Assessment of Environmental performance of an economic Enterprise:the case of ELSEWEDY Electric Algeia

تقييم الأداء البيئي للمؤسسة الاقتصادية -دراسة حالة مؤسسة السويدي إلكتريك الجزائر-

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Abstract:

The growing global environmental impact has shifted the environmental dimension from a luxury to an urgent necessity for economic institutions, the main contributors to issues like climate change and resource depletion. This shift in the managerial paradigm focuses on leveraging environmental performance as a strategic advantage for excellence and survival.

The need to develop scientific methodologies to control the environmental impacts of economic institutions through the environmental assessment process has become evident. This is the objective of the study, which employs a descriptive-analytical approach to explain and analyze the various dimensions of the process in its first section, as well as an inductive approach through a case study of Al-Suwaidi Electric Algeria. The study concluded that the organization under study is committed to achieving environmental sustainability by controlling the majority of the environmental impacts of its various activities.

Keywords: Environment, environmental pollution, environmental performance, environmental performance assessment, ELSEWEDY Electric Algeria.

JEL Classification Codes: Q5

ملخص:

إن بروز مشاكل بيئية جمة إلى سطح التأثير البيئي العالمي المتنامي كتغير المناخ، واستنزاف الموارد الطبيعية، أخرج البعد البيئي من خانة الترف الفكري إلى اعتباره كضرورة ملحة وجب تبنيها فعليا من قبل المؤسسات الاقتصادية المتهم الأكبر في استحداث أغلب التأثيرات السلبية السالفة الذكر، فكان التحول الفكري الإداري المعاصر الذي ينبني على تحويل هذا البعد لميزة استراتيجية تتيح التفوق والبقاء من خلال التحسين المستمر للأداء البيئي.

تجلت ضرورة إيجاد صيغ منهجية علمية للتحكم في التأثيرات البيئية للمؤسسة الاقتصادية من خلال عملية التقييم البيئي، وهو ما هدفت إليه الدراسة إعتمادا على منهجها الوصفي التحليلي في شرح وتحليل مختلف أبعاد العملية في محورها الأول، وكذا منهجها الإستقرائي بدراسة حالة مؤسسة السويدي إلكتريك الجزائر، وقد توصلت الدراسة إلى تبيان التزام المؤسسة محل الدراسة بتحقيق البعد البيئي من خلال التحكم بجل التأثيرات البيئية لأنشطتها المختلفة.

كلمات مفتاحية: بيئة، تلوث بيئي، أداء بيئي، تقييم الأداء البيئي، مؤسسة السويدي إلكتريك الجزائر.

تصنيفات JEL: Q5

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1. Introduction

Economic activity is considered one of the main causes of environmental degradation, as economic institutions have been and continue to compete for the resources involved in the production process to face fierce competition in various fields. Thus, the concept of environmental performance has emerged as a comprehensive approach that frames the relationship between institutions and their natural environment in a way that ensures its protection both now and in the future within the concept of sustainability. This has led to the development of administrative processes concerned with organizing environmental work within the economic institution. Environmental performance in an economic institution is only achieved if it adopts the principle of pollution prevention as a foundation, starting from the source of resources and ending with the impact of its products and activities on the natural environment. This is pursued through striving for clean production using technology that rationalizes energy and resource consumption, resulting in fewer pollutants and recyclable resources. This enables the institution to comply with environmental requirements, thereby reducing legal repercussions for environmental non-compliance, as well as gaining supportive competitive advantages that contribute to solidifying the institution's position within its strategic environment.

From here, the need to achieve environmental performance emerged as the optimal choice for institutions in general and for Elsewedy Electric Algeria in particular in order to align the economic and environmental dimensions to serve those strategic goals.

In light of the above, the contours of the problem that the study will address emerge through answering the following main question: How is environmental performance achieved at the ElSewedy Electric Algeria company?

In order to logically address the issue, the main question can be divided into the following sub-questions:

- What is the concept of environmental performance, and what are the most important methods for evaluating it?

Does the institution under study have a clear approach to achieving effective environmental performance?

- How does the institution under study control its environmental impacts?

1-1 Study Hypotheses

- The first hypothesis: The environmental analysis approach in the institution under study is effective;

- The second hypothesis: The institution under study effectively controls most of its environmental impacts;

1-2 Study Objectives:

The study aims to analyze and diagnose the environmental performance of the economic institution by focusing on the following objectives:

- Determining how to achieve environmental performance through the activation of specific mechanisms;
- Diagnosing and analyzing the reality of environmental performance at ElSewedy Electric company
- Providing general recommendations for economic institutions regarding the requirements for achieving effective environmental performance.

1-3 Study Methodology

In general, the study relied on the descriptive-analytical method in the first axis, aiming to analyze the theoretical framework related to various concepts of environmental performance. Meanwhile, the inductive method was employed in the second axis through the use of the case study tool, aiming to determine the nature of the relationships forming the subject of the study by projecting it onto the ElSewedy Electric Algeria institution.

1-4 Structure of the Study:

Based on the study's objectives and significance, and in order to verify the validity of its hypotheses, the study was divided into two main axes to cover all its theoretical and practical aspects.

