The role of the energy accounting system in improving the performance of sustainable energy and its impact on the value of the economic unit

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Abstract

Excessive use of traditional energy represented by fossil energy has caused great damage to the environment and the resulting risks to the life of society in general. resulting from the inefficient use of energy, hence the importance of the research that seeks to shed light on the need to improve the performance of sustainable energy and work to raise the efficiency of its use, by relying on the energy accounting system and in order to meet the needs of stakeholders in increasing the value of the economic unit as well as "achieving the economic well-being of society and protecting the environment by achieving sustainable development goals, and on this basis, the research community was represented by the industrial joint stock companies listed in the Iraqi Stock Exchange, while the research sample was represented by Al-Mansour Company for Pharmaceutical Industries, Medical Supplies, Cosmetics and Sterile Water. - A special contribution, and the temporal limits of the research were represented in the period (2009-2019), as the researchers relied on analyzing the data represented by the financial statements of industrial companies, and the research sample using the statistical program (SPSS) -25), the statistical program (AMOS-25) and the EXEL2020 program)) and the researchers reached a number of conclusions, the most important of which is the existence of a significant correlation relationship with statistical significance between improving sustainable energy performance and the value of the economic unit, where the correlation coefficient amounted to (0.782), and the researchers also proved the existence of a significant effect relationship with statistical significance between improving the performance of sustainable energy and the value of the economic unit. Research that supports governmental efforts to support the work of traditional energy alternatives by adopting internationally adopted standards to avoid waste by using energy and reduce environmental pollution within a phased and strategic planning.

Keywords: Energy accounting system, sustainable energy performance, economic unit value, energy efficiency, energy management system.

Introduction

Increasing economic growth has become a huge burden on the environment, and as a result, many environmental stakeholders are interested in focusing on energy conservation from waste, with the aim of reducing emissions and achieving sustainable development goals. Therefore, it has become necessary to realize the importance of the energy accounting system in preserving Resources and provision of the necessary information on the extent of the ability to rely on traditional energy, as improving the level of sustainable energy performance and increasing reliance on renewable energy helps to conserve energy and raise its efficiency and follow the energy management system by

following energy efficiency assessment procedures and following continuous improvement procedures By setting goals, setting plans and measuring results that will improve the performance of sustainable energy, thus reducing the level of greenhouse gas emissions, which is one of the most important causes of global warming, which is one of the most important causes of environmental pollution and its great damage to the health of society. The interest of Iraqi industrial companies to achieve the highest profits without paying attention to the negative aspects on the environment and the health of society that result from their unjust use of energy, as industrial companies should bear the responsibility of disclosing information related to environmental damage, as well as “taking all necessary measures that It would raise and preserve energy efficiency and implement measures that would reduce harmful emissions, as well as "preserve natural resources as a right for future generations to contribute to achieving sustainable development goals" .

The first axis: Research methodology and previous studies:

First, the research methodology:

Research problem :

The world has witnessed rapid technological developments that have cast a shadow over the process of data processing and the resulting increase in the accuracy and speed of information delivery to decision makers. However, it is noticeable through reviewing the reports of industrial companies listed on the Iraqi Stock Exchange, that it does not contain Detailed information about the types of energy used quantitatively, and the effects resulting from the use of energy and the damage it causes to the environment and society, and its reflection on stakeholders in forming a comprehensive and integrated picture of its performance, and thus its ability to create and maintain sustainable value, and its consequences Effects related to the selection of appropriate investment opportunities, so the research problem can be summarized in the following questions- :

- Is there a role for the energy accounting system in improving sustainable energy performance?
- Is there a role for the energy accounting system in improving energy efficiency and what is its impact on the value of the economic unit?
- What are the obstacles that limit the adoption of sustainable energy concepts in industrial joint stock companies listed in the Iraq Stock Exchange?

Research importance- :

The importance of the research lies in the urgent need for this type of research, as it addresses an important issue related to improving sustainable energy, by seeking to optimize the use of available economic resources, by relying on the energy accounting system in order to meet the needs of stakeholders, in promoting the growth of value Economic unity and work to achieve the goals of sustainable development and economic well-being by serving the environment and society.

Research Aims- :

The main objective of the research is to clarify the role of Energy accounting system in Improving the performance of sustainable energy by applying sustainable energy performance indicators and its reflection on the value of the economic unit . The objectives can be summarized in the following points- :

1- Statement of the role of the energy accounting system in improving sustainable energy performance.

2- Highlight the need to preserve natural resources as a right for future generations.
3- Encouraging Iraqi industrial companies to use clean energy because of its positive effects on society and the environment in general, thus achieving the main objectives of the energy policy represented in energy stability, competitiveness and sustainability.
4- Recognize the impact of the energy accounting system on improving sustainable energy performance.
5- Studying the impact of improving sustainable energy performance based on the energy accounting system on the value of the economic unit.

