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SUSTAINABLE TRANSFORMATION OF THE ENERGY SYSTEM IN IRAQ AND ITS ROLE IN SUSTAINABLE DEVELOPMENT

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Abstract:

Energy is an integral part of many of these challenges. The region depends heavily on oil and natural gas. Yet the region is a key energy producer, many countries in the Middle East and North Africa struggle to meet the increasing domestic need for energy. Switching to energy systems on the basis of renewable energy promises to meet this need. The switching also reduces greenhouse gas emissions under the Paris Agreement. Additionally, renewable energy use has the potential of increasing economic growth and employment reducing financial constraints.

Keywords: Energy, Middle East

INTRODUCTION

The Middle East and North Africa face many challenges, such as rapid population growth, slow economic growth, high unemployment, and important environmental stresses. These problems are aggravated by universal and regional problems including climate change. It is an area that is already highly vulnerable because its geographical and environmental circumstances and will be negatively be affected by the climate change. Namely, droughts and temperatures rise in the world's majority of water-stressed areas. With large segments of the heavily populated urban in coastal areas, people will also suffer from lack of water, storms, floods and higher temperatures. In agriculture, climate change could reduce production, while food demand increases because of the increase in the population and changing consumption trends. Also, the destruction of the critical infrastructure rises, and the amount of money on repairs and new construction is extra burdens on already-scarce finance. The interaction of economic, social and climatic aspects, need greater attention, as they pose risks to economy and society - and finally the stability of the region.

Energy is an integral part of many of these challenges. The region depends heavily on oil and natural gas. Yet the region is a key energy producer, many countries in the Middle East and North Africa struggle to meet the increasing domestic need for energy. Switching to energy systems on the basis of renewable energy promises to meet this need. The switching also reduces greenhouse gas emissions under the Paris Agreement. Additionally, renewable energy use has the potential of increasing economic growth and employment reducing financial constraints.

In contradiction to the background of quickly rising energy need because of the growth of population, altering consumer behavior, increased urbanization etc. such as industrialization, desalination of water, and high electricity use for cooling. Renewable energy has attracted a great interest in the MENA region. To secure long-term energy and achieve climate change aims, the majority of MENA countries have been working on ambitious plans for expanding their production of renewable energy. The great latent in the MENA to produce renewable energies, particularly wind and solar energies, produces nearly CO2-neutral electricity and to boost economic prosperity. Yet, the majority of the countries are still using fossil fuels as a key, depending on fossil fuel imports from highly populated areas posing a risk to energy security and public budget expenditure.

The transition to renewable energy-based energy systems needs large-scale renewable energy deployment, enabling infrastructure, suitable regulatory frameworks, and new markets and industries. So, an understanding of the social and technical interdependence of the energy and the key innovation dynamics is critical, and clear goals and directions of the transformation facilitates targeted fundamental changes, and enhances understanding the transitions support of constructive dialogue on future energy system in the East Middle and North Africa. It helps stakeholders in developing strategies for transitioning towards an energy system based on renewable energy sources.

The classical economy analyzes economic growth theory observing several major economic policies such as savings, investments, research and technological progress, education, population increase, free trade, etc. In traditional economy, the GDP size and movement are important in economic growth and advancement. With the depletion of non-renewable and finite

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resources, global warming, general pollution and environmental endangerment, unavoidably variations in economic growth and development understanding. Himaya has attracted a great interest in efficiently using natural resources.

In economic theory and policy, there are great efforts to align economic and environmental interests for more appropriate tools to encourage sustainable social developments.

Natural resources are effective for the developing human society because of the availability of natural resources on the basis for the development of many human activities and the environment is one of the complex assets providing many facilities, yet it is also a special asset providing human existence. Third, the environment conducts indispensable functions vital functions ensuring the life quality, such as the stability of the global climate or filtering harmful ultraviolet rays. In addition, economists point out that one of the most important prerequisites for achieving sustainable development is the economically efficient management of natural resources, and therefore to apply sustainable development, monitoring the environmental changes is caused by economic activity. So, economic activity must be supportable. On the other hand, there is no possibility to increase non-renewable natural resources, so the problem of optimal use of these resources is in finding the optimal depletion rates, of resource exploitation. On the other hand, the economically analyzing renewable resources shows that the economic use of resources matches environmental sustainability.

Yet, resource free access causes their overuse, in renewable resources, it is significant to conduct an exploitation with no risk for the renewal of the resource to make a return sustainable rate.

The 2030 Agenda for Sustainable Development and the Sustainable Development Goals by all UN Member States in 2015, provide a roadmap and vision for all countries and actors to strive for a prosperous, sustainable and equitable world while at the same time protecting our planet's resources from inefficient and unfair use and preserve it for future generations.

When this agenda and its goals were announced, Iraq was busy fighting terrorist groups and dealing with the repercussions of falling crude oil prices in global markets. However, Iraqis did not stop looking forward to a better future. They did their best to achieve the millennium development goals and today they are resuming work on the Sustainable Development Goals and targets. Therefore, these goals are universal, indivisible, integrated and interrelated and attempt to strike a balance between the economic, environmental and social issues of sustainable development.

The study Problem:

The energy system in the world at the present time is a traditional system that depends entirely on fossil energy sources and suffers from several problems, including the inability to meet all the energy resources needed by the economy to carry out production operations without causing environmental damage.

The study hypothesis

The hypothesis of the study stems from the fact that the increasing economic pressures towards the consumption of the current non-renewable energy resources requires the use of other alternative sources of this energy and their efficiency in order to be able to maintain meeting the demand for quantities of goods and services.

The study importance

The importance of this study lies in identifying the economic and environmental dimensions of renewable energy and its effect on sustainability, according to its objectives, and the extent to which Iraq can convert to this renewable energy and achieve effective steps in the sustainable development process.

The first topic

Theoretical framework for renewable energy

It is expected in energy studies that in the near future the majority of the countries such as the MENA, will use wind and solar energy to make electricity. Biomass and hydropower are limited because of poor availability and competition. So, it is basically assumed that the phase model will increase the use of wind and solar energy, such as direct use of electricity in end-use sectors now depending on fossil fuels and natural gas.

E-mobility in transportation and heat pumps in construction are critical. There are the sectors that are difficult to decarbonize from a technological point of view such as aviation, marine vehicles, big vehicles, and high heat industries. Here, fuels and synthetic gases based on hydrogen or hydrogen can substitute fossil fuels, natural gases, and the hydrogen from electrolysis renewable electricity.

Solar wind, water flow and biomass energy etc. are gaining great significance to grow in total energy productions and consumption(Dudley & Dale, 2012)

A big focus on using the electricity infrastructure is required because of electricity extraction (volatile) to keep grid stabile and, so, energy production and need is synchronized, or storage options used. However, electricity storage is a challenge mostly, and potential is limited because of the geographical circumstances.

There must be commensurate with the changing supply of wind and solar power plants with the need for electricity through expanding networks, and increasing the flexibility of producing fossil energy, or storage, or

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Vol. 14, September 2022
ISSN: 2749-3628,

managing the demand side. Also, information and communication technology can support flexibility through certain applications with various sectors linked tightly, such as a regulations and infrastructure and accommodating new market designs. Since energy demand is four or five times bigger in a low-carbon energy based on renewable energy sources, improving energy for a better energy transition. The energy efficiency treats energy competence as a key in the future energy, alongside other options like renewable energy sources(Blander, Sinha, Pelton, & Eriksson, 1989).

