

Review Article

Energy Production and Development Projects to achieve the Sustainable Development Goals “Case Study of the Arabian Gulf Oil Company”

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Abstract

This study aimed to highlight the importance of adopting developmental energy production projects based on supporting sustainable development in order to improve the environmental performance of the production operations of the Arabian Gulf Oil Company (AGOCO). The study reached several outcomes, the most important of which is that the sustainability strategy adopted by the Arabian Gulf Oil Company since its establishment, which is based on reconciling the increase in the performance capacity of these projects to ensure its distinction in terms of clean production in the markets. Increasing the performance capacity of these projects ensures their distinction in terms of clean production in the markets, in addition to achieving noticeable progress in protecting the environment and achieving sustainable development in it.

Keywords: Energy Production, Environmental Management System, Sustainable Development.

1. Introduction

Achieving sustainable development goals based on the optimal use of resources to preserve the share of future generations, while paying attention to environmental responsibility, has become the goal of all companies in the world because of its positive impact on workers and the surrounding community. Environmental protection is one of the main concerns of industrial organizations in general and oil and gas companies in particular, given that they are primarily responsible for environmental pollution as a result of their waste that is thrown into the natural environment or as a result of their products that negatively affect the environment during and/or after their use on the one hand [1]. In light of the international trend towards sustainable development and the requirements for achieving it, of which environmental responsibility is one of its most important dimensions, on the other hand [2].

In light of these circumstances, it has become necessary to integrate the environmental dimension into the strategy of these institutions to ensure their contribution to achieving the desired development, using methods that help in the most important part of which is energy production, which is an effective tool to raise the level of the organization's environmental and financial performance by reducing costs and improving environmental conditions at the same time, thus

achieving industrial progress and sustainable protection of the environment [3]. This study shed light on the method of energy production, development projects, and sustainable development by enhancing the efficiency of energy production as a tool for achieving efficiency in the use of economic resources, dealing with waste in general, reducing the emission of polluting gases to the environment, and demonstrating its role in supporting the environmental management system, and thus achieving sustainable development.

The aim of this study is to highlight the importance of adopting energy production, development projects and sustainable development in order to improve the environmental performance in the activity of the Arabian Gulf Oil Company and increase its contribution to achieving sustainable development through the company's administrative practice.

Basic Concepts

Many institutions are always seeking to improve the level of their environmental and financial performance in line with the dynamic changes in the markets, and in response to the pressures of international endeavors and agreements aimed at respecting environmental integrity and the responsibility to preserve the environment as a basis for achieving sustainable development, which has prompted them to adopt what is known as energy production, development

projects and sustainable development with the aim of reducing its costs and environmental preservation, which is one of the basic approaches to including the environmental dimension in production and operations management [4]. From this standpoint, this topic is devoted to identifying the definition of energy production, development projects and sustainable development, its characteristics, benefits, and application mechanisms. Energy production, development projects, and sustainable development are considered one of the main components of industry in various countries of the world due to the productive and environmental advantages it provides. It was proposed for the first time by the United Nations Environment Program (UNEP) in 1989 in response to demands to reduce pollution and industrial waste, and in order to achieve major goals centered around... Increasing awareness of the cleaner concept across the world, helping governments develop cleaner production programmes, facilitating its adoption and facilitating the transfer of clean technology [5]. There have been many definitions of cleaner production by researchers and organizations, as the United Nations Environmental Program defined it as: "the continuous application or practice of an integrated preventive environmental strategy in production processes, products and services to reduce risks to humans and the environment" (UNEP, 1999) [6]. As for production processes, energy production, development projects, and sustainable development include preserving raw materials and energy, getting rid of toxic materials, and reducing the amount and degree of danger of emissions and waste released during the production process.

As for products, energy production, development projects, and sustainable development focus on increasing the economic efficiency of using resources, and reducing risks related to waste and pollution, which would affect humans and the environment [7]. And its treatment during the life of the product, starting from the extraction of the raw materials necessary for its production and during use until the final disposal of the product (Arab Organization for Industrial Development and Mining, 2017), and with regard to services, the strategy focuses on integrating environmental considerations into the design and provision of services (UNEP, 1999) [8]. Energy production, development projects, and sustainable development are closely linked to environmental technology, which is a basic condition for its existence, as it is based on introducing technological changes that improve environmental performance by reducing pollutants in the production process through its development and identification of the necessary raw materials and energy used, as well as the use of low-cost innovations from In order to reduce waste and thus avoid processing it in the future [9].

