

**IMPROVEMENT INNOVATION ENVIRONMENTAL MANAGEMENT BY PT
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Abstract

This study describes the implementation of several innovations at PT Pertamina Patra Niaga Fuel Terminal Sei Siak Pekanbaru. The implementation of this implementation program is focused on improving environmental management. The innovation program is a social innovation system that integrates the process of energy efficiency, emission reduction, reduction of B3 and non-B3 solid waste, water efficiency, and pollutant load by prioritizing and paying attention to the analysis of the impacts that will be caused. This study was conducted using descriptive qualitative methods and data collection techniques carried out by in-depth interviews with PT Pertamina Patra Niaga Fuel Terminal Sei Siak, as well as a literature study on the implementation of innovation. The innovation program carried out by PT Pertamina Fuel Terminal Sei Siak has resulted in a configuration of social innovations that can provide significant benefits in efforts to improve environmental management.

Keywords: innovation; environmental management; environmental impact; efficiency; decreasing

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INTRODUCTION

Riau Province. PT Pertamina Patra Niaga Fuel Terminal Sei Siak is a company that receives fuel oil supplies (BBM) by using ships and barges as a means of transportation for receiving fuel and using tank cars as a means of transportation for receiving biofuel (vegetable fuel). The operational activities of PT Pertamina Patra Niaga Fuel Terminal Sei Siak include receiving, stockpiling, and distributing BBM products which include Pertamina Turbo, Pertamina, Peralite, Diesel, Biosolar B30, Dextlite, and Fame products. PT Pertamina Fuel Patra Niaga Terminal Sei Siak operates in Tanjung Rhu Village, Limapuluh District, Pekanbaru City. The company has carried out its business activities based on the principles of good corporate governance to be highly competitive in globalization. Pertamina is one

of the largest state-owned companies with more than 64 years of experience, increasing confidence to commit to running its business activities professionally and with high technical mastery (Surjandari et al., 2011). Oriented to customers' interests is something that is Pertamina's commitment to be able to play a role in providing added value for the progress and welfare of the country. One form of progress made by PT Pertamina Patra Niaga Fuel Terminal Sei Siak is making efforts to improve and innovate according to the demands of global conditions and community needs (Hasiholan & Daryanto, 2018).

ISO 26000 is a guiding standard regarding social and environmental responsibility carried out voluntarily by involving all sectors of public or private bodies engaged in natural or non-natural resources, both for developed and developing countries

(Hemphill, 2013; Sukananda & Nugraha, 2020). ISO 26000 also requires all legal entities and organizations to implement CSR, including, in this case, Limited Liability Companies, Firms, CVs, Foundations, Community Organizations, and labor unions (Rozak, 2021). The implementation of CSR for companies in Indonesia must be in line with the implementation of CSR at the international level. At the international level, guidelines and standards for the implementation of CSR have been born, which are named ISO 26000: Guidance Standard of Social Responsibility (Licandro et al., 2019).

ISO 26000 describes social responsibility as a form of organizational responsibility for the impact of its decisions and activities on society (Rahmi, 2011). The implementation of social responsibility refers to the concept of ISO 26000, which covers 7 (seven) main issues: Community development, consumers, healthy institutional activity practices, environment, employment, human rights, and government organizations (Valmohammadi, 2014). This research will focus on the main environmental issues that are one of the core issues in ISO 26000. This central issue covers the production process's environmental aspects, including pollution control in business operations, prevention and repair of environmental damage due to natural resource processing, and resource conservation (Rozak, 2021).

A good and healthy environment is the human right of every living being, especially humans. The environment is a collective problem that requires all components' involvement to manage it (Wibawa, 2019). The government, community leaders, companies, and the community should preserve the environment to fulfill the rights of future generations' needs (sustainable development) (Sachs, 2012). Improper environmental management can increase the decline in environmental quality, so it is necessary to increase environmental protection and management. Environmental

protection and management aim to create and realize sustainable development (Najwan, 2010). Environmental management currently prioritizes environmentally friendly principles. Currently, many environmental communities are conducting socialization related to the importance of protecting the environment to the community. The purpose of socialization is to invite the community to protect the environment as well as possible (Sabardi, 2014).