Renewable or inexhaustible energy

First: The concept of inexhaustible or renewable energy:

It is an expression that includes and describes a package of energy sources that do not perish with use, such as hydroelectric, solar, tidal energy, and bioenergy and wind energy whose source is from natural resources that are inexhaustible, meaning that they are constantly renewable, and it is also called sustainable energy and its sources differ from other sources. Depleted or non-renewable fuel, known as fossil fuels from oil, coals and natural gases, as well as nuclear fuel that is used in nuclear reactors, which does not result in any waste that harms the environment, but it is considered one of the depleted energies, and renewable energy is one of the natural resources of countries, especially if it is Investing them correctly, which makes the most of them to meet the growing needs, especially with regard to energy consumption, preserving non-renewable energy sources and protecting the environment from pollution resulting from the consumption of fossil fuels.

We can identify renewable or clean energy sources by dividing them into their types, which are as follows("World nuclear association anther drop in nuclear generation world nuclear news," 2018).

1- Hydropower:

The source of hydroelectric energy is one of the renewable energy sources, because it uses the natural water cycle to generate and produce electricity. The flowing water produces energy that we can calculate and convert into electrical energy, through which hydroelectric energy is converted into electrical energy. Hydroelectric power depends mostly on rain and according to the altitude of the rainy areas, the high level of precipitation of large amounts of rain and the height are very necessary to generate electric power.

Hydropower is also the most mature and largest source of renewable energy, in which hydropower plants convert energy in flowing water into electricity, and the most common form of hydropower is used to build dams on rivers to make big water reservoirs through which water is released by turbines. yet, there are special systems for diverting river flow and diverting water from the river and directing it in a pipeline to the turbines.

Hydroelectric power plants emit no carbon but affect water and wildlife. So, hydroelectric power plants reduce the effect on the rivers. Some divert the water flow partly around their dams mimicking the natural flow of the river, but while this improves the river's environment for wildlife reducing the power plant production.

According to the estimates of the World Energy Council, hydropower produces about 16% of the world's electricity production in (2014). Also, there are other trends that work to increase this percentage of production, and there is another trend that promotes increased investment, especially in western and northern Europe and in North America. And this trend is to modernize factories as part of efforts aimed at ensuring higher efficiency and sustainable operations("Global Scenarios for Demand and Supply Availability 2015-2035, The Nuclear Report, World Nuclear Association," 2020).

2- Biomass energy:

Bioenergy is from biomass (organic matter) like plants. Wood burning in a fireplace or campfire is bioenergy. Yet, that does not mean bioenergy is used and at the same time of the biomass resources from trees or other plants, and several applications like the ones used in construction or agricultural processing, can make large amounts of unused or residual biomass as bioenergy sources.

Biomass is the next largest renewable energy resources, as some facilities and power plants with coal-fired substitute coal with biomass as a low-cost option for less emitting the unwanted (15%) coal substituted with biomass which has less sulfur than coal, so less sulfur dioxide is released enhancing acid precipitation. Moreover, the use of biomass reduces carbon dioxide emissions("Energy for Sustainable Development in the Arab Region, Framework for Action, United Nations Environment Program - Regional Office for Western Asia," 2017)

There is another process called the gasification process, converting biomass into gas, burned in gas turbines for generating electricity. It results in the decomposition of biomass in landfills and most of it is methane, to produce steam to generate electricity or in industry. The biomass is heated with no oxygen for the chemical conversion into fuel oil known as pyrolysis oil used for power generation and as a feedstock for fuels and chemical productions.

Biomass is converted into a liquid fuels called biofuel whose easy transport with high energy density made it

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Vol. 14, September 2022
ISSN: 2749-3628,

preferable for fueling vehicles and generating power. Ethanol is alcohol made from fermentation high-carbohydrate biomass as the most common biofuel. The present largest exporter of ethanol is corn, and ethanol is used in some cities gasoline is added to meet air quality standards.

Biomass from corn, wheat, soybeans, wood and waste can also be used to produce chemicals and materials we usually get from petroleum, and the industry has already started using cornstarch to produce a plastic commodity, such as plastic eating utensils (Maczulak, 2010).

3-Geothermal energy:

Geothermal energy can reach the temperatures of the Earth's core, which lies at a depth of 4000 miles below the surface, to (9,000) degrees Fahrenheit, and this heat or geothermal energy flows externally heating the near area form underground hot water and steam reservoirs. The reservoirs are exploited for different uses, like generating electricity or heating buildings, by geothermal pumps, with a stable ground temperature for heating and cooling buildings.

The ground is drilled so that geothermal plants can access subterranean steam or hot water from wells drilled a mile or more underground. Steam or hot well water is pumped to power a conventional steam turbines, powering an electric generator, then to the ground for recharging the tank and complete the renewable energy cycles(Devine-Wright, 2012).

Geothermal power plants can be dry steam, fast steam, and binary cycle. Dry steam plants are derived from steam tanks, yet steam and dual cycle plants come from hot water tanks.

Rapid steam plants are often used at temperatures above (360) degrees Fahrenheit. In contrast to steam and flash plants, dual cycle plants transfer heat from the water is a working fluid, so these plants could work by water at temperatures as low as 225 to 360 degrees Fahrenheit(Al-Sana'a, 2014).

4- Solar energy:

Solar energy is used for producing heat, light and energy, lighting and solar heating. The sun has been used to heat their homes and light their homes for centuries, and solar energy is very significant inexhaustible renewable energy with increasing attention in recent decades, as it is an abundant energy sources compared to other renewable energy sources. The sun is a sufficient form for the generation of the whole energy needs of the earth. Solar energy is clean and free of carbon emissions. Solar energy is used in many life applications such as home energy and space. The light and heat of the sun was used as a source of energy in ancient civilizations.

In the eighteenth century, solar energy was used for cooking and heating, and during the nineteenth century, houses that run on solar energy actually seemed to be built, and French scientists ran a steam engine using heat derived from solar energy, and one of the advantages of solar energy is that it does not need large areas as It is the case in hydro and biomass energy to produce the same amount of energy, and the potential of solar energy is several times the amount of global energy consumed annually(Patel & Beik, 2021)

Solar low heat energy is used from energy for water heating and heating, and the technology is usually simple and stable. Solar water heating is already competitive with fossil fuels in many climates. Solar heating is also possible, but there is an economic challenge that is an almost complete opposite between supply and demand. In the summer, the solar supply is more than the demand for it, and vice versa in the winter season, meaning that heating systems need supplemental heat because the marginal cost of collecting solar energy in the winter is high. Solar energy is available sustainably in infinite quantities. The major drawback to the use of solar energy is that the technical costs of solar cells are still high. Solar energy could be utilized for heating water for homes or swimming pools.

By a solar collector, solar water heating utilizes natural convections or domestic water pressures for measuring water to a storage tank with no electrical components, generally making them more reliable.

