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Oil and Gas Exploration in Full Swing

Zangeneh:
Iran Has Own
Tools to Foil
Sanctions





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Leaping Over Sanctions Wall

Kasra Nouri
Director General of Public Relations

Verse 216 of chapter Al-Baqara of Holy Quran says: "...though it be hateful to you. Yet it may happen that you will hate a thing which is better for you; and it may happen that you will love a thing which is worse for you; God knows, and you know not."

A clear manifestation of this verse is seen in the unjust and illegitimate sanctions the US has imposed against Iran.

These sanctions had been designed to target Iran's economy and industry, particularly Iran's petroleum and petrochemical sector; however, the outcome has been development of the sector based on self-reliance and progress based on domestic capabilities.

A review of the trend of growth and development in Iran's petrochemical industry over recent years despite tough sanctions would lay bare the ineffectiveness of efforts by narrow-minded politicians.

Abandoning crude oil sales and creating a chain of high value-added industries has been a major plan of Iran's Ministry of Petroleum. The petrochemical sector makes the largest contribution to that objective.

Despite their short-term impact, the sanctions prepared the ground for

increased investment in the petrochemical sector and concentration on this sector.

Plans to develop the petrochemical industry started in the 1990s, which brought Iran's petrochemical revenue from \$1 billion to over \$16 billion over 15 years. If the pressure exerted on Iran's petroleum industry through sanctions is taken into consideration that would be a record.

During the third jump in Iran's petrochemical industry, which started in 2013, a comprehensive and well thought-out plan was implemented for the growth of the petrochemical chain. That would bring Iran's petrochemical revenue to \$25 billion. The unprecedented and sustainable growth and development of the petrochemical industry despite sanctions and economic pressure highlight the fact that independent nations could no longer be blocked by economic and political pressure. Consequently, inexperienced and incapable politicians could no longer use the industry and the economy as tools for their illegitimate political objectives.

Throughout its third jump, Iran's petrochemical industry crossed the wall of sanctions. That is an undeniable fact that would turn out to be true in all economic, industrial and political sectors.

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Oil and Gas Exploration in Full Swing



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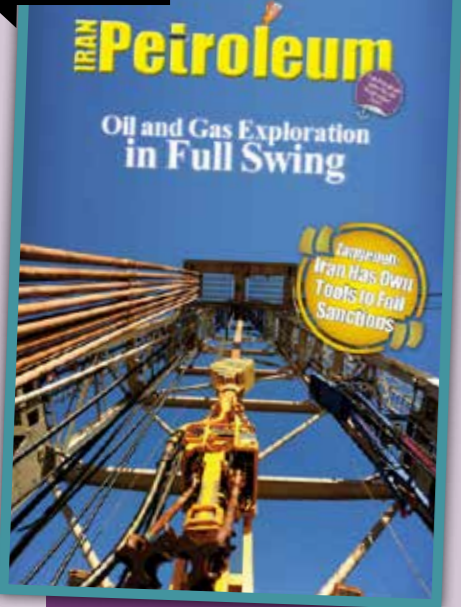


Photo: HASSAN HOSSEINI

New Gas Find in Fars Province

National Iranian Oil Company (NIOC) announced the discovery of an independent gas field in the southern Iranian province of Fars. The Eram gas field holds 19 tcf of gas in place, over 13 tcf of which is recoverable.

Reza Dehqan, deputy CEO of NIOC for development and engineering, said: "With this discovery, it can be argued that Iran has reached self-sufficiency in exploration activities." NIOC Directorate of Exploration said the new gas field was located 200 kilometers south of the city of Shiraz, 60 kilometers north of Assaluyeh and 25 kilometers south of the city of Khonj. The gas reservoir is 50 kilometers

long and 5 meters wide.

Seventy-five percent of Iran's gas discoveries and twenty percent of oil discoveries have been made following the 1979 Islamic Revolution. Iran sits atop 159 billion barrels of recoverable liquid hydrocarbon, standing in the fourth rank in the world. In terms of gas reserves, Iran comes second in the world with 34 tcm of recoverable gas. Therefore, Iran comes first in terms of combined oil

and gas reserves in the world.

Light and Sweet Gas

According to Dehqan, the exploration well which led to the discovery of Eram had been drilled by National Iranian Drilling Company (NIDC). Drilling began in summer 2018 and lasted more than 9 months. Eram is also estimated to hold 385 billion barrels of gas condensate, or equivalent to one phase of the giant South Pars gas

field. Data provided by the Directorate of Exploration shows an API gravity of 49 and hydrogen sulfur content of 800 ppm for the Kangan and Upper Dalan reservoirs and an API gravity of 50 and hydrogen sulfur content of 45 ppm for the Lower Dalan reservoir. That shows the high quality of gas in the Eram field. The vicinity of the Eram field to the Shanol and Homa gas fields near the Parsian gas refinery, as well as the existence of proper infrastructure would add to the significance of development of this field in making up for production loss in adjacent fields, as well as in sustainable feedstock supply to the Parsian treatment

facility.

\$40bn Revenue

Dehqan said Eram's gas was enough to meet Tehran's needs for 16 years. "But fortunately or unfortunately since we have the South Pars field, which is the world's largest gas field, other discoveries are not seen as important." "Such discovery would be taken seriously were it made in other countries," he added. Dehqan said Eram's gas was sweet, adding that the gas layer of this field was 400 meters thick, which is high for a gas reservoir. "Estimates show that this field's gas and condensate would produce \$40 billion

in revenue," he added. He said that the Baghoun field, which had been discovered earlier, was part of the Eram field. Dehqan said the available infrastructure in Fars Province would facilitate treatment of gas at the Parsian refinery.

Dehqan underlined the significance of exploration as the first link in the value chain of oil and gas production. He said: "Fortunately, not only in the exploration sector but also in the development sector we are self-reliant. The prime examples of self-sufficiency are the implementation of enhanced oil recovery, as well as the Goureh-Jask crude oil transmission project by hiring Iranian contractors."

Estimates show that this field's gas and condensate would produce \$40 billion in revenue

With this discovery, it can be argued that Iran has reached self-sufficiency in exploration activities



Gas Find Likely in Khuzestan

The Exploration Directorate of National Iranian Oil Company (NIOC) has drawn up extensive plans for exploration in Iran's intact areas. The Directorate has for the first time in 10 years embarked on gravimetric and magnetometric studies in untapped areas like Makran, planning to install 12,000 magnetometric and gravimetric stations there.

Ali Moalleni
Deputy Director of Exploration, NIOC

Since stratigraphical and geological studies conducted over the past couple of years show that West Makran is conducive to complementary studies, this project will start as a giant project there. We hope to identify the exploration potential of this area following the completion of studies. Furthermore, magnetometric and gravimetric operations have started in Kopet Dagh, covering the area extending from Dargaz to Sarakhs Plain. In parallel, a 2D seismic testing plan in Dargaz is under way on 500 square kilometers. The contractor for this project has been selected. Meantime,

another gravimetric and magnetometric project will start in Bostan-Abad and Sarab Plain areas following the conclusion of petroleum-based geological studies that have been conducted to identify the hydrocarbon potential of northwest. The philosophy behind choosing these two areas is the possibility of existence of suitable structure. Therefore, gravimetry and magnetometry studies are on the agenda. We are currently in the process of choosing a contractor to activate 4,500 stations in the region. The Exploration Directorate is committed to discovering new fields in order to increase the volume of oil reserves in place and carrying out exploration operations in new areas. To that

effect, we have launched many activities in the Zagros and Abadan Plain areas. Gravimetry and magnetometry studies have started in Abadan Plain since May, and we plan to start 3D seismic testing. Following the proof of existence of oil in West Karoun, and the discovery of giant fields like Azadegan, Yadavaran and Darquain, our exploration activities have shifted to the east of Karoun River. Due to existence of certain geological structures, we expect to meet stratigraphic traps. We need advanced technology there and that is why we have so far been reluctant to start work there. Now, 3D seismic testing has started on 1,900 square kilometers of land. An outstanding feature of this

project is that for the first time geophysical data gathering is under way in the onshore/offshore areas. Of course, following the discovery of the Minoo oil field, it came out that the area can have a good hydrocarbon potential; therefore, 2D and 3D geological and geophysical activities may open a new horizon to us in this vast area. The Minoo field has a stratigraphic structure and we have no possibility to make calculations there. In order to obtain more data on Minoo, we have to start production from it or use a specific seismic testing. OIEC is set to handle production from this field under a 6-month trial run and send the results to the Abadan oil refinery. This field is located along the

border and it will be impossible to make precise calculations about its reserves. Another project currently under way is the Basht project, located in an area of the same name between the three provinces of Kohgiluyeh and Boyer Ahmad, Fars and Khuzestan. In seismic operations we are seeking to access the Khami and Dehrom layers. The important point is that no drilling has been made in the Dehrom layer anywhere in Khuzestan Province. That is while in Fars and the Persian Gulf areas, this layer has created giant gas fields. In case the depth of access to this layer is deemed suitable, we can study the possibility of existence of gas in Khuzestan by designing an exploration well.

Oil and Gas Exploration in Full Swing

Official data show that Iran's recoverable liquid hydrocarbon reserves have increased to more than 160 billion barrels over the past four decades even though massive recovery has been under way. According to the United States Geological Survey (USGS), Iran comes third behind Iraq and Russia in terms of exploration potential.

In the wake of the 1979 Islamic Revolution, a total of 65 oil and gas fields have been discovered in Iran. Lately, Petroleum Minister Bijan Zangeneh had announced oil find in Minoo Island for the first time, saying the new oil was light and sweet. Saleh Hendi, exploration director at National Iranian Oil Company (NIOC), said 390 oil and gas reservoirs had been identified in Iran, 171 of which have been developed. That indicates Iran's potential in petroleum industry development. He said during early years following the 1979 Islamic Revolution, some people used to say Iran would be running out of oil within 20 to 30 years, "but now 40 years has passed and you can see we have still oil and gas." He said despite consumption and in light of new discoveries over the past 40 years, volume of Iran's oil reserves have not changed over these years. "Of course, conditions have improved in the gas sector. The massive gas explored in South Pars has increased the amount of our gas reserves eight-fold compared to the early years of the Revolution. That allays our concerns for the future," said Hendi. He said a total of 390 oil and gas reservoirs had been identified in Iran, including 258 oil and 132 gas reservoirs.

FOCUS

One Exploration per Season

Hendi said exploration on the borders had been always prioritized, adding that NIOC had made one exploration per season since last winter. "The discovery of the Minoo field in Minoo Island and a gas field in Fars Province, whose details will soon be announced by Petroleum Ministry officials, are among these new discoveries," he said. "Also in summer, we had significant discovery in southwest, which would be added to recoverable reserves." Noting that a rig was operating in a joint field in the Persian Gulf, he said two more rigs would soon start operations there. Hendi said last calendar year, the data for an oil field which Iran shares with Saudi Arabia had been submitted to the Petroleum Ministry. He said that NIOC Exploration Directorate had in recent years been tasked with deciding about sedimentary basins across the country. Hendi said: "In case exploration operations prove to be unsuccessful in a spot, that would be considered a positive activity for exploration. For instance, the Azarbaijan, Makran or Jazmourian areas were always exposed to speculation about exploration potential and we had to decide on them. We came to conclusion by carrying out operations in these areas."



Hendi said 171 of these fields had been developed. He added that 45% of oil reservoirs and 77% of gas reservoirs remained undeveloped. "These figures show that exploration is ahead of production and are signs of development in the country," he added. Hendi said that NIOC Exploration Directorate had not been active enough during the 6th Five-Year Economic Development Plan. He said that oil exploration had become more difficult because "structural traps

were ending" and "stratigraphic traps have shrunk in size". Hendi said over the past three years, 15 exploration well operations had been concluded despite high risks. "Our rate of success during this period of time has been on average 60%. The figure jumped significantly last year and almost all wells completed in the current and last [calendar] year have proven to be successful," he said.

14 Geophysical Projects

Hendi said a significant number of costly geophysical projects had been envisaged for the current calendar year. Despite financial restrictions, NIOC is being effectively supported for the implementation of

the projects. For five of these projects, agreements have been signed and “€150 million plus IRR 4,000 billion” credit has been allocated.

“With these projects we will for the first time step into Makran, Jazmourian and Mianeh,” he said. Hendi said: “Last year, after drilling one exploration well work started in east of Karoun. We started drilling Arman well in a fully intact area.” He said: “We are currently drilling wells near Shadegan Lagoon and we expect an imminent exploration horizon.” “Also in Azadegan Plain, we are operating southward and we will have several joint onshore and offshore projects. The agreement on one of them has been signed and we expect the tender bid for the remaining to have a winner. We expect to witness massive structural traps there,” he added. Hendi also touched on new exploration in the Kopet-Dag area, saying: “This area is very far from Iran’s southern energy hub, but it has always been of significance to us. Based on the Petroleum Minister’s instruction we are looking for gas.” He said that seismic testing operations had started in the current calendar year. Hendi said in coming years, at least three exploration wells would be drilled in Kopet-Dag area. “Kopet-Dag is a sedimentary area, extending from east of Gorgan to Sarakhs. It is divided into eastern, western

and central sections,” he said. “Our exploration will be in eastern Kopet-Dag. We have also started exploration in other areas like Kalat Naderi, Dargaz and Sarakhs and we will have seismic testing in Zarrineh Kuh, too.” He said: “Gonbadli and Khangiran are among oil fields that have already passed half of their life and are faced with pressure fall-off. That is why gas exploration in this region is significant.”

Exploration Potential

Asked if NIOC had started operations in other areas without any history of exploration projects, Hendi said: “Last [calendar] year, we zoned the country in terms of exploration potential. It is our forecast that the biggest potential lies in the south and southwest. But it does not imply that we would not be looking for new explorations in other areas of the country. In the following phases we will become active in northeast and northwest where there is lower potential.”

“Of course earlier we had exploration operations with higher risk in Kashan, Garmsar, Kohguiluyeh Boyer Ahmad and some areas of Qom and Kurdistan,” said Hendi.

He said that exploration operations began in northern Dezful, whose results will be soon announced. Hendi said

NIOC’s exploration commitments for the 6th five-year plan would be covered with the Dezful exploration and “allows us to focus on higher-risk drilling for some time.” He said: “For the sedimentary areas all across the country, 10-year roadmap was drawn up. We are moving ahead based on the priorities and we have major plans for all these areas like Makran or Moghan or Kopet-Dagh.”

Shale Oil/Gas Reserves

Hendi said access to shale oil and gas reserves was among plans ahead, adding: “Last year, we announced existence of massive shale gas reserves in Ilam and Kermanshah and the minister appreciated it, but development of these fields is not currently prioritized by NIOC and we are looking for the private sector’s potential.”

He said that shale oil had been discovered in the Qali Kuh area in Lorestan, whose complementary studies were under way. He added that the project was among NIOC priorities. Hendi said: “Should legal problems in the awarding of shale reservoirs to the private sector be resolved, such oil and gas which is of high quality could be cost-effective for the private sector.” He said that exploration and

production of shale oil and gas in the world was economical, “but in the current mix of NIOC projects, the priority would be to produce oil at \$10 a barrel and refrain from \$20 a barrel.” Hendi said sovereignty over oil and gas is in the hands of state and the law does not authorize the private sector to be involved in the oil and gas sector. He added: “Studies about legal aspects are under way and we are trying to apply the Mine Law to this issue. Petroleum Ministry is conducting consultations in this regard.”

E&P Companies in Exploration Blocks

Hendi also touched on the joint research projects conducted with universities, saying: “Our effort has been to refrain from individual programs from the first year. We implemented a roadmap which provided us with the major chapters required for research.” He said the next step was long-term joint research project with five universities – Ferdowsi University, Shahroud

University of Technology, Shahid Chamran University, Shahid Beheshti University and Khawrazmi University. Hendi said: “The first phase of these agreements was done and approximately all these universities did their part of the plan and useful studies were conducted, creating a network of domestic and foreign experts. The report on the conclusion of these five agreements was submitted to the minister.” He added: “In the roadmap designed for each of these contracts, a five to nine-year period has been envisaged for the development of technology and even commercialization.” Hendi said talks had been held with the Office of Vice President for Strategic Affairs and CEO of NIOC, and the Office of Vice President agreed to provide the sum to be paid by NIOC to knowledge-based companies in the five universities. On the issue of oil companies’ involvement in exploration, he said: “In light of restrictions in attracting

foreign investment we decided to employ E&P companies in exploration blocks.” Hendi said TENCO (Negin Afagh Kish Energy Development Company) was the first company to sign an MOU in this regard. He added that TENCO was provided with the Toudaj block data. He said that the Exploration Directorate would provide its viewpoint soon about the possible signing of agreement and start of operations. Hendi said Petroiran Development Company (PEDCO) and Petropars had teamed up for several field development projects “and we are in the stage of signing contracts”. He added that Iranian Offshore Engineering and Construction Company (IOEC) and Pars Petro Zagros had also teamed up to look for offshore blocks. “Currently, we have shared data with them,” he said. Hendi said a total of five Iranian companies were engaged in exploration blocks. He added: “Of course we have not yet issued appeal to Iranian E&P companies. We are waiting for the endorsement of all contractual parameters by the minister and then we will forward them to all 19 Iranian E&P companies.”



Two Seismic Testing Agreements Signed

The National Iranian Oil Company Exploration Directorate has signed two seismic testing agreements with two Iranian companies. The agreements, including one 2D and one 3D seismic testing, are aimed at identifying new exploration potential in Iran.

Saleh Hendi, NIOC exploration chief, said all sedimentary basins had to be decided upon. He said that due to discoveries of previous years, the Directorate had fully met its exploration targets. The 2D Basht seismic testing agreement was signed between Hendi and Ali-Reza Behbahaninia, chairman of Oil Exploration Operation Company (OEOC) affiliated with the Oil Industries Engineering and Construction Company (OIEC). The 3D Paniz seismic testing agreement has been signed between Hendi and Omid Asakareh, CEO of TENCO (Negin Afagh Kish Energy Development Company).