Research hypothesis:

Based on the research problem and its objectives, the following hypotheses were formulated:
The first main hypothesis:
(There is a significant statistically significant correlation between improving the performance of sustainable energy by relying on the energy accounting system and the value of the economic unit) from which the secondary hypothesis emerges as follows- :
There is a significant statistically significant correlation between (total production capacity costs , Savings in total energy costs, total energy efficiency (combined and between the value of the economic unit in Al-Mansour Company for Pharmaceutical Industries, Medical Appliances, Cosmetics and Sterile Water) . A private contribution.
The second main hypothesis:
(There is a significant effect of statistical significance for the variable of improving sustainable energy performance based on energy accounting in the value of the economic unit) and eight secondary hypotheses emerge from it as follows- :
There is a significant effect of statistical significance for the independent dimensions (total production capacity costs , savings in total energy costs, total energy efficiency) combined on the value of the economic unit in Al-Mansour Company for Pharmaceutical Industries, Medical Supplies, Cosmetics and Sterilized Water - a private contribution.

Research community and sample:

The research community is represented by industrial joint stock companies listed in the Iraq Stock Exchange , and the research sample is represented by Al-Mansour Company for Pharmaceutical Industries, Medical Supplies, Cosmetics and Sterilized Water A private contribution . For the period (2009-2019), the research community was chosen because it meets the objectives of the study, through which it is possible to measure the impact of the energy accounting system in improving the performance of sustainable energy, as well as the possibility of measuring the value of the economic unit as it is industrial joint stock companies whose shares are traded in the Iraqi market. As for the reason for choosing the research sample, it is due to the environmental effects resulting from the company's practice of its activities.

Statistical methods used in the research:

The researchers relied on the data analysis process, which is The annual financial reports of the companies sample the research using the statistical method using the statistical analysis processing program (Spss-25) , the statistical analysis processing program (AMOS-25) and the electronic spreadsheet program (Microsoft Excel-2020).

Scientific Research Methodology-:

For the purpose of achieving the objectives of the research and proving its hypotheses, the deductive approach was relied on in studying the theoretical side and the adoption of the inductive approach in the practical side, by relying on energy accounting data by using sustainable energy performance indicators and measuring the extent of its impact on the value of the economic unit by relying on Tobin's Q index to measure the market value.

Second, previous studies:

1- Study, et al, 2012) Young Chiu	
the address	**Establishing an Integration-Energy-Practice Model for Improving Energy Performance Indicators in ISO 50001 Energy Management Systems** **Establishing an integrated model for energy practice to improve performance indicators of energy management systems in accordance withISO 50001**
Study type	Research published in the journal MDPAI
Objectives	Identify the challenges associated with enhancing energy performance indicators, and the factors that lead to improving energy efficiency .
study community	Company in Guangdong Province of China
The study sample	production plant with an area of 281,000 m 2 and 21,000 employees .
The tool used in the study	The Energy Integration Practice Model for Improving Energy Performance Indicators .
The most important conclusions	establishment of an energy integration practice model that the introduction of the ISO 50001 energy management system can lead to meeting the requirements of energy performance indicators and passing the international certification ISO 50001 in energy management systems .
The most important recommendations	The study found the need to pay attention to renewable energy by relying on energy saving solutions using wind movement and biomass energy .

1- Study) 2019 Susanto & Meiryani(,	
the address	**Impact of Environmental Accounting Information System Alignment on Company Performance and Environmental Performance: The Case of Small and Medium Enterprises in Indonesia** **The impact of environmental accounting information system on company performance and environmental performance: a case study in small and medium-sized companies in Indonesia**
Study type	Research published in the International Journal of Energy Economics and Policy **International Journal of Energy Economics and Policy**
Objectives	Statement of the impact of the Environmental Accounting Information System(EAIS) on the company's performance and environmental performance and a case study of the impact of environmental requirements, environmental capacity and environmental impact on the company
study community	Small and medium businesses in Indonesia
The study sample	Managers in middle management

The tool used in the study	Use theSPSS statistical program
The most important conclusions	The results confirm that the Accounting Environmental Information System(EAIS)company , the It has a positive and significant impact on besides, the study also indicates that the company's response to environmental needs is critical not only to the environment but to the company itself in building the company's image and sustainable practices and the impact of this in enhancing its reputation and understanding of .managers of environmental needs and improving societal obligations
The most important recommendations	The need to rely on the outputs of the accounting information system in enhancing the environmental performance of small and medium-sized . companies

