

**Implement cleaner production system to ensure clean oil environment
(Field study in Basrah Oil Company / Al-Burgesia Operations association)**

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Abstract

The research aims to detect the possibility of implementing the Cleaner Production System in the Iraqi Oil Company. Basra Petroleum Company was chosen as a field of study. The check list was distributed to Intended sample of the operation and environment engineers in the AlBargesia Operations association. The research reached a number of results. The weakness of the technical and administrative staff in the company to understand the concepts and practices of cleaner production and clean techniques and how to use them.

Keywords: cleaner production, clean technologies, clean and safe environment.

Introduction

Pollution from modern industry and agriculture in industrialized countries was the main driving force of concern for many industrialized and oil-producing countries, and on whose basis the United Nations organized its Conference on the Human Environment, held in Stockholm in 1972. This was one of a series of conferences sponsored by the United Nations, The United Nations, which addressed a variety of global issues in this area. During the latter half of the 1970s, the concept of technologies that were reduced or finally eliminated from waste emerged, which now shifted from a focus on pollution treatment to a focus on pollution prevention, This means provide room for improvement and development of clean production technologies and cleaner production with time, The ultimate ideal objective is to obtain technology that does not produce pollution at all, as if the production process begins and ends without the appearance of any accidental products that conflict with the target output of the process. This led to further consideration and to the verification of the need to take into account pollution resulting from the use of the product (Such as exhaust gases from the car). The verification needs to be addressed as well as technologies. The whole life cycle must be

extended from inputs and processes to complete products or (so-called cradle-to-edge analysis). Verification involves product design, production process, and management practices. The study examined the possibility of implementing cleaner production system in the Iraqi Oil Company, through the survey of the views of some of the engineers of production and the environment, as well as the views of some academicians concerned with the environment, in anticipation of access to some of the results and proposals that contribute to the clean environment of the Iraqi oil company.

The first topic : previous studies and research methodology.

First: Previous studies

The study [1] aimed at the identification of clean technology and cleaner production in relation to sustainable development and environmental requirements. The study concluded that the minimization of losses and losses of material and energy inputs from important environmental objectives does not lead to the development of sustainable technology and creativity Automatically reduce the overall environmental burden of industrial production, but technological innovation is an important factor and appears to play a pivotal role in cleaner production initiatives over the long term. [2] noted that (now it is no longer necessary to demonstrate that cleaner production can improve the performance of enterprises and projects, but rather the need to translate this fact into policies and projects commensurate with the capacity of target (economies and stakeholders) Clean-up for reduction in - Chemicals, - Water - Energy and other related state of work such as noise, odor and cleaner production, according to a proactive approach, its conclusion "Better prevention of treatment", The study of [3] confirmed that cleaner production received a huge boost after the known projects provided tangible evidence of the economic advantages of a set of simple low-cost procedures and considered pollution prevention as profitable policy for both sides., And noted to the transition from pollution disposal to pollution prevention, [4] Cleaner production plays a crucial role in influencing changes in consumption and production patterns. These changes are due to regulatory and voluntary initiatives. Cleaner production involves the pursuit of a more equitable society by defending consumer rights and promoting responsible and sustainable consumption by society, but the path to cleaner production is not without obstacles. Preventive

approach-based prevention is resistant to change. Another barrier involves preconceptions about the amount of investment and potential unknown risks, Despite these and other challenges, cleaner production is making progress,) [5] noted the development of process integration technology design tools aimed at reducing the operational and capital costs of chemical processes. The main focus of these tools was to identify energy conservation processes and practical waste reduction designs, And these tools have been successfully used for solutions to a large number of design problems, [6] explained that the application of cleaner production technologies and practices enables the production industry to reduce pollution and better manage the risks of pollution from waste and other byproducts, as well as helping to address other environmental issues including avoiding emissions and making a positive contribution In sustainable development in general, [7] presented the European Community's definition of clean technologies as the main objective of proactive strategies: describing them as any technical measures taken in various industries to reduce or eliminate any source of pollution or waste production, as well as assistance in the conservation of raw materials and natural resources, and Energy.

From the presentation of the previous studies, it is concluded that:

- ❖ Cleaner production concepts and technologies have become the focus of the departments of productive organizations seeking to ensure a cleaner and safer environment.
- ❖ The use of cleaner production technologies contributes to the elimination of waste and various types of waste , from inputs and energy to processes and products, thus saving costs and supporting sustainable economic development.
- ❖ This led many productive companies to develop policies and adopt projects that work to eliminate the causes of environmental damage, and ensure the achievement of the green environment.
- ❖ The concepts and objectives of cleaner production from disposal of environmental damage have tended to avoid environmental damage.
- ❖ Responding to the aspirations of the community to enjoy a green environment free from pollution of various kinds.
- ❖ In the oil operations environment, which has become a major source of pollution, cleaner

production technologies and strategies have become more needed.

- ❖ Despite the attention to the applications of cleaner production technologies and strategies in the oil industry, it sometimes faces the risk of investing in such technologies, and the fear of the emergence of some of the practices of resistance to change.

Second: Methodological Framework

- ❖ Purpose: To search for the possibility of implementing the cleaner production system in the environment of the Iraqi oil company in order to achieve a green oil environment (clean free from various kinds of pollution).
- ❖ The problem: Pollution control and improving environmental performance have become important issues facing the productive companies in general and the oil companies in particular, which led the administration to search for the best and cheapest methods to get rid of various kinds of pollution and environmental damage. Studies at the international level confirmed the positive and effective role of the Cleaner production system and clean technologies. In this topic, the research summarized its problem by the following question:

Is it possible to implement a cleaner production system in the environment of the Iraqi oil company?