Thus, this technology protects the environment by addressing the actual damage to the environment, such as removing pollution from the soil on the one hand [10]. As well as avoiding potential environmental damage on the other hand. It is clear to us from the above that energy production, development projects, and sustainable development are a method

of production that is based on preserving the environment from pollution and wasting its natural resources by addressing potential environmental problems at the source and not after they occur. Its adoption requires the availability of clean or environmental technology that ensures the reduction of negative environmental impacts [11].

Sustainable Development

The current environmental reality, characterized by the multiplicity and diversity of environmental problems (climate change, global warming, ozone layer depletion, etc...) has become a real threat to the life of living organisms, and one of the most important global problems that is receiving increasing attention, as many national, regional and international efforts have been made to pay attention to it. Environmental issues and environmental management aim to achieve optimal exploitation of resources and preserve the environment within the requirements of achieving sustainable development, and since economic institutions are the most important links in development with the various environmental impacts of their activities [12]. It has been concluded that it is necessary to include the environmental dimension within the administrations of these institutions, and thus environmental management systems have been developed concerned with controlling and directing the activities of these institutions in a way that allows them to achieve their economic goals while preserving the environment [13].

From this standpoint, this topic has been devoted to learning about the development of interest in environmental management. Definition and importance of the environmental management system, as well as its objectives and components, in accordance with the international standard for the environmental management system ISO 14001:2015 [14]. Official global interest in the environment began with the holding of a group of conferences that resulted in the issuance of resolutions [15]. In light of the continuing international efforts to protect the environment and integrate it into the pillars of achieving sustainable development, all countries have adopted policies capable of including it among their priorities and obligated their institutions - to varying degrees - to include it within their comprehensive management under the name of the environmental management system, which the International Organization for Environmental Standards and Metrology defined as: "a subsystem of The overall administrative system includes the organizational structure, planning activities, responsibilities, methods and techniques, processes and resources aimed at developing, implementing and improving environmental policies in the enterprise" [16].

The close complementary relationship between energy production, development projects, sustainable development, and the various stages of the environmental management system, starting from environmental policy to planning, implementation, and operation, all the way to the correction stage, can be illustrated through the following figure [17].

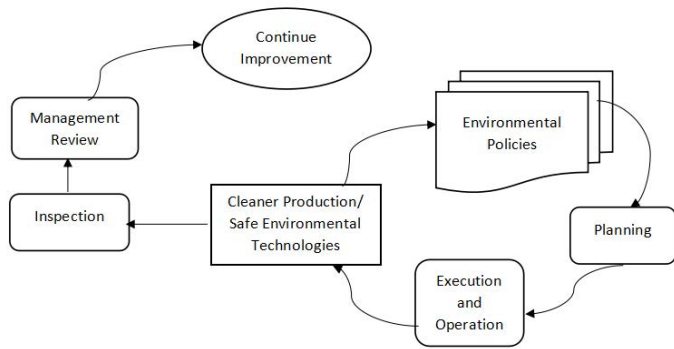


Figure 1: Integration of Energy Production, Development Projects, Sustainable Development and Environmental Management System.

Source: Al-Hajjar Salah, Saqr Dalia, Environmental and Technological Management System, first edition, Dar Al-Fikr Al-Arabi, Egypt, 2006, p. 118.

The experience of the Arabian Gulf Oil Company and the utilization of gas from the Messla and Sarir Oil fields: Messla and Sarir located in the eastern part of Libya, about 600 kilometers south of Benghazi, are the largest Oil fields in the Sirte Basin operated by the Arabian Gulf Oil Company (AGO-CO) its headquarters in Benghazi, a subsidiary of the state-owned National Oil Corporation (NOC). Stimulating efforts to reduce gas flaring and remove carbon from energy systems globally has become the main concern of many countries and international organizations. In this context, the oil industry is striving to reduce the carbon intensity of crude oil production to reduce upstream emissions, pressure is increasing on the Libyan state to reduce gas flaring of natural gas associated with the extraction of crude oil, which produces many pollutants, including methane and carbon dioxide, which are most responsible for the climate crisis [18].