The first axis addressed the theoretical presentation and grounding of the concepts of environmental performance, through its definition, the determination of its dimensions, and its evaluation.

As for the second axis, it examined and scrutinized the case of the Swedish Electric Company in Algeria as evidence of the effects of applying the environmental analysis approach to activities as a method to achieve high environmental performance, through conclusions and testing the study's hypotheses to determine their validity.

2- Concepts about Environmental Performance

The environment and its problems are almost the most important topics of discussion in regional and international forums, considering it a global dilemma that does not recognize natural or political boundaries. Whenever an environmental problem arises here or there, we soon hear about its significant impact on other subsystems, as it is a comprehensive and integrated system where each part affects the others.

2-1 Definition of the Environment

The term "environment" is not limited to the natural environment only; it is a commonly used term in various fields of life. We say the economic environment, the social environment, the political environment, the cultural environment... Etc. As for the definition of the environment, it primarily focuses on distinguishing between two closely related sciences: the specific and the general, which are ecology (Ecology) –

the specific – and the environment (Environment) – the general. Ecology is a term derived from the Greek origin of the two words "Oiks," meaning dwelling, and "Logos," meaning science. Thus, the term means "the science that studies the relationships and interactions between living organisms with each other and with their surroundings, which consist of water, air, minerals, and soil." (Jerry, 2000, p. 09) .The term (ecology) is attributed to the German biologist Ernst HAECKEL, who used it to refer to the relationship between living organisms and their organic and inorganic environment in 1866 (Ahmed, 2007, p. 15) , and we can observe that the ecological concept of the environment is a narrow concept that does not include customs, traditions, and human behaviors, or what is known as the human environment, which was included in the definition of the environment after 1972; it also issued a definition of the environment in 1973: "The environment consists, in addition to the natural or artificial surroundings that envelop us, of the intricate structure of intellectual relationships and the network of information we create. (Thiombiano, 2004, p. 22)

The Algerian legislator has also provided a comprehensive definition of the environment that includes all its constituent elements. The environment consists of both biotic and abiotic natural resources such as air, atmosphere, water, land, subsoil, plants, and animals, including genetic heritage, and the forms of interaction between these resources, as well as places, landscapes, and natural landmarks (Law No. 03-10, July 20, 2003)

From the above, the terminological meaning of the environment is clear, referring to "the medium that surrounds humans and contains various interactions between biological, physical, and chemical elements in an integrative and complementary manner, with some affecting others either positively or negatively."

The ecosystem is defined as "a set of elements that integrate and interact systematically to form a cohesive unit" (Al-Azzawi, 2007, p. 95).

2-2 Environmental Pollution

The Algerian legislator defined it as "Any direct or indirect alteration of the environment caused by any act that creates or may create a situation harmful to the health and safety of humans, plants, animals, air, atmosphere, water, land, and collective and individual properties." (Law No. 03-10, July 20, 2003)

According to the international pollution law issued by the United Nations in 1974, it is defined as "Various human activities that necessarily lead to the increase or addition of new materials or energy to the environment, where this energy or these materials expose human life, health, well-being, or natural resources to danger, whether directly or indirectly." (Wahbi, 2004)

We will review the most important types of pollution as required by the subject of the study.

2-2-1 Air Pollution

Air pollution tops the list of the most dangerous types of pollution ever, due to the significant impact this type of pollution has on various elements of the living environment on one hand and its ease and speed of transmission on the other. According to the latest reports from the World Health Organization, 9 out of 10 people worldwide breathe polluted air, resulting in annual air pollution-related deaths exceeding seven (7) million people according to the same organization. This prompted the decision to hold an international conference on air pollution and health on October 30 and November 1, 2018. (WHO, 2026)

2-2-2 Water Pollution

Many of us may have heard the term "the blue planet," which is often used to refer to Earth in scientific and media circles. This is not without reason, as the percentage of water on its surface represents more than 75% of the total area. The danger of this type of pollution lies in the fact that freshwater suitable for human use constitutes only 3%, a very small percentage of the total water on Earth's surface, existing in the form of rivers, lakes, glaciers, and groundwater. Not only that, but all living organisms share this small percentage, considering water to be the elixir of life that ensures the survival and continuity of various ecosystems.

Water pollution is defined as "the deterioration in the quality of natural water due to the addition of harmful substances in increasing concentrations or the introduction of effects such as an increase in temperature or the reduction of some of its essential natural components (Al-Azzawi, 2007, p. 95) These natural components of water vary from one ecosystem to another, depending on the salts and substances that interact with the system, as water is a natural solvent par excellence more than any other solution. Therefore, it is considered a medium for the spread of many pollutants and diseases such as typhoid, cholera, malaria and hepatitis, in addition to many other significant impacts on living organisms, such as harming fish stocks, coral reefs, and bird migration... Etc.

2-2-3 Soil Pollution

Soil is defined as the mineral material that may exist in a solid form or as fine mineral particles referred to as sand, silt, and clay (Al-Azzawi, 2007, p. 95). It represents the surface crust produced by the Earth, serving as the source of food for the products that are considered the first link in the food chain.

