

Challenge of Fossil Energy and Importance of Investment In Clean Energy In Iran

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The main objective of this paper is to express the positive features of renewable energy and the necessity to substitute fossil fuels, especially oil, with these novel sources of energy. Nonetheless, the crucial question which should be answered primarily is "what are the key advantages of renewable energy, especially in countries like Iran with considerable and inexpensive underground resources like oil and natural gas?". Renewability, flexibility, cleanliness and creation of new job opportunities are some of the most significant benefits of renewable energy. In addition, this type of energy not only does not suffer from fossil fuels drawbacks, but also provides some benefits for countries. While depending on oil challenges the security of countries in various areas - political, economic, social and environmental – the new alternative energy provides sustainable development and security for their consumers. This matter will be discussed throughout three parts in this paper by the aid of descriptive-analytical method. The result, with emphasis on Iran, will demonstrate there is no alternative to these new, clean and renewable energy sources.

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1. INTRODUCTION

There is no doubt that fossil fuels are one of the main reasons for rapid growth and development in different countries over the past 100 years. In fact, fossil fuels, especially oil, are regarded as one of the hallmarks of human civilization in the twentieth century. Without oil, much of the modern advancements would not have occurred. However, fossil fuels such as oil and coal have caused many extensive environmental, security and economic challenges for countries and, in general, for human beings [2]. For example, many of the environmental problems, including the phenomena of global warming, air pollution and climate change, which have threatened the future of life on this planet, are only part of the consequences of the extensive use of oil and coal. In addition, due to the close relationship between the energy and the daily lives of peoples and communities, there is a strong connection between countries' politics and the issue of energy. In fact, the energy is so important in the political arena that has shaped a pattern of disputing, conflicting, convergent and divergent relations in the field of international relations [1].

As a result, some part of countries' interactions in the international arena and in other words, some parts of the international relations are influenced by energy, especially oil and gas. In

fact, oil can be introduced as one of the main causes of disputes, conflicts and wars occurred in the past 100 years. Dependency on oil has seriously threatened the economic security of several countries. Therefore, the fluctuations of oil price have threatened the state of the budget and consequently, the economic stability of various countries. In this regard, it is sufficient to refer to the international statistics in. For instance, 95Due to such issues and problems, different countries have understood the need for passing the fossil fuels and tried to supply some of their needed energy by other resources. In this regard, western countries could be addressed as the most successful countries turning into the renewable energy. According to BP reports, countries such as Japan, Germany, The United Kingdom, France and the United States are of the leading countries in terms of investing in and using the renewable energy [6]. Of course, investments in renewable energies are not limited and exclusive to advanced countries, and developing countries are also active in this field, of which it can be addressed to the Islamic Republic of Iran which has considered the necessity of this issue over the past few years. As a developing country, Iran is seeking to achieve sustainable development. In order to achieve this objective, there should be logical policies and be followed the three pillars of sustainable development social development,

economic development, and environmental protection in the pattern of development. The fact is that regarding the limitation of the reserves of fossil fuels and increase in energy consumption in the current world as well as Iran, it is no longer possible to rely on existing energy resources, especially oil. Therefore, investments in renewable energies such as wind energy and solar energy should be prioritized.

Accordingly, the purpose of the present paper is to assess the current threats, problems and to study the most important negative consequences of countries' dependency on fossil fuels, especially oil, and to examine the need to turn to renewable energy in a way resulting in the reduced problems in the energy field. So, the main question of the present article is proposed as follows: Considering Iran's current conditions, what are the most important advantages of renewable energies?

To answer this question, it is to say that the renewability, flexibility, cleanliness and creating job opportunities are the most vital characteristics of renewable energies. It can relieve Iran from the dependency on oil and gas and their widespread negative consequences. The present paper intends to examine various aspects of this topic in three sections. In the first section, the negative impacts of the extensive global dependency on fossil fuels is discussed. The positive features of alternative energies will be addressed in the second section. And, the third section deals with the status of the renewable energy sector in Iran. Finally, it presents the conclusions.

