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An environmental analysis of the human potential to invest in alternative energy in Najaf Governorate

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Abstract---Alternative energy is an important source of clean energy, as it is one of the ways to reduce environmental pollution, and it is renewable and inexhaustible energy. There are potentials available to invest in alternative energy in Najaf governorate, represented by solar, wind, water energy, and that Najaf governorate is an ideal location for the establishment of this vital project, which is used in a number of public and proposed projects for the production of electricity, as the study revealed the existence of serious steps in investing alternative energy in Najaf Governorate, the study proved that solar energy has been invested in the province through the establishment of many projects investing in solar energy and used for irrigation and lighting purposes in various parts of the province. Wind and this is an important step in the development of wind energy investment in Najaf Governorate. The amount of energy produced by the dams, the Kufa dam was limited to only 50 watts, while the Abbasid dam is currently disabled.

Keywords---environmental pollution, Wind, Health, human, energy.

Introduction

Energy in general and alternative energy in particular is an urgent strategic commodity and an indispensable pivotal issue in our contemporary world on the grounds that it represents the main engine for all comprehensive development processes and is responsible for the spread and continuity of advanced aspects of contemporary life. A variety of scientific, household and recreational devices

advanced means of transportation and communications, as well as our great needs for them in the water desalination industry. Energy is also an essential element for the interaction between the natural environment and society, as well as a major source for achieving sustainable environmental development, and the development of the process of exploiting renewable energy sources. Clean energy provides the necessary energy and reduce dependence on primary sources and choose alternatives from renewable sources, in addition to preserving the safety of the environment, as studies and research indicate the need to reduce the effects of climate changes expected globally and the need to replace primary energy sources coal, oil and natural gas with renewable energy sources such as energy sun, wind and water to achieve environmental security and that making development more sustainable can Enhance the ability to mitigate and reduce its emissions and thus reduce the possibility of change in the characteristics of the Earth's climate elements. The study concluded that renewable energy has the ability to meet the need for development in the study area, in addition to its ability to increase development and growth on a large scale, as renewable energy resources and technologies are an essential element of Elements of sustainable development The study concluded that the environmental damage resulting from the use of renewable energy sources is less than similar sources of energy and can provide reliable and sustainable supplies as they are available first, and they are natural sources that are not implemented such as the sun and wind secondly, as well as they do not adopt the techniques of the central system. The need for it has increased steadily these days as a result of many factors, including the doubling of the population worldwide, the increase in the adoption of modern technologies everywhere, the transition of societies and their transformation from agricultural to industrial, all of which are accompanied by a significant increase in energy consumption, and all of this has led to an increase in demand for all Types of fuels sharply, which put pressure on natural energy sources, so energy is a measure of economic growth for countries and a symbol of their scientific, technical and civilized progress, as well as an indicator of the well-being and good conditions of peoples and societies.

Research problem

What are the types of alternative energy in Najaf Governorate 1?

Are there potentials for investment and development of alternative energy in Najaf Governorate -2?

Research Hypothesis

The alternative energy in Najaf governorate includes (solar energy, wind energy and -1 (hydroelectricity).

There are potentials available for investment and development of alternative energy in Najaf -2 Governorate.

Purpose of the study :

The study aims to reveal the types of alternative energy and the possibility of investing them in Najaf Governorate, in order to use clean energy for various activities in the province.

Study area boundaries :

The study area is represented in the province of Najaf, which represents the southern part of the Republic of Iraq and extends between longitudes (50,24-44,45) east and two latitudes (5,29-21,32) north. The east is bounded by the governorates of Qadisiyah and Muthanna, while the borders of Iraq are adjacent to the Kingdom of Saudi Arabia from the south and southwest, while it is bordered to the west by the Anbar Governorate. Note the map 1. search structure:

The research was divided into five sections:

First: The natural situation of Najaf Governorate.