Largest 3D Seismic Project

The Paniz project would be the largest 3D offshore-onshore seismic project in Iran, covering 2,000 square kilometers of land in the cities of Shadegan, Abadan, Mahshahr and Darquain. Estimated to last 32 months, the project is valued at IRR 3,000 billion. In the data gathering phase of this project, a vast segment of Abadan Plain's sedimentary basin would undergo exploration operation and the 3D seismic testing of Abadan Plain would be largely completed.

Meanwhile, the connection between East Karoun's structures and adjoining

structures would be examined. Stratigraphic hydrocarbon traps would be also identified. The 2D seismic testing, worth IRR 1,400 billion, would cover the three provinces of Kohguiluyeh and Boyer-Ahmad, Fars and Khuzestan. OIEC would operate the project over 28 months. The project is aimed at identifying new exploration potential. In the data gathering phase, the southern Dezful sedimentary basin would be studied. That would allow the determination of the precise geometry of buildings and the depth of access to exploration objectives.

No Submission to Sanctions

Addressing the signing ceremony, Hendi highlighted US sanctions imposed on Iran's petroleum industry and said: "In spite of all problems faced with by the petroleum industry, this sector is dynamic and industrious. The signing of these agreements shows that we have not bowed under the pressure from sanctions."

He said Iran did not welcome sanctions and isolation from the entire world, adding: "But we will not raise our hands in show of submission." Hendi highlighted complications in seismic testing projects like Paniz, saying: "Foreign companies were supposed to operate such projects, but under the present



circumstances [sanctions], the Exploration Directorate will operate such projects in partnership with Iranian companies." He also touched on the studies conducted on exploration blocks, saying: "We had already signed a memorandum of cooperation with an Iranian company and we are now about to sign an agreement." He said that for the first time exploration studies were being jointly conducted with an Iranian company, which proved Iran's self-reliance in exploration.

Increased Exploration

Hendi said NIOC Exploration Directorate had managed to reach its liquid hydrocarbon (oil, liquefied gas and condensate) and gas exploration targets at 130% and 170%, respectively. He

said it was due to increased exploration over recent years.

He said that the Exploration Directorate was officially obligated to decide upon prospective measures to be taken in all sedimentary basins in the country. Hendi said: "Tender bids are planned to be launched for 14 seismic, gravimetry and magnometry agreements this [calendar] year. Seven agreements have been finalized and we hope that the remaining contracts would be finalized by the end of next calendar year."

He said the implementation of agreements needed IRR 22,000 billion, adding: "These agreements will be implemented in various parts of Iran and they are scattered sufficiently. In some areas like Jask, Jazmourian, Bostanabad and Mianeh, which had

remained intact, we will be prospecting."

Contractors, Operating Arm of NIOC

Gholam-Reza Manouchehri, CEO of OIEC, said contractors would be the operating arm of NIOC. "Under the present circumstances, further cooperation between clients and contractors is expected," he said. Manouchehri said major oil and gas potentialities in Iran had become practical, adding: "Exploration activities are just the beginning of this road. Therefore, focusing on the development of exploration activities is a right decision under the present circumstances in Iran."

Manouchehri said OEOC had already conducted joint investment with an Iranian service company, adding they

were considering tie-up. He also expressed hope that Saba Drilling Company would be able to meet NIOC needs.

OIEC is among companies active both in upstream and downstream sectors, and was involved in the development of the South Pars gas field. It has recently signed agreements to cooperate with Loule Gostar Esfarayen and Mashin Sazi Arak in the upstream and petrochemical sectors. Manouchehri said agreements worth IRR 20,000 billion had been signed with the private sector, adding that another IRR 20,000 billion was on the agenda. Asakareh said the Paniz project would be implemented in Khuzestan Province, including 1,900 square kilometers of 3D seismic testing and 400 square kilometers of 2D seismic testing. According to Asakareh, the Paniz project was planned for 32 months, 22 months of which would be for implementation and the rest for data processing. He referred to an MOU signed between TENCO and National Iranian South Oil Company (NISOC) for developing the Shadegan field, saying: "Since development of this field is a TENCO priority, I hope to sign the agreement for developing this field with NISOC. However, due to restrictions in attracting foreign financing, we plan to implement the projects on our own by relying on domestic technical and technological knowhow." Asakareh said TENCO was among dozens of companies recognized by Iran's Petroleum Ministry as E&P companies. He added: "Given the significance of exploration, in this company, in addition to the development section, a division has been set up to take care of exploration projects and seismic testing affairs."

€60mn MOU for Petchem Equipment Manufacture

A memorandum of understanding worth €60 million was signed between three Iranian companies for the domestic manufacturing of petrochemical industry equipment. The MOU was signed between Oil Industries Engineering and Construction Company (OIEC), Mashin Sazi

Arak and AzarAb Industries to supply equipment to Kian Petrochemical Company and Dehloran Petrochemical Company. Mashin Sazi has a €40 million share and AzarAb the remaining €20 million share. The signing ceremony was attended by Reza Rahmani, minister of industry, mine

and trade, Gholam-Reza Manouchehri, CEO of OIEC, and a group of managers of private manufacturing companies.

Addressing the ceremony, Manouchehri said the MOU would soon become an agreement, adding: "OIEC is currently operating the largest petrochemical, LNG and

upstream oil projects and has filed nearly \$1 billion orders for domestically manufactured equipment." He said extensive support by Petroleum Minister Bijan Zangeneh and Industry Minister Rahmani in line with the policy of resilient economy had prompted Iranian experts to focus on domestic

manufacturing.

He added: "Fortunately, with the formation of conceptual engineering chain and the identification of domestic potential, we are now able to assign most tasks to the private sector."

NISOC to Gather Flare Gas

Ahmad Mohammadi, CEO of National Iranian South Oil Company (NISOC), said four agreements and one memorandum of understanding had been signed for gas gathering in NISOC-run areas. He said one of the most important agreements for this purpose had been signed for gathering flare gas at the Bid-Boland refining project in the Persian Gulf. He put the agreement's value at \$1.1 billion. "Within the framework of this agreement, according to a timetable, about 400 mcf/d of flare gas in Gachsaran and in the east of Khuzestan Province would be gathered," he added. Mohammadi said a \$200 million agreement had also been signed with the Maroun Petrochemical Company, adding that over 200 mcf/d of flare gas would be gathered in Maroun and Ahvaz in Khuzestan Province. He said: "We have signed two auction deals with two private companies for associated petroleum gas sales."

Iran E&P Companies Must Sell Oil

Reza Dehqan, deputy CEO of National Iranian Oil Company (NIOC), has said Iranian E&P companies are expected to be able to sell their own oil in the near future. He said: "This issue requires these companies to work out necessary mechanisms. It has to be taken into account as soon as possible." Dehqan also called for further cooperation between Iranian companies to benefit from opportunities available for the petroleum industry. He touched on the findings of appraisal of exploration blocks, saying: "The results of appraisal of exploration blocks in recent years indicate that the volume of oil reserves in place and recoverable reserves in Iran are more than estimated." Dehqan underlined that Iranian companies need to be fully capable under conditions of sanctions, saying: "We won't welcome international sanctions, but we believe that a progressive society is a society that would turn threats into opportunities."

South Pars Production Platforms Count at 39

The deputy CEO of Pars Oil and Gas Company (POGC) for logistics, Yahya Rashidi, has said six new platforms would become operational in the South Pars gas field. He said South Pars would have had 39 platforms by the end of the current calendar year next March. He noted that safety was the fundamental of gas production at South Pars, adding that compliance with safety regulations would help stabilize production in the long term. Rashidi said South Pars gas production capacity had grown significantly over the past five years to double. He said such a breakthrough would not be achieved without observing safety obligations in the production process. He said the startup of six platforms last calendar year helped South Pars increase its production capacity by 85 mcm/d, adding that with the installation of new platforms, the production capacity from the developed phases of South Pars would reach 750 mcm/d.

Key Equipment Manufactured for Ilam Gas Refinery

Yousef Ezzati, chief engineer at the Ilam gas refinery, said a supporting reboiler had been developed at the refinery for the demethanizer tower. He said: "In the design and manufacturing of the reboiler of the demethanizer tower, BAHX-powered convertors have been used. Such convertors are manufactured by a limited number of manufacturers in the world." Ezzati said: "Although this technology is upgraded, in case of any damage resulting from the manufacturing, it was impossible to have it repaired inside or outside the country; therefore, the only solution was to replace it. That is why we had to repurchase this equipment after it was damaged." He said the impossibility of repairing reboilers at the demethanizer tower would impact sustainable production at the refinery, adding: "This problem had to be resolved in a way or other."

LNG, Key Option for Revenue Generation

Talin Mansourian, director of investment and business at National Iranian Oil Company (NIOC), said developing the liquefied natural gas (LNG) industry and stepping into the LNG market was necessary for making revenue from gas. "Iran sits atop huge gas reserves. Therefore, development of the LNG industry is a common approach for making revenue from gas reserves. Therefore, presence in this industry is a must," he said. Mansourian said

the framework for setting up an LNG park has been drawn up following several rounds of meeting held at Petroleum Ministry and NIOC. She added: "Now we intend to complete or amend it by receiving the views and suggestions of investors." Mansourian said financing companies could propose their approaches for the purpose of making investment attractive in this project. She highlighted the role of Iran LNG Co. in this project, saying: "Iran LNG has



facilities and installations which would be used for launching the LNG park. This project includes 6 LNG units to produce 500,000 tonnes a year." She said that NIOC is the investor in this project

and Iran LNG would be the beneficiary party. Mansourian said the Petroleum Ministry as the supplier of feedstock would guarantee the quantity and quality of sweet gas for a period

of 15 years. The investor would also produce LNG.

S-LNG Units at Assaluyeh

Ali-Akbar Shabanpour, CEO of Iran LNG, said the company would be responsible for preparing infrastructure for this park. "In this project, 1,910 mcf/d of gas is received from South Pars for the annual production of 10.5 million tonnes of LNG," he said. Shabanpour said 30 ha of land near SP14 was envisaged for building the six S-LNG units. Mohammad Mostafavi, CEO of Iran Oil Industry Investment Company, said the world

was witnessing a rapid gas consumption growth. "Global gas trading is forecast to be done in LNG form in the future. Russia, the United States and Qatar are currently the main players of the LNG market in the world and our country has no place there," he added. Mostafavi said the reason for choosing mini LNG units at this park was the availability of necessary technology in many countries, in addition to its lower costs. He added that six S-LNG unit would provide enough LNG whose export by oceangoing ships would be economical.

Second MOU for Bamdad Exploration Block

The second memorandum of understanding for exploration studies in the Bamdad offshore block along with a non-disclosure agreement has been signed. The MOU was signed between Saleh Hendi, director of exploration at National Iranian Oil Company (NIOC), and Saeed Shad, CEO of Iranian Offshore Engineering and Construction Company (IOEC). Hendi said NIOC and the Petroleum Ministry had undertaken measures to facilitate the presence of domestic companies in exploration. "Owing to their qualified manpower, equipped systems as well as necessary knowhow and technology, Iranian companies can get involved in numerous exploration projects and present an acceptable performance," he added. Hendi said: "In the past, studies on all exploration blocks were carried out by foreign companies, yielding favorable results. Some of those blocks are developed and operational." He said over the past one year, feasibility studies for the Toudaj block had been assigned to the Iranian company Tanco. Hendi said the Bamdad block was the best among a group of 14 envisaged for development by the NIOC Directorate of Exploration. He said the proven oil system in Bamdad showed it was low-risk. He said IOEC was experienced enough for the development of the Bamdad block. "After signing this MOU, we also feel compelled to show our most cooperation as the client in empowering this company," he added.

NIOC, PEDC Eye Cooperation

National Iranian Oil Company (NIOC) and Pasargad Energy Development Company (PEDC) have studied avenues of long-term cooperation in Sepehr and Jofair fields' development. During the first meeting of NIOC-PEDC joint management committee (JMC), Reza Dehqan, deputy CEO of NIOC for development and engineering, said: "The direct investment value of this agreement stands at \$2,427 million for a 20-year period." He added: "The first production target is to reach 21,000 b/d output after 30 months, which would reach 110,000 b/d ceiling. The accumulated production from this field is estimated 500 million barrels." Dehqan said Sepehr and Jofair development agreement was the third IPC contract NIOC signed. "This agreement has been signed with an Iranian company, but the latter can have a foreign partner in the future," he added. Mehdi Mir-Moezzi, CEO of PEDC, said: "We had plans to benefit from a foreign company's presence in this agreement and even talks with two companies had been finalized, but these two companies pulled out due to the US withdrawal from the JCPOA (Iran's nuclear deal). However, we are still determined to benefit from a foreign partner." He said the 20-year period for the agreement was an advantage of the Iran Petroleum Contract model compared with the buyback deals.

Condensate Refinery Euro-5 Gasoil Output at 20ml/d

The Bandar Abbas gas condensate refinery has raised its Euro-5 gasoil production to 20 ml/d, CEO of the refinery Mohammad Ali Dadvar said. He said that the refinery had increased its refining capacity by 90,000 b/d and has reached 450,000 b/d. "Now that the refining capacity of this refinery has reached 450,000 b/d of gas condensate, on average between 17 and 20 ml/d of Euro-5 gasoil and 47 ml/d of Euro-5 gasoline is produced at this refinery," said Dadvar. He said that initially four phases were envisaged for the refinery, adding that the activity forecast for four phases is now distributed between the three existing phases. "Through optimization in the existing three phases, a total of 90,000 b/d has been added to the refining capacity of the refinery and another 90,000 b/d is to be added after receiving authorization for feedstock," he added.

Dadvar said the fourth phase was initially for treating another 120,000 b/d of condensate, the plan was reconsidered and renamed capacity optimization and debottlenecking. "The initial investment for phase 4 was estimated at €980 million, but with debottlenecking at €90 million, about €900 has been practically saved, which could be invested in other sectors," he added.

PGPIC 2nd in ICIS Ranking

Iran's Persian Gulf Petrochemical Industries Company (PGPIC) came second after Germany's Basf in the Independent Chemical Information Service (ICIS) 2018 ranking in terms of investment volume, PGPIC CEO Jafar Rabiei said. He said PGPIC came 9th in the 2017 ranking of ICIS, but it managed to improve its position after one year. Rabiei also said that the latest sanctions imposed on Iran's energy sector were unprecedented. "With the imposition of sanctions, some problems were created in domestic sales and exports of chemicals, but our colleagues managed to reduce the impact of sanctions," he said. Rabiei touched on a 53% increase in PGPIC revenue in 2018 from that of the year before, adding the company recorded a 110% growth in operating profits, 99% growth in investment profits and a 137% net profit in the same period. Describing PGPIC as a "profitable" company, he said it held 12% of Iran's capital market. "The stock market value of six subsidiaries of this holding stands at IRR 1,350 billion," he added. Rabiei said the Lordegan petrochemical plant, Ilam olefin, the first phase of Bid-Boland gas refinery, the first phase of flare gas gathering facilities in southern oil-rich regions and the Urmia potassium sulfate would become operational by March 2020. He added that the startup of the Bid-Boland, Ilam and Lordegan projects would increase PGPIC installed capacity by about 6 million tonnes.

New Oil Find in Khuzestan

Iranian Minister of Petroleum Bijan Zangeneh said that the newly-discovered oilfield in Khuzestan was named Namavaran, adding the field had an oil in place estimate of 53 billion barrels. Addressing reporters on Monday, the official said the new discovery had added 22 billion barrels of crude oil to previous estimates of the field. Zangeneh, who had attended a ceremony to unveil the Atlas of oil and gas discoveries in Iran since the 1979 revolution, said the field was estimated to hold 53 billion barrels of crude oil in

place and there is a possibility of its southward continuation. According to Zangeneh, exploration activities began in 2016 and given that 31 billion barrels were previously discovered, 22 billion barrels were added to previous estimations. Assuming 10% recovery rate in the field, 2.2 billion barrels of crude oil have been added to the country's crude oil production capacity, he said. This is the second largest oilfield discovered in Iran following Asmari Oil Layer in Gachsaran with 54 billion barrels of oil in place. Speaking in the southern



province of Yazd on Sunday, Dr. Rouhani announced discovery of the field for the first time.

"My good news is that the staff of the National Iranian Oil Company in the exploration section, after years of efforts, especially in 2016, have discovered a field," said the Iranian President in an address to the people of Yazd.

He said the field straddled from Bostan to Omidyeh County in Khuzestan measuring nearly 2,400 km and 80 meters in thickness. The field will generate 320 trillion in revenue for Iran with 10 percent recovery rate, he added. Moreover, the Atlas

of Iran's oil and gas fields which were explored after the 1979 Islamic Revolution was unveiled by the National Iranian Oil Company (NIOC)'s exploration department. NIOC Exploration Activities Hot since 1979 Revolution During the ceremony, Seyed Saleh Hendi, director of the NIOC exploration department, said his company had made a new discovery every year since the revolution, with the exception of six years which were contemporary with the Iran-Iraq war. He said the atlas entailed all the oil and gas discoveries in Iran over the past four decades.

Iran Learns from Previous Sanctions

After the United States moved to tighten sanctions against Iran's petrochemical industry last July, experts said those sanctions were merely symbolic. Five months have now passed since the US made that decision, while Iran's petrochemicals sales continue despite the imposition of those sanctions.

Negar Sadeqi

Hossein Alimorad, director of investment at National Petrochemical Company (NPC), told "Iran Petroleum": "We had the experience of previous round of sanctions and we had experimented ways of countering the sanctions."

He added: "Through interaction with investors and our customers we managed to find ways of attracting investment for industrial development. It was tough, but we managed to afford it."

Alimorad said despite US threats, NPC's negotiations were under way, noting that NPC preferred to push ahead with its talks in total silence.

