

# Current Situation of Renewable Energy Resources Marketing and its Challenges in Light of Saudi Vision 2030 Case Study: Northern Border Region

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## Summary

The Saudi Vision 2030 defined the directions of the national economy and market towards diversifying sources of income, and developing energy to become less dependent on oil. The study sought through a theoretical review to identify the reality of the energy sector and the areas of investment available in the field of renewable energy. Findings showed that investment in the renewable energy sector is a promising source according to solar, wind, hydrogen, geothermal energy and burning waste than landfill to extract biogas for less emission. The renewable energy sector faces challenges related to technology, production cost, price, quantity of production and consumption, and markets. The study revealed some recommendations providing and suggested electronic marketing system to provide investors and consumers with energy available from renewable sources.

## Key words:

*Marketing, Energy, Vision 2030, Solar Energy, Wind Energy, Thermal Energy, Landfill*

## 1. Introduction

The Kingdom of Saudi Arabia is a vast country and is considered a geographical area that is diverse in its nature and climate. It is characterized by many natural components and a major source of global oil, in addition to the fact that it benefits from large sea and land borders, and its rocky layers contain large mineral wealth, accompanied by desert areas that are sunny throughout the year, and high temperatures Summer and moderate to somewhat cold winter. In addition to the oil wealth, Saudi Arabia consumes 40-50% of its oil exports as financial returns to feed the state treasury to spend on infrastructure and services, the education and health sector and the provision of religious services accompanied by a parallel consumption of the same oil products for the purpose of generating electric power. The Saudi Vision 2030 came to set new governmental directions in which the government and the people participate together, the most important of which are the sources of electric energy, reducing carbon emissions, and developing sources of income from agriculture,

tourism, marine navigation and transportation.

encourage entrepreneurs to exploit the investment potentials provided by the Kingdom in the field of renewable energy.

### 1.1 Study Problem

The problem of the study lies in the need to provide sufficient information for the marketing and investment sector in the field of renewable energy in the Kingdom of Saudi Arabia and to identify the challenges it faces.

### 1.2 Study Importance

The importance of the study comes in its compatibility with the directions of the Saudi Vision 2030 towards sustainable development by identifying the possibilities of investment and marketing in the renewable energy sector, especially in the northern border region, which represents a large area of northern Saudi Arabia and has many natural resources and a sunny area in summer and wind blowing in winter, which Making it an inspiring source for investment in the field of renewable energy from the sun and wind, in addition to the use of thermal heating technology through the ground and burying the waste of animal and population products, where more than one-fifth of the state's stock of camels and sheep, in addition to the consumer wastes of the population, are stored in its territory.

### 1.3 Study Objective

The study aims to analyze the reality of marketing for renewable energy sources and its challenges in the light of Vision 2030 in the Kingdom of Saudi Arabia and to identify what it offers as an important development resource in an oil country, especially in the northern border region.

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## 1.4 Study Questions

The study attempts to answer the following questions:

- (i.) What is the state of renewable energy in the Kingdom of Saudi Arabia from the point of view of researchers and specialists?
- (ii.) What are the renewable energy sources available in Saudi Arabia?
- (iii.) What are the challenges of marketing renewable energy and investing in its projects in the Kingdom of Saudi Arabia?

## 1.5 The Study Limits

The temporal boundaries were represented in the period between 1440/1441 AH, while the spatial boundaries were represented in the northern border region.

## 2. Theoretical Consideration

The Kingdom of Saudi Arabia is considered in the advanced ranks of the countries that have oil and gas reserves, and it consumes a fifth of its oil production. In addition to the presence of abundant wind and solar energy resources, the use of these resources is negligible [1]. The view of the rapid growth in the population and the oil industry and the need to provide services, it has become important to keep pace with the increasing needs and exports to enable the state to continue as an economic power within the list of twenty [2]. The Kingdom is facing the problem of carbon emissions that threaten the environment and pollution of air and water, which has caused health problems that increase the burden of the health service bill provided to residents, expatriates and residents [3]. The Kingdom also has the capacity to generate hydroelectric power, generate energy from organic landfills, solar energy, and wind energy [4]. In addition to this, its ability to generate electricity from geothermal energy, which is considered a sustainable source, which covers a large part of the increasing demand for electricity in an economical and environmentally friendly manner [5]. The use of renewable energy and enhancing the efficiency of energy saving and consumption are environmental issues and its effects on human health, which reduces carbon emissions and provides cash from oil revenues to promote development projects [6]. The results of a number of studies made important recommendations for the development of renewable energy technologies in the Kingdom of Saudi Arabia, including solar energy and wind energy [7].