Second: alternative energy

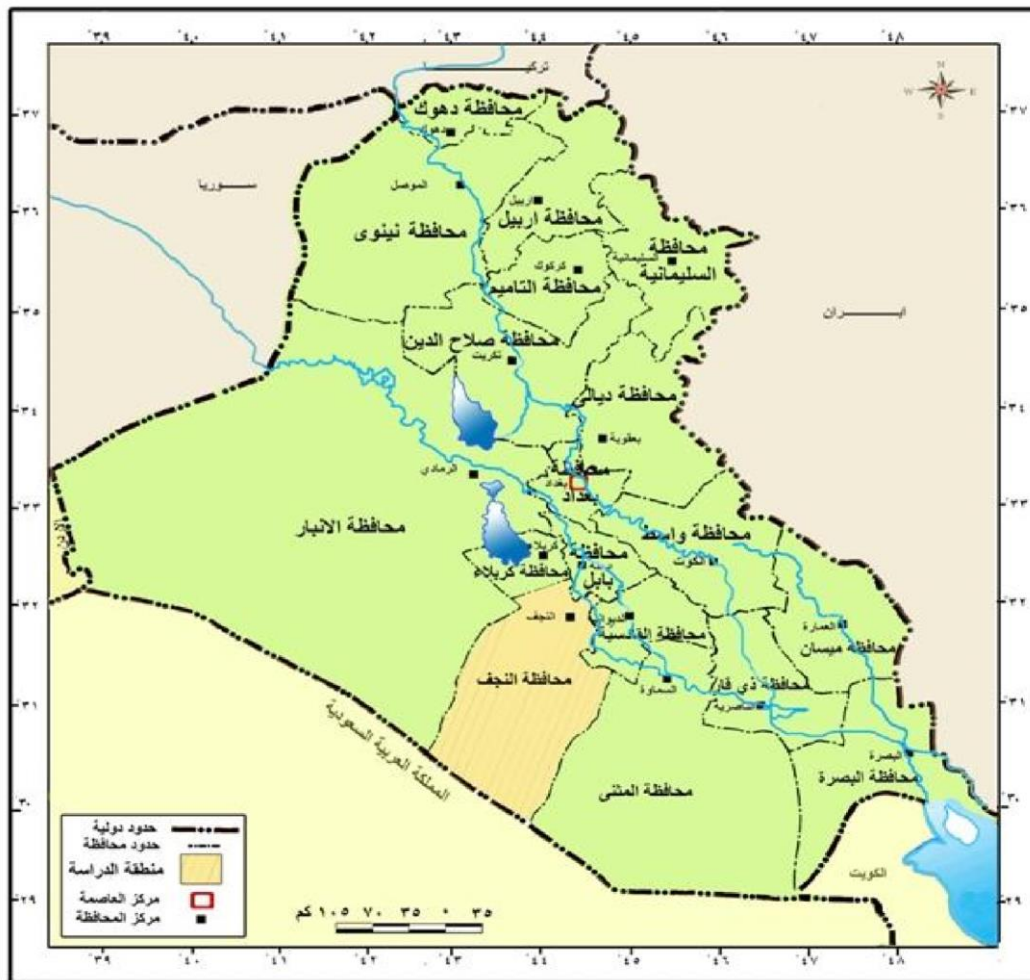
Third: the potentials available to invest in alternative energy in the province of Najaf

Fourth: The problems facing alternative energy in Najaf Governorate

The surface: proposals for the use of alternative energy in the province of Najaf

The research concluded with a summary and a list of sources

Map 1 Location of Najaf Governorate, Iraq



Source: General Establishment for Surveying, Administrative Map of Iraq, Baghdad, (1/35 km). 2009

Source: General Establishment for Surveying, Administrative Map of Iraq, Baghdad, (1/35 km). 2020

First: The natural situation of the study area: Surface

The study area is characterized by flatness, especially in the alluvial plain, as the Euphrates River extends in the province of Najaf within the region of the alluvial plain, which is characterized by flatness and gradual decline from north to south, as the elevation line is 26 m in its northern sides and the elevation line is 13 m in its sides. While the elevation line extends 25 m in its western sides and the elevation line 20 m in its eastern sides, which helped direct the waters of the Euphrates

River from north to south with the general slope of the surface of the study area 1 which leads to a high The course of the river thus increases the opportunity to

exploit hydropower, and the advantage of the flatness of the study area facilitates the use of solar energy and wind energy through the installation of solar cells and wind turbines.

Climatic features

It appears from Table 1 that the general annual rate of the amount of solar radiation in the study area is 2309 hours/cm² and this amount varies according to the climatic seasons. It reaches 771.94, so a greater benefit is achieved for the exploitation of solar radiation to generate solar energy during this month. But if the amount of solar radiation decreases, the opportunity to benefit from the exploitation of solar radiation decreases, and this is what happens during the month of January, when the amount of solar radiation decreases in this month, reaching 258.04. The benefit from the exploitation of solar radiation in generating solar energy during cloudy days may also be lost. As for the temperatures of the study area, they reached 24.5 m, as the temperatures reach their maximum during this summer month, in the month of July the temperatures reach 36.9 m and for these temperatures The high effect had a significant impact on the increase in the values of evaporation / transpiration, as the annual total of the amount of evaporation reached 617,5 ,mm. As for the annual total of the amount of rain it amounted to 104 mm, despite the concentration of rainfall during the winter season and it is It falls abundantly and suddenly, but it is very little. As for the annual total amount of moisture, it amounted to 42.2%, as the high levels of atmospheric humidity lead to erosion of the solar system and the wind turbines and reduce their efficiency. As for the annual rate of wind speed, it reached 2 m/s, as the wind movement is active in the governorate during the summer, to record the highest rates of wind speed in the months.