First Round Experience

Iran's Minister of Petroleum Bijan Zangeneh recently said the country was exporting petrochemicals at a satisfactory

pace. He noted that over 95% of petrochemical companies had brought back home the foreign currency achieved from selling products. So, it implies that the US sanctions targeting Iran's petrochemical industry had no impact on petrochemical products exports. Even Jafar Rabiei, CEO of the Persian Gulf Petrochemical Industries Company, said the sanctions against Iran's petrochemical sector had failed.

Alimorad said the most significant

reason for the ineffectiveness of US sanctions against Iran's petrochemical industry was the previous experience of sanctions. He added: "We had the experience of the previous round of sanctions, which helped us find various solutions for countering the sanctions." He said investors and customers were both looking for options to invest in Iran without being affected by the sanctions.

More Anti-Sanctions Options

Alimorad refused to reveal ways of bypassing the sanctions, but said: "The sanctions have had no impact because we tested various ways and they proved to be effective. We are now expanding these options, and we are following them."

NPC has announced that it would continue making efforts towards the second and third jumps in the petrochemical sector. Iran hopes to bring its petrochemical production volume to 150 million

tonnes a year in the third jump. The country would need to invest \$17 billion for the second jump and \$23 billion for the third jump. Asked if foreign investment would be needed for the second and third jumps to materialize its goals, Alimorad said: "In the second jump, we have made necessary projections for financing the projects. We have presented a suitable mechanism to the Petroleum Ministry, which would empower us to use foreign financing."

Challenging but Not Worrying

Alimorad said there was nothing to worry about with regard to financing mechanisms. He said: "We have nothing to worry about with regard to financing the second jump. In fact, in light of government's support and coordination with the Central Bank, Ministry of Economy and Finance and Petroleum Ministry, we can provide the necessary financing." He; however, said: "We may face challenges in attracting foreign investment for the third jump in the petrochemical

sector, in light of the current circumstances." He added: "As you know our negotiations with famous European petrochemical companies have been affected by the sanctions, but in order to acquire necessary technology for the third jump, there are other options. Backed by Petroleum Ministry and NPC, our investors are working on these options in order to gauge their feasibility so that we would provide financing for the third jump and achieve necessary technology."

No Halt in Talks

Alimorad said NPC's negotiations with foreign investors were under way. He added: "You need to take into account that our previous talks with foreign investors were continuing without any halt."

He said: "We will also try to pursue our negotiations so as to cause no problem to foreign investor and company."

Alimorad said sanctions were haunting Iran's petroleum industry and the US was making every effort to block attraction of foreign investment for this industry. "Therefore, it seems that Iran would face a big challenge in this sector and fail to achieve its objectives," he added.

Alimorad said despite all sanctions faced with by the petrochemical industry, this sector remains attractive to

foreign investors.

He added: "Our ability to attract foreign investment under conditions of sanctions depends on investors. But we will continue our activity under the conditions of sanctions and direct and unilateral pressure from the US." Alimorad said foreign investors' interest in Iran's petrochemical industry resulted from Iran's advantages in this sector.

He added: "Our market is not limited to Iran's 80-million-strong population. We have 13 neighboring countries, i.e. a 400-million-strong market. Another issue is permanent, reliable and stable access to feedstock in Iran, which would encourage investment in the petrochemical industry." Alimorad said: "As the previous sanctions strengthened our position in the industry and we managed to develop good interactions with neighboring countries, we will leave behind the sanctions, too." He said that NPC had drawn up six development plans, the last of which would be based on economic resilience and using homegrown technical savvy. "That is why I suggest that foreign companies willing to invest in Iran reconsider the domestic technical knowhow," he said. Alimorad added: "In case foreign investors prove their real intention and their technical capability, the Petroleum Ministry and NPC will cooperate with them."

Iran Petchem to See Two Output Jumps

Some may say petrochemical production would mean making money. But it may be expressed by those who live in a country rich in hydrocarbon reserves. Petrochemical production is by nature a value-generating industry. Throughout energy production, it generates value via specific and complicated procedures. Sitting atop huge oil and gas reserves, Iran is among nations that has switched to the development of the petrochemical industry and benefited from its advantages very soon. Iran's petrochemical revenue currently stands at \$17 billion, which is expected to make two significant jumps in 2021 and 2025. That would mean an enhanced role for the petrochemical sector in Iran's macro-economy. Iran's Petroleum Minister Bijan Zangeneh has said the petrochemical sector is among few industries to have not been much affected by US sanctions. Rather, this industry has spared Iran's economy harms from big crises amid sanctions.

Farzin Savadkoobi

Petchem Output at 150mt/y

Zangeneh told "Iran Petroleum" reporter: "After the second jump, we are now about to make a third jump in the petrochemical industry, under which we will bring Iran's petrochemical production capacity to 150 million tones a year." He said that Iran's petrochemical production was valued at \$1 billion in 1997. "With NIOC's cooperation, we managed to start major projects, some of which became operational by 2005. The rest also came online and our revenue reached \$15 billion to \$16 billion." The minister said efforts were made for finishing incomplete projects, which are mainly focused on plastic and olefin with feedstock having a major part. He added: "In 2013, the ethane production stood at 4.2 million tons in 2013. It reached 7.3 million tons in 2018 and 16 million tons in 2021." Zangeneh said petrochemical production would reach \$25 billion after the third jump, adding: "By 2021, in the run-up to the second jump in the petrochemical industry, about 27 new projects would become operational, while we are still under sanctions." He said: "We have a number of considerations now, including feedstock and

product diversity. Until recently we intended to make maximum use of our ethane production. That is why we designed numerous plants for methanol and urea fertilizer production in order to use liquid feedstock combined with gas in order to reach our required propylene and diversify the value chain of this industry in the downstream sector."

Quality Products

Behzad Mohammadi, CEO of National Petrochemical Company (NPC), told "Iran Petroleum" \$17 billion was envisaged to be invested in the second jump and \$23 billion in the third jump. Asked what horizon would be envisaged for downstream industries in the second and third jumps and how diverse the products would be, he said: "That is not possible overnight and we undoubtedly need comprehensive planning. What we would achieve in 2021 would be increased production capacity and we can work more effectively on quality in the third jump. Therefore, we would not be able to fully realize quality standards in our 27 projects; however, we are looking for the development of a new method of thinking in order to move towards quality production." In response to a question on whether

or not the ethane produced throughout this process would reach maximum, he said: "As far as excess methane is concerned we would think about combined feedstock and move towards polymers and aromatics." He added olefin projects have faced high demand for ethane. He said: "Moreover, they have to move towards combined feedstock. In addition to ethylene and polyethylene, we need to embrace propane and aromatic production." Mohammadi said in addition to ethane, gas condensate, propane and butane would be also given to applicants.

Ethane Surplus

Mohammadi said implementation of the Kangan and Parsian petrorefineries, in addition to South Pars projects, would strike a balance in the ethane consumption by 2023. He said that from 2019 to 2023, the country would see "golden excess". He said from that time onward, Iran would have no ethane surplus. "Of course, up to that time this excess production would reach 5 million tones. However, we have made plans to develop the petrochemical industry smartly based on our feedstock," he said. Regarding feedstock supply for this excess ethane production, Mohammadi said: "There is nothing to worry about, because we hold an extensive look at the supply of feedstock and we have six projects to feed the petrochemical industry, three of which is related to NGL 3100 in the Dehloran area, NGL 3200 in West Karoun and NGL Kharg. Upstream NGL projects in the Bidboland gas refinery are under way." He said that commissioning of these six projects would bring feedstock supply capacity to 15 million tons, while the petrochemical industry feedstock would increase from the current 650,000 barrels to 1.35 million barrels by 2025. Therefore, with the horizon unfolding in Iran's petrochemical industry, this economic activity in Iran can soon meet the expectations of domestic and foreign investors. Relying on the homegrown knowledge in this sector and owing to experience

gained over previous years, Iran's petrochemical industry has not been much affected by sanctions. Furthermore, the accelerated profitability of this sector would provide investors with a good chance. Abundant manpower and low-cost feedstock for petrochemical projects in Iran, when compared with neighboring states, would allay the concerns of actors of this sector. Furthermore, the prevailing security and access to petrochemical tools would make investment in the petrochemical sector more and more economical.

Diverse Downstream Products

Ali Mohammad Bosaqzadeh, director of NPC projects, told "Iran Petroleum" the ground had been paved for further diversification of petrochemical products in the downstream sector. He said over recent years, polymer and compounding manufacturing companies had made significant progress, which facilitated diversity in petrochemical production. The official touched on the potential of Iranian companies, saying: "Given the capability of domestic companies, the government is expected to provide more support for domestic manufacturers, while imports of products whose similar prototypes exist in Iran should be kept in check." According to regulations, state support should be limited to the removal of obstacles to business. The government is barred from direct involvement in this market, paving the way for the private sector to operate based on free interactions. Downstream petrochemical industrialists are currently pushing ahead with their production with minimum concern, and no crisis could stop this industry. It would be no exaggeration to say that Iran is currently a haven for the petrochemical industry. In case some regulations and semi-bureaucratic obstacles remaining from previous years are modified, Iran's petrochemical industry would become an influential sector with significant role in Iran's economic growth and profitability.

Zangeneh: Iran Has Own Tools to Foil Sanctions

Iran's Minister of Petroleum Bijan Zangeneh told the opening ceremony of the 5th annual "Iran Petroleum and Energy Club" (IPEC) Congress that the country would use its own initiatives to overpower US sanctions. He said: "Although sanctions deal the biggest blows at the petroleum industry and downgrade our global standing, we will resist and use our own initiatives under such tough conditions." Zangeneh said Iran's oil sector was being dealt "deadly blows" from time to time.

"So far we have survived these blows and resolved the problem," he added.

The minister said: "We have learnt to live and work under tough conditions and that is why we have survived. We have learnt to resist under tough conditions and not let a bunch [of nations] encroach upon the rights of the Iranian nation and exert pressure upon us." Zangeneh highlighted high revenue from oil sales, saying: "The price of the smallest oil cargo is \$50 million and the Petroleum Ministry could not trust just any buyer. Therefore, we have to be careful with selling oil cargoes."

He said that conditions were conducive to exporting refined petroleum products like gasoil, gasoline, fuel oil and even gas condensate.

Private Sector in Oil Contracts

Zangeneh, an advocate of the private sector, said private contractors would be instrumental in oil projects.

He said that EPC contractors were being granted dominant role in the petroleum industry. He added that the petroleum

industry would not be interested in small-sized projects. Zangeneh said oil preservation operations were mainly a job assigned to several contractors to work together. "But now, a single contractor handles the entire job from beginning to end, and payments depend on production rate," he said. Zangeneh also said that the systems needed in the petroleum industry like skid-mounted production and desalination units or pressure compressors should be built in Iran. Touching on direct investment in the petroleum industry, more precisely in the petrochemical, refining, gas liquefaction as well as the downstream oil, gas and petrochemical chain, he said: "There is sufficient group and valuable feedstock in which we can invest with a view to completing the value chain and avoiding raw materials sales as much as possible." Zangeneh also referred to Exploration and Production (E&P) companies, saying: "The Petroleum Ministry has named 15 to 16 companies as qualified ones for exploration and production work. These companies can play a decisive

role in the prospective business of the petroleum industry. Even under the present conditions of sanctions, these companies can have good activity."

Geopolitical Changes

Zangeneh went on to underscore changes in the oil geopolitics, saying: "Over the past ten years, nobody forecast the US to become the largest producer of oil in the world. The US was the largest importer of oil, but now it is the largest oil producer. Moreover, it has started exporting oil, gas and condensate." The minister said there was significant potential in the Persian Gulf states and traditional producers for development and dynamism. He added that oil could still be the driver of Iran's economy.

Zangeneh also referred to the petroleum industry outlook, adopted in 2004, as well as the country's 20-year Vision. He said: "The macro objectives of that vision were realistic and accessible. All aspects of oil had been envisaged in it. Now we can update it in order to make the objectives materialize."



Large-Scale Financing

Zangeneh touched on the big dimensions of the petroleum industry, saying: "The presence of the private sector depends on the three factors of 'capability and suitable management structure', 'technology and interaction potential', and 'sufficient capital and capability for providing financing through monetary and capital markets.'" He said large-scale financing was a major requirement for the private sector to get involved in upstream oil projects, as well as in oil trading. "So far, everyone has been after the National Development Fund of Iran (NDFI). It's no longer possible. We have to find options for financing," he said.

Zangeneh said he was aware of the challenges contractors are faced with. He added: "However, we cannot merely rely on the government for financing. The Petroleum Ministry would help contractors only if they also have their own equity."

Iran, Gasoline Exporter

The minister touched on quantitative and qualitative achievements of the refining

industry, saying: "For the first time this year, we have become an exporter of gasoline, thanks to increased gasoline production." He added: "Euro-4 gasoline and sulfur-free gasoil is being distributed in mega cities. Furthermore, the whole excess refined products are exported." Zangeneh said completing the Siraf condensate refineries with a capacity of treating 360,000 b/d of condensate was a priority. He said: "This project is a chain of refineries and petrorefineries. Under the Siraf project, we must set up petrochemical units because the main product of the Siraf refineries is naphtha."

Total, CNPCI Friendly Exit

Zangeneh referred to Phase 11 of development of the giant offshore South Pars gas field, saying: "We wanted to implement the project with the French company Total because of the need for using offshore pressure compression technology, but unfortunately, due to the re-imposition of sanctions, both Total and China's CNPCI quit. All this was friendly. We had no dispute with each other. Due to the sanctions, they

could not and they were not willing to stay with us. They said they could not work and they quit."

The minister said: "The offshore sector of the 27 phases of South Pars would come on stream by March 2020 and the refinery of SP14 would be completed by 2021."

Supporting Startups

Zangeneh said IPEC members, who initially came together to share their experience, were good consultants for accelerators, startups and knowledge-based companies.

"We need to put this issue on the agenda, and benefit from the capabilities of IPEC and its members," he said.

Zangeneh has tasked the Office of Deputy Minister of Petroleum for Engineering Affairs with pursuing the issue of startups for oil activities. The minister has even visited accelerators and startups in the past one month and has allotted land to such companies. Addressing the IPEC Congress, he said the Petroleum Ministry would continue to support startups.

Other topics highlighted by Zangeneh in his opening speech were as follows: the 2nd and 3rd jumps in the petrochemical industry and an increase in the petrochemical production capacity to 150 million tonnes a year, negotiations with domestic and foreign companies for Iran Petroleum Contract (IPC)-based projects, signing agreements with Iranian contractors for enhancing oil and gas production, implementing associated gas gathering projects, finalizing the case of jointly owned oil and gas fields, signing agreement for the development of the Farzad-A field in coming months, development of West Karoun fields and expansion of national gas distribution network.

Renewables Set to Replace Fossil Energies

On the first day of the 5th annual congress of "Iran Petroleum and Energy Club" (IPEC), keynote speakers expounded on the fact that fossil energies were being replaced by renewable energies. Forecasts show that global demand for oil would be on the decline up to 2040, while more gas and other renewable energies would be consumed. Therefore, oil companies are changing their policy to shift towards a greener future. The following are excerpts from keynote speakers at the conference:



Norway Ambassador:
No Oil Policy

Like Iran, Norway owes its development to oil. The exploration of oil completely changed Norway's conditions. We moved from a poor

European country to one of the richest in the continent. However, we have adopted a cautious oil policy. Oil reserves belong to the entire people and we decided in 1990 to establish a reserve fund, where oil revenues would be accumulated rather than being injected into national budget. That is how we have invested our oil revenue all across the globe in order to prevent any increase in the inflation rate. Our oil policy is to have no policy. Everything must be based on trade benefits. We should ignore political considerations in oil supply. In that case, we would be able to be an exporter. We are currently supplying 25% of Europe's gas needs. Diversity in suppliers is a key point for European Union member states. Over recent years, we have seen how energy suppliers have declined their oil and gas flow for political motivations to use their level of power against customers. We have also invested in renewable energies. Norway's oil and gas companies have to adapt themselves with a greener future. That is based on such policy that Norway's Statoil has been renamed Equinor, and shifted its investment from fossil energy to renewable energy. We are so lucky that oil and gas was discovered in our country and we are moving ahead by relying on this wealth.



GECF Former Secretary General, Mohammad Hossein Adeli:
Geopolitical Changes and Renewables

Until 2000, gas was mainly used for domestic purposes. Even today, 68% of Iran's gas production is used domestically. But this domestic product

has become instrumental as a strategically important international commodity. In other words, in the second half of the 20th century, the role of oil as a strategic commodity has been overshadowed, while gas is taking up added significance. The gas market structure, which was based on pipeline, has totally changed. Gas has become the topic of international rivalry and tension between top gas producers and consumers like Russia, China and the US. Data released by international economic institutes show that the global economic growth rate was down in 2019, but it will be up in 2020. However, such growth will not materialize due to the US-China trade war, the European Union and the Brexit issue, US sanctions against other nations and increased geopolitical risks. Nations and companies are exposed to unforeseeable risk conditions. In case the US-China trade war stops, we will witness economic growth in 2020. Policy changes vis-à-vis gas production and consumption, shutdown of coal-fired power plants in some European nations in coming years, climate conditions and low gas prices among other factors have caused the global demand for gas to grow. That is why the gas structure saw a 5% growth in 2018 from the average 2.5% growth rate recorded for the 2000-2017 period. Of course, over recent years, gas production has increased significantly due to increased gas production in the US, Russia and Australia. In 2018, the LNG market grew 10% with Asia and Europe ranking the first and the second, respectively. The European and Asian markets have become a place for US-Russia rivalry in LNG exports. That is why from October 2018 onward, gas prices have been in free fall due to the US-Russia rivalry.



