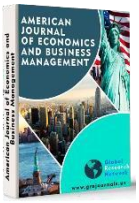

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Article

Analysis of The Impact of The Green Economy in Light of The Sustainable Development Vision (2030) and Its Impact on The Iraqi Economy

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Abstract: The green economy has emerged as a pivotal strategy for aligning economic growth with environmental sustainability and social justice in response to escalating global climate challenges. Within this context, Iraq's pursuit of the 2030 Sustainable Development Agenda underscores a critical need to transition from an oil-dependent economy to one based on sustainable practices, such as renewable energy, environmental protection, and social development. However, the country continues to face challenges due to insufficient investment in education, health, and green infrastructure, weak institutional frameworks, and the persistence of pollution and resource mismanagement. This research aims to evaluate the feasibility and impact of adopting a green economy model in Iraq by analyzing sector-specific performance (e.g., energy, health, education, waste management) and assessing policy alignment with sustainable development goals. The findings reveal that although Iraq has initiated several efforts toward sustainability, the contribution of green sectors to GDP and employment remains minimal. Environmental degradation, inefficient waste disposal, and low renewable energy integration hinder progress. This study provides a comprehensive national-level analysis combining socio-economic, environmental, and policy perspectives, offering rare insight into Iraq's green transition trajectory. To realize the vision of sustainable development, Iraq must implement structural reforms, increase funding for human capital development, expand renewable energy projects, and strengthen regulatory frameworks to mitigate environmental damage and promote long-term sustainability.

Keywords: Sustainable Development, Green Economy, Development Plan 2030, Iraqi Economy.

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1. Introduction

In light of increasing environmental challenges and global climate change, the green economy has emerged as a strategic option that balances economic development with environmental conservation. It is no longer possible to rely on traditional patterns of production and consumption that deplete resources and increase pollution. Instead, it has become necessary to adopt new development models capable of achieving environmental and social sustainability. The research examines the effects of the green economy and what they mean for the Iraqi economy within the context of the 2030 Sustainable Development Plan.It focuses on highlighting the importance of the transition to a more just and resource-efficient economy, and the role of this transition in addressing environmental challenges, enhancing job opportunities, and achieving the well-being of Iraqi society. Within this framework, the research seeks to provide a clear analytical vision of the required policies, available opportunities, and challenges that must be addressed to ensure a smooth and effective transition to a green economy that supports comprehensive and sustainable development in Iraq [1].

LITERATURE REVIEW

Green Economy

The United Nations Environment Programme (UNEP) defines a green economy as one that enhances human well-being and social fairness while considerably lowering environmental dangers. When applied to specific sectors, the green economy means more employment and income opportunities for people, as investments improve resource management, lower emissions, decrease wastes and save on losing biodiversity and damaging nature. It is also known as a clean energy economy that helps the environment by reducing greenhouse gas emissions, lessening damage to nature and making the best use of natural resources. It covers several economic sectors and uses technology to make manufacturing cleaner, not just to produce clean energy. Others defined it as a new economic model that requires the preparation of all professions and a focus on goods and services that will require more specific changes to improve energy efficiency and reduce resource use. University education has an important role to play in preserving this model [2].

The United Nations Conference on Sustainable Development, held in Rio de Janeiro, Brazil, in June 2012, emphasized that "the green economy is an important path to achieving sustainable development," and this was reflected in the conference's outcome document. The green economy is a new and fast-growing way of developing economies that mainly comes from environmental economics. The purpose is to study how human economies and the natural environment are linked. It is important to understand the processes that may be applied to effectuate the transition, since there are various actions that must be taken to develop a green economy, such as:

- **a)** Create a comprehensive plan for transitioning to a green economy, including the commercial sector and civil society organisations. Establish defined targets and quantitative indicators.
- **b)** Reaching sustainable development objectives by emphasising rural development, attaining balanced urban-periphery growth, and generating employment in these regions.
- **c)** Achieving sustainable development objectives via rural development, balanced development between cities and the periphery, and employment creation in these regions.
- **d)** Reviewing and changing economic policies to make it easier for people to switch to more sustainable ways of earning, investing, and spending money.
- **e)** Establishing administrative, economic, and financial mechanisms and procedures that are in accordance with the implementation of priority programs, including the rationalisation of water use, the expansion of energy sources, the transition to clean energy, the construction of green buildings, the promotion of sustainable transportation, and the protection of the environment from desertification.
- **f)** Fostering collaborations with the commercial sector and local community to drive investments towards green sectors, promote national competences, and support green activities.