- ❖ Objectives :

- Improving the environmental performance of the Iraqi oil company based on the implementation of cleaner production system.
- Detection of obstacles and difficulties in the implementation process.
- Detection of the possibilities that help to implement the system easier situation in the Iraqi company.
- Disclosure of the difference between clean technologies and cleaner production system.

- ❖ Importance:

- Scientific: directing the oil professional departments to pursue developments in the field of environment prevention.
- Economic: contributing to the reduction of the total costs of environmental performance by

improvement processes.

- ❖ Method and Methodology of the Study: The research followed the deductive approach in the theoretical aspect and the case study methodology on the field side, using the data collection under the list of the Profiting from Cleaner Production Checklists for Action.

The second topic: the theoretical approach to research.

The concept of cleaner production and its benefits: Pollution prevention is generally the fourth stage in the development of environmental management strategies (following the strategies of pollution disposal, control and recycling). Cleaner production has exceeded previous strategies by preventing and / or minimizing the generation of wastes and pollutants. Cleaner production preceded the sustainable development strategy, which emerged as an environmental management strategy, but can no longer be considered a purely environmental strategy, given its emphasis on integration rather than the balance between the goals of economic growth, social justice, environmental protection and resource [8], Cleaner production describes the transition between pollution prevention and sustainable development. Has gone beyond the concept of pollution prevention by explicitly retaining materials, energy and other natural resources, and by enhancing the value-added aspect of operations. It is not a concept of sustainable development, because it is not explicitly aimed at integrating social justice objectives). [9]

Cleaner production can be considered as a common denominator of the most frequently used preventive approaches. Old prevention approaches focused on waste minimization, pollution reduction and the use of toxic substances, but all tended to focus on one main environmental impact (hazardous wastes, toxic substances or pollution, respectively). Figure (1) illustrates the cleaner production relationship other environmental protection concepts.

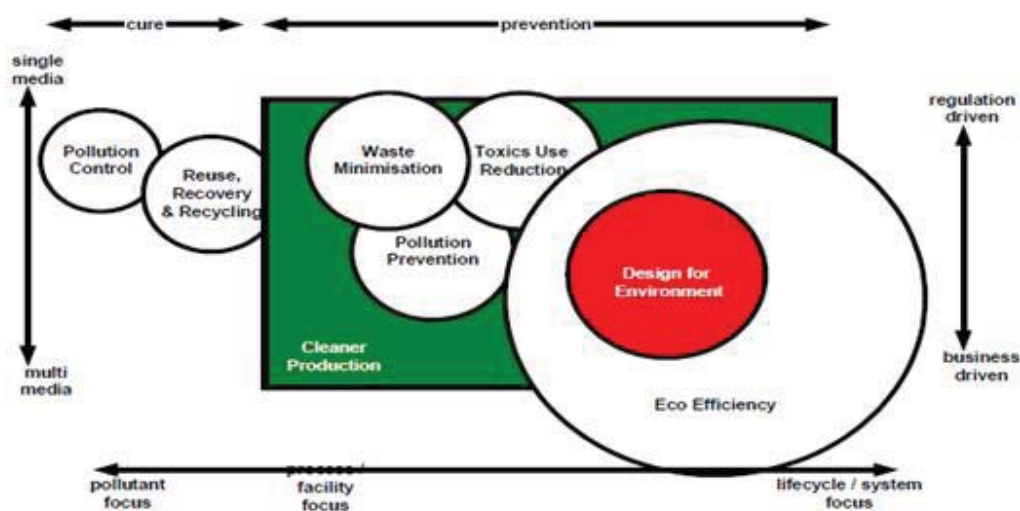


Fig. (1) Cleaner Production in relation to preventive environmental management concepts (modified from Van Berkel, 1997) [10]

The concept of cleaner production for the manufacturing industry began in the mid 1970's in response to the increasing complexity and rigor of environmental requirements. The world's leading manufacturing companies, especially those based in the United States, have begun to critically evaluate their approach to environmental issues. The concepts of "pollution prevention", "minimizing waste" and addressing challenges through the clarity of the most economical and more environmentally efficient means [11], defined the definitions of Cleaner Production from multiple views.

The environmental point of view: (The continuous application of an integrated preventive environmental strategy applied to processes, products and services to increase overall efficiency and reduce risks to humans and the environment), and the perspective of production processes: Cleaner production (including conservation of raw materials and energy, elimination of toxic raw materials, Emissions and waste before it leaves the process), and from the product point of view: (it is the strategy that focuses on reducing impacts throughout the entire product life cycle, from extraction of raw materials to final disposal of the product), and from the point of view of services: Environmental concerns in design and service delivery), and from the standpoint of position: (cleaner production requires changing

attitudes, responsible of environmental management and assessment of technology options).

This means:

That cleaner production extends beyond technical methods, expressing a comprehensive integrated vision that is not isolated or focused on only one aspect of the problem but rather emphasizes the continuity of work according to the best, and also focus on the social environment that contributes to generating the demand for this product, [12]

