any foreign help. Iranian companies have significantly increased their capabilities in recent years in installing platforms in the Persian Gulf. If until seven years ago Iranian companies could install and launch platforms within three months they are now able to do so in 26 days and without getting help from foreign companies.

The Iranian contractors' capabilities in the offshore sector has reduced costs in platform construction and saved money in this sector. Tavasolipour said: "The construction of all four platforms of SP14 has cost $570 million, far less than that of similar projects. That has saved Iran $150 million."

Multiple Contractors Delay Project

The offshore sector of SP14 is to be completed by winter to feed 56 mcm/d of gas into national grid. But the onshore sector has been delayed. The first sweetening train of the refinery of this phase would come online next March.

The offshore sector having been completed, arrangements have been made for using surplus processed gas in SP12 and SP13 until SP14 is completed. Tavasolipour said one reason for the delay in the onshore sector was the multiplicity of contractors and lack of coordination among them. Asked if managerial changes at Industrial Project Management of Iran (IPMI) had any impact on the onshore sector, he said: "As the project client, we are following up on this issue because IPMI has had delays in the offshore sector."He said that any delay in the implementation of project by one contractor would affect the task of fellow contractors. "This issue has caused problems for us in the onshore sector. Of course, we have asked IPMI to find practical approaches to resolve this problem and bring agility back to the project," he added.

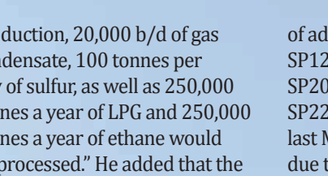
Notice to Contractors

Tavasolipour said: "In the contract, all necessary arrangements have been made to deal with any fault on the part of contractors. The necessary notice has been given to contractors. Should any contractor fail to deliver on its pledges on schedule, we will take legal actions." He said that project management consultation (MC) services are among issues enshrined in the project. He added that the Industrial Development and Renovation Organization (IDRO), as consortium leader, had been warned to make major changes into its management section "or we would hire experienced MC companies.""However, we have not seen any expected changes in this company," said Tavasolipour.He said that the contractor had apparently envisaged changing management in the commercial division, which supplies equipment, in order to make good on its pledges. Tavasolipour expressed hope that the contractor of this phase would honor its commitments. "Of course, as far as this plan produces no loss and does not hinder production we will continue supporting domestic contractors," he said.

Order Placed for Goods

Asked about the impact of sanctions on the onshore sector of SP14, Tavasolipour said: "The petroleum industry has been under sanctions for 40 years now. Therefore, for the implementation of the onshore sector of SP14 necessary measures had been considered and orders were placed for commodities."

He added that the obligations announced for implementation were based on realities, and the contractor would honor its commitments to the Petroleum Ministry. Regarding the allocation of financial resources, he said: "The financial resources for this project would be allocated from the National Development Fund of Iran (NDFI)." Platform 14B weighs 2,450 tonnes. SP14 has four platforms, each having a capacity of 500 mcf/d of gas. Before 14B, gas recovery from 14A and 14C had started at the rate of 1 bcf/d of rich gas (28 mcm/d).



West Karoun Output Hike Plans under Way

CEO of Petroleum Engineering and Development Company (PEDEC) Touraj Dehqani has said plans are under way to boost production from a group of oil fields Iran shares with neighboring Iraq. He said the joint oil fields located in West Karoun were currently producing over 300,000 b/d of oil.

Dehqani said PEDEC was determined to increase production from the Yadavaran oil field in coming months.

"In order to increase maximum efficient recovery, measures will be taken for further use of oil recovery potential in order to safeguard legal and contractual frameworks, while securing national interests," he added.

The buyback contract for the development of the Yadavaran field was signed with China's Sinopec in three phases. Phase 1 required 85,000 b/d output, Phase 2 180,000 b/d and Phase 3 300,000 b/d.

Feasibility studies conducted on Yadavaran indicate that the primary recovery rate from the Sarvak layer (heavy crude) is 6% and from the Fahlyan layer (light crude) is 14%. Yadavaran is estimated to hold 34 billion barrels of oil in-place. Phase 1 was inaugurated in November 2016. Dehqani also touched on the agreement for the technological development of the Azadegan field in cooperation with the University of Tehran, saying: "The biggest achievement of reservoir technological study projects is transforming shadow value (hydrocarbon reserves) into real value. That can materialize through optimal management of installations, reservoirs and assets. Last year, for the first time we used the results of research and studies conducted by the University of Tehran in Azadegan and we are hopeful of future achievements and results of this research."

2nd Downhole Pump in Yaran

Dehqani said an electrical submersible pump (ESP) had been installed in Well No. 4 of North Yaran for maintaining production from this joint field. "Naturally, we need to wait for information on the performance of this pump," he said. According to PEDEC, this pump has been installed at a depth of 2,300 meters within the casing. The pump, which measures about 17 meters long, has an outer diameter of 4 inches. The functionality of this pump would provide effective guideline in choosing method of production and enhanced recovery from the Sarvak reservoirs of West Karoun fields. The North Yaran oil field development plan was inaugurated in November 2016 with a production capacity of 30,000 b/d. But the field experienced output fall-off after some time. Therefore, downhole pumps were again considered for the field. The first pump was installed in June last year, but nothing happened in practice. Now a second ESP has been installed and everyone is waiting to see how it would function.

South Azadegan Development

South Azadegan is the largest oil field Iran shares with neighboring states. After the contract for its development with China's CNPCI was cancelled, PEDEC has been accelerating its output.

Dehqani said PEDEC administers development affairs in West Karoun, while Arvandan Oil and Gas Production Company (AOGPC) is in charge of operation. He said that West Karoun fields would be delivered to AOGPC after development under PEDEC authority.

He said: "During a period when the issue of new oil contracts and awarding developed and production together to contractors was on the cards, it was discussed that before new contracts have been signed for West Karoun fields, PEDEC would be temporarily in charge of production. But that target was not met; therefore, the procedures are back to their normal track." Dehqani said awarding South Azadegan project to AOGPC has already started and each section would be delivered stage by stage.

He said the first phase of the West Karoun power plant was also close to operation, adding: "Sustained oil production in West Karoun depends on a sustainable power supply. For this reason, it would be specifically important to launch the West Karoun power station. According to plans, the Yadavaran and West Karoun pumping station projects are to be supplied with electricity soon."

According to Dehqani, despite a slight decline in oil production following recent floods, over 300,000 b/d of oil was recovered from West Karoun's oil fields.

According to PEDEC, this pump has been installed at a depth of 2,300 meters within the casing. The pump, which measures about 17 meters long, has an outer diameter of 4 inches.

Gowreh-Jask Oil Pipeline

Dehqani also touched on a pipeline project to carry oil from Gowreh to Jask, cutting through the three provinces of Bushehr, Fars and Hormuzgan.

He said the strategic project would cost about $2 billion, involving 1,000 kilometers of pipeline, export terminal, pumping stations, gauging equipment, and storage facilities. He added that tender bids for various sections of the project have been held and most of them have reached the phase of contract.

Dehqani said contracts for pumping stations had also been awarded to contractors, while infrastructure and site preparation operations are under way.

He said pipe-laying and storage construction had also started.

Sour Service Pipes

The delivery of 1 mb/d of light and heavy crude oil from oil fields in southwestern Iran to coasts in southeast, storage and exports via Jask terminal, guaranteeing crude oil exports stability, decentralization from export terminal and diversification of terminals, supplying feedstock to refineries in the Makran coasts, facilitating investment, implementing downstream projects and ensuring sustainable development in underprivileged provinces of southeast Iran are among objectives of the Gowreh-Jask crude oil pipeline project.

Dehqani touched on the advantage of engaging domestic manufacturers in this project, saying: "Due to sanctions, we hit snags in importing pipes. But fortunately, there is a possibility for manufacturing sour service pipes in the country and manufacturing this type of pipe has started since several months ago."

He gave a positive assessment of cooperation on the part of other organizations in the Gowreh-Jask oil project, expressing hope that the project would become operational by March 2021.

West Karoun is comprised of two oil centers: Azadegan (North Azadegan, South Azadegan, North Yaran and South Yaran fields) and Yadavaran (Koushk and Hosseinieh).

These fields are estimated to hold over 67 billion barrels of oil in place. Iran was extracting nearly 50,000 b/d of oil from these fields until 2013, which has now reached 300,000 b/d.

Iran Petroleum Ministry Focuses on Startups

Minister Directive on Startups

Iran's Ministry of Petroleum has decided to provide special support to startups and knowledge-based oil companies. Minister of Petroleum Bijan Zangeneh has said that 17 ha of land in southern Tehran would be allotted to these companies. He said the Ministry of Petroleum had a detailed plan for startups, which would become operational in the second half of the current Iranian calendar year. Using technology and innovation in the petroleum industry is the main factor effective in reducing costs, increasing competitive power and countering future problems of the petroleum industry. That is why technology and innovation have turned into major actors in the oil sector. Over the past decade, oil startups have been focused upon more than ever in light of their high-risk ideas which mainly rely on technology. Zangeneh has called for the formation of startups in Iran's petroleum industry, saying the petroleum sector would see major changes, should this objective materialize. He said: "Therefore, there is firm will on our side and we have allocated investment for this purpose."

Demand and Consumption Main Energy Factors

Sirous Vatankhah, secretary of energy technology development at the Office of Vice President for Science and Technology, believes that demand and consumption are the main drivers in the energy sector. That has no significant place in Iran's executive organs. Noting that innovative businesses have profoundly changed energy sector activities, he said: "Today, many things have been done in the startup sector. In the energy sector, with e-sale of gasoline, a new project would emerge." Given the significance of using modern technologies in the petroleum industry, the Ministry of Petroleum's insistence on the use of technologies and creating new business environments, startup activities in Iran are significant due to their innovative contribution to the petroleum industry. Therefore, NIOC is determined to use the experience of the Office of Vice President for Science and Technology and specifically focus on the startup issues.

New Experience in Oil Sector

Over the past decade, Iranian startups have emerged in various sectors, but they are yet to make themselves known in the energy sector, particularly the petroleum industry. The Ministry of Petroleum had not taken any concrete actions prior to Zangeneh's directive. Mohammad Saheb Kar Khorasani, head of the Knowledge-Based Companies center of the Office of Vice President for Science and Technology, has said that of 4,350 knowledge-based companies recognized in Iran, 500 are more or less related to the oil and gas sector. Upon Zangeneh's instructions, the Ministry of Petroleum has set up a committee to support knowledge-based oil companies. Established to develop and upgrade the ecosystem of petroleum industry technology and innovation, this committee is determined to make long-term plans, create active relationship between stakeholders, use existing capacities in inner and outer bodies and lead entrepreneurship groups to recognize oil startups and knowledge-based companies with a view to preparing the ground for the development of technology and commercialization.

RIPI Role in Startups

Jafar Tofiqi, president of Research Institute of Petroleum Industry (RIPI), touched on planning for the establishment of an innovation center to complete the production chain and commercialize technology, saying: "Since we are moving into the phase of technology development while commercialization must be pursued along with accelerators and knowledge-based companies, we plan to set up an innovation center at RIPI in order to expand the cooperation network and complete the production chain, proceed with commercialization and supply technology on the market." He said that RIPI relies on the cooperation with universities, research centers as well as domestic and foreign companies for fulfilling its obligations, i.e. equipping the petroleum industry with new technology and knowhow in a bid to create higher value-added for the country.

Commerce and High-Risk Ideas

Hassan Montazer Torbati, CEO of National Iranian Gas Company (NIGC), has said the idea behind the establishment of startups was to decide on commercialization and high-risk ideas, so that they would transform their ideas into product without any concerns for the initial capital. Therefore, there must be concentration on possible ideas which may turn into a process so that the projects would come online shorter than envisaged. National Iranian Oil Company (NIOC) has expressed its readiness to make maximum use of the potential of knowledge-based companies and startups. However, it is said these companies should provide practical and not idealistic proposals for overcoming challenges. Therefore, in order to make use of potentialities, challenges must become known and plans be made for overcoming them. The main issue with startups is commercialization and demand.

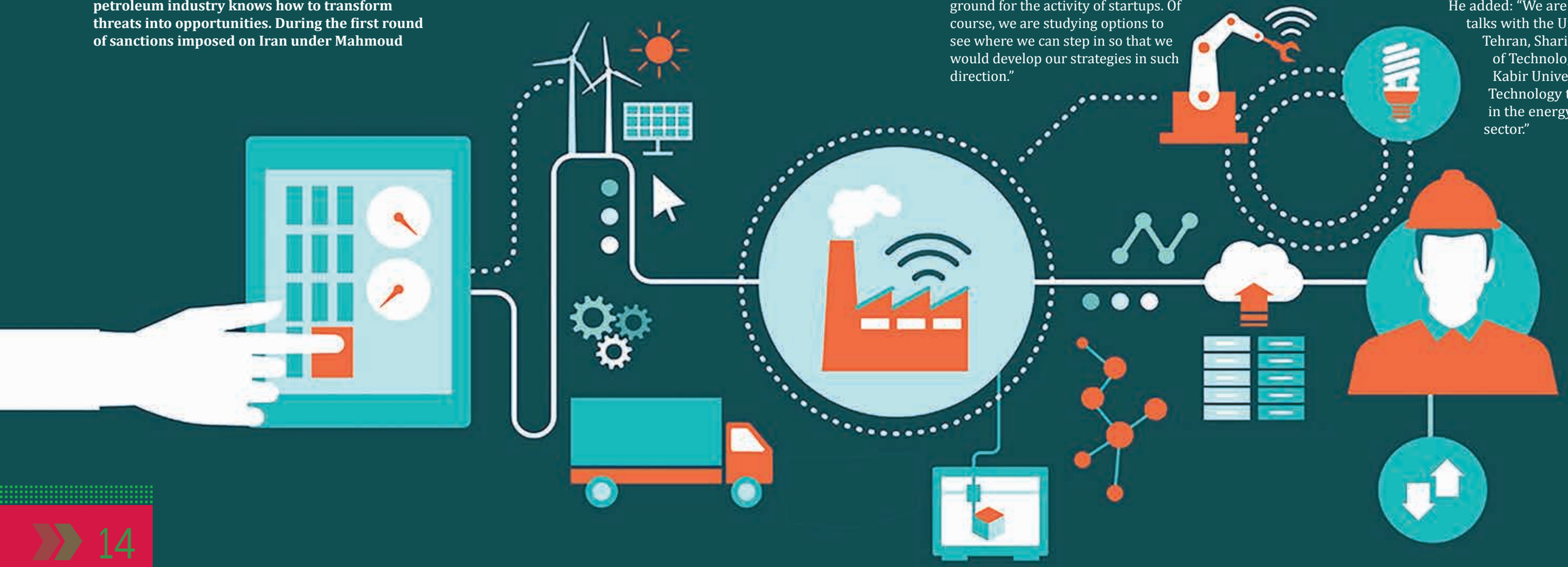
Startups Defy Sanctions

Parviz Sangin, general director of Ministry of Petroleum Technology Commercialization and Supply Regime, referred to Iran oil sanctions, saying: "We have made our utmost efforts to establish cooperation between ourselves and startups, because under the present circumstances in the country, startups and their solutions would be effective in overcoming challenges." Investment in startups started in 2005. North America has the highest share in this ecosystem, followed by China and India. In Iran, oil and gas industry complications have hindered diversity of startups. It should be also taken into consideration that when startups get engaged in the petroleum industry, new businesses would take shape and this issue will definitely face resistance. Currently many renowned international companies have issued appeals in support of startups. Even at an offshore technology conference in Houston, 10 out of 60 startups were selected as model companies.