In pursuit of the goals of Saudi Vision 2030, achieving sustainable development enhances economic, social, commercial, human and environmental development through building and developing the renewable energy sector [8]. [9] indicated that developing a marketing and manufacturing model for renewable energy products in the Kingdom of Saudi Arabia will reduce carbon emissions, increase revenues and create more jobs. [10] showed that the current state of energy in Poland while the situation is similar to previous results found in the case of energy in the Kingdom of Saudi Arabia that focuses on policies and challenges in terms of adopting advanced technology that requires taking the best applied practices, improving education and awareness of the importance of using and marketing renewable energy products. [1,11] focused on the importance of governmental policies and plans that stem from Vision 2030 to develop the renewable energy sector and identify the challenges it faces.

## 3. Methodology

The research depends on the analytical approach of the results and information emanating from the theoretical review of previous studies and diagnosing the reality of renewable energy in the Kingdom of Saudi Arabia in general and in the northern border region based on the principle of SWOT operations in identifying strengths, weaknesses, opportunities for improvement and challenges facing the industry market in renewable energy.

### 3.1 Study Community

The study population consists of studies, reports and research in the field of renewable energy production in the Kingdom of Saudi Arabia and its investment and marketing locally and globally published in scholar-journals. The Kingdom's Vision 2030 and the reports of official authorities in the field of renewable energy.

### 3.2 Study Sample

The Qualitative Sample Approach relates to previous research and studies related to the field of renewable energy and its sources, development, investment and marketing. And statistical data that will be collected from official and private agencies specialized in the field of research and exploration for renewable energy sources in the northern border region and their investment and marketing locally and globally.

### 3.3 The limits of the study

The temporal boundaries were represented in the period between 1440/1441 AH, while the spatial boundaries were represented in the northern border region.

### 3.4 Study Model

The study depending on the following model to review the previous studies and matching best practices in renewable energy marketing sector.

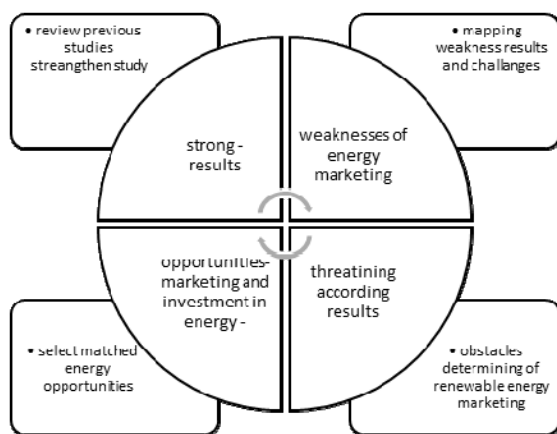


Fig. 1 Study analysis model

## 4. Results

### 4.1 Renewable Energy Sources in Saudi Arabia

A theoretical review of studies related to the field of renewable energy in the Kingdom of Saudi Arabia revealed the emergence of a number of sustainable energy sources, which were represented in each of the following:

#### (i.) Solar Energy:

Saudi Arabia achieved a level Advances in the global solar energy index, when it jumped two places in the list of this index in 2018 , as it advanced to the twelfth place after it was in the fourteenth place globally, and this comes at a time when the country seeks to export solar energy to Europe during the ten years The Kingdom aims to operate solar power plants with a

production capacity of 41 gigawatts by 2032, projects that are supposed to meet more than a third of the Kingdom's electricity needs. These giant Saudi projects are promising, and it is believed that when oil ends, Saudi Arabia will be the world's first in solar energy. The most important of these stations are: the Laila project with a capacity of 80 megawatts, the Wadi Al-Dawasir station with a capacity of 120 megawatts, the Saad station with a capacity of 300 megawatts, the Al-Rass station with a capacity of 700 megawatts, the Sakaka station with a capacity of 300 megawatts, and the Sudair station with a capacity of 1500 megawatts [12].

#### (ii.) Wind Energy

The Kingdom of Saudi Arabia has moved towards energy production by relying on clean energy sources that reduce carbon emissions within the directions of the Kingdom's Vision 2030, and aspires to implement projects that produce approximately ten thousand megawatts of electrical energy based on renewable sources in a shift towards diversifying the components of the Saudi economy, and away From almost total dependence on oil and gas, while enhancing the ability to meet internal demand and looking towards exporting renewable energy in the far future. The Kingdom of Saudi Arabia has long sea beaches capable of producing more than 180 gigawatts of electricity by utilizing wind energy with an average production rate of 40%, which exceeds global projects implemented by countries to produce electric power based on wind, and this includes the United States with a percentage 34%, Britain 28%, Denmark 29%, and Germany 20%. There are a number of places in the Kingdom that can be used to generate electricity from wind energy, such as the Gulf of Aqaba, the Jahid site, the Taif Mountains, and Yadmah, which are characterized by strong wind speeds that allow the construction of efficient projects to generate electricity from wind energy. In addition to this, the geographical advantages of the Kingdom are added, as it has long sea beaches, ideal wind speed, and one of the most important energy projects in it is the Domat Al-Jandal wind farm in Sakaka area with a capacity of 400 megawatts. These projects add nearly ten thousand job opportunities and feed the GDP of the Kingdom of Saudi Arabia with more than 24 One billion US dollars by 2030, which accompanies the state's directions to shift towards renewable energy sources, diversify the economy from oil and gas, feed domestic demand, and consider exporting renewable energy in the long term [7, 10] and [13]