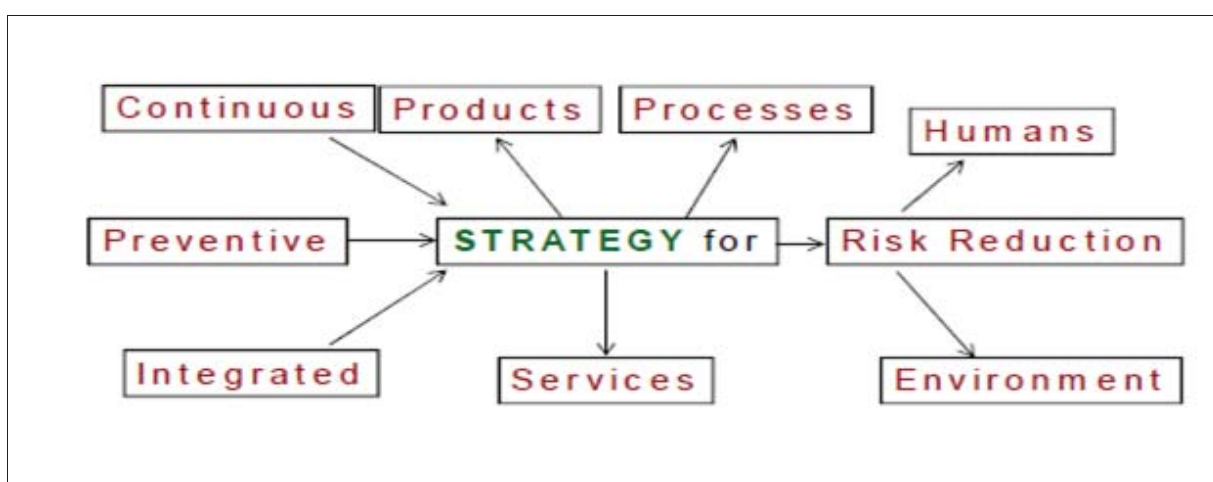


Fig. (2) Cleaner Production Definition

From the above diagram, four approaches to the definition of cleaner production are:

- Proactive approach: Potential Processing must prove that any substance or activity should not have harmful effects.
- Preventive approach: prevention of pollution from the source and not after the occurrence of pollution.
- The approach to control through democracy: that workers, consumers and all communities have access to information and participate in the decision-making process.
- Integrated and comprehensive approach: treatment of all materials as well as energy.

Cleaner production aims at increasing efficiency in the use of natural resources (raw materials, energy and water) , reducing waste generation and emissions at source. This can be achieved in different ways. Five preventive practices are the most common [13]:

- Product modification: Change product characteristics, such as shape and composition of

materials. The new product, for example, is the least polluting product. Changes in product packaging are considered.

- Replacement of inputs: the use of raw materials and less polluting substances, and the use of complementary processes (such as lubricants and refrigerants) that can provide a longer service.
- Modifications of technology: include, for example, improved process automation, maximizing process performance, re-equipment design, and process replacement.
- Good internal management: includes changes in operational procedures and management, to eliminate waste and emission sources. Examples include spilling prevention, better worker retention and training.
- On-site recycling: means the beneficial use of substances or contaminants resulting from the Company's operations. This can happen through reuse raw of materials, material recovery, or useful use.

The importance of cleaner production is reflected in great importance of environmental policy and management. It provides, in an environmental sense, concrete and long-term technology to remove and / or reduce emissions such as carbon dioxide and sulfur dioxide. It therefore plays an important role in addressing global environmental issues such as climate change, acid rain and urban smog. Economically, past experience has shown that the cleaner production program effectively helps to reduce the cost of avoiding environmental damage, and is more successful in addressing environmental damage than other environmental protection programs [14]. Cleaner production depends on the following [15]:

- Reduction Waste or Waste disposal : refers to all types of waste, including hazardous waste Solid, liquid, gaseous, and thermal waste, etc., the goal of cleaner production is to completely eliminate waste and exhaust.
- Non - polluting production: Ideal production processes, under the concept of cleaner production, are conducted in a closed loop down to zero pollutants.
- Energy efficiency: Cleaner production requires the highest levels of energy efficiency, and maintenance. Energy efficiency is determined by the highest share of energy consumed to produce the product, on the other hand, energy conservation refers to the reduction of energy use.

- **Safe and Healthy Work Environment:** Cleaner Production seeks to reduce workers' risk in order to make the working environment cleaner, safer and healthier.
- **Environmentally sound products:** The end product and all marketable secondary products should be environmentally appropriate as far as possible. Health and environmental factors must be addressed in or through use and disposal.
- **Environmentally sound packaging:** The packaging and packaging of the product should be minimized where possible. Although packaging is necessary to protect the product in order to market it.

Cleaner production benefits: The use of cleaner production has multiple benefits, organized according to the following:

Economic benefits: [16]

- **Reduction of expenditure on inputs, energy and water materials:** cleaner production options can reduce the consumption of materials, energy and / or water per unit of produced products, thus saving the costs of these natural resources;
- **Reducing expenses on waste treatment (water):** The quantity and load of waste is reduced from the different process streams, (Including solid waste, sewage and air emissions), thereby reducing waste treatment, waste disposal and emissions;
- **Increasing production revenues:** Cleaner production often increases the efficiency of production processes, resulting in higher production levels and thus increased revenues.
- **Best quality of products:** The application of cleaner production system improves the levels of all production processes, which in turn increases the overall quality of the product

The following are the benefits of cleaner production: [17].



Fig. (3) Benefits CP

Second:

cleaner production strategies and technologies and the obstacles to its implementation:

Cleaner production is a tool for the pollution prevention strategy that combines emission reduction and energy regeneration, an ongoing process involving technical factors as well as attitudes, incentives and other non-technical factors that companies use to improve industry performance of Environmental production cycles.

1- Cleaner production technologies: Various and diverse classifications of cleaner production technologies have been received as :

- ❖ Classification of [18] : Four types of technologies classified according to their general characteristics are:
 - Business-based technologies: advanced production systems, improved production and / or efficiency, improved competitiveness and reduced costs. These technologies improve environmental efficiency in the context of improved overall performance and are of high utility.
 - Clean technologies: fairly sophisticated production systems, developed and adopted for fundamental purpose of improving environmental performance.
 - Appropriate technologies: Simple production systems that improve environmental performance, but are primarily employed for economic development.