Startups, New Energy Business Sector

Negar Sadeghi

A new business sector is emerging in Iran's petroleum industry. Several years after the formation of knowledge-based companies in this vital sector, it is now oil startups' turn. The startups are expected to develop creative ideas with a view to reducing production costs and boosting productivity in the petroleum industry. Iranian energy players say sanctions provide the best opportunity for startups to show off. Iran's petroleum industry has been into ups and downs particularly following the US's 2018 unilateral withdrawal from the 2015 Iran nuclear deal and the ensuing reimposition of sanctions. The United States has left no stones unturned to zero Iran's oil exports and slow down the pace of projects in this industry. However, the experience of sanctions shows that Iran's petroleum industry knows how to transform threats into opportunities. During the first round of sanctions imposed on Iran under Mahmoud Ahmadinejad, many foreign companies left Iran. However, Iranian contractors developed some phases of the giant South Pars gas field and set records for project startup in this massive offshore gas reserve shared with neighboring Qatar. Now the conditions have become tough for the activity of international companies. Therefore, a new business is taking shape in the petroleum industry. Relying on technology and creativity, this new business can address some petroleum industry challenges without having to spend enormous money. Oil startups have just started their activity and the Ministry of Petroleum has offered its full support for these companies. The Office of Deputy Minister of Petroleum for Research and Technology is tasked with facilitating the activity of these companies in the petroleum industry. Oil industry experts are optimistic about the activity of these companies currently active in Iran.



No Huge Finance Needed

Mehdi Mirmoezzi, CEO of Pasargad Energy Development Company (PEDC) told "Iran Petroleum" that in the light of sanctions, the ground is prepared for new businesses, particularly startups. "Modern businesses are technological and creative in nature. Therefore, they need new idea and thoughts with small capital," he said. Mirmoezzi, a former CEO of National Iranian Oil Company (NIOC), added: "Sanctions will harden conditions for high-tech and big capital activities because the necessary ground is not prepared for them. But the time is now ripe for us to get involved in startups, because it is related directly to creativity and innovation without having to provide big finance." Iran holds events about the activities of startups. That indicates state and private organs' special support for new businesses. However, the engagement of startups in high-risk oil and gas sectors is totally new. Add to this the confidentiality of significant parts of these technologies for at least a specific period of time. Iranian startups are stepping into a sector for which there is not much experience. However, the companies that manage to step into the phase of commercialization by developing new ideals will be holding the bargaining chip in the competitive atmosphere of Iran's petroleum industry. Iran's petroleum industry currently needs investment and modern technologies to enhance productivity. The new model of oil contracts – Iran Petroleum Contract (IPC) – was developed to attract investment and transfer technology into this industry. Now as the sanctions get tougher, new restrictions are created for foreign investors. The question here is to know if startups can get involved in the upstream sector. Mirmoezzi said: "In the upstream sector, particularly surface equipment and installations, there is good ground for the activity of startups. Of course, we are studying options to see where we can step in so that we would develop our strategies in such direction."

Negotiations with Universities

Mohammad Mostafavi, a startup chairman, said: "We are still at the beginning of the way. But since the downstream sector needs less investment and is less controlled by state, I think that there are more opportunities for the activity of startups. We are looking to provide the necessary ecosystem for innovation in the petroleum industry. Cooperation with universities on using innovation could be the first step."

But CEO of Dana Energy Mohammad Iravani, also the Board member of the same startup, said: "Decrepit petroleum industry equipment has increased production costs in this industry, while productivity remains low. Startups can help cut these costs." He said: "We have to make efforts for the startups to become active in the energy sector, in which case we would hope for the formation of more startups and accelerators in this sector."

He added: "We are currently in talks with the University of Tehran, Sharif University of Technology and Amir Kabir University of Technology to start work in the energy startup sector."

High-Risk but Profitable

Sanctions will not remain on the petroleum industry for good. There are numerous opportunities for investment in Iran's oil sector in light of great potential in this industry. Given the Ministry of Petroleum's insistence on the use of modern technologies and methods that would help reduce costs or overcome some challenges and problems, startup companies take advantage of this chance and supply commercial commodities by engaging creativity and idea. Iravani said: "There are many opportunities in Iran's petroleum industry, where no serious activity has been done. Owing to our potentialities in Iran we can create new ideas to reduce production costs."

He said there is potential in the downstream sector where due to the high risk of license, no company has so far entered. He added that startups can step into this sector, develop their own brands and work for commercialization. Iravani said: "Currently startups are a high-risk business. They fail in 80% of cases, but if 20% accomplish their energy projects, they will be definitely influential." He touched on the achievements of Iran's petroleum industry during years of sanctions, saying: "Although due to sanctions, we are lagging behind in the transfer of technology, the fact is that Iranian contractors built South Pars. Taking benefit from startups we can reduce our costs and boost productivity."

Ambitious Plans with Startups

Iravani touched on Silicon Valley startups, saying they are ambitious projects. "The main feature of startups is their ambitiousness. I believe that we have to be ambitious in this regard, but move reasonably and rationally." Asked if Iranian startups would be able to operate outside Iran, he said: "Startups will be successful when they have their markets. If we want to create new business we have to engage experienced people and create value. Big companies have their own model in this sector and we can definitely compete with those outside Iran, too." Mostafavi said: "Startups are not costly. Although we are facing financing and capital attraction problems in the petroleum industry due to sanctions, the technology sector would need changes in the attitudes towards the petroleum industry rather than costs."

He said: "The Ministry of Petroleum is influenced by global conditions. Until 10 years ago, there was no talk of petroleum industry. But now the Ministry of Petroleum is determined to benefit from new and creative ideas for overcoming petroleum industry challenges. Startups must be able to create ideas which would be commercialized." "In the new business environment, we welcome every new idea in the petroleum industry. We think that these ideas would be more successful in the downstream sector. However, we face no obstacle for activity in the upstream sector," he added.

MOU to Support Startups

Last December, Dana Energy, Oil Industry Investment Co. (OIIC) and PEDC signed an MOU to develop the startup ecosystem, support new businesses and set up a venture capital fund in the energy sector. The MOU first led to the establishment of Apadana Ventures as a startup.

The Board of Directors of Apadana Ventures recently held a meeting. Mostafavi, Board chairman, highlighted the neglected role of technology in Iran and stressed the need for paying attention to innovation in the petroleum industry.

He said: "The issue of startup innovation and ecosystem is new in the petroleum industry and its stability requires empathy and time by all actors in the state and private sectors."

Mehdi Gholamloo, CEO of Apadana Ventures, said plans had been made for launching energy innovation centers in cooperation with reputable universities.

"This company is determined to fulfil its role as a private sector developer of startup ecosystem in the petroleum industry and welcomes all actors in this sector," he added.

Mir-Moezzi touched on new chances for innovative activities in the petroleum industry, saying: "What's clear is that all petroleum industry sectors including upstream, downstream and midstream energy sectors have great potential. The presence of startups can be helpful for all of them to step into these sectors."

Iravani pointed to productivity and cost reduction, saying innovative activities and startups would be a good solution for cost reduction.

Oil Startups, Key to Petroleum Industry Changes

Mehdi Gholamloo

The new Iranian calendar year has seen events on startups, and signature of memorandums and adoption of bylaws that support startup ecosystem. This issue has now become a major cause of concern for senior Iranian managers, particularly the Iranian president. It would not be strange if we call the current year the year of foundation of modern wave of Iranian startups. This development is likely to emerge in one of the most significant ministries. Minister of Petroleum Bijan Zangeneh established the "Council to Support Knowledge-Based Companies in Petroleum Industry" and is now drawing up bylaws for the development of knowledge-based companies and oil startups in partnership with the private sector. But the point is that in case of misunderstanding the necessity of development of startups for the oil and gas industry among oil and energy experts and actors, the envisaged plan is likely to decline to the level of a propaganda show and would cause many problems. Therefore, I will try to explain some reasons for the necessity of development of startup ecosystem in the petroleum industry.

Oil and gas industry is among the most complicated industries and is technologically very challenging. That along with growing pressure for reducing costs, developing oil fields and reducing environmental impacts has led to the development of technology to cut spending, bring about distinction and finally create competition among leading oil companies in the world. Technology and innovation have always been the main game-changers in the upstream oil and gas industry, particularly when global oil prices change. For instance, in early 2010, ExxonMobil introduced a sophisticated technology that could reduce costs while raising production capacity to 5.8 mb/d and prolong the life of oil fields. The new technologies in the petroleum industry in coming years are expected to increase the volume of recoverable crude oil to 10.2 trillion barrels, not to mention raise the recovery rate for a longer time. For instance, internet and mobile technology would create over $100 billion a year in revenue for mining, metal and oil industry by 2025.

The significance of using technology and innovation for the upstream oil and gas industry is undeniable in the world; however, their increased use has given rise to some challenges due to being time-consuming, high costs and startup risks, tests and assessments.

Until the 1980s, development of technology and innovation in the upstream petroleum industry was under monopoly ofmajor oil companies, but after one year and following oil shocks, new actors including oil service companies, universities and independent research centers have been engaged. Oil service companies are now the main source of innovation and technology in the upstream oil industry. However, development of technology and innovation are faced with new challenges and problem of adaptability.

Moving towards formation and development of oil startups is a global campaign. Leading companies in the world are now trying to address such challenges. Between 2008 and 2017, over 80% of venture capitals belonged to oil giants like BP, Shell and Total.

Oil startups are emerging teams or companies capable of presenting new technological solutions to help overcome challenges of big oil companies. These startups would introduce new business models and develop new technologies. Their business models would be very similar to customer business models and help customers use technologies at much lower costs and much more easily.

The oil and gas industry is not often welcomed by private capitalists due to its heavy dependence on economic conditions, long sale cycle and slow procedures.

The startups currently operating in the development of technology in the oil and gas industry are facing major problems in attracting capital and credit due to the absence of capital venture funds specializing in this sector and also the lack of communications between startups and oil and gas companies. Establishment of specialized oil and gas accelerators like BBL LAB in Houston are instances of the oil and gas industry solution for filling this void in the oil and gas startup ecosystem, which became operational in 2019.

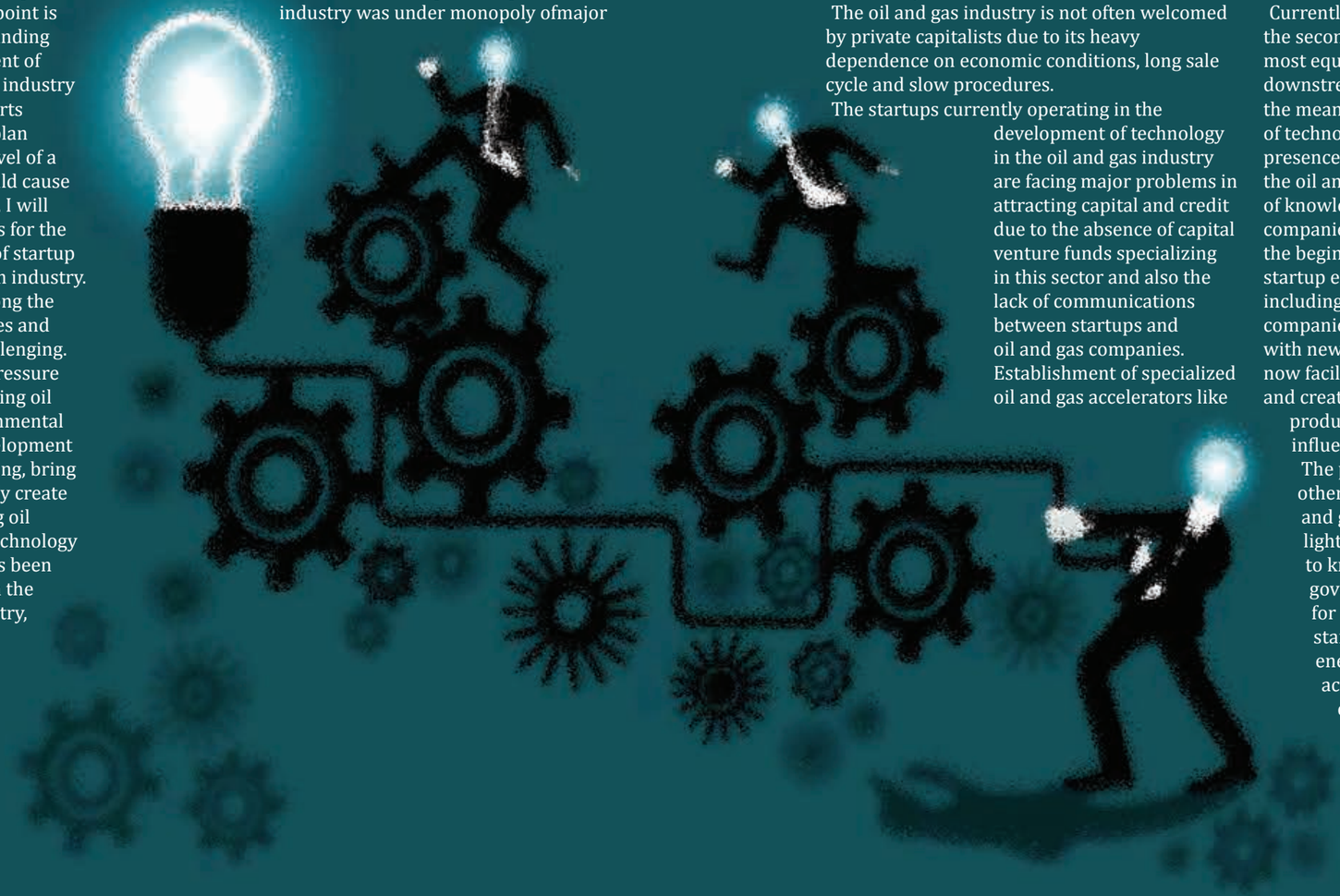
In Iran, the first oil well was drilled in 1908. The country's oil and gas industry has since been improving, but access to technology has always constituted a challenging issue. This issue has taken up added significance with the re-imposition of unilateral and unlawful US sanctions over recent years.