2- Study (Almagtome , et all, 2020)	
the address	**Circular Economy Initiatives through Energy Accounting and Sustainable Energy Performance under Integrated Reporting Framework** **Circular economy initiatives through energy accounting and sustainable energy performance under integrated reporting**
Study type	International Journal of Mathematical, Engineering and Management Sciences Research published in the International Journal of Mathematical Sciences, Engineering and Management
Objectives	circular economy that contributes to preserving economic Identifying the resources for the longest possible period through the use of a number of ecological initiatives to achieve this, such as reducing the consumption of .fossil energy , recycling waste, and reducing emissions and pollutants
The most important conclusions	• Finding financial and non-financial indicators to measure sustainable energy performance • The implementation of the Integrated Reporting Framework represents a "fundamental" change in the philosophy of companies in the field of financial reporting • Focus on preserving natural resources, especially energy sources, by adopting sustainable development strategies that aim to maintain .economic activity and preserve energy sources in the long term
The most important recommendations	Conventional energy sources and since the gradual abandonment of Which major industrial companies in the world are the main companies consume energy, and the low consumption of traditional energy sources means an increase in the interest of these companies in sustainable .energy

1- Study (Bosnia, 2019)	
the address	**The modern strategic direction of companies through the adoption of) theGRI standard for the disclosure of social responsibility and its (impact on the value of the company: Evidence from the French non-) financial companies listed inCAC40 (**
Study type	A research published in the Journal of Financial, Accounting and Administrative Studies
Objectives	The research aims to examine the relationship between the commitment of the French companies listed in the (CAC40) index to the (GRI) guidelines for the disclosure of social responsibility and their value in the stock exchange during the period 2005-2017.
study community	French non-financial companies
The study sample	) Companies registered within theCAC40 index that apply corporate (.social responsibility
The tool used in the study	Tobin 'sQ
The most important conclusions	The random-effects model is theideal model to represent the relationship between the level of disclosure of social responsibility and the value of .French companies

The second axis - Energy Accounting System (EAS)-:

It is a new branch of accounting , which applies the theories and methods of economics and accounting, and is guided by environmental accounting, energy conservation goals, emissions reduction, the application of energy laws and regulations, as well as the issuance of reports on energy conservation and reduction activities. Pollution and Helping Achieving Sustainable Development Goals (Su,2019:1) Kırlı&Kulu, 2016: 4895 , explained The energy accounting system is necessary for the efficiency of energy management, as it is an effective tool that contributes to reducing energy costs and works to enable the effective management of energy costs through feedback and help managers in conducting the necessary analyzes of all energy-related elements, and on the other hand, The energy accounting system goes through five stages:

The first stage: - Develop a standard formula that will form the basis of the continuous monitoring mechanism that will cover the reporting period, the type and quantity of energy used in production departments and processes, and the amount of production that will be obtained.

The second stage: - Establishing the necessary infrastructure for calculating energy consumption through the use of energy density indicators, which is an important indicator for measuring energy efficiency

The third stage: - identifying and delegating the persons responsible for collecting, analyzing and reporting data

Fourth stage: - Evaluating the results of the report

Fifth stage: Take the necessary measures to improve energy efficiency and reduce energy consumption.

The importance of energy accounting system Importance of Energy Accounting System -:

The world is still largely consuming fossil energy , as oil , natural gas and coal are the main sources of energy consumption, and many countries are trying to improve energy conservation policies and reduce emissions, however, there is still a long way to achieve a change in the structure of energy consumption in On the other hand , economic units are the main force for energy consumption and

the resulting greenhouse gas emissions, as statistics indicate that the combustion of fuels resulting from power generation causes carbon dioxide emissions by a percentage of 60% of the total global warming emissions, prompting analysts and researchers to seek to gain a better understanding of environmental problems through the development of carbon dioxide emissions accounting systems (EMAS) (Tian &Ang,2019,13) , and since accounting is an effective tool in the decision-making process in economic units, it is necessary to combine energy issues and accounting procedures to build an energy accounting system , as well as "the outputs of the energy accounting system can be a guide." To formulate objectives related to reducing emissions and energy conservation in a manner that promotes sustainable development, achieving economic growth and preserving the environment, in addition to enhancing the competitiveness of the economic unit through controlling energy consumption and implementing measures to conserve energy and reduce emissions , and in the same On the other hand, the reporting of energy information can meet the needs of different users, as government units benefit in identifying the procedures of economic units in energy conservation and emissions reduction, as well as the assessment of economic strength. For the units, in addition to the creditors and investors' knowledge of the economic unit's ability to preserve environmental and energy resources, in order to measure its efficiency in achieving profits (Su,2019:3-4).