- Low-yield technologies: simple production systems that modify existing systems to improve environmental performance (heat recovery / recycling of waste using special furnaces in aluminum smelters).
- ❖ [19] classification: four types of clean technologies:
 - Replacement technologies and savings in inputs.
 - Pollution prevention and control technologies: to integrate the production process with new technology or a new type of equipment that makes it possible to reduce or treat pollutant emissions.
 - Internal recovery or recycling in the recovery, recycling or refurbishment of raw materials and / or materials, thereby reducing the pollutant emissions of the production process;
 - Clean and new radical process: It means choosing a new and clean process involving radical innovations, and contributing to the full adjustment of the production process.
- ❖ Cleaner production technologies have also been classified into the following :
 - auxiliary technology: which include all technologies supporting the monitoring and control of the existing production process and all logistics and technological infrastructure.
 - End-of-pipe technology: which can be defined as all technologies added at the end of existing processes to reduce the amount of environmentally harmful emissions.
 - Internal process technology for production: which includes improvement and application of existing technology, and changes within the practical devices are integrated from the current production steps.
 - New technology: which includes the principle of new production process or the design of a new technical plant.

Cleaner production technology can be summarized according to what was mentioned in two main groups:

Group 1: Proactive Technologies (Cleaner Production Technology): a technology that integrates with the production process as a comprehensive and prevents pollution or environmental damage. The Commission (EC) has considered the definition of cleaner production technologies as a key objective of proactive strategies: defined as technical measures in various industries to reduce or eliminate pollution and waste from the source at production,

as well as the conservation of raw materials, natural resources, energy, Clean techniques in processes and products make it possible to avoid or reduce emissions of pollutants from the source, as well as the use of raw materials, natural resources and energy. These technologies provide technological solutions that are likely to achieve environmental conservation on the long term . And the reduction of pollution produced during the production process from the source, these technologies integrate environmental issues into the entire production process, [20, 21], these technologies indicated to proactive approach to pollution prevention that contributes to sustainable production capacities when ecosystems and economies are unbalanced.

Group II: End-of-pipe technologies: - Also called clean technologies [22] have introduced the definition of end-of-pipe technologies: (end-of-pipe technologies) As add-on technologies that enable subsequent control of pollution, technologies that address pollution or environmental damage in part of the production process or in one of the sub-processes, and aim to prevent environmental damage after it occurs. Several authors referred to the conservative role of end-of- technology, has coincided with the reorientation The strategy towards less polluting species of processes. At the end of the production process, treatment technologies are another pattern of the old way of reducing waste, because they assume that waste can be separated from the production process .

The cleaner production system has characteristics that distinguish it from other clean technologies, including:

- 1- Preserving raw materials.
- 2- Optimization of production processes.
- 3- the rational use of raw materials.
- 4- The rational use of energy.
- 5- The rational use of waste.
- 6- Disposal of waste that is unavoidable or recycled.
- 7- Accident prevention.
- 8- Risk management to prevent major pollution.
- 9- Restore sites after stopping activities.

2- Cleaner production strategies: The successful application of a cleaner production system in enterprises depends on property management, maintenance, adequate infrastructure and training of people. The transfer of cleaner production practices should be achieved by:

- Technological capacity: Ability to adapt to clean technologies.
- Training capacity: the ability to train and educate cleaner production ideas for different groups of people.
- Institutional capacity: the ability to communicate and collaborate among different stakeholders.
- Government capacity: the ability to develop and implement policies in various policy areas.

Technological capacity is one of the most important ways to apply cleaner production. Environmental technology is usually associated with the design and analysis of complex and integrated management systems and sustainable development (Figure 4) [23, 24].

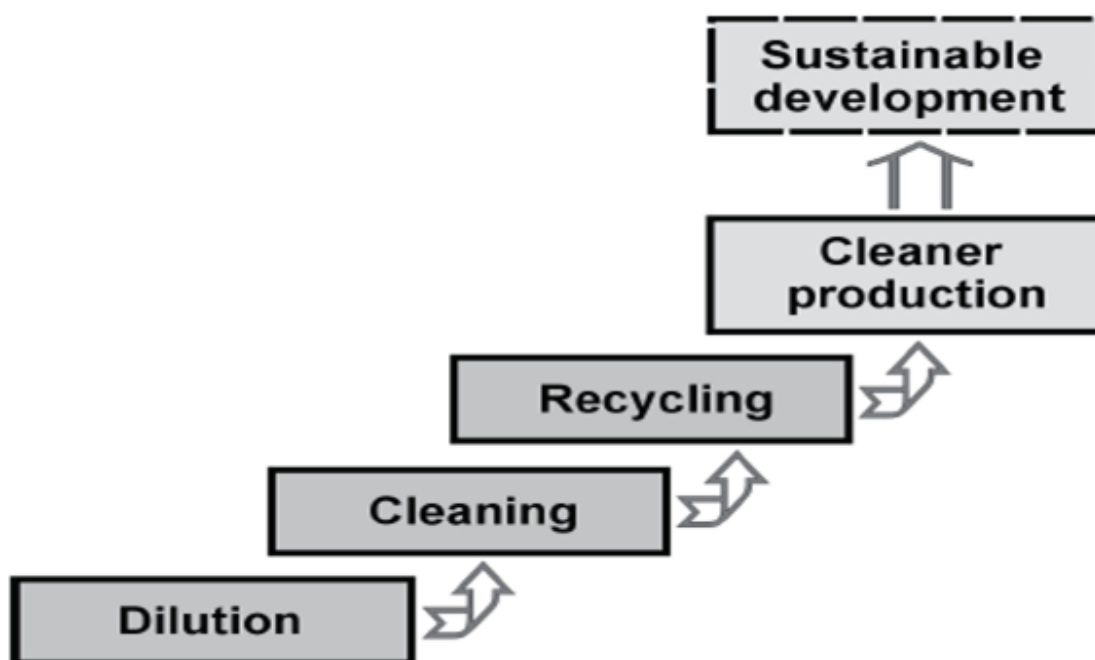


Fig. (4) Hierarchy of environmental problems solution (19-21)