The heat ⁽¹⁾ June, July at rates 3,1 - 3,0 respectively, so the use of it increases during these months in generating wind energy. Wind speed to a large extent, such as strong storms, has a negative impact on the exploitation of alternative energy, as it may cause the uprooting of the solar system and the wind turbines, and the fast winds lead to the transfer of soil atoms, and thus dust storms, which in turn affect the damage of solar cells and wind turbines, reducing their efficiency.

Table 1 Monthly averages of climate elements in Najaf Governorate for the period from 2018-1987

evaporation/mm	mm Rain /	relative humidity %	wind speed (m/s)	average temperature/m	/ calcium cm ²	Months
89,62	14,4	68.7	1.3	10.7	290.72	January
156,64	15,1	58.5	1.8	13.3	381.37	February
212	13,3	51	2.1	17.7	481.09	March
301,95	14.1	41.5	2.3	24.3	589.69	April
425,0	4,8	30.6	2.6	30.1	673.59	May
545,16	0	23.6	3	34.1	771.94	June
617,5	0	21.5	3.1	36.9	760.09	July

564,22	0	22.7	2.5	35.1	702.63	Father
410,44	0	28	1.8	32.3	607.03	September
284.22	4,8	39	1.5	26.1	449.41	October 1
145,67	16.1	55.9	1.3	17.9	329.21	October2
92,52	19,4	68.2	1.2	12.6	258.04	Canon 1
-	-	42.43	2.5	24.2	527.92	annual rate
3854,0	106.4	-	-	-	-	the total

Source: The Ministry of Transport and Communications and the General Authority for Meteorology and Seismic Monitoring in Iraq, Water Resources Department, unpublished data 2019 due to the extension of the study area in two different natural regions, the sedimentary plain: Soil region and the western plateau region, so the soil in Najaf Governorate is divided into ¹

A- Alluvial plain soil: These are divided into three sections

1. Soil the shoulders of rivers
2. Soil river basins
3. Soils of marshes and swamps

B - the soil of the western plateau region

For these types of soils have no effect on the use of alternative energy

C- Desert soils: These soils have a negative impact on alternative energy sources, where this effect is the formation of dust storms, where these soils are dry and exposed to transmission by wind, so when the wind blows, dust flies with it, forming dust storms and thus It and wind affects solar cells to them, and even the rivers in the study area turbines, causing damage

(¹) Water resources in Najaf Governorate :

The sources of water resources in Najaf Governorate vary, some of them are surface represented by the Euphrates River in its branch Shatt al-Kufa, Shatt al-Abbasiya and the streams branching from them within the sedimentary plain region and the second is subterranean represented by wells and springs within the western plateau region

Surface Water Resources in the Alluvial Plain Territory

The water resources are represented in the sedimentary plain region of the Euphrates River and the two branches of Shatti al-Kufa and al-Abbasiya. The Euphrates River enters the Najaf governorate at the Al-Haidariya district, with a length of 10 km and a drainage of 250 m³ / s, and one stream branches from it, which is Bani Hassan, whose length is (10) km and with a discharge of 2.5 / m³ sec , and the total lengths of the Euphrates River with the Bani Hassan stream are 20 km, with a

total discharge of 252.5 m³ / sec . South of Al Kifl, about 5 km to two branches, Shatt Al Kufa and Shatt Al Abbasiya.

A- Extension of the river system in the study area ¹

Shatt al-Kufa

The Euphrates River enters the district of Kufa after branching off and is called the Shatt al-Kufa, as its length within the province is 75,200 km. A group of streams and sub-rivers amounting to about streams and sub-rivers, as their total lengths are (454.3) km and their total expenditures are (78) 907.14 m³ / sec
Shatt al-Abbasiya

The Euphrates River enters the Abbasid district after branching off and is called the al-Abbasiya Shatt, as the length of the al-Abbasiya Shatt within the governorate is 28 km. cutter . From Shatt al-Abbasiya, from the beginning of its entry to al-Abbasiya district and to its last point in the governorate al-Hurriya district a group of streams and subsidiary rivers is about, 20 streams and sub- rivers b- Discharge