The objectives of the energy accounting system:

Energy accounting system mainly aims to measure, manage and control energy costs, enhance measures to prevent and treat pollutants, as well as "conserve energy and reduce emissions and encourage economic units to pay great attention to environmental and social benefits and to focus greatly on benefits." Economic (Su, 2019: 1).

second axis - sustainable energy performance and financial measures to calculate it

1- Energy- :

The word (energy) is derived from the Greek word (energos) and it is defined as the ability of a thing to perform a certain action , and it is often "related to the mechanical movement of bodies (Bouzekri and Laour , 2018:9), and it is also known as" the ability of matter to give A force capable of accomplishing a specific work, and there are several forms of energy represented in light, heat and sound, as well as the mechanical energy generated by machines and equipment and chemical energy resulting from chemical reactions, electrical energy, radiation energy and atomic energy (Amr and Atman , 2020: 7)

2- energy resources Energy Sources-:

Energy sources can be divided according to several criteria In terms of its renewable capacity , it is divided into non-renewable energy sources, which are present in fixed quantities over time, and their quantities are decreasing as a result of extraction and exploitation processes, and renewable energy sources, which are increasing over time, and their current rate of consumption does not affect their production rate in the future. Its reserves remain constant , such as (solar energy, wind energy and biomass energy), And traditional energy sources, which are mainly relied upon, such as (oil, natural gas, and coal), and these sources contribute a large percentage of the world's energy consumption (Al-Sherbiny, 2017: 124)

3- Sustainable Energy Performance:

Sustainable energy is defined as the process of using energy in a way that meets the needs of the present without affecting the ability of future generations to meet their energy needs (Demirtas , 2013: 32) and (Shim & Lee, 2021: 709) see that energy performance are measurable results related to energy efficiency that It aims to provide sufficient, safe and cost-effective energy supplies, by

improving energy resources, whether renewable or non-renewable alike, as well as diversifying its sources, whether from within or outside the borders of the country, and working to promote optimal use of energy And avoiding wasted patterns , in order to reduce the negative effects of energy production, conversion and consumption on the environment (Hashim , & Ho, 2011: 4782). The concept of sustainable energy performance is linked to the following elements:

 Energy Efficiency Energy Efficiency-:

Energy efficiency has been defined as the process in which energy is used in less quantity, which leads to rationalization of its consumption and without affecting the level of performance and in order to save and reduce energy consumption (Bruni , et all, 2021: 2) It has also been defined as the optimal use of energy resources without compromising the comfort or productivity of users or compromising the efficiency of devices and equipment (Abu al-Tabouq, 2015: 842). as well as" about It is the process of using less energy and obtaining the same result in the long run by reducing energy input to provide more of it (AbuBakar , et all, 2015: 3) , while (Ehrlich & Geller, 2018:341) explained that energy efficiency is the use of energy Less to achieve the same goals by using technical solutions , while energy conservation means reducing energy use even at the expense of compromising the goals This is based on behavioral solutions.

 energy management system (EMS) Energy Management System-:

It is the proactive and orderly coordination of energy acquisition and distribution And its use to meet the requirements, taking into account the environmental and economic aspects (Kals, 2015: 5) , and it has been defined by (International Standards Organization) (ISO 50001) as a set of interrelated and interacting elements to establish an energy policy in accordance with “the procedures that ensure achieve goals, And the commitment to take behavioral and organizational measures systematically in order to ensure the improvement of energy consumption efficiency at the level of the economic unit and to continue the process of developing performance in a sustainable manner (Howell, 2014: 1) , as and Energy management system (EMS) is based on a continuous improvement system in which monitoring, measurement and analysis are the main components of an energy management system (Shim&Lee, 2021: 710) In order to reach the target result in raising energy efficiency, the economic unit must adhere to the main steps for implementing the energy management program.

Measuring sustainable energy performance:

Measuring Sustainable Energy Performance

Energy is measured through the use of Energy Performance Indicators (EPI) , which is a set of measures used to indicate the energy efficiency of processes or activities that consume energy based on typical indicators for comparing energy efficiency between an economic unit and other units in the same industry Luknongbu & Assawamartbunlue , 2021: 992)), and it is worth noting the conclusion - study magtomee , et all, 2020: 1040-1043) (Al) to reach indicators to measure the performance of sustainable energy in economic units, based on the integrated reporting framework, as follows:

Total Cost of Production Capacity (TCPC)

This indicator measures the volume of energy consumption involved in the production process of the economic unit as measured in monetary unit. It is calculated by collecting the costs of energy consumed in all production activities based on the data of accounting records during the year, where energy costs should be disclosed in detail, with reference to The costs of each energy component.

Saving in Total Energy Costs (STEC):

This indicator measures the efficiency of managing and controlling energy costs in an economic unit and it is measured by the amount of savings in energy costs incurred in all activities of the economic unit , and the formula below reflects the method of calculation.
Savings in total energy costs = total energy costs consumed at the beginning of the period - total energy costs consumed at the end of the period
Energy Investments (EI)-:
This indicator measures the efficiency of the economic unit in energy management as well as the amount of spending on investment in devices and equipment to improve energy efficiency.
Renewable Energy Investments (REI)-:
This indicator measures the efficiency of the economic unit in the field of energy management , as it is calculated by summing the costs of investment in Devices and special equipment _ b Generation of renewable energy, such as solar cells, wind energy and others.
overall energy efficiency Total Energy Efficiency(TEE)
This indicator measures the total energy efficiency per economic unit and its success in reducing energy consumption. It is calculated by dividing the total cost by the number of units. The formula below reflects the calculation method .
Total energy efficiency = total energy costs ÷ number of units produced
fourth axis - the market value of the economic unit

