



## Analysis of the Implementation of EMS ISO 14001:2015 Based on the Global Environmental Management Initiative at PT Pertamina Hulu Rokan Zone I Pangkalan Susu Field

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### Abstract

This research aims to analyze the implementation of the ISO 14001:2015 Environmental Management System at PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field using the Global Environmental Management Initiative (GEMI) method. Evaluation was carried out using the GEMI checklist which includes the 7 main clauses of ISO 14001:2015 and GAP analysis. Data collection was carried out for 1 month through observation, interviews and assessments. The research results show that the implementation of the environmental management system in companies reached an average of 85.9%, with details: organizational context clause (85%), leadership (89.4%), planning (84.2%), support (78, 9%), operations (88.4%), performance evaluation (86.7%), and improvement (88.8%). Overall, the implementation of the environmental management system at PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field is included in the good category, although there are still several aspects that require improvement, especially the support clause which received the lowest score.

Keywords: ISO clause, ISO 14001:2015, GEMI

### Introduction

Various organizations are increasingly increasing their concern for achieving and demonstrating good environmental performance through controlling environmental impacts related to the activities, products and services of the organization concerned, consistent with statutory and regulatory policies, developing economic policies and other tools that encourage environmental protection, and increase awareness of interested parties towards the environment and sustainable development. One of the standards related to the environment and a benchmark for stakeholders to maintain competitiveness is ISO 14000:2015. In connection with environmental management systems, ISO publishes a standardization regarding environmental management systems known as ISO 14001:2015 which is part of an organizational management system used to develop and implement policies regarding the environment and also as a guide for organizations in managing their environmental aspects.

In research conducted by Hilman M S and Kristiningrum E on 12 companies that have received ISO 14001:2015 certificates, there are several reasons for implementing ISO 14001:2015, the most important reasons are to improve the company's image, increase employee participation, reduce environmental pollution, increase market share and consumer demands. The research results show that by implementing ISO 14001:2015, the company experienced a reduction in environmental pollution (20%). Implementation of ISO 14001 provides a way to systematically identify and manage environmental risks and liabilities, thereby reducing public complaints (20%).

PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field is a company engaged in oil and gas management. To implement a good environmental management system, it is necessary to have a standard that explains the system. The International Standard ISO 14001:2015 is a tool to guarantee the performance of the environmental management system. The International Standard ISO 14001:2015 emerged as a result of several environmental issues that are often discussed. These issues are air pollution, water pollution, land pollution, waste and hazardous materials, sound/noise and vibration, radiation, physical planning, use of materials/materials, energy use and employee safety and health.

The success of implementing ISO 14001:2015 is obtaining ISO 14001:2015 certification which is proof that the company has implemented this standard. Therefore, it is necessary to carry out an evaluation to find out how the environmental management performance of PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field currently is, whether it is in accordance with the principles of ISO 14001:2015.

Based on the problems above, researchers conducted research entitled "Analysis of the Implementation of the ISO 14001:2015 Environmental Management System Based on the Global Environmental Management Initiative (GEMI) at PT

Pertamina Hulu Rokan Zone I Pangkalan Susu Field".