Accordingly, it can be said that soil pollution refers to "the degradation that occurs in the soil as a result of the introduction of certain elements, materials, and properties, causing the biological, chemical, and physical composition of the soil to be disrupted in a way that makes it unable to support natural ecosystems."

2-2-4 Noise Pollution:

Noise pollution is closely related to cities and more advanced places, especially industrial areas due to the expansion in the use of machines and modern technology, with the maximum noise level that a human can tolerate being between 30 and 35 decibels; therefore, noise pollution is the increase in the level of noise or sound to the extent that it causes harm to some components of the ecosystem (Al-Kharji, 2007, p. 73)

2-2-5 Visual pollution or the disappearance of aesthetic appearances

It is the distortion of any scene that the human eye falls upon, causing psychological discomfort when viewed. It can also be described as a type of lack of artistic taste, or the disappearance of the esthetic image of everything surrounding us, from buildings to roads, sidewalks, and gardens... Etc. (Al-Kharji, 2007, p. 67)

And these types of pollution are mentioned as examples, not an exhaustive list, as there are other types of pollution, such as electromagnetic pollution, moral pollution, organic pollution, thermal pollution, etc. Etc.

2-3 Definition of Environmental Performance

The term "performance" is not new; there are numerous studies and research from both theoretical and practical perspectives aimed at refining its concept. However, there is no general agreement on its definition. The term "performance" has Latin origins and has been used in the French language since the 13th century. However, it was the English language that gave it a clearer meaning in the 14th century, according to the Oxford Dictionary, which defines it as the representation of a craft work, such as performing in a musical or theatrical group. The French dictionary Le Grand Larousse defines it in terms of success in any field or domain (Berrouche, November 22–23, 2011, p. 655).

Performance is defined as the result of the institution's ability to utilize all its resources and direct them toward achieving its goals. Performance is a function of all the institution's activities and is the mirror that reflects the institution's status from various aspects. It is the action that the institution's parties strive to enhance. Therefore, performance reflects the success or failure of the institution and its ability to achieve its goals (Bougaba, 2011, p. 74).

From this standpoint, definitions of environmental performance have emerged from various researchers and thinkers, each according to their perspectives, and some of them can be mentioned as follows:

Environmental performance is defined as "All the actions of the institution toward the environment, regardless of their measurability or non-measurability, and regardless of their impact on it or lack thereof. In other words, environmental performance is any impact of the institution on the environment, whether positive or negative" (Mohamed, 2020, p. 156)

Another definition states "Environmental performance is the impact resulting from the institution's business practices on its environment, and it is considered a competitive advantage through the institution's dominance and control over the environmental skill, characteristic, or knowledge that enhances its efficiency and effectiveness" (Karraoui, 2020, p. 54)

And there are those who believe that "Environmental performance is an economic performance, and thus the possibility of measuring the results of environmental management concerning environmental aspects, for example: environmental policy, environmental goals, environmental plans, and others related to the environmental performance of the institution" (Kafi, 2014, p. 137)

2-4 Dimensions of Environmental Performance

Many researchers have not agreed on the dimensions of environmental performance, as numerous studies have reached various proposals for these dimensions, which we summarize in the following studies (Najwa, 2015, pp. 25-26)

- The study "Bennett & Jamess" which proposed a classification of dimensions based on three groups: the institution's operations in terms of material and energy efficiency, dimensions related to environmental effectiveness, stakeholders, products, and environmental status;

- The study by "Ditz & J. Ranganathan," which emphasized that there are four main dimensions of an organization's environmental performance: material use, energy consumption, outputs (non-products), and pollution emissions;

- The study by "Loew & Kottman,", which classified the dimensions of environmental performance based on areas of environmental protection into: energy, transportation, pollutant emissions, packaging and storage waste, production, storage, and water management;

- Study "V.W Tam & al." "It indicated that the environmental performance of the institution can be inferred through five main dimensions: the environmental efficiency and effectiveness of production processes, measuring the environmental aspects of the product and service; addressing environmental management issues; identifying and allocating environmental costs, and investments and commitments linking environmental performance to financial performance."

Based on the above, the dimensions of environmental performance can be summarized into two main aspects:

2-4-1 Environmental Efficiency: It is defined as "The ability of the institution to achieve its environmental goals, which depends on the capacity and standards used in measuring it based on the model used in studying institutions. This variable is often used as a dependent variable to other independent variables such as: authority structure, communication patterns, supervision methods, morale, and productivity" (Al-Dahimi, 2011, p. 656)

The success of environmental efficiency depends on the synergy of four factors, which are (Chaaban, 2021, p. 34):

- Focusing on customer service by emphasizing the services that must be provided;
- Focusing on product quality and evaluating the performance of institutions through production methods;
- The presence of a life cycle perspective can lead to decisions to redesign processes and products in order to minimize their environmental impact as much as possible;

The essence of environmental efficiency lies in enabling institutions to add new value within the framework of available capabilities and resources.