An electric pump is used in the system to circulate water. These systems are expensive but efficient. The active systems are easier to modify as their storage tanks need no installation above or near collectors.

Solar Thermal Electricity, different from solar electric systems converting sunlight into electricity, the sun's heat into electricity by solar thermoelectric systems where its technology is mainly utilized in in large-scale power plants in cities and communities that have consistent sunlight.

5-Wind Energy:

Most human societies have utilized windmills for harnessing wind energy, and wind turbines operating differently from windmills and a more efficient technology. Yet, turbines are highly advanced energy systems capturing wind energy through new blade designs or ailerons, and contemporary mechanical drive systems work in conjunction with innovative generators, converting this energy into electricity because the wind turbines create electricity. The grid of utility is 50 kW to 1 or 2 MW. Large projects have hundreds of turbines in many land areas. Small turbines, less than 50 kW, charge batteries, power homes, pump water to farms,

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and power telecommunication kit. Wind turbines are put in water near the coast when the open land is restricted, as in Europe taking advantage of the winds strong abroad as wind power is the world's quickest growing energy since 1990("Dimensions of sustainable development, research and studies, Arab Union for Sustainable Development and Environment," 2016).

6- Tidal energy:

The tidal process is usually converted into electrical energy by special mechanical devices and these devices are converts tidal energy into electricity by pushing water by a turbine which activates the generator. At the same time, wave energy utilizes mechanical energies for activatating the generator directly, or for transferring to water or working air, which in turn drives the generator turbines and most research in ocean energy is in Europe(Khaligh & Onar, 2017).

The second topic

Conceptual entrance and comprehensive view of sustainable development

The Industrial Revolution is caused sustainable development. Since the second half of the 19th century, Western societies have discovered that their economic and industrial deeds had a big influence on the environment and social balance. Many environmental and social crises have occurred universally and raised awareness for more sustainable models. The economic and social crises that shook the world in the twentieth century are:

:1907 •American banking crisis
:1923 •The American hyperinflation crisis
:1929 •The financial crisis began in the 1930s
:1968 •Global protests against bureaucratic elites
1973 •and 1979: the oil shocks
1982 :The debt shock of developing countries

There are some other instances of crises such as (global warming, air pollution, ozone layer issue, biodiversity loss)(Smith & Taylor, 2008).

First: the concept of sustainable development:

In 1968, The Tragedy of the Commons by the ecologist and philosopher (Garrett Hardin) argued that if individuals acted independently and rationally and pursued their individual interests. They would end up violating the common interests of their societies and depleting the planet's natural resources. The limitation of finite resources would smother these resources, and Hardin stated that since procreation was focused indefinitely, the resources of the earth would eventually be overexploited causing future disaster to maintain the path of sustainable development. A few years after Hardin's article, in 1972, Meadows et al., commissioned by the Club of Rome, conducted a computer simulation aimed at predicting the consequences of what would happen on a planet with limited resources and the interactions were analyzed Between five different dimensions, including (world population growth, industrialization, pollution generation, food production, and depletion of non-renewable resources). It takes into account the scenario grew in these variables greatly affected the ability of technology to increase resources at a certain level, as the resilient final scenario would be the occurrence of economic and social collapse by at the recent years of the twenty-first century if human beings did not impose limits on growth. More than four decades later, these predictions seem correct when it comes to pollution and its consequences that threaten sustainable development (Timmons, Harris, & Roach, 2014).

With the development of the world's knowledge of world politics, the first historical conferences were organized. In 1972, the United Nations Environment Conference - the first meeting of major world leaders by the United Nations for the discussion of the human influence on the environment and its relation to economic development - took place in Stockholm. One of the main goals of this gathering was to find a common viewpoint and common principles to inspire and guide the world's population to conserve the "human environment."

Sustainability is endurance. In a broader scientific sense, sustainability equates to continuity, or the continuity of a cycle with no termination. So, sustainability corresponds to the existence of the universe, which is the ability to maintain a fixed result. Evolution to a sustainable state can be predicted. Yet, the shape or sustained state changes intelligence or systematic interventions in the evolution.

Sustainability is the processes or things and sustainability does not correspond to the m rises or reductions in a substance. Yet the reduction leads to eventual exhaustion, in vital processes sustainability corresponds to a steady state.

Sustainability could mean what is best known is the impact of this new growth on the planet's ability to continue to exist, and another definition is awareness not to harm the environment or deplete natural resources. It thus supports the long-term ecological balance, yet, when in terms of development of the process, it needs expansion. This definition includes all areas that may cause a business to have less than expected life and return on investment, and the sustainability of the operation must include an assessment of the following considerations as well as environmental considerations(*Report of the Economic and Social Commission for Western Asia, Energy for Sustainable Development in the Arab Region: Framework for Action*):

1-Long-term variations in current technology.

World Economics & Finance Bulletin (WEFB)
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Vol. 14, September 2022
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2- Feed and stimulants in the long term Availability.
3- Long-term cost and availability of facilities.
4- Disposal of long-term waste and by-products.
5- The ability to operate and maintain the process facilities in the long term.

The oldest literature on sustainable development goes back to 1713, when ensuring the sustainability of forests achieved by cutting only replanted timber for keeping soil fertility. The environmental issues were first mentioned in 1962 at the time, the idea remained in its early stage and only explained informally in the literature.

Sustainable development and ecological scopes originated in the 1980s, and the first formulations is in 1980 Global Conservation Strategy for the Conservation of Nature and Natural Resources of the United Nations Environment Program, the World Wildlife Fund and the International Federation. The social, environmental and economic factors proposed this. Developed endlessly till today, the formulation of sustainable development is:

To make the development sustainable, it taking into account the social and environmental factors is required, in addition to the economic factors, of the renewable and non-renewable resource base, and the advantages and disadvantages of alternative measures in the long and short term. Here, we discuss and compare sustainable development to green chemistry and green engineering, and was widely recognized in the international scientific community following the publication Our Common Future by the World Commission on Environment and Development in 1987. The Report Our Common Future opened with the remembrance of one earth but not the world. There is one biosphere to sustain our lives, yet all society struggles to survive and thrive with little in terms of its effects on others(BLEDSOE, 2021).

Some are consuming the Earth's resources quickly and there will be nothing left for the future generations, too little for living with the potentials for hunger, disease, early morbidity, and the inability of the next generations to fulfil special needs. So, it is recommended to take several critical actions to reverse unsustainable trends, such as the change of the growth quality, meeting basic needs, ensuring a sustainable population, maintaining and strengthening studies, managing risks, and including environmental and economic considerations in decision-making.

The current and future generations, rich and poor simultaneously and the present generation must take into account the influence on future generations if over-consumption continues. There were a set the standard for future discussions on sustainability with spaces for different interpretations.

Following the publication of Our Common Future, discussing sustainable development from different perspectives, with the concept being comprehensively amplified was conducted. Importantly, the United Nations Conference on Environment and Development held in Rio de Janeiro in 1992. The conference, the Earth Summit, in which more than 170 governments participated, attracted the Rio Declaration on Environment and Development, and the Commission on Development was organized and established sustainable development, the Inter-Agency Committee on Sustainable Development, and the High-level Advisory Council on Sustainable Development to serve as follow-up mechanisms to the Summit.