## Literature Review

- 2.1 ISO 14001:2015 Environmental Management System  
ISO 14001:2015 Environmental Management System (EMS) is an international standard that provides a framework for organizations to protect the environment and respond to changing environmental conditions while balancing socio-economic needs (ISO 14001, 2015). This standard provides specific requirements that enable an organization to achieve the expected results from its environmental management system.
- 2.2 Benefits of Implementing ISO 14001:2015  
Several studies have shown significant benefits from implementing ISO 14001:2015. According to Hilman and Kristiningrum's research on 12 ISO 14001:2015 certified companies, implementation of this standard resulted in:
  - a. Reduction of environmental pollution by 20%
  - b. Reduced public complaints by 20%
  - c. Improved company image
  - d. Increased employee participation
  - e. Increased market share
- 2.3 Global Environmental Management Initiative (GEMI)  
GEMI is an evaluation method that uses a quantitative assessment system to measure the level of implementation of the environmental management system. This method uses a checklist that includes 7 main clauses of ISO 14001:2015 with a rating scale of 0-2, where:  
Value 0: no implementation yet  
Value 1: partial implementation  
Grade 2: full implementation
- 2.4 GAP Analysis in Environmental Management System Evaluation  
GAP Analysis is a method used to identify gaps between actual performance and established standards. In the context of an environmental management system, this analysis helps organizations to:
  - a. Identify areas that need improvement
  - b. Determining development priorities
  - c. Plan necessary corrective actions
  - d. Measuring the effectiveness of system implementation
- 2.5 Clauses of ISO 14001:2015  
The ISO 14001:2015 standard consists of 7 main clauses:
  - a. Organizational Context  
Understand the organization and its context, as well as the needs and expectations of interested parties
  - b. Leadership  
Management commitment, environmental policy and organizational responsibility
  - c. Planning  
Identification of risks and opportunities, environmental aspects, and action planning
  - d. Support  
Resources, competencies, awareness, communication and information are documented
  - e. Operation  
Operational planning and control
  - f. Performance Evaluation  
Monitoring, measurement, analysis and evaluation
  - g. Improvement  
Nonconformities and corrective actions

## Materials & Methods

Research activities were carried out for 1 month starting from observations, interviews, to assessments at PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field.

- 3.1 Variable Identification:  
The variables in this research include the implementation of the 7 clauses in the ISO14001:2015 standard at PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field.
- 3.2 GEMI Models:  
This method is based on GEMI (Global Environmental Management Initiative) checklist questions and uses 7 clauses, namely organizational context, leadership, planning, support, operations, performance evaluation and continuous improvement. Each question has an answer range of 0-2, where a value of 0 is a value that the company has not implemented at all until a value of 2 is a company that has implemented it completely (GEMI – GEMI ISO 14001:2015 Self-Assessment Checklist, 2015).  
The GEMI method is a quantitative scoring method which aims to find out where improvements need to be made, making it easier for researchers to find the root causes of environmental aspects in a company to be studied.
- 3.3 GAP Analysis Model:  
This method connects the results of the self-assessment with an interval table assessing the level of differences in

the implementation of the Environmental Management system. GAP Analysis in the Corporate sector is used as an assessment method that makes it easier for companies to benchmark ongoing performance and set standards. So, companies can analyze which divisions, clauses or performance require improvement and development. GAP Analysis is useful for analyzing gaps at the planning level and in the evaluation stages of achieved capabilities or competencies

**Tabel 3.1** Score Checklist Criteria

Score	Description
0	The organization has not met the requirements
1	The organization has partially fulfilled the requirements
2	The organization has fully met the requirements

**Tabel 3.2** Distribution of Fulfillment Level Categories

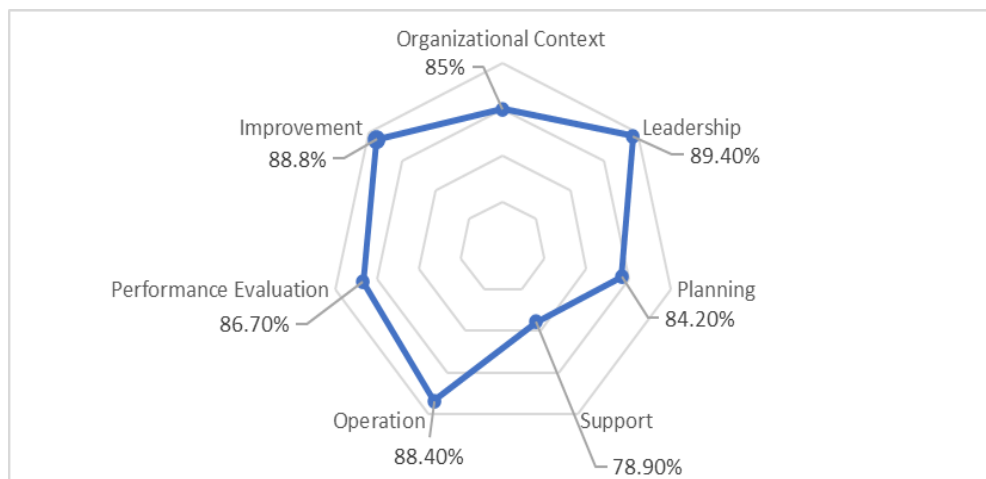
Nilai Score	Fulfillment Rate
1-75	Bad
76-151	Currently
152-208	Good