Environmental strategies: They guide and lead the cleaner production system towards areas that

reduce environmental damage, or eliminate it completely, and have taken a rising path, depending on the type of damage and methods of treatment according to the following:

- Mitigation strategies: These are strategies aimed at mitigating environmental damage by using certain measures and technologies that reduce environmental damage resulting from production processes.
- Cleaning strategies: means the adoption of methods and practices that reduce the pollution caused by the operation of the production systems by: the separation of waste, and prevent the leakage of materials, scheduling production, and good hygiene of the workplace and equipment.
- Recycling strategies: strategies that address by - products by converting them to others that are usable in other areas.
- Cleaner production strategies: technical measures taken in various industries to reduce or eliminate pollution and waste from the source at production, as well as the retention of raw materials, natural resources and energy.

Strategies for sustainable development: These strategies are aimed at protecting environmental resources, preventing pollution and using existing resources in a way that does not affect the needs of future generations, thus achieving a balance between development and the environment, by integrating environmental considerations into economic activities, In light of the above, environmental strategies in relation to cleaner production have been summarized into two types, as follows:

- Proactive environmental strategies: (Cleaner Production strategies): strategies aimed at preventing generation of wastes or disposal of sources of environmental damage and are part of cleaner production strategies directed towards sustainable development. Combined: (good workplace measures, input replacement, best control process, equipment modification, technology change, product modification, efficient use of energy resources, site repair / reuse).



Fig. (5) Cleaner production strategies

Reactive environmental strategies: strategies that address some of the environmental damage resulting from processes, and each case (mitigation, cleaning, recycling) is often summarized under the heading "Treatment strategies at the end" production line (end-of-pipe strategies).

3- Obstacles to implementing cleaner production: Given the fundamental changes in the management perspective and culture as a result of the facts of development and the great concern for the environment and the requirements of its cleanliness and safety, the trend towards environmental systems and technologies, including the cleaner production system, may be faced with significant internal barriers to the adoption of production processes and practices Cleaner inside companies. As well as external barriers that may limit the Company's ability to change to work in accordance with the cleaner production system, in the light of its presentation by [25, 26, 27] The barriers that prevent the implementation of production in companies are generally summarized as follows: (resistance to change, lack of information and experience, lack of integrated internal communications system, lack of potential risk perception, access to clean technologies, system failure Accounting for the containment of benefit and cost accounts, difficulty in accessing external financing, failure to comply with Current legislation of implementation requirements, the possibility that the investment in the adjustment process is not effective for existing companies), yet the human nature of cleaner production system may help to overcome many of these difficulties.

Third:

The role of cleaner production in achieving the green oil environment or (clean and safe) Reducing waste, emissions and reductions in physical inputs and energy are the most important environmental objectives. Sustainable development and technological innovation do not automatically reduce the total environmental burden of industrial production. However, technological innovation is an important factor and appears to play a pivotal role in the initiation of cleaner production over the long term. The environmental improvement of corporate strategy through the application of the cleaner production concept associated with sustainable technologies leads to the production of environmentally friendly products and further strengthens the company's position in the market. Cleaner products must be given a stronger meaning in the future because of the necessary transition to sustainable economy and development. Is a major goal in environmental science and plays a key role in the growth of global economies. Therefore, modern manufacturing companies and oil companies should apply technologies designed to reduce pollution and use limited resources. These technologies tend to improve the global environment and human life. The mission of the Environmental Program is to promote reliable, affordable and secure supply of domestic oil and clean natural gas, through the provision of effective environmental technologies and the promotion of environmental protection during oil and gas production processes, and to facilitate the development and use of environmental regulatory frameworks based on environmental risks, Many cases of emission and leakage, as well as accidental products that may cause various environmental damage, so leave things the same, or the adoption of some simple treatments or that do not meet the purpose may be the cause of the survival of the polluted environment Insecure, the company and the exposure of environmental accountability, However, root remediation of environmental causes using clean technologies and a cleaner production system may result in a clean and safe (green) oil environment that will have economic and social benefits for the company.

The third topic: The field study:

First: Presentation and analysis of data (Statistical description): The statistical description for the purposes of data analysis includes two methods complementary to each other, statistical charts, and percentages as shown:

- 1- **Obstacles:** Are there any difficulties in implementing the cleaner production system in the Iraqi oil environment?