The summit gave the reasons for complicating the problem, that the excessive consuming by the rich population harms the environment, and the issues of poverty simultaneously, altered governments were asked to change the plans and policies for following up on the summit's actions.

Sustainability has been defined as the unlimited survival of the human race (with a quality of life that goes beyond mere biological survival) through the maintenance of basic life support systems (air, water, land and animal) and the existence of infrastructure and institutions that distribute and protect the components of these systems, as the definition of the concept of sustainable development means the continuity of Ensuring decent living conditions in relation to human rights by making, enlarging, refining and keeping the biggest options for determining life plans. Fairness between present and next generations in environmental, economic and social resources are noted. Protecting biodiversity is needed regarding the ecosystem, species and genetic diversity, are vital for life, strengthened through different disciplines, which are necessary for the ultimate goal of sustainable development(Karakatsanis & Theodossiou, 2022).

Second: the requirements of sustainable development

The concepts of sustainable development urged the possibility of preserving the value of natural and industrial capital between generations in order to achieve social welfare, in which the protection and preservation of ecological resources is required on an equal basis. With this objective proposition and in order to achieve sustainable development, there are necessary requirements, the most important of which are:

1- The existence of a strong economic system that works on creating technical differences and depends on sustainability.

World Economics & Finance Bulletin (WEFB)
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Vol. 14, September 2022
ISSN: 2749-3628,

2- The existence of a social system that has the ability to develop solutions to ideological conflicts.
3- The existence of a production system that guarantees the preservation of the environment.
4- The existence of a technological system that works on finding new solutions.
5- The existence of an international system that adopts sustainable means of trade and finance.
6- The existence of a flexible administrative system that has the ability to self-correct.

The process of achieving sustainable development comes through the preservation of natural resources, and this informs us of the existence of two bases. It is the first rule in which direction is directed towards working in renewable energy sources, and the second rule is through reducing consumption in non-renewable energy.

Third: The characteristics of sustainable development permanence.

1- Sustainable development is one of the most complicated matters if it is compared with development in its classical concept, especially with regard to what is natural and social.
2 - That sustainable development depends on implementing necessary requirements for the poorest segments of society.
3- The sustainable development has qualitative dimensions and is related to the development of the cultural aspects and it seeks to preserve the civilization of the country.
4- Sustainable development has a global dimension related to the necessity of international intervention in order to activate and develop the development of poor countries(Karakatsanis & Theodossiou, 2022).
5- Sustainable development must take into account the right of future generations to the quantity of natural resources.

Fourth: Sustainable Development Goals

1- A better life for the residents.
2- Increasing the population's awareness of the existing environmental problems.
3- Rational and rational use of resources.
4- Working on linking modern technology with the goals of society.
5- Working to bring about continuous and appropriate changes in the priorities of society.
6- Achieving technical economic growth.

Fifth: Sustainable development, energy and the impact defects of its consumption

Energy is closely related to the three dimensions of sustainable development: economic, environmental and social, and it is clear that energy services are necessary for economic and social development to contribute to this continuous development. current while preserving energy resources for future generations.

Energy is the key and is the modern civilization basic. Its services are required for the human contribution to social stability thanks to the continuous development in the standard of living. Itis crucial to the development and prosperity. Yet the needs of energy intensity in modern economies gradually decrease, big energy are needed for improving the living conditions in the developing world, and the energy sector is important for the global economy in employments, incomes and trades(Glassley, 2014)

Since electric energy is the final energy and countries today are particularly interested in sustainable development controlling energy need begins with the best using consumed electricity and the aim is to increase the user comforts and the current level while saving energy, and this is achieved by using devices consuming little electricity and with possible intelligent management of existing equipment, today more users change their behaviors in the right direction.

Energy demand control includes some techniques and methods to improve consumer spending on energy while reducing public infrastructure costs and the influence on the environment. This can be possibly done by the use of the low energy lamps, building insulation with electric heating systems, household and economical industries, etc.). Devices reducing the common energy need on the network (energy controllers, programmers, etc.) are also recommended and work on replacing electricity. The mainly used in thermal industry such as heating and hot water is electricity from renewable energy sources(Wachtel & Voege, 2010).

The renewable energy rate in our energy consumption is inevitably increased significantly, and using them is possible locally, and in better techniques, so everyone can contribute to sustainable development by selecting use renewable energy sources, partially or exclusively. Also, renewable energy sources cannot be separated from sustainable development, as sustainable energy comes in abundance by the sun, wind, geothermal heat, waterfalls, tides and plant growth, and they leave little or no waste or emissions, and by these sustainable sources help to conserve resources the planet's fossil fuels, including the natural gas and oil, whose reserves are naturally limited and inevitably be depleted. Because of the scientific and technical progresses, renewable energy sources can fulfil large proportions of the population's energy needs at the moment, outside the transportation sectors. Our reliance on non-renewable energy ensures sustainable development and the sustainability of the earth's resources and the

World Economics & Finance Bulletin (WEFB)
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Vol. 14, September 2022
ISSN: 2749-3628,

existing fossil fuels for future generations, and managing energy resources. Renewable energy helps to maintain the general balance and our natural heritage. This production of more electricity using renewable energy sources reduce the electricity generated by the conventional or nuclear electric power plants. Thus, there is a direct reduction in the producing radioactive wastes so the future generations have deal with it any way. The extremely serious accident in Fukushima in Japan, in 2011 revealed that nuclear power is not an effective the solution to all the electricity supply issues(Timmons et al., 2014).

The third topic

Renewable or inexhaustible energy in Iraq sustainable development portal

The global community's long-term decarbonization efforts under the Paris Agreement support the Iraq's plans of developing its own energy system, and volatile global oil prices and the changes in the energy markets in lower state revenues). Also, the Iraqi government has needs to meet the needs of the growing populations.

First: Transforming the energy system in Iraq

Iraq's energy highly depends on forms of energy based on fossil fuels, as has so much fossil fuels. It is the third exporter of oil and possibly stay so in future and one of the 13 Organization of Petroleum Exporting Countries (OPEC) with no ratification of the Paris Agreement, yet, Iraq has a draft its Nationally Determined Contribution reduces in some carbon of capita emissions by 6% in 2030 in relations to 2010. There renewable energies and plans of increasing its share by 10% by 2030. Yet, the regulating deployment of renewable energies are minimal, and its framework improvements and energy efficiency measures, should be an importance.

Yet, the continuous rise in energy demand in Iraq challenges the expansion and infrastructure development of domestic energy to fulfil the current and next requirements. Additionally, the political instabilities due to the war with the Islamic State in Iraq and the Levant (ISIL) which made it highly unsafe power supply and nodes to retrofit and expand the grid electricity, and Iraq is in a changing global energy disrupting the economy of fossil fuels and change the future(" Observatory of Corporate Social Responsibility-Sustainable Development: A Challenge for Managers, Editions AFNOR," 2008).