2. ISSUES AND PROBLEMS OF OIL AND COAL

Today, the world is encountering major problems in supplying and consuming the fossil fuels. In this regard, it can be referred to the results of extensive researches in the field of energy carried out by experts, countries, and international institutions.

The review of the results from the conducted research shows that, in general, countries, especially major energy-importing countries such as the United States and China are facing major challenges in the field of energy. These problems include the restrictions on the supply of new resources, the increasing trend of energy consumption, the instability in the supply of energy-producing countries, the occurrence of subversive acts, especially the spread of terrorist incidents and finally the environmental problems. Considering such issue, it is tried in the following that each of these problems, is examined in greater detail, and then it is dealt with the importance and the positive features of the new energies in order to analyze completely the need for turning to such energies.

A. The finitude of fossil fuels and the demand overtaking the supply

One of the major problems of countries in their energy sectors is a reduction in fossil fuel resources and the failure in replacing them with new energies. As an example, an important portion of the oil reserves is about to run out. In this regard, many of the major oil fields in the world have passed their ascendant time. For example, at the present, 50% of the world's supplied oil is extracted from 120 large fields, half of which are over 40 years old and 95% over 25 years old; therefore, it can be prefigured that over the next few years, and considering the end of the ascendant time of such oil fields, an important part of oil producing potential in the world will terminate [14].

In addition, according to the provided data, it is estimated that the crude oil is produced by 97% of its capacity in the world, and oil-producing countries are able to produce only 2 million

extra barrels of oil. At present, it is Saudi Arabia having the more production capacity and nearly all the other countries are producing with all their capacities. Interestingly, even some of the major OPEC countries are hardly capable of producing at the agreed capacity rate, and even some others are producing below their own declared capacity [19].

Considering above conditions, it can be suggested that one of the countries' most significant problems in the energy sector is the inability of major oil producing countries to produce more oil, considering the reduction of oil resources, as well as the end of useful life of major oil wells. In addition, investments in alternative energies have not yet led to the desired results. For example, over the past few decades all countries depending on the imported energy, such as the United States, European countries and Japan have invested heavily in new energies; however, taking into account their high cost of production, such energies have so far no potential to compete with cheap oil. The production cost of all the new energies, such as solar, wind, biomass and Geothermal heating energy, is much higher than that of fossil fuels. Of course, over the past few years, Western countries, especially the United States, have more invested in the field of cheaper new energy, which is expected to justify the consumption of new energies in the future in light of rising oil prices. However, the professionals and experts predict that oil will continue to preserve its domination over other energy resources over next several decades [5].

In Iran, there are obstacles to develop and make use of renewable energies due to the lack of necessary infrastructure. As a result, the measures taken so far have not produced significant results. Of such obstacles, the most important ones are as follows:

- The availability of cheap fossil fuels has precluded serious actions in the production of renewable energy.
- The lack of a national, comprehensive and well-designed program with quantitative standards which has been enforced legally.
- The structural problems in the subject of renewable energy due to engagement of several government bodies, including the Ministry of Agriculture Jihad, the Fuel Conservation Organization, the Atomic Energy Organization and the Ministry of Energy, are of other mentioned obstacles. It results in dispersive and parallel works, leading to decentralized, low efficiency, and incomplete costs and credits.
- Lack of financial resources needed to implement programs and projects and their full and timely allocation.
- Limited relevant, qualified consultants, contractors and observers, and costly and time-consuming trend of creating technical, scientific and industrial potential needed to carry out these projects in the country.
- A new and advanced industry of some technologies and the lack of sufficient knowledge in these areas due to various global sanctions in the country [16].