**Tabel 3.3** ISO 14001:2015 Dimension Classification

Dimensions of Sustainability	Percentage of Implementation
The sustainability dimension is less	0-59 %
Good sustainability dimensions	60-84 %
Sustainability dimensions are satisfactory	85-100 %

## Results and Discussion

Based on results of data collection collected interviews and checklist is known that overall performance of Pertamina Rokan Zone 1 Pangkalan Field has



the through a guide, it the PT Hulu Susu shown

that it has a good sustainability category. This performance is diagrammatically shown in the following figure:

**Picture 1.** GEMI Assessment

### 4.1 Organizational Context Clause Analysis

Based on the results of observations at PT. Pertamina Hulu Rokan Zone 1 Field Pangkalan Susu, the total score

generated for the organizational context clause is 85% or included in the satisfactory category. This shows that this organization has created written procedures or documentation regarding the organizational context and understanding of interested parties, written procedures or documentation regarding the scope of the environmental management system, and how the company implements the scope of the environmental management system on all matters related to the company's activities.

#### 4.2 Leadership Clause Analysis

Based on the results of observations made at PT. Pertamina Hulu Rokan Zone 1 Field Pangkalan Susu, the total score generated for the leadership clause was 89.4% or included in the satisfactory category. This shows that the company has demonstrated good leadership as regulated in the PT documents. Pertamina Hulu Rokan Zone 1 Field Pangkalan Susu contains the creation of safety, occupational health, environment and quality (K3LM) policies and has been signed by top management and communicated to all employees.

#### 4.3 Planning Clause Analysis

Based on the results of observations at PT. Pertamina Hulu Rokan Zone 1 Field Pangkalan Susu, the total score generated for the planning clause was 84.2% or included in the satisfactory category. It explains that the company has made progress in identifying most environmental aspects, as well as legal requirements and environmental monitoring carried out according to procedures. Companies may have established several environmental management programs designed to achieve goals and targets.

#### 4.4 Support Clause Analysis

Based on the results of observations made by PT. Pertamina Hulu Rokan Zone 1 Field Pangkalan Susu, the total score generated for the support clause was 78.9% or included in the good category. This explains that this company has procedures related to human resources and the company also understands the need for personnel competency to carry out work.

#### 4.5 Operating Clause Analysis

Based on the results of observations at PT. Pertamina Hulu Rokan Zone 1 Field Pangkalan Susu, the total score generated for the operations clause was 88.4% or included in the satisfactory category. This explains that this company already has many procedures to achieve its policy goals and targets.

#### 4.6 Performance Evaluation Clause Analysis

Based on the results of observations at PT. Pertamina Hulu Rokan Zone 1 Field Pangkalan Susu, the total score generated for the performance evaluation clause was 86.7% or included in the satisfactory category. This explains that the company quite often checks the performance of the EMS and existing component elements on a regular schedule. So that non-conforming areas can be adequately identified, as a result, corrective or preventive actions can be effectively taken.

#### 4.7 Analysis of Enhancement Clauses

Based on the results of observations at PT. Pertamina Hulu Rokan Zone 1 Field Pangkalan Susu, the total score generated for the improvement clause was 88.8% or included in the satisfactory category. This explains that this company has followed up on complaints or non-conformities by investigating the problem and making improvements according to the impact of the problem, as well as corrective actions for problems determined based on existing non-conformity procedures, namely reviewing the effectiveness of the corrective actions taken.