The annual rate of the discharge of the Euphrates River at the Hindiya dam is $274.8 \text{ m}^3 / \text{sec}$, while the rate of discharge of the Abbasid Shatt at the Abbasid dam is $134.5 \text{ m}^3 / \text{sec}$, while the rate of discharge of the Shatt al-Kufa at the Kufa dam is $130.2 \text{ m}^3 / \text{sec}$. It is clear from the above that the discharge rates of the Euphrates River are decreasing as it reaches the highest discharge in the Hindiya Dam, and the decrease begins at the Abbasid Dam and decreases at the Kufa Dam C- Attributed The general elevations and the multiple locations in the study area vary spatially and temporally, and this is due to the ramifications of the river system and the ramifications of the streams branching from the banks of Kufa and al-Abbasiya, as the elevations rates increase with the increase in drainage rates and vice versa. The highest average water level for the front and rear of the Hindiya Dam in Babil Governorate is 29.2 meters above sea level, as it reached at the front 31.4 meters above sea level and the backside 27 meters above sea level, while the average water level of the front and back reached Abbasid Barrage 22.7 m above the sea level reached at the front 23.8 m above sea level and the rear 21.4 m above sea level.

The sea reached at the front 23.8 m above sea level and the rear 21.4 m above sea level, while it decreased at the Abbasid town, reaching an average of 21.4 m above sea level, and its average at the front and back of the Kufa dam was about 22.6 m Above sea level, it reached at the front 24 m and the rear m 21.3 above sea level, and it decreased at the town of Kufa, reaching an average of 20.1 m above sea level, and it decreased as it reached 18.7 m above sea level at the town of Al Manathrah. The level continued to decline, reaching an average of 17.8 m at the Al-Mishkhab Regulator, at the Ya'u Regulator, at a rate of 15.2 m above the sea level, and at the Abu Ashra Regulator at 15.3 m above the sea level. The highest water level of the Euphrates River reached in the month of June and in July, it reached at the Abbasid dam it reached (23.4-23.4) m above sea.level, and at the Kufa dam it reached (23.2-23.3) m above sea level, respectively. upstream areas While the water level of the Euphrates River decreased to the bottom at the dam of Kufa and then the town of Kufa, and this may be due to the increase in agricultural areas and as a result of the, prevailing climate conditions in the province of high heat and intense evaporation in the summer this water quickly evaporates

Second - alternative energy

The concept of alternative energy

Alternative energy is a term used to denote some sources of energy .fossil fuels Alternative energy to the term denotes non-conventional energy sources with little harm to the environment, In general Some use it The term renewable energy. It produces alternative energy from Sources as a synonym wind, water and the sun,

currently more Production of renewable energy produced in hydroelectric power stations by means of great dams. Wherever you find suitable places for its construction on rivers and waterfalls, the methods that are used are used. Rely on wind and solar methods are widely used in developed countries and some. The Developing Countries; But the means of producing electricity using renewable energy sources has become. Alternative energy is. recently ⁽¹⁾ Familiar not limited to the production of electricity only, but it is also the production of any. Something a machine needs to do an activity, we need to use more natural and renewable energy and use it instead of fuel. The traditional one that we extract from the ground. Also, the huge amount that we extract daily. To secure people's need for fuel, contribute to climate change, air pollution and surrounding environments with it. Although there are many issues that need to be addressed, the transition to clean and renewable energy is a major step forward towards combating climate change and pollution. cleaner environment ² types of alternative energy

A solar energy

The sun is the main source of energy production, which is estimated at about %99.9 and reaches the earth, of which about 1 kilowatt/m² is sufficient to meet human needs, heat the earth, the atmosphere and the oceans, generate winds, create the water cycle and grow plants ³

Solar energy is considered one of the cleanest and least polluting energy sources, and as long as the sun is glowing, it outperforms all traditional energy sources, as well as its superiority in this feature over other renewable energy sources, as what is characterized by solar energy increases that it is renewable and inexhaustible, as well as being inexhaustible. Polluting the environment, i.e. preserving the safety of the environment, and accordingly, the applications of solar energy have been numerous and varied and include heating and cooling processes, electric power generation and water desalination. Solar cells (a new, advanced technology with great benefits, and solar cells are known as photovoltaic converters that convert direct sunlight into electricity, as well as semi-conductive and photosensitive and surrounded by a front and back conductive envelope ⁽¹⁾ The use of solar panels to generate electricity. Clean and renewable electric energy is one of the most important ways to :generate energy. There are two basic forms of the solar cell solar cells to generate electricity and solar panels to heat water) and both. Two technologies allow generating electricity or heating water by exploiting solar energy

