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Iran's Strategy for Natural Gas

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Abstract

Natural gas as one the most significant fossil fuels, is playing a crucial role in national energy mix in different countries. Nevertheless, its applications have not been limited to energy providing, and has been used widely as the feed stock in production of different varieties of petrochemicals. So, that most of new petrochemical complexes around the country are designed and constructed based on natural gas feed. Natural gas was produced as one of the byproducts of crude oil and mostly was burned. Gradually along with increasing volumes of extracted natural gas, planning on gathering and using associated gas resulted in more usage of natural gas in different sectors including petrochemical feed and fuel. Following the developments, National Iranian Gas Company (NIGC) was established in 1965 as one of the subsidiaries of the petroleum ministry with initial capital of 25 million Rials.

Keywords: Natural gas; Associated gas; National energy

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Introduction

Since its establishment, NIGC has gradually achieved capabilities and managed to have access to various sources and facilities such as experts and efficient human force equipped with scientific and theoretical vision and knowledge, tools, equipment, machinery and various advanced workshops for implementing its operations proportionate with the economic and social development trend of the country, so that it can independently accomplish all the related tasks complying with the valid international acceptable standards [1,2].

Today, NIGC as one of the 4 mail subsidiaries of petroleum ministry is supplying more than 70 percent of total energy in the country as well as the feed stock for tens of petrochemical and industrial complexes around the country. The company also is operating one of the biggest high pressure gas transmission and distribution networks of the world facilitating export, import, transit and swap of natural gas in the country. In the point of natural gas treatment and supply, the company has the first position in the Middle East and one of major gas companies around the world.

At the time being, the number of the NIGC permanent staff is more than 19000 official staff and more than 19300 total staff.

A glance at the NIGC administration and organization staff

- The National Iranian Gas Company is comprised of 8 directorates as follows:

  Natural Gas Production Coordination and Supervision Directorate
- Financial Affairs

  Planning
- Research and Technology
- Human Resource Development

- Gas Distribution
- Natural Gas Distribution Coordination and Supervision (Dispatching)
- International Affairs

In addition to the mentioned directorates, there are thirteen departments which directly report to the managing director as follows: Public Relations, Legal Affairs, Inspection & Complaint Consideration Affairs, Internal Auditing, Security, Assemblies' Affairs, Executive Affairs of Violation Investigation, Technical Inspection, Health, Safety and Environment (HSE), Information and Communication Technology, Commercial Expertise Affairs, Recruitment Affairs, and Structural Engineering Affairs.

Iranian gas engineering and development company

Iranian Gas Engineering and Development Company is one of the subsidiaries of the NIGC. Based on the executive system of oil industry projects, the company is responsible for the implementation of National Iranian Gas Company master plans. In terms of the volume of under implementation projects, the company is the biggest one in the NIGC and invests most of the credits. The company is in charge of designing and construction of gas transmission pipelines, gas boosting stations, development of processing plants and infrastructure facilities [3,4].

The company is based on the executive system of oil industry projects and is authorized to deal with the following tasks according to the article 5 of the company statute:

Carrying out economic and feasibility studies of the projects left to the company.

Carrying out fundamental and detailed engineering affairs and implementing all the projects left to the company.

Design, supervision and implementation of all the engineering and construction operations such as construction and development of oil and gas production, collection and transfer systems, wellhead facilities, processing plants and dehydration facilities, underground gas storage, transfer pipelines, gas supply and distribution, gas pressure boosting and reducing stations and C.N.G, telecommunication systems, pumping stations, constructional and infrastructural activities and several marine structures and their related facilities inside and outside the country

Performing all the required material procurement activities inside and outside the country

Carrying out all the scientific, technical, commercial and service activities required for the development of the company

Also recently, according to some organizational changes, all underground gas storage projects and activities shifted to the IGEDC.

Iranian gas transmission company

Iranian Gas Transmission Company is one of the other subsidiaries of NIGC. Since the establishment of NIGC in 1965, Gas Transmission Company was active under the supervision of Gas processing and Transmission Company. In 2005, the transmission directorate was organizationally separated from the processing sector and in 2006 the Gas Transmission Company was established. The most important task of the company is receiving natural gas, Ethane, LPG and gas liquids from domestic and foreign production sources and transferring it to domestic production terminals and export terminals.

The Iranian Gas Transmission Company is comprised of seven managerial districts and 10 operational zones. The company is responsible for operation management of about 36000 km gas pipelines all over the country. It is noteworthy that the above-mentioned constructed pipelines which start from production resources to gas processing plants and continue up to the consumption points, are considered to be the main arteries of gas transfer throughout the country. It is obvious that the complexity and sensitivity of the job cannot only be sensed through referring to some figures in this regard.

However, it is noteworthy that having assurance of about 700 MMC of natural gas transmission from the production regions to consumption points and export terminals could not be materialized without the efforts of more than 4000 hardworking personnel and the management of 76 high pressure boosting stations, the existence of 257 compressors and administration of a modern telecommunication and telemetry network [5,6].

Underground gas storage

Underground Gas Storage is one of the other major sections of the natural gas value chain aiming at building and maintaining balance between the natural gas production and consumption in special circumstances (sudden temperature drop). Activities include continuing the current projects and defining new projects. NIGC started momentum for surveying and studying in various parts of the country to identify potential underground structures suitable for gas storage; and studied 217 reservoirs. At present, Shoorijeh and Sarajeh underground gas storage reservoirs with an annual capacity of 4 BCM are operational and the Yortsha, Nasr Abad, Imam Hasan, Ghezel Tapeh, Baba Ghir and Bankoul reservoirs are under different phases of study and implementation. For the time being, Activities and projects of underground gas storage are being supervised by NIGEDC.