OIEC CEO, Gholam-Reza Manouchehri:
21st Century, Age of Renewables

The world is about to experience major changes in the energy sector. All this has occurred over the past ten years. If we can identify these changes we would be able to regain our status for maximizing national interests in the energy sector. Of

course, such factors as price fluctuations, environmental concerns, and obligation of nations to reduce CO2 emissions, the Middle East crisis and regional hostilities, as well as the US-China trade war have impacted global energy developments and made forecasts difficult. Focusing on climate change has reduced oil and coal consumption, leading to increased gas use. Demand for renewable energies and electric vehicles has increased. Electrification of transport industry, which had a 19% share up to 2005, is now enjoying a 29% share. Guarded forecasts indicate the increased share of investment in the electricity generation sector and renewables. That is much higher than investment made in the upstream oil and gas sector. Therefore, we see that the geopolitical and energy map of the world is changing. Over the past decade, the costs of producing solar and wind have been significantly cut, and they are less expensive than hydrocarbon production. If we name the 19th century as the century of coal and the beginning of industrial period, and the 20th century as the century of oil and the start of geopolitical developments, the 2nd half of the 20th century and the 21st century would be the period of renewable energies, geopolitical changes and shift in the balance of power. According to forecasts, by 2040, oil and coal consumption will keep falling while gas consumption mainly LNG, as well as the consumption of renewables will keep rising. Gas and renewables will have a 20% share in the global energy mix by 2040. By 2035, demand for oil will decline in the transport sector, but it will maintain its position in the petrochemical and industrial sectors.



NIGC CEO, Hassan Montazer Torbati:
Gas Regulatory Body Draft Suggested

The presence of private sector and the significant position of regulatory bodies in the process of revision of gas industry structure is important

and effective. The gas industry, as a networking sector, enjoys special features. The long time spent on manufacturing and the high level of private investment, the long time spent on return, the limited number of suppliers and the necessity of coordination among various sectors of the value chain are among them. The vertical integrated model, individual purchaser model with regional distributors, rivalry in production and retail sales with regional distributors, production and retail with regional transmitters and distributors are among the gas industry business models. Meantime, I would like to stress the significant role of regulatory bodies in the process of structural revision. To that end, commercialization, regulation, competition, liberalization and privatization are the most important steps. Protecting consumers and investors are among key regulatory tasks. We (NIGC) have studied the activities of various regulators in the world and achieved interesting results. For instance, the regulatory agency in the US is the Federal Energy Commission whose spending is secured through annual payments by affiliated industries. In Iran, this task partly rests with the Council of Competition. The government is obligated to take necessary legal action for the establishment of the aforesaid body within three months from the receipt of the Council's proposal. The financial resources are provided through relations created between components which are affiliated with no organ.

Can Iran Reach 8mb/d Oil Output?



Iran is currently under US oil sanctions. Some OPEC and even non-OPEC oil producers are determined to take Iran's share of the oil market. Is it possible for Iran to bring its oil output to 8 mb/d? Is the ground prepared for such production levels?

A panel at the 5th annual Iran Petroleum and Energy Club (IPEC) Congress was focused on the issue of "8 mb/d oil output: a must, dream or reality?"

Oil Peak Uncertainty

Reza Dehqan, deputy minister of petroleum for engineering and development, said the 8mb/d figure was just symbolic in order to let discussions start.

He said uncertainty revolved around future oil peaks, adding: "Numerous statistical data is available in this regard and some forecasts show that an oil peak will materialize between 2030 and 2050." Dehqan said oil peak was once determined based on the countries' oil production capacity, adding: "Today, the criterion for oil peak is demand for oil. In light of developments transpiring the world in recent years and climate change, global demand for oil has declined."

Enhanced energy efficiency lower petrochemical output of plastic materials, replacement of fossil fuels with solar and wind energy and electrification of cars constitute the most important factors that have lowered global demand for oil, said Dehqan.

Touching on the decline in renewable energy production costs, he said: "Statistical data shows that production costs for once-expensive solar energy have declined somewhat. Estimates also show that by 2040, electric cars would constitute half of light vehicle sales."

Oil Off the Line?

Based on figures provided by Dehqan at the panel, there was speculation about a halt in oil supply in coming years, in which case oil producers would no longer be able to generate wealth from their fossil energies. Dehqan dismissed such speculation, saying: "I don't say that oil supply is forecast to stop, but its supply rate will decline. Therefore, many international companies involved in the petroleum industry have already embarked on their serious move towards renewable energies and it seems that by 2050, the world will see a shift in demand from fossil energies, particularly oil, to renewable energies because there is nothing to worry about in terms of limited supply of renewables." Ali Akbar Vahidi Al-Aqa, who currently chairs an energy consulting firm, said international companies' shift to renewable energies indicated the commercial nature of these companies. He said: "They take into consideration their maximum profits. Therefore,

a decline in the oil share of the energy mix does not mean any reduction in oil demand in coming years."

8mb/d Output, a Dream?

Dehqan said: "Given the conditions prevailing in global markets now, would it be realistic to move towards 8mb/d oil output. If the answer is positive, is it achievable?"

Ali Kardor, former CEO of National Iranian Oil Company (NIOC), said an 8mb/d oil output seemed unrealistic under the current status of Iran's petroleum industry. "However, given Iran's oil production capacity, this figure would not be an unrealizable dream," he said. Saleh Hendi, director of exploration at NIOC, said in order to estimate Iran's achievable oil production capacity, depending on the number of reservoirs, economic policymaking and other items; a variety of targets may be considered. "However, what is certain is that maximizing the oil production would be a must, and moving towards such objective must become possible," he said. Mahmoud Mohaddes, director of exploration and production at Dana Energy, said speaking about such output levels would require a realistic analysis of oil. He said: "I personally favor increased production, but the 8mb/d figure has not been studied.

State-Oil Financial Relations

Financial relations between the state and the oil sector have long been discussed. Oil experts and officials lay emphasis on the necessity of amending these relations; however, there are butts and ifs due to the Iranian economy's intertwinement with oil and the budget's dependence on oil. One of the panels held during the 5th annual congress of "Iran Petroleum and Energy Club" (IPEC) was focused on this issue.

Profit-Based Relation

Mohammad-Reza Kasiri, director of oil and gas governance plan at the Governance Think-Tank of Sharif University of Technology, said the financial relationship between the government and National Iranian Oil Company (NIOC) was a conceptual design comprised of four dimensions.

He said: "The regime of financial contract between the government and NIOC, NIOC's financial management and governance, the transparency and accountability of the financial regime and the legal framework of this financial relationship constitute the four dimensions." Kasiri said one of the major problems currently faced with by NIOC was the government's interference with industrial affairs through a complicated mechanism. He added that a more transparent mechanism would facilitate NIOC's task. "Non-attractiveness of the current



financial relationship for the investor, lack of a proper model for monitoring the costs and financial shortcomings are other challenges faced with by NIOC under the current circumstances," he added.

Kasiri said NIOC's share of total oil and gas revenue stood at 14.5%, taking into account development, production, preservation and exploration costs. He added that under the current circumstances, the share must be increased to 26%.

"It means that NIOC lacks sufficient resources for development, and many projects have been restricted due to financial shortcomings," said Kasiri. He said: "If we want to preserve the current trend, NIOC would need at least 26% of oil revenue. Of course, it does not mean that this sum must be the budget of NIOC; rather it is necessary to maintain the current trend."

Kasiri referred to the financial relation between 25 national oil companies (NOCs) and governments across the world, saying they are generally classified under revenue-based and profit-based categories in light of the motivation of NOCs for investment, containing costs and enhancing technology.

"The profit-based model suits Iran better. Based on this model, the NOCs' costs are deducted and the remaining

profit will be divided between the government and the NOC," he said, noting that it was currently difficult for Iran to implement this model. Kasiri said, at present NIOC is following a revenue-based model. "Under this model, the government first takes its own share of production without interfering with the details of costs. Currently 85.5% of [Iran's] oil revenue is given to the National Development Fund of Iran (NDFI) and the government." He said access to sources of financial and income, as well as transparency is requirements for the commercialization of an NOC. "After the adoption of Article 12 of Law on Removing Obstacles to Competitive Production and Upgrading Financial System, the financial burden on NIOC has been partially relieved because NIOC would not support such investment with a 14.5% share," said Kasiri.

National Missions

Mehdi Mir-Moezzi, CEO of Pasargad Energy Development Company, gave his nod to the model suggested by Kasiri.

He said: "Commercial activity is profitable everywhere in the world and it is taxed. That's a principle. That is while we want to forget about these issues and apply our own self-made methods, which would get nowhere."



From Fuel Quality to Business Ecosystem Changes

Environmental challenges and compliance with environmental standards in the petroleum industry were another topic to be discussed at the 5th annual Iran Petroleum and Energy Club (IPEC) Congress. Within a panel on this issue, Ali-Reza Sadeq-Abadi, CEO of National Iranian Oil Refining and Distribution Company (NIORDC), said the fuel produced in Iran was in compliance with standards.

Meantime, the head of Center for Knowledge-Based Companies and Institutes affiliated with the Office of Vice-President for Science and Technology said the criteria for assessing knowledge-based companies had been toughened. He added that the government pays special attention to the development of startups and knowledge-based companies.

Standard Fuel

Experts participating at the panel entitled "Environmental challenges; step forward or backward?" exchanged views on fuel consumption and relevant pollution. In Iran, experts remain divided about the real cause of air pollution

in mega cities. However, in light of global issues and growing anxiety with environmental pollution and life threats, tough laws have been enforced on fossil fuel production. That is why over recent years, activity in the renewable energy sector has been widely welcomed. However, the Petroleum Ministry has over the past five years concentrated on upgrading the quality of refineries in a bid to upgrade the quality of fuel produced and distributed in mega cities.

Another cause of concern that was discussed at the panel was flaring gas. Mohammad-Reza Sediqi, director of incorporate planning at National Iranian Gas Company (NIGC), said in 2014, in Assaluyeh about 3 bcm of associated gas was flared, which has been lashed to 800 mcm now. At the same time, he added, more units are coming online on a daily basis. Sediqi said: "Currently, IRR 200 billion worth of gas is being produced in the country. That amounts to about \$50 billion (4 mb/d) a year. Without such gas, liquid fuel would have to be used."

Sadeq-Abadi said air pollution

did not stem merely from fuel, adding that he had figures to prove his conclusion.

"It is not acceptable for me to claim that the fuel we produce is the main cause of pollution. Currently, the sulfur content of fuel variations produced in the country has been cut significantly. Our fuel meets global standards and has no problem," he said. Sadeq-Abadi said the Bandar Abbas gas condensate refinery was producing about 45 ml/d of Euro-5 gasoline, whose pollutant particles are 0.5 ppm. That is while global standards accept up to 10 ppm, he added.

He said: "We are producing 17 ml/d of clean gasoline at the Arak refinery, 12 ml/d at the Isfahan refinery and 3 ml/d at the Tabriz refinery. We are totally producing 79 ml/d of clean gasoline." Sadeq-Abadi said: "That is while the refining process clears Euro-grade standards. So how can we say sulfur, benzene and aromatics are not removed from this gasoline? Undoubtedly, we have to look for the problem in the substandard combustion systems of cars."

Startup Panel at IPEC 2019

Startup actors attended in large numbers in a panel dedicated to startups and innovation in the petroleum industry at the 5th annual Iran Petroleum and Energy Club (IPEC) congress. The main reason for the strong presence at this panel was the novelty of the issue of startups in the petroleum industry and the special attention paid by Petroleum Ministry to this issue this year. IPEC 2019 was the first event to specifically focus on oil startups. Saeed Mohammadzadeh, deputy minister of petroleum for engineering, research and technology, said Iran needed to boost its knowledge and innovative services under the present circumstances amid complicated market conditions. He said: "67% of our academic work in Iran is related to the petroleum and energy industry, while only 1.2% of investment funds are active in the oil and energy sector." Mohammadzadeh said in modern work, development projects are accelerated by innovation, adding that in Iran's petroleum industry, hiring elites and experts along with application of innovation ecosystem would produce significant results. "Iran possesses a high global ranking in creative outputs, knowhow and technology, development of knowledge, intangible assets, impact of knowledge, public infrastructure, academic education, human capital and research," he added.



Mohammadzadeh said major oil companies had been among top companies over the past 10 years, but they are now being replaced by new companies.

4,600 Knowledge-Based Companies

Mohammad Sahebkar, director of Center for Knowledge-Based Companies and Institutes at the Office of Vice President for Science and Technology, said knowledge-based companies were being assessed based on their technological potential. He said: "So far, 4,600 knowledge-based companies have been confirmed to be active in various sectors of industry and technology. Every two to three years, the criteria for evaluation of these companies become tougher." Sahebkar said necessary conditions had to be provided for a more prominent presence of knowledge-based companies and startups in the oil and energy sector.

New Ideas to Enhance Value-Added

Mohammad Mostafavi, CEO of Oil Industry Investment Company, said startups started up in the United States and Western Europe in the 1990s. "Oil actors changed technologies when they stepped into this field," he said. Mostafavi said new ideals developed by the youth could create high value-added. "Startups do not appear like corporate business, but they are very effective," he added.

Zangeneh Welcomes Innovation

Ali Sadeqi Mojarrad, CEO of Samatech accelerator company, said Petroleum Minister Bijan Zangeneh had recently met with startups and accelerators. He said: "I realized that Mr. Zangeneh was looking for an approach towards development of new ideas and innovation in the petroleum industry." He added: "Furthermore, it has to be taken into consideration that startups and oil elites have long been focusing on some issues which may not be important today, but would become key issues in the oil sector in the future. That can introduce a new approach for the entry of new ideas into the petroleum industry."

Overcoming Challenges

Rashid Qanei, chairman of Aban accelerator company, said startups had gained a new meaning. "Startups are incorporated with a creativity that would overcome many of existing challenges, while creating new business in parallel. Even though they need no big investment, they can generate big revenue," he said. Qanei said the future of startups was bright, adding that biomethods were being used across the globe for oil exploration. "Over recent years, a petrochemical company has relied on startups and developed a new inexpensive product, and made big profits," he added.



Mehdi Mehrabi

Gas Storage, Reliable Support for Energy Security

In fact, we store gas in huge quantities in underground facilities, which are totally different from surface facilities

→ *This strategic industry would be profitable and serve as a reliable support in energy supply and exports. Mahmoud Nemati, director of gas storage projects, speaks about achievements in this sector in an interview with "Iran Petroleum".*

» Where does gas storage stand in the world today?

The United Nations Economic Committee releases an annual report about storage across the globe. Some data is surprising. There are more than 400 storage sites in the US and even its tropical areas. The first gas storage site was built in Canada more than a century ago. The issue of gas storage takes up added significance for European countries which mainly import natural gas. Some nations like Russia rely on their numerous storage sites to supply domestic needs, while gaining revenue from exports.

» When was the issue of storage taken into consideration in Iran?

Up to 2007 the issue of storage was discussed sporadically. But after a cold spell struck in that year, causing accidents in the north, decision-makers realized that sitting atop huge gas reserves could not on its own guarantee national energy security. Since then, the issue of storage with the objective of energy security stability and avoiding possible problems became serious.

» What complications are storage projects faced with in terms of extent and technology?

Generally speaking, storage is an underground operation which is carried out on a large scale. In fact, we store gas in huge quantities in underground facilities, which are totally different from surface facilities. Currently, we are enjoying technological capacities for wells and storage in hydrocarbon reservoirs. But we would need to acquire knowhow

and technology with regard to equipment and storage in aquifers and salt domes. To that effect, we have obligated contractors to hire foreign technologically-capable partners.

» Underground gas storage to ensure energy supply during consumption peak is a major advantage of the storage industry. Could you elaborate on that?

In the winter when household consumption is multiplied, we would need resources in addition to what we have at our disposal in order to meet the consumers' needs during consumption peak. Furthermore, in order to produce oil from the reservoirs with pressure fall-off, we would have to inject gas. Should injection come to a halt in the winter due to the priority of domestic needs, oil recovery will decline. Therefore, storage facilities would be a blessing under such circumstances.

» How can storage support exports?

We have currently gas export deals with neighboring countries. Such agreements take up added significance in the winter. Should we fail to use our stored gas in the winter in response to growing domestic consumption, we will have to cut gas exports, in which case we will be imposed heavy fines. Such losses will even surpass gas export revenue achieved in several years.

» What are the strategic advantages of storage?

As you know, some areas like northeastern Iran



The storage industry is more than century-old. Some countries like the US have over 400 natural gas underground storage facilities. Iran is the world's second largest gas reserves, and has one of the most expanded gas transmission networks. However, it is at the beginning of road with regard to underground natural gas storage. Iran has about 1% of world gas storage capacity.

are located far from production spots. In case Khangiran reservoir, which covers the main needs of consumers in that area, faces any fall-off in the long-term, gas supply to Khorasan and the mega city of Mashhad will be faced with problems. In order to prevent any problem with gas supply, we will have two options: First, we need to build a new pipeline, which would impose exorbitant costs upon us. Second, we can develop storage sites around the cities, in which case we can recover gas in the winter which is stored in the summer. It is noteworthy that sometimes pipes may be damaged due to acts of God and natural disasters like floods or earthquake. Under such conditions we can sit idly and cut gas supply to cities until the problem is resolved. The gas storage sites built around mega cities are of great help during times of crisis. By dipping into these reservoirs we can supply gas to cities for a short period of time as long as damage is repaired.

» In addition to the depleted hydrocarbon reservoirs, what other options are there for underground gas storage?

Our top priority in storage is depleted oil and gas fields. If in some areas, hydrocarbon reserves are not available we will go towards aquifers, i.e. reservoirs which have the properties of reservoirs but they contain water instead of hydrocarbon. In such cases, we deplete the water and store gas instead. The third priority for storage is using underground salt domes. These structures are in fact thick salt layers with big volume. We wash and solve the salt layers and use the created space for storage. In Iran, we are using the three types of hydrocarbon storage tanks, aquifers and salt domes.

» Given the significance of energy supply security for northern and northeastern areas, which areas are envisaged for that purpose?