The economic implications of the transition to a green economy can be substantial, as evidenced by the following fundamental steps:

- **a) Stimulating economic growth:** Over the long term, it is anticipated that green investments will stimulate global economic growth.
- **b) Poverty alleviation and job creation:** The move toward a green economy opens up many opportunities for green jobs in various economic fields. Making agriculture more environmentally friendly is meant to reduce poverty in rural areas and keep people from moving to cities which helps solve the problem of food security.

c) **Addressing environmental challenges:** By lowering greenhouse gas emissions, enhancing resource management and efficiency, minimising and controlling waste, safeguarding biodiversity, and slowing the degradation of forests and fisheries.

d) The green economy emphasises enhancing long-term economic efficiency by optimising resource productivity, minimising pollution, decreasing waste and resource consumption, and channelling investments towards the sustainable use of natural resources.

2. Materials and Methods

Research Objective

This research seeks to understand how the green economy will affect Iraq, given the 2030 Sustainable Development Vision, cheque its feasibility in Iraq, examine its possible effects on the environment, the economy and society and judge how far existing government policies suit the move to a green economy [3].

Research Significance:

The importance of the research stems from its addressing a contemporary, global priority: the green economy, which constitutes the foundation for achieving sustainable development. The research also sheds light on Iraq's reality in this context, in light of the growing environmental, economic, and social challenges, and provides an analytical perspective that helps decision-makers adopt more sustainable and equitable policies for future generations [4].

Research Problem:

The research problem lies in the fact that the Iraqi economy continues to suffer from the dominance of the oil-based renter model, with a clear absence of strategies for transitioning to a green economy. This comes at a time when indicators of environmental degradation are increasing, the quality of basic services is declining, and investment in sustainable sectors is lacking, hindering the achievement of the 2030 Sustainable Development Goals [5].

Method and Procedures:

The research relied on a descriptive analytical approach, through an analysis of literature related to the concepts of the green economy and sustainable development, in addition to a review of statistical data related to the economic, environmental, and social reality of Iraq. Official tables and data from reports from the Ministries of Planning, Environment, Electricity, and Education were also used to provide an accurate quantitative and qualitative analysis of the Iraqi reality and compare it to the determinants and indicators of the global green economy [6].

Sustainable Development

The concept of sustainable development can be described through the 1987 Brundtland Commission Report, which defined sustainable development as development that meets the needs of the present without compromising the ability of future generations to meet their own needs.(8) There are other definitions of the concept of sustainable development, including the definition by the Food and Agriculture Organization of the United Nations (FAO), which defines sustainable development as the protection and management of the natural resource base and the direction of technological and institutional changes to ensure the permanent fulfillment and satisfaction of present and future human needs. The World Bank defines sustainable development as: “The process of achieving continuous equity that ensures the availability of the same current development opportunities for future generations by ensuring the continuity of comprehensive capital or its continuous increase over time [7].

Sustainable development is of great importance for the present and the future, as it is distinguished from other developments by the following:

a) It is based on the idea of justice among individuals, between generations, and among peoples, along with an emphasis on the role of civil society, its organizations, and all segments of society.

b) It is focused on by addressing the needs of the most impoverished members of society and working to stop poverty from spreading globally.

c) The time dimension is essential, as it is a long-term development that relies on assessing the potential of the present while taking into account the rights of future generations to community resources.

d) Compared to general development, it is more complicated and includes both natural and social components.

e) The quantitative and qualitative aspects overlap, making it impossible to separate components and quantify indications.

f) It is dedicated to the conservation of resources, including human, environmental, and community resources, and endeavours to increase awareness of conservation through its activities.

Policies pursued in light of the 2030 Development Plan and their impact on Iraqi economy

First: The contribution of the green economy to achieving sustainable development and combating environmental pollution.

1. Improving renewable energy sources.

Energy is a fundamental component of the universe and a form of existence. It is a permanent, inexhaustible natural resource available in nature, whether limited or unlimited, but constantly renewable. It is clean and its use does not result in environmental pollution. Therefore, it is a comprehensive term that describes a wide range of energy sources. [8]

Hydropower: This is the energy produced by the constant movement of water, which is characterized by its inexhaustibility. Its sources of generation include dams, waterfalls, and tides in the sea. It is one of the oldest, most widely used, and least expensive renewable energy sources [9].

A. Solar Energy: It is one of the most important sources of energy that can be used. It is characterized by continuity due to its widespread and sustainable availability, as its source is the sun, which never dies. Technological progress in solar energy continues, leading to a decrease in the cost of energy generation [10].