#### 4.8 Recommendations for Improvement

Recommendations for improvement are researchers' efforts to provide solutions to problems that have been identified so that they can help to achieve goals and objectives. The recommendations for improvement are as follows:

#### 4.9 Recommendations for Improvements to the Organizational Context Clause

The score for this principle is 0–20. The total score generated for the organizational context clause is 17. This explains that this organization has an organizational context that meets the standards, but not all. This organization has clear policies and commitments regarding the environment, meaning that the organization's environmental policies have been partially documented and communicated to all employees and the public. The organization's environmental policy does include a commitment to continuous improvement and prevention of pollution. It is clear whether the policy is in accordance with the nature, scale and impact of the company's current environment, but not all of it meets the standard requirements. In accordance with the results of observations using a checklist instrument, recommendations for improvements that are appropriate for PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field in the organizational context are as follows:

- a. Top management should establish and document an environmental policy that meets most of the standard requirements.
- b. Comply with or better the requirements of applicable laws and regulations and other requirements followed by the company related to its environmental aspects, reflecting the nature, scale and environmental impact of the company's activities.
- c. Prevent pollution and achieve sustainable improvement through the development of environmental performance evaluation procedures and related indicators that take into account environmental aspects.

#### 4.10 Recommendations for Improvements to the Leadership Clause

The score for this principle is 0–38. The total score generated for the leadership context is 34. This explains that this organization has leadership that meets standards. The company has leadership matters regulated in the PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field document as well as a clear description of the company's

organizational structure. In accordance with the results of observations using a checklist, the recommendations for improvement for this clause are as follows:

- a. There is a need to increase communication between employees by holding environmental management system training programs for new and existing employees.
- b. Publication of environmental policies that can serve as a reminder for all employees, including on the official website of PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field.

4.11 Recommendations for Improvements to the Planning Clause

The score for this principle is 0 – 38. The resulting total score for the planning clause is 32. This indicates that the organization has made progress in identifying most environmental aspects as well as legal requirements, and may have established several environmental management programs designed to achieve goals and targets, but there is still much improvement needed. Based on the observation results, recommendations for improvements that can be made are:

- a. Identifying the extent of employee knowledge regarding the importance of environmental aspects and increasing this knowledge from the activities carried out.
- b. A specific or detailed explanation of the role of responsibility, goals, objectives and time period in environmental management.

4.12 Recommendations for Improvements to the Support Clause

The score for this principle is 0–38. The total score generated for the support clause is 30. This explains that this organization has many procedures to achieve policy goals and targets that already exist, such as the company having SOPs related to human resources, personnel competency requirements in a job, a list of training needs based on activities or work. And the company has held training on the environment and notifications about K3LM policies. However, the company has not yet made ISO 14001:2015 training mandatory training as a basic knowledge that must be obtained by all workers and to increase communication between or within each department. Recommended improvements that can be made are:

- a. Making ISO14001:2015 training mandatory as a basis for all employees.
- b. Improve communication between each department.

4.13 Recommendations for Improvements to the Operating Clause

The score for this principle is 0–26. The total score generated for the operations clause is 23. This explains that this organization has many procedures to achieve policy objectives and targets already exist. Responsibility and accountability for implementation have been established for most, but not all of the required resource requirements have been provided. Overall, the company has procedures, documentation, communication about the Environmental Management System, and control inspections or routine audits according to a predetermined parameter checklist. So as to minimize any incompatibilities during system operation. The results of field observations indicate the need for:

- a. Training programs that reflect the responsibilities specified in the environmental management system and take into account participants' understanding and knowledge of the subject matter.
- b. Invite all employees to maintain the procedures required by ISO 14001:2015.
- c. Emergency preparedness and response is the responsibility of each organization to determine what is appropriate for the organization's needs.
- d. Improved communication between each department.

4.14 Recommendations for Improvements to the Performance Evaluation Clause

The score for this principle is 0–30. The total score generated for the performance evaluation clause is 26. This explains that the organization already has procedures in place to check the performance of its Environmental Management System and its component elements. The company has procedures related to internal audits and has a written environmental audit program schedule. Internal audits have also been documented in the form of audit reports and audit records, and audit results have been evaluated and verified. In accordance with the results of observations using a checklist, as for recommendations for improvements according to PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field, the company should review the things that are still lacking periodically. Such as conveying the results of internal and external audits to all employees so that employees also remain aware of the progress of a company.