B. Increasing global energy consumption

It is considered the increase in the consumption of energy versus decrease in the production potential as another could create major concern for countries. In fact, while the life of many major oil fields in the world is about to be terminated, countries are

in need of more energy and oil every day. The US and China, for example, have been ranked first and second, respectively, in terms of oil consumption. According to the British Petroleum Company, China's rate of oil consumption has been steadily increased over the past three decades. Accordingly, the country's oil consumption grew from 4,570,000 barrels in 2004 to 7,880,000 in 2009. Interestingly, China's oil consumption peaked at around 12 million barrels in 2015, resulting in China gaining world's first rank in terms of increasing speed of energy consumption [6].

The same is true for US, India and other major oil consuming countries. Over the past several decades, the United State has been the world's number one oil consumer and only in 2003 it consumed about 20 million oil barrels a day. At the moment, i.e. in the first six months of 2016, oil consumption rate by US has been the same as before as a result of Obama administration's investment in new energies [6].

In addition, according to the International Energy Agency, global demand for oil will rise to 118 million barrels in 2030, due to increased consumption of industrial countries and entry of Asian countries. Considering this issue, it can be talked about two contradictory trends in the energy market, which have already shaped the countries' most important energy challenge. The world is facing a reduction in the potential of energy production, especially fossil fuels, on the one hand, and an extensive demand of energy due to the increased consumption by industrialized countries and emerging new large countries such as China and India, on the other hand [15].

Iran is one of the largest producers and, of course, consumers of the world's oil and gas. At 2016, by the suspension of Iran's sanctions, the country regained its position in the energy market and reached a daily production of 4 million barrels. Of course, because of the high consumption and low productivity in Iran, it is consumed in Iran about 2 million barrels of oil every day, every day around 2 million barrels consumed inland which is very high. Possessing of 34 trillion cubic meters of oil Iran is dedicated the first rank in the world. In fact, by the discovery of new gas reserves over the past few years, Iran has taken the first place in the world from Russia. At present, Iran holds about 19

C. Instability in energy-producing countries and regions

The instability among the energy-producing countries and regions is another source of concern for countries in the energy sector. Meanwhile, the Middle East with more than about 33 percent of the world's oil, as well as substantial gas reserves, plays an essential role in terms of supplying the world's energy; however, it is considered as one of the most unstable regions in the world [6].

A glance at the changes in the region during the second half of the twentieth century, as well as the first decade of the twenty-first century, documents this issue very well. As an example, several conflicts and wars between the Arabs and Israel and the continuation of such issues in recent years, the rise of the Islamic Revolution in Iran, as well as the outbreak of the Iraq war against Iran and Kuwait, the US invading Iraq, and continuous conflicts between Arabs, Arabic changes and revolutions, and finally the emergence of terrorist groups such as ISIL, are all only a part of the events and incidents happened over the past six decades in this critical and strategic region. Currently, Iraq's internal problems and issues, the continuation of Israeli-Palestinian conflicts, Lebanon's internal problems and issues, the existing differences between Arab nations, as well as the difference between Shiite and Sunni, do not provide a clear perspective of the region [3]. More or less, the same situation is true for other countries and

regions producing oil and gas. In this regard, it can be addressed to the instability of oil-producing countries in Africa, the spread of internal instability in Venezuela after Chávez, and the spread of the disagreements between Russia and the West, which in general do not create a positive outlook for the energy market [4].

D. Spread of international terrorism and threats

Over the past few decades, particularly after the events of September 11, sabotage and terrorist acts against oil installations are highly possible, and created a new concern for major oil-importing countries. In this regard, the oil installations are, for several reasons, the option and choice for terrorists who seek to treat and put at serious risk the interests of the United States and the West. In fact, terrorists are well aware of the widespread dependence of the United States and the West on imported oil and gas. In addition, most of the world's oil and gas resources are located in the Middle East and this could multiply the consequences of terrorist acts against oil installations and facilities. Resulting from such conditions, terrorist groups such as al-Qaeda have assessed the oil installations and facilities and also the routes of oil transportation to the western countries as the best way to harm them. In this regard, bin Laden declared in a war statement against the West in 1996 that oil installations and pipelines would be the main target of al-Qaeda to harm the United States [27].

