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Renewable Energy: Pros and Cons

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Annotation: The electricity generated in Iraq, which relies on fossil fuels and renewable hydropower, is insufficient to meet the country's electricity demands. Most European and industrialized countries are shifting toward renewable energy for electricity production to protect their environment from pollution caused by fossil fuels and to reduce their reliance on these finite resources. Investment opportunities are available, given the economic capabilities of the studied country. Being an oil-rich nation with substantial petroleum reserves, Iraq can allocate a portion of its oil revenues to invest in renewable energy within the country. There are obstacles to investing in renewable energy in the studied region; however, most of these challenges are minor and can be mitigated or resolved. Among the key challenges are governmental policies, which can be addressed by enacting laws that encourage both public and private sector investment in the available renewable energy resources in the region.

Introduction

Energy is one of the most critical topics that has captured the attention of researchers since ancient times due to its diverse applications. The global demand for energy continues to grow as a result of rapid population growth and increasing awareness of the threats posed to the Earth's environment by traditional energy sources, primarily fossil fuels and nuclear energy. The exploitation of these traditional energy sources in factories, homes, and transportation has led to various environmental and health issues, including air pollution caused by toxic gases, ozone layer depletion, and respiratory diseases. Although some forms of renewable energy, such as solar and wind power, were among the first energy sources utilized by humans, interest in them diminished

with the advent of coal in the 13th century, oil in the 19th century, and nuclear energy in the 20th century. However, the global energy crisis of 1973 prompted nations to reconsider renewable energy sources. Renewable energy sources, including wind, water, and solar power, currently account for approximately 20% of electricity generation but only 5% of total energy consumption globally, as the majority of energy is derived from coal and oil. However, reliance on renewable energy, which was virtually nonexistent 15 years ago except for hydropower, has shown promising effects in reducing carbon dioxide emissions. According to the International Energy Agency, greenhouse gas emissions from electricity generation are expected to increase at a slower pace than electricity consumption. By 2020, renewable energy sources were projected to account for 62% of newly constructed power generation facilities worldwide, making them a driving force in the electricity sector's growth. Today, 160 countries have set goals for using renewable energy sources, although these sources still need to prove their efficiency and competitiveness with traditional sources. In countries like Germany and the United Kingdom, wind power plants have become less expensive than coal and gas. Experts predict this trend will continue in the future.

Definition of Renewable Energy

Renewable energy refers to energy resources that naturally replenish themselves in the environment and do not deplete, although they may be limited in availability. In other words, they are permanent, inexhaustible natural resources that are either finite or infinite but continuously renewed. Utilizing renewable energy does not produce significant environmental pollution, making it a clean energy source.

It is also defined as a type of energy that does not run out or deplete. The term "renewable" indicates that as soon as it nears exhaustion, it becomes available again. Its sources include natural phenomena such as wind, water, and sunlight. The most notable characteristic of renewable energy is its cleanliness and environmental friendliness, as it does not emit harmful gases like carbon dioxide and does not adversely affect the surrounding environment. Additionally, it has no significant impact on global temperatures. Renewable energy sources are in stark contrast to non-renewable sources such as natural gas and nuclear fuel, which contribute to global warming and release carbon dioxide when used. Given the importance of renewable energy, a new field of work has emerged in recent years under the name "renewable energy trade." This industry focuses on harnessing renewable energy sources and utilizing them as a means of generating income and financial benefits through their promotion. Although renewable energy exploitation is criticized for its high costs and the insufficient availability of necessary tools and technologies, some countries are preparing to embark on renewable energy investment projects. These projects aim to establish policies, develop infrastructure, and expand the use of renewable energy sources to benefit both the environment and the economy.

- Advantages of renewable energy

There are a set of advantages that renewable energy enjoys, which make it a distinctive source of energy, the most important of which are:

- ✓ Renewable energy is well present all over the world.
- ✓ Renewable energy is environmentally friendly and clean. It is always present, and can be renewed again.
- ✓ It is easy to use based on simple technologies and mechanisms.
- ✓ It is characterized by being a very economical energy.
- ✓ It is an important factor in environmental, social, and all fields development.
- ✓ It helps create new job opportunities that help mitigate the damage of gaseous and thermal emissions.