Impacts are changes in environmental conditions or quality after the existence of a business/ activity/ project that will experience more significant changes with the activity of an activity according to space and time (Rizal, 2016). Community participation in environmental protection and management has an extensive reach. The existence of effective community participation and aspirations is a form of environmental protection and management, such as in the case of licensing aspirations, environmental impact analysis (*Amdal*), and so on (Sukananda & Nugraha, 2020). However, over time, concerns arise over the principle of openness and community participation in environmental management not being implemented optimally. The position of AMDAL in environmental management is significant and strategic because it is a step to prevent environmental pollution, which will determine the quality of the environment. The existence of development activities carried out on the earth's surface will certainly provide changes to one component that has a sustainable impact on other components, including humans and the environment (Raharjo, 2014).

METHOD

This research was conducted at PT Pertamina Patra Niaga Fuel Terminal Sei Siak, located in Tanjung Rhu Village, Lima Puluh District, Pekanbaru City, Riau Province. This research was conducted with a descriptive qualitative approach to dig deeper and describe research findings using primary data

collection techniques, namely in-depth interviews, and secondary data collection techniques, namely library research or literature review (Sugiyono, 2015).

RESULTS AND DISCUSSION

A. Energy Efficiency Innovation (New Loading Arm Efficiency)

PT Pertamina Patra Niaga Fuel Terminal Sei Siak innovated the New Loading Arm For Efficiency program, which modifies the filling system in the filling shed by installing a new loading arm in the fuel filling bay. Initially, filling in the shed only used one loading arm for each tank car, so it required electrical energy and took a long time for the fuel filling process. Seeing the high intensity of filling in the filling shed with an average of 125 tank cars per day, there must be efficiency with adding tools tailored to the needs.

Modification of the filling system in the filling shed by installing a new loading arm in the fuel filling bay. Several steps were taken in implementing the innovation, including:

- 1) The crew of the Tank Car submits loading instructions to the filling officer
- 2) The Tank Car crew places the tank car in the bays that correspond to the product to be loaded.
- 3) The crew of the tank car installed 2 (two) units of loading arm on the bottom loader of the tank car.
- 4) The filling officer simultaneously fills up according to the product listed in the loading instruction through 2 (two) bottom loaders.
- 5) The process of filling one tank car takes 33.6 minutes.
- 6) After filling the tank car, it will leave the bays filling shed.

The resulting environmental impact is to shorten the charging time, which is 33.6 minutes/tank car, and electrical energy efficiency of 661.48 GJ in 2021, equivalent to a cost savings of IDR 265,326,452,-. The absolute results and

savings of funds due to the full implementation of the Loading Arm For Efficiency program are shown in Table 1.

Table 1
Absolute Results and Savings in Funds Due to Energy Efficiency Innovation Program (New Loading Arm Efficiency) Implementation

Year	Absolute Results	Funds Budget	Savings
2021	661.48 GJ	IDR 90,000	IDR 265,326,452
2022*	320.39 GJ	IDR 90,000	IDR 128,512,089
Total	981.87 GJ	IDR 180,000	IDR 393,838,542

Note: *Data until June

B. Emission Reduction Innovation (Dipping Measurement Device)

The development of the Dipping Measurement Device originated from the company itself. The idea for this innovation program emerged because when measuring (dipping) the level of the stockpile tank manually, it was necessary to open the dipping slot, which resulted in conventional pollutants coming out into the air. The company can improve environmental conditions by adding a Dipping Measurement Device that can automatically measure the oil level in the storage tank, thereby eliminating the potential for air pollution.

The measurement of the oil level in the stockpiling tank is done manually, where the measuring officer measures using a measuring tape (dip tape). In the measurement process, the operator opens the dipping slot (measuring hole), which can cause conventional pollutants to come into the air. Installing the Dipping Measurement Device on the stockpile tank is a step in the measurement process.