First: The concept of economic unit value
acquiring something (Ali, 76: 2017). It was defined as "a process of interaction between a group of decisions taken by the employees and the management of the economic unit and the decisions of investors outside the economic unit in the financial markets in which the shares of the economic unit are offered for the investor to decide to sell or buy and thus raise or lower its value, as maximizing the market value of the unit A synonym for maximizing the market value of common shares, i.e. maximizing the wealth of the owners (Al-Jubouri and Al-Maliki, 2009: 5). See (Yang, et all, 2019: 87) There are several terms related to the concept of economic unit value, which are as follows:

Par value:
It is the value recorded in the share certificate, and it is an equal value for all the issued shares, through which the investor's contribution to the capital is determined. Some legislations in developed countries may allow the issuance of shares without a nominal value, provided that their value is determined according to the "supply and demand" process in Stock Exchange. (Al-Tamimi, 201 5 (160. :

Market value- :
The market value of the assets of the economic unit is the value at which the assets are sold, and in the field of shares is the value that the investor will pay to buy the stock, and it may be greater or less than the book value, and this value depends on the income of the economic unit and is used by the investor in capitalizing profits (Yusuf and Ambady, 2017 (147: . Market capitalization refers to the total values of the shares issued by the unit and can be determined by the amount that must be paid to acquire the economic unit in a given period (Nimtrakoon, 2015:19. (
Fair Value

It was defined as an estimated amount in exchange for an exchange that exists on the date of the valuation between a seller and a buyer willing to make a deal, and in the light of a neutral market where each of them has sufficient information and they are free and without coercion to complete the deal (Ismail and Saleh, 2016 : 8) And as the fair value of any asset is known as the amount that can be sold or bought for that asset in a real ongoing process between two willing parties, provided that the asset is not in a state of liquidation (Saleh, 2021: 56) sees (Al- Hamashi ,, 2021: 112) that the real value of the company, which is expressed at fair value, is the value that achieves a balance between the historical position of the economic unit and the expected position for at least five years to come, and the investor's goals based on the expected return.

Second - Market entrance to measure the market value of the economic unit Market Approach

This is one of the most popular approaches used in measuring the value of an economic unit. The reason for this is the focus of all criteria, with different sources, on the use of the market price primarily in the evaluation process (Ali, 2017: 83). Using this measure requires trading the shares of the economic unit in the ASE market . Securities with a large number of sellers and buyers, and it is based on the investors' assessment of the expected profits in the future, meaning that it takes into account the economic value of the unit (Al-Sirawi, 2018: 54) . According to "this entry, there are three A methods for measuring the value of the economic unit, which is the market value (closing price), the ratio of the market value to the book value of equity, Tobin's Q) (Pham et al, 2012: 84. (

1- Market value (closing price) Market Value-:

It is the evaluation approach that depends on the capital market in determining the value of the economic unit . The investor is based on the market value of his shares at the moment of sale, which is less or greater than the book value or the nominal value, and it can be extracted through the following equation (Abed and Zalmat , 2019: 120)

Market value = number of shares traded x share value (closing price)

Ratio of market value to book value of equity:

The ratio of market value to book value of equity

It is used to compare the market value and the book value, which depends on the liquidating value of the economic unit, where its importance lies in verifying that there is no exaggeration in determining stock prices, by determining the number of cash units paid by the investor in exchange for obtaining one unit of net equity, Thus, it gives an estimated picture of the liquidation value of the assets of the economic unit after paying its obligations (Al- Da'our , 2019: 61).

Tobin 's Q index to measure the market value of an economic unit:

Tobin'sQ was first introduced by Kaldor in 1966 as a ratio between the market value of a physical asset and its replacement value (reproduction cost). In 1968, James Tobin restored Its introduction and the letter " Q " did not appear until (Tobin) published an article entitled The General Equilibrium Approach to Monetary Theory in the Journal of Money , Credit and Banks in (1969) , and it became one of the most famous methods of value measurement or stock market equilibrium (Gharaibeh, 2017: 334). It is defined as a model for measuring financial performance by comparing the market value of the assets of the economic unit and their replacement value, as this ratio responds to the general change in prices , and it has also overcome many problems related to the ratio of the

market value to the book value by using it. The replacement value of assets to measure the value realized by the economic unit (Chung & Pruitt, 1994:70) and the (Tobin's Q) ratio can be extracted by applying the following equation:

Tobin's Q = (Market value of equity + book value of liabilities ÷ book value of assets)

A value less than one indicates that the market considers that the value of an economic unit is less than its total assets, while a value greater than one indicates that the unit's market value is greater than its total assets due to some unrecorded factors, such as trademark equity. Thus, higher ratios indicate that the market assumes outperformance of the economic unit (Butt et al,2021:3)

Fifth Axis: - Statistical analysis and discussion of the results of the research sample represented by Al-Mansour Company for Pharmaceutical Industries, Medical Supplies, Cosmetics and Sterilized Water - a private contribution.