Table (1) Obstacles

first	Dimension and its main components	the description	Approval%		Discussion	The result
			no	yes		
	Obstacles	Limitations that Limit Implementation of cleaner production.	29.2	70.8	The company lacks Studies and information Which helps to Advance knowledge of Benefits and costs of Modern technologies	Constraints are Relatively weak
	Cost requirement	Calculation of investment costs of cleaner production	35	65		
	2 - Environment	The determinants of the environment prevent by Cleaner production	23.3	76.7		Relatively strong
						strong

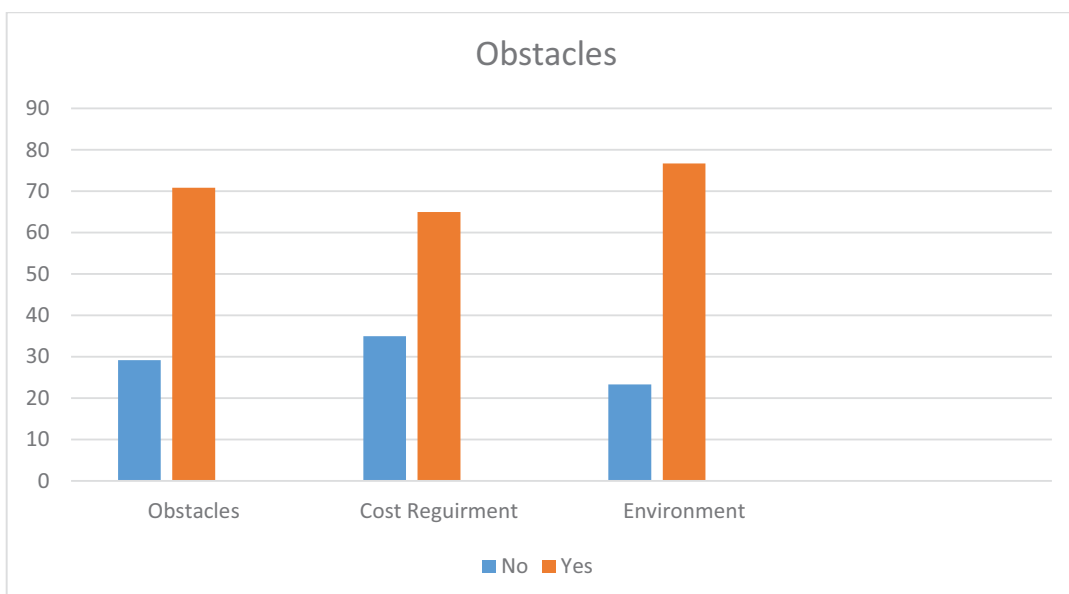


Fig. (6) Obstacles

From previous table (1) and the chart in figure (6), emergence of some obstacles to the implementation of cleaner production system, but they are weak and have little impact on the implementation process.

2 - Implementation of cleaner production: Is it possible to implementing a cleaner production system in the environment of the Iraqi oil company?

Table (2) Implementation of cleaner production

second	Implementation of cleaner production	Methods and requirements of for implementation Cleaner production.	47	53	Interest is relatively strong
		Company perspective of Cleaner production	25	75	The attention is strong
	1. Position from Cleaner production	Effect of cleaner production in Operations	43	57	Interest is relatively strong
	2 - Operational processes	Document activity accounts	63	37	Attention is weak
	3 - Accounting And registration	Implementation of cleaner production. Specify execution options Choose the best way	56	44	Attention is weak
	4. methods for implementation				

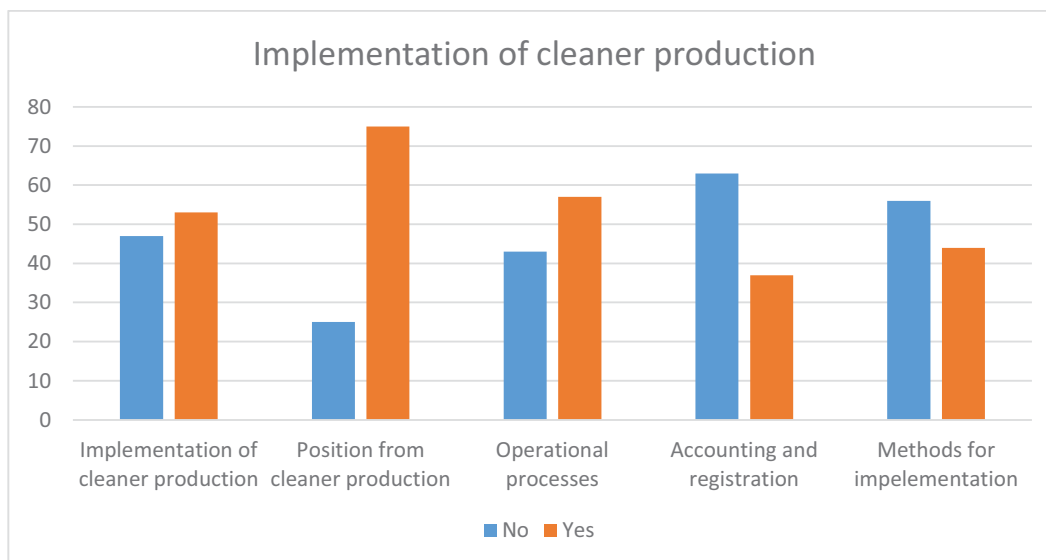


Fig. (7) Implementation of cleaner production

From the table (2) and the previous chart in figure (7), Appearance of Relatively strong in the company in providing methods and requirements for implementing cleaner production system, this need Relatively strong interest to success implement of cleaner production system.

3- Strategies and capacity – building: Does the use of the cleaner production system need strategies capacity building?

