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Research Article

ENERGY SCENARIOS ON HORIZON 2035 CASE STUDY: OIL OF THE ISLAMIC REPUBLIC OF IRAN

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ABSTRACT
Economics has spent many years trying to plan for optimization of allocation equations with the goal of allocating limited resources to unlimited needs. The economy has tried to look to the future. Prediction has been made regarding the amount of consumption in the future by entering the variables of the consumption side on one side of the equation and predicting the amount of production in the future by entering the variables of the production side on the other side of the equation. Although in the pre-industrial period, this equation could answer with a high degree of confidence with the minimum variables of both consumption and production, but in the industrial and post-industrial era, issues such as economic multiplication, multiple interdependence of countries, polarization, the powerful entry of technology into all walks of life, especially economics, and growing uncertainties at every level of decision-making, the traditional planning capacity of the economy has plummeted, and it admitted its inadequacy in almost every complex issue. Although accepting this inability and confession seemed unpleasant to many economists in various schools, the reality of the outside world was nothing more than that. In this research, an attempt has been made to include the foundations of futuristic thinking and scenario-based thinking in one of the most important and sensitive economic issues of the country. For more than a hundred years, the tree of the country's economy has been flooded with oil revenues, and whatever happens to this natural raw material has a direct impact on the lives and deaths of the people of this land. Therefore, proper knowledge of this huge resource and planning for it is not a common task but a necessity. In the past, this issue has been considered in all Iranian governments and governments. Oil that can overthrow a government and impose heavy wars on nations cannot be left without a plan. But which program? Which thinking and which way of thinking can illuminate the future in the best possible way? This research intends to address this issue based on a futuristic method. Oil is a complex commodity with many national, regional and international dimensions, the complexity and chaos of which has been shown many times in the past. This includes the results of a country's elections, a president's speech in a congress or parliament, a local war in a Third World country, a country's threat to close a waterway, an ethnic or religious dispute, the emergence of promising technology, and so on. They can raise and lower the price of oil on the stock exchanges all over the world. Futurism can greatly vaccinate the country's economy in the face of these countless uncertainties.

Keywords*: Energy, Futures Studies, Economics*

INTRODUCTION

Today's vast civilization is largely depended on energy. Energy is one of the factors used in most economic activities. The national security of most countries depends on secure access to energy. Therefore, the future of production and consumption of energy carriers and their optimal use is of particular importance. Among these, oil is of considerable importance (Farshad Gohar, 2003).

Oil and natural gas are the most important sources of human energy today. And in the meantime, Iran, being on a huge platform of energy resources, especially oil and gas, and also benefiting from its political and economic geography, has a valuable and unique position in the world. Iran has huge reserves of natural gas and Crude oil (16% of gas reserves and 11% of oil reserves) is the world's fourth largest oil

producer and exporter and the second largest exporter of OPEC oil. On the other hand, with the discovery of huge oil reserves in the Caspian Sea, Iran's geopolitical position as the only country connecting the two strategic regions in terms of hydrocarbons, namely the Caspian Sea and the Persian Gulf has become very important (Ebrahimi *et al.*, 2011).

Oil plays an important role in various aspects of domestic and international politics of political and economic units. Daniel Yergin points out that oil is a key element in national power, a major factor in the global economy, a vital hub in war, and a defining force in international events. This impact is exacerbated when the economic nature of governments is dependent on oil, or in other words, about half of the country's income is received through the sale of oil in the form of rent. Iran is also one of the countries that has been most affected by its oil resources in the domestic and international arenas. Since 1908, when oil was discovered and extracted in a well in Masjed Soleiman Mosque, the political, social and economic destiny of Iran has been inextricably linked to oil (Obedience and Victory, 2013).

Iran's economy has been and is mainly based on oil. In Iran, oil, firstly, as a source of energy, has transformed the life and economy of the people and caused economic growth and development, and secondly, oil revenues have led to progress and development in all economic and social aspects (Zoghi, 2014).