Since then, the attack on such installations and facilities has been increased by al-Qaeda; however, such attacks have not led to many results due to greater safeguarding and protecting acts, and oil tankers' greater facilities. Nonetheless, there is an increased concern over this issue for major oil importing countries. The statistics of the "Institute for Global Security Analysis" can be cited in this context. Based on data from this institute, al-Qaeda has attacked more than 300 times against oil installations over the years 2003-2005 [21]. The results from the Institute for Global Security Analysis show that at present, oil installations and facilities are the best options for saboteurs and terrorists. The reason is that it is transported annually 60% of the world's oil by 3500 oil tankers through the sea. There are also two important areas in the world in terms of oil transportation, the Strait of Hormuz and the Strait of Malacca where there is shipped daily 26 million barrels of oil to industrialized countries. Moreover, it is estimated that the rate of oil transportation from these two straits will be doubled in the future, i.e. something about 60 million oil barrels, and it has created a heavy concern for countries in terms of sabotage and terrorist acts. [19].

E. Environment contamination and disasters

Another problem resulted from fossil fuels is the widespread impact of these resources on the environment. The fact is that today's world is facing a major challenge due to the massive use of oil and coal. This serious challenge is demonstrating a perspective of climate and weather conditions of the planet, which will enter the critical state if the current trend of fossil fuel consumption continues. The consumption of fossil fuels and the release of energy hidden in these fuels, in addition to significant benefits, create some problems. A part of these problems comes from producing so-called "greenhouse" gases, which act as a thermal trap. This trend has occurred substantially because of the increased and ever-growing consumption of fossil fuels by the industrialized world and developing countries. Hence, the energy plays a major role while the world confronting such great challenge at the beginning of the 21st century. At the moment, fossil fuels, including oil, natural gas and coal are considered

as the major resources of human's energy, so that 90% of the energy consumed by peoples on the planet is supplied through these resources. Under these conditions, a part of the solution to this problem is to replace the fossil fuel with clean, renewable energies [30]. Keeping this issue in mind, it is discussed in the following alternative energy resources, especially their prominent role in reducing the countries' problems.

3. THE ALTERNATIVE CLEAN ENERGIES

In general, all sources of energy, except for fossil resources, are called "alternative energies," which are divided into two groups of "renewable energies" and "non-renewable energies". Nuclear fuels are of alternative nonrenewable energy and solar, water, wind and biomass energies are of renewable energy. One of the most important sources of alternative energy is the power of water and nuclear energy, which accounts for roughly 12 percent of the world's energy consumption. It should be noted that alternative energy resources form currently a small but increasing portion of total energy consumption in the world. This is because alternative energies and their resources are very clean in terms of the environment [22]. In addition, due to concerns about the reduction of fossil fuel resources, and in order to provide energy security and to reduce their dependence on imported oil, countries are struggling to invest extensively in new energies. As an example, Obama's most important strategy in the field of energy had been focused on reducing dependence on oil, as well as on turning to renewable energies. In this regard, the Obama administration has invested \$ 150 billion in renewable energies [20]. In addition, renewable energies possess some prominent features such as cleanliness, flexibility, and job creation, which are discussed in the following.

A. Cleanliness and Endlessness

One of the most important features of renewable energies is that most of them are clean and endless. These features are of their important characteristics and the significant difference between renewable energies and fossil fuels. As we know, fossil fuels such as oil, gas and coal are exhaustible. Currently, many countries have drained their fossil fuel resources. On the contrary, the renewable energies are naturally clean and seemed to be endless. As an example, solar or wind energy exists naturally due to the everlasting solar radiation or air flows. So, the cleanness is among the outstanding features of renewable energies. In contrast, one of the most important concerns of countries and experts in the field of energy is the issue of the exhaustibility of fossil fuel resources and, consequently, endangering the energy security in future. But, this is not true about the renewable energies, and the countries investing in such resources will not be worried about the energy security in the future. Because of this, over the last few years, many countries, especially Western countries, have invested heavily in these energies [24].