The Shourijeh gas storage project is over now and the second phase of development of this field will start soon. In that area, there is also the Qezel Tappeh gas field which we have under study. As far as the significance of development of storage fields is concerned, it would be sufficient to say that implementation of these projects would make NIGC independent of new pipes, and would put an end to dependence on gas imports from Turkmenistan.

» Could you update us on gas storage in central Iran?

In fact, except Sarajeh, there is no other field available for this purpose in central Iran. Our studies bear proof to such conclusion. Sarajeh was the first field that came on-stream in Iran. The second phase of this field is under way. Due to the lack of any other hydrocarbon storage facility but Sarajeh, the Kashan salt dome is being developed for storage. The gas storage project in Kashan's Nasrabad (a salt dome) is now in the phase of development with drilling operation under way. The Yurthsha aquifer is also located in central Iran and we have to make decision about it.

» Talking about northwest, could you tell us about fields envisaged for storage in that area?

Primary studies have been conducted on the Bankul and Baba Qir fields, and we are currently in the process of planning for drilling in those fields. Currently, the bulk of feedstock for the Ilam refinery is supplied from Tang-e Bijar, and due to the necessity of gradual fall-off from this field, it is necessary that the Bankul and Baba Qir fields become operational in the shortest possible time to enable us to supply feedstock for the refinery. In the Yasuj area, we have the Mokhtar field under study. It is now in the phase of pre-feasibility study.

» Anything else you would like to add?

Gas storage would create a strategic advantage for the country due to its economic advantages, safety and accessibility. Achieving this important objective would be a must for our country due to the necessity of supplying this clean energy at home. Compared with gas transmission through pipeline, gas storage projects are more cost-effective and they would guarantee the security of energy supply to people and industries. It is noteworthy that the authority for all those fields has been delegated from NIOC to NIGC, and it means that our organization is now stepping into the upstream sector. Some fields are depleted, but some others are still able to produce. They would be used as storage sites after depletion. The 6th Five-Year Economic Development Plan requires us to supply 13% of gas needs from storage sites and we are determined to develop underground facilities all across the country, particularly in cold areas in order to use them when gas flow is cut.



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Latest Iran Gas Storage Projects

Nasrabad salt structure in Kashan, Shourijeh field, Bankul, Baba Qir and Qezel Tappeh are among the most important underground natural gas storage projects in Iran. The following is a review of the latest status of the above projects.

Nasrabad Salt Structure

Ali Teimouri, director of underground natural gas storage projects, said: "Given the exploration activities conducted in Kashan's Nasrabad salt dome, our analyses brought us to a structure which could be worked upon." "Following implementation of geological studies, we went step by step until we were assured about the potential for developing this structure. As the project had been defined in five phases and there was no previous experience of salt reservoir development in the country, we hired an internationally recognized company with good experience in salt structure development," he said. Teimouri said that in the next phase, the drilling of a 2,000-meter-deep well was started in Kashan's Nasrabad salt structure. Coring is currently under way at the depth of 1,400 meters. "By analyzing the chemical and geo-mechanical properties and the purity of salt we can assess whether or not the structure is suitable for natural gas storage.

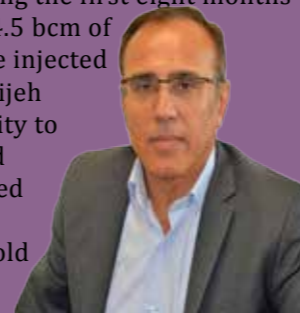
Having finished three phases of this project, we are following up on phases 4 and 5," he said. Teimouri said the findings of the studies currently under way would be announced in coming months, adding they would be decisive for the project. He expressed hope that the Nasrabad structure would have a significant share in the future of gas storage in Iran.



28 Wells Drilled for Shourijeh Development

Mohammad Zaman Jokar, director of natural gas storage development project at Shourijeh site, said: "One of the plans envisaged to make up for gas shortages in the northeast is to develop gas storage in the Shourijeh field." He said that following the positive feedback from the first phase of the Shourijeh gas storage project, the second phase is under way, which would require the drilling of 28 wells and construction of gas gathering, as well as injection and treatment facilities. Jokar said unlike the first phase, which was done through EPC and was handled in upstream by National Iranian Oil Company (NIOC) and in downstream by National Iranian Gas Company (NIGC), in the second phase, full authority has been delegated to NIGC, and the

project will be a BOT one. After the technical assessment of contractors and the conclusion of tender bid, the successful bidder (investor) will agree to supply treatment facilities and gas injection compressors, drill 28 wells, lay out gas gathering and transmission lines and build necessary utilities over three years and bring the project into operation. Based on the tender documents, the investor will have control over the facilities for 20 years, during which the contractor will recover costs. After the startup of the project, during the first eight months of the year, 4.5 bcm of gas would be injected to the Shourijeh storage facility to be recovered and consumed during peak shaving in cold months.



Bankul, Baba Qir Project Due in 2023

Mehdi Yousefi, head of construction and installation for underground storage projects and manager of the Bankul and Baba Qir project, said: "Initial assessment of exploration drilling operations on the Bankul and Baba Qir fields was done in 1973 in order to estimate volume of oil reserves. After one well was spudded in Bankul and two wells in Baba Qir, the wells were declared mothballed due to the gas deposits of the reservoirs." Yousefi said that Natural Gas Storage Company conducted pre-feasibility studies in 2017 and it was decided that an appraisal well be drilled to study the possibility of gas storage in the Bankul field. He added: "Also, an appraisal well should be drilled to assess the possibility of gas and condensate recovery in the Baba Qir field. NIGC approved budget allocation for this operation in March 2019 after follow-up by the Iran Gas Engineering and Development Company." Yousefi said gas storage feasibility studies had begun in the Bankul field, which would be concluded by 2023. And for the Baba Qir field, seismic testing data is being provided and the feasibility study would be over by early 2024.



Qezel Tappeh Storage

Hossein Sheikhzadeh, director of feasibility study for natural gas storage in the Qezel Tappeh field, said: "The concentration of Iranian hydrocarbon reservoirs in the tropic zones of the southern half and the lack of gas storage facilities to support populated and cold areas in the north and northeast of Iran, GSC was prompted to carry out technical and economic assessment and screen structures for natural gas storage with a view to finding a suitable place for gas storage, mainly in the northeast and Gorgan Plain." He said the outcome of these comprehensive studies was identifying and choosing several fields, including Qezel Tappeh and Gonbad Kavous, for underground natural gas storage. According to Sheikhzadeh, the next step would require acquisition of necessary permits and delegating authority to NIGC over this reservoir. He said a plan was adopted to study the

feasibility of storage in this field. The upstream data from the fields was received from the Directorate of Exploration of NIOC and Khazar Exploration and Production Company (KEPCO), and the prefeasibility study was carried out by the University of Tehran. Finally, this field was proposed as the option for underground natural gas storage. Sheikhzadeh said in the first step, one appraisal well was being drilled and completed so that analyzing the output data including geological data, petrophysical logs, cores and well tests would be used for the development of the field. He said that the output from these studies would provide two scenarios to decision-makers. "In the first stage and in case of production potential in the reservoir, planning would be made for production and recovery from Qezel Tappeh. In the event of negative production, the feasibility of storage would be put on the agenda," he said. "What matters in the stage of well drilling and reservoir assessment is the

very special conditions of the appraisal well. We are faced with complicated conditions in this project, including depth, high temperature and pressure. Drilling here is totally different from drilling in other wells, and input data shortages and insufficient knowledge add to the drilling and prospective development problems." In terms of logistics and operation, displacing drilling rigs and equipment from north to south and the difficulty of services, as well as concerns over the supply of commodities and equipment would add to complications, he said. He added: "We will try to overcome these obstacles by using facilities available and requesting commodities from other oil companies. Special technological complexities and the depth of engineering, knowhow and commodity supply issues in this project become more serious in light of uncertainties and the changing behavior of the reservoir. In order to resolve this problem, we have forced contractors to

hire foreign consultants so that the project would come online at high quality, optimal cost and on schedule." Sheikhzadeh said: "We are hiring a qualified consulting company with experience in oil exploration and extraction."

He said: "We should not forget that Gorgan Plain where the Qezel Tappeh field is located is an exploration-extraction objective for NIOC. Project data could be of great help for both the NIOC Directorate of Exploration and KEPCO that are looking for hydrocarbon exploration potential in the north."



Bangestan, Strategic Oil Reservoir

Iran hopes to exceed 5 mb/d oil production under its 20-Year Vision Plan. To that end, it hopes to invest in enhanced recovery from the fields that have long been operational. Most of Iranian oil fields whose output is over 300,000 b/d are in the second half of their life. That is while less than 30% of their oil reserves has been extracted and they would need modern technologies in order to increase their production. An interesting point to know is that through utilizing these technologies it would be possible to raise the enhanced recovery from oil fields to more than 80%.

One of the fields Iran can count on for enhancing its production in the long-term is the Mansouri oil field and more specifically its Bangestan oil reservoir.

The Bangestan reservoir was offered for foreign investment during a conference held in Tehran a couple of years ago on introducing opportunities for investment in Iran's oil and gas sector.

Over recent years, the project for production from

the Mansouri oil field was studied at the Committee of Consultants in the Directorate of Reservoirs at National Iranian Oil Company (NIOC).

According to the Corporate Planning Directorate of NIOC, the scenarios envisaged for recovery from this field include natural depletion, gas and water injection to study various parameters including output flow and downhole pressure. This field enjoys good potential for prospective production and development. Studying the Bangestan reservoir of the Mansouri field requires more research activities in the future. Such activities have already started. Some of them pertain to artificial lifting, hydraulic fracturing and enhanced recovery methods.

Over recent years, Iran's petroleum industry, particularly National Iranian South Oil Company (NISOC) has been trying to enhance crude oil production and processing in the Mansouri field from 60,000 b/d to 100,000 b/d. The project has had 97.5% progress.

The only remaining part of the

first phase of development of the Mansouri field pertains to the completion of a production and desalination plant with a capacity of 75,000 b/d. Another objective sought in this development project is to increase oil recovery to 150,000 b/d. The high recovery rate has created a special status for the Mansouri field and added to its significance. The latest estimates indicate that the average rate of recovery from oil fields in Iran is about 28%. That is while the rate of recovery from the Asmari reservoir of the Mansouri field is 47%, indicating the high potential of this oil field.

The Mansouri field is located 60 kilometers south of Ahvaz, 50 kilometers west of Mahshahr Port and 40 kilometers east of the Ab Teimour field.

Discovered in 1963, the field started production in 1973. Oil flow from the Bangestan reservoir of the Mansouri field is currently under way in the area run by Karoun Oil and Gas Production Company (KOGPC).

KOGPC is the largest subsidiary of NISOC with an output of over 1 mb/d.

The Bangestan reservoir of the Mansouri field has a production unit with a nominal

capacity of 75,000 b/d, a desalination unit with a rated capacity of 35,000 b/d and a gas compressor station with the installed capacity of 30 mcf/d. The reservoir is estimated to hold 15 billion barrels of oil in place. So far, a total of 347 million barrels of oil has been extracted from the Bangestan reservoir and there is potential for enhanced recovery by up to 79,000 b/d.

Official data shows the average recovery rate of oil in Iran is 24% now. This figure is 48-65% in other countries. Of course, Iranian Petroleum Ministry officials say the rate of recovery for Iranian oil fields varies from 7% to 35%. NISOC-run oil

fields are not producing oil at maximum efficient rate (MER) and the reservoirs are likely to suffer damage. In the 1940s, the average production from Iranian oil fields stood at 18,000 b/d. Today the figure has fallen to 2,000 b/d.

As oil fields get close to the second half of their life, they experience an annual decline of 330,000 to 350,000 b/d of oil in offshore wells. Therefore, in order to realize production objectives in the vision plan, enhanced recovery from old reservoirs like Bangestan should be envisaged.



Changuleh, Iran's Oil Investment Priority

One of the oil fields which Iran shares with neighboring Iraq is Changuleh. This untapped field has won the hearts of foreign companies on many occasions. Three major Russian companies and a Croatian firm offered to develop this field located in western Iran, but due to the US's withdrawal from the 2015 Iran nuclear deal and the ensuing re-imposition of sanctions against the Islamic Republic, development of this field was exposed to changes. Now, Iranian E&P companies have been added to the list of candidates willing to develop this field.

According to the Petroleum Ministry data, Iran has more than 102 oil fields, sharing 28 of them with neighboring states. Jointly-owned onshore

fields are located along the border with Iran, while offshore reservoirs are located in the Persian Gulf and the Sea of Oman. However, the problem with these jointly-owned fields is the conclusion of development operations in neighboring countries and incomplete development operations in Iran's part. Neighboring countries will not wait for Iran to finish development of its own sector before starting recovery. Every day, the reserves in place of jointly-owned reservoirs decline without Iran having made any extraction.

In light of the limited lifecycle

of jointly-owned reservoirs, Iran has reconsidered its development plans to concentrate on development of the jointly-owned fields in order to increase Iran's share of production from the current 7%.

In parallel with the policy of accelerating jointly-owned fields, Iran's Minister of Petroleum Bijan Zangeneh has ordered the transfer of drilling equipment from the independent oil fields to the joint fields, indicating the realizing of industrial objectives.

As far as the Changuleh field

is concerned, until recently it was assumed that in the Anaran block, the only shared field was Azar. Changuleh was long considered as an independent field. Therefore, National Iranian Oil Company (NIOC) decided to remove the priority of the Changuleh field. The results of seismic testing in 2015 by NIOC Directorate of Exploration showed that Changuleh was structurally connected with Iran's Azar field, and Iraq's al-Badra field. That was when development of the Changuleh field was put once more on the agenda.

In July 2016, Changuleh was agreed to be offered for development through Iranian-foreign partnership. Several

European and Asian companies expressed readiness to develop it and offered the findings of their studies to NIOC.

The Reservoir Consultants Committee, citing studies conducted by various companies, has taken action to determine the priority of reservoirs.

Changuleh is set to undergo development through drilling 19 wells. To that end, two development phases are envisaged. The first phase, which would last 36 months, would be carried out with an investment of \$200 million to \$250 million for an output of 15,000 b/d of oil from six wells. This phase would also include a 130-km pipeline to carry 15,000 b/d of oil to Dehloran.

Full development of Changuleh would last 44 months. Under this plan,

13 new wells would be drilled while infrastructure facilities, a production unit and pipelines would be built to add another 35,000 b/d to the field's output. That would bring output from this field to 50,000 b/d.

Changuleh is estimated to hold 1.5 billion barrels of oil in place with an API gravity of 22.

Three wells have so far been spudded in Changuleh. The first one dates from 1974, the second one was drilled in 1997 while the latest one was spudded in 2006.

According to a report from the Oil Engineering and Development Company, early development of the Changuleh field and assessing its hydrocarbon potential would allow for the recovery of 65,000 b/d of crude oil.



OPEC/non-OPEC Likely to Extend Production Cut Deal

Ehsan Jenabi

As OPEC is increasingly requested to further cut crude oil production, new speculation, based on statements by senior officials of OPEC MCs, suggests that OPEC will consider preventive supply cut at its 177th Ministerial Conference due to be held on 5 December 2019 in Vienna. OPEC

Secretary General Mohammed Sanusi Barkindo has recently said the Organization will do whatever necessary to prevent market recession, and OPEC MCs have tendency toward exploring all options. In this regard, newly-appointed Saudi Energy Minister Abdulaziz bin Salman has also said that his task is to examine the surplus in the market. Even Russian President Vladimir Putin, who is OPEC's most important ally, has said he acknowledges the need for further

cooperation of OPEC/non-OPEC. Various issues such as the release of figures and statistics on world economic growth rates in 2019 and 2020, US inventories and oil freight rates caused changes in oil prices. The figures indicate that the oil market is more unpredictable than ever, and will jump in parallel with every uncertainty and speculation.

Recently, we have witnessed signs indicating that OPEC and its allies were agreeing upon continuing to cut production, and because of this oil prices have jumped 1% to reach \$59.5. According to data released by the International Monetary Fund (IMF), the world economy is ending 2019 with declining economic growth rates. This situation emanating from rising regional tensions and trade wars, may affect many countries for a long time. The IMF report, which is indeed an outlook on the future of the world economy in the short term, confirms that at least in the next three months conditions would not improve and demand for oil would not increase. Therefore, it will strengthen the willingness of OPEC and its allies for further cuts.

Despite the decline in oil prices and the increase in the refiners' motivation to continue their production activities, the high rate of oil shipment did not necessarily lead to US oil exports increase. Due to the high rate of oil shipments from the US Gulf to Asia, many buyers prefer to

use their own reserves of oil. And while hopefully waiting for reduction in shipments cost, they just make new orders for the medium term. It is not just confined to the United States that has reduced its oil exports, the other producing countries are on the same boat, as well. Due to this, oil trade trend has been recently so slow.

Even though the index of shipping rates for oil shipments from the Persian Gulf to Far Asia reached \$300,000; oil tankers transportation cost, raising US reserves and the likelihood of further decline in oil production by OPEC were not the only factors affecting oil prices. Over recent months, rising international tensions in the Strait of Hormuz, and increasing insecurity in the Red Sea on one hand, as well as halt in the activities of Casco China with regard to oil transportation, the world's largest shipping company, are among the other factors contributing to oil price volatility. In an unprecedented event, China's economic growth, the world's second-largest economy reached 6 percent in the third quarter of 2019. The figure was 0.2 percent lower than projected and it is the country's lowest seasonally-adjusted growth rate since 1993. It seems that the consequences of a trade war with the United States is emerging more than ever in the Chinese economy, and some economists have warned that the continuation of the current trend could push China's economic growth to below 6%.