Second, supply and demand for energy

The energy sector in Iraq declined recently, largely due to the war and sabotage, the demand for energy has risen, and the generation size has not meet this demand, which led to a serious shortage of energy, as the economic cost of this has been estimated. The shortfall was more than $22 billion in 2013. Iraq lacks the financial resources for other basic requirements like education and health cares. Iraq totally consumed energy in 2018 at (2,2552) kilotons of oil. In terms of energy consumption by sector, the transportation was 50% and then households (24%), industry (19%) and others (7%). The energy mix is mostly fossil fuels. In 2018, oil was 78% of the energy mix, and natural gases 21%, and renewable energy 0.3%, wasteful gas flaring practices increase consumption of natural gas (22).

Electricity intake in Iraq has increased twice 1990, reaching nearly 50 TWh by 2018, and the demand for electricity is supposed to reach about 170 TWh by 2035, as there is a present and future increased demand for electricity. With increasing population and economy due to high consumer purchases as well, old methods of appliances and high energy is consumed in the residential areas. In 2018, Iraq operates about 14 GW and 15 GW, with a stable capacity of 26.2 GW with the highest need 25 GW in summer Iraq is in a key shortage due to the summer peak e 50% higher than the average demand. It is not able to meet from the supply side. Although generation increased, the peak demand is much greater than the grid supply. In 2013, in Iraq, energy reserve margin reached17% causing Iraqis in particular acquiring diesel generators for filling the need gap and Iraq's electricity generation capacity could rise 72% by 2025in relation with 2017 levels(Sharp, 2002).

Generally, the Iraqi generation power is low because of the outdated equipment, lack of fuel, breakdowns, or regular maintenance (ibid.). Moreover, low water quantity in dams and hydropower plants lead to big unutilized capacity. The low water level is partly due to the (Ilisu) dam that was recently built in Turkey reducing the water resources of Iraq. Oil and natural gas predominate the electricity sector increasing trend in generation recently. Also, there is an increase in the use of gas Natural gas which equals using oil for power generation. Since the power system in Iraq is currently unable to meet the need for electricity, and thus requiring the capacity expansion, Iraq based on the MENA phase is model in the initial phase (Yergin, 2019).

Third: Iraqi Renewable energy

Hydropower is the key mixer of renewables, yet the total share of renewables is insignificant. In 2018, the generation of electricity was 1,875 GWh from renewable energy sources with 1,818 GWh hydropower and 57 GWh solar.

In 2004, renewable electricity generation increased because of the reform of current hydropower plants, yet, the Environmental Protection and Improvement Act in 2009, the 2014 National Integrated Energy Strategy, and renewable energy auctions in 2016, showed little

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 14, September 2022
ISSN: 2749-3628,

impact until now on generating electricity using renewable energy. In 2018, renewables produce only 2% of the electricity, Iraq aims at 10% renewable energy in the electricity by 2030, and a permanent target (timeframe not exceeding the limits) of 40%, to meet supply need. The solar PV is 42% of the total renewable energy in 2025. Temporarily, renewable energy would be primarily off-grid need centers in far regions, and in the medium to long runs the solar and wind power feeds into the grid. So far, the coupling of the sector, synthetic fuels, and hydrogen attracted not been discussed politically. In 2016, the Iraqi Ministry of Electricity reported the first 50MW solar PV renewable energy tender in Al-Salman city. In 2019, a new tender has been reported to generate 755 megawatts of solar energies. The Build Own Operate Scheme investment is in the granting the Power Purchase Agreement (PPA) with the Ministry of Electricity over 20 years(Heinberg, 2006).

In spite of its great latent in renewable energy, Iraq is behind other countries. Developing renewable energy in Iraq faces multidimensional challenges. There are policy measures, no unattractive investment conditions, and no financing mechanisms limits to enlarge energy facilities. There is a lack in official tax government incentives with no government funding for renewable energies, especially with no strong legal framework clauses for the promotion of integrating renewable energies (IEA, 2019). In 2006, Foreign Direct Investment Law on Foreign Direct Investment changed into Law No. 2 of 2010 and, to Law No. 50 of 2015. This legislation includes a foreign investor with the right of investing in Iraq with no restrictions. In 2009, the Environmental Protection and Improvement Law (Law No. 27 of 2009) focused on pollution control. 2014 witnessed the Integrated National Energy Strategy for Iraq to make an energy vision. Yet, it ignored the challenges facing Iraq and difficulties of implementation, the energy auction scheme of 2016, and by Electricity Law No. 53 of 2017, for the acceleration of using renewable energy as Iraq's first attempt to support for Renewable energy sources, increasing energy, and protecting the environment(Kazem, 2012).

The 2018 National Development Plan recognizes that Iraq is influenced by climate change, and has listed eight aims for the electricity sectors, primarily targeting securing electricity supplies. In 2019, the Ministry of Planning formulated the 2030 Sustainability Vision on empowering Iraqis is safe. It is unified is by a diversity in economy, sustainability in environment, justice and good governance, however, neither the National Development Plan (2018) nor the Sustainability Vision 2030 define a specific plan for the development of renewable energy. Figure 4-6 are the generation of renewables-based electricity introducing of the most relevant energy policy measures from 1990-2018("Thermal power plants include gas ،coal ،oil -biomass and multi-fuel (e.g. ،gas/oil ،coal/biomass). PBL Netherlands Environmental Assessment Agency and European Commission (EC) Joint Research ،Trends in Global CO2 Emissions Report," 2016).

Iraq minimally uses renewable energy and is rich in renewable resources. It has about than 3,000 hours of solar radiation annually with an intensity pf 416 W/m2 in January and 833 W/m2. Yet, the framework is not sufficient, the Iraqi Ministry of Industry increases the use of solar energy. So, domestic water heating, street lighting and drip irrigations will be active. However, the advantages of solar energy have no sufficient recognition by the government, limiting the development of the sector . there is no investment from a private company in renewable energy in Iraq, and all activities(Hogan, 2021)

The potential of wind energy in Iraq has been a lonesome field. Iraq has three wind regions. The last region covers 8% of the area with high wind speeds of about 5.0 m/s with an 378 W/m2 energy density, in the other two regions, wind speeds range between 2.0 m/s and 4.9 m/s, which This results in a power density of 174-337 W/m2(Philibert).

The first Iraqi wind turbines were made in 2010 in Baghdad (Al-Jadriya), with a 20 kilowatts, then the Ministry of Science and Technology installed some. However, this did not enhance wind sector in terms of techniques or economy because of the weak and variable wind and the problems of linking the turbines to the electricity grid.

Yet there are some potentials in Iraq in bioenergy, the government has neglected this sector so far. A few analyses have analyzed using bioethanol and methanol in mixed internal combustion fuels, like diesel and gasoline. Given the low availability of water in Iraq, it is expected that the use of biomass for power generation remains limited("Thermal power plants include gas ، coal ،oil -biomass and multi-fuel (e.g. ،gas/oil ، coal/biomass). PBL Netherlands Environmental Assessment Agency and European Commission (EC) Joint Research ،Trends in Global CO2 Emissions Report," 2016).

In terms of hydropower, the major rivers in Iraq are Tigris and Euphrates originating in Turkey and making 98% of Iraq's water, providing supplies for power generation and irrigation.