B. Flexibility and regionality:

New and clean energy resources can be controlled regionally and in order to do that, there is no need for advanced power transmission systems. In other words, it is not necessary for all the different regions of a country to be connected to each other through lines or other energy transfer devices. Accordingly, by proper and logical planning based on the characteristics of each region, countries can choose the type of energy used in those regions, and resolve the problem of supplying the needed energy in a secured and high efficient manner by investing properly and

purposefully. For example, some European countries use this type of energy in the windy areas to meet their people's needs. In contrast, in areas where the sun and the heat exist sufficiently, it is prioritized to use their energy to meet the people's needs. [24]. So, flexibility is another feature of the new energies and has greatly increased the importance and value of such energies for different countries.

Accordingly, there is no need for all cities and villages in a country to be connected to the grid to use energy. As a result, it is profoundly reducing the cost of transfer as well as the energy waste. It should be noted that at present, one of the most important issues for countries is transferring energy from the production site to all cities and villages, which imposes both a high cost and energy waste in the transferring route. For example, a part of the produced electricity is simply wasted on high voltage power cables during transmission. It is because of this that countries are looking for a method to transfer electricity wirelessly in order to reduce the wastage rate.

C. Clean and green

Another significant feature of new energy is that it is clean and green energy, which has been highly attracted by countries and experts in the field of energy and the environment. It can be said in this regard that nearly all of the new energies are clean in the view of environmental standards and do not produce any pollution. As an example, all energies like solar, wind, and biomass ones are considered as purely renewable energies, whose widespread use does not lead to environmental problems.

Of course, in the case of some of the new energies, especially in the case of geothermal power, it will be some pollution due to the release of hydrogen sulfide, mercury, and radon; however, the amount of such pollution is not comparable to the one produced by the oil and coal consumption.

As it was mentioned, the consumption of oil and coal has resulted many problems for the environment, as well as human life. In fact, the widespread pollution of the seas, global warming, the expansion of the process of melting Arctic ice, the destruction of forests, the spread of deserts on the planet, the elimination of biodiversity and the extinction of thousands of species of animals and plants, and dozens of other environmental issues, are just a small portion of the crisis that human being has created in the early twenty-first century because of the excessive use of fossil fuels. Therefore, given the widespread human problems in this area, the cleanliness of new energies can play normally an important role in reducing environmental pollution [29].

D. Job creation and sustainable development

Another central aspect of investment in new energies is the role they are playing in the job creation and the sustainable development in different regions of a country, as well as at the general employment level. However, many countries are now facing the extensive problem of increasing unemployment, in the circumstances, the investment in new energies not only reduce the dependency on fossil fuels and many environmental problems but also raise the level of general employment simultaneously.

For example, the job creation such as forestry and forestation to produce biomass energy, construction of various factories to manufacture various devices for energy conversion, the employment of specialist manpower to design diverse energy conversion systems and of professionals in research centers for new energies, all of them can play a significant role in the sustainable development in different regions of different countries.



Fig. 1. US unemployment rate in the last 10 years [32]

The importance of job creation through investing in new energies is so high that Barack Obama declared as one of his most important goals in this context resolving an important part of America's unemployment problem. In this regard, Obama had announced the creation of 5 million new jobs through investing in new energies as one of his goals in the energy policy [5], and according to the statistics, he achieved this goal. During the previous year, the rate of unemployment in the United States was only 4.9% [32].