Iran gas industry

Having a glance at the writings of the ancient historians, one can realize that Iranians were the pioneers of using natural gas and oil derivatives. For example, the existence of the ruins of fireplaces and temples like the immortal fire near Kirkuk, known as Bokht-Ul-Nasr torch was located near a natural gas reservoir. Zoroastrians' temple near Masjid ¬Soleyman and historical narrations regarding Azargoshasb fireplace, all together is proof for this very claim. Ancient Iranians, based on the norms of their own religion, esteemed fire, and tried to keep it alive. In central and southern plateaus of Iran and the regions where dense woods existed, Iranians used some other things apart from wood

taken from jungle to keep the holy fire alive and the nature of these regions with the abundant underground reserves made this effort easy [7].

Iran's ranking in the world's gas reserves

Economy prosperity in the world requires rich sources of energy. Various survey indicate that by 2050 hydrocarbon resources will be still the most major sources of supplying energy. Examining the trend of these resources and their geographical distribution indicates that only the five countries in the Persian Gulf region -the Islamic Republic of Iran, Saudi Arabia, Kuwait, Iraq and United Arab Emirates- will be the major oil producing countries. In addition, Iran, Russia, Qatar, Saudi Arabia and United Arab Emirates will be the major gas producing countries by 2025.

Gas reserves, like oil reserves, are categorized in three groups: proven reserves, probable reserves and possible reserves. The volume of the proven natural gas reserves has tripled over the last three decades. That is to say, the proven gas reserves from about 72 Trillion Cubic Meters (TCM) in 1970 has reached over 187 TCM at the beginning of 2016 and Iran with 34 TCM (18.2 percent of the total) of the world gas reserves ranks the first among the reservoir holders.

Among the operated gas reservoirs in Iran, two reservoirs namely Maroun Khami located in Southeast of Ahwaz and South Pars are of extreme importance. Especially, South Pars as the second and most important gas reservoir of Iran owns 50 percent of the country's whole gas reserves and more than 8 percent of the world's.(**Table 1**).

Item	Country name	Production (Billion Cubic meters)	Partial percent
1	United States of America	767.3	22
2	Russia	573.3	16.1
3	Iran	192.5	5.4
4	Qatar	181.4	5.1
5	Canada	163.5	4.6
6	China	138	3.9
7	Norway	117.2	3.3
8	Saudi Arabia	106.4	3
9	Algeria	83	2.3
10	Indonesia	75	2.1

Table 1: Iran's position among the world's top ten natural gas producing countries in the world in 2016.

Natural gas processing

With respect to the natural gas share in the fossil energy mix and the 50 years of valuable experience in the gas industry activities in terms of hardware and software, the NIGC has a high potential and is considered to be among the major gas companies in Iran and the Middle East. As much as consumption rate has gone up, and based on the horizons developed in the development outlook document, natural gas production, processing and dehydration capacity has had a growing trend to meet the new requirements. Without operating its development projects, the NIGC is capable of processing about 770 MCM per day of gas. As mentioned earlier, at present, the NIGC is responsible for the management and operation of seven independent and private processing companies. According to the estimations, by 2020, the number of gas processing companies is supposed to increase through carrying out development projects. Predictions indicate that in case all the gas processing development projects are materialized, by the end of 2025, the total processing capacity of the NIGC will amount to over 1200 MCM per day.

Natural gas transmission

Natural gas transmission from production origins and processing plants to various consumption points in various sectors of gas industry is of high sensitivity and importance. The total length of high-pressure gas transfer pipelines in Iran is around 37 thousand km. The pipeline's transfer capacity is estimated to be 600MCM per day based on the decisions adopted in the framework of the twenty-year outlook document, the length of pipeline from 37 thousand km should reach 70 thousand km. Hence, the Iranian Gas Transmission Company as one of the subsidiaries of the NIGC benefits from all vast executive- logistic facilities and various machinery to implement general projects in the realm of engineering, fundamental and detailed designing gas especially in relation with designing gas transfer pipelines, supply and distribution networks, pressure reduction stations all over the country while observing international standards.

Iranian Gas Transmission Company, which enjoys 78 active gas pressure-boosting stations, has taken measures to boost gas transmission capacity to meet the requirements of both domestic and export sectors through planning for construction of new stations. In case the above- mentioned projects 36,200 km of pipeline by 2025 are materialized, our pipelines will benefit from 140 active stations. The status of Iran's strategic gas reserves in south coast of Iran and the existence of common gigantic South Pars gas field shared with Qatar has made the Pars Special Energy Zone so important.

Iran's share from gas reserves in South Pars is estimated to stand at around 14.2 TCM (around 8 percent of the world's total gas reserves and 50 percent of Iran's gas reserves). Taking into consideration all the above - mentioned points, the Pars Special Energy Zone's position and role in development of the economy of the country is undeniable [8].

Natural gas distribution and consumption

Besides Iran's integrated and vast gas distribution network in home and business sector which consumes the lion's share of the produced and processed natural gas, there are some other sectors including power plants, major industries and petrochemicals that consume a significant amount of the processed gas. The share of gas in the country's oil and gas product basket has reached 72 percent so far and is expected to continue to grow in the near future.

Until the present time, the total length of over 310 thousand km

of urban gas distribution network has been constructed which is responsible for providing gas to 1082 cities and 23000 villages. At present, around 25 million households enjoy natural gas.

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