1- An introduction to Al-Mansour Company for Pharmaceutical Industries, Medical Appliances, Cosmetics and Sterile Water - Private Contribution:

The company was established under the certificate of incorporation numbered (3346) on April 19, 1989, based on the Companies Law No. (36) for the year 1983, and the company's headquarters is located in the province of Baghdad in the Abu Ghraib district on land leased from the Abu Ghraib municipality department. The company aims to contribute In supporting and developing the industrial movement in Iraq and strengthening and developing the national economy in the pharmaceutical field (Annual Report of Al-Mansour Pharmaceutical Industries, 2019, 1).

Statistical analysis of the company research sample-:

In order to achieve the objectives of the research and based on the energy accounting system, sustainable energy performance indicators were applied, by analyzing the energy-related information contained in the list of commodity requirements and the management report and as shown in Table (1), whereby the total production capacity costs indicator was applied from By collecting the costs of production energy (fuel, oil and electric energy costs) used in the company that was studied, as well as applying the indicator to measure savings in total energy costs by applying the following equation:

Savings in total energy costs = total energy costs consumed at the beginning of the period - total energy costs consumed at the end of the period

The overall energy efficiency index was also applied by applying the following equation:

Total energy efficiency = total energy costs ÷ number of units produced

Which represents the per unit share of the energy costs consumed, and therefore the decrease in the unit share of energy costs indicates an increase in energy efficiency and vice versa.

Table (1) Sustainable Energy Performance Indicators for Al-Mansour Company for Pharmaceutical Industries, Medical Appliances, Cosmetics and Sterile Water - Special Contribution for the Period (2009-2019)

the years	Total cost of production capacity	Total energy savings			overall energy efficiency		
		Initial energy costs	End-of-term energy costs	Savings in total energy costs	Total energy costs	Number of units produced	overall energy efficiency
2009	**40391400**	**61339271**	**46788576**	**14550695**	**46788576**	**6306640**	**7.42**
2010	**29340250**	**46788576**	**29867750**	**16920826**	**29867750**	**6124296**	**4.88**
2011	**42079750**	**29867750**	**42631250**	**-12763500**	**42631250**	**8385480**	**5.08**
2012	**56717500**	**42631250**	**64266550**	**-21635300**	**64266550**	**7806640**	**8.23**
2013	**46744000**	**56717500**	**51665500**	**5052000**	**51665500**	**1764544**	**29.28**
2014	**63302750**	**51665500**	**70697250**	**-19031750**	**70697250**	**8939712**	**7.91**
2015	**78583750**	**70697250**	**86566000**	**-15868750**	**86566000**	**8939712**	**9.68**
2016	**88214250**	**86566000**	**101803000**	**-15237000**	**101803000**	**5363328**	**18.98**
2017	**84879250**	**101803000**	**116151000**	**-14348000**	**116151000**	**2053008**	**56.58**
2018	**106139500**	**116151000**	**114,269,000**	**1882000**	**114,269,000**	**712704**	**160.33**
2019	**84879250**	**114,269,000**	**94179750**	**20089250**	**94179750**	**926688**	**101.63**

Source: Prepared by the researchers based on the financial statements of Al-Mansour Company for Pharmaceutical Industries, Medical Appliances, Cosmetics and Sterile Water - Special Contribution for the period(2019-2009)

And in order to study the dependent variable (the value of the economic unit), it was relied on the (Tobin's Q) index to measure the market value of the economic unit , through studying and analyzing the list of the financial position of the research sample company, as shown in Table (2) and by applying the following two equations-:

Tobin's Q = (Market value of equity + book value of liabilities ÷ book value of assets)