E. Iran and Renewable energies

The production and consumption of renewable energy in Iran is not very suitable. At the present, the total renewable energy produced throughout the country is estimated at 254.52 MW. It consists wind, solar, biomass and hydroelectric powers of 146.700, 37.92, 7.5, and 62.4 MW, respectively. It has been planned this amount of energy to be increased up to 300 MW, which is of course very low. It is while Iran has many great capacities to produce clean energies such as hydroelectric, wind, solar, geothermal, and biomass powers, due to its specific geographical conditions, and in the case of investment, Iran can derive benefits from these energies in the best manner. As an example, located in a geographical region with about 300 sunny days, Iran is at the highest level among the different parts of the world in terms of gaining solar energy.

Due to a variety of reasons, such as ease in availability and conversion to electricity, environment-friendly, and cleanliness, the solar energy is of great utility. In addition to reducing environmental pollution and related social costs, the presence of solar energy in the country's energy basket will increase the energy security and strengthen the country in terms of passive defense. Also, it can be addressed by the studies conducted on Iran's capacity for wind energy which can produce 40000 MW of electricity by installing wind power plants in the country [28].

To make optimum use of these opportunities, the Iran government has passed new regulations in terms of consumption pattern reform. Based on a joint proposal by the ministries of petroleum, power, economic affairs and finance, and management and planning organization, and based on Article 17 of Energy consumption pattern reform Act, passed in 2010, the Cabinet of Ministers approved a new executive code. This executive code consists of 11 applicable articles which should be enforced by petroleum and power ministries and a full report of them should be presented every six months [12]. The ultimate goal of this code is to strengthen and to provide opportunities to invest in new energy. In this regard, it should be noted the energy consumption pattern reform Act. Under this law, the task of defining, modifying and reviewing the basic policies

for each of the areas of consumption and energy production is carried out by a work team of ministers consisting of power minister, oil ministers, and president's deputy for planning and strategic supervision. Also, it is formulated by the ministries of petroleum and energy and passed by the cabinet of ministers the appropriate executive guidelines in the form of the annual budget in order to support, to promote and to enhance the research and development system on new technologies through the provision of needed research funding up to manufacture samples and commercialization.

According to this regulation, the policy-making in the country's energy sector including renewable energies and optimizing the production and consumption of energy carriers is only of the responsibilities of the Supreme Council of Energy, and the structure of the Supreme Council of Energy should be reformed so that it will be possible for energy supply and demand parties to participate regularly in the council meetings and their joint policy-making in the energy sector.

Also, the ministries of power, petroleum, agriculture, and industries mines are required according to their professional field, to identify and design all the needed technologies in the specialized field of energy supply and consumption for the next 20 years and to provide for internal manufacturers and producers to design and improve such technologies. The energy consumption pattern reform Act also requires the ministry of power in Article 61 to conclude a long-term contract with non-governmental producers on guaranteed purchase of electricity driven from the renewable energy resources to support extensively the use of renewable energy resources, including wind, solar, geothermal, water small installations up to 10 MW, marine and biomass including Agricultural waste, forest waste, garbage, urban and industrial wastewater, Livestock waste, biogas and biomass.

It is supposed to obtain and pay to the ministry of power the funding needed for the guaranteed purchase of electricity produced through renewable resources. This funding is provided through the value of saved fuel on the basis of imported liquid fuels and the price of exported gas and the benefits from non-production of pollutants and environmental protection per the electricity produced by such power plants. Article 62 requires the ministries of power and petroleum to announce their support generally and publicly and to pay from their approved annual budgets in order to promote the economized use of renewable energy resources in separate systems of the network such as solar water heater, solar bath, wind pump, wind turbine, photovoltaic systems, gas recovery from biomass resources and savings in the supply and distribution of fossil fuels.

In order to recycle energy from the heat losses in nuclear power plants in the form of heating, cooling or producing fresh water, Article 63 of the same law requires the Atomic Energy Organization to study the possibility and feasibility of the simultaneous heat and power production at the nuclear power plants before their construction and in the case of obtaining positive results from the studies, to construct and to exploit solely by the aforementioned method. The above organization is required to conduct research and study plans in order to reduce the energy consumption of fuel cycle facilities, to domesticize the nuclear plant construction, and to implement research projects related to nuclear fusion [13].