Table (3) Strategies and capacity-building

third	Strategies and capacity-building	Methods that encourage Investment in Cleaner production and provide technical and administrative staff.	69	31	The company lacks long-term plans Concerns with the environment and methods of dealing with environmental damage Which has greatly reduced the need in environmental technologies	Attention is weak
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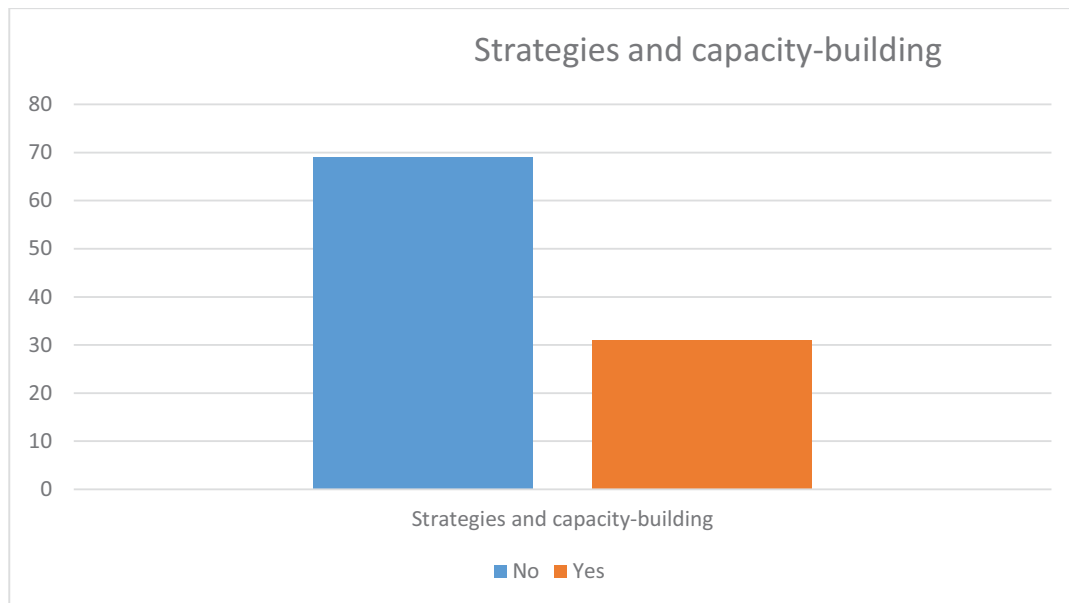


Fig. (8) Strategies and capacity-building

From the table (3) and the previous chart in figure (8), appears need to Methods that encourage Investment in Cleaner production and provide technical and administrative staff, this contributes in part to the possibility of implementing cleaner production system in the Iraqi Oil Company

4- Financing options

Table (4) Financing options

fourth	Financing options	How it is on · Base selection options Finance.			Hard Economic situation of country did not Encourages the use of internal financing, and weak pursuit of Change in the global economy May weaken the ability \ To go towards foreign investment In the field of processing Environmental pollution .	
	1. Internal financing	Funding from within the country.	67	33		Weak attention
	2. External financing	Outsourcing External financing (Foreign Direct investment)	58	42	Weak attention	

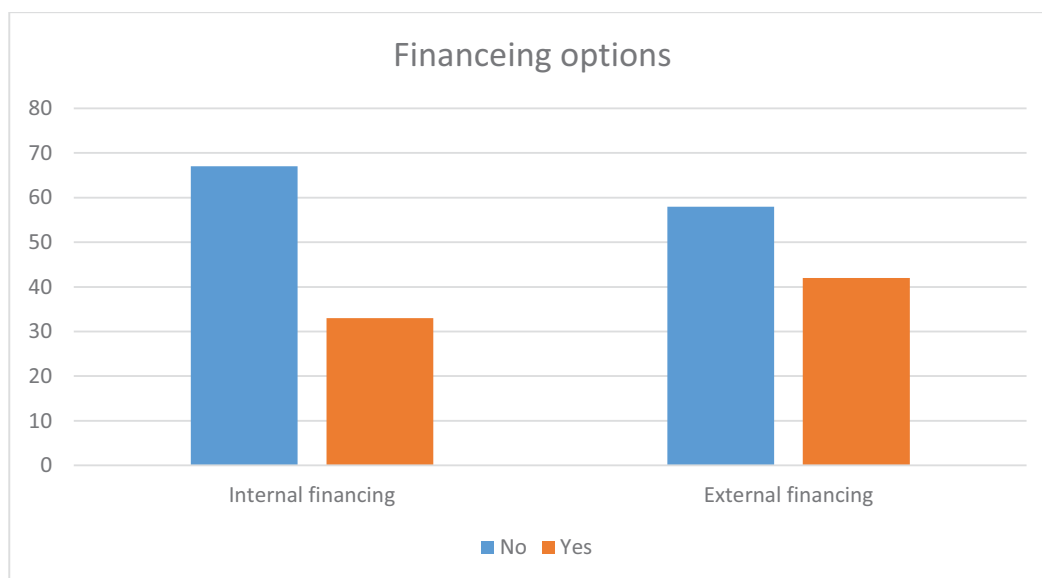


Fig. (9) Financing options

Hard Economic situation of country did not Encourages the use of internal financing, and weak pursuit of Change in the global economy May weaken the ability to go towards foreign investment in the field of processing Environmental pollution.

The above analysis indicates the possibility of implementing the cleaner production system in the Iraqi companies in the case of: (1) understanding of the benefits of cleaner production and

its costs; (2) clear knowledge that cleaner production is a human strategy based on the knowledge and skills of those responsible for its implementation.

Conclusions:

The following conclusions are drawn from the presentation and discussion:

- 1- The need to distinguish between cleaner production (comprehensive treatment of sources of environmental damage) and clean technologies (individual treatment for each case of environmental damage after emergence).
- 2- The need to distinguish between end-of-pipe technology and cleaner production techniques.
- 3- Cleaner production techniques are concerned with preventing environmental damage through the overall production process.
- 4- More attention to the company with some pollution control practices and in specific places and situations.
- 5 - The company still needs to provide and control the requirements for comprehensive treatment of environmental damage resulting from oil operations.
- 6- The Company's need for a strategic plan to develop the knowledge and skills of the technical staff on avoiding any potential environmental damage.
- 7- weak understanding of the technical and administrative staff in the company concepts and practices of cleaner production and clean techniques and how to use them.
- 8- weak management attention to the company requirements for finance activities that contribute to a clean and safe environment.
- 9- clarity of the desire of the company's management and technical staff to clean the environment and avoid sources of pollution, but it lacks the plans and options required by the implementation process.
- 10- The attention of the technical and environmental staff in the company activities pollution control after the occurrence and in place.
- 11- Weakness in some procedures for documentation of environmental activities, especially with respect to the activity evaluation and the costs involved.
- 12- The company lacks studies that are concerned with the diagnosis of environmental problems, alternatives to treatment, and criteria for evaluating the alternatives to choose the best

alternative.