Undoubtedly,oil and gas industry is an artery of Iran's development. Now that Iran is under tough sanctions, we need to think about endogenous development of technology and domestic capabilities.

The issue of domestic potential and development of technology is nothing new. It has long been on the cards in the oil and gas industry and the result has been nothing but further dependence on foreign technology. One reason may be lack of paying attention to the changes in the ecosystem of global innovation in the oil and gas industry.

Currently, most oil fields in Iran are nearing the second phase of their recovery, and most equipment used in the upstream and downstream oil and gas sector are decrepit. In the meantime, the impossibility of purchase of technologies from other countries and the presence of talented university graduates in the oil and gas industry, as well as formation of knowledge-based and technology-based companies in the oil and gas industry as well as the beginning of formation of other elements of startup ecosystem in the oil and gas industry, including accelerators and venture capital companies, have provided this vital industry with new opportunities. A series of factors has now facilitated interaction between startups and creative minds with big exploration and production companies, as well as other influential players.

The persistence of this trend, like every other measure, would need policymaking and government support. Of course, in light of lessons learned by Iran with regard to knowledge-based companies, the government had better offer its support for the formation of oil and gas industry startup ecosystem, including support for energy innovation centers development, accelerators, common work space, parks of technology, zones of innovation and specialized venture capital funds with the private sector playing the central role.



Iran Manufacturers
Serving Petroleum Industry

Iranian manufacturers of petroleum industry equipment have been doing their job for more than four decades now despite the sanctions imposed by the United States. Many representatives of foreign companies operating in Iran have expressed their willingness for establishing joint venture with Iranian companies. Until several decades ago, foreign companies had to bring all necessary equipment to Iran due to substandard and low-quality products manufactured by Iranian firms. The situation has now drastically changed and Iranian manufacturers are now able to supply commodities conforming with international standards.

Iran's petroleum industry has left behind ups and downs and struggled with tough and complicated conditions particularly in the past one decade to guarantee its development. Domestic manufacturing and mastering modern technology have always been among the major concerns of Iran's petroleum industry. This issue has taken up added significance over recent years. However, the advantages of commercialization and revenue generation should not be forgotten. Over recent years, exploring solutions and obstacles to commercialization, finding solutions against investment risks in different sectors have been among the major activities of Iranian petroleum industry managers. In the meantime, due to planning made by Ministry of Petroleum for boosting Iran's oil production capacity, several hundred billion dollars would be invested in the petroleum industry over coming decades, 50 to 70% of which would be spent on purchasing equipment.

10 Groups of Commodities Manufactured

Industrialization started in Iran following the discovery of oil, but Iran's petroleum industry had improved only in operation before the 1979 Islamic Revolution due to US and UK-dependent policymaking, as well as shortage of specialized manpower.

Over the first years following the revolution, the country was involved in imposed war and the Iranian government had to focus on basic needs. Paying attention to the petroleum industry was limited to preserving the production capacity in order to gain enough dollars to meet urgent needs.

When the imposed war ended, Iran had to rebuild the war-ravaged country. Until the end of the 1990s, the manufacturing of equipment did not get attention.

Until early 2010s, foreign companies supplied Iran with necessary equipment. But the imposition of tough international sanctions against Iran's petroleum industry caused difficulties for the import of such products. The sanctions have been re-imposed now.

Based on the instruction of Minister of Petroleum Bijan Zangeneh, 10 groups of basic petroleum industry commodities were identified to be mass-produced in collaboration with knowledge-based companies and the private sector. Recently, the production line was launched for three items of this strategic equipment in Kish Island.

Iranian experts have managed to develop state-of-the-art technology through collaboration with a foreign company. Now, some wellhead and downhole equipment is being manufactured domestically.

Over the past five years, as US companies have stopped cooperation in completing gas wells, Iran has in collaboration with a European company moved to replace necessary equipment in gas wells and decided to produce such equipment in Kish Island. To that end, a domestic company established a joint venture with a European manufacturer to set up a plan for producing well completion equipment in Kish. Minister Zangeneh recently ordered the establishment of a working group to follow up on the signature of necessary contracts for manufacturing equipment widely used in the petroleum industry.

The text of agreements, the value of each contract, modalities of payment, terms and conditions of contract as well as preferences and guarantees need the approval of this working group. The volume of commodities mentioned in each contract and the quality of commodities are finalized based on the request of major companies and in exchange of views with them in the working group.

Envisaging necessary plant and field tests (establishing commodity standards) to have assurances about the quality of products and assessing and making decisions for the signature of contract and bringing into operation technology upgrade projects and knowledge-based manufacturing of such equipment lie within the authority of this working group.

Competitiveness of prices and the quality of products are highly significant. Contracts are also required to be from future demands and orders without causing any disturbance in ongoing activities.

A symbol of domestic manufacturing in Iran may be seen in the words of Abol-Qasem Zamani, product manager at the Iran Oil Pipelines and Telecommunications Company (IOPTC). He said 40 demands for the manufacturing of 203 items were under way by this company. Twenty-eight demands are in the phase pf manufacturing, while twelves others are in the phase of tender bid. These demands are approximately valued at IRR 234 billion. With the domestic manufacturing of 203 items at IOPTC, about $18 million will be saved. IOPTC manufactured 2,070 items from 2003 to 2018, saving the country $37 million.

10 Contracts Signed

Domestic manufacturing and commercialization of research are so important that the number of advisory services centers in petrostates is increasing. Domestic manufacturing and commercialization have become a major pillar of technological innovation. In Iran, by relying on academic and scientific research related to the petroleum industry, contracts have been signed with domestic companies for the manufacturing of some strategic commodities like casings and tubing needed in the development of oil and gas fields.

Recently the Oil Industries Engineering and Construction Company (OIEC) and Luleh Gostar of Esfarayen (LGE) signed an agreement to order tubing and casings for the development of Ramshir and Mansour fields. Addressing the ceremony, Reza Dehqan, deputy CEO of National Iranian Oil Company for development and engineering, said: "This agreement indicates domestic capabilities under the present circumstances, and shows that the wheel of industry is still spinning and we can go ahead under any conditions." He touched on the projects which were to come online under the Iran Petroleum Contract (IPC), saying: "From a stage onward we concluded that we should no longer wait for agreements. That is why we started projects in parallel based on the new oil contract model. Now that we are faced with sanctions, the parallel agreements are still in effect." Twenty-three packages for enhancing oil production capacity, valued at $6.2 billion, were defined by NIOC for the purpose of job creation, creating space for Iranian contractors and manufacturers and preserving the production of about 280,000 b/d of oil. Meantime, contracts were signed with domestic companies, in which domestic manufacturing is highlighted. Import bans were slapped on 84 items of foreign commodities that would be manufactured domestically. NIOC also identified 15 items of widely consumed commodities. NIOC officials said about 40% of the $6.2 billion would be earmarked for domestic supply of commodities. Dehqan said 10 agreements had been signed, while 10 more would be signed in coming months.

"OIEC runs two important fields subject to these agreements and I hope it would increase output by 70,000 b/d as envisaged," he said. Oil production preservation and enhancement in Iranian oil fields is envisaged in 23 packages with $6 billion investment over three years. This national project, whose objective is to engage Iranian companies and to create jobs, includes 23 projects, including 29 onshore and 4 offshore ones. With an investment of about $220 million, these projects will be implemented in seven oil-rich provinces (Khuzestan, Bushehr, Fars, Hormuzgan, Kermanshah, Ilam and Kohguiluyeh Boyer Ahmad). With their implementation, the country's crude oil production capacity will increase by 300,000 b/d, earning the country $14 million in revenue.

IGAT-9 Extension under Way

The Iran Gas Trunkline 9 (IGAT-9) is a strategic pipeline in Iran's gas grid. Due to its significance in providing necessary infrastructure for exports and enhancing gas supply to the western and northwestern provinces as well as feeding industries, this trunkline has taken up added significance.

As this project is completed, gas supply becomes more stable in the cities of Baneh, Saqez, Sardasht and Boukan. Although western Iran is mostly mountainous and there are numerous rivers and obstacles, this pipeline is progressing. Mehdi Bazargani, IGAT-9 project manager, speaks with "Iran Petroleum" about the project.

Four projects, totally 400 kilometers long, extending from Ahvaz to Kuhdasht are envisaged. They are in fact the next phase of IGAT-9 to complete the Bidboland-Kuhdasht section

Would you please tell us about IGAT-9 projects?

IGAT-9 projects are among the prioritized and important projects operated by National Iranian Gas Company (NIGC). This trunkline stretches from Bidboland to the Bazargan border. Construction of Dehgolan-Miandoab section, which is 230km long, is over. Gas was fed into the final 55km section in January. The rest is also ready for gas injection. The Bidboland-Ahvaz part which is 98 kilometers long is still under construction.

Would you please tell us about future projects?

Four projects, totally 400 kilometers long, extending from Ahvaz to Kuhdasht are envisaged. They are in fact the next phase of IGAT-9 to complete the Bidboland-Kuhdasht section.

In addition to IGAT-9, what other projects do you have under way?

A 56-inch project connecting sites 1 and 2 of Assaluyeh has been fed with gas and is in its final stages. It will become fully operational after the installation of launcher and receiver. A 40-inch ethane project has been also inaugurated. It earned the country high value-added. The pace and quality of work there constitute the outstanding features of the project.

What advantages do the 20-inch and 30-inch Bidboland-Gachsaran pipes create?

This pipeline will supply gas to the Behbahan power plant, Behbahan cement factory, as well as the Gachsaran petrochemical plant. Supplying gas to the Gachsaran petrochemical plant is of vital significance for the plant managers. We are making efforts to finish the project according to schedule by next March.

What conditions does the Bidboland-Ahvaz pipeline lie in?

About 30 km of this pipeline extending as far as Mahshahr is prioritized. It is expected to receive gas by November. Construction of the rest of the pipeline, 68 kilometers long, would be over by next July.

Would you please explain about the steps and toughness of job?

IGAT-9 in western Iran and Khuzestan Province is faced with many impediments. In the West Corridor, from Dehgolan to Miandoab, we were faced with steep mountains and hard land which made it difficult and time-consuming to work. However, we made every effort to increase resource, machinery, equipment and working shifts in order to overcome these obstacles. When the projects were under way in Kurdestan, we had tough time, particularly last winter when the temperature was unprecedented in 20 years.

In addition to mountains, what other natural obstacles were you faced with?

There were many of them. We had 45 instances of cutting through paved road and five cases of cutting through permanent rivers. For instance, it was very difficult to cross the Qezel Uzan River, which is 320 meters wide.

How about land obstacles?

In Kurdestan and West Azarbaijan Provinces, we crossed highly valued pieces of land. Settlement of related issues for the land acquisition group was difficult and time-taking. It was our first experience in full assignment of land acquisition affairs to contractor, which grew into a successful model to be extended to other projects. Another problem with land acquisition was our challenge between natural resources and obstacles about the land being national or not. All these obstacles caused hardship to us, but none of them could harm our colleagues' firm determination and the projects are coming online even ahead of schedule. The second section of the Dehgolan-Miandoab pipe became operational several months ahead of schedule, despite the pipe supply problem. Land acquisition is not limited to the Kurdestan area. In the existing and future projects in Khuzestan, Kermanshah and Lorestan, we will be faced with similar obstacles. We will keep crossing obstacles to future projects by cutting through Maroun and Karoun rivers. For all of them, we have made necessary planning and arrangements.

Anything else you want to add in conclusion?

One of the major problems to IGAT-9 is shortage of human resources required in the construction, installation and engineering sectors. Due to the seriousness of this issue, we hope that relevant authorities would cooperate with us to overcome this problem and we would be able to pursue the activities of this project particularly in the regulatory section with more precision and motivation and the company would experience a good jump in this strategic pipeline.

This pipeline will supply gas to the Behbahan power plant, Behbahan cement factory, as well as the Gachsaran petrochemical plant. Supplying gas to the Gachsaran petrochemical plant is of vital significance for the plant managers. We are making efforts to finish the project according to schedule by next March

Iran Gas Transmission Matures

Iran's gas treatment capacity is set to exceed 1 bcm/d by the end of the current year. According to plans, gas supply to cities and villages is planned to hit 100% in three years. Every year, over 3,000 villages are connected to the natural gas network, a breakthrough experienced in no other country. Along with the development of its domestic network, Iran has been seriously working on gas export projects like the Iran Gas Trunkline 9 (IGAT9) and IGAT6. The country has a long-term plan to win an 18% share in global gas trading. Hassan Montazer Torbati, CEO of National Iranian Gas Company (NIGC) says: "Gas transmission through pipeline remains attractive in the world and Iran's neighboring countries still have good capacity to receive natural gas via pipeline." He added: "But LNG exports are envisaged for farther spots. Many international issues and sanctions have impacts on gas exports, but in the long-term we will have good conditions because the Europeans are now assured about Iran's gas exports stability." Montazer Torbati said Iran had been sustainably exporting gas to Turkey despite pressures.