B wind energy

Wind is a source of clean and renewable energy called wind energy and this energy comes through the placement of wind turbines. These turbines consist of two or three blades or blades installed on a rotor. As a result of the location and shape of these blades, the wind energy rotates, and the energy transferred by the wind to the rotor depends on the intensity of The air and the area that the blades take during its flow and the wind speed, and the wind areas, its speed and direction depend on the global winds in addition to the local conditions in each region and for this we see that there are areas that are very suitable for air turbines and there are areas that are not valid due to the lack of the necessary wind speed ⁽²⁾ Wind energy is used to generate electricity. By converting the kinetic

energy present in the wind into electrical energy, where the wind energy can be stored for use in charging the batteries, which leads to the generation of a constant current that feeds the isolated facilities ⁽³⁾. We can benefit from the wind energy in the study area in a scientific and economic way as it is an open area where it is available. It has the speed needed to generate wind energy, but this requires making topographic maps for the distribution, strength and direction of wind throughout the year in order to suggest the most appropriate places and regions for the establishment of units to generate electric power to supply the areas. Isolated villages and deprived of electricity, and to benefit from wind energy, especially in generating electricity, records of exact measurements of wind direction and speed in the study area should be kept ⁴.

C- Hydropower

Water and waterfalls are among the cleanest sources of energy at all in terms of their environmental impacts. This type of energy source does not generate any solid waste or its means, nor does it release ⁽¹⁾ any heat-retaining or acidifying gases. Water energy arises from the continuous movement of water through the energy of water flow or its fall in the case of waterfalls, waterfalls or from crashing waves. In the seas, as it can produce energy that can be exploited and converted into electrical energy apart from the tidal movements in the water, and the difference in temperatures between the upper and lower layers of the oceans ².

Hydroelectric energy is defined as the kinetic energy that is generated by dams that receive flowing energy is water, which then flows through turbines and then is converted into electricity ⁽³⁾. Where obtained here from water falling behind industrial barriers such as dams and reservoirs, or natural barriers. Like water falling from the top of waterfalls. The main idea in this technique is to convert the mechanical energy of the falling water, from the top of the waterfall or behind the dam, into electrical energy through the management of the falling water. Huge fans or turbines that in turn operate electric power generators ⁴.

Third: The human potentials available to invest in alternative energy in Najaf Governorate

The alternative energy project is one of the most successful projects in Najaf governorate, and the longitude governorate's location is as $^{\circ}44.45-42.50$ east and between latitudes $21,32-29.50$ north.

It is considered one of the most successful places to establish such projects, and the availability of ⁽⁵⁾ standard conditions from the sun and wind helped provide possibilities for investing alternative energy in generating electric power, especially since the governorate is going through an electrical crisis, and the continuation of agriculture requires the continuation of electricity, so alternative energy is considered one of the most successful solutions, in addition to that it works. To reduce the environmental pollution that occurs, so many projects have been established that use solar cells, and these projects take either for lighting purposes or for irrigation purposes. The Najaf Governorate Municipality has established many projects for lighting roads and public streets in the province. Note picture 1.



Picture 1 Solar cells used for lighting in one of the governorate's streets
The photo was taken on April 30, 2020

It was found that the number of solar cells used to illuminate the streets of the province is 82 cells and the producing capacity of these cells is 180 watts. Therefore, the total energy produced from these projects amounted to 14760 watts, and the Najaf Reconstruction Authority was established to implement a project to illuminate the cemetery Najaf cemetery It was found that the number of solar cells The cells used in this project amounted to 1200 cells, and the producing capacity of these cells is 170 watts. Therefore, the total energy produced from these cells amounted to 204000 watts Also, the municipality of Najaf Governorate established a project that was recently implemented to light the existing traffic intersection in the Al-Ghadeer neighborhood. It was used in this project 6 Cells and that the producing capacity of these cells is 1200 watts, and accordingly, the total energy produced from this project amounted to 7200 watts As for the other purpose of using solar energy ¹ is for the purpose of irrigation, some projects have been implemented to pump water by solar energy. Note the picture 2.