The FlareIntel website explains a number of important facts, including:

- Carbon dioxide emissions from each production field
- The quantities of gas burned daily in cubic feet and annually in cubic metres
- The value of burned gas is \$/US annually
- The distance between the burning site and the nearest gas collection pipeline

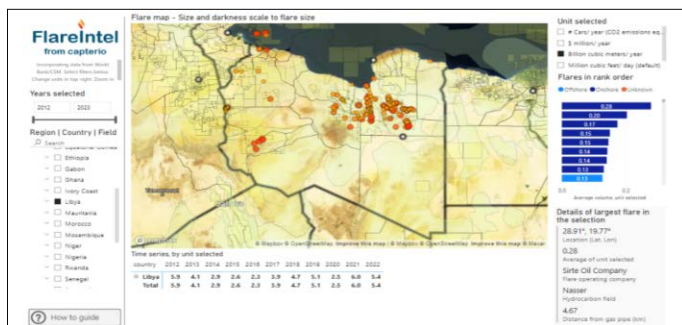


Figure 2: The Annual Quantities of Gas Burned In Libya in Cubic Metres.

Source: FlareIntel website to explore all gas flares around the world <https://flareintel.com/flareintel-t34gh8271>.

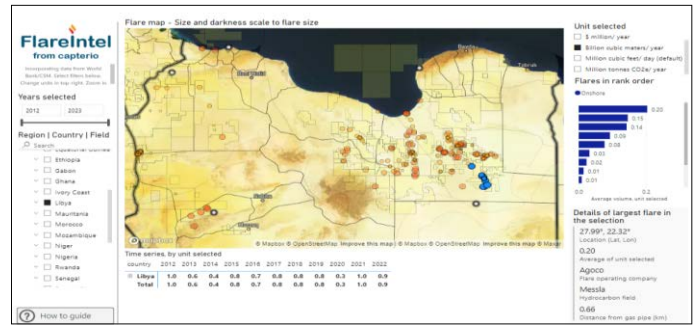


Figure 3: The Annual Quantities Of Gas Burned In Sarir And Messla Oil Fields In Cubic Metres.

Source: FlareIntel website to explore all gas flares around the world <https://flareintel.com/flareintel-t34gh8271>.

Therefore, the Arabian Gulf Oil Company adopted a comprehensive strategy to achieve sustainable development based on improving economic and social performance while preserving the environment. From this standpoint, the J-22 Gas Utilization Project was allocated to benefit from gas in the Messla and Sarir Oil fields to identify the content of the sustainability strategy, its foundations, and its results as follows:

Content of the sustainability strategy for the Sarir Gas Project

The strategy adopted by the Arabian Gulf Oil Company aims to achieve sustainable development by taking advantage of these gases that are currently being burned by collecting them and transporting them to feed the electric power production station, in which they are used as fuel with greater efficiency in gas turbines for electric generators belonging to the General Electricity Company.

Mechanisms taken to implement the sustainable development strategy: The Arabian Gulf Oil Company has taken several measures to implement its strategy, the most important measures summarized as follows:

- Raising production levels, developing performance and maintaining a clean environment by proposing the implementation of several projects called projects to increase production capacity. Initial studies and economic feasibility studies were conducted and budgets were allocated to begin implementing these projects in accordance with the latest technologies, technical standards and International Safety Standards (IAEA).
- The actual implementation of plans related to conducting technical studies on the uses of renewable energy within the adoption of a clean production method, which is characterized by innovation and the ability to adapt to variables, in addition to placing them within a time frame taking into account the future development of the sources, their discoveries, and their technologies.
- Gas Utilization Project J-22 in the Messla and Sarir Oil fields: the main aim of the project is to benefit from the produced associated gas that are burned at the Oil gathering center (GC's) stations, and increasing the production of condensate by directing the produced gas (34

million cubic feet per day) to the Qumra station, where it will be used as gas fuel for the 855MW Power Plant operated by the General Electricity Company of Libya (GECOL) located about 100 kilometers west of the Sarir field, and the hydrocarbon condensate (15,600 barrels per day) will be injected in the main Oil pipeline that is pumped to the export port at Hariga Port in the city of Tobruk.