Gas Grid Can Handle Any Volume

Iran's gas transmission network is currently ready to handle any volume of gas treated at gas treatment facilities. Of course, increasing the amount of refined natural gas requires expansion of gas transmission lines and gas compressor stations. Therefore, based on plans envisaged for the gas industry, the length of high-pressure gas pipelines will exceed 64,000 kilometers from the current 37,000 kilometers. Based on forecasts, the number of gas compressor stations will increase from 80 to 140. That would place Iran in the rank of countries with the most expanded gas transmission networks in the world. Iran with more than 37,000 km of high-pressure pipeline intends to operate new projects in order to maintain its fourth position in the world in terms of the extent of gas distribution. At the time of 1979 Islamic Revolution victory, the gas industry was 13 years old. By that time, Iran had only one pipeline for exporting gas. It was IGAT1 which carried gas to the Union of Soviet Socialist Republics. Iran's gas supply owes eighty percent of its volume to Iran's Minister of Petroleum Bijan Zangeneh who had already served as Minister of Petroleum for eight years from 1997 to 2005. Iran's gas transmission industry with more than half a century of history in the energy sector is currently the most significant supplier of energy in the country. This position was hardly imaginable when NIGC was established five decades ago. But strategic and macro planning by the Petroleum Ministry and NIGC senior officials on one hand and daily growing demand for gas to supply national energy needs, earn the country revenue from gas exports for investment and operating infrastructure industries on the other, paved the ground for the fast and structural development of the gas industry. According to BP's annual statistics review of 2017, Iran sits atop 33.2 tcm of gas, coming second behind Russia. Iran holds 17.2% of the world's total gas reserves. Qatar and Turkmenistan trail behind. Iran is producing 223.9 bcm/y of gas, standing third behind the United States and Russia. Therefore, Iran holds a 6.1% share in global gas production.

Iran Unrivalled in Mideast

Transmission of natural gas from reservoirs and refineries to consumers is of high significance. Iran's gas transmission network is handled by IGAT1-IGAT10. IGAT11 has been built and is about to come on-stream. Gas compressors are installed throughout the trunklines. Iran's 38,000-km pipeline, fitted with 81 gas compressors, is able to carry more than 800 mcm/d of gas. Until the 1979 Islamic Revolution, Iran had only 2,900 km of pipeline. But under Iran's 20-year Vision Plan, the country should have 70,000 km. Before the Revolution, Iran had only 14 gas compressors, which is now 81 and would go to 140 under the Vision Plan.

Saeed Tavakoli, CEO of the "Iranian Gas Transmission Company" (IGTC), said there is currently over 36,829km of high-pressure gas pipeline in the country. He added that by using 82 gas compressors, 240 bcm of gas was transmitted across Iran in the last calendar year to March. Also in the last calendar year, 5,740km of cleaning pigging as well as 7,457 km of smart pig-running was done. Other measures undertaken in gas transmission in the last calendar year were: reducing gas waste in Iran's gas grid by 6%, formulating the package of outsourcing the Safa Shahr 4 gas compressor installations, successful overhaul of ZORYA DJ 59 turbine for the first time, relying on IGTC manpower and saving IRR 46 billion, carrying out research project to improve technology for producing injection current anodes with a view to upgrading resistance to corrosion, level of corrosion, mechanical properties, joint failure and current density with a view to increasing the lifetime of pipelines at IGTC, producing compressor to be used in INGROSOLL-RAND air compressors of IGTC at industrial scale, signature of MOU between IGTC and the "Iranian Spatial Agency" for communication services and meeting industrial communications' needs of Iran. In January, Iran transmitted 761 mcm/d of gas, which was a new record for Iran's gas industry. Chief among the major plans pursued by Iran's gas transmission industry in the current calendar year are: removing blowdown valve leaks, studying new methods of pigging pipes after manufacturing, examining the recent flooding problems and finding solutions, studying international standards and experience with regard to access to pipes, gas quantity management, upgrading energy and carbon management, upgrading project management and engineering, improving risk management, carrying out renovation projects and development of strategic companies.

Techno-Engineering Service Exports

Iran is currently exporting technical and engineering services to neighboring countries thanks to its domestic experts' potentiality. This achievement was made through the Iranian gas industry's planning and all-out support for the private sector during years of tough sanctions. The Self-Sufficiency Committee of IGTC was recently established, while a self-sufficiency code of conduct was drawn up to outline the procedure of self-sufficiency through using domestically manufactured products in the gas transmission industry through domestic companies, as well as parks of science and technology. The issue of self-sufficiency is very important in drawn up strategies for Iran's gas transmission. The establishment of specialized working groups at the Self-Sufficiency Committee of IGTC in recent years bears proof to this fact. Ever since the 1979 Islamic Revolution, Iran's gas industry has been seeking to free itself from dependence in infrastructure industries, save hard currency, reach self-reliance, develop sector-wise, and pursue designs based on needs. To that end, it has taken big strides to reach self-sufficiency in the manufacturing of commodities and items needed in the gas industry. Upgrading quality to meet national and international standards, using domestic potentialities to maximum level, timely delivery and finally proper price, have topped the agenda of Iran's gas industry. At present, many items needed in the gas industry are designed and manufactured by domestic manufacturers. In the gas supply sector which involves the urban network and pressure decompressors, more than 400 items of commodities are used. More than 98% of these items including pipes, steel and polyethylene joints, valves, gas meters and regulators are manufactured domestically. In the gas transmission sector, more than 500 items of products are used. More than 90% of these items are domestically manufactured. In the refinery equipment sector, most metallic equipment and pressurized tanks equipment like scrubber and separator, as well as tower equipment and chemicals, humidity absorbents and catalysts of some refineries have been domestically manufactured. Regarding support for domestic manufacturers, IGTC has moved to identify such companies and/or individuals and adopted incentives, offered intellectual thinking and reduced bureaucracy, provided them with necessary information, established close contacts between manufacturers and researchers in the gas industry and encouraged investors to support knowledge-based companies. Designing gas turbines, smart pig, domestic manufacturing of turbine control systems, DCS control system of refineries, turboexpander control system, turboexpander designing and manufacturing, compressor gearbox, flame and gas detection sensors, covering nanofluid, and quake-sensitive valves are just examples of NIGC achievements in supporting domestically manufactured equipment.

4,000km Gas Pipeline in 6 Years

Based on the current instructions for Iran's gas transmission industry, 580km of gas transmission lines is to become operational in the current calendar year while 4,100km is planned up to 2025. In the gas transmission line, 850km of pipes is being built; 2,000km will be outsourced while 200km of pipes would be produced in the current year. Implementing 41,00km of gas transmission line, 300,000 square meters of administrative complexes, more than 20 pressure facilities, five main refining units and 100,000 square meters of production centers are among the major plans for "Gas Engineering and Development Company" up to 2025. Gas transmission safety index reached 100% last January, when Iran was transmitting 761 mcm/d of gas.

Iran has 294 turbocompressors in its gas transmission network, which are all being maintained without assistance of any foreign company. The turbocompressors are operating without any problem. Every category of oil used by IGTC has been domestically manufactured thanks to confidence in the private sector.

Halegan, Golden Chance for Foreign Investment

Halegan which measures 50 kilometers long and 11 kilometers wide and holds 12.4 tcf or 355 bcm of gas in place is one of dozens of Iranian gas fields whose development was offered to foreign investors a couple of years ago at an international conference in Tehran. The field is located in Fars Province, more precisely 73 kilometers north of Assaluyeh and 25 kilometers south of the Sefid Baghoun gas field and north of the Sefid Zakhour and Dey gas fields.

Iran is implementing its gas consumption optimization projects in the household, business and industrial sectors while enhancing its gas production capacity in a bid to account for a 15% share of global gas trading.

Onshore fields, due to ease of access and need for not much investment, are favored by investors across the globe.

National Iranian Oil Company (NIOC) plans to establish a gas hub in the south of Fars Province. By developing the Sefid Zakhour, Sefid Baghoun, Dey, Halegan and several other gas fields, NIOC hopes to produce and treat gas.

Halegan was discovered in 2005 following a 2D seismic testing project conducted on 1,000 square kilometers in 2004 and 2005 in Fars Province. Halegan was among several gas fields discovered then in Fars.

With a 70% recovery rate, 8.938 tcf of gas may be recovered from Halegan. Such recovery rate in Iran is excellent. Halegan also contains 249 million barrels of gas condensate in place, 98 million barrels of which being recoverable.

Halegan Valued at $83bn

The gas and condensate held in the Halegan gas field is estimated to be valued at about $83 billion. That is while only $36 million has been spent for the discovery of this gas field over two and a half years. With the development of this gas field, it would be possible to produce 50 mcm/d of gas over 20 years. Due to the toughness of land caused by the high-pressure layers of this field, exploration drilling operations were very slow at this field. Therefore, a 4,999-meter-deep well was planned to be drilled. Then, several reservoir layers – including Kangan, Upper Dalan, Naar and Lower Dalan were tested. Finally, the field was estimated to hold 12,400 bcf of gas. The important point about gas discovery in this field is that all geophysical, reservoir and petroleum engineering studies, as well as reservoir layer tests were conducted by the Exploration Directorate of NIOC.

Fars Province is one of gas hubs in the Middle East. Some exploration studies in this province are indicative of huge gas reserves. Halegan is the latest gas field in Fars Province. Compared with neighboring fields, Halegan has larger dimensions.

Iran would have to invest largely in its gas sector, should it be willing to possess the status it deserves among gas exporting countries. An oil market analyst has described Iran's oil and gas industry as a golden opportunity for international oil companies.

The extension of Iran's oil and gas facilities across the country requires widespread development activities.

It needs new investment in addition to exploration activities. The current installations would need huge investment because of their decrepit conditions and the maturity of oil wells.

Among Iranian oil and gas fields, whose investment is estimated at $200 billion, the Halegan field is the most accessible to foreign investment.

Aghar Field 2nd Phase Open to Investment

The Aghar gas field is among large onshore gas fields in Iran. It is currently producing 20 mcm/d of gas. The Iran Central Oil Fields Company (ICOFC), which supplies more than 40% of Iran's total gas, is in charge of development of the Aghar field.

Aghar was introduced along with other fields to foreign investors to undergo development under the newly-coined Iran Petroleum Contract (IOC) model. The second phase of the Aghar field, with a recovery rate of 71.5%, is an attractive investment project.

The annual growth in domestic consumption, as well as international obligations for gas exports to Turkey, Iraq and other neighboring countries has always led the Iran's Petroleum Ministry to envisage gas production hike as a priority.

The Aghar gas field is located 110 kilometers southeast of Shiraz and 35 kilometers southeast of Firouzabad in Fars Province.

Discovered in 1972, the Aghar field has now 16 wells, 13 of which are producing gas.

Gas production from Aghar began in 1999. Natural gas and condensate are separated after production to be delivered to the Farashband gas refinery for processing through two pipelines. Each pipeline is 90 kilometers long.

The second phase of the Aghar gas field is to undergo development to double production to 40 mcm/d. Planning has been done for the second phase development of the Aghar gas field.

Aghar Gas Output Up

In parallel with the plan to double the Aghar gas output, installations would be built near the Farashband gas refinery for processing.

The gas produced at the Aghar field is planned to be injected into southern oil fields, including Maroun. This gas field has wellhead facilities, four gas gathering centers, pipeline to carry gas from wells to central facilities and finally the Farashband refinery, a gathering and separating center, controlling room, pumping station, and pigging systems.

The Aghar gas production capacity stands at 95.22 mcm/d of natural gas. It also supplied 4,300 b/d of gas condensate.

Studying the Aghar gas field implemented with a view to updating previously conducted studies, incorporating new findings and completing previous studies through interpreting and assessing petrophysical diagram, and modelling of fractures. The studies, which lasted four years, were led by the Department of Reservoirs Studies. The main finding of these studies is that the field's in-place gas deposits are up 40%.

The final recovery of over 71% of in-place reserves of this field has been done. In the natural depletion scenario, in light of wellhead pressure restrictions, the final recovery rate is set at 34.7% with a production ceiling of 22 mcm/d by 2023, when the installation of a compressor would bring the recovery rate to 71.5%.

Chief among studies conducted are: drilling operations to enhance recovery and preserve the production ceiling, carrying out periodical static tests, appraisal wells drilling, PGF output phase increase to 30 mcm/d and the optimal scenario after installing compressor and spudding six new wells for reaching the production ceiling of 30 mcm/d

Interaction with Iran Benefits Foreign Firms

Iran sits atop the world's largest hydrocarbon reserves and is located on the energy corridor route. However, in the aftermath of the 1979 Islamic Revolution, the United States has been using every tool at its disposal to keep Iran from becoming a key energy player. Morteza Behrouzifar, researcher at the Institute for International Energy Studies (IIES), says due to Iran's geopolitics, young and educated population; foreign companies would be beneficiary to any interaction with Iran."Iran Petroleum" has conducted an interview with Behrouzifar on the impact of shale oil in global oil markets and the impact of technological development on oil and gas production, as well as foreign companies' interaction with Iran.

The technology required for shale oil and gas production is so sophisticated that the countries with such reserves can rarely engage in production and rival the US in shale production

For nearly a decade now, unconventional reserves have turned into a serious rival to conventional oil producer in the market, significantly affecting oil prices. Even the Charter of Cooperation recently signed by OPEC and non-OPEC partners was an instrument to prevent a serious oil price fall as shale production is becoming economical. Is that true?

I would like to start with one decade ago when shale production became economical and started impacting global oil prices. In fact, following the 1973 oil shock, the US embarked on policymaking with a view to reducing its own dependence on the Persian Gulf oil. To that end, the US enhanced its oil and gas production capacity and used various tools like granting tax exemption to oil and gas production companies. That was exactly when the US started studies on shale oil and gas production. Even at that time shale production was under way, but not enough to alter the result of the game. In other words, shale oil and gas were no game changers in the 1970s and 1980s.

How long can shale owners continue to supply?

China holds the most unconventional oil and gas reserves in the world, particularly shale gas. But its production stands very low. The technology required for shale oil and gas production is so sophisticated that the countries with such reserves can rarely engage in production and rival the US in shale production. However, the expectation is that shale development technology might spread in other countries like China or South America, in which case we will see oil and gas production increase. Naturally it can affect global oil and gas prices and even change current projections about global oil and gas demand.

I remember in 2004, we drafted a report at IIES about global gas markets. We had predicted that the US would become the largest LNG importer in the world in 2014 and US LNG production would increase so much that even Canada would not be able to meet its needs completely and that the US would have no option but to import LNG. In the year when we were preparing this report lots of licenses had been issued for the construction of LNG terminals to import this product into the US and some of these terminals had been completed. The US was about to become one of the largest LNG importers in the world. But with the development of shale technology, the trend changed. In 2017, the US gas production stood at about 735 bcm with gas consumption at 740 bcm. This gap was eliminated in 2019. The US is now an LNG exporter and will soon become one of the influential LNG players in the world.