## (iii.) Geothermal Energy

Made extensive efforts; To shift to new energy sources, primarily geothermal energy, which provides a clean alternative to other sources that are not environmentally friendly. Geothermal energy in the Kingdom provides a tangible opportunity to exploit it and achieve tremendous changes by relying on it. It has many geothermal resources in its various geographical locations, and is linked to the general tectonic activity of the Red Sea, rocks and volcanic hills. Thermal energy is a huge source, and it is of natural origin stored in the ground. Therefore, research and academic institutions in the Kingdom attach great importance to this matter, especially King Abdullah University of Science and Technology (KAUST), which discussed in a research conference how to exploit geothermal energy, focusing on Potential aspects of the resources to be found in the Kingdom, early geothermal development, and geological capabilities, from subsurface fluid flow to drilling, and from surface energy conversion systems to regulations and economics. and counting Generating geothermal energy from natural heat underground, a safe and clean method that is not subject to fluctuations in its use and is valid throughout the year, and now represents the main source of energy in some countries, especially in volcanically active places; Such as Iceland and New Zealand, but despite the limited volcanic activity in Saudi Arabia, it is sufficient to establish geothermal power plants along with other sources. One of the most important advantages of thermal energy is that it does not need fossil fuels, coal or gas, and it emits relatively less carbon dioxide, and its sustainable availability, unlike solar and wind energy, as the steam used can be condensed and returned to the ground. In addition to the low operating cost after the construction of the station. It also generates electricity, and hot water is usually hot, so it is easy to extract. While there are three methods of generating geothermal energy: dry evaporation, flash evaporation, and binary cycle. Currently, King Abdullah City for Atomic and Renewable Energy is applying the first method by using deep tubes inside the ground to generate steam that It will drive the turbines that generate electricity, and it is working to exploit the opportunities that arise in this field to be an economic activity; It is expected to generate 1,000 megawatts of geothermal energy by 2032. One of the most important areas for benefiting from this type of renewable energy in Saudi Arabia is Ain Jabal Libya, located at Wadi Daghbjaj, on the international road between Mecca and Yemen, and Rawan al-Obeid located in Wadi Jazan. And Bani Malik is located on Wadi Damad, Wadi Khalab and is located in the Qamzeh area of one of the governorates of Jazan, Ain Amiqeh is located in the Laith governorate of Makkah, and Ain Al-Hara and Ain Umm Sabaa are located in Al-Ahsa [5].

## (iv.) Hydroelectricity

It is one of the clean, environmentally friendly forms of energy used on a wide global scale. Energy is produced by using the Earth's gravitational force as a result of descending water from different heights to move turbines designated to generate energy. The energy produced is used to operate brine desalination plants. The cost of a hydropower plant is also relatively low, which makes it a competitive source of sustainable electricity production. The hydro plant does not consume any water, unlike coal or gas plants. The standard cost of electricity for a hydropower plant with a capacity of more than 10,000 kilowatts is less than 0.05% US dollars per kilowatt -hour. The establishment of the station requires the presence of a water dam and a reservoir, and it produces varying amounts of electricity as a result of the difference in the slope of the water surface, up and down, in a few seconds. The project also produces no direct waste and usually has a much lower level of greenhouse gas production compared to photovoltaic power plants and fossil fuel power plants of course. It actually emits up to 3 to 4 times more greenhouse gases. Studies have shown that the Kingdom can install electrically generated capacities to 170,000 kilowatts of hydroelectric power in existing dams and flows, and generate about 1,000 megawatts annually. Here, it is necessary to delve into studies and technological economic analysis to estimate the potential of this sector and the performance of this sector and to develop it in order to use a clean source of energy generation [4].