4.15 Recommendations for Improvements to the Enhancement Clause

The score for this principle is 0–18. The total score generated for the Improvement principle is 16. This explains that this company already has many procedures to achieve its policy goals and targets. The company already has relevant procedures regarding non-conformance and corrective action. The company also follows up on non-conformities and investigates problems and makes improvements according to the impact of the problem. The appropriate improvement recommendation for PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field is to periodically review and carry out improvements to its environmental management system on an ongoing basis with the aim of improving its overall environmental performance.

## Conclusions

Judging from the assessment results, the implementation of environmental management in companies currently has an average score of 85.9%. With this research using the quantitative GEMI scoring method, the percentage results obtained for 7 clauses were organizational context 85%, leadership 89.4%, planning 84.2%, support 78.9%, operations 88.4%,

performance evaluation 86,7%, and continuous improvement 88.8%.

Implementation of ISO 14001:2015 at PT Pertamina Hulu Rokan Zone 1 Pangkalan Susu Field as a whole has shown to have a good sustainability category, namely 85.9%. In general, the fulfillment of the implementation of the sustainability dimensions is in accordance with the GEMI-2017 ISO 14001:2015 method, as well as the self-assessment checklist which has a well implemented category. Among the seven dimensions measured, the clause that has the highest score is the leadership clause at 89.4%, while the dimension that has the lowest score is the support clause at 78.9%.

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## References

- [1] Hidayati, R. N., Sodikin, S., & Nurhasanah, N. (2023). Analisis Kinerja Sistem Manajemen Lingkungan ISO 14001:2015 di PT. Elang Perdana Tyres Industry Kabupaten Bogor. *Briliant: Jurnal Riset Dan Konseptual*, 8(4), 903. <https://doi.org/10.28926/briliant.v8i4.1588>
- [2] ISO 14001. (2015). *Sistem Manajemen Lingkungan - Persyaratan dengan Panduan Penggunaan ISO 14001:2015*. Badan Standardisasi Nasional, 71.
- [3] Kurnianto, A. (2019). Penerapan Sistem Manajemen Lingkungan Iso 14001 : 2015 Pt. "X." *Jurnal Sain Dan Teknologi*, 9(2), 67–73.
- [4] Maryeska, C. P., Jati, D. R., & Pramadita, S. (2020). Analisis Transisi Penerapan Sistem Manajemen Lingkungan ISO 14001 Versi 2015 (Studi Kasus : PT.AZ) (Transition Analysis on Application of The Environmental Management System ISO 14001 2015 Version (Case Study: PT. AZ)). *Jurnal Teknologi Lingkungan Lahan Basah*, 8(1), 001. <https://doi.org/10.26418/jtlb.v8i1.39119>
- [5] Rachman, F., Nurleli, N., & Rosdiana, Y. (2019). Analisis Penerapan Sistem Manajemen Lingkungan Terhadap Kinerja Lingkungan pada Rumah Sakit di Kota Bandung. *Kajian Akuntansi*, 21(2), 36–44. <https://doi.org/10.29313/ka.v21i2.4498>
- [6] Ramadan, B. S., Hapsari, S. B., Lakshita, A., & Ikhlas, N. (2015). 22922-66083-1-Pb\_2. 16(1), 1–7.
- [6] Susanti, A. P., Apriani, M., & Widiiana, D. R. (2022). Analisis Persiapan dan Penyusunan Dokumen Sistem Manajemen Lingkungan (SML) ISO 14001:2015 di Industri Asam Fosfat Gresik. *Conference Proceeding on Waste Treatment Technology*, 5(1), 262–266.
- [7] Tiara, S., Sukwika, T., & Kholil, K. (2022). Analisis Dimensi Keberlanjutan Sistem Manajemen Lingkungan ISO 14001:2015 pada PT Indonesia Power UP-Mrica. *Jurnal Ekologi, Masyarakat Dan Sains*, 3(2), 21–29. <https://doi.org/10.55448/ems.v3i2.54>
- [8] Wicaksana, R. F. S., & Hatini, S. (2014). Analisis Pelaksanaan Sistem Manajemen Lingkungan Berdasarkan Sertifikasi ISO 14001 Di PT Bartec Utama Mandiri. *Industrial Engineering Online Journal*, 3(4), 1–9. <https://media.neliti.com/media/publications/184529-ID-analisis-pelaksanaan-sistem-manajemen-li.pdf>