The photo was taken on 4/30/2020

Picture 2 Solar cells used for irrigation purposes at the University of Kufa

This project used 16 cells, and the producing capacity of these cells is 180 watts. Therefore, the total energy produced from these projects amounted to 2880 watts. Many studies and experiments have ¹ proven that the solar energy project in Najaf Governorate, which is used for irrigation purposes, is a very successful project. But with regard to the solar energy project used for lighting purposes, it is considered an unsuccessful project for the following reasons

The high cost 1

The presence of pollutants dust that hinder the work of solar cells

High temperatures, which leads to a reduction in the efficiency of solar cells
Wind Energy

By studying the natural situation of Al-Ashraf Governorate, it was found that there are available potentials for investing wind energy in the governorate. These capabilities are represented in the nature of the area, which is characterized by the flatness of the surface and that it is open areas, which wind, helps to provide wind at the appropriate speed to be exploited in the generation of wind energy depends on wind speed

Note that the wind speed was measured in a number of places in Najaf governorate, and it was found that the wind speed ranges between 7-8 m/s ⁽¹⁾ and this is the ideal speed and it is approved by the Ministry of Science and Technology and now wind towers are working in the extension farm in the Najaf desert 3 .



Picture 3 Wind towers used to produce wind energy at the demonstration farm in the Najaf desert

The photo was taken on February 25, 2020

Which is the first circuit powered by electricity using renewable energy or clean energy, as it depends directly on the generation of electric power. The renewable energy system was started in the extension farm in the Najaf desert in 2010. The goal of using renewable energy was to rely directly on electrical energy alternatives. To produce electrical energy for the purpose of extracting water from the ground and irrigating crops, and until 2020, types of renewable energy systems have been operated in the Najaf desert farm, including the renewable energy system production of 25 amps for the purposes of extracting water from the ground and irrigation, which is the largest system used in the farm consists of a fan to generate electricity number 12 towers It works in a way that follows the wind speed, where the energy produced from this system is 25 amps. It is able to operate the submersible with the watering pump and lighting the circuit at the same time under standard conditions of air. In this system, it can compensate for the shortage by using water basins, as there is another system is the power system Renewable production of 12 amps for each tower by 15 towers to light the external fences of the farm, which is 15

Tower distributed on the external fence of the farm, each tower has the ability to produce 1.5 amperes and the aim of this The towers are only the lighting of the external fence, and in this system it can be compensated for the shortfall by using electricity storage batteries wind energy of a German type gel and the age of five

years. These batteries store the electrical energy generated from wind energy and use it at night or when it is not sunny. Therefore, the total number of towers The number of used towers in Najaf governorate has reached 27 towers ¹ and now the Ministry of Science and Technology is working, with the Najaf Governorate Council to build a number of towers in the Bahr al-Najaf region, and studies have been approved for work, where these towers are placed for a period of one year, during which period they measure the appropriate conditions for the use of energy Winds in Najaf Governorate, and after the end of the year, it is ascertained whether these places are suitable for using wind energy or not, according to the findings of the towers from the results ²

Hydropower

The hydropower project in Najaf Governorate is considered an unsuccessful project, considering that, the water resources in the governorate are insufficient to generate power in large quantities. However hydropower was generated in dams located within the governorate, as Najaf governorate contains two dams

Barrage of Kufa ³

There was no source on the Euphrates River at the site of the Kufa Dam, and for the purpose of regulating water for the agricultural lands there, the Regulator of the Shatt al-Kufa was established on the Euphrates River south of the Hindiya Dam between the city of Al-Kifl. And the city of Kufa this regulator, al-Sadda is located within the administrative borders of the province of (Babylon, and it is one of the parts of the Kifl-Shanafiya irrigation project that includes the regulation of irrigation and drainage of the irrigated lands from the two banks of Kufa and Abbasiya, which has an area of 550,000 acres. Note the map 2 The Indian company, Wabcos has completed studies and designs for the entire project, including (Kufa Dam), the subject of the research, through the Euphrates Center for Irrigation Studies and Designs, and then the establishment of this regulator was entrusted to the Chinese company The General Directorate of Structural Engineering at the beginning of the year (1986) and completed it completely in 1988, the agricultural lands that are irrigated reach. From the Kifl – Shanafiya project, about 400 thousand dunums of traditional agriculture, especially rice, which is a crop

It is important for the crops of the Levant and Mashkhab area, and that the project is planned for vertical cultivation of land with a density of 128%, after the implementation of irrigation and drainage networks within the project and 160% according to the designs of the consulting company Wabcos and after the establishment of, (Kufa Dam) it was possible to control the water expenditures that, pass through the Euphrates River, including It ensures the success of the annual agricultural plans .as water is rationed by 40% of the quantities that were released before the construction of the dam Tha with a frontal level of 25.70 m above sea level and an operational discharge ranging from (50m³/s 230 and the operational water level in the front is 24.50 above sea level. Note image 4 On the site, there is a hydroelectric power station, and in the past this station used to generate electricity.