Is it the same with oil? Can we expect the US to become a large oil exporter to affect global oil prices?

No, that's not so when it comes to oil. At least estimates show that the US will continue to import crude oil. The US is consuming nearly 20 mb/d of oil, while it is producing 16 mb/d oil and condensate. But the US is in the oil market and is trading oil. It is noteworthy that until several years ago, US oil companies were not authorized to export oil, but they are now engaged in oil trading thanks to shale. Current estimates show that US shale oil production would not exceed 20 mb/d. Therefore, there is no mid-term expectation for the US to become an oil exporter. Although the US is not yet a net oil exporter, it can disturb the markets.

Does it mean that the OPEC+ deal would not be a game-changer in the oil market at least for now?

In the next decade, hybrid and electrified cars are expected to grow in number. That would be a game-changer in the oil market. Europe is currently making significant investment in renewables. However, we know that about one billion people in the world have access to renewable energies. In case this technology is developed in all countries, we can expect a decline in energy consumption level in the transportation sector.

Oil prices have not changed significantly in the past one month despite the Strait of Hormuz and Strait of Gibraltar oil tanker incidents, and US sanctions against Iran and Venezuela. In case the market conditions were normal and OPEC producers were not sanctioned would prices be on the decline again?

Look at the oil market. Iran and Venezuela are under sanctions. Libya and Nigeria are facing challenges in production. Even Saudi Arabia has cut its output. In case all member states were producing normally oil prices would be much lower. Now certain issues have transpired the Persian Gulf. The situation has become somewhat tense, but it would not let oil prices fall significantly. Meantime, oil prices have not grown significantly. Under conditions when shale oil production is even economical at $30 a barrel in some zones, I think if OPEC and non-OPEC producers agree on cutting 4 mb/d from their production we can then expect that the downward trend of prices be overturned. Iran sits atop the world's largest conventional oil and gas reserves. It would be important for us to be a major player in the market. That would be possible only if our production increases significantly, which is impossible under the present sanctions. I would like to reiterate here that after the 1979 Islamic Revolution, the US never allowed Iran to become the energy hub of the region. It used every tool at its disposal so that Iran could not become a key energy player. If you may recall, after the JCPOA (Iran's nuclear deal with six world powers) was signed, Iran was said to be the largest market to have opened its doors to the world after the collapse of the USSR. The Iran market was projected to attract $1 trillion in investment over five years thanks to favorable conditions. Iran is among the most populated countries in the region. Its population is young and educated. The country is located at the intersection of the region. Therefore, foreign companies interacting with Iran will be beneficiary.

In the next decade, hybrid and electrified cars are expected to grow in number. That would be a game-changer in the oil market. Europe is currently making significant investment in renewables

Global Rivalry over Shale Oil/Gas

Shale oil and gas market has been gathering steam across the globe over the past decade. Many countries, particularly the United States, have developed new technologies to produce and process shale oil and gas. The shale oil and gas industry has reached the stage that US President Donald Trump hopes to make the country energy-independent before his term ends. He plans new laws and instructions for facilitating and accelerating extraction from hydrocarbon reservoirs.

China is home to 1,275 tcf (35 tcm) of shale gas, the largest in the world. It is followed by the United States, Argentina, South Africa, Canada and Australia. Among them, the US has been working to increase shale oil and gas production over recent years. This country is the biggest energy consumer in the world.

The daily increasing shale gas activities in the US brought production from 390 bcf (11 bcm) in 2000 to 11.41 tcf (320 bcm) in 2013. The US shale gas output is forecast to exceed 20 tcf (560 bcm) by 2040. Then the world's largest economy would be able to largely supply its domestic gas needs. The US would become a net natural gas exporter in 2020. In 2013, the US was producing higher volumes of shale gas compared with offshore and onshore natural gas. In mid-1970s, the US Department of Energy, in cooperation with Gas Research Institute (GRI), undertook widespread efforts for the commercial production of gas from the Huron Shale in the east. This cooperation led to the development of technology which was instrumental in extracting natural gas from shale gas. Large-scale natural gas production from shale gas reserves started after the 1980s and the 1990s when Mitchel Energy and Development started shale gas production in the Barnett Shale in Texas. After this successful gas recovery, other companies joined the game. Natural gas production from the Barnett Shale reached 1.4 bcf (40 mcm) by 2005. After the profitability of shale gas production was proven in Barnett and Fayetteville, operations were started for extracting from Marcellus, Haynesville, Woodford and Eagle Ford. Shale gas development is a determining factor in the US natural gas market. The US Energy Information Administration estimates the country's recoverable shale gas at 750 tcf (21 tcm). The US shale gas is mainly located in Northeast, particularly Marcellus. Northeast holds 472 tcf (13.5 tcm), of which 410 tcf (11.5 tcm) is concentrated in Marcellus. Then the play in the Gulf of Mexico with 100 tcf (3 tcm) and Southwest with 76 tcf (2.2 tcm) are the second and third biggest ones.

Development in Shale Production

North America is currently the world's largest shale gas producer. It owes this status to the hydraulic fracturing technology for extraction from shale fields. According to studies, the wells drilled in the US shale plays can produce between 2 mcf/d and 5 mcf/d (56,000 to 140,000 cubic meters) of natural gas. Within two to three years, a well's production falls to 1 mcf/d (28,000 cubic meters). Under such circumstances, regular drilling in shale gas plays would be inevitable.

Inclination for shale production over recent years has led to the development of new technologies for causing artificial fractures in the wellbores. Furthermore, horizontal drilling to increase the friction between the reservoir and the wellbore is widely used. In some cases, horizontal drilling continues as far as 3,000 meters for the production targets to materialize. Such technological advancements would increase production at lower costs, while a significant number of drilling rigs are operating in shale zones.

Developing the horizontal drilling technology alongside hydraulic fracturing has facilitated extraction of unconventional gas deposits, particularly shale gas. Hydraulic fracturing dates back to the 19th century, but it became widespread since the 1950s.

As indicated earlier, natural gas production in shale plays is not important due to their geological structure. Production from shales is done mainly in the first two years. According to EIA, most shale recovery has been from Haynesville, Eagle Ford and Barnett-Woodford. The minimum shale gas recovery was from Cincinnati Arch with 120 mcf/d (3.4 mcm/d).

Russia

Russia is currently the largest supplier of gas to Europe.

According to BP, Russia was known to hold about 17% of the world's proven natural gas reserves in 2013. That means future 1,168 tcf (33 bcm) plus current 339 tcf (9.5 bcm).

Europe

Unlike the US, Europe has not been very active in shale gas production mainly due to high population, existence of numerous obstacles to land accessibility and environmental concerns. It has to be acknowledged that the volume of the US unconventional gas reserve is seven times higher than that of Europe.

Europe would end its dependence on Russian gas as well as LNG imports, should it develop its shale gas in the future. Europe is investing in shale gas while at the same time envisioning widespread energy-saving activities.

Europe is forecast to hold about 639 tcf (18 tcm) of shale gas. Poland, France and Norway are the largest holders of shale gas in Europe with respectively 187 tcf, 180 tcf and 83 tcf of shale gas.

The important point is the significant difference between conventional and unconventional natural gas reserves in Europe. In other words, Europe's shale gas reserves are 3.5 times higher than its conventional gas deposits.

Asia

Asia is following Europe's model with regard to shale gas production in a bid to put an end to its imports. China sits atop 1,275 tcf (36 tcm) of shale gas, becoming the world's largest holder of shale gas. India and Pakistan hold 63 tcf (2 tcm) and 51 tcf (1.5 tcm) of shale gas, respectively.

China's shale gas is 12 times higher than its conventional gas. Therefore, should China manage to develop a plan for shale gas production, it would supply its domestic needs in the long-term and become another US.

China's shale gas deposits are 48% higher than that of the US's.

North America

The US, Canada and Mexico hold a total of 1,931 tcf (54 tcm) of shale gas. That makes North America the richest region in the world in terms of shale gas reserves. The ratio of shale to natural gas reserves in North America is 5.6. That along with necessary technology and capital makes North America the largest producer of natural gas in the world.

Africa

Among African nations, South Africa awaits a promising future thanks to its 485 tcf (13.5 tcm) of shale reserves. Meantime, South Africa is a hub of the gas-to-liquid (GTL) industry. South Africa is expected to master technology for shale gas production by 2040. After that, it would become a major exporter of natural gas and GTL-based petroleum products and play a major role in global energy markets.

South America

South America is home to about 1,225 tcf (35 tcm) of shale gas. In this region, Argentina holds 774 tcf (22 tcm) and Brazil holds 226 tcf (6.5 tcm) of shale gas. The important point is the existence of 1,225 tcf of shale gas compared with 239.2 tcf (7 tcm) of natural gas.

Iran

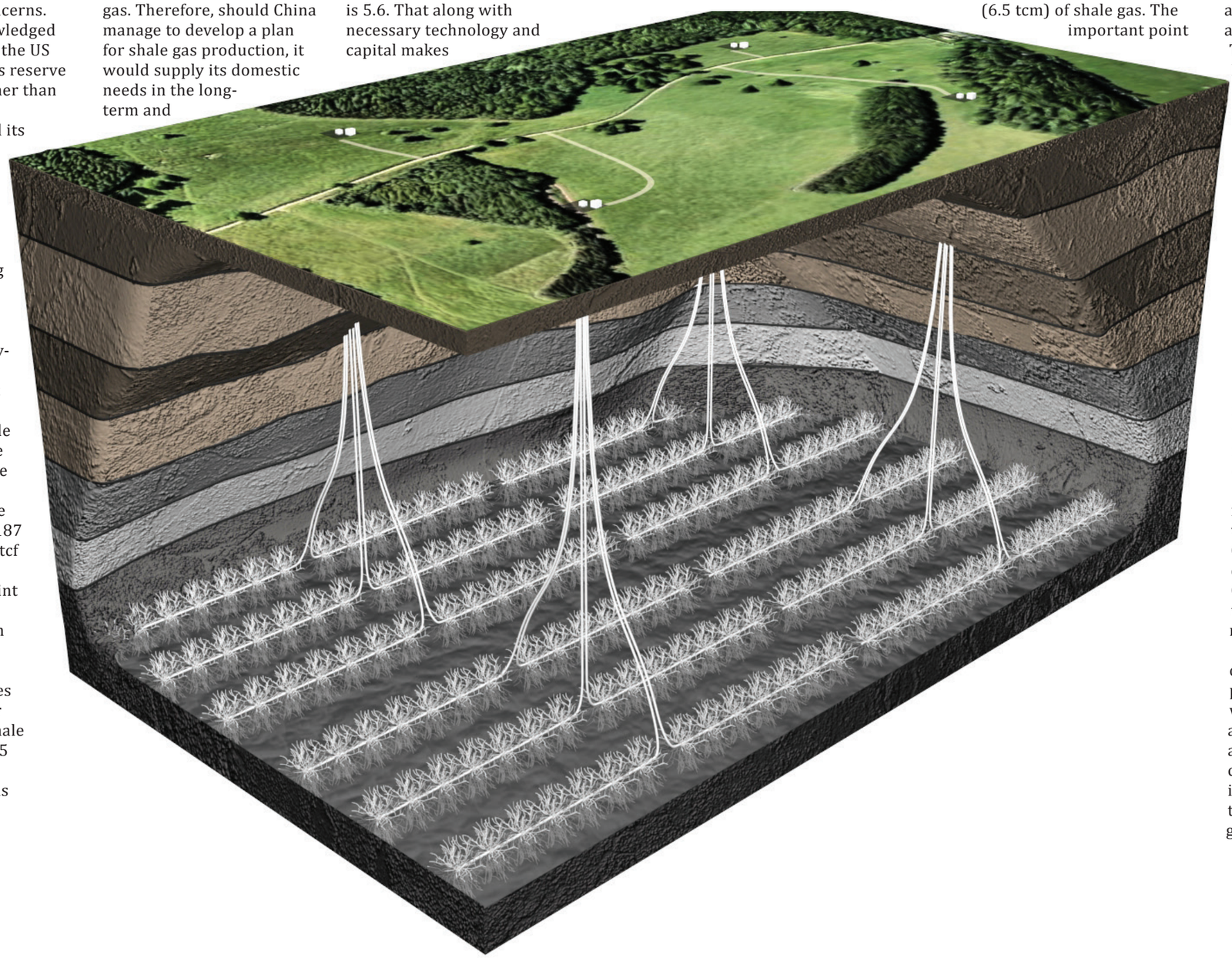
No detailed study has so far been conducted on shale gas reserves in Iran. In 2011, the Exploration Directorate of National Iranian Oil Company made preliminary arrangements for shale gas recovery in the sedimentary areas of Zagros, Kopeh Dagh and central Iran.

The Research Institute of Petroleum Industry (RIPI) has said studies were to be carried out in collaboration with the Exploration Directorate of NIOC in the Lorestan province.

Experts believe that shale gas development would bring about a major change in the oil and gas sector, unseen in the world in the recent decades. Countries like the US that depend on energy imports are trying to benefit from shale gas in order to end their imports. Some countries like China were once major energy importers, but they now own huge gas reserves.

That is expected to leave important impacts on the world energy economy. Gas prices have already declined, while Russia and Qatar are not as powerful as they were in the global gas market.

Technological complications, higher production costs compared with conventional gas and some concerns about the environmental consequences of shale gas in some countries constitute the major obstacles to shale gas development.



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Persian Gulf Tensions

Where Are Energy Markets Headed?

Over recent weeks, tensions have escalated in the Persian Gulf, more particularly in the Strait of Hormuz, a strategic lane for international oil shipment. Four tankers were attacked in the United Arab Emirates' Fujaira Port, two commercial vessels were reportedly targeted by mines in the Gulf of Oman, while a Britain-flagged tanker was seized by the Islamic Revolution Guards Corps Navy. The Persian Gulf region is now experiencing significant developments that would influence the future of global energy markets.

Shuaib Bahman

Tensions flared up in the Persian Gulf following reported attacks on an Emirati and a Norwegian tanker in the Gulf of Oman. Then, Japanese Prime Minister Shinzo Abe's landmark state visit to Tehran coincided with attacks on two oil tankers headed to Japan.