In July this year, OPEC and its allies came to an agreement to continue complying with the OPEC Plus reduction deal. According to the deal, which is valid by the end of March 2020,

its signatories collectively cut production by 1.2 mb/d. Oil prices rose to \$62 and 48 cents after OPEC Plus announced the continuation of the deal. Despite the 200% compliance of the signatories of the deal, oil prices ended the week below \$60 in September. This led to some speculation about further cuts in oil production at the upcoming OPEC Conference in Vienna on 5 December. It is speculated that while many experts believe that if signs of continued economic weakness and stagnation emerge in some major countries such as Germany, China, the United Kingdom, and so on, OPEC will cut its oil production by 500,000 barrels to raise the price. "Most of the oil-producing countries are concerned about falling demand and the uncertain future of the economy," said Thomas Weimel, head of the Commerce Department at Total. He continued as saying "In fact, the concern about slowing economic growth and increasing trade conflicts more influence oil prices than sanctions and drone strikes." Although experts believe that slowing economic growth is the most important factor affecting the decline in oil prices in the market, OPEC members are of the opinion that the drop in oil prices is a result of oversupplied market. Saudi Arabia's Minister of Energy Abdul Aziz bin Salman said: "Our task is to review the surplus. We are trying to eliminate the surplus supply to raise prices." Concerns about the future of world economic growth is the most important factor impacting oil prices, especially if demand for energy declines by China - the second largest energy-demanding country in the world declines.

China has recently released a report on its economic growth that raised global concerns. According to the statistics, China's economic growth rate for the 3Q 2019 was much lower than that of the same period last year. The figure, which was 6%, has been unprecedented in the last three decades. This shows that China's share of oil demand will constantly decline, unless China and the US reach a trade agreement. The impacts of the trade war and the rise of skepticism and uncertainty about the future have led many forward-looking analysts to take into consideration oil demand reduction in the 2020 horizon in their analyses, as they believe that due to structural problems such as inflation, inaccurate fiscal and monetary policies, the probability of budget deficit increase in the world's top economies, and rising international and commercial tensions; the conditions will certainly worsen the financial crisis even worse than the one in 2008.

An instance of this claim is that China's economic growth is slower than expected and the US budget deficit is rising. However, there are some analysts who believe that areas of the globe such as Asia Pacific by the time horizon of 2025 are in dire need of oil and products, and thus demand in them are not affected by the trade war. The need for oil in the above-mentioned areas for the next six years is in a way that most probably they would face a serious problem to meet their routine needs. In other words, although all countries are affected by the trade war and therefore the demand for oil has decreased, by 2025 the region along with China will face a deficit of about 6 mb/d."

US Oil Theft

Ehsan Jenabi

Introduction

The present article, while attempting to thoroughly review oil industry conditions in Syria, aims at shading some more light on the US vain attempts to secure its interests, to prevent the decline of its hegemony on one hand, and smuggling Syrian oil amid tensions in Syria, on the other. Moreover, through providing instances, the article seeks to prove that American intervention in the Middle East is mainly driven by oil to a large extent, but in different ways.

Background

Syria, among crude oil producing countries in the Eastern Mediterranean region, is the only country that produces relatively significant amount of crude oil. The countries in this region include Jordan, Lebanon, Zionist Regime, the West Bank, and Gaza. According to the statistics available, Syria produced about

400,000 b/d of crude and other petroleum liquids in 2010. Prior to being invaded by the ISIS, almost all of its oil was exported to Europe. Syria's natural gas was used in reinjection

for enhanced oil recovery and for domestic electricity generation. It can be argued that due to its strategic role in regional security and prospective energy transit routes, Syria is severely eyed by super powers. Regional integration in the energy sector is expected to increase as a result of ongoing plans for the expansion of the regional oil and gas pipeline networks connecting Syria with neighboring countries: Turkey, Iraq, and Iran.

In mid-March 2011, Syria faced problems emanated from ominous plots of the US, and led to unrest in the country.

This was followed by the imposition of sanctions on Syria by the United States and the European Union, and by additional sanctions imposed by the U.S. on Syria's energy sector in August 2011. Having a glance at the history of Syria's oil production and exports figures, it can be noticed that it has had a falling trend since the mid-1990s.

In order to increase its crude oil exports, Syria had to reduce domestic consumption through phasing out subsidies. However, getting involved in war with ISIS in 2011, the Syrian government was forced to prioritize kicking



out the ISIS rather than eliminating subsidies.

Syria's Oil Reserves

According to *The Oil and Gas Journal*, Syria's petroleum reserves stood at 2.5 billion barrels as of 1 January 2011. Majority of its proven oil reserves are mainly located in the eastern part of the Syria near its border with Iraq and along the Euphrates River; however, a number of smaller fields are located in the center of the country. Since peaking at 582,000 b/d in 1996, Syrian crude oil production (including lease condensate) declined to around 387,000 b/d in

2010, but the point is that heavy oil accounts for about 60 percent of Syria's oil production.

The largest and most mature fields are Al-Furat's Omar and the Jbessa fields, which reportedly had production capacities of 100,000 and 200,000 b/d, respectively, in 2010.

Other smaller mature fields, such as Oudeh, Gbeibe, and Tishrine, were under field rehabilitation contracts to China's CNPC and Sinopec, and prior to the unrests in Syria their production capacity was on the rise.

Foreign investment has been vital for improving

production levels. The US sanctions had excluded U.S. companies from participating, and Syria worked with Chinese, Indian, as well as European companies.

Exports

Syria has three Mediterranean oil export/import terminals, all managed by the Syrian Company for Oil Transportation (SCOT). Baniyas (7 berths) and Tartous (2 berths) are larger ports from which Syria's two main export crude oil grades are exported. Latakia handles smaller cargoes.

The terminals are connected to refineries through the domestic pipeline network. Syria's net petroleum exports were estimated to be 109,000 b/d in 2010, down slightly from 117,000 b/d in 2009. Syria exported two crude oil blends, Syrian Light and Souedieh (or Syrian heavy); through its state marketing company Sytrol.

Heavy crude oil accounts for about three-fourths of Syria's oil exports. Souedieh, heavy, very high-sulfur oil, was produced by SPC from Soueidieh and Jebeisseh, two of the country's oldest oil fields. Syrian Light is Syria's only light crude stream, and

is a blend of production from the Royal Dutch Shell-led AFPC venture, and smaller amounts from Total's Deir ez-Zor venture. Syrian crude oil exports went almost entirely to OECD European countries, in particular Germany, Italy, and France, and the Netherlands.

Pipelines

Syria has a developed domestic pipeline system for transporting crude and petroleum products managed by SCOT. Pipelines include the 250,000-b/d, 347-mile Tel Adas-Tartous crude line linking SPC and other fields to the port at Tartous with a connection to the refinery at Homs, and oil products pipelines linking the Homs refinery to Syria's major cities. Two trans-national pipelines across Syria had been built to transport oil from Saudi Arabia and Iraq to terminals on the Mediterranean. The 500,000 b/d Tapline was built during the

1940's to transport Saudi crude oil to an export terminal in Lebanon, but was closed during the 1970's because it had become uneconomical. Proposals have been made to rehabilitate the Tapline, but the pipeline remains closed.

The second pipeline was built during the 1950's to transport oil from Kirkuk in northern Iraq to the Baniyas terminal in Syria and to Tripoli in Lebanon. This approximately 800 kilometer (500 mile) pipeline system had been re-habilitated in 2000, but closed in 2003 during the war in Iraq. Syrian and Iraqi ministers have discussed rehabilitating this

pipeline, as well as building new ones. In June 2011, Syria and Iraq signed yet another MOU to repair the existing 800,000 b/d pipeline system, and to build two new ones, including a 1.5 million b/d pipeline to carry heavy Iraqi crude oil, as well as a 1.25 million b/d pipeline to transport light crude oil from Iraq.

Refining

Syria's total refining capacity was approximately 240,000 b/d as of January 2011, according to *The Oil and Gas Journal*. Syria's two state-owned refineries are located at Baniyas and Homs, which have 133,000 b/d and 107,000 b/d, respectively, of refining capacity. Syria faced shortages of gas oil and diesel, and needs additional domestic refining capacity to meet these needs. However, foreign oil companies have been reluctant to invest to build new refineries in Syria without more support from the government. In December 2010, Venezuela signed an MOU to construct the 140,000 b/d Froklos refinery, a project which had been stalled since an agreement to establish it was signed in March 2008. Chinese officials had also discussed a long-delayed 70,000 b/d refinery project in Deir al-Zor, where construction was supposed to have begun in 2008.

Having access to a brief account of Syria petroleum industry, one can realize how important the strategic position of Syria is. Moreover, the question here is: "Why does U.S. try to maintain its presence in Syria?" Although some



analysts are of the opinion that the threat of "resource wars" over possession of oil reserves is often exaggerated, it seems that oil and its impacts have been constantly a leading cause of war, at least in oil rich regions. Between 25% and 50% of interstate wars, since 1973, were connected to one or more oil-related causal mechanisms. This strategic commodity has had such an undeniable impact on global energy security.

The influence of oil on conflict is not thoroughly understood. Public thought in U.S. debates about the main reason of 1991 and 2003 Iraq wars. Many observers focus excessively on the

question of whether or not the United States was fighting for possession of oil reserves; but they did not seek a broader understanding of how oil shaped the preconditions for war.

Oil fuels international conflict through various distinct mechanisms; for instance conflicts triggered by the prospect of oil-market domination, such as the United States' war with Iraq over Kuwait in 1991, clashes over control of oil transit routes, such as shipping lanes and pipelines. All these mechanisms may contribute to conflict individually or in combination.

U.S. Defense Secretary Mark Esper has recently said that Washington would send

armored vehicles and troops to the Syrian oil fields in order to prevent them from falling into the hands of ISIS militants.

In a statement, Russia's defense ministry said Washington had no mandate under international or U.S. law to increase its military presence in Syria, and said its plan was not motivated by genuine security concerns in the region. "Therefore, Washington's current actions - capturing and maintaining military control over oil fields in eastern Syria where major Syrian oil reserves are located, is international state banditry," it said.

U.S. troops and private security companies in eastern Syria are protecting

oil smugglers who make more than \$30 million a month, the statement said.

Russia, which backs Syrian President Bashar Assad and has helped him turn the tide of a bloody civil war, has long insisted that the U.S. military presence in Syria is illegal.

Conclusion

Presence of superpowers in Syria and other civil war-stricken countries is in line with the competition with Russia to bolster their hegemony in the world and preventing power imbalance. To that effect, the super powers seek pretext to dispatch military troops to regions across the world, where the ground is paved, to maximize their political and financial interests, claiming they are to restore and maintain global peace and tranquility. For instance, The U.S. presence in Syria indicates the centrality of oil and economic interests of U.S.

oil corporations to American intervention in the Third World, e.g. Syria. Recalling President Trump's statements about not being eager anymore to spend money on guaranteeing security of Arab countries in the Persian Gulf, and explicitly asking them to spend petrodollars and pay the U.S. for protecting them while highlighting Iran phobia; one may conclude that the U.S. is smuggling Syrian oil to offset the high expenditure of its military troops' presence in the areas where major Syrian oil reserves are located. Thus, it can be argued that American intervention is thus driven by oil to a large extent, but in different ways.

US Oil Production Growth; Persistence or Halt

Russian Energy Minister Alexander Novak has forecast US oil production growth to come to a halt in coming years. To prove his forecasts, he says ongoing oil prices would contain the pace of production growth in the United States.

Shuaib Bahman

For Novak, despite the fact that the US has been increasing its oil production in recent years, the pace of growth has been on the decline every year. Therefore, Novak maintains that in the near future the world would see a halt in the US oil production growth.

The Russian energy minister's forecasts come at a time the US has been pursuing a new policy in the energy sector since Donald Trump took office.

Trump's insistence on enhanced oil production in his country and focus on exports would not go ahead smoothly without paying attention to shale oil. Therefore, studying the possibility of realization of Novak's forecasts about the US government's energy policy could present

a bright perspective to global markets in the future.

Shale Oil

Over recent years, shale oil was forecast to create a big wave in the global market. However, despite forecasts about shale oil, the US supply of this unconventional hydrocarbon on the global markets has failed to prevent a supply shock.

International Energy Agency (IEA) estimates show that such thing could happen only when all actors start producing shale oil and that shale oil production would not be limited to the US.

For instance, should Canada significantly increase its shale oil production new developments would transpire the oil supply sector. Therefore, the US alone cannot be a game changer in the energy developments.

That is while there are no estimates about any possible jump in the shale oil production. For instance, the US Energy Information Administration (EIA) has estimated shale oil production in this country to hit 2.8 mb/d by 2020 before going on a downward trend to stabilize at 2 mb/d. Although shale oil production in Eagle Ford and Bakken has contributed to the US oil output hike, extracting such oil from other fields is not easy.

US Options

In most estimates about shale oil production, the technological costs of extracting this category of oil stand between \$60 and \$80 a barrel. Therefore, shale oil and gas production in the future will be economically viable just in case oil prices exceed \$100 a barrel.

Since oil prices in global markets have not experienced any significant increase to make shale oil production economical, continuation of ongoing trend about oil prices would dissuade

companies from investing in shale oil projects. Under such circumstances, the US will have two options.

First, US politicians must try to increase oil prices in global markets at any price. The logical result of choosing this option would be either imposing oil sanctions against oil producing nations or triggering chaos in oil producer countries and oil transit lanes. In fact, oil prices would increase on global markets when various oil-rich regions and nations plunge into chaos and challenge. Therefore, the consequence of choosing this option would be the imposition of economic pressure and unilateral sanctions by the US against oil producing nations. This option may also trigger security threats and riots in oil producing nations or oil shipment lanes.

In the second option, US officials will have to make no effort to drive oil prices up, because oil price hike could be directly linked with political equations in the US and even affect presidential and Congress elections. Therefore, factional and political rivalries in the US have always prevented presidents from manipulating

international markets. Normally, in case the Americans take no political measures to increase oil prices, world markets will not experience any such consequence and therefore shale oil extraction could not prove economical enough to survive.

Trump Calamity

President Trump is currently following up on increasing shale oil production; however, he fears that high energy prices in the US particularly in the run-up to the 2020 election would lead to the public dissatisfaction and affect the outcome of the vote.

Having imposed sanctions on major oil producers- Iran and Venezuela- Trump has sought to restrict oil supply in a bid to push prices up slightly. But he is fully aware that in case oil prices increase more than thought, he will be at the receiving end of the consequences and risks losing the presidency for a second term.

The Trump administration may not know that every development could not happen under US management. For instance, creation of tensions in the Persian Gulf, including oil tanker attacks as well as attacks on Saudi Aramco oil facilities were totally beyond the control of the United States.

Therefore, the US is faced with a fundamental problem and it will face challenges in the face of any choice. If the US government is willing to increase shale oil extraction, it will have to manipulate the current prices through political and security measures. Meantime, in case the US government moves towards intentional

manipulation of international energy markets, President Trump and Republicans may face public anger, playing well into the hands of Democrats.

Under such circumstances, Trump will have to make a strategic choice. More shale oil extraction can be of great help to him in the run-up to presidential election rather than public anger over oil price hikes and subsequently gasoline price hikes.

In addition to domestic challenges, shale oil production has never been welcomed by traditional oil producers including US ally, Saudi Arabia. The Saudis have made efforts on many occasions in their talks with major producers like Russia to maintain oil production at price levels to phase out shale oil extraction. Consequently, shale oil production in the US requires a strategic choice and may even lead to revision in the US foreign policy, particularly with regard to a traditional ally like Saudi Arabia.

In light of no significant oil price hike, unwillingness of major oil companies to invest in shale oil, upcoming US presidential election and dissatisfaction of some of Washington's traditional allies; Novak's forecasts about US oil production are likely to come true and the US will fail to push ahead with its accelerated oil production in coming years.

Of course, it does not mean the US oil production has dropped; rather the US oil output would remain at a specific level. It may lead to US self-sufficiency in oil recovery, but will not agree with Trump's hope to make the US a game changer in oil trading.

Majors Detail Offshore Brazil Block Awards

Brazil's 16th bid round concluded with the award of 12 of the 36 offshore blocks offered, according to the National Agency of Petroleum, Natural Gas and Biofuels (ANP). The bid round collected a record R\$8.9 billion (\$2.2 billion) in signature bonuses. In all, 11 companies from nine countries made offers, 10 of which acquired blocks. Petrobras will operate block C-M-477 in the Campos basin, with partner BP Energy (30%). Total will operate block C-M-541 in the Campos basin, with partners Petronas (20%) and Qatar Petroleum (40%). According to ANP, this block had the largest signature bonus ever offered, R\$4,029,302,001 (\$976,897,854.83).

Clontarf Eyes Ghana License Positions

Clontarf Energy is more optimistic about its license offshore Ghana following talks with the country's new NPP government. The administration is pro-development, Clontarf said in a statement, and is reviewing historic petroleum agreements, with a focus on early exploration, discoveries, and output. During 2018 and 2019 the Ghanaian Ministry of Energy and the Ghanaian National Petroleum Commission have considered a re-application by Pan Andean Resources (owned 60% by Clontarf and 30% by another Irish company, Petrel Resources) for the Tano 2A license block acreage in the Tano basin.

Norway Offshore License Round

Thirty-three oil companies submitted applications for Norway's Awards in Predefined Areas (APA) 2019, according to the Norwegian Ministry of Petroleum and Energy. The APA process is staged annually over mature or known areas on the Norwegian continental shelf. It includes large parts of all available exploration acreage. According to the Ministry, this year's response was in line

with applications for the previous APA rounds. Minister Kjell Børge Freiberg said: "Predictable and stable framework-conditions and an active licensing policy are two of the main pillars in the government's petroleum policy. We have continued to expand the APA-area considerably based on professional advice." This year the predefined area was enlarged in both the Norwegian Sea and the Barents Sea.

CNOOC Set to Co-Fund Deepwater Well

FAR has approved Svenska Petroleum Exploration GB's request for a farm-out to CNOOC offshore Guinea-Bissau. Svenska plans to transfer 55.55% of its share of the Sinapa and Esperanca petroleum licenses to CNOOC and retain operatorship with a 23.03% interest. FAR holds the remaining 21.42% in each of the concessions. Under the arrangement, the Chinese major will fund 55.55% of all expenditures incurred under the joint venture participation and joint operating agreements.