B. Wind Energy: Wind energy is one of the most important and oldest types of renewable energy. It has been used in sailboats and to generate power for homes. It relies on wind speed and turbines, and is defined as energy derived from air currents [11].

C. Other Types of Renewable Energy: There are many energy sources that humans can use to generate electricity and other areas. These include geothermal energy, which is latent heat deep within the earth in the form of hot water, and bioenergy, which is produced from a variety of organic materials, known as biomass, such as wood, coal, and other natural fertilizers to produce heat and energy [12].

2. Climate Change and Integrating a Green Economy for the Poor into National Development Plans

Climate change is the term used to describe the long-term fluctuations in weather patterns and temperatures. The solar cycle may be the cause of these alterations, which may be considered natural. Nevertheless, the combustion of fossil fuels, including coal, oil, and gas, has been the primary cause of climate change since the nineteenth century [13].

3. Green Economy and Reducing Environmental Pollution

Although pollution was born with humans and increased with their development, the world did not realize its dangers until about a hundred years ago or a little more. Since then, calls have been made to address these dangers, beginning with cutting off the

sources of pollution. Therefore, dealing with the problem of pollution must be realistic, and the first step in this approach is to recognize it by finding a practical definition of pollution: Pollution refers to the direct and indirect discharge of fumes, heat, and noise into the atmosphere, water, and land resulting from human activity, which may be harmful to human health and environmental quality [14].

Education for a Green Economy and Global Transformations in the Education Economy.

1. Using Indicators to Measure Social and Cultural Development.

Social development seeks to change society and the way it works to meet the needs of people and groups. This means changing old social conditions to form a new system, where new relationships and special values develop to meet the wants, communal obligations and beliefs of people. To achieve this, we must really focus on making important changes and aim for the required progress. The objectives of social development include the following:

a) Creating a desire for change by clarifying dissatisfaction with the status quo and creating new social roles for members of society, transforming it from a traditional society to a socially and materially advanced one [15].

b) Improving the education and social status of individuals to help them solve their problems.

c) Solving problems resulting from economic development, such as the transition from rural to urban society, which may increase the unemployment rate [16].

d) Instilling positive social values and attitudes, such as cooperation and fulfilling one's duties.

e) Strengthening family life to increase cohesion, stability, and cooperation among family members.

Among the social indicators that can be used to measure the progress, slowness, or backwardness of social development are:

- Available government social services.
- Available private social services.
- Available health services.
- The level of education in society.
- The level of illiteracy in society.
- The birth and death rates.
- Cultural awareness in society.
- The extent of acceptance of others.
- The rate of popular participation.
- The extent of leisure activities.
- The number of civil society organizations, especially NGOs.

2. Cultural Development Indicators

UNESCO's efforts over the past decade to champion the role of culture in achieving sustainable development have resulted in the adoption by the United Nations General Assembly of three landmark resolutions recognizing the role of culture as an empowering factor and driver of sustainable development. As a result, culture was included in the new Sustainable Development Agenda that was approved in 2015. Cultural heritage is directly included in Target 4 or SDG 11 subtarget 4, called “Strengthen efforts to protect and safeguard the world’s cultural and natural heritage,” and UNESCO Institute for Statistics will develop and deliver the internationally agreed indicator 11.4.1. Along with the related internationally agreed target 11.4.1, culture contributes to development as an active sector and cross-cuts other sectors. The New Urban Agenda, which was endorsed at the United Nations Conference on Housing and Sustainable Urban Development (Habitat III) in Quito, Ecuador, in October 2016, is another prominent international framework that explicitly acknowledges the contribution of culture to sustainable development [17].

UNESCO's Culture Indicators in the 2030 Agenda for Sustainable Development (Culture Indicators 2030) are thematic metrics intended to assess and track culture's impact on the achievement of the goals and targets outlined in the 2030 Agenda for Sustainable Development at both national and local levels. This framework will assess the role of culture as a sector of activity and its cross-cutting contribution to the achievement of various Sustainable Development Goals and other areas. The purpose of this set of thematic indicators is to support and complement the global indicators agreed upon in the 2030 Agenda for Sustainable Development and to establish links between the various goals and targets contained therein. These thematic indicators for the role of culture in implementing the 2030 Agenda for Sustainable Development include:

a) Environment and resilience to climate change
b) Prosperity and livelihoods
c) Knowledge and skills
d) Inclusion and participation

3. Green schools: benefits and advantages for health and education

The term "green schools" dates back to the 1990s, but it only became widespread in the early 2000s. Despite several years since the term emerged, "green schools" and their principles remain insufficiently widespread. The concept of green schools focuses on encouraging children to use appropriate skills to take necessary actions on important environmental, economic, and social issues. Education in green schools is not limited to classroom instruction, but extends to outdoor settings as opportunities for students to engage in direct, first-hand experiences. Green schools are characterized by being clean, healthy, and surrounded by a green environment [18].