In Iraq hydropower is the source of renewable energy which is the biggest portion of renewable electricity

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 14, September 2022
ISSN: 2749-3628,

about 90% of renewable energy is from hydropower. The sector faced some problems because of wars damaging the infrastructure and power transmission lines in addition to climate change for which hydropower is susceptible. In 2012 the installed hydroelectric power plant capacity reached 1,864 MW and the power generation was not totally used. Despite water resources are limited, the plan aims at increasing energy hydropower to 14 TWh by 2035, in comparison to some other Arab nations, Iraq is uses hydroelectric dams like pumped storage options. Operational and planned hydroelectric dams are listed in Iraq("World Energy Council ،"Efficiency of power generation-Energy Efficiency Indicators," 2019).

The debate over water in Iraq is crucial. The Tigris and Euphrates rivers is decreasing by 50% and 25% respectively by 2025. Turkey started building dams since the 1970s, and Syria did too to improve the management of its water. As a result, water discharges to Iraq reduced and since the two rivers are critical in Iraq's energy, the water supply may become a springboard for future conflicts. Yet, it is claimed that Iraq has no good water management, neighboring countries are reasons to their unilateral water policies.

Water resources are important for the energy Iraq – in hydropower plants and for cooling or traditional ones. Integrated interconnection planning needs a focus and the same applies to energy use in the water sector increase significantly because desalination technologies expand.

Iraq's share of renewable energy sources is insignificant compared to its great potentials. This has prompted the weak legal frameworks and the high demands for energy, the Iraqi government focusing on easy and quick solutions such as distributing diesel generators which supports the classification of Iraq as in a pre-transition stage according to the stage model(*Iraq Energy Outlook, Special Report in the World Energy Outlook, OECD/IEA (International Energy Agency)*, 2013).

Fourth: Institutions and Governance.

The majority of the policies in Iraq need approval by the Ministry of Finance, on the Central Bank finances develops measures, and the Ministry funding according to the needs of the ministries for energy projects. Some ministries promote and developed the renewable energy industry such as the Ministrys of Oil, of Electricity and its departments, of Industry and Minerals, of Water Resources and of Transport. They have fund in the general budget to invest in renewable energy projects in Iraq through licensing for specialized companies, in particular with significant experience in renewable energy whose keys is the Ministries of Electricity in Kurdistan Region. In the latter, there are many active independent power producers, such as Erbil, Sulaymaniyah, and Dohuk plants. In, they are, for instance Maysan, Rumaila, and Basmiya Phase III. Solar PV projects Tenders are to independent investors. The Ministry of Electricity has four federal firms to generate and transmit powers. Likewise, four federal distribution ones—Baghdad, Central, South, and North—distribute electricity (*Energy Efficiency2 ،O17 ،Market Report Series-International Energy Agency*, 2017).

The institutional framework for the electricity sector is vertically integrated, yet there is a weak governance framework for renewable energy sources in Iraq. The process of corporatizing the electricity sector is delayed because of the policy uncertainty and political sensitivities, still, private and independent organizations can support the transitions from dissimilar perspectives, thus enriching transitions. Since Iraq does not have an electricity regulator nor wholesale market with a weak electrical infrastructure. Except for large unexpected shift, the transition of the power to renewable energies is possible over a longer period of time, and this strengthens Iraq's classification However, it is in the first pre-transitional phase model.

Fifth: CO2 emissions

While the per capita annual electricity consumption is about 1,300 kilowatt-hours, lower than the neighboring countries, the per capita energy consumption in Iraq is about 1,437 kilowatts, which is a high rate compared to other countries in the region, by 2018, carbon dioxide emissions had risen by about 69% in relation to 2009 levels, the year the Environmental Protection and Improvement Act came into force. Electricity and heat production peaked emissions, transportation and households.

In 2018, carbon dioxide emission reached 85.9 million tons from the electricity and heat generations. The oil sector emits 73%, yet the natural gas sector emits the left percentage. The leakage of industrial waste and traffic smokes cause most air pollution, and Iraq's emissions increase because economic activities and consumer behaviors change.

The lack of environmental policies weaken the environment. Out of 180 countries, Iraq ranked 152 in 2018 based on the Environmental Sustainability Index not approving the Paris Agreement as a sign due to its limited ambition to reduce emissions, and this supports Iraq's classification at a pre-stage level. In the applied stage model("to get real-the myths and realities of financing energy systems,p65. ،London2019،,").

Sixth: Energy Efficiency

Energy efficiency strategies are scarce with no focus of political debate recently, yet, developing the National

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 14, September 2022
ISSN: 2749-3628,

Sustainable Development Plan 2018-2022 made Iraq focused on improving in energy system efficiency. So Iraq aims at rationalizing electricity consumption for consumers to reduce a 7% in energy consumption in 2022 (ibid.). In its declared NDC, Iraq reduces per capita emissions by 6% than 2010 levels.

The impediment of the Iraqi energy efficiency plans is caused by the large energy aids. Being cheap failed to motivate the final users to use non harmful environment behaviors or energy-saving measures. Iraq enjoys regressive and high subsidy in the Arab region, and the decline in fossil fuel prices, which is supported by a rate 56%, significantly distorting the energy market. In 2019, fossil fuel subsidies were 3.3% of GDP. Iraq's electricity price is the lowest in the Arab area, at 1.2 US cents/kWh. Yet electricity tariff is low in comparison to the regional level, paying distribution companies and payments from neighborhood generators is high for the overall costs to the end consumer of electricity regardless of subsidies (generator costs amounting to About 8.40 US dollars per 1 ampere per month (8 hours daily), fuel cost is 10 to 15 times more than the electricity tariff. In addition, the enhanced price in the electricity sector are because of using oil fuels, suffering from a high opportunity cost, technical inefficiencies such as thermal power plants, gas turbines, and diesels are 27.5% efficient and lack of use of domestic air. Existing capabilities, high combined technical and commercial losses, and increased staffing("Bloomberg new energy finances annual long-term economic forecast of the worlds power sector ،Executive," 2017). So far, the Ministry of Electricity, owning and managing electricity assets in Iraq, has implemented a tariff-blocking scheme. It charges the customer a higher price with an increase in the number of kilowatt-hours. Other schemes are being considered, and communication is being developed to raise public awareness on the current system weakness. Because Iraq is afraid that removing subsidies causes unrest, it is critical to re-price the scheme balances economic efficiencies and social justice.

The Iraqi government lastly recognized energy efficiency efforts as critical to the energy transition with two basic requirements to smoothly transit to energy. Specifically, implementing constantly updated energy efficiency measures and the subsidy gradual elimination, both of which are not currently in Iraq, which indicates that the country is in a phase prior to these requirements.

Seventh: Infrastructure

In Iraqi, the electricity network is not sufficient, as it does not cover peak demand, which led to load separation because of the old and inefficient network structures, and technical barriers including excessive losses when transmitting and distributing. this increases the challenges the network faces. In 2016, losses increased by than 50%, and National Sustainable Development Plan 2018-2022 focused on technical and non-technical losses showing the need for good efforts for addressing this problem and multiple plans were set to expand the electricity transmission networks, developing concepts to connect the whole region("Energy efficiency indicators Highlights,").