To enforce these regulations, the Ministry of Petroleum plans to increase energy efficiency within the framework of a resilient economy. In this context, the optimization of energy consumption has been considered in three sections of resilient economic

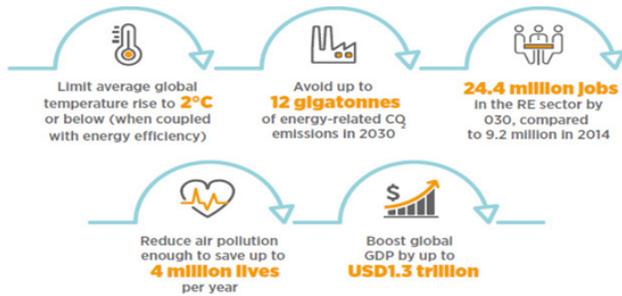


Fig. 2. Benefits of Doubling Renewable Energy [25]

policies. By its legal instruments and under the regulation titled Removing production barriers, the Ministry of Petroleum has also approved a \$ 16 billion contract. Also, in line with energy efficiency policies, the Ministry of Petroleum is seeking to establish and support energy services companies. According to officials from the Ministry of Petroleum, the creation of these companies provides the opportunity for attracting investors, as well as the attention to new technologies reducing energy consumption. According to this plan, it is decided all plans in the entire production chain to be optimized while the energy consumption pattern reform should be hardware, rigorous and compulsory. In this regard, the Ministry of Petroleum seeks to provide infrastructure for optimizing energy consumption, reducing energy consumption, enhancing energy efficiency with minimal losses, reducing energy consumption extremity, exporting more products and standardizing energy indicators [12].

Iran Renewable Energy Organization has also made extensive measures to promote renewable energy across the country, one of which is to provide the deprived and remote areas with the sustainable and available energy through photovoltaic systems in order to improve living conditions and social conditions. In this regard, this system has provided more than 1000 rural households in Qazvin, Ardebil, Khuzestan, Fars, Zanjan, Mazandaran, Kerman and Semnan provinces with the electricity [25].

Also, by adopting incentive regulations, it has provided investors and private sector with the possibility of entering the field of renewable energy, including the increase in the guaranteed purchase price, up to 4627 rials per kilowatt-hour, for the clean electricity produced by new power plants. The contract for the electricity purchase from these power plants for a career of 5 years is one of the other measures of the Iranian government. Also, it can be addressed to the regulation on Electricity Toll in order to promote the development of renewable energies. Accordingly, in addition to receiving the electricity price per kilowatt-hour, the Ministry of Power includes also a 30-rial extra price in the electricity bills and receives it from all electricity subscribers, unless rural households. It is to be spent about half of the received money for the support of clean electricity production. At the end, it can be mentioned the law of commitment to delivering saved liquid fuel or its equivalent to private sector investors for 2 years from the start of the clean power plant exploitation [25].

Despite these measures, Iran is one of the countries that continue which is profoundly dependent on oil and gas, and much tendency is not seen in various sectors to turn to new energies. It is in the conditions where Iran has a strong commitment to reduce greenhouse gas emissions in the Paris Agreement. It is worth to point out that in the Paris Agreement Iran has pledged to reduce unconditionally greenhouse gas emissions by 4% and

if sanctions are lifted, by 8% until 2030 [31]. The reason for this situation is the serious and structural barriers in the country, of which the following can be mentioned:

- **Technical barriers:** The inherent limitations of renewable energy such as climate and the existing technological barriers are one of the reasons for non-expanding renewable energy in Iran and other developing countries.
- **Financial constraints:** The most critical barrier to the development of renewable energy in developing countries is the financial constraints from two origins: first is the relatively high cost of renewable energies compared to fossil fuels and the second is fossil fuel subsidies which lower their relative prices and make them uncompetitive.
- **Cognitive impediments:** which include the uncertainties and unawareness, in turn, forming improper prejudices of the society, both at the family level, at the private sector level or at the state level, and resulting from the lack of information in this section. In Iran, for example, almost no family or institution or company is planning on renewable energies as one of its sources of energy.
- **Institutional obstacles:** The present of few organizations in this sector, lack of supportive laws and lack of proper market, and etc. are of institutional barriers to the expansion of the renewable energies in the country. In the case of Iran, although many efforts have been made to clarify the priority of renewable energy to other types of energy, the achievements in this sector are negligible, because in general, the real status of environmental factors in the system of the production and decision making has not been determined and unfortunately, unless the problem of fossil fuels destroy obviously the environment, one cannot be attracted to support the renewable energies [16].

4. POLICY RECOMMENDATIONS

A. Understanding the problem with the elites' consensus

It seems that there is no consensus among the ruling elites in the Islamic Republic of Iran regarding the problem of economic underdevelopment. Obviously, one of the main requirements to overcome the current situation and to move the country's economy toward the investments in the field of renewable energy and to achieve a sustainable development is that the key elites reach to a comprehensive consensus to recognize the country's problem, i.e. the underdevelopment of the economy [23].

B. Considering the difficulty and time consuming of changing the policies of the non-developmental government

One of the essential requirements in policy-making and designing the development models is that the consensus among the elites on the necessity of changing macro policies is a difficult and time-consuming process, and sometimes waiting to achieve this consensus leads to a great loss to the country. Therefore, it is better to design development models according to the status quo and without requiring radical changes in the structure and agent.

C. Using peoples' capacities along with the government direction

Development plans have massive economic and social impacts, and people capacities should rely on both in the design and

implementation phases. Therefore, it seems that one of the requirements of design development models is the use of such capacities and their expansion [26]. As an example, if the government can implement a model that utilizes the massive capacity of liquidity, gathered in the form of peoples' micro and macro capitals, in the country's economy, it can overcome the problem of the inefficient accumulation of capital and make use of public small-scale investments in renewable energy production, since people's participation is an important factor in developing the renewable energies, and on the other hand, the nature of the use of renewable energy is so that whoever has little capital can equally enter useful economic activity, consequently resulting in new employment for people and a good economic benefit for investors. Germany and Denmark, for example, are the pioneers of massive exploitation of renewable energies. They wouldn't be successful without public participation. In Japan, Africa and Latin America, people participation have turned into a driving engine for renewable energies.

5. CONCLUSION:

Despite fossil fuels outstanding role in the countries' economic growth and development, it has turned into the origin of extensive problems in various fields. In the current situation, the problems caused by fossil fuels have become so evident that the necessity of turning to renewable energies seems obvious and irrefutable. Accordingly, many countries, especially Western ones, have turned to renewable energies which ensures sustainable growth and development. While many other countries, including Iran, have not yet done much in this regard and continue to use fossil fuels extensively.

As mentioned only about 300 MW of renewable energy is produced in Iran. Iran has no alternative but to turn into renewable energy in order to guarantee its security in various aspects and also have a sustainable development. The fact is that, over the past few years oil sanctions have shown widespread dependence on oil revenues and not only it threatens, economic security but also military, political and social security of the country. Accordingly, to increase the national security and to reduce the vulnerabilities, it is necessary to turn to renewable energies and to reduce the dependency on oil revenues. In addition, the disturbing issue is that the consumption of oil and gas is very high in the country, and it is even possible that the domestic production doesn't suffice the internal consumption in the coming years. Considering the country's vast capacity to produce renewable energies, it should be prioritized to invest in this field. This category of energy will not only reduce the country's dependency on the oil revenues, but also leads to sustainable development by reducing environmental problems. Moreover, the job creation through the investment in renewable energies can lead to long-term economic growth for Iran, and ultimately the sustainable development can serve as a factor in providing sustainable security in a variety of dimensions.

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