One week after that, the IRGC announced the downing of a US drone for violating Iran's airspace. Two weeks later, a supertanker carrying Iranian crude oil was seized in Gibraltar and finally a British-flagged tanker was seized in Iranian waters.

The Persian Gulf last saw such tensions during the Iraq-Iran War when the so-called Tanker War happened.

The future global economic growth rate, US economic growth stability, consequences of US-China trade war, China's economic growth decline, as well as the oil production and supply by top oil producers including the United States, Russia and Saudi Arabia have prevented a significant increase in global oil prices.

However, so far the global oil market dynamics have been moving towards lower impact by political and security tension on the prices. Even the impact of these shocks on prices has been short-lived. But recurrence of tense events in the Persian Gulf in the future could drive oil prices up. The International Energy Agency (IEA) has warned against a sudden growth in oil prices should Persian Gulf tensions notch up. Oil price has also warned against the consequences of ongoing tensions, saying any military confrontation in the Persian Gulf may push oil prices up to $325 a barrel.

Although current tensions in the Persian Gulf have not caused any jump in the oil prices, they will indirectly affect the future of energy transfer from this region.

For example, a significant increase in the insurance premium of oil tankers crossing the Persian Gulf would increase energy transmission prices, while reducing the activity of oil companies. Any increase in energy transfer costs will cut the profits of these companies. Should it continue, it will affect global economic growth and development in the future.

US, Main Culprit

Due to the failure of the US policy aimed at attempting to zero Iran's oil exports, oil prices did not jump significantly following the recent unprecedented tensions in the Persian Gulf.

Iran has managed to blunt the impact of US sanctions and prevented any void in global markets. That is while in case Iran's oil vacuum was coupled with the Persian Gulf insecurity in global markets, prices would experience a significant jump.

Therefore, despite claims by senior US officials who have accused Iran of stoking up tensions in a bid to push up global price, Tehran would not need tensions. But the US failure to zero Iran's oil exports could provide a better reason for Washington to be resorting to sabotage in order to utter false accusations against Tehran and push Iran further into isolation.

The adoption of this policy by Washington may increase the costs of all nations. For instance, ongoing tensions in the Persian Gulf have once again pushed to bold relief the security of energy transfer across the world. Some European countries are now seeking to set up a joint taskforce to protect vessels. If Europe launches its maritime security taskforce, it would not guarantee energy security and would even boost the possibility of tensions. In such case, one can no longer be optimistic about keeping energy prices in check in global markets.

Therefore, insecurity in the transportation of energy through the Persian Gulf stems from the US policy rather than that of Iran or regional countries. The US's pullout from the 2015 Iran nuclear deal and the re-imposition of unilateral sanctions on Iran and efforts to reduce Iran's oil exports to zero are among such destructive actions that stir up insecurity in the Persian Gulf. Therefore, should energy consumers want to know who to blame for ongoing tensions in the region, they should point their fingers at the US. Before Washington embarked on its anti-Iran moves by imposing sanctions, the Persian Gulf did not witness such tensions.

Petrobras Offering Three Gas Fields

Petrobras has initiated the disclosure stage for the sale of its entire working interest in the producing Peroá and Cangoá fields, and 88.9% of the BM-ES-21 concession. All are in the Espírito Santo basin offshore Brazil. Peroá and Cangoá are shallow-water fields in turbidite sandstones 50 km (31 mi) offshore Linhares which came onstream in respectively 2006 and 2009. They currently produce around 900,000 cu m/d of non-associated gas. The production system is based on up to six wells connected to the unmanned platform PPER-1, in 67 m (220 ft) water depth, and a further well tied directly to the pipeline that transports gas from the platform to the onshore Cacimbas Gas Treatment Unit for processing.

UK Offshore Operations Becoming Cleaner

Britain's offshore oil and gas industry has achieved a stable environmental performance while at the same time increasing production, according to Oil & Gas UK's a 2019 Environment Report. Louise O'Hara Murray, OGUK's environment manager, said: "Operators are making changes to processes and equipment offshore to continually improve efficiency and emissions performance.

Chinese Groups to Conduct Joint Studies

CNOOC China Ltd. has signed a three-year cooperation framework agreement with China Petroleum & Chemical Corp. (Sinopec Corp.) regarding the sea areas of Bohai, Beibu Gulf, and South Yellow Sea, and the North Jiangsu basin.

Both parties will share data and carry out joint studies in the Yellow River Mouth Sag, the Qingdong Sag and the eastern part of Bodong Sag in the Bohai basin, as well as southwestern Weizhou and Xuwen areas of the Beibu Gulf basin, the North Jiangsu basin, and blocks in the eastern South Yellow Sea basin.

Qatar Petroleum set tojoin Eni, Total in Kenya Blocks

Qatar Petroleum (QP) has signed an agreement with Eni to acquire a 13.75% share in three exploration blocks offshore Kenya.

The agreement is subject to customary regulatory approvals by the government of Kenya. Blocks L11A, L11B, and L12 are in the Lamu basin in water depths ranging between 1,000 and 2,700 m (3,280 and 8,858 ft), cover about 15,000 sq km (5,792 sq mi), and are said to hold high exploration potential.

Australia Award Exploration Block to INPEX

INPEX has secured a new exploration permit in the offshore Bonaparte basin under Australia's 2018 Offshore Petroleum Exploration Acreage Release.

The AC/P66 block on the North West Shelf covers an area of 3,460 sq km (1,336 sq mi), in water depths of 60-500 m (187-1,640 ft).

It is close to various developed oil fields including Laminaria, in an area thought to be prospective for further discoveries.

INPEX will hold a 100% interest in the block.

UK

China

Brazil

Ivory Coast

Australia

VIEW

VIEW

VIEW

Algeria to Seek Foreign Loans for Power Projects

Algeria's state power utility Sonelgaz will seek foreign loans to finance its development plan, its chief executive said, becoming the first company in the North African country to look for funds abroad in decades.

OPEC member Algeria relies heavily on oil and gas, which account for 94% of total exports and 60% of the state budget.

The government has been trying to cut spending to cope with budget and trade deficits since crude oil prices fell sharply in mid-2014.

Subsidised electricity prices are very low in Algeria compared with neighboring countries, and Energy Minister Mohamed Arkab earlier this week said there was no plan to raise prices.

Algeria subsidises almost everything, from basic foodstuffs to fuel and medicine, with the aim of avoiding social unrest in the country which has been shaken by protests since early this year demanding the removal of the ruling elite.

"External debt is an option, which is being examined in order to find the most comfortable and least restrictive conditions," Sonelgaz CEO Chahar Boulakhras told a news conference.

"Foreign indebtedness becomes a necessity. We need funding for our development plans".

He said the plans were aimed at meeting consumption levels in the future amid increasing domestic demand in the country of 43 million people.

The money sought by Sonelgaz will go mainly to renewable projects.

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NEWS

Kuwait, Saudi May Resume Neutral Zone Oil Production

OPEC members Saudi Arabia and Kuwait have discussed resuming oil production in jointly operated fields in the Saudi–Kuwaiti Neutral Zone, Kuwaiti state news agency KUNA said.

Saudi Arabia's minister of state for energy affairs visited Kuwait to "continue to discuss and cooperate on the resumption of oil production in the southern [Neutral Zone] after settling all required technical issues from both sides," KUNA said, quoting a Kuwaiti government spokesman. The Saudi–Kuwaiti Neutral Zone, or Divided Zone, is an area of 5,770 square km between the two countries' borders that was left undefined when the border was established in 1922.

3

NEWS

TechnipFMC Awarded $7.6bn Contract for Arctic LNG-2

Oil services firm TechnipFMC said it had been awarded a major engineering, procurement and construction contract by Russia's Novatek and its partners for the Arctic 2 liquefied natural gas project in western Siberia.It said the consolidated contract value to TechnipFMC for Arctic LNG-2 was $7.6 billion and consists of three LNG trains, each with a capacity of 6.6 million tons per annum (Mtpa).The Arctic LNG 2 project aims to develop more than 7 billion barrels of oil equivalent (boe) of resources.

Novatek holds a 60% stake in the project, while French oil and gas major Total, China's CNPC, CNOOC, and Japan Arctic LNG consortium each hold 10%.

4

UK, Denmark Building Subsea Power Cable

Italy's Prysmian, Germany's Siemens and Sweden's NKT have secured contracts worth a total 1.1 billion euros ($1.2 billion) to build the world's longest subsea power cable, the Viking Link between Britain and Denmark.

Britain's National Grid and Denmark's Energinet awarded the contract for the project's 1.4 gigawatt (GW) parallel high voltage current cables to Prysmian and NKT HV Cables AB, while Siemens will supply two converter stations.

The link between the two nations will help them diversify supplies and integrate renewable power sources, National Grid said. The link will offer producers, such as those adding wind capacity, more opportunities to sell surplus power.

"Viking Link will play a vital role in helping to decarbonise the UK's power supply," said Jon Butterworth, chief operating officer for National Grid Ventures, putting the total value of the contracts at 1.1 billion euros.

The bulk of the work, worth 700 million euros, was won by Milan-based Prysmian, which will build Viking's 1,250 km (780 mile) submarine section and the 135 km (85 mile) section on British soil, a sign it has recovered from glitches that plagued its Western Link project between England and Scotland.

National Grid operates the Western Link submarine connection, which has suffered repeated technical problems since operations began in December 2017. As a result, Prysmian restated core earnings for 2018 after booking additional writedowns.

2

NEWS

Abu Dhabi, , China Sign $12bn Deal

The Abu Dhabi National Oil Company (ADNOC) has signed a partnership framework deal worth up to $12 billion with China's Wanhua Chemical Group for collaboration in the downstream sector, ADNOC said. Downstream operations in the oil industry include refining, sales and shipping. The agreement was signed during a three-day state visit to China by Abu Dhabi Crown Prince Sheikh Mohammed bin Zayed.

ADNOC and Wanhua Chemical also signed a shipping joint venture agreement building on a 10-year LPG supply contract signed in November 2018, according to the statement. "The potential total value of the collaboration between ADNOC and Wanhua is estimated to be up to $12 billion," the statement said.

5

NEWS

Petrobras to Privatize Brazil's Top Gas Seller

Brazil's state-run oil company Petroleo Brasileiro SA is set to relinquish control of the country's biggest fuel distributor in a share offering, pushing ahead with a privatization drive under new Chief Executive Roberto Castello Branco. Petrobras, as the company is widely known, will effectively privatize its listed subsidiary Petrobras Distribuidora SA in the secondary share offering set to price after markets close. The parent company plans to auction off 25% of Petrobras Distribuidora shares. That percentage could increase to 33.75% via overallotment provisions. Supplementary and additional allotments will be allocated by Aug. 28, according to the prospectus. As Petrobras now holds 71.25% of the fuel distributor's shares, the unit will cease to be a state-run company.

6

India Reliance Stake Sale Talks with Aramco Stall

India's Reliance Industries talks to grant a minority stake in its refining assets to Saudi Aramco have hit a roadblock over the valuation and structure of the deal, two people familiar with the matter said. State-owned Aramco, the world's biggest oil producer, plans to boost investment in refining and petrochemicals to secure new markets for its crude and sees growth in chemicals as central to its downstream strategy to reduce risk as oil demand slows.

Reliance had held talks on offering Aramco at least 20% in a special purpose vehicle covering refining, petrochemicals and marketing, and with a focus on expansion.

"Talks have stalled as Reliance is asking for a higher valuation and wants to transfer debt of the holding company to the new SPV (special purpose vehicle)," said one of the sources.

Reliance, controlled by Asia's richest man, Mukesh Ambani, operates the world's biggest refining complex with capacity to process 1.4 million barrels per day (bpd) of oil at Jamnagar in western India.

It plans to expand capacity to 2 million bpd by 2030, according to plans shared with the Indian government.

As of June 30, Reliance had outstanding debt of 2,882.43 billion rupees ($41.8 billion) compared with 2,875.05 billion rupees as of March 31, while cash and cash equivalents as of June 30 were at 1,317.10 billion rupees versus 1,330.27 billion rupees as of March 31, the company said.

7

NEWS

US Split on Renewing Chevron's Venezuela License

The Trump administration is split over whether to renew a license this week for energy company Chevron Corp's operations in Venezuela, with Secretary of State Mike Pompeo supporting a renewal and others opposing it, three sources with knowledge of the matter said. At issue is a six-month U.S. Treasury Department license that expires on July 27 that has allowed Chevron to keep operating its four joint ventures in Venezuela despite U.S. sanctions on the OPEC nation's oil sector. Washington imposed sanctions on Venezuela's state oil company PDVSA in January as part of an effort to slash cash flow to socialist President Nicolas Maduro and pressure him to step down.

Venezuela's economy is on the brink of collapse. Pompeo, who was once the president of oilfield services company Sentry International, understands that having an American beachhead in Venezuela would help speed an economic recovery if Maduro's government falls, said the sources, who spoke on condition of anonymity. White House economic adviser Larry Kudlow also favors renewing the license, the sources said. John Bolton, Trump's national security adviser, opposes renewal as part of keeping maximum pressure on Maduro, the sources said.

If Chevron is forced to leave, it could further crimp cash flow to Maduro's government, as oil production could dip. "Those in the administration who have looked at the enormous task of bringing Venezuela back from the abyss realize that the revival of the oil industry, the main source of foreign earnings, is a difficult multiyear process," one of the sources said of Pompeo's view.

9

IEA Ready to Act Quickly to Keep Oil Market Supplied

The International Energy Agency (IEA) is closely monitoring developments in the Strait of Hormuz and ready to take swift action if needed to keep the global oil market supplied, it said.

The Paris-based agency said the right of free energy transit through the strait was critical to the global economy and must be maintained.

The Strait of Hormuz is a vital maritime transit route for world energy trade. About 20 million barrels of oil, or about 20% of global supply, are transported through the strait each day, the IEA said.

"The IEA is ready to act quickly and decisively in the event of a disruption to ensure that global markets remain adequately supplied," it said, adding that executive director Fatih Birol has been in talks with IEA member and associate governments as well as other nations that are major oil consumers or producers.

"Consumers can be reassured that the oil market is currently well supplied, with oil production exceeding demand in the first half of 2019, pushing up global stocks by 900,000 barrels per day," the IEA said in a statement.