From a strategic point of view, following the industrial revolution, energy gradually became one of the important factors of production

And in the twentieth century was recognized as one of the important components in the formation or change of geostrategic realms. Accordingly, over the past decades, the countries of the Persian Gulf have always been considered as one of the geopolitical regions of the world due to their vast oil and gas resources. However, with the discovery of significant hydrocarbon reserves in the Caspian Sea and surrounding countries, the geostrategic territory of the Middle East expanded to Central Asia and the Caucasus, and a new geostrategic territory called the "Greater Near East" was formed due to its vital role in the decades. The future of oil and gas supply is referred to as the "falcon of world equilibrium in the sixth century." In such circumstances, Iran is located in the heart of the Greater Middle East, has the first rank of extractable hydrocarbon reserves in the world, high production and export capacity of oil and gas and a special position to become a strategic corridor of oil and gas trade in the region and the world. , Is of unique importance (Ghasemian, 2011).

Although the main focus of this study is to examine the position of crude oil in the Iranian economy over the next 20 years, the strategic, geostrategic and geo economic effects of this vital substance cannot be ignored. In today's world, it is impossible to study an issue in isolation, and security and economic growth in each country and region are completely intertwined. Therefore, the issue of the position of oil in the economy should also be considered from the perspective of national security. There may be many uncertainties of a security and strategic nature that have a major impact on Iran's oil economy.

Iran ranked third in the world after Saudi Arabia and Venezuela in terms of proven oil reserves in 1996, and second in the world in terms of proven gas reserves after Russia.

Of course (BP Statistical Review of World Energy, 2011) of course, if we consider the composition of the country's total hydrocarbon reserves, Iran ranks first in the world.

Literature Review

The importance of oil has been known to the world since the early nineteenth century. Crude oil is now the most important and it is the most inevitable raw material in the industrial civilization of the world. Today, oil and gas have become an economic commodity and a strategic value. Various studies show that hydrocarbon resources will remain the main source of energy until 2050, and in the short and medium term, finding alternatives to oil and gas is costly and uneconomical. Oil consumption in 2005 was 84 million barrels per day and is projected to reach 116 million barrels per day by 2030. In general, it is predicted that by 2030, the world's energy demand will increase by 83% (Abolhassan Shirazi and Akhund Mehrizi, 2007).

After all, oil is not just a valuable commodity traded among other universally traded commodities, but it is a strategic and important commodity as long as it is the "dominant energy" in all countries, including industrialized countries. , And is considered the head of the petrochemical products chain, maintains its strategic and important position and is also an important source of income for oil-exporting countries as well as the main raw material in the production process in oil-importing countries. Is (Samadi *et al.*, 2009: 5)

According to global statistics in 2010, the primary consumption of energy carriers worldwide in oil 35%, gas 23.7%, coal 28.8%, and the rest related to other energy carriers including Nuclear power (6.4%), hydropower (2.5%) and renewable energy (OPEC, 2010, quoted by Mirtorabi, 2014). In this way, about 60% of the world's energy needs are still supplied by oil and gas, and if we also consider coal as a fossil fuel, it will become clear to what extent human beings still rely on resources in energy production. Renewable fossil is dependent.

On this basis, it can be said that in today's world, not only industry but also modern lifestyle is highly dependent on oil consumption. In addition to producing energy, oil is a major source of income and wealth in oil-rich countries such as Iran. The oil trade accounts for about ten percent of world trade, representing the large sums of money in circulation in the sale and purchase of oil and its products. (Mirtorabi, 2014).

65 countries have resource-based economies. That is, countries that account for 25 to 50 percent of their total exports and services are exports of natural resources such as crude oil and other mineral resources.(Gylfason *et al.*, 1999) In the following, two dimensions of the effects of oil on the economies of different countries will be examined.

The positive role of oil on the economy of countries

Regarding the role of oil as an energy source, it should be emphasized that in fact, oil is a key factor in achieving economic and industrial goals and in ensuring national security. The goal of all human societies, and especially of all governments, is to achieve a level of economic growth that can ensure the well-being of society. Achieving this goal or the desired rate of economic growth requires having and benefiting from two factors of capital and energy. This is where the relationship between economic growth and energy comes into play. A direct relationship, in this sense and in other words, welfare requires economic growth and economic growth requires energy (Zoghi, 2014).

For this reason, crude oil has always been considered as an important and strategic commodity for countries, in which oil-producing countries are always looking to create positive effects of oil production on their country's economy (Ebrahimi *et al.*, 2011).

Given that owning oil in the world today also means financing and gaining capital, the value and importance of oil, both as a source of energy and a source of financing, is high. In terms of financing, it should be noted that the crude oil trade, in terms of monetary value, accounts for ten percent of total world trade, which in comparison with other commodities such as wheat with a 3 to 4 percent share of total world trade, Its importance in providing capital for oil-rich countries and in the direction of economic growth becomes more apparent (Zoghi, 2014).