They promote students' physical, mental, and social health, ensure healthy classrooms and a safe learning environment, and bring children closer to nature and engage them in its conservation. Research indicates the importance of environmental education. The Brookings Institution found that if 16 percent of secondary school students in high- and middle-income countries received climate change education, they could reduce carbon emissions by approximately 19 gigatons by 2050. Furthermore, some studies indicate that the classroom environment can affect a child's academic performance by up to 25 percent, and overall student performance in schools with sunlight increases by 10 percent. Environmental education contributes to increasing public awareness and knowledge of environmental issues, teaches students critical thinking, and develops problem-solving and decision-making skills. Environmental education also creates tolerance and understanding in students, increases their appreciation for the nature around them, encourages healthy lifestyles, and develops commitment in learners as students take steps to improve their environment and community [19].

3. Results

Analyzing the Relationship Between the Green Economy and Sustainable Development in Iraq

First: The Green Economy and Education in Iraq

In all countries worldwide, the development of the education sector, which encompasses education, training, and higher education, as well as the construction of its infrastructure, are among the most critical objectives and established pillars. Most countries endeavour to advance this sector in order to accomplish other development objectives, such as economic, social, and environmental purposes. The only way to know is by checking how much is actually spent on education in that country. While Iraq's gross domestic product changes somewhat, the country continues to give too few financial resources to education at all levels. In international terms, Sierra Leone is number one for investing the highest percentage of its budget in education. In Sierra Leone and other African nations like Guatemala, Turkmenistan, Hong Kong, and South Africa, public expenditure on education was 33.9%, according to figures from the previous year [20].

In 2019, Iraq spent 6,372,198 million dinars on education, as shown in Table (1). In 2005, the amount spent on education rose to 6,743,700 million, with a growth rate of 0.06%. This is better than the rate in previous years. Still, the number of new cars sold in 2007 was 13% lower than in the previous year. In 2008, the budget for education was 6,063,120 million dinars, showing an increase of 0.03%. In 2009, the growth rate slowed to 0.02% because of the financial crisis and a drop in worldwide oil prices. The proportion of the sector went down because of the big financial crisis and the drop in crude oil prices, which affected the size of the gross domestic product.While it increased from 0.07% in 2010 to 0.09% in 2011, 0.17% in 2012, and 0.08% in 2013, it experienced a slight decline to 0.08% in 2013. Overall, education dropped to 0.01%. After the financial crisis ended and oil prices started to climb again, expenditure on education went up a lot. In 2015, it reached 9,774,128 million dinars, which was a 0.10% increase from the year before. In 2005, expenditure on education was 2.23%, and it was continuously increasing higher. This rate went up to 13.24% in 2016 and then down to 2.32% the following year. The growth rate was 0.16% in 2012. 2007 had the lowest growth rate, at -0.13%. This rate went risen even further, reaching 0.04% when the GDP reached 10,920,011 in 2023 (Table 1) [21].

Table 1. The amount of expenditure on education and its relation to the GDP in Iraq for the period (2005-2024), in million Iraqi dinars.

year	The amount of spending on education in Iraq is one million Iraqi dinars.	Growth rate of education spending	Percentage of spending on education as a percentage of GDP
2005	6,372,198	-	-
2006	6,743,700	0.06	4.32
2007	5,895,762	-0.13	6.54
2008	6,063,120	0.03	5.35
2009	6,158,220	0.02	9.27
2010	6,569,640	0.07	6.14
2011	7,130,552	0.09	8.31
2012	8,375,769	0.17	10.42
2013	9,007,152	0.08	8.23
2014	8,893,764	-0.01	0.00
2015	9,774,128	0.10	5.19
2016	10,937,437	0.12	13.24
2017	10,781,060	-0.01	2.32
2018	10,634,364	-0.01	3.26
2019	11,146,720	0.05	6.29
2020	11,934,014	0.07	3.18
2021	11,922,011	0.06	2.17
2022	10,921,010	0.05	2.14
2023	10.920.011	0.04	2.12

Source: Ministry of Planning, Central Statistical Agency, National Accounts Directorate, annual reports for various years.