IEA countries hold 1.55 billion barrels of public emergency oil stocks. In addition, 650 million barrels are held by industry under government obligations and can be released as needed, it said.

The stocks are enough to cover any supply disruptions from the strait for an extended period, it added without saying how long that might be.

8

NEWS

Market Braces for Mexico Annual Oil Hedge

Trading in crude oil options and futures surged last week as market participants prepared for Mexico's annual oil hedging program, in which the country buys as much as $1 billion in contracts to protect its oil revenues. The global oil derivatives market braces itself every year in late spring and summer for the hedge, the market's largest and most secretive financial oil deal. This year, Mexico has faced several challenges in executing the hedge and timing has become a crucial factor. Traders and brokers who monitor money flows told Reuters that activity in crude oil options and futures suggests that Wall Street has started to position itself for the trade, attempting to secure protection against further price volatility. It was not clear whether Mexico has started executing the hedge. The Mexican Finance Ministry did not immediately respond to a Reuters request for comment. Traders have also had to react to weakening sentiment in oil markets. Implied volatility, a gauge of options demand, for 2020 contracts has risen steadily over the past week, dealers said. Prices for 2020 options started to surge after a top Finance Ministry official told Reuters that Mexico had finished calibrating the formula used as a basis for the program, market sources said.

"Within minutes of that announcement, we saw a big pop in implied volatility," one source at a bank said. "It rallied in the December 2019-June 2020 range, which is typically where the hedges lie. That volatility has been well-bid the entire week," the source added.

10

Global Oil and Asian Product Market, July

The Brent forward price structure remained in backwardation in June 2019, as prompt prices remained higher than forwards, underpinned by concerns about oil supply disruptions. Lower oil supply and loading crude programmes in Northwest Europe, due to outages in North Sea oilfields also supported prompt prices.

Latest developments of global crude oil prices during the month of July 2019, was mainly on the back of OPEC cut extension, geopolitical risks/international tensions, fears about weaker global demand as a result of a US-China trade spat, rising US crude oil production, more than expected decline of US crude inventories, halting more than 73% of Gulf of Mexico's output (more than 1.38 mbd) as a result of tropical storm in this region(14th of July, 2019) , lower expectation on call on OPEC crude during the year of 2020 (based on OPEC) , concerns over a global crude surplus (IEA forecast) and consecutive weekly declines of US rig counts according to Baker Hughes reports along with mixed china's economic data (slowing Q2 GDP growth).

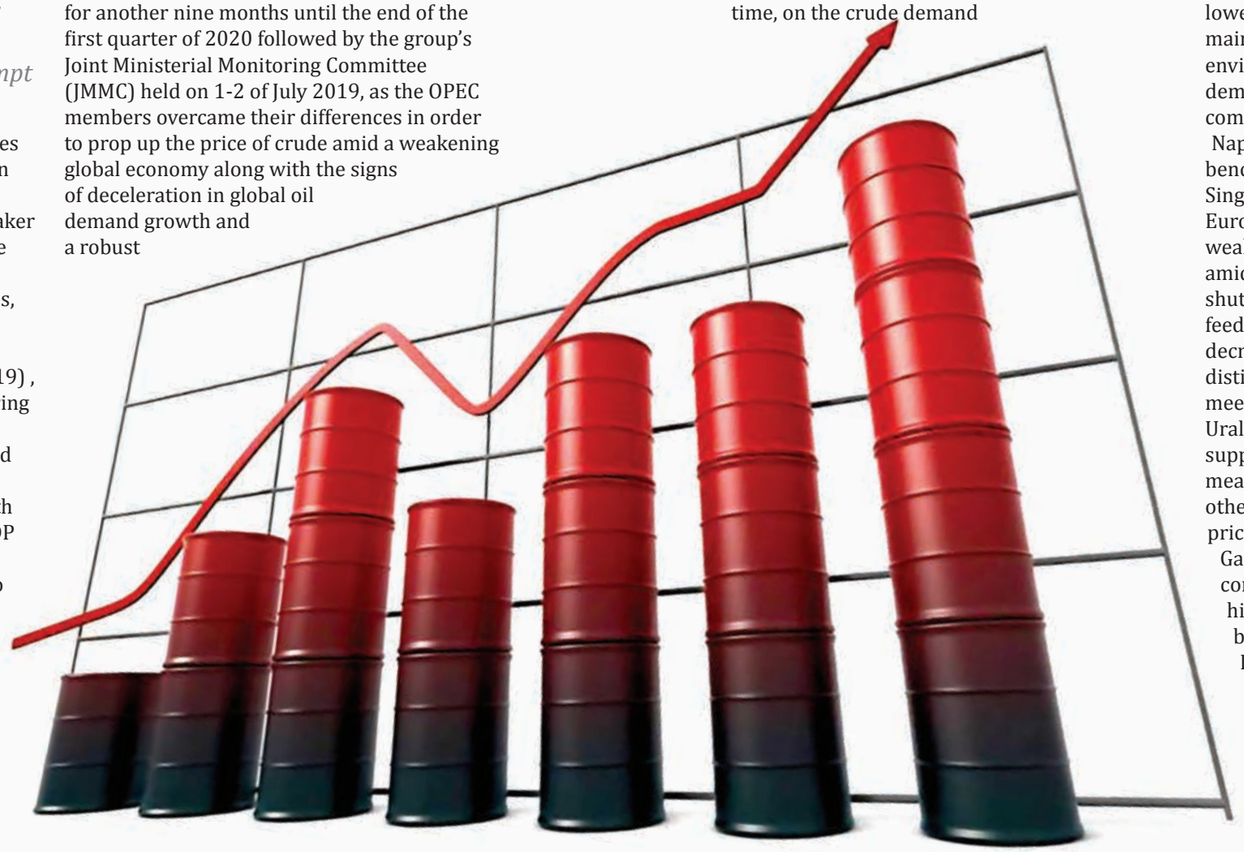
Benchmark Dubai crude futures' discount to ICE Brent (EFS) continued to narrow in Asia on 19th July 2019, as unexpectedly higher premiums for Russian grades (particularly ESPO Blend) priced off Dubai provided a floor for the sour crude complex. Some market players attributed the pickup in Dubai derivatives to a parallel rise in premiums of Dubai based Russian sour crude being delivered into China. The September Brent/Dubai EFS – the exchange of futures for swaps spread that tracks Brent's premium over Dubai – narrowed to $2.51 which makes it economical to arbitrage the Atlantic Basin barrels(Brent based crudes) to the Asian market (West Africa, North sea,…) as EFS narrows.

The International Energy Agency (IEA) forecast surging US oil output will outpace sluggish global demand and lead to a large inventory build-up around the world in the next nine months. Goldman Sachs recently revised down its forecast of growth in oil demand for 2019 to 1.275 million bpd, citing disappointing global economic activity.

The Organization of the Petroleum Exporting Countries (OPEC) gave its first 2020 forecasts in a monthly report, stating the world would need 29.27 mb/d of crude from its 14 members next year, down 1.34 mb/d from this year. The forecast points to the return of a surplus despite an OPEC-led deal to restrain supplies, and was seen as a drag on prices.

OPEC / non-OPEC partners ratified an agreement to extend their production cuts for another nine months until the end of the first quarter of 2020 followed by the group's Joint Ministerial Monitoring Committee (JMMC) held on 1-2 of July 2019, as the OPEC members overcame their differences in order to prop up the price of crude amid a weakening global economy along with the signs of deceleration in global oil demand growth and a robust forecast for continued non-OPEC oil supply growth, particularly led by soaring US crude oil production which mainly comes from its shale basins. This will be the fourth time that the producers' alliance has extended production cuts to rebalance oversupplied markets since the joint deceleration of co-operation was agreed in late 2016. The five-year average for OECD commercial stock levels reached a record high overhang of over 400mn bl in July 2016. In May 2019, the overhang in OECD commercial oil stocks has been reduced to 25mn bl. OPEC forecasts global oil demand growth at 1.14mn b/d this year, against a non-OPEC supply increase of 2.14mn b/d. Based on Goldman Sachs, growth in US shale production is likely to outpace that of global demand at least through 2020 and limit gains in oil prices despite output curbs led by the OPEC. However, the EIA raised its outlook for U.S. crude oil production, projecting an all-time high of 12.36 mb/d in 2019, versus its forecast last month of 12.32 mb/d.

The OPEC+ cuts are set to effectively shorten crude and condensate supply by 550,000 b/d on average over H2-2019 vs. H2-2018. At the same time, on the crude demand side, it is expected to see a sizeable uptick of 975,000 b/d y-o-y for the H2-2019. This comes on the back of large-scale capacity additions and relatively low product supply on the back of run shortfalls and refinery outages over H1, which led to forward demand cover in products falling below the 5 year average.



In fact, oil demand declined due to the trade war between the United States and China while market faces rising US shale oil production. According to market sources, Mideast Gulf liftings during the first half of this year fell by 1.46 mb/d to 16.7mb/d followed by US sanctions and also OPEC cut strategy. In the meantime, the IEA is revising its 2019 global oil demand growth forecast to 1.1 mb/d and may cut it in case of further weakness.

Asian refining margins jumped recently for simple and medium refineries as a result of tight market structure for fuel oil, but to the contrary it was not very good for complex setups as the cost of the heavy crude basket utilized by these refineries increased much more than the light crude basket did. Looking ahead, a return to seasonally average maintenance levels and new refining capacity should drive margins lower once the cushioning effect of earlier maintenance is removed. The refining margin environment suggests that risks to crude demand are skewed to the downside for the coming months rather than the upside.

Naphtha crack's values against regional crude benchmarks declined in northwest Europe, Singapore and the US Gulf coast. Northwest Europe naphtha's weakness is as a result of weak demand from petrochemical producers amid a combination of planned cracker shutdowns and competition from alternative feedstocks. Also some Asian refiners have decreased runs because of recent weak light distillate margins, while European refiners can meet some of their demands with rival Russian Urals crude which is returning to normal quality supplies through the Druzhba pipeline. In the meantime the slower demand outlook has made other Mideast Gulf producers cut their August prices to Europe and Asia-Pacific.

Gasoline crack increased slightly in comparison with last month as a result of higher cracks in the Atlantic Basin followed by destruction of alkylation unit of 330 kb/d PES refinery which is the US East Coast's largest refinery by fire. Also export of gasoline from Europe to US Atlantic coast increased to its highest in last three years as a result of shutdown of the mentioned refinery.

Modern Technologies, Oil Industry Development Pulse

Foad Nabavi

The Reservoir Management and Field Development Division of the Research Institute of Petroleum Industry (RIPI) is a dynamic specialized and scientific center seeking to bring about new changes in the upstream petroleum industry based on modern technologies and latest scientific achievements. The process of reservoir management which involves decision-making for the administration of oil and gas reservoirs comprises four steps. The first step is about formulating strategies and policies. It is in compliance with the 20-Year Vision Plan and national five-year development plans. The second stage is about comprehensive studies on reservoirs and development plans. This Division is the main advisory arm in reservoir management, as well as formulation of development plans for oil and gas fields. The third phase involves implementing development plans and the final stage is about supervision on production. Therefore, the main mission assigned to the Division would be to conduct studies for the management of reservoirs and development of fields. Given industrial needs, the diversity of technical challenges for decision-making in reservoirs management and playing a more effective role in following up on RIPI objectives and missions, the Division is set to adopt a new approach within the framework of its current status. Touraj Behrouz, director of RIPI's Reservoirs Management and Field Development Division, has spoken with Iran Petroleum about the important activities and achievements of this division.

What are the most important projects in reservoir management and field development?

We have a technology value cycle in the petroleum industry and so far the Reservoir Management and Field Development Division have concluded 35 comprehensive studies. Fortunately, these studies have produced satisfactory results. Our most recent activities involve studies in the Homa field, which are still under way. Putting into practice the assessment of the Gordan and Sepehr fields in collaboration with the Exploration Directorate of NIOC is under way and technical studies are progressing well. Meantime, other activities of this division include participation in the horizon study projects for Abadan Plain and gas shales.

NIOC has, over recent years, focused on reservoirs studies as well as development and assessment. What has this Division done in this regard?

Studying reservoirs, enhanced recovery methods, improved production and optimal use of reservoirs as well as oil and gas fields with a view to enhancing productivity have been handled by this Division by using the existing capacities. Modern scientific and technical methods are being used at the highest qualitative and quantitative level possible. I may refer to the Integrated Assets Management (IAM) method for oil assets. In such activities, the modeling of wells, reservoirs and installations must be optimized simultaneously, which would finally lead to value-added.Another significant achievement is presentation of master development plan (MDP) which targets the highest rate of productivity. MDP would contribute to optimal use of hydrocarbon reservoirs. Under this method, an MDP is formulated for various fields located in a specific zone by taking into consideration technical and economic issues. Expectations, technical and economic restrictions are considered simultaneously for the fields. Other outstanding achievements of the Division include mastering design knowhow and enhanced recovery pilot for hydrocarbon reservoirs. It is being done for the first time in Iran.

How is cooperation with clients and the mode of activities?

RIPI's Reservoir s Management and Fields Development Division is the research and scientific arm of the petroleum industry. It has desirable communications with various sectors of the upstream industry and our cooperation with ICOFC is on the rise. We are also cooperating with IOOC, Petroleum Engineering and Development Company (PEDEC), Pars Oil and Gas Company (POGC), National Iranian South Oil Company (NISOC) and Exploration Directorate of National Iranian Oil Company. RIPI's Reservoir s Management and Fields Development Division is also open to international cooperation. In case we receive requests for cooperation and studies from neighboring countries, we would be ready for cooperation and interaction. We are conducting studies and activities by benefiting from scientific achievements and all our colleagues are using advanced technologies in their expertise. Transfer of knowhow and technology is done by using specialized videoconferences, participation in international seminars on different sectors, formation of specialized teams in collaboration with domestic and foreign experts and researchers, exchange of technical knowhow and the presence renowned international specialists. Meanwhile, in collaboration with universities, research centers and scientific centers as well as knowledge-based companies, we are pushing ahead with some of our studies and projects. The scientific level of Iranian researchers in reservoirs management and fields' study is growing rapidly.

FOCUS

What measures have been taken with regard to the transfer of technology, smart reservoirs and upstream sector development?