2-4-2 Environmental efficiency: The concept of environmental efficiency emerged from the Rio de Janeiro Conference in 1992, which pertains to the supply of goods and services at competitive prices that meet human needs, improve quality of life, and reduce the volume of environmental impacts and material consumption over the life cycle. So, environmental efficiency works to improve both environmental and economic performance, and it is also a tool that links environmental performance with the financial return of the institution (Al-Dahimi, 2011, p. 657).

2-5 Environmental Performance Evaluation

The process of environmental performance evaluation is based on a set of methods that reflect the efficiency and effectiveness of the institution in achieving its environmental goals and objectives. Before presenting these methods, it is necessary to first address the definition of environmental performance evaluation and the reasons for its importance to institutions.

2-5-1 Definition of Environmental Performance Evaluation

Environmental performance evaluation according to the ISO 14013 standard is defined as "An approach to facilitate management decisions regarding the environmental performance of the organization by selecting indicators, collecting and analyzing data, evaluating information according to the environmental performance scale, preparing reports, communicating information, conducting periodic inspections, and ultimately developing this approach (Safia, 2010, p. 230).

Through this definition, it becomes clear that the process of evaluating environmental performance is a quantitative process that relies on a data analysis approach and the extraction of information that is intended to support managerial decision-making regarding the environmental aspects of the organization, ensuring integration, efficiency, and effectiveness as a result of these activities.

As stated in another definition: "a process crystallized in the form of a set of indicators reflecting the environmental effectiveness of the institution in terms of achieving environmental goals and policies set as a result of the institution's impact on the internal or external community (Mahjoubi, 2016, p. 75)

2-5-2 Methods of Evaluating Environmental Performance

Before delving into environmental performance evaluation methods, it is necessary to address its requirements as an illustrative stage for the key points on which the appropriate environmental evaluation method for each institution is based, as follows (Hussein, 2003, p. 180):

- Identifying the current and expected environmental impacts of all the institution's activities, actions, and available alternatives from the outset before undertaking the activity;
- Identifying and measuring environmental costs and categorizing them according to the type of environmental activities that cause those costs;
- Identifying the environmental benefits or savings resulting from the institution's various environmental activities, whether voluntary or mandatory;
- Identifying the environmental standards that the institution must adhere to in order to ensure the improvement and development of its environmental performance. Additionally, a set of financial and non-financial metrics and indicators can be used to measure the evaluation of environmental performance, provided that these metrics are objective, accurate, and reliable. This aims to achieve the goals of the stakeholders through the design and preparation of descriptive, quantitative, and financial report models to disclose the institution's environmental performance.

One of the United Nations Environment Program's initiatives has identified a set of methods that can help in evaluating environmental performance when an industrial institution implements environmental management systems, as follows:

- Safe or clean production assessment method;
- Environmental impact assessment method;
- Environmental reporting method;
- Product life cycle analysis method;
- The method of using environmentally safe technology;
- Method of recycling hazardous waste;
- Supply chain management approach;
- Method of evaluating environmentally used technology.

3- Diagnosis and Analysis of the Environmental Performance of Elsewedy Electric Algeria

The Swedy Electric Algeria Company is a prominent player in the electrical industry, established in 1984 with a capital of 10 million Saudi riyals and headquartered in Cairo, Egypt. It is a joint-stock company involved in the production of high-quality cables, transformers, and electrical accessories and has expanded into wind energy

projects. The Elsewedy Group operates 31 production units across 12 countries, meeting the demands of over 110 nations with its innovative products.

In Algeria, the company set up a joint-stock factory in Ain Defla, investing 20 billion dollars over 6 hectares. Since its inception in 2008, it has achieved a production capacity of 30,000 tons of cables, projected to increase to 50,000 tons by 2025. The product line includes low, medium, and high voltage cables, overhead conductors, and optical fiber ground wires, suitable for various applications, including energy transmission and the oil and gas sector.

The company has also significantly ramped up its production of electrical transformers, from 3,000 units annually in 2012 to 6,000 currently. Additionally, the introduction of a factory for cable accessories in 2018 has further allowed Swedy to respond to increasing market demand, producing 100,000 cable accessory units each year.

Before 2008, Algeria relied heavily on imports for 75% of its electrical cable needs. However, following Swedy Electric's establishment, this dependency dwindled to 25%, fostering self-sufficiency and allowing the company to export to numerous countries. The local market has also benefited from a 20% reduction in cable prices due to increased competition initiated by the company.

3-2 Products of El Sewedy Electric Algeria.

- Low voltage cables: production capacity: 20,000 tons/year, and below is an illustrative image of this product.
- Medium voltage cables: production capacity: 15,000 km/year, and below is an illustrative image of it.
- High voltage cables: production capacity: 1500 km/year.
- Electric transformers: With a production capacity of up to 3,000 transformers annually, 1,000 megavolts per year, reaching 6,000 transformers by 2025.
- Optical Ground Wire (OPGW): The institution has a production capacity of 3000 km/year.
- Electrical Accessories: To complete the electrical solutions for the institution's clients, it was decided to produce electrical accessories, including:
  - Cable termination box;
  - Cable junction box;

3-3 Analysis of the environmental situation of Swedy Electric Algeria company.