## (v.) Solid and Organic Waste

Many countries have tended not to extract energy from solid waste due to the lack of space allocated for landfill and the high and environmental cost of transporting garbage. Due to the significant increase in the production of waste, which has become a global environmental problem, and the lack of sufficient space for landfills that distort the landscape, and hardly can accommodate the tons of waste and waste that continue daily due to our consumer civilization, which is persistent in throwing and replacing. The spread of disturbing odors, the leakage of toxins, the growth of bacteria that cause diseases and epidemics, in addition to the increase in carbon dioxide emissions through burning fossil fuels during waste disposal processes, or through the emissions of methane, ammonia and sulfur dioxide directly from waste. Hence, the idea of converting waste into energy sources is not new, as in the past, animal waste was used for heating and heating, by direct burning. Waste is currently the third source of renewable energy growing around the world after solar and wind energy,

and it contributes to more than half of the renewable energy used. Globally, energy extraction from solid garbage is an encouraging option, due to the small number of areas designated for backfilling, and the high material and environmental cost of transporting garbage. Most of them come from an industrial source, such as industrial waste, and the consequences of recycling it, which may not be free, as well, of environmentally unfriendly by-products [14]. Hence, the fuel derived from the waste will help reduce the storage and disposal of industrial waste in the long term, and ward off the environmental risks that can be caused by its accumulation in landfills. In the Kingdom of Saudi Arabia, there are huge quantities of industrial solid waste and similar food waste, and it can be a distinguished source of energy through special treatment to produce biogas (methane). In Saudi Arabia, there are also a large and diverse number of new technologies capable of producing energy and fuel from waste without the need for direct burning of waste. The Kingdom has technologies capable of producing more electrical energy than that produced from the same amount of fuel through direct combustion. The main reason for this is the separation of corrosive components (ash) from the converted fuel, which leads to higher temperatures resulting from burning, and these technologies include boilers or boilers, gas-powered generators, internal combustion engines, and fuel cells. And some of these devices are capable of converting energy into liquid or gaseous fuels as efficiently as possible [15].

#### 4.2 Marketing and investment challenges in renewable energy

As mentioned in theoretical review the studies of [6, 9, 16] presented major issue that face the marketing sector for renewable energy products faces a number of challenges that may limit investment in this sector in the current circumstances, including:

- (i.) Significantly high costs, compared to producing electricity from traditional sources.
- (ii.) Lack of awareness of the importance of renewable energy by the consumer.
- (iii.) Directing studies, research and techniques for petroleum exploration and petrochemical industries.
- (iv.) The lack of supportive legislation in the first decade of the 21st century to promote the use, export and investment of renewable energy.
- (v.) Lack of studies of market needs and the role of the marketing sector in promoting a renewable economy.
- (vi.) Focus on oil production linked to the exchange rate of the dollar as the market value of the products provided by energy generated from fossil fuels.
- (vii.) The lack of geological survey techniques to identify the reality of thermal energy in the tectonic layers to know the benefit of this energy and its market impact on the gross national product.
- (viii.) The lack of electronic markets that enhances the ability of investors to establish investment companies to market renewable energy products, equipment or technologies.

### 5. Discussion

It is evident from previous studies and by answering the study's inquiries and questions that the concept of marketing the renewable energy sector in its entirety is not economically feasible, during the first decade of the 21st century, but with the passage of time the costs have decreased dramatically; as a result of the technology improving very quickly; by increasing support for research and development activities in renewable energy technology, especially solar cells, while raising the efficiency of supply chains and providing investments that created a wide scope for the spread of renewable energy projects around the world [2]. It also produces an environmental problem for some types of energy, such as thermal energy, which emits hydrogen sulfide gas, which It smells like rotten eggs, and they contain subterranean fluids with a noticeable toxicity. The marketing sector faces a problem in setting a ceiling for the assumed pricing for the cost of production and export of energy, whether at the local level from the consumer side or to neighboring countries, as the Kingdom aspires to export energy to Europe and Asia [17]. The sector finds a big problem in providing qualified nationally qualified competencies and expertise in the field of renewable energy technologies, as the Kingdom is approaching its diamond year in the use of oil, and its studies focused on its specializations previously in the oil field. of jobs and their promising future.

### Recommendations

The study recommends the necessity of providing regulatory legislation that enables the renewable energy marketing sector to provide investment areas in supporting the sector by spreading awareness of the importance of reducing greenhouse gas emissions from power plants using the carbon capture technology in power plants and industrial facilities in order to prevent carbon dioxide from entering the atmosphere. In addition,

it mandatory to raising awareness of the importance and advantages of renewable energy by introducing and developing academic curricula for renewable energy, increasing the scope of study, at the school level, and providing specialized human resources in the fields of solar, wind and other renewable energy sources. Establishing an organization for energy production from renewable energy sources within policies and procedures that enhance the state's efforts to diversify the energy mix, promote economic development, reduce emissions.

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