Regarding smart reservoirs and development of upstream sector, it has to be noted that certain measures have been carried out. A smart well pilot has been designed and developed. In cooperation with the Iran Central Oil Fields Company (ICOFC), some oil fields located in central Iran were screened for the application of this technology. Then, in collaboration with the Arvandan Oil and Gas Production Company, a new MDP plan was presented with intelligent attitude for the Jofair field. In the Tousan field studies, a 3% increase in the recovery rate was calculated in collaboration with the Iranian Offshore Oil Company (IOOC). We hope to be able to make the intelligent well operational under the aegis of future support.

Another significant achievement is presentation of master development plan (MDP) which targets the highest rate of productivity. MDP would contribute to optimal use of hydrocarbon reservoirs

Studying reservoirs, enhanced recovery methods, improved production and optimal use of reservoirs as well as oil and gas fields with a view to enhancing productivity have been handled by this Division by using the existing capacities

RIPI Involved in Ahvaz Field Development

Four years ago, research agreements were signed with universities and research institutes on the technological development of oil fields. These projects, which are going ahead on schedule, were envisaged under the country's Five-Year Economic Development Plan thanks to Mr. Zangeneh's foresight.

The main philosophy behind these projects was to transfer and develop technology for the upstream sector, work on enhanced oil recovery (EOR) and improved oil recovery (IOR) methods and also clear the way for the growth of fundamental knowhow for technologies. The Research Institute of Petroleum Industry (RIPI) is one of the entities involved in the agreements. It is tasked with conducting studies on the Ahvaz oil field. RIPI has so far achieved good results through its studies on the Ahvaz field.

Abbas Shahrabadi, director of the Ahvaz Field Enhanced Recovery project, said development of the upstream sector of a number of fields, including implementation of EOR and IOR, has been assigned to nine universities and research centers in line with Iran's economic resilience plans.

He told "Iran Petroleum": "The agreement for enhanced recovery from the Asmari and Bangestan reservoirs of the Ahvaz field was signed with RIPI. The general objective behind these agreements was a knowledge-based and technological view of problems and challenges of these fields." Shahrabadi said the agreements had been signed for ten years so that these universities and research centers would get familiar with the challenges related to the fields up for development and would find technological solutions to address these challenges.

"Meantime, there is issue of interaction and communications with domestic and foreign research centers so as to help set up a research network and enhance communications between universities," he said.

Shahrabadi touched on the massive Ahvaz field, saying: "The Ahvaz field has a big share in Iran's total national oil production. The reason why it was awarded [to RIPI] is the background of RIPI studies on the Asmari reservoir in partnership with Statoil in previous years."

He added: "This agreement has been designed in five distinct phases. Phase 1 pertains to knowledge of the field and its challenges and problems, as well as screening EOR methods."

Shahrabadi said the first phase of the project was of high significance, adding: "The project is planned to be accomplished in two and a half years." He said this phase would be over in September, while at the same time plans for the second phase, which mainly involves updates, were being submitted to the steering committee of the project for final approval.

Regarding the third phase, Shahrabadi said it was about plans for introducing solutions to reservoir challenges and conducting lab studies so that precise tests would be done on the proposed EOR methods.

He added: "In phase 4, the simulation model will be reformed to match phase 3 results. And finally in phase 5, we will have the pilot plan on the agenda."

Shahrabadi said: "At the beginning of signature of the agreement, an IRR 40 billion budget was earmarked. It was decided that each phase be submitted to the steering committee for approval."

He said: "More than 20 persons are directly and indirectly active in this project at various levels. Moreover, five PhD and Master's students are working on these projects." Shahrabadi also said there was good interaction under way with National Iranian South Oil Company (NISOC).

"We have already carried out projects at NISOC's request and in this project our communications have got better and closer," he said. He added that a specialized committee comprising NISOC and RIPI representatives had been formed to supervise the project and share experience and provide advice.

Regarding the Bangestan reservoir, Shahrabadi said: "This reservoir is vast and therefore exposed to deep changes in properties. These changes toughen our work."

He said that the rate of recovery in Bangestan was "very low" due to the recovery mechanism of rock and fluid expansion. He added the reservoir rock's permeability was very low and due to the varying features, it would not be possible to apply a single EOR method for the whole reservoir. Shahrabadi said due to the diversity of rock and fluid, eight separate zones had been identified while at each zone EOR methods had been screened. Referring to challenges of this reservoir, he said: "One of major problems pertains to sediments which are in the well column. They need to be examined."

Shahrabadi said lost circulation was a major challenge in this reservoir, which has imposed huge costs. In addition to fluid costs, he added, there was problem of formation damage and low permeability of reservoir rock. He said due to the juxtaposition of layers with low permeability and layers of high permeability, the oil trapped in the sand layers would be depleted while in the carbonated layers oil remains trapped. Therefore, extracting oil is a major challenge in these layers. Furthermore, since the Asmari reservoir is connected to a strong water drive, the water challenge is seen. It brings about corrosion, reduces the well production potential and damages the environment. Furthermore, it increases production costs.

"In addition to lost circulation in this reservoir, we are faced with the sand production problem. This field has been faced with this problem since the very first year, and it has caused major problems, leading to the corrosion of pipes, pumps and wellhead equipment," he said. Shahrabadi said at RIPI's Petroleum Engineering Division, which is run by himself, the Drilling Research Group had taken some steps to design drilling mud additives.

"In light of the high lost circulation in both reservoirs, our colleagues in this group have mastered technical savvy for producing additives containing lost circulation. Using these materials would in certain cases cut lost circulation up to 80%," he said. Shahrabadi said: "In the Reservoir Production Group of the Petroleum Engineering Division, a specialized team is working on preventing asphaltine sediments and wax. During this time, they have made good forecasts about sediments in the Ahvaz field's reservoir. Furthermore, given the advanced systems for lab studies on water and gas-based EOR methods, it would be possible to conduct such tests." Regarding the recovery rate of the field, he said: "In this project, the studies would not be limited to EOR methods and new technologies like fracking will be used. This technology has already been used in some fields, but it has not been always successful. It has not been successful in the world either. However, most production companies have moved in such direction." Shahrabadi said RIPI had picked its foreign partner for the project and cooperation had been going on well. He added: "The foreign partner in this project would help RIPI in four sections. Two sections have been already done. We are pursuing two objectives in this cooperation. First, we want them to get involved in the screening of EOR methods and introduce new technologies. Our second objective is to use the homegrown software developed by this company."

Abadan's soccer and Naft Abadan enjoy great potential. You have to display how to work with it. There is enough talent here, but you should train them to be on the right path

Dragan Skočić:

Iran, Croatia Enjoy Cultural Affinities

Dragan Skočić is a Croatian head coach with long years of experience in Iran's football. In the new season of Iran's Premier League, he is leading the Naft Abadan team. In an interview with Iran Petroleum, he highlights cultural affinities between Iran and Croatia, saying he adores football. Here is the full text of the interview:

Arash Jafari

You're back to Iran. How come you made this decision?

I have to say that Croatian coaches have had good communications with Iran's football. Meantime, Iranians are very hospitable. That is why I chose Iran once more and I decided to return and lead the Naft Abadan team.

Compared with the first time that you came to Iran, how much has Iran's football changed?

Football has neither progressed nor gone in Iran. Your football has remained quite unchanged and that is not good. In my view, you had to make progress given your facilities. You have sufficient potential to prepare the ground for progress through investing in youth. But that has not been the case. However, I have to note that your coaches mainly look at the final result and that is why they refuse to engage youth and veterans. We can make necessary changes. That is a chance for Iran's football.

Why did you choose Naft Abadan?

I was offered the head coach job for Naft Abadan and I accepted. Of course, when I was not working due to my little child I received the proposal and I accepted. One reason for choosing Naft Abadan was the lovely spectators of this team.

How do you see the Naft Abadan football potential now?

Abadan's soccer and Naft Abadan enjoy great potential. You have to display how to work with it. There is enough talent here, but you should train them to be on the right path. I think that with Abadan's youth, Naft Abadan will await good days. However, it depends on good training.

To what extent have Croatian head coaches been instrumental in Iran's football progress?

Croatian head coaches have been very active. Sometimes it is very difficult to change the behavior of a player and that makes everything more difficult for you. In fact, I think that Croatian coaches are trying their best to do this tough job. Sometimes, our problem stems from cultural issues in the society. New methods emerge, and players need to adapt by learning new things. Croatian coaches have updated modern football for Iran.

Branco Ivancovic, also a Croat, had brilliant performance in Iran. What do you think of him?

Branco had a great performance in Persepolis. You may finish champion once a year, but winning the championship title for three consecutive times indicates comprehensive and good planning. Of course, Persepolis has advantages like recruiting players much easier and attracting so many fans. That is why you will achieve the desired result.

Begovic, Bonacic and Francis have achieved brilliant results in Iran. Will you do as good as them?

Why not! I can win championship because I put faith in myself.

Croat coaches communicate very easily with Iranians and become friends. Why?

I think that our cultures are very close to each other. Furthermore, Iranians are very hospitable and that is why we come friendly very soon. This is not just my own words; everyone else coming back from Iran shares the same view.

I think that exporting football coaches is a lucrative business in your country.

If you look at the population of Croatia and compare football and people, you will see that everything is excellent and we can export qualified coaches.

Your president is a football fan and I observed this during the last World Cup final. What do you think of that?

Politics would like to remain shoulder-to-shoulder with football. Football can help people remain in their political posts. There are many self-reliant clubs without having to do with political issues. Therefore, politicians would have to come towards football in a bid to preserve their posts.

What is your favorite Iranian food?

I have to say that I love everything, but nothing beats Iranian kebab. I specifically love Iranian rice and kebab.

What do you think of Iran's new coach Wilmots?

His background is very good. It can lead Iran's national team. I think that the only major problem is that the footballers can adapt themselves with the coach's ideas.

Are you happy with Naft Abadan?

I feel very happy when I work with this team. My footballers have sought to implement my objectives on the ground. However, I expect it to be much better. I would like to hire more foreign players in order to work better. I love myself and I do tough jobs. I am also motivated to do great jobs.

It may be premature to ask this question. What results do you think Skočić will bring for Naft Abadan by the end of the season?

My team still needs more players, while league matches are yet to begin. I have to get more information about other teams. However, Naft Abadan has great potential and I hope I would be able to meet their expectations.

Do you favor offensive football or do you prefer prudent football like many Croat coaches?

I cannot say that we are prudent. We play based on what we have. If I want to explain further, I should say that for instance you are in the boxing ring, you do not defend all the time. You also attack. Therefore, I both strike and defend. Of course, if you compare football with chess I would be making the first move. I have to add this point that you should have offensive tools, which are players. You are required to have creative, intelligent and offensive players. Otherwise, you have to play with what you have at your disposal. When I was in Malavan, we scored more goals than Esteqlal and Persepolis and when I was with Foolad, the number of goals scored against us was the lowest. Therefore, my team can play both defensively and offensively.

What do you think of Iranian spectators?

Wherever in Iran I worked I saw very good spectators. They desperately love football. That is a very good feeling to enjoy such support. Even under tough conditions when you are under pressure fans will motivate you. This is what I think about the fans of Naft Abadan and spectators of matches.

Paulo Sérgio

I think that our cultures are very close to each other. Furthermore, Iranians are very hospitable and that is why we come friendly very soon.

Zanjan, Historical City with Popular Handicraft

Zanjan covers areas in central and northwestern Iran. It is a historical city located in a mountainous area with mild weather conditions. In addition to a beautiful nature which should not be missed during a trip to Zanjan, historical places, handicraft and the Zanjan market are among wonders. Some of these tourist attractions are as follows:

Soltanieh Dome

Soltanieh Dome is located in the city of Soltanieh in Zanjan Province. It is a masterpiece dating from the Ilkhanid dynasty. The dome was built between 704 and 712 AH at the order of Mongol king Öljaitü, also known as Sultan Muhammad Khodabandeh. Soltanieh comes third behind Santa Maria of Italy and Sainte-Sophie of Turkey in terms of height. It is also known as the largest brick dome in Iran.

Photo:

Old Bazaar

Zanjan's bazaar is the longest roofed bazaar in Iran. Its construction lasted from 1205 to 1213 AH, covering the reign of Agha Muhammad Khan Qajar to Fath Ali Shah Qajar. Caravanserais, bathrooms and mosques have been built around this bazaar. During the reign of Muhammad Ali Shah Qajar, it turned into a big complex.

Photo: Hassan Hosseini

Jame' Mosque

Zanjan's Jam'e Mosque, known as Seyed Mosque, was built in 1863 when a son of Fath Ali Shah Qajar, known as Abdullah Mirza Dara Qajar ruled in Iran. The mosque was built to become a place for teaching, prayers and meetings with Abdullah Mirza who was a senior cleric. Built in the heart of the older pat of the city, it is accessible.

Zanjan, IOPTC Northwest Branch

The northwestern area of the Iranian Oil Pipelines & Telecommunication Co. (IOPTC) is located in Zanjan. IOPTC is a subsidiary of National Iranian Oil Refining and Distribution Company (NIORDC).

IOPTC uses more than 14,000 kilometers of pipeline, as well as facilities like pumping stations to receive crude oil and petroleum products for delivery to power plants, refineries and other consumer spots.

IOPTC has 12 subsidiaries charged with fuel supply to western Iran.

The northwestern part of the pipeline in Zanjan is the longest in Iran. It carries fuel through 2,000 km of pipe to the provinces of Alborz, Qazvin, Zanjan, East Azarbaijan, West Azarbaijan and Ardebil.

Throughout this 2,000-km route starting from Mahdasht in Alborz Province, pumping stations are located in Eshtehard, Abhar, Idelou, Qareh Chaman and Miandoab for pumping crude oil and petroleum products.

Zanjan, Mianeh, Tabriz, Maragheh, Miandoab, Urmia, Sarab and Ardebil are among facilities located throughout the same route for the delivery of crude oil and petroleum products.

Telecommunications stations are also located in Eshtehard, Qazvin, Abhar, Saein Qale, Zajan Kuh, Microwave Zanjan, Idelou, Mianeh Kuh and Qare Chaman. These stations ensure the safe delivery of crude oil and petroleum products.

Transmitting and delivery of the required feed of Tabriz oil refinery and the Tabriz petrochemical plant, as well as supplying oil products and jet fuel to the provinces of Zanjan, East Azarbaijan, West Azarbaijan and Ardebil are among missions of IOPTC northwest branch in Zanjan.


Zanjan
Soltanieh Dome