3-3-1 Presentation of the environmental policy of Elsewedy Electric Algeria.

Protecting the environment and natural resources, while striving to achieve sustainable economic development, is of strategic importance to Elsewedy Electric. A responsible approach toward the environment is crucial for the resilience and competitiveness of the institution.

The strategic importance of the environmental management approach in the institution is evident through addressing environmental challenges, expanding the institution's contributions to sustainability, preventing negative environmental impacts, improving the quality of products and services, creating value for the institution and various stakeholders, in addition to complying with legal obligations and voluntary commitments regulating industrial activities.

As for the scope of the environmental policy in the institution, it encompasses all its activities and production lines, based on the conviction that environmental protection and its resulting benefits begin with establishing its principles as a preventive rather than a remedial approach. Therefore, the focus is on enhancing and improving environmental performance, which contributes to overall performance and significantly creates value and success in the long term, without neglecting the responsibility of bearing environmental damages in case they occur.

3-3-2 Environmental Management Tasks at Elsewedy Electric Algeria.

The tasks of the environmental management of the institution under study are mainly represented in the following stages:

3-3-2-1 Environmental Analysis: Environmental analysis is considered a pivotal tool in the institution's environmental management, as it provides a sound and comprehensive understanding of the internal and external environmental factors that affect the ecosystem. This enables the development of an effective environmental strategy that aligns with the institution's overall strategy. Through environmental analysis approaches, the institution can address the following points:

- Working with a preventive approach instead of a remedial one;
- Understanding the current environmental conditions;
- Predicting future environmental impacts and changes;
- Assessing risks and opportunities, enabling good preparedness in line with the principle of business intelligence;
- Supporting the environmental decision-making process within the framework of continuous improvement philosophy;
- Achieving legal compliance through adherence to Algerian and international environmental laws, regulations, and standards.

3-3-2-2 Implementation of Environmental Programs: After the environmental analysis process, the stage of implementing environmental programs follows, which represents the steps to be taken within the daily activities of the institution to ensure environmental efficiency and effectiveness by adopting the best environmental improvement alternatives approved by the decision-makers in the institution.

3-3-2-3 Environmental Audit: The goal of this process is to assess the extent of adherence to the planned implementation within the framework of the institution's

environmental approach, in order to determine the degree of alignment of the programs with the strategy during and after various activities.

3-3-2-4 Dealing with Environmental Impact: In the case of negative environmental impacts after the environmental audit, the institution will work on addressing long-term impacts that are prioritized due to their cumulative nature over time or their high severity. In the case of a positive impact, the institution will work on valuing and developing the environmental programs used.

3-3-2-5 Continuous improvement: Through maintenance systems and the acquisition of advanced machines and systems in the environmental field, such as the Fire PRO fire extinguishing system, which relies on an environmentally friendly gas instead of carbon dioxide, to reduce the carbon footprint in the institution.

3-4 Diagnosis of the Environmental Impacts of Elsewedy Electric Algeria

The institution under study has specific impacts, like other industrial institutions, at both the local and global levels. Each impact will be analyzed and justified as an entry point to substantiate the fundamental principles outlined in the aforementioned institution's environmental policy, through an environmental analysis approach that focuses on preventing environmental impact from the outset.

3-4-1 Diagnosis of Liquid Industrial Pollutants for the Institution Under Study

The volume of liquid industrial pollutants for the institution under study will be diagnosed by comparing the values recorded during environmental audits with the maximum values of liquid industrial pollutants, as specified in Executive Decree No. 06-141 dated 20 Rabi' al-Awwal 1427 AH, corresponding to April 19, 2006, according to the following table.

Table 02: Liquid industrial pollutants of the institution under study

The indicator	units	Analysis result	Extreme values	Analysis standard
Temperature	C^O	15.6	30	
PH	/	8.0	8.5-6.5	Different
MES	Mg/l	45.0	35	ISO 11923:1997
DCO		115	120	ISO 6060:1989
DBO_5		25.0	35	ISO 5815:1989
Oils and greases		18.0	20	RODIER
Iron		01	03	FD T90-112
Copper		0.2>	0.5	ISO 8288:1986
Aluminum		01	03	ISO 120120:1997

Source: Prepared by the researcher based on data from the institution.

Commentary and analysis: Based on the results shown in Table 02, it is observed that the values of the environmental audit for industrial liquid waste are in line with the maximum values set by the Algerian authorities in this field. It is noted that the temperature, which was measured at 15.6, is lower than the maximum value set at 30°C. As for the pH, it also falls within the specified range of 6.5-8.5.