Picture 4 Al-Kufa Barrage in Najaf Governorate
The photo was taken on 4/28/2020

But at the present time the production capacity of the station has decreased large amounts of energy it now produces about 50 watts only, which is enough to operate the small generators located inside the station only ⁽¹⁾. This dam and the Abbasid, Shamiya and Ghammas regulators are supervised by the Kufa and Abbasiya system project management from the formations of the General Directorate of Dams and Reservoirs

The Abbasid Barrage

There was no origin on Abbasiya Shatt Al Al Shamiya previously, for the purpose of regulating irrigation in The aforementioned beach was established by the regulator of Shatt al-Abbasiya in a site on the river, 10 km away South of the city Al Kifl and about 10 kilometers. The front of the city Al-Abbasiya) and within the administrative borders of the province of Najaf. The front of the city of Shamiya is about 3 kilometers, and Nazim Ghammas Or as Nazem Abu Tabban is called in the city of Ghammas, these three regulators were established in 1988 (the Chinese General Company for Structural Engineering with the Kufa dam at the same time, as the company started the work in 1986 and completed it completely in 1988. These three regulators and the Kufa dam are part of the irrigation project Kifl-Shanafia which has a total area of 550 thousand acres. The arable area is 400,000 acres have studied the project and put Designs by the Indian company Wabcos and that the most important agricultural crops that are grown on Shatt al-Abbasiya is rice which is specialized in cultivation in the lands of Al-Shamiya and Ghammas in addition to , To

other agricultural crops, and after the establishment of the regulators on the Shatt al-Abbasiya formerly al-Shamiya , it was possible to control the water expenditures that pass through the shore to ensure the success of the agricultural plans. Annually, where water is rationed by 40% of the quantities that were released before the establishment of The aforementioned three regulators 0 reach Drainage of the Shatt al-Abassiah design dashboard $1100 \text{ m}^3 / \text{sec}$ at the advance level of 25.70 m above sea level, while the operational discharge is $50\text{-}230 \text{ m}^3/\text{sec}$ and at an operational level of 24.50 m above sea level that the number of openings for this the regulator is 6 with radial gates, the dimensions of each opening are $x 6.3 \text{ } 12.00$ note picture , meters 5 There is a hydroelectric power station in the dam, but it is currently inoperative, but in the past it was used to generate hydroelectric power ¹.



The photo was taken on 4/28/ 2020
Picture 5 Abbasid dam in Najaf Governorate

Fourth: The problems facing alternative energy in Najaf Governorate

Progress in the field of alternative energy is still encountered by some obstacles and problems including technological, economic and technical obstacles, which are as follows

The high cost that greatly exceeds other energy costs

The presence of pollutants dust that hinder the work of cells

The higher the temperature, the higher the temperature, the lower the efficiency of the solar cells ¹ The problem of storing solar energy, as this energy lacks regularity with regard to the sunrise and sunset system and the change in its temperature intensity from one season to another, as the increase in the period of solar radiation in summer provides the energy needed to generate electricity in quantities that exceed other seasons.

Weakness of the legal legislations that support the investment of alternative energy and that negatively affect the investment of alternative energy

Insufficient data available due to its non-standard characteristics and that the study area lacks clear national policies for renewable energy sources

The region's lack of research and development, which makes it need to transfer technology, which carries heavy financial burdens, which means its continued dependence on industrialized countries

The absence of a culture of the importance of developing and developing alternative energy sources among many segments of society

The existence of a state of relaxation and scientific and research luxury towards the development and development of available alternative energy sources

Fifth: Suggestions for using alternative energy sources

The study of alternative energy sources in the province of Najaf is of great importance to maintain the economic level that the province enjoys, so proposals have been developed for a better use of alternative energy sources in the study area, and these proposals are It is necessary to clean the solar collectors periodically from the dust that accumulates on their surface to maintain their efficiency in the production of solar electricity or solar thermal energy.

The necessity of using water completely free of salts in the heating cycles of the solar communities to protect them from rust and the speed of corrosion

The necessity of activating the research movement in the alternative energy fields and providing them with material and moral support.

Create wind and solar energy maps that are necessary to find the best sites for the establishment of wind and solar energy plants

Carrying out pioneering and large projects at a level that benefits the country as other sources of energy and training cadres on them, as well as not to repeat them, but rather to diversify them in the study area to benefit from all alternative energy applications

Activating the methods of scientific exchange and scientific advice by holding seminars and periodic meetings. Updating studies of the use of alternative energy in the study area and inventorying and evaluating what is available

Applying all means of rationalizing energy conservation and studying the best methods, apart from supporting citizens who use alternative energy in their homes

Applying all means of rationalizing energy conservation and studying the best methods, apart from supporting citizens who use alternative energy in their homes

Adopting the idea of popularizing the solar house project as it achieves energy self-sufficiency

Results

Alternative energy is an important source of clean energy, as it is one of the ways to reduce environmental pollution, and it is renewable and inexhaustible energy.