Many analysts attribute America's economic progress in the decades following World War II to its oil resources. From the heart of the American oil industry emerged the largest economic giants of this country, namely large oil companies, which in fact over the past half century have influenced many economic and political policies of the world (Sheikh Nouri, 2012).

The negative role of oil on the economy of countries

One of the mysteries of development economics is the role and impact of natural resources and wealth in achieving economic growth and development. The economies of the 1940s and 1950s believed that countries with natural resources could easily overcome the problem of under-savings and inadequate investment, and with the income from the export of natural resources put great pressure on industry. To become. Unsuccessful experience of OPEC and other developing countries with natural resources in achieving higher levels of per capita income, serious doubts

On the success of the development strategy relied on natural resources. During the nineteenth century and the first half of the twentieth century,

Several empirical studies have identified natural resources as the engine of economic growth. But since the 1990s, most empirical studies have found that the abundance of resources has slowed economic growth, as evidenced by developing countries that, despite their rich natural resources, have lower economic growth than countries without these resources. Have been sources. But theoretically, and based on the economic literature, on the one hand, the abundance of resources directly and inherently can not cause the backwardness of an economy; Because it is a huge source of income and a special privilege for the economy of countries with God-given resources, which has a very high income compared to the cost of obtaining it (Emami Meybodi *et al.*, 2011). The beginning of these studies was accompanied by future research, and in 1995 Sachs and Warner in an article expressed the negative relationship between growth and the share of natural resources in exports and called it the scourge of natural resources; This means that, on average, countries that export natural resources or have high natural capital have lower economic growth than countries that did not have such resources. Natural resources are therefore a mixed gift, which makes nations rich, but its effect can be temporary, and the cost of such enrichment may be to reduce economic growth in the long run. Oil resources are a clear example of natural resources. Oil revenues in oil-rich countries cause many economic problems

It has created oil-rich countries in general. Proper management of oil revenues in oil-rich countries requires comprehensive knowledge and acquisition of the necessary knowledge about the effects of oil revenues, the mechanism of impact and its channels of impact on the economy of exporting countries, so that based on the acquired knowledge, policy can be Adopted appropriate measures to reduce the cost of oil revenues to the economy and maximize its benefits. During the nineteenth and first half of the twentieth century, several empirical studies were conducted that introduced natural resources as the engine of economic growth. But most studies from the second half of the twentieth century to the present have identified the abundance of resources as a slowdown in economic growth, and some have interpreted it as a scourge of resources. Objective observations and empirical studies show that, in fact, the resource disaster does not affect all countries with rich natural resources. Because some countries, despite having abundant natural resources, have had high economic growth and development, and this phenomenon only applies to most developing countries, especially oil-rich countries. Reasons for a negative relationship

Between economic growth and resource abundance (natural resource disaster) has been raised. These include the effects of the Dutch disease, the inappropriate allocation of revenues between resource utilization, rent-seeking behaviors, the quality of institutions, the role of human capital, and so on. The following is a description of some of the reasons for the occurrence of the resource disaster phenomenon that has been obtained in various studies (Emami Meybodi *et al.*, 2011).

MATERIALS AND METHODS

Foresight methods are now developed and cover a wide range of quantitative and qualitative methods. Different classifications of futuristic methods have been done according to the application, purpose, nature, etc. Among these, the scenario writing method has been developed and used as the most widely used futuristic method more than other methods. This method is based on various logics and has several methods. Meanwhile, the analysis of cross-effects by eliminating the shortcomings of the Delphi method and combining it with computer tools has recently become very popular. This approach has been developed in France and has been used in many cases. In this chapter, the type, nature and methods of collecting and analyzing the results were briefly mentioned. Briefly, the methods used in this research in the input section include environmental scanning, interviews and expert opinions. Methods of processing and analyzing the effects of propellants and analyzing the space of scenarios are also done using Mick Mac software and consensus index. Finally, using the scenario model of the Global Business Network (GBN), the scenarios of the position of oil in the country's economy in accordance with 2035 have been explained and the storytelling and illustration of the scenarios have been done.

RESULTS AND DISCUSSION

Historical evidence of Iran's economy shows the will of Iranian policymakers to transform the oil sector towards economic and social progress in the past and present. To find out the degree of dependence of a country on a commodity, one can refer to the Hirschman index, which is provided by the United Nations.