The value of sulfonic acid MES (Morpholino Ethanesulfonic Acid) is 45.0 mg/L, which is higher than the maximum value set at 35.0 mg/L according to the ISO standard shown in table (3-2). For clarification, this chemical solution is used in laboratories and factories to maintain the pH level within the range of 5.5-6.5.
The DCO (Dynamic Cut Off) value is 115 mg/L, which is lower than the maximum specified value of 120 mg/L. This indicator is used in liquid chromatography to separate primary and secondary compounds based on their ionic strength (mass spectrometry).
The value of BOD5 (Biochemical Oxygen Demand) is 25.0 mg/L, which is lower than the maximum specified value of 35.0 mg/L. This indicator is used in chemistry to measure the biochemical oxygen demand over five days.
The value of fats and oils is 18.0 mg/L, which is less than the maximum specified value of 20.0 mg/L.
The amounts of iron, copper, and aluminum are respectively: 01.0, >0.2, and 01.0 mg/L, which are less than the standard values respectively: 03.0, 0.50, and 03.0 mg/L within the industrial liquid waste.
Based on the aforementioned values, one can assess their compliance with the standard values within various international standards. All the recorded values from the audit fall within the maximum ranges stipulated in Executive Decree 06-141, except for the value of sulfonic acid, which is higher than the standard value by 10 mg/L. This indicates the efforts made by the environmental management of the institution to maintain the pH level of the liquid waste, as a measure to avoid environmental penalties and the associated costs.
3-4-2 Diagnosis of the air pollutants of the institution under study: The air emissions of the institution are measured using a specialized advanced device for this purpose called the ADR1500 emission analyzer, and the environmental audit values are as shown in the following table.

Table 03: Air Emissions of the Elsewedy Electric Algeria Company.

The index	Measurement location	Measurement unit	Results		The standard
Total emissions	Inside the factory	m^3c (The standard cubic meter unit is used due to the effect of temperature and pressure on volume)	**2020**	**0.47**	>0.50 mg/m^3 According to Executive Decree No. 06-138 concerning the determination of maximum values for industrial air emissions.
			2021	**0.017**	
			2022	**0.020**	
			2023	**>0.01**	
	Outside the factory		**2020**	**0.025**	
			2021	**0.018**	
			2022	**0.015**	
			2023	**0.01**	

Source: Prepared by the researcher based on data from the institution.

Commentary and analysis: Based on the results shown in Table 03, it is observed that the values of environmental audits for industrial air emissions are in line with the maximum values set by the Algerian authorities in this field, estimated at 0.50 mg/m³. A continuous decrease in air emission values is noted, both inside and outside the factory, with values dropping from 0.47 mg/m³ in 2020 to less than 0.01 mg/m³ in 2023 inside the factory. Similarly, outside the factory, values decreased from 0.025 mg/m³ in 2020 to 0.01 mg/m³ in 2023.

From the aforementioned values, we find a significant commitment to maintaining air emissions within the limits set by Executive Decree No. 06-138 concerning the determination of maximum values for industrial air emissions. This is due to the advanced investments made by the institution in machinery that work to prevent pollution risks from the outset.

3-4-3 Diagnosis of Acoustic Pollution in the Studied Institution: The acoustic pollutants (noise) of the institution are measured using the C-322 Sonometer on the test day, March 9, 2025.

Table 04: Acoustic emissions (noise) of the institution under study

Measurement location		Noise level in decibels (A)db	
Cable production workshop	Pulling machine	**2025/03/09**	**2019/11/14**
		83.0	**87.75**
	Insulation machine	**81.0**	
	Assembly machine	**78.0**	
	Inspection machine	**72.0**	
Spare parts warehouse		**54.0**	
Electrical testing laboratory		**56.0**	**61.35**
Raw materials warehouse		**62.0**	
Maintenance workshop		**73.0**	
Workshop for producing accessories		**64.0**	
Department No. 02		**49.0**	
Mechanics workshop		**73.0**	
Central Administration		**61.5**	
Transformer workshop	Welding transformers	**62.5**	**87.8**
	Transformer coil installation	**70.0**	
The eastern entrance of the factory		**56.0**	**61.85**

Source: Prepared by the researcher based on data from the institution.

Commentary and analysis: It is observed from the previous table that the noise levels were above the values specified in Executive Decree No. 93-184 dated July 27, 1993, which sets the maximum values for industrial noise at 70 (A)db. In the production workshop, the average was 78.5 (A)db, in the maintenance workshop it was 73.0, and in the mechanics workshop, it was 73.0.

As for the other parts of the facility, they were below the aforementioned maximum value.

Therefore, we conclude that noise levels increase in relation to the volume of activities due to the metallic nature of the raw materials used in production. However, it is observed from the actual inspection of the factory that occupational health and safety activities are largely effective in dealing with this type of pollution. According to the quality inspector, the institution aims to reduce these levels to their minimum in the future by acquiring a type of material to cover the production rolls, which significantly reduces the noise level. This is confirmed by the evident efforts to reduce noise, as clearly shown in the comparison of some values between 2019 and 2025.

3-4-4 Diagnosis of water analyzes intended for human use: The institution under study is subjected to numerous analyzes conducted by the Environmental Directorate to assess the environmental quality of its various activities, which proves its compliance with the applicable standards in Algeria. The executive decree No. 96-14 dated March 4, 2014, amending and supplementing the executive decree No. 125-11 dated March 22, 2011, sets the quality standards for water used for human consumption, and their values are shown in the following table.