Several steps were taken in implementing the innovation, including:

- 1) The officer ensures that the power from the Dipping Measurement Device is ON.
- 2) Officers can automatically monitor the oil level in the storage tank, both on the interface outdoors and on the monitor in the operator's room.
- 3) No need to do level measurements manually.

The resulting environmental impact is a reduction in emissions of 1370.74 Tons of VOC in 2021, equivalent to a cost savings of IDR. 65,898,882,821,-. Absolute results and cost savings from the Dipping Measurement Device in full are shown in Table 2.

Table 2
Absolute Results and Fund Savings Due to Dipping Measurement Device Innovation Program Implementation

Year	Absolute Results	Fund	Savings Funds
2021	1.370.74 tons VOC	IDR 1,000,000	IDR 65,898,882,821
2022*	280, 61 tons VOC	IDR 1,000,000	IDR 13,490,345,070
Total	1,651.35 tons VOC	IDR 2,000,000	IDR 79,389,227,891

Remarks: *Data until June

C. B3 Waste Reduction Innovation (Iso Tank Sludge)

The development of the Iso-Tank Sludge transportation ex-tank cleaning sludge. The idea of change or innovation by the company comes from the opportunity to overcome these existing problems. The company can improve environmental conditions by changing the method of transporting sludge from drum packaging to iso-tank packaging so that the tonnage is obtained accurately and

precisely during the sludge transportation process.

Sludge ex-tank cleaning is accommodated in drum packaging to be weighed before being transported by a licensed third party. With the amount of sludge, the more the need for drums as the packaging will affect the tonnage and transportation costs. With the change in the sludge packaging system, the steps in the sludge management process are as follows:

- 1) Sludge is accommodated in the drying bed
- 2) Sludge that has been accommodated will be transferred using a transfer pump into the iso-tank / sludge tank car.
- 3) Sludge accommodated in iso tanks/tank cars will be sent to third-party managers and licensed carriers.

The resulting impact in 2021 is a cost savings of IDR.1.163.794,-. The total absolute yield and cost savings from the Iso-Tank Sludge is shown in Table 3.

Table 3
Absolute Results and Savings of Funds Due B3 Waste Reduction Innovation Program (Iso-Tank Sludge) Implementation

Year	Absolute Results	Fund Budget	Funds Savings
2018	0.64	IDR 10,000,000	IDR 414,375
2019	0.14	IDR 15,000 .000	IDR 93,438
2020	0.73	IDR 30,000,000	IDR 476,166
2021	1.66	IDR 35,000,000	IDR 1,163,794
2022*	0.00	IDR 0	IDR 0
Total	3.18	IDR 90,000,000	IDR 2,147,771

Remarks: * Data until June

D. Non-B3 Solid Waste Reduction Innovation (GaBan Hydrant Hose)

The development of an innovation program for GaBan Tires (GaBan) Hydrant Hose is an idea to utilize *hose* leaky and unused. The idea of change or innovation by the company comes from the opportunity to overcome the problem of a large number of used hose hydrants. Gaban Hose Hydrant can reduce non-B3 waste at the Sei Siak Fuel Terminal location. Gaban is used to support tank car tires when filling in the filling shed, which currently uses rubber tires. The process of filling the tank car in the shed must use a rubber tire wedge as a safety device so that the tank car does not move when filling in the shed. The use of many existing rubber tire wedges is damaged and requires continuous new purchases. Modifying used hose hydrants into Gaban Hydrant hoses can reduce the purchase of new rubber tires used by tank cars during the fuel-filling process at the filling shed. The implementation of the Gaban Hose Hydrant innovation program has an impact on Process Improvement by reducing non-B3 waste, which, so far, no innovation efforts have been made.

The resulting environmental impact is the savings in rubber waste of an absolute value of 0.005 tons in 2021, equivalent to a cost savings of IDR. 17,451-. Absolute results and savings due to the implementation of the Gaban Hose Hydrant program in full are shown in Table 4.