Equinor Awarded Permit Offshore Western Australia

Equinor has secured a new exploration permit in the Northern Carnarvon basin offshore Western Australia. The company will operate WA-542-P with a 100% interest. The concession covers 4,815 sq km (1,859 sq mi), 100 km (62 mi) offshore, in water depths ranging from 80-350 m (262-1,148 ft). It is also west of the Santos-operated Dorado oil discovery. Paul McCafferty, Equinor's senior vice president for international offshore exploration, said: "An interesting new liquids play has emerged in this part of Australia's northwest shelf and we are looking forward to assessing the potential in our new permit."

VIEW



VIEW



VIEW



Aramco Delays Planned IPO

Saudi Aramco has delayed the planned launch of its initial public offering in hopes that pending third-quarter results will bolster investor confidence in the world's largest oil firm, two sources familiar with the matter said. Aramco had been expected to announce plans next week to float a 1% to 2% stake on the kingdom's Tadawul market, in what would have been one of the largest ever public offerings, worth upwards of \$20 billion. However, after a Sept. 14 attack on its Abqaiq and Khurais plants temporarily knocked out half its crude output, the world's top exporter wants to reassure investors by first presenting results covering the period, the two sources said, speaking on condition of anonymity as the information is not public. "They want to do all that they can to hit the valuation target. Solid results after the attack will put them in a stronger position," said one of the sources. The



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second source confirmed the offering had been postponed, and there was currently no new date set for the listing. Neither source knew when third quarter results were likely to come out.

In a statement to Reuters, Saudi Aramco said: "The company continues to engage with the shareholders on IPO

readiness activities. The company is ready and timing will depend on market conditions and be at a time of the shareholders' choosing." The news comes after Reuters, citing sources familiar with the IPO, reported on Sept. 24 that the offering was unlikely to happen this year in light of the attacks.

DTE Energy Expands Pipeline Unit

DTE Energy's midstream business said it would buy a natural gas gathering system and pipeline in Louisiana's Haynesville shale formation for \$2.25 billion in cash, expanding the unit's operations to the Gulf coast. DTE Midstream, which currently focuses on the Midwest and Northeast of the United States, will acquire M5 Louisiana Holdings from Momentum Midstream and Indigo Natural Resources, which is the main producer which feeds gas into the network. The deal, which also includes a \$400 million payment upon completion of a 150-mile gathering pipeline, currently under construction and due to enter service in the second half of 2020, will immediately add 15 cents to the company's operating earnings per share in 2020, a company statement said. "The assets are located in a great demand area, the quickly growing Gulf Coast natural gas market, with excellent access to other pipeline systems," DTE Energy CEO Jerry Norcia told



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analysts on a call to discuss the acquisition. DTE Energy's shares closed 1.7% lower. The company said the acquisition would be paid for using an equal split of senior unsecured debt and mandatory convertible bonds. The purchase forms part of DTE Energy's plan to invest between \$4 billion and \$5 billion into its midstream

unit between 2019 and 2023, the statement said. DTE Energy has looked to expand into natural gas pipelines and storage, which provides steady cash flows even during energy price swings, at a time when advanced energy efficiency measures have made the provision of electricity less lucrative.

NEWS



Total: 2mb/d Crude Supply Off Market

Oil markets have lost 2 million barrels per day (bpd) of crude supply this year due to security and political issues but are more concerned about slowing demand, a senior executive at French oil and energy group Total said.

The political issues that led to the lost crude supply include U.S. sanctions on Venezuela and Iran, and disruptions in Saudi Arabia and Libya, Thomas Waymel, Total's president of trading and shipping, said at the International Petroleum and Natural Gas Enterprises Conference in Zhoushan, China. Saudi Arabia's crude supply in September fell by 770,000 bpd to 9.02 million bpd, the lowest since 2011, following attacks on state oil giant Saudi Aramco's facilities on Sept. 14, according to the International Energy Agency.

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NEWS



Germany Awards Onshore Wind Power, Solar Licences

Germany's power network agency said it had awarded licences to build onshore wind turbines with the capacity to produce 204 megawatts (MW), after its Oct. 1 auction, aiming for a possible maximum of 675 MW, was again undersubscribed. The Bundesnetzagentur energy markets regulator also said in its statement that it had awarded 153 MW of solar power capacity out of a tender volume of 648 MW, with nearly all permits going to Bavarian bidders. The authority has warned that a sharp fall in applications for green power projects threatens the country's energy transformation. The economy ministry this month presented a schedule to reverse the lull.

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NEWS



Brazil Awards Power Project Contracts

The Brazilian government awarded contracts for companies to build new power generation installations with combined capacity of 2.98 gigawatts, that will cost about 11.16 billion reais (\$2.71 billion) to be built. According to the power trading chamber CCEE, the new plants, which will need to be operational in six years, will sell energy for an average price of 176 reais per megawatt, a 33% discount over the initial price at the auction. The final result was much above expected. Analysts had projected total awards of around 800 MW at the auction. France's Voltalia, Norway's Statkraft and Brazil's Eneva are among the winning bidders. "We have to celebrate. We managed to achieve an amount of projects almost three times what was expected," said Reive Barros, planning secretary at Brazil's Energy Ministry.

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NEWS



PetroChina to Supply Zhoushan Bunker

A PetroChina unit has won a license to supply marine bunker fuel in Zhoushan on China's east coast, as the city's free trade zone looks to challenge Singapore as a regional shipping fuel hub, according to a company executive and local government official. PetroChina Fuel Oil Co. Ltd, a subsidiary of state oil and gas giant PetroChina, will join half a dozen other domestic independent and state-run firms supplying marine fuel from bonded storage, with the permit coming just months before new global rules on cleaner bunker fuel come into force. Zhoushan, in Zhejiang province, is relying on its proximity to major Chinese ports and support from Beijing to give it an edge over its larger Southeast Asian rival in the multi-billion dollar marine fuel industry.

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Russia Sells Crude at Record Premiums to Asia

Russia, the world's No. 2 oil producer, has become an unintended beneficiary of U.S. sanctions after an embargo on Chinese ships drove up tanker freight rates, spurring record premiums for Russian crude that takes just days to arrive in North Asia. Demand for key Russian oil grades sold in Asia has been strong in the past month after an attack on key oil processing facilities in Saudi Arabia drove up prices for spot crude while Asian refiners are processing more low-sulphur grades to meet shippers' demand for cleaner fuels from 2020. Soaring freight rates in the past two weeks prompted Asian buyers to bid up for cargoes that ship over shorter distances such as oil from Russia. These factors pushed spot premiums for December ESPO Blend crude ESPO-DUB, loading from Russia's Pacific port of Kozmino, to an all-time high of about \$9 a barrel to Dubai quotes in two Surgutneftegaz spot tenders. The spot premium for Russian



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Sokol crude also jumped to a five-year-high of about \$9 a barrel to Dubai quotes as oil major Exxon Mobil Corp sold a December-loading cargo at that level in a spot tender, traders said. Freight rates soared to new highs over the past couple of weeks after nearly 300 oil tankers, or 3% of the global fleet, were

placed off limits as companies fear violating U.S. sanctions against Iran and Venezuela. "Russia's Urals (crude) has been doing fine this year mostly thanks to sanctions against Iran and Venezuela and now ESPO has clearly benefited. U.S. sanctions really do Russian oil grades good," a Western trader said.

NEWS

EU, China, to Coordinate "Green" Investment

The European Union, China, India and several other countries teamed up to coordinate rules and standards for trillions of dollars of private and public "green" investment needed over decades to prevent irreversible climate change. The initiative, called the International Platform on Sustainable Finance (IPSF), also involves Argentina, Chile, Canada, Kenya and Morocco - a group responsible for 44% of the world's GDP and the same amount of carbon dioxide emissions. Its aim is not to raise money,

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but to harmonise rules on what is sustainable, or "green" investment, across the world so that private capital can flow into it more freely. "To deal with climate change Europe can only do so much, because Europe generates only around 9% of emissions," European Commission Vice President Valdis Dombrovskis told Reuters on the sidelines of International Monetary Fund meetings in Washington where the initiative was launched. "While public funding will be vital for the transition, it cannot pay the massive bill alone. We

also have to tap into private capital to raise the trillions needed," he said. "No national budget can pay for that on its own. Nor should it. Countries should link their sustainable financing needs to global financial markets to scale up green investment at the level that the world needs," he said. The European Union's executive arm, the European Commission, in June sought to boost the flow of private money to tackle climate change by publishing guidelines on what qualifies as environmentally friendly investment.

Canada LNG Export Plans Progress

Pieridae Energy moved closer to building a liquefied natural gas (LNG) export terminal on Canada's East Coast after taking ownership of fields from Royal Dutch Shell which will feed gas into the plant, the company said. The Goldboro LNG terminal would be the first on Canada's East Coast and compete with the growing number of plants on the U.S. Gulf Coast, hoping its shorter distance to Europe and further west will help sell its LNG by cutting shipping costs. Pieridae said in a statement it had closed a C\$190 million (\$145 million) acquisition of Shell's gas assets in Alberta's Foothills region, giving it most of the gas needed to supply the first of two plants at the Goldboro terminal. "We will now complete our negotiations with Kellogg Brown & Root Limited for a fixed price contract to construct the Goldboro LNG facility so that we can then proceed to complete the project financing and final equity raise and make a final investment decision (FID)," Pieridae CEO Alfred Sorensen said. The Canadian LNG industry



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has been slower than its U.S. counterpart to take advantage of soaring gas demand around the world and build export plants, in part due to securing feedstock supplies for the terminals. This contrasts to the U.S. Gulf Coast, where there is so much gas being produced thanks to the shale revolution, some producers have had to pay buyers to take it off their hands. This makes it

easier for LNG projects there, which tend to buy gas rather than own gas assets. Five large LNG export terminals operate in the United States including the 25 million tonne a year (mtpa) Sabine Pass, operated by Cheniere Energy. By contrast, there are no operating LNG export facilities in Canada although Shell has begun constructing a massive one on the West Coast.

NEWS

Carlyle Group Quits \$1bn US Oil Export Project

Carlyle Group said it had dropped out as a stakeholder in Lone Star Ports LLC, which proposed a \$1 billion crude oil export terminal near Corpus Christi, Texas. Sean Strawbridge, chief executive of the Port of Corpus Christi, said Carlyle notified the port on Oct. 8 it would no longer proceed with its investment. That left construction company Berry Group as the sole backer. Carlyle said in a statement Berry Group was "now the sole owner of Lone Star," but did not comment

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on why it dropped out of the project, which it said continues to be actively developed. Lone Star in September filed a lawsuit against Carlyle in a Texas state court, alleging the private equity firm breached its contract to jointly pursue the project and asking the court to award it full ownership. The lawsuit also sought unspecified damages. The project was one of at least nine crude oil export terminals proposed for the U.S. Gulf Coast to load U.S. shale oil onto supertankers that carry around 2 million barrels apiece. Carlyle was competing

with projects in the same area proposed by commodities trader Trafigura AG and refiner Phillips 66. "Interest in Harbor Island remains at an all-time high," Strawbridge said. The port will continue dredging in the area to make it more attractive to export crude, he said. Lone Star and Berry did not immediately respond to requests for comment. The U.S. shale boom has prompted a surge in oil exports, which last week hit 3.25 million barrels per day (bpd) and continued to fuel a race to build new export terminals.

Asian Crude and Products Market

Having the news of attacks on Saudi oil facilities and then recovering its oil production to normal level, indeed brings an obvious view to have a downside price trend in October compared to September.

Crude oil price reduced by around \$ 3 per barrel in October, correcting the tensions was occurred after September 14th attacks on Saudi Aramco's oil facilities. This sounds almost simple, but light grades of crude oil which Saudi Aramco claimed to recover the production, is still tight and would be likely the case as we go closer to 2020. 2020 is expected to be challenging as IMO new regulation would be applied. Considering IMO and looking forward, the gap of light and

heavy grades of crude oil is expected to go wider in 2020.

Products Market

On the products side, though natural, situation is misty. As we are going closer to the year 2020, there are still the uncertainties how the market would be shaped on the bottom and middle of the barrel.

The International Maritime Organisation (IMO) has ruled that from 1 January 2020, marine sector emissions in international waters be slashed. The marine sector will have to reduce sulphur emissions by over 80% by switching to lower sulphur fuels. The current maximum fuel oil sulphur limit of 3.5 weight percent (wt%) will fall to 0.5 wt%.

IMO 2020 regulations will see the largest reduction in

the sulphur content of a transportation fuel undertaken at one time. To this end, market players started to be prepared to supply lower sulphur bunker grades or be able to consume the higher sulphur ones. This is not However, as simple as it seems. Singapore, the largest bunkering hub, appears not to be capable of supplying lower sulphur bunker grade in 2020 as it did normally around 45 mmt per year. By the virtue of the fact that Asia will face insufficiency of low sulphur fuel oil, gasoil producers are in comparative advantage to offer more gasoil as bunkering. Asian gasoil producers ready themselves to make IMO compliant bunker fuel.

China is one of the substantial gasoil producers in Asia. It started to make Zhoushan Island equipped and accessible to supply bunkers to the ship-owners, collecting the profits of its comparative advantage.

Taking all above mentioned into account, market is in favor of Middle products and against heavy products.

How about light products? They should be strong as the market is moving to demand more light crude grades aiming to produce less fuel oil and more gasoil. Gasoline and naphtha are now passing their boom days. They are both highly demanded. Strong petrochemical demand on easing steam cracker turnarounds may also added more support to naphtha market. Despite the healthy demand of gasoline and naphtha, Margins have also come under pressure from soaring freight rates that now make it considerably more expensive to fix cargos to Asia.

In spite of all above rational response of market players ahead of IMO 2020, there are mixed feelings on the coming situation.



National Capabilities in Field-Oriented Contracts

One of the major concerns of the petroleum industry in recent years has been the self-reliance of domestic industry in supplying domestic needs. This issue has taken up added significance particularly in the past couple of years and following the US's imposition of sanctions on Iran's oil sector. In line with this objective, many sectors of the petroleum industry have sought to overcome legal and infrastructure obstacles to facilitate the activity of domestic sectors. What has been reported as scientific and research achievements, as well as sales and exports and inauguration of new projects indicate the special attention paid to the issue of prosperity of production in the petroleum industry. Ebrahim Taleqani, director of research and technology at National Iranian Oil Company (NIOC), said: "In the R&D sector, we were looking for indexes and criteria in favor of production prosperity, and we regulated programs to that effect." He added that some of these programs were implemented in 2019, while some others would continue in coming years. "Of course, we have started some cases in recent years that would continue," said Taleqani.

He said that quality improvement, quantity growth, scientific support for production in the petroleum industry,

development of technological infrastructure, logistic and structural support as well as culture-building for production prosperity were among the main topics. "The measures we have taken over years with regard to projects and infrastructure have been in parallel with those objectives," he said. Taleqani added that major issues related to resilient economy, science and technology and energy policy were also on the agenda. As far as improvement in quality is concerned, he said, the operation of apparatuses and equipment as well as application of modern technologies were important. He added: "Nationalization of technology must materialize particularly with regard to optimization, documentation and sharing documents, in which case, we can be hopeful that our commodities would be of high quality. Meantime, quality improvement would be accompanied by market guarantee, which would in turn, result in prosperity in production." Taleqani said "quantity upgrade" was a key element in enhanced recovery from oil fields. He added: "We started technological studies for enhanced recovery in 2017 and the first package of the field-oriented contracts with nine universities is almost over. Besides, mutual confidence has been created between



universities and industries scientifically and technologically and the necessary infrastructure has been created."

Exploration Contracts New Package

Taleqani said five working packages have been envisaged for each field-oriented contract. He expressed hope that the number of these fields, currently 9, would increase this year and more universities would be engaged. He said: "Under the first MOU, 20 fields were envisaged, but we have not reached figure in mind yet. We hope to increase the number of fields."

He added: "Furthermore, the initial shortcomings were removed and the ground is prepared for the development of cooperation between research and industrial centers." Taleqani said five exploration contracts had been signed based on the same exploration technology roadmap. "We hope that the next exploration technologies working packages would be approved and we would be able to engage five more universities that have

become active in this sector by presenting targeted projects," he said. Taleqani stressed that the projects implemented in recent years had to reach the market, adding that was why the Office of Commercialization was established. He added: "If this objective becomes operational, one of our missions, i.e. following up on the application of research achievements or commercialization, would have been accomplished." "In our view, all of domestically manufactured equipment may be commercialized. Regarding the 10 items ordered to domestic manufacturers, upgrading technology and developing technological manufacturing have been emphasized. That could result in prosperity in domestic production," he added. Taleqani said: "Meantime, sanctions could serve as motivation for more trust in domestic companies. Our companies will also try to meet quality standards."

Knowledge-Based Companies

Taleqani said startups and

knowledge-based companies were being widely supported, adding: "Part of this support is primary and we can only provide infrastructure for them."

He added: "The important issue is to provide commercial ground for them so that they would continue their activity independently and conduct financial transactions without having to rely on government support." He said: "In this regard, we need to use international experience and we suggest that these companies import cutting edge technology and try to indigenize it." Taleqani said Department of Research and Technology had envisaged 25 projects under the 6th Five-Year Economic Development Plan. "Furthermore, the second stage of identifying and commercializing widely consumed commodities was on the agenda, and we hope that they would be introduced as a new working item to manufacturers," he said.

Taleqani said: "It might not be more than 10 items, but

new commodities would be introduced and our mission would be to provide a market for manufacturers to equip themselves." He said that over 100 subjects had been introduced to the Ministry of Science, Research and Technology and several professors had already volunteered to conduct studies on the subjects. "At the start of new term, we will witness the presence of professors at the petroleum industry to discuss the envisaged issues. That could be a turning point for communications between scientific and research centers to get closer together," he said.