Table 05: Analyzes of water used for human consumption dated 08/11/2022

The index	Results	Normes	Unit
PH at 20°C	**6.77**	**9.0-6.5**	/
Temperature	**20**	**25**	**C^0**
Electrical conductivity of water	**1025**	**inf 2800**	Micromhos per centimeter (µS/cm)
Total Dissolved Solids (TDS)	**447**	/	Parts per million (PPM)
Turbidity or water cloudiness	**0.00**	**05.00**	Nephelometer
Total water hardness TH (the concentration of dissolved calcium and magnesium ions in water)	**250.00**	**500.00**	mg/L
Total alkalinity TA (the ability of water to neutralize acids)	**00.00**	/	Mg/L
Chlorine ratio	**240.00**	**500.00**	Mg/L
Parts per million Total Dissolved Solids Nephelometric Turbidity Units Total Alkalinity Total Hardness		**PPM** **TDS** **NTU** **TA** **TH**	

Source: Prepared by the researcher based on data from the institution.

Commentary and analysis: Based on the values shown in the previous table, the quality of the water supplies directed for the various uses of the institution is observed, as all the water quality measurement results comply with the quality standards in force in Algeria, as defined by Executive Decree No. 96-14.

Therefore, the importance of maintaining the health and occupational safety of employes and workers is evident, as it is a key factor in achieving excellence, considering that human resources are the top priority of the institution.

Table 06: Water Usage for the Year 2024

Months	The quantity in cubic meters	Months	The quantity in cubic meters
January	138	July	126
February	138	auguest	126
March	138	September	126
April	47	October	95
Mai	47	Novembre	95
Jun	47	December	95
total	1217		

Source: Prepared by the researcher based on data from the institution.

The most notable observation from the previous table is the institution's low water usage compared to its size, which supports the institution's approach to preserving the strategic natural resource, thereby achieving the dimensions of strategic sustainability that reinforce a positive mental image for stakeholders.

3-4-5 Solid Waste of the Institution Under Study: It is worth noting in this regard that solid waste is primarily produced in the cable and transformer factories, and the details of each will be provided according to table (3-7).

Table 07: Solid Waste of the Swedey electronic Algeria Company in 2024

The factory	Material	The quantity in tons
Cable factory	Wood	91840
	Batteries	22
	Iron waste	110749
	Copper rods	1073
	Insulated copper	83992
	Aluminum rods	144385
	Insulated aluminum	141334
Transformer factory	Plastic pulleys	4688
	1000-liter plastic tanks	203
	Transformer oils	2000
	Flexible plastic bags	56

Source: Prepared by the researcher based on data from the institution.

The institution deals with the solid waste generated by its activities in two different ways. The first approach involves recycling 3% of copper and 4% of aluminum annually. As for the quantities that are not recycled, the institution sells them to other companies to enhance its forward integration. Continuing its sustainability approach, the institution also produces solar energy in the two factories, generating 14,400 kilowatt-hours per year, which significantly contributes to reducing energy

costs used in the factory and increasing the value chain. This is a statement of electricity and natural gas consumption in the two factories.

Table 08: Electricity and gas consumption in the institution under study in 2024

The factory	Gas consumption (cubic meters(	Electricity consumption (kilowatt-hour)
Cable factory	**43848**	**20906014**
Transformer factory	**4872**	**1328212**

Source: Prepared by the researcher based on data from the institution.

The large consumption quantities reflect the urgent need for the importance of both energies in the production processes at the Swedy Electric Algeria company. Therefore, the company is moving toward solar energy production to enhance the use of renewable energies in production.

4 Testing the study hypotheses.

After reviewing the main results of the applied study at the Sweidi Electric Algeria company, it is possible to determine the validity or invalidity of the study hypotheses stated in the introduction, which are as follows:

4-1 First Hypothesis: The environmental analysis approach in the studied institution is effective (True).

By adopting an environmental analysis approach that focuses on controlling the environmental impacts of industrial activities from the outset, the institution was able to obtain the ISO 14001 compliance certificate, which is considered a value that elevates the institution to the ranks of environmentally and socially responsible organizations. This strategic dimension grants the institution the ability to export its products to most global markets.

The institution relies on performing environmental management tasks in an integrated manner through: environmental analysis, implementation of environmental programs, environmental auditing, addressing the environmental impact if present, and conducting continuous improvement processes for environmental performance.

Therefore, it can be said that the first hypothesis, which states that the environmental analysis approach in the institution under study is effective, is a correct hypothesis.

4-2 Hypothesis Two: The institution under study effectively controls most of its environmental impacts (correct).

Through the effective application of the environmental analysis approach, the institution under study was able to fully control the negative impacts resulting from its various industrial activities, which are represented in:

4-2-1 The liquid industrial pollutants of the institution under study: By comparing the values recorded during the environmental audits with the maximum values of liquid industrial pollutants, as specified in Executive Decree No. 06-141 dated 20 Rabi' al-

Awwal 1427 AH, corresponding to April 19, 2006, it was found that all recorded results were below the standard values;

4-2-2 Air pollutants in the studied institution: It is observed that the environmental audit values for industrial air emissions are in line with the maximum values set by the Algerian authorities in this field, estimated at 0.50 mg/m³. There is a significant commitment to maintaining air emissions within the limits specified in Executive Decree No. 06-138 concerning the determination of maximum values for industrial air emissions.