Based on the points highlighted, we find that the main preparation of human resources and education processes form a primary base for defining the character of Iraq's socio-economic growth. Nevertheless, we observe a decrease in education indicators, which should be reoriented towards development and bolstered in order to prevent any catastrophic scenarios for the general development of society and the economy. Iraq must join the global move from using resources without thinking about the future towards optimising resource use through knowledge. This change takes place when national education systems are aligned and given a new priority: to focus on learning in light of

environmental importance. This is achieved by urging schools to teach people how to work in a green economy and care for the environment. As a result, we learn that the "green economy" is a new scientific model that makes sense and builds on the idea of "sustainable development." This is the only possible situation that can protect our present generation's material well-being and also protect the foundation for future generations. We need a totally new way to teach and educate people of all ages if we want to move to a "green economy." Young people, middle-aged folks, and adults who want to learn and improve in their careers. On account of many changes that are in the making in Iraq, there must be a reorganisation of present buildings into systems that nurture harmony and mutual development of society and varying ecosystems [22].

Second: The Green Economy and the Health and Environmental Sector in Iraq

Following a fourfold increase in the global economy over 25 years, which has benefited hundreds of millions, 60% of the ecological services and products essential for livelihoods have either degraded or been exploited unsustainably. Economic growth in recent decades has been primarily driven by the withdrawal of natural resources, leading to systemic loss and deterioration. Governments agreed at the Rio+20 Conference that a green economy is crucial for sustainable development, inclusive growth, and a secure environment for all people worldwide. It can also help eradicate poverty, create employment, and promote economic growth while ensuring the proper functioning of Earth's ecosystems. Iraq is aiming to achieve the 2030 Sustainable Development Goals by prioritizing the health sector and increasing expenditures. The Iraqi Ministry of Health aims to promote public health, improve service standards, provide primary care, prevent risks, improve human resource standards, acquire medications and medical supplies, immunize against infectious diseases, manage medical complications, and manage communicable diseases. The goal is to improve the overall management of the Iraqi health system [23].

Iraq's health sector has not fully benefited from adopting a green economy, with expected benefits only being realized in the medium and long term, which Iraq has not yet achieved, aiming to create a healthy and safe environment free of numerous illnesses. People can work and stay active so long as the environment is healthy and void of diseases. Learning and understanding skills for kids and teens will boost their knowledge and remove the knowledge difference that grows as society's overall well-being and education fall. Iraq is already working with international groups to improve health using the green economy and the ideas it brings to strengthen the health sector in Iraq [24].

Among the most prominent challenges facing the health and environmental sectors in the transition to a green economy are:

1. Environmental pollution in Iraq

The rise in pollutant levels above permissible limits in Iraq has negatively impacted the health of the majority of the population, leading to an increase in the number of birth defects, cancer, and respiratory diseases. This negatively impacts the present and future of sustainable human development, especially in light of the security and political instability and the weak role of the state in the development process required by the current circumstances to catch up with the civilizational progress witnessed by the world today, particularly in developed countries. Iraq's efforts toward creating a green sustainable economy have been threatened by air pollution. Results show that this phenomenon is due to wars fought in the last decades of Iran and also to increasing desertification because of low rainfall. Moreover, the rise of the air pollution is augmented by the production of fossil fuels and the absence of modern technology in the extraction process. Despite the laws enacted in the Iraqi Constitution of 2005, which stipulated that "the formulation of environmental policy to ensure the protection of the environment from pollution and the preservation of its cleanliness shall be carried out in cooperation with the regions and governorates not organized within a region [25].

Despite the efforts aimed at mitigating pollution, these laws have not seen the light of day, with the continued deterioration of the environmental situation in Iraq and the failure to utilize them, thus hindering the sustainable development process that the Iraqi economy aspires to [26].

2. Pollution of Potable Water in Iraq

Iraq has suffered from the problem of water pollution for decades due to the increasing population, industrial development, and the failure to use safe methods for dealing with factory waste, especially since most factories are located on or near river banks or have pipelines that drain into the river. Its waste into these rivers. Many of the industries that existed at that time lacked the conditions for environmental balance in terms of their locations and methods of disposing of their waste. However, today, they are characterized by many water pollutants, including organic pollutants, liquid waste from hospitals, and sewage. Many studies have shown that various sectors, including agriculture and industry, use thousands of synthetic organic chemical compounds in the production of plastics, pesticides, medicines, dyes, and other highly toxic compounds that can contribute to birth defects or cancer, which exacerbates the problem. Also, some of these environmentally unfriendly compounds do not decompose easily, so their entry into the water poses a major environmental risk in Iraq in the absence of wastewater treatment plants. The Ministry of Environment, upon monitoring 30 water treatment plants polluted by sewage, found that 6 stations discharge their water into the river, 5 stations into the drain, 11 stations are not suitable for operation, and 8 stations are suitable for operation, which threatens the sustainable environmental balance now and in the future. These and other enclosures belong to the public sector, while some belong to the private sector [27].