- 13- The company lacks the development of strategic plans based on the results of studies to develop comprehensive treatments for the expected effects of the environment.
- 14- The difficult economic situation in the country is an important constraint in preventing the diversion of domestic sources of financing to environmental pollution prevention strategies.
- 15- The company lacks sound studies that help in the diagnosis and precise identification of sources of external financing of modern systems and technologies that contribute to the formation of a green oil environment.

References

1. R. Nowosielski, R. Babilas*, W. Pilarczyk; Sustainable technology as a basis of cleaner production; journal of Achievements in Materials and Manufacturing Engineering, Volume 20 Issues 1-2 January-February 2007.
2. Beverley Thorpe; Clean Production Strategies: What is clean production? June 2009: 2 (www.cleanproduction.org).
3. Osama A El- Kholy; Cleaner Production; John Wiley & Sons, Ltd, 2002.
4. Jacqueline Aloisi de Larderel et al, 2002 UNEP ; Industry and Environment ; July – December 2002.
5. Russell F Dunn1* and Mahmoud M El-Halwagi2; Review Process integration technology review: background and applications in the chemical process industry; *Journal of Chemical Technology and Biotechnology*, Society of Chemical Industry, 2003 : 1 - 23
6. Rene Van Berkel; Cleaner Production for Process Industries; Plenary Lecture- CHEMECA 2000
7. A. B. Koltuniewicz and E. Drioli; Membranes in Clean Technologies. Theory and Practice; 2008
8. Rowledge et al, 1999 / Rowledge, L.R., Barton, R.S. & Brady, K.S. (1999) *Mapping the Journey –Case Studies in Strategy and Action Toward Sustainable Development*, Sheffield, Greenleaf Publishing.
9. Rene Van Berkel; Cleaner Production for Process Industries; Plenary Lecture- CHEMECA 2000
10. (Van Berkel, R), *New Horizons in Cleaner Production: a discussion notes on forging new alliances for the development and transfer of Cleaner Production technologies and for financing their uptake in industry in developing countries*, Conference Paper at *UNEP Invitational Expert Meeting on New Horizons in Cleaner Production*, Trolleholm (Sweden), October 22-24, 1997.
11. Rene Van Berkel; Cleaner Production for Process Industries; Plenary Lecture- CHEMECA 2000 : 2.
12. (A) (Osama A El- Kholy; Cleaner Production; John Wiley & Sons, Ltd, 2002.
13. B - Skudai, Johor; INTRODUCTION TO CLEANER PRODUCTION ; UTM Module on Introduction to Cleaner Production : 8 - 9
14. USEPA (1992) *Facility Pollution Prevention Planning Guide*, United States Environmental

Protection Agency, Cincinnati, EPA 600/R92/088.

15. (USEPA , opcit : 7)
16. Skudai, Johor; INTRODUCTION TO CLEANER PRODUCTION ; UTM Module on Introduction to Cleaner Production , : 10 - 11
17. (Rene Van Berkel, 2000 , opict : 8
18. Skudai, Johor; INTRODUCTION TO CLEANER PRODUCTION ; UTM Module on Introduction to Cleaner Production : 14
19. A. B. Koltuniewicz and E. Drioli; Membranes in Clean Technologies. Theory and Practice; 2008
20. Belis – Bergouignan, M.-C., Oltra, V. and Saint Jean, M.; Trajectories towards clean technology: example of volatile organic compound emission reductions; Ecol. Econ ., 2004 : 48, 201–220
21. Van Weenen, J. (1995) Towards sustainable product development. J. Cleaner Prod., 3 (1/2) : 55
21 -Baas, L., Hofman, et al., 1990 / (Baas, L) Cleaner Production: beyond projects. J. Cleaner Prod., (1995, 3 (1/2), 55-59.
22. Fukasaku, Y., Stimuler innovation environmental, STI Revue. Numéro Spécial Le Développement Soutenable, 2000: 25, 52–70
23. R. Nowosielski, R. Babilas*, W. Pilarczyk; Sustainable technology as a basis of cleaner production; journal of Achievements in Materials and Manufacturing Engineering, VOLUME 20 ISSUES 1-2 January-February 2007.
24. Fukasaku et al, 1998 / Faucheux, S. and Nicolaý, I. Les firmes face au Développement soutenable: changement technologies governance au sein de la dynamique industrielle Revue d'Econom, (1998).
25. Neil Gunning ham & Darren Sinclair; BARRIERS AND MOTIVATORS TO THE ADOPTION OF CLEANER PRODUCTION PRACTICES; ACEL FINAL REPORT, 1997: 9 - 25
26. G. Hilson, 2000 / G. Hilson; Barriers to Implmenting Cleaner Technologies and Cleaner Production (CP) Practices in the Mining Industry: A Case Study of the Americas; Minerals Engineering, Vol. 13, No. 7, 2000: 699-717.
27. Ellen H. M. Moorsa, Karel F. Mulderb, Philip J. Vergragt ; Towards cleaner production: barriers and strategies in the base metals producing industry ; Journal of Cleaner Production 13 (2005) : 665.