Interconnected networks provides system reliability which reduces reserve margins, supports reactive power, better manages the diversity of daily and seasonal demand, and reduces operating costs. Volatile renewables, as well as interconnection among countries can support electricity trades in the region, increasing the willingness of countries' cooperation in a regional electricity market. The present projects of interconnection include Egypt, Iraq, Jordan, Syria, Turkey, Lebanon, Libya and Palestine. Iraq and Syria are interconnected is side since 2010, with a capacity of 400 kV. Iraq and Iran are connected at 400 kV, and a 400 kV between Iraq and Turkey implemented later and under discussion where Iraq is connected to Kuwait, and a plan to connect Iraq to the Jordan. The agreement provides Iraq with electricity from Jordan of about 1,000 gigawatt-hours yearly, has been an operative framework since 1988 and stabilizes the grid and trade of facilitate energy. Yet, the interconnection is suboptimal and not fully asynchronous. Electricity trade in the Arab world has been hindered by limited generation reserve margins. Another cause is the weak institutional and regulatory frameworks, yet, interconnection and regional integration support sustainability and secure energy supplies. So, the general expansion of the regional network is caused by diversifying energy supply resources, in particular in terms of the expanding and integrating renewable energy (ibid.). Yet, Iraq's first prioritizing improving the security of supplies.

There are serious reliability and security weaknesses in the transportation network in Iraq. The national grid infrastructure requires major transformations to meet the increasing demand and to integrate non-dispersible renewable energy sources that depict the electricity transmission networks. Data is based on 2017. So, the updated extensions could be lost. (Singh, Croiset, Douglas, & Douglas, 2003).

The Ministry of Electricity controls electricity transmitting to more than 550 power substations in the country by a high-capacity grid transmission networks. The Ministry of Electricity Owens the network through four companies and by the voltage grid. Distributing

World Economics & Finance Bulletin (WEFB)
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Vol. 14, September 2022
ISSN: 2749-3628,

companies geographically monopolizes (North, South, Central and Baghdad) with no retail sectors in Iraq. Yet, recently, the private sector is progressively involved in generating power, in terms of electricity retail in small pilot projects: billing and revenue collection is restricted to these four distribution companies. Privatizing electricity is emphasized because there is no supply and it is difficult to enter into long-term agreements.

The current power grid is no stable, and generation capacity is not enough due to the outdated state of energy assets. Rebuilding and expanding the network introduces smart grids, but Iraq still requires a lot of time prior to achieving these advanced systems. In its underdeveloped grid, Iraq is considered in the initial phase of energy transition.

Seventh: System-level developments

On a landscape level, the COVID-19 pandemic affects the energy transition at least in the term and long term. It is a suitable position for Iraq, till the nation recovers from this crisis.

Also, these epidemiological influences, , the technical, financial, and regulatory framework system-wide barriers greatly prevent developing renewable energy. Yet Iraq has published bids for solar projects with almost no regulations for dispatches and financial sustainability. As a typical rentier state, Iraq's energy relies on oil and gas to a great extent, and the economy depends on hydrocarbon. Under Electricity Law No. 53 of 2017, Iraq officially aimed to support renewable energy sources, enhance efficiency, and preserve the environment. Yet, as the country lacks developed infrastructure and chronic power outages, the priority is improving its electricity supply before the addition of the renewable energy to the grid. Also, there are political tensions with neighboring countries over water infrastructures and supplies for generating power ("To word a green economy-pathway to sustainable development and poverty evadication-Asynthesis for policy markets," 2018).

After the Euphrates and Tigris are central since antiquity), Iraq will likely rely on diesel generators to offset present need.

In short, many factors at the system level prevent Iraq's progress in its energy transition: the pandemic, the difficulties in the institutional framework, and political situation is not stabile. Iraq has a national energy strategy with no clear vision and political commitment. So, renewable energy resource does not replace fossil fuels, like oil and gas, in the energy mix. So, Iraq is a pre-energy transition model stage and it summarizes and compares important energy transition indicators in Iraq over several years.

Eighth: A future look at the next stages of the transition to sustainable development

Iraq has huge potentials for renewable energy although lagging behind its regional peers in deploying renewable energy technology. The Iraqi electricity as struggled to efficiently use its renewable energies including war and violence creating harsh conditions in comparison to some other Middle Eastern and North African countries. The current Integrated National Energy Strategy attempted at a short-term vision needing to be revised with a better focus on the particular facts. So, Iraq have no a clear and defined strategy and nor direct approach to the transition towards renewable energies. The dominant role of fossil fuels on the economy and the state, the lack of legislation and awareness of efficiency, and political factors all impede the path of energy transition in Iraq. Following the COVID-19, energy strategy must be developed emphasizing the value that Renewable energy technologies and renewable energy sources as short-term stimulus and recovery plans. The existing 2030 Sustainability Vision, embracing a new social contract between the state and its citizens to trust in government and provide self-development opportunities, employment and income generation is good an updated national energy strategy. The construction of long-term energy vision is an understanding of the nature and interrelationship of structural challenges. As energy security and electricity stability are main problems, harnessing the potential of renewable energy contributes to these aspects as and critical step. Also, policy makers and citizens are required to understand the advantages from that renewables, and realize how global cost reductions this technology makes as an exciting alternative. for diesel generators. Specific programs could increase awareness and help acceptance and participation by the stakeholders and citizens.

While secure national energy supplies is required which is a key for the further deploying renewable energy sources, the environment is not a relevant critical element in Iraq's energy transition. Yet, this may alter the long term, as Iraq is affected by the growth environmental concerns globally, such as the need to reduce greenhouse gas emissions. Therefore, a timely transition to the production of fuels from renewable energy sources can provide new development for the economy and future export to encourage Iraq to adopt environmentally sound technologies. Also, since the establishment of new conventional power plants, production facilities and transportation infrastructure can make path dependencies in the energy stabilizing the effects, transitioning towards renewable energy sources in the future more difficult and possibly more

World Economics & Finance Bulletin (WEFB)
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Vol. 14, September 2022
ISSN: 2749-3628,

expensive. Prioritize jumping into the energy transition over investments in carbon-intensive technologies, although it will be difficult to overcome political, institutional, and cultural resistance to renewable energy in the world. Although the transition to renewable energy can have positive economic and environmental impacts, for instance, it creates jobs and the energy value chain, reducing environmental pollution and thus reducing health risks, rising levels of energy security as a prerequisite for economic growth(*UN Environment's Economy Division and Frankfurt School And unep Collaborating Centre for Climate & Sustainable Energy Finance*, 2017).

To drive the transition towards renewables, appropriate institutions and structures are required. Also, the same is with research and development for making local value chains supported financially, such as taxing oil sector to fund renewable energy research. To create a realistic time frame for renewable energies in developing plans for the transition, also, the necessary infrastructure is required and society needs to be a key in the overall process, an appropriate framework and legislative context or consumers is required for adopting renewable energies or producing their own electricity introducing better participatory tools and channels in the transition promoting acceptance and contribution to fair energy dynamics and energy policies. With the local context, against this background, there is a need for a long-term and integrative approach considering the entire energy and its objectives long-term transition towards a fully renewable energy system, and policy makers understanding of the early use of the renewable energy systems to make various benefits in the short term (by increasing security of supply) and the long term (for economic development) and represents a case Iraq's energy system transformation provides insight prospective for future steps("Levelized Cost of Electricity Market Outlooks," 2018).