As a result and because plans to solve these issues have failed and pollution has grown, Iraq is now faced with even greater water scarcity challenges. One important issue in Iraq at present is the severe water shortage it deals with every day. Whether the problem is postponed or currently hidden, we must make a bigger effort to ensure water resources are used sustainably [28].

Table (2) shows the deficit in the water revenues of the Tigris and Euphrates rivers in the past few years when compared to the years that preceded them. The annual discharge rate of the Tigris River during the years 2016-2017 reached about (360 m3/s) with a surplus rate of (7), while it decreased in the years 2019-2020 to (300 m3/s) with a deficit rate of (-15) due to the water policy of the upstream countries (Turkey and Iran) with the quantities of water entering Iraq, which negatively affected the amount of water revenues and decreased them significantly, which affects In the loss of the economic importance of the reality of dams, environmental deterioration, the spread of diseases and epidemics, and the spread of famine, as the water of the Tigris River is one of the arteries of economic life and the basic social environment in Iraq. The same table makes it evident that the Euphrates River's water revenues decreased from 320 m3/s in 2016–2017 with a deficit rate of -33) to 300 m3/s in 2019–2020 with a deficit rate of -10. This has an impact on the nation's environmental sustainability and development reality unless water resources are managed rationally, both internally with the countries' policies and externally with the source countries (12%) [29].

Table 2. The amount of water revenue of the Tigris and Euphrates rivers, m3/s, measured from the Mosul Dam hydrological station.

Water year	Annual water discharge rate of the Tigris River m3/s	Annual water discharge rate of the Euphrates River m3/s	Deficit in the drainage of the Tigris River	The deficit in the drainage of the Euphrates River
2017-2016	365	320	7	33
2018-2017	330	300	30	20
2019-2018	315	310	15	10
2020-2019	300	300	15	10

2021-2020	300	300	15	10
2022-2021	317	312	17	12
2023-2022	318	312	18	12

Source: Ministry of Water Resources, Annual Water Report, various reports for the period 2017-2023.

3. Waste Management and Recycling in Iraq

The state is currently focussing on the issue of waste, particularly solid waste, as one of the major environmental issues. This is due to the negative effects on public health and the environment, as well as the distortion of the cultural image, as well as the social and economic consequences. There is a substantial cost associated with each of these factors, which causes nations to spend money they might have avoided or saved. Even though the amount of solid waste produced each year is growing, the basic steps for managing it (collecting, transporting, sorting, treating, recycling, and disposing of it) have not kept up with changes in this area around the world. Waste from various sources, including cities, homes, shops, commercial markets, institutions, hospitals, administrative buildings, parks, and hotels, is causing pollution due to a lack of clear plans and methods, resulting in lost opportunities to exploit it as a valuable resource [30].

Most governorates have large amounts of refuse accumulated in random collection and transfer stations, which do not meet environmental standards. Open burning and arbitrary landfill sites have also contributed to air pollution, resulting in air pollution. The majority of sanitary landfill sites are irregular in nature, and landfilling is not conducted in a consistent manner. Many negative phenomena, such as burning operations, are prevalent in these areas, and they are utilised as refuse depots. Furthermore, individuals of varying ages choose materials that generate an economic return. The table below displays the quantity of sanitary landfill sites that have received environmental approvals and those that have not [31].

The information in Table (3) above shows that every year, more and more sites are getting environmental permissions. This year, there are 46 sites. On the other hand, there were 128 sites that did not have environmental clearances.There were 174 landfill sites in Iraq, not including the governorates in the Kurdistan Region of Iraq. The first to the second was just 35.93%. This number also went up to 36.56% after five years, which is a promising sign that Iraq is making progress towards its environmental objectives. The data indicates a slight increase in the number of allowed sites compared to unapproved sites, with 183 sites in 2015 and 54 with official authorization and 138 unauthorised sites in 2018, with a rate of 39.13%.