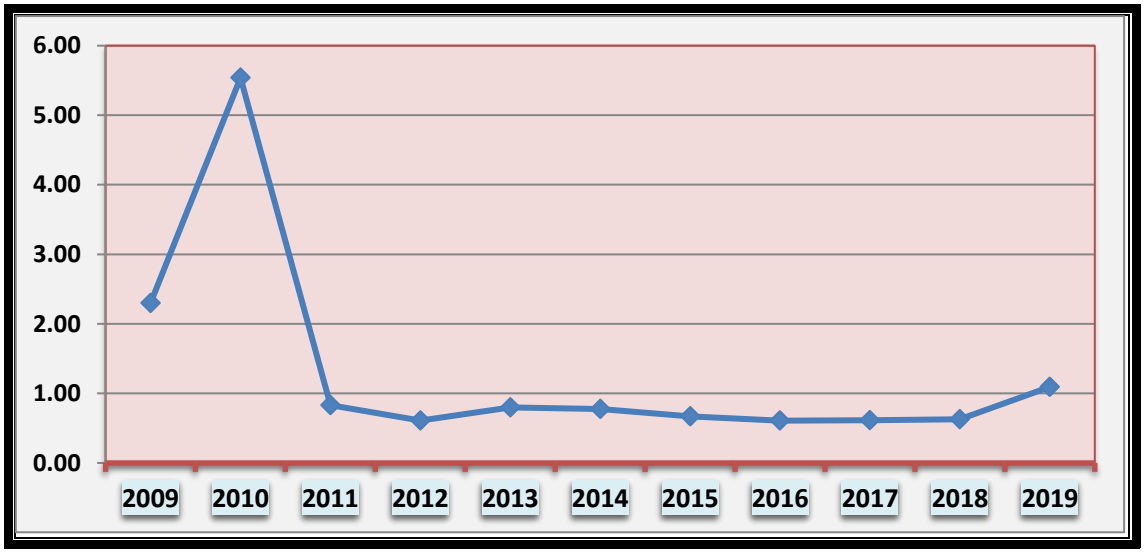
Table (2) Measuring the market value based on the (Tobin's Q) index for Al-Mansour Company for Pharmaceutical Industries, Medical Appliances, Cosmetics and Sterilized Water - Special Contribution for the period (2009-2019)

the years	The market value of the economic unit	total debt	Market value of equity			book value of assets	Tobin's Q
			closing price	Number of Shares	Market value of equity		
2009	7085169861	187929861	2,760	2499000000	6897240000	3081534302	2.30
2010	18562200974	63000974	2.600	6897000000	1793220000	3351867369	5.54
2011	3240698365	330098365	0.900	3234000000	2910600000	3893597630	0.83
2012	3120680017	210080017	0.900	3234000000	2910600000	5104341874	0.61
2013	6268321383	446221383	0.900	6469000000	582210000	787839866409	0.80
2014	6323100598	889140598	0.84	6469000000	5433960000	8161583614	0.77
2015	5373690475	457,250,475	0.760	6469000000	4916440000	.8006206671	0.67

2016	4950992890	616,762,890	0.670	6469000000	4334230000	8143450589	0.61
2017	4936773818	473163818	0.690	6469000000	4463610000	8050176521	0.61
2018	5978102879	1837942879	0.640	6469000000	4140160000	9504928526	0.63
2019	7583408040	1,437,858,040	0.950	6469000000	614550000	6949287881	1.09

Source: Prepared by the researcher based on the financial statements of Al-Mansour Company for Pharmaceutical Industries, Medical Appliances, Cosmetics and Sterile Water - Private Contribution

(1) confirms that the total annual production capacity costs of the research sample company recorded its highest levels during the study period in 2018 at a rate of (106139500) dinars, while 2010 recorded the lowest level for him By (29,340,250) dinars, and the reason for the high costs of production capacity is due to the increase in the productivity of the company, as (612,4269) units were produced in 2010, while the company's production reached (71,2704) in 2018, and this explains the increase in production capacity consumption in the research sample company during The study period . Table (1) shows that the savings in the total annual energy costs of the research sample company Its highest level was recorded during the study period in 2019 at (20089,250) dinars, while the year 2012 recorded the lowest level in savings in the annual total energy costs of the company at (21635300-) , and the reason is due to the company's adoption of the research sample approach that would improve the efficiency of Production capacity and preserving it from excessive use and obtaining energy savings through the development of machines and equipment that would reduce energy consumption and in line with the production plans of the company. Table (1) confirms that the total annual energy efficiency of the research sample company recorded Its lowest level during the study period in 2018 was (160.33) , while 2010 recorded the highest annual total energy efficiency level for the company (4.88) , and the reason is due to the decline in production in 2018, and the table confirms (2) The value of the economic unit measured by the annual Tobin'sQ index of the research sample company recorded its highest level during the study period in 2010 by (5.54) as shown in Figure (2), while 2012, 2016 and 2017 recorded the lowest level The average value of the economic unit measured by Tobin'sQ index and by (0.61) , and the reason is due to the increase in the market value of the research sample company due to the high closing price of the stock by (2,600) dinars per share and the increase in the number of traded shares, reaching (6897,000,000) shares in 2010, and this was reflected positively on the market value of property rights, as The number of shares traded in The years 2016 and 2017 (6,469,000,000) led to a decrease in the market value of property rights to (4,334,230000, 446,361,000,000) dinars for the two years (2016, 2017) respectively.



shape(1)

The average value of the economic unit measured by the annual Tobin's Q index for Al-Mansour Company for Pharmaceutical Industries, Medical Appliances, Cosmetics and Sterilized Water - Special Contribution for the period(2019-2009)

Source: Prepared by the two researchers based on the statistical program (spss.V25) the annual report of Al-Mansour Company for Pharmaceutical Industries, Medical Cosmetics, Medical Supplies and Sterile Water for the period(2019-2009)

1- The relationship between (total energy costs, savings in total energy costs, total energy efficiency) combined and the value of the economic unit in Al-Mansour Company for Pharmaceutical Industries, Medical Appliances and Sterile Water.