Question: What are the drivers of Iran's crude oil?

In order to explain the propellants, first an initial list of propellants was prepared using environmental scanning method and then the list was sent to 50 experts in this field to complete the list of propellants by providing suggestions for removal, combination and adding new propellants. After receiving the opinions of experts, the list of drivers was reviewed and amended again, and finally the list of drivers in both national and global scales was prepared.

The list of the most important drivers is summarized.

- The pattern of Iran's international interactions with the world
- Changing the share of renewable energy in the energy basket
- Energy consumption pattern
- Carbon emission tax laws
- Environmental political and social movements
- Crude oil price in accordance with 1414 (2035 AD)
- The sovereign macro view of oil
- The share of oil in development infrastructure
- Global economic growth and increasing global consumption
- Establishment of indigenous systems for sustainable energy production
- The future model of the country's economy

Question: What are the uncertainties in the position of crude oil in the future?

In response to this question, in order to explain the critical uncertainties, two methods of cross-impact analysis and consensus index were used. Then, by equalizing the output scores of the two propulsion methods, they were ranked based on their importance and uncertainty and placed on the critical uncertainty diagram. Based on this, critical uncertainties were identified and scenarios were selected and analyzed to map the space.

Question: Scenarios of the position of crude oil in the country's economy according to 2035

How can the scenarios facing the Iranian oil industry affect the future of the country's economy?

After explaining the critical uncertainties and drawing the cross of the scenario and creating a four-dimensional space of the future based on the two drivers using the GBN method, four scenarios were created, each of which according to the conditions and effects of the second critical uncertainty, ie "Iran's international interaction pattern". And "The share of renewable energy in the energy basket" outlines the position of crude oil in the future of the country's economy.

The pattern of direct interactions in both direct and indirect ways can affect the country's economy in general and the position of crude oil and the economy's dependence on crude oil. On the one hand, extensive economic relations with other countries and extensive interactions provide the opportunity to export oil products to more countries and better prices, and can lead to an increase in the share of oil in the country's economy. On the other hand, the opportunity for extensive interactions has provided the opportunity to expand trade relations in the field of non-oil products, and therefore the country's economy is moving towards several products and can be saved from dependence on oil. But the important issue in this regard is the attitude and management of oil revenues by the government and the government. Due to recent developments in the Middle East, the increase in regional security costs and the expansion of Iran's regional power, has led to extensive interactions with other countries and will give a special place to oil in providing the country's revenues. Therefore, the expansion of Iran's interactions in the horizon of Study 1414 in any case will lead to an increase in the share of oil in the country's revenues and an increase in the position of oil in the country's economy.

On the other hand, due to recent advances in energy-related technologies and the emergence of renewable energy and developments in industry and the type of energy they need, on the one hand, and the increasing pressure of environmental laws on fossil fuels, including oil, the market can expand.

Renewable energy and a sharp increase in their share

Therefore, one of the basic assumptions of the future scenario space is the possibility of increasing the share of renewable energy and reducing the position of oil in the energy basket. However, it is necessary to mention two points in this regard. First, Iran's position in the Middle East region and its position in the developing world default to the rapid and rapid growth of technologies and the sharp increase in the share of renewable energy in this region is questionable and uncertain. Therefore, increasing the position of renewable energy as a definite default cannot be corrected. On the other hand, according to the study horizon and also due to the recent unrest in the region, the possibility of the rapid emergence of these energies in the horizon of 15 years cannot be considered definitive.

Increasing or decreasing the share of renewable energy in the energy portfolio can be effective in determining the position of crude oil in the Iranian economy in two ways. On the one hand, increasing the share of renewable energy in the global energy basket will stagnate the market of fossil fuels, including oil, and therefore will lead to lower oil prices. In addition, it can have a direct effect on reducing economic growth. If the share of renewable energy in the country increases and the domestic demand for oil and oil products decreases, then oil is the place It will be declining.