4-2-3 Auditory pollutants in the institution under study (noise): It is observed that the noise levels were above the values specified in Executive Decree No. 93-184 dated July 27, 1993, which sets the maximum values for industrial noise at 70 (A) dB, in both the production workshop with an average of 78.5 (A) dB, the maintenance workshop at 73.0, and the mechanics workshop at 73.0.

As for the other parts of the facility, they were below the aforementioned maximum value.

Knowing that noise levels increase compared to the volume of activities due to the metallic nature of the raw materials used in production, it is observed from the actual inspection of the factory that occupational health and safety activities are largely effective in dealing with this type of pollution. According to the quality inspector, the institution aims to reduce these levels to their minimum in the future by acquiring a type of material to cover the production rolls, which significantly reduces the noise level. This is confirmed by the evident efforts to reduce noise, as clearly seen in the comparison of some values between 2019 and 2025.

4-2-4 Water Quality Analyzes Used in the Institution Under Study: Based on the recorded results of the water quality analyzes intended for human use, the quality of the water supplies directed for the institution's various uses is noted. All water quality measurement results comply with the quality standards in force in Algeria, as defined by Executive Decree No. 96-14, dated March 4, 2014, amending and supplementing Executive Decree No. 125-11, dated March 22, 2011.

4-2-5 Solid waste of the institution under study: The institution deals with the solid waste generated by its activities in two different ways. The first approach involves recycling 3% of copper annually and 4% of aluminum annually. As for the quantities that are not recycled, the institution resorts to selling them to other companies.

4-2-6 Energy resource consumption in the institution under study: The large quantities of electricity and natural gas consumption in the institution under study reflect the urgent need for the importance of these two energies in its production processes. Therefore, the institution is moving toward solar energy production to enhance the use of renewable energies in production, as the institution produces 14,400

kilowatt-hours per year, which significantly contributes to reducing the energy costs used in the factory.

Therefore, it can be said that the second hypothesis, which states that the institution under study effectively controls most of its environmental impacts, is correct.

5 Conclusion

The study showed that adopting a comprehensive methodology for environmental analysis is not only a response to environmental challenges but also a strategic investment that enhances the environmental performance of institutions. The proactive vision that combines environmental protection and profitability is no longer a voluntary option but a strategic necessity in a highly competitive economy, with increasing awareness of the importance of integrating the three dimensions: economic, social, and environmental, to achieve effective sustainable development. This is reflected in the extent to which the institution controls administrative systems based on precise and objective standards, allowing for distinction and generating creativity, and thus added value to achieve survival and growth. Therefore, the conscious linking of the environment and performance is considered a comprehensive model that achieves a balance between the requirements of economic development and the necessities of environmental preservation, ensuring a more sustainable future for businesses and future generations.

This was demonstrated by the study of the Sweidi Electric Company in Algeria, which proved the effectiveness of adopting an environmental approach in controlling environmental performance, achieving a leading position in the national market, and making it a reference to be emulated in its commitment to aligning its various performances with Algerian regulations and international standards expressed by ISO. This led to the company's distinction and its ability to achieve significant financial performance.

5-1 Study Results

The study concluded with a set of results, the most important of which are:

- Environmental issues and the exacerbation of environmental problems (such as pollution in its various forms, global warming, ozone layer depletion, and the issue of population explosion, etc.) Etc.), are considered an inevitable result of economic activities in particular;

- The shift from addressing environmental problems to an environmental management approach, within integrated administrative and executive systems;

- The voluntary nature of the environmental dimension is not an administrative luxury, but a strategic necessity for the institution's development;

Achieving environmental performance improves resource efficiency, shifts from reactive to proactive action, and enhances reputation and organizational resilience.

- The Sweidi Electric Algeria Company has an effective environmental strategy;

- The company under study adopts a comprehensive approach to managing its activities environmentally according to global standards, primarily based on the environmental analysis of its activities;

- The Sweedy Electric Algeria company efficiently controls its solid, liquid, and gaseous environmental impacts, and it supports its environmental approach through its efforts to rationalize energy and natural resource consumption;

- The first hypothesis, which states that the environmental analysis approach in the studied institution is effective, is a correct hypothesis;

- The second hypothesis, which states that the institution under study effectively controls most of its environmental impacts, is also correct;

5-2 Study Recommendations

- The necessity for Algerian institutions to adopt modern administrative systems;

The institution under study should share its pioneering experience in adhering to modern systems locally and nationally.

- The institution under study should increase the financial efficiency of its training operations;

- The institution under study should find more stable ways to source its raw materials, as it relies on importing more than 90% of its raw materials;

- The necessity of reducing work pressure in the institution under study, as performance effectiveness does not mean focusing solely on work and neglecting the social and psychological needs of workers and employes.

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