The results of the correlation test demonstrated the existence of a significant statistically significant correlation between (total production capacity costs , savings in total energy costs, total energy efficiency) combined and the value of the economic unit in Al-Mansour Company for Pharmaceutical Industries, Medical Supplies and Sterile Water { which confirms the acceptance of the first hypothesis emanating from The first main hypothesis with (90%) confidence, as the calculated T value was (1.914), which is significant , while the value of the correlation coefficient was recorded between (total energy costs, savings in total production energy costs , total energy efficiency) combined and the value of the economic unit (0.782). This establishes the existence of a strong direct correlation between (total production capacity costs , savings in total energy costs, total energy efficiency) combined and the value of the economic unit according to the studied company data.

2- The effect of independent dimensions (total production capacity costs , savings in total energy costs, total energy efficiency combined) on the value of the economic unit in Al-Mansour Company for Pharmaceutical Industries, Medical Appliances and Sterile Water.

The results of the impact test proved the existence of a significant effect with statistical significance for the independent dimensions (total production capacity costs , savings in total energy costs, total energy efficiency) combined in the value of the economic unit in Al-Mansour Company for Pharmaceutical Industries, Medical Supplies and Sterile Water { which confirms the acceptance of the first hypothesis emanating from The second main hypothesis with (90%) confidence, as the calculated F value was (3.664), which is significant , while the value of the coefficient of

determination was recorded to show the effect of the independent dimensions (total production energy costs , savings in total energy costs, total energy efficiency) combined in the unit value. The economic unit (61.1%) to document that the changes that occur in the value of the economic unit due to changes in the three independent dimensions and by (61.1%) according to the studied company data.

3- Comparison between the costs of conventional energy and renewable energy represented by the solar energy system

Table (3) A comparison between the costs of fuel and oil to run diesel generators compared to the cost of the solar energy system

electric power capacity	Cost of fuel and oil	The cost of the solar energy system	Saving in energy costs
600 kva	442696000		600 kva

Source: Prepared by the two researchers based on the annual reports of Al-Mansour Company for Pharmaceutical Industries, Medical Supplies, Cosmetics and Sterile Water for the period (2015-2019) and the estimated costs of the solar energy system prepared by the Central Bank of Iraq

Table (3) shows the high costs of traditional fuel to operate diesel generators alternating with the national electric current for a period of (5) years compared to the energy costs of the solar energy system that operates on lithium batteries that have a validity period of (5) years, as the cost of purchasing a solar energy system The capacity of (600 KVA) is estimated at (412,000,000) dinars, while the cost of the traditional fuel used amounted to (442696000) dinars, meaning that the company's use of the research sample for the solar energy system will save estimated costs (30696000) dinars in addition to the environmental and social advantages obtained as a result of Adopt the use of clean energy.

Sixth Axis: Conclusions and Recommendations

Conclusions

- There is a strong, significant, and statistically significant direct correlation between the improvement of sustainable energy performance and the value of the economic unit.
- There is a strong impact relationship of (61.1%) between improving sustainable energy performance and the value of the economic unit
- The high costs of traditional energy compared to renewable energy represented by the purchase of a solar energy system and attic, the use of renewable energy in the company, the research sample, contributes to reducing energy costs as well as obtaining environmental and social benefits.
- The financial statements of the joint stock industrial companies listed in the Iraq Stock Exchange include total information on the energy costs used and do not include detailed or non-financial information such as (the number of consumed liters of fuel, kilowatt units of electricity and others).
- Strengthening the path of improving sustainable energy performance and through implementing the means that will improve energy efficiency and its optimal management is one of the most important elements of achieving economic development goals.

Recommendations

- The adoption of the use of renewable energy will save the company the research sample costs, it will provide support for efforts to preserve the environment as well as "increase the efficiency of the energy used in the company in addition to saving material costs".
- Legislating binding and attractive laws for the use of renewable energy and formulating a legal framework that adopts providing the necessary facilities to support renewable and sustainable energy projects, working on customs exemptions for importing renewable and sustainable energy production sources and their requirements, and granting tax allowances to industrial companies that adopt sustainable energy use.
- Work to enhance the effectiveness of sustainable energy support plans, update their strategies in line with related programs and policies, and take the necessary measures to ensure improvement in energy performance and increase its effectiveness.
- Encouraging studies and research and enhancing government efforts to support the work of traditional energy alternatives by adopting globally adopted policies and programs to avoid energy waste and reduce environmental pollution within a phased and strategic planning.
- Requiring industrial companies to disclose in detail the amount of energy they consume in non-monetary units such as (kilowatts, liters), in addition to requiring companies to disclose the amount of pollutants emitted as a result of energy consumption in order to demonstrate the efficiency of companies in addressing emissions and reducing pollution.

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