Solution of the first scenario

In the first scenario, the country's economy will face very difficult conditions. On the one hand, it will not be possible to sell oil at a reasonable price to many customers due to the lack of extensive relations with the world, and on the other hand, increasing the share of renewable energy will narrow dependency over oil as sole source of an energy. In this scenario, it is necessary to conduct extensive research in the field of crude oil processing and its conversion into needed goods in the country, as well as to provide gasoline self-sufficiency. However, efforts to attract customers from neighboring regions and countries should be a priority to create new regional markets to provide acceptable sales and foreign exchange needs of the country. Based on this, the most important solutions proposed in this scenario:

• Efforts to attract customers among neighbors and countries in the region
• Development of indigenous research in the petrochemical industry
• Efforts to increase the share of renewable energy in the country and the use of technologies in this field

Scenario 2 solution

In this scenario, the most important opportunity is to develop Iran's relations with developed countries, which is considered as an opportunity approach: on the one hand, the development of Iran's relations with other countries provides access to large markets and oil is sold at a reasonable price. On the other hand, these extensive communications will pave the way for the introduction of new technology in the field of oil, and through this, it will be possible to develop refineries and petrochemical industries with the latest technology in the world to prevent crude oil sales and reduce environmental pollution. In addition to this opportunity, the increase in renewable energy will have a dual effect, on the one hand, the increase in renewable energy will take over a part of the crude oil market in its favor, and therefore the price of oil may decrease day by day. However, given that crude oil is not only considered as an energy but also as a raw material needed by many petrochemical industries, it can simultaneously play its part in the economy, but this time it will play a different role. In this scenario, the following solutions are suggested:

• Introduction of new technologies in the field of crude oil extraction and reduction of pollution in the oil industry
• Development of refineries and petrochemical industries to process petroleum products and prevent crude sales
• Allocate more investment in the development of crude oil-related factories
• Preparing the ground for the development of renewable energy in the country and not using crude oil
• Skin to global institutions in energy supply

• Development of scientific and trade cooperation with developed countries

Third Scenario Solutions

The third scenario provides an ideal opportunity to sell oil as an energy as well as a raw material. In this scenario, due to the small share of renewable energy, there will still be demand for oil, and on the other hand, there is an opportunity to develop trade and oil exports to different countries, so oil will be sold at a reasonable price. What is important is that in this scenario, due to the existence of different markets and high demand for oil, sales and extraction should not be done indiscriminately. It is necessary that some of the revenues from the sale of oil at a reasonable price be spent on the development of petrochemical industries and the purchase of new technologies in these industries. Also, the use of oil revenues in the development of other sectors is a necessity that should be considered by the government. Some of the most important solutions in this scenario are:

• Utilizing revenues from oil sales in the field of infrastructure development, especially industrial and tourism
• Prevent improper extraction and sale of raw materials
• Introduction of new technologies in the supply of crude oil processing and development of petrochemical industries
• Efforts to import existing technologies in the field of renewable energy into the country

Scenario 4 solutions

Scenario 4 provides a special condition for crude oil that requires conservative decisions to be made to maintain the status quo. In this scenario, the lack of widespread communication and the negligible growth of the share of renewable energy in the energy basket are both considered as a threat. Lack of extensive relationships will limit global markets and there will be few customers for petroleum products, on the other hand, the lack of growth in the high share of renewable energy will increase dependence on oil as an energy. But in the global arena, the high share of crude oil in the energy basket and the need for it as a raw material in the chemical industry can have a significant impact on markets, albeit limited. Especially in the case of many neighboring countries, the need for energy is increasing sharply and can be an important market for Iranian oil products. Based on what has been said, in this scenario, the following solutions are suggested:

• Development of local research centers in the field of crude oil extraction and processing
• Development of gasoline refineries with acceptable standards and self-sufficiency in the field of fuel
• Focus on creating new markets in neighboring countries and dominating these markets
• Development of indigenous research in the field of new energy
• Reduction of exploitation of independent oil fields
• Development of local investment platforms in the petrochemical industry

SUMMARY AND CONCLUSION

In this article, the current state of Iran's oil reserves and oil export volume, oil fields and special geopolitical position, along with other factors affecting the development of oil and gas industries and the factors affecting the future development of Iran's oil based on existing data and documents were reviewed. Were analyzed and evaluated. Based on these studies, a set of macro-influential factors was explained, which was provided to experts as the initial list of propellants to complete their initial list by providing their opinions on removing, combining and adding new propellants to explain the list of propellants. . After receiving the opinions of experts, the list of drivers in two national and global scales was extracted and in the form of cross-analysis analysis matrix and consensus index questionnaire was provided to experts to score the importance and uncertainty of drivers to extract critical uncertainties. A total of 4 scenarios were created that will be important in decisions.

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