The study showed that there are potentials available to invest in alternative energy in Najaf governorate, represented by solar, wind, water energy, and that Najaf governorate is an ideal location for the establishment of this vital project, which is used in a number of public and proposed projects for the production of electricity, as the study revealed the existence of serious steps in investing Alternative Energy in Najaf Governorate, the study proved that solar energy has

been invested in the province through the establishment of many projects investing in solar energy and used for irrigation and lighting purposes in various parts of the province. The total number of cells used in these projects in Najaf province has reached 1304 cells. Wind energy in the province in the province, but its investment was limited to the project used for wind towers in the extension farm in the Najaf desert, as the number of towers used in this project reached 27 towers, and they are also used for irrigation and lighting purposes. Wind, and this is an important step in the development of wind energy investment in Najaf Governorate. As for hydropower, it is in the field Although the water resources are characterized by being few, they have been invested in generating hydroelectric power, as it has been invested in the existing dams in the governorate, which are the Kufa and Abbasiya dams. The amount of energy produced by the dams, the Kufa dam was limited to only 50 watts, while the Abbasid dam is currently disabled.

Conclusions

Wind energy in the province in the province, but its investment was limited to the project used for wind towers in the extension farm in the Najaf desert, as the number of towers used in this project reached 27 towers, and they are also used for irrigation and lighting purposes. Wind, and this is an important step in the development of wind energy investment in Najaf Governorate. As for hydropower, it is in the field Although the water resources are characterized by being few, they have been invested in generating hydroelectric power, as it has been invested in the existing dams in the ,governorate, which are the Kufa and Abbasiya dams. The amount of energy produced by the dams the Kufa dam was limited to only 50 watts, while the Abbasid dam is currently disabled.

References

- Al-Ahmad, Fuad Qasim, Energy, the greatest challenge of this century, Baghdad, Al-Malak Press 2005
- Fathia Muhammad, Environmental Problems, Amman - Jordan, Arab Society Library for ,Al-Hassan Publishing and Distribution, first edition, 2010
- Hassan Ahmed, Environmental pollution and energy risks, second edition, Arab Book ,Shehata House, 1999
- Ghanem, Ali Ahmed, Applied Manakh, Dar Al Masirah, Jordan, 2010
- Metwally, Zine El Abidine, Horizons of Alternative Energy, Cairo, Egyptian General Book Organization, first edition and 2009
- Al-Jalabi, Mustafa Kamel, Spatial Variation of the Characteristics of Water Resources in Najaf Master Thesis (G.M), College of Arts - University of Kufa 2002
- Al-Attar, Zahraa Adnan Ahmed, Climate Changes in the World and the Uses of Renewable Energy to Reduce Its Effects, Master Thesis (G.M), College of Education for Girls - University of Kufa, 2011 Al-Mudhaffar, Safaa Majeed, the spatial pollution of soil pollution in the province of Najaf, a master's thesis (g.m), College of Arts - University of Kufa, 2007
- Suryasa, I. W., Rodríguez-Gámez, M., & Koldoris, T. (2022). Post-pandemic health and its sustainability: Educational situation. *International Journal of Health Sciences*, 6(1), i-v. <https://doi.org/10.53730/ijhs.v6n1.5949>

- Ministry of Municipalities and Public Works, Najaf Municipality Directorate, Traffic Engineering Department, unpublished data, 2020
- Ministry of Water Resources, Directorate of Water Resources in Najaf Governorate, Statistics Department, unpublished data, 2020
- What is alternative energy, research published on the website
1<http://www.ejabat.com>
- Alternative energy - renewable energy, research published on the website
<http://www.emkanat.org>
- Osama Ibrahim Al-Zalouk, solar energy, research published on the website
<http://www.Mmsec.com>
- Engineer Ahmed Saleh Abdul-Mahdi, director of the extension farm in the Najaf desert
- Eng. Shawkat Aziz Abed, Head of the Renewable Energy Division at the Ministry of Science and Technology
- Safaa Majeed Al-Mudhaffar, Spatial Variation of Soil Pollution in Najaf Governorate, Master Thesis G.M, College of Arts - University of Kufa, 2007, p. 19