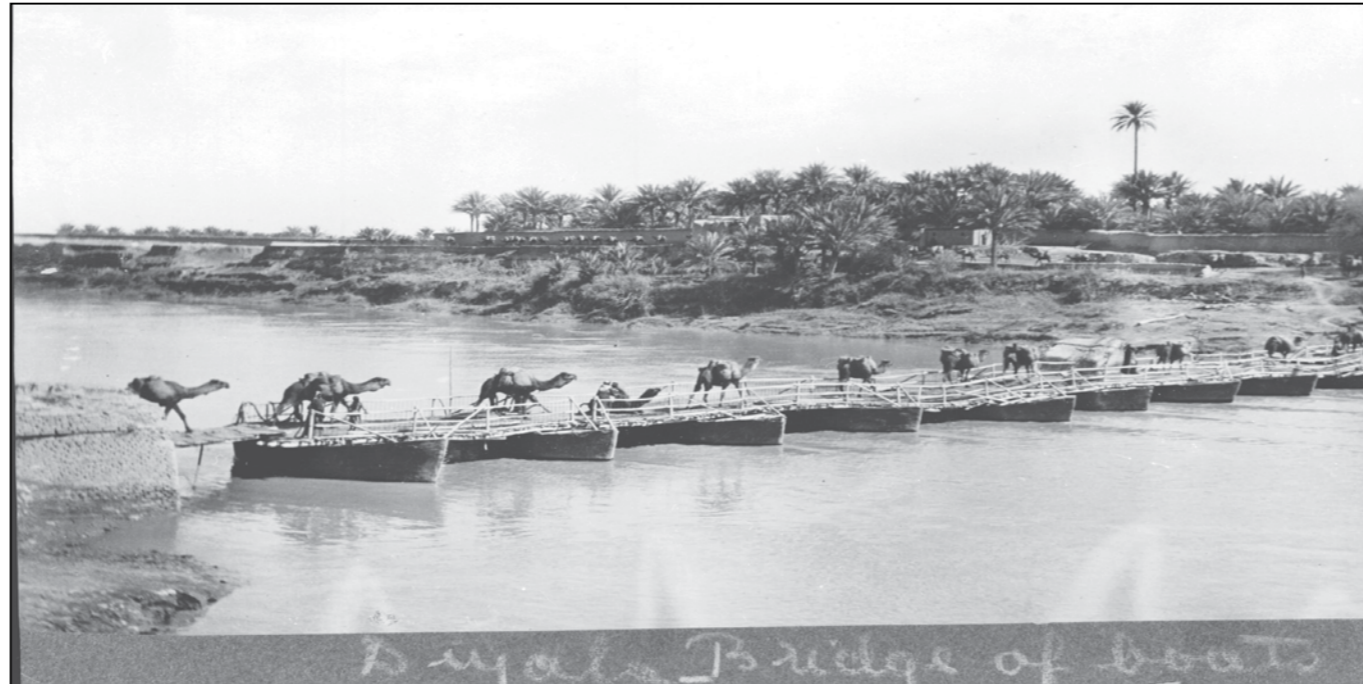
Taleqani said in the new projects, universities and industries needed reference laboratories. "A bottleneck in the domestically manufactured equipment is meeting standards set by reference labs and many manufacturers say they do not meet requirements for the safety of domestically manufactured commodities," he added.

Taleqani said in many cases commodities need to be tested in operating zones and in wells, imposing heavy costs.

"That is why we have several agreements for starting up and completing these laboratories this year," he said.

Incentive for Universities

Taleqani said 20 fields were initially set to be assigned to nine universities for development. "At the time of signing contracts, after the activation of one field for each university and research center, we will assign more fields to them," he added. Noting that universities had in the past two years upgraded themselves at different levels for this project, he said: "Assigning a second field to them could be an incentive for the universities that have done networking and fulfilled their obligations and engaged universities in the projects."



Oil before D'Arcy ²

D'Arcy's name is strangely intertwined with Iran's oil history. When the first oil well was struck, Iran's contemporary history took a new turn. Everyone knows the story of D'Arcy and particularly his perseverance to find oil in Iran and pocket profits.

But it may be interesting to know that oil did not enter the thoughts and literature of Iranians with D'Arcy. Several centuries before D'Arcy came to Iran, Iranians had learnt about oil and gas.

In continuation of what we read in the previous issue, we will turn the pages of contemporary history to learn more about the petroleum industry in Iran.

Mirza Abu Talib Khan was among the first Iranians to travel to London owing to the financing of the East India Company (EIA).

In his travelogue, Talib Khan refers to lights illuminating London's streets and corners. He describes how lights were decorated and installed on walls and at stores.

Talib Khan also notes that colorful light bulbs show the image of humans, as well as the form and name of king and queen and their crowns.

He says the lights are too beautiful to be described in writing.

Mirza Saleh Shirazi is another traveler who had seen gas lamps in London. Largely influenced by the lights, he writes in his travelogue that lights had been installed at very close distance from each other.

Lights are not limited to London for Iranian travelers. Saint-Petersburg had its own attractions.

arranged in a way that their images were reflected in the water.

Hutzer and Reuters

D'Arcy is known for his toughness with regard to the discovery and extraction of oil in Iran. But before him, other Western groups had made attempts to extract oil in Iran.

The first agreement was the 1884 Hutzer Concession. This company started work in Bushehr, but it stopped exploration very soon and abandoned the project. According to some narratives, Hutzer owned by Dutch national Albert Houston was a commercial company involved in imports and exports in the Persian Gulf region. The company was based in Bushehr.

Hutzer had received permit from the Government of Persia to drill in Dalaki and Qeshm Island for oil. But the company failed very soon and dropped the project. Hutzer had to cede its concession to "Iran Bank Mineral Rights" that had been established for activity in mining. The bank suffered the same fate as Hutzer. The company was dissolved and had to step out of the drilling industry.

A second case up to D'Arcy is Reuter. Everyone has heard about the Reuters news agency. This agency derives its name from Baron Julius Reuter who made an attempt in 1889 to benefit from Iran's oil.

Following the death of Amir Kabir, the king, princes and ministers abandon the country to its own fate and the country is heavily indebted. They traveled abroad under any pretext and imposed heavy costs on the country.

As Iran was undeveloped under the Qajar dynasty, the only option for the rulers to pay for their foreign travels was to grant lucrative concessions to Western governments.

Reuters was born under such cultural and economic atmosphere. He kept an envious eye on Iran's mines and underground resources including oil. Based on a historical document describing the Reuters Concession, Article 11 specifically refers to oil.

Thanks to efforts made by some patriotist figures inside Iran, the Reuters Concession was finally scrapped. But it provided evidence and proof of foreign governments' covetous eye on Iran's oil.

According to the Reuters Concession, the Government of Persia had granted the exclusive authority and privilege to the other party to extract iron, copper, lead, oil and every other mineral substance it may deem suitable. The mines with private ownership were exempted in this agreement.

Mosa Khan Afshar, who had travelled to Russia in the company of Qajar Prince Khosro Mirza, refers to diamond lanterns.

He writes in his travelogue that lanterns had been installed at intervals of 30 steps from each other.

He describes how lanterns had illuminated the streets and alleys, so that passers-by did not have to carry any lantern. He notes that in Moscow, 7,000 lanterns were alight every night while in Saint-Petersburg it was much higher.

Along Niva River, he writes, lanterns had been

A Century of Weightlifting in Petroleum Industry

Morteza Rezaei

Ever since oil was extracted in Masjed Soleiman in 1899, many sport disciplines entered Iran alongside the black gold. Chief among them were football, baseball, golf and tennis. It might be interesting to know that weightlifting was among these firsts. Weightlifting was introduced into Iran in 1917, but the first round of league matches was held in 1939. A team from the Anglo-Persian Oil Company (APOC) took part in the competition. Therefore, it may be concluded that

weightlifting has been popular. It is set to mark its centenary soon. Like many other things, Britons were behind it. It may be hard to believe, but everything started in an old district, known as workshop, where weightlifting discs were being produced. Several years later, US-made discs entered Iran and mass production of weightlifting sets started for national distribution. Simultaneously and may be sooner, a weightlifting club had been set up in Tabriz. But it was totally different from what we may imagine today. Ten years would be needed for weightlifters to come together from various cities and compete. To be precise, it was in 1933. In that year, weightlifting competitions were held for the first time, but they could not be described as league matches because the weightlifting league officially started in 1939. In the same year, three APOC workers proved to be competent weightlifters. By then, nobody could imagine that APOC

service workers would be lifting weights.

First Club

Everything was happening very quickly. The growing trend of athletic exercises in the petroleum industry had reached such a climax that its echo was heard as far away as the capital. That is why when oil club activities reached their peak, APOC officials set up a sport club in lieu of the Indians Club for public use. Meantime, in light of growing cultural activities and the establishment of schools equipped with sport terrains, one team from Sabzabad High School had become so professional that took part in the competitions. History is marked with the names of petroleum industry athletes, particularly weightlifters. The oil company's teams have long participated in weightlifting matches and won the Iranian and Asian championship titles. Mehran and Bahman Motlaq, Amir Mangashti, the Asian champion and record-setter of his time in weightlifting, Shamsi, the champion of seven rounds of global matches, Navab Nasir Shahal, the 2012 Olympic

and international champion, are all famous figures in weightlifting. Many cities and provinces always envied such athletes. Either they were among oil staff or they were born into families with background in the oil sector. Of course, many years have passed since then. The petroleum industry has made every effort to maintain its status. Compared with other sport teams, weightlifting does not require huge costs, nor does it impose any unusual costs upon administrators. Any honor achieved from these matches would be traced back into such companies as National Iranian South Oil Company (NISOC) or National Iranian Drilling Company (NIDC). These two teams have gained fame in weightlifting. Describing them and their merits would be impossible in this article.

Just look at the body of the national team. Several athletes from southern Iran and from petroleum industry teams are members. For example, Reza Dehdar was awarded global medal. Where is he from? He's from southern Iran, born into a family with background in the petroleum industry. Investment on local athletes, particularly young ones, has always been a priority for National Iranian Oil Company (NIOC) and it has so far produced positive results. However, over the past couple of years, due to unjust sanctions, the teams financed by Petroleum Ministry are faced with numerous challenges. In this year's pro league, NIDC is ranked the second with 747 scores. NISOC is at the bottom of the table, but its score is not much different from the top teams to let us call it failure. Petroleum industry teams are like beacons in weightlifting. They have been illuminating for years. And even if new lights emerge, they will continue to illuminate.

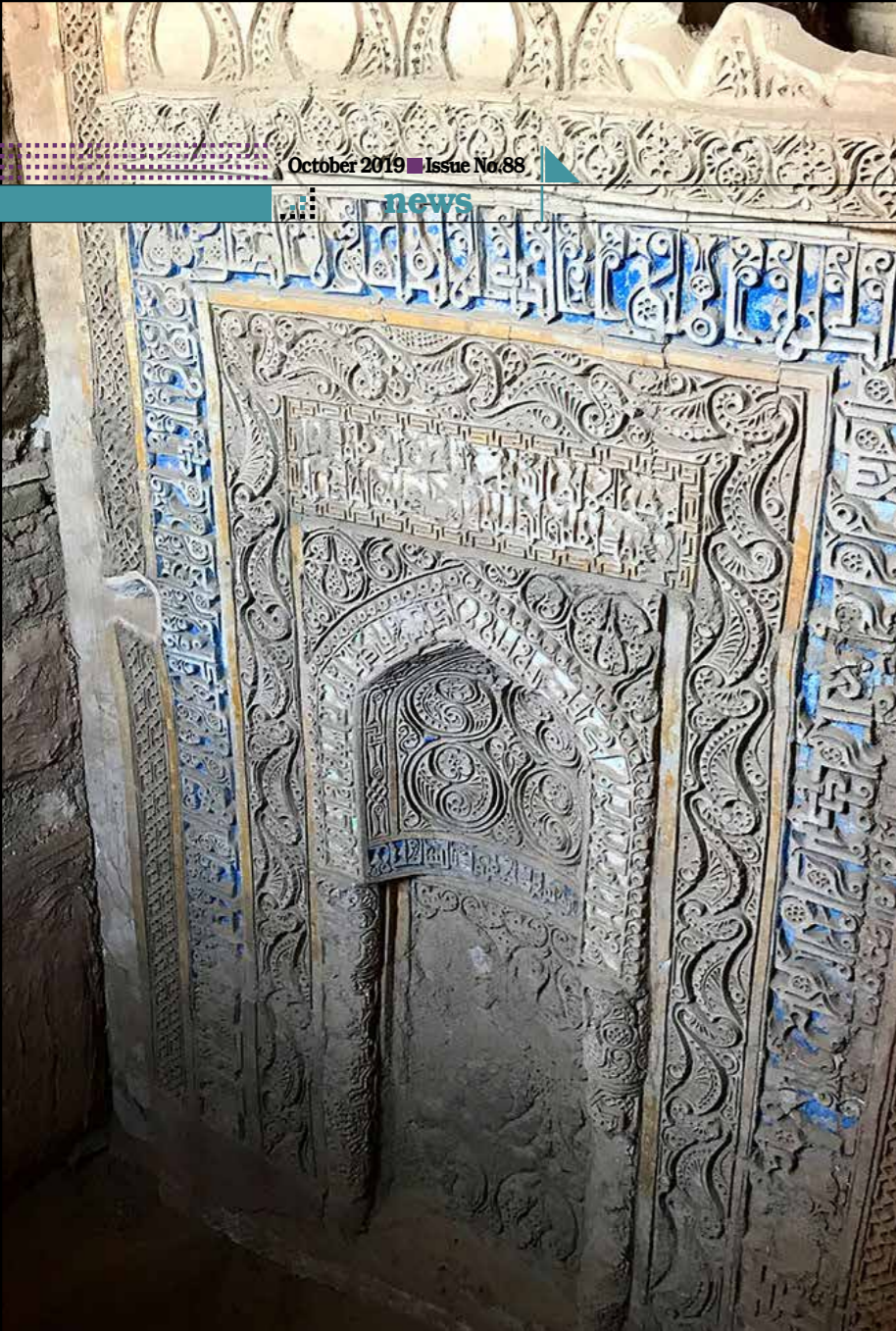
Khaf, Historical and Ancient City

Khaf is a historical and highly visited city in Khorasan Razavi Province in northeastern Iran. Sharing border with Afghanistan, Khaf is located 262 kilometers southeast of the holy city of Mashhad. In the pre Islam era, Khaf was in the territory of the Arsacid Empire. Historians say Khaf was a developed city under the Arsacid and Sassanid empires. The following is a review of some tourist attractions of Khaf.

← Nashtifan Windmills

These mills needed strong, continuous and long wind to run. The wind that ran these mills is known as 120-day-long winds of Sistan. These strong winds cover the provinces of Khorasan, particularly from Khaf to Nehbandan. Windmills are made from adobe and have two units including the main hall located in the ground floor and a wheel and rotor chamber located on the rooftop. The entrance to the ground floor is located opposite the wind direction. It is in fact a room where rotors and large and round stones are located. In another spot, there is a grains warehouse. Rotors are built in various areas of Khaf from wood, but in Nehbandan and tropical areas, palm tree branches are used as rotors. Windmills are often interconnected in order to resist Sistan's winds.





Malek Zuzan Mosque
Malek Zuzan Mosque is the last brick structure left from the remnants of the historical city of Zuzan. The mosque is named after Malek Moazzam Abu Bakr bin Ali Zuzani, the most prominent governor of that area. It is the second mosque dated during the Khawrazmian period. According to inscriptions dating from 615 AH, the mosque was still under construction for one year following that. What remains from the structure is one small and one large veranda located face to face on the eastern and western sides. It is the core of a major edifice built as a school-mosque. Due to the invasion of Moghuls in 617 AH, the construction was left incomplete.



Ghiasieh Khargerd School

Ghiasieh Khargerd School is in the vicinity of the village of Khargerd and 5 kilometers from Khaf, more precisely on the Taibad road. This historical school is among four brick buildings constructed under Shahrokh Teimouri by two architects known as Qavamuddin Shirazi and Ghiasoddin Shirazi in 848 AH. The two-storey building comprises 32 rooms, eight square-shaped halls in the corners and two big halls on the sides of the archway.





Fuel Supply to Mideast Largest Iron Ore Mine

The city of Khaf, covering more than 9,797 square kilometers and being home to 180,000 inhabitants, shares borders with Afghanistan. It is one of the four branches of the Torbat Heydarieh Zone of National Iranian Oil Products Distribution Company (NIOPDC). A total of 41 iron ore mining companies are supplied with more than five million liters per month of fuel by this company in the Khaf area.

Residents of Khaf have long been living on farmland, animal breeding, livestock trading and workmanship. Today, iron ore mines have given a special significance

to Khaf in terms of economic prosperity.

The Khaf iron ore mine is one of the largest iron mines in Iran. In terms of quality, it can rival global products. It is known to be the biggest iron ore mine in the Middle East.

Silk Road

In ancient time, Khaf was a main Silk Road route, linking Azerbaijan, Neyshabour, Qayenat and Zuzan to Herat. Now, thanks to railroads, it is possible to carry out cross-border export a variety of products, particularly oil.

NIOPDC is supplying fuel to Khaf's agriculture sector. Khaf

has 20,000 ha of farmlands and 60 broilers units and one egg-laying hens unit. That is instrumental in the economy of Khaf.

Torbat Heydarieh

The Torbat Heydarieh zone of NIOPDC is located on the south-north transit route. It covers nine cities (Torbat Heydarieh, Meh Valat, Rashtkhar, Kashmar, Khalil Abad, Gonabad, Bajestan and Khaf). With a storage capacity of about 235 million liters, it distributes petroleum products. This zone of NIOPDC also serves the southern areas of Khorasan Razavi Province, as well as parts of South Khorasan Province.

Iran Petroleum

If you have any comments regarding the articles in this magazine, please feel free to contact us through e-mail. Your views are appreciated



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Khaf Nashtifan
Windmills