- Benefits of renewable energy

The benefits of renewable energy vary according to the field in which it is used, the most important of which are:

- The military field One of the most important applications of renewable energy in the military field, which can be used to facilitate life in new military cities, is the following:
- ✓ Solar heating system for military colleges, to meet the needs of students.
- ✓ Supplying units with hot water, by using field solar heaters.
- ✓ Water desalination
- ✓ Feeding fixed wireless stations.
- 2The domestic commercial field of renewable energy is of great importance in the lives of the population, and its most important uses are:
- Heating water for cleaning, bathing and washing purposes, by using solar collectors, without converting it to any other form of energy, and it is the cheapest type of energy at all.
- Types of renewable energy

Renewable energy comes from several sources, and has different types, and can be divided into several of the following classifications:

- 1Solar energy: The rays emitted by the sun and the heat and light it carries with it are a source of solar energy; as humans have exploited them in their interests and harnessed them by relying on technological means and techniques. The sun can be used to generate thermal and electrical energy, while electrical energy can be generated through solar energy using thermal engines, photovoltaic panels, and photovoltaic converters. Solar energy was used in prehistoric times, when monks used gilded surfaces to light the altar scale. In 212 BC. Archimedes burned the Roman fleet by shining sunlight on it from a distance, using reflective mirrors. In 1888, Weston came up with a way to convert solar energy into mechanical energy, using what is called the thermocouple process, where he generated voltage between the hot and cold points of contact between two different metals.
- 2Sustainable bioenergy: Bioenergy is derived from what is called biomass; which is an organic material that stores solar rays, then converts them into chemical energy. These sources may be wood, fertilizer, or sugar cane, and bioenergy sources are similar to fossil fuels.
- 3Wind energy: Man resorts to relying on wind turbines to extract energy from the wind and generate electrical energy from it. Wind energy is also used to produce mechanical energy in what are called windmills.

About 2% of the sunlight that falls on the surface of the Earth is converted into kinetic energy of the wind. This is a huge amount of energy, which exceeds the world's need for consumption in any given year. Wind energy has many uses, the most prominent of which are:

- Pumping water using wind pump energy; wind-powered pumps are widely spread in Australia, parts of Africa, Asia and Latin America, and wind energy is often used soon to generate electricity on farms and homes, at a lower cost than using fuel.
- Moving ships and propelling their sails. It is characterized by being completely reliable as a good alternative to fossil fuels, and is permanently available and constantly renewable, and is considered one of the cleanest and most environmentally friendly sources of energy.
- 4Hydroelectricity: The term hydroelectricity is a comprehensive term for electricity and water together, and this type of energy is used to exploit water energy to generate electricity, and is considered a very clean energy, and is widely spread. In the process of exploiting this energy, the potential energy in the water, or potential energy, is completely relied upon, and converted into kinetic energy through the falling of water and its flow from top to bottom, to operate the

generating turbines, so the electric generator begins to rotate, and thus works to produce electrical energy.

One of the most important advantages of using hydroelectric energy is that it is environmentally friendly, and the capital spent in this process is represented in building a dam or reservoir, which is useful in the process of regulating irrigation, in addition to generating electricity, and it does not require high costs for maintenance operations, and water turbines are easy to install and operate.

Water has been a source of energy for centuries, as it was used in the past to move flour and grain mills, and pump water and push it to waterwheels, and the most important forms of exploiting water energy are the following:

- ✓ Al-Zay channels (waterwheels)
- ✓ Tidal energy.
- ✓ Wave energy.
- ✓ Tidal current energy.

5Geothermal electricity: The efficiency of geothermal energy and its stations is relatively low. It is noted that the temperature of the water extracted from the earth's interior is the main determinant of the efficiency of geothermal power stations during the generation of electrical energy. As a result of the low temperature of the water that is raised, geothermal power stations have been characterized by low efficiency. As for geothermal energy, which is also called geothermal energy, this type of energy is extracted from the interior of the earth, and is considered one of the environmentally friendly types, due to its cleanliness and renewal. It is characterized by its high temperature, and it increases as the depth increases in the earth's interior, and it is heavily relied upon in generating

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