Table 4
Absolute Results and Savings of Funds Due to Non-B3 Solid Waste Innovation Program (GaBan Hydrant Hose) Implementation

Year	Absolute Results	Fund	Savings
2021	0.005 tons	IDR 700,000	IDR 17,741

2022*	0.005 tons	IDR 700,000	IDR 15,049
Total	0.010 tons	IDR 1,400,000	IDR 33,150

Note: *Data until June



Figure 1. Implementation of Non-B3 Solid Waste Innovation Program

E. Water Efficiency Innovation and Pollutant Load Reduction (FOC 1234)

The development of the Oil Catcher Filtration (FOC) 1234 innovation program came from the company itself. The idea for this innovation program emerged as an effort to maintain the quality of wastewater discharge and reduce pollutant loads. The idea of change or innovation by the company comes from the opportunity to overcome these existing problems. The company can improve environmental conditions by applying FOC 1234, which can filter and clean wastewater that leads to the oil catcher.

Wastewater that leads to the oil catcher is only separated by segmentation at the oil catcher bulkhead so that the pollutant load is still too heavy for the oil catcher for oil and fat parameters. The officers only clean the garbage and collect the wastewater without any first filtration. With the installation of FOC 1234 on the *oil catcher*, then the steps in the cleaning process are as follows:

- 1) Officers collect wastewater flowing in the *oil catcher*.

- 2) Officers pour the collected water into the filtration facility to separate the oil and water content and waste.
- 3) The water will be drained back into the oil catcher, while the remaining oil will be collected into the drum for further processing.

The resulting environmental impact is a reduction in the burden of wastewater by 0.007791 Ton TOC and 0.000560 Ton Oil and Fat in 2021, or equivalent to a TOC saving of IDR. 13,514 and an Oil and Fat saving of IDR. 291;. Absolute results and cost savings from the Dipping Measurement Device in total are shown in Table 5.

Table 5
Absolute Results and Fund Savings Due Water Efficiency Innovation Program and Pollutant Load Reduction (FOC 1234) Implementation

Year	Absolute Yield (TOC)	Absolute Yield (Fat Oil)	Fund	Savings
2021	0.007791 tons	0.000560 tons	IDR 1,000,000	IDR 14,420
2022*	0.000523 tons	0.000004 tons	IDR 1,000,000	IDR 293
Total	0.008314 tons	0.000564 tons	IDR 2,000,000	IDR 14,713

Remarks: *Data until June

CONCLUSION

PT Pertamina Patra Niaga Fuel Terminal Sei Siak Pekanbaru has implemented an innovative program focused on improving environmental management. The innovation program is a social innovation system that integrates the process of energy efficiency, emission reduction, reduction of B3 and non-B3 solid waste, water efficiency, and pollutant load by prioritizing and paying attention to the impact analysis that will be caused. The innovation program carried out by PT Pertamina Patra Niaga Fuel Terminal

Sei Siak has resulted in a configuration of social innovations that can provide significant benefits in efforts to improve environmental management. PT Pertamina Patra Niaga Fuel Terminal Sei Siak conducts an energy efficiency innovation program (New Loading Arm For Efficiency) which is a modification of the filling system in the filling shed with the installation of a new loading arm on the fuel filling bay. The second innovation program, namely the development of the emission reduction innovation program (Dipping Measurement Device), came from the company itself; where the idea for this innovation program emerged because when measuring (dipping) the level of the stockpile tank manually required opening dipping slot, which resulted in conventional pollutants coming out into the air. . The third innovation program, namely the development of an innovation program to reduce B3 waste (Iso-Tank Sludge Transportation ex-tank cleaning sludge). The fourth innovation program, namely the development of an innovation program to reduce non-B3 solid waste, namely Ganjal Tire (GaBan) Hydrant Hose, is an idea to utilize hose leaky. Unused while the last innovation program, namely the development of water efficiency innovation programs and reducing pollutant loads (Filtration Oil Catcher / FOC 1234), came from the company itself where the idea for this innovation program emerged as an effort to maintain the quality of wastewater discharge and reduce pollutant loads. All innovation programs carried out by PT Pertamina Patra Niaga Fuel Terminal Sei Siak are a step to increase responsibility for environmental management and overcome environmental impacts that will be caused.

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