CONCLUSIONS AND RECOMMENDATIONS

Conclusions

1- Renewable energy is critical in activating the dimensions of sustainable development, and its projects contribute to achieving economic gains, improving the pattern of social conditions and preserving the ecosystem for current and future generations.
2- Governments have a major role in establishing renewable energy projects by setting policies that are compatible with the state's capabilities and the incentive systems and mechanisms.
3- The transition from a non-renewable energy economy to renewable energy depends on the availability of objective and subjective motives, and the core of the problem is in the subjective motives and the economy in which the rentier pattern prevails and the absence of environmental awareness.
4- Iraq's vast area offers great potentials that can enhance its good position by moving towards investment in renewable energy, especially solar and wind energies, and hydroelectricity.
5- There is great potential for investment in renewable energy in Iraq, but there are some challenges such as economic, technical and environmental.

Recommendations

1- Encouraging the use of renewable energy through the issuance of laws and legislation that are compatible with the capabilities of Iraq and as is the case in countries that are pioneers in the field of sustainable energy.
2- Providing the appropriate investment climate for companies working in the field of sustainable or renewable energy in order to benefit from their expertise in this field.
3-Working on creating a climate atlas that provides the necessary information for specialists in order to accurately assess the energy potential in Iraq.
4- Iraq has great potentials that qualify it to invest in renewable energy, especially in solar energy. In most regions of Iraq, it is conditioned on the establishment of stations with large capacities that are close to transmission stations or the establishment of hybrid stations in order to reduce costs.
5 - With regard to wind energy, there are distinct areas for investing in wind energy, taking into account the technology used to obtain high capacities, as Iraq is located in a semi-tropical region, which leads to instability in wind speed throughout the year.

REFERENCES

1. Al-Sana'a, B. (2014). Geothermal Energy Needs Who Can Use It Better, Tharwatna Retrieved from http://tharwatna.com
2. Blander, M., Sinha, S., Pelton, A., & Eriksson, G. (1989). *Calculations of the influence of additives on coal combustion deposits*. Retrieved from
3. BLEDSOE, P. (2021). The Role of Natural Gas in Meeting Global Energy and Climate Change Goals .
4. Bloomberg new energy finances annual long-term economic forecast of the worlds power sector ،Executive .(2017) .

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 14, September 2022
ISSN: 2749-3628,

5. Devine-Wright, P. (2012). *Renewable energy and the public*: Routledge.
6. Dimensions of sustainable development, research and studies, Arab Union for Sustainable Development and Environment. (2016). Retrieved from http://www.ausde.org/ausde/750
7. Dudley, B., & Dale, S. (2012). Bp statistical review of world energy june 2017. *London, UK*, 1-4 .
8. Energy efficiency indicators Highlights .
9. *Energy Efficiency*2 ،*O17* ،*Market Report Series-International Energy Agency*. (2017). France.
10. Energy for Sustainable Development in the Arab Region, Framework for Action ,United Nations Environment Program - Regional Office for Western Asia .(2017) .
11. Glassley, W. E. (2014). *Geothermal energy: renewable energy and the environment*: CRC press.
12. Global Scenarios for Demand and Supply Availability 2015-2035, The Nuclear Report , World Nuclear Association .(2020) .
13. Heinberg, R. (2006). Beirut: Arab House of Science.
14. Hogan, C. L. W. (2021). *Displaced to Save the World: Strategies for Using Historic Preservation and Education to Interpret Pre-1942 Communities in Oak Ridge, Tennessee* . Middle Tennessee State University ,
15. *Iraq Energy Outlook, Special Report in the World Energy Outlook, OECD/IEA (International Energy Agency)*. (2013). Paris.
16. Karakatsanis, D., & Theodossiou, N. (2022). Smart Hydropower Water Distribution Networks, Use of Artificial Intelligence Methods and Metaheuristic Algorithms to Generate Energy from Existing Water Supply Networks. *Energies, 15*(14), 5166 .
17. Kazem, H. L. (2012). *Iraqi oil and oil policy in Iraq and the region under the American occupation, a future vision, Iraq* (First ed.): Center for Studies.
18. Khaligh, A., & Onar, O. C. (2017). *Energy harvesting: solar, wind, and ocean energy conversion systems*: CRC press.
19. Levelized Cost of Electricity Market Outlooks . .(2018)
20. Maczulak, A. E. (2010). *Renewable energy : sources and methods*: Infobase Publishing.
21. Observatory of Corporate Social Responsibility-Sustainable Development: A Challenge for Managers, Editions AFNOR .(2008) .
22. Patel, M. R., & Beik, O. (2021). *Wind and solar power systems: design, analysis, and operation*: CRC press.
23. Philibert, C. Renewable Energy for Industry: From Green Energy to Green Materials and Fuels.(2017). In.
24. *Report of the Economic and Social Commission for Western Asia, Energy for Sustainable Development in the Arab Region: Framework for Action*. Technical Secretariat of the Council of Arab Ministers Responsible for the Environment, United Nations Environment Programme, Regional Office for Western Asia.
25. Sharp, B. (2002). *Institutions and decision making for sustainable development*. Retrieved from
26. Singh, D., Croiset, E., Douglas, P. L., & Douglas, M. A. (2003). Techno-economic study of CO2 capture from an existing coal-fired power plant: MEA scrubbing vs. O2/CO2 recycle combustion. *Energy conversion and Management, 44*(19), 3073-3091 .
27. Smith ,Z. A., & Taylor, K. D. (2008). *Renewable and alternative energy resources: a reference handbook*: ABC-CLIO.
28. Thermal power plants include gas ،coal ،oil - biomass and multi-fuel (e.g. ،gas/oil ، coal/biomass). PBL Netherlands Environmental Assessment Agency and European Commission (EC) Joint Research ،Trends in Global CO2 Emissions Report .(2016) .
29. Timmons, D., Harris, J. M., & Roach, B. (2014). The economics of renewable energy. *Global Development And Environment Institute, Tufts University, 52*, 1-52 .
30. to get real-the myths and realities of financing energy systems,p65. ،London .2019،
31. To word a green economy-pathway to sustainable development and poverty evadication-Asynthesis for policy markets . .(2018)
32. *UN Environment's Economy Division and Frankfurt School And unep Collaborating Centre for Climate & Sustainable Energy Finance*. (2017). Bloomberg New Energy Finance.
33. Wachtel, A., & Voege, D. (2010). *Geothermal Energy*: Chelsea Clubhouse.
34. World Energy Council ،"Efficiency of power generation-Energy Efficiency Indicators . .(2019)
35. World nuclear association anther drop in nuclear generation world nuclear news . .(2018)

World Economics & Finance Bulletin (WEFB)
Available Online at: https://www.scholarexpress.net
Vol. 14, September 2022
ISSN: 2749-3628,

36. Yergin, D. (2019). *The Quest for Energy, Security and the Reshaping of the Modern World* (H. Nashm & S. Mujahid, Trans.). Berut: Forum on Arab and International Relations.