In 2016, the project was launched, and construction work and installations began in late 2019, many works were carried out and new equipment was installed in packages that defined in the scope of works for each site:

- Package 1: Modifications to the gas processing plant and increasing the production of gas and condensate in Oil Gathering Center Station (GCS) No. 1 in the Sarir Oil field.
- Package 2: Gas supply to the Oil Gathering Center Station (GCS) No. 4 including installing addition gas compressor and flares package.
- Package 3: Gas supply to the Oil Gathering Center Stations (GCS) No. 2 and No. 3 including installing addition gas compressor in the Oil Gathering Center Station (GCS) No. 2 and the flares package.
- Package 4: Renewal of compressors at the Oil Gathering Center Station (GCS) No. 9 in Messla field.
- Package 5: Renewal of the ground-based flares system at the Sarir Oil field gas Gas Utilization plant.

Results achieved from the strategy implemented in the Messla and Sarir Gas Utilization project: The most important outcomes achieved as sustainable development indicators, can be summarized as follows.

- The J-22 gas utilization project is considered one of the most important projects to increase production capacity that the National Oil Corporation entrusted to Arabian Gulf Oil Company for follow-up and supervision.
- The J-22 gas utilization project, in addition to the gas arriving via the gas pipe line from Al-Waha Oil Company's Al-Faregh field, which is 200 km away, will supply the General Electricity Company of Libya (GECOL) Power Plant with enormous quantities of natural gas according to the required specifications, which will contribute to providing clean and more effective energy sources through replacing the heavy fuel currently used in industrial complexes, production units, and electric power generation stations with clean gas fuel, as well as reducing the hours of electrical load shedding with the entry of the GECOL Power Plant with its full production capacity into the Libyan national power grid.

From the above, we conclude that development energy production projects based on supporting sustainable development in order to improve the environmental performance of production processes allowed for optimal exploitation of available resources and reduced emissions of polluting gas-

es, which contributed to providing clean products of higher quality and lower cost, all of which are factors that contribute to achieving sustainable development.

2. Conclusion

The study concluded several findings, the most important of which are summarized as follows:

- Energy production, development projects, sustainable development, and the environmental management system are compatible in terms of the benefits and goals that both approaches seek to achieve. They also both focus on protecting the environment and reducing pollution through optimal exploitation of economic resources and energy sources, and adopting a premise of continuous improvement and the commitment of top management to implement the environmental laws and legislation, as well as building a culture of change in all operations.
- The environmental management system emerging from the efforts aimed at integrating the environmental dimension into the organization's operations is an administrative input that contributes to giving the organization a competitive advantage compared to its competitors, this is achieved through its positive repercussions on the organization's environmental performance, which in turn affects its comprehensive performance. In addition, this system confirms to adopt energy production, development projects, and sustainable development to achieve its goals.
- The energy production method, development projects, and sustainable development are all integrated with the environmental management system, as the latter includes administrative methods that can improve the environmental performance of the organization, and the clean production method focuses on the practical changes that must be made to the production system based on the use of clean technology.
- The experience of the Arabian Gulf Oil Company from the gas utilization project in Messla and Sarir Oil fields is considered one of the leading international experiences in this field through its formulation of a strategy aimed at achieving sustainable development based on improving economic performance while taking into account social responsibility and environmental protection, the implemented strategy included four main components: intergenerational justice, quality of life, social cohesion and international responsibility, in addition to adopting measures based on exploiting renewable energies as an alternative to polluting energies, and integrating the method of energy production, development projects, and sustainable development within its environmental management systems, which contributed to Improving the environmental performance of its institutions, providing clean green products to its residents, exporting them to international markets, as well as improving the services provided by its environmental systems, which contributes to achieving sustainable development.