Table 3. The number of sanitary landfills with and without environmental permits from 2010 to 2020

Details	Number of sites with environmental approvals	Number of sites without environmental approvals	Ratio of sites with to sites without environmental approvals	Total number of sites	Growth rate of total sites
2010	46	128	35.93	174	-
2015	49	134	36.56	183	0.05
2018	54	138	39.13	192	0.05
2020	57	141	40.42	197	0.03
2021	58	142	41.43	198	0.02
2022	59	143	41.44	198	0.02
2023	60	144	42.45	199	0.03
2024	61	145	43.46	100	0.03

Source: Iraqi Ministry of Environment on the official website https://moen.gov.iq/

Generally, the rate of increase of the number of official and unofficial sites in Iraq has been consistent. The growth rate also shrank to a mere 0.03% in 2020 though the number of sites with environmental approvals' relation to the number of unapproved sites was 40.42%. There are many reasons for this, including financial and political ones. Iraq's economy has also been hurt by the sharp drop in crude oil prices because the global economy is focused on getting rid of the COVID-19 pandemic. This growth continued to increase, reaching 61 sites in 2024, and 145 sites without environmental approvals. The ratio of sites with environmental approvals to those without environmental approvals is 43.46%, with a total of 100 sites [32] .

So far, no efficient way exists for dealing with all kinds of solid waste, as the current system fails to support society. Waste is removed by certain vehicles, then dumped at conversion facilities, compressed and dispatched to landfills all across Iraq.

Third: Income Levels and Employment Opportunities in the Green Economy

The effect of the green economy on Iraq's income levels remains enigmatic, as the country is making gradual progress towards the 2030 Sustainable Development Goals and is actively working to accomplish them in some capacity. We observe that the export of petroleum oil to global markets is a significant component of Iraq's GDP, which is significantly reliant on hydrocarbon resources (31). Consequently, Iraq's revenue levels are exclusively determined by the export of petroleum oil, which is a direct reflection of its production, rather than by these long-term objectives, which can be achieved within a year or two, even if they are not achieved until 2030. Iraq's GDP is composed of the agricultural, industrial, productive service, and community sectors. Nevertheless, their financial revenues are exceedingly modest, despite their substantial volume contribution. In other words, they collectively account for only 1-2% of Iraq's total budget in terms of actual financial revenues. This leads us to the conclusion that the green economy in Iraq is not yet achieving the desired income levels and employment opportunities. Fourth: The Green Economy and Electricity Production in Iraq [33].

Electric power production in Iraq is sourced from various sources, including primary fuels like oil and gas for steam and gas-fired power plants, and hydropower for hydroelectric power plants, which rotate turbines using cascades. The sources of power generation vary across countries. The quantity of environmental contamination generated by these plants is not quantifiable in Iraq; however, it rises in tandem with the country's electricity production [34].

Table (4) illustrates that a substantial proportion of the total production share is occupied by gas-fired facilities. In Iraq, as well as in the majority of countries, there has been a surge in interest in gas-fired facilities, which are among the most successful forms of electricity generation. This is a result of their use in supplying peak demand during periods of increased demand for electric power, as well as their speed and simplicity of operation.

One of the benefits of this type of plant is its rapid operation, low maintenance costs and wages, and low fuel consumption. Additionally, it has a lower cost of construction and production in comparison to other varieties. Particularly suited for water scarcity dealing region as it does not rely on water. The superior environmental performance of this type has made Iraq initially interested in such station. In 2010, the country had 146 stations, of which 115 were operational, which accounted for 78.7% of the total. In 2019, instead of 198 stations, 164 actual operational stations were running (40.4%), among which 82% were still compliant to port state control requirements. It is clear from the above mentioned paragraph that the number of purchases has increased while the number of petrol stations that are really functional have gone down [35].

The inefficiency of allocating financial resources to the electricity sector and poor management led to a reduction in participation and dependence on petrol stations from 55% in 2010 to 41% in 2019, ranking fuel-based stations second in Iraq's electricity production participation. In 2019, only 21% of the market belonged to AMR carried by

CA. Yet in 2010 the share amounted to 31%. This is another gauge of waste, loss and mismanagement. It is necessary to open investigative files and impose legal penalties on anyone who is found to be negligent in this critical area. The participation rate of hydroelectric stations was 10% in 2010, but it has since decreased to only 4% due to the reduction in water releases from Turkey and Iran, as well as the water that has been withheld from them. This has weakened the capacity of Crown. Aside from that, the drop in the stations was from 37 in 2010 to 23 in 2019. In its true terms, The number of hydroelectric stations that were actually operational represent only 79.3%, compared to 97.2% in 2010, as a corresponding reflection of the national electricity production in Iraq [36].

This resulted in an increase in the workload of the substantial diesel generators that are installed in the majority of the stations that provide assistance to the primary stations. Only 20.4% of them were operational in 2019, a significant decrease from 100% in 2010. According to the Iraqi Ministry of Electricity's yearly reports, the number of major working backup generators in Iraq declined from 253 in 2010 to just 66 in 2019, due to overload and a lack of maintenance activities. Thus, Iraq started importing electricity abroad, without reforming this sphere and thus managing to increase ratio of operating stations to non operating stations. In 2019, the percentage of power imports was 29%, bringing the overall share to 100%, a statistic that does not reflect Iraq's real requirements, despite the fact that energy is a vital need on which the country's economy depends in all sectors. By 2024, the proportion had reached around 32% (Table 4).

Table 4. Number of generating stations, operating stations, and the total share of electricity production in Iraq for the years (2021-2024) (MWh)

Details	Number				Ratio of operating stations to the total number		Participation rate of operating stations	
	Total		Operating		2021	2024	2021	2024
	2021	2022	2023	2024				
Steam Power Plants	26	31					% 31	% 21
Gas Power Plants	146	198	115	164	% 78.7	% 82.8	% 55	% 41
Hydroelectric Power Plants	37	29	36	23	% 97.2	% 79.3	% 10	% 4
Large Diesel Power Plants and Back-up Power Plants	253	322	253	66	% 100	% 20.4	% 4	% 5
Imported Energy + Investment Power Plants	-	24	-	24	-	% 100	-	% 29
Total	462	604	428	278	% 92.6	% 46.2	% 100	% 100

Source: A product of the researcher for use in the thesis with regard to the annual reports for the years 2021-2024, prepared by the Ministry of Electricity, Planning and Studies, Statistics Division

4. Discussion

Iraq is dependent on specific types of electricity generation and production, which are generally not environmentally favourable, as evidenced by the aforementioned. The expansion of renewable energy sources mitigates the risks of high and unstable fossil fuel prices, presenting a significant economic opportunity. Additionally, it necessitates the enhancement of efficiency, the substitution of investments in severely carbon-intensive energy sources with renewable energy investments, and the development of sustainable solutions to address contaminants and waste in the energy sector. The government has a major role to play through issuing pertinent legislation and laws, facilitation of administrative and financial facilities, tax deduction and incentives for renewable energy supply as well as direct assistance to such investments in furtherance and support of funds

for investment in renewable energy by means of this policy. This can increase the appeal of renewable energy investment in terms of its risk profile (34).

5. Conclusion

1. The green economy represents a strategic approach to achieving sustainable development, as it combines economic growth, environmental conservation, and social justice.
2. The reality of the Iraqi economy is still far from implementing green economy principles, due to its excessive reliance on oil resources and the low contribution of sustainable sectors such as education, renewable energy, and agriculture.
3. Weak spending on education, health, and the environment in Iraq poses a major challenge to achieving sustainable development goals and limits the building of qualified human capacities for the transition to a green economy.
4. High rates of environmental pollution in Iraq (air, water, and waste) are among the most significant obstacles to achieving a healthy and safe environment and pose challenges to future human development.
5. Current energy production policies in Iraq rely on polluting and unsustainable sources, with declining power plant efficiency and a lack of serious focus on renewable energy.
6. The lack of societal and institutional awareness of the importance of the green economy is one of the most prominent reasons for the weak implementation of environmental initiatives on the ground.

Recommendations

1. Establish a nationwide strategy for a green economy transition, with measurable goals, agreed and implemented by partnerships between the public and private sectors and civil society organisations.
2. Increase government spending on the education, health, and environment sectors, while strengthening infrastructure that supports sustainable human development.
3. Invest in renewable energy projects (solar, hydro, and wind) and encourage the private sector to contribute through tax and financing incentives.
4. Develop educational curricula, promote environmental education at all levels of education, and expand the "Green Schools" experience to include all governorates.
5. Improve the management of water resources and solid waste by adopting modern and sustainable technologies and activating suspended environmental legislation.
6. Strengthen the role of environmental media and civil society organizations in spreading awareness about the culture of the green economy and the importance of sustainability in facing future challenges.
7. Reevaluate Iraq's general economic policy to ensure diversification of national income sources and reduce reliance on oil as the sole source of revenue.

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