The Implementation of Green Industry through Innovative Approach at PT. Tirta Investama of Pandaan

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Abstract. Industrial companies in both Indonesia and the world are now making green environment as a part of their business strategy. Various companies have proven that green environment will be able to increase the competitiveness of its companies. Through government policy, companies in Indonesia have initiated and created certain methods and approaches to realize green industry as a form of concern for the environment, one of which is carried out by PT. Tirta Investama (TIV) of Pandan. The company engaged in Bottled Drinking Water (AMDK) has carried out various innovative approaches in the field of energy efficiency through the Juminten Program, emission reduction through re-setting the pressure of 1,500 Line-2 SBO machines, reducing B3 waste with the WyPall Tissue Utilization approach, and Non B3 by developing the Integrated Waste Management approach based on Purwosari Industrial Estate - Pandaan, water conservation through the Improvement Setting Final Rinse 5 Gallon, the approach of optimizing the wastewater recycling system in the Water Pollution Load Program, biodiversity program through Wareh Sapen, and community development through the Integrated Community Development.

Keywords: Environment, Green Industry, Innovation

1. Introduction

Green industry arises because of human desire to increase economic growth but still pay attention to environmental sustainability. According to the Regulation of the Minister of Industry No. 05 / M-IND / PER / 1/2011 concerning the green industry awarding program, what is meant by a Green Industry is an environmentally sound industry that harmonizes growth with environmental sustainability prioritizing efficiency and effectiveness of resource use nature and benefit the community. Industry itself is a fast-growing sector in the Indonesian economy. In addition, the industry is also a sector with the largest use of resources and energy and a large number of waste producers. Therefore, the Ministry of Industry chooses the concept of green industry as a compulsory concept in the development of industrial estates in Indonesia.
The rapid growth of the manufacturing industry has also created many economic, environmental and social problems, including global warming and environmental problems due to waste disposal (Sangwan, 2011). Therefore, environmental issues related to the scarcity of natural resources, global warming, waste management, and increasingly stringent environmental rules are challenges that must be faced by the industrial world in addition to competition and a very fast and dynamic business environment. This attention and awareness of the increasing environmental aspects throughout the world has prompted the industry to apply the concept of Green manufacturing (GM) to business activities carried out (Ghazilla et al., 2015; Sangwan and Mittal, 2015). The idea of Green Manufacturing (GM) is basically a process / system that has a minimal impact on the environment or does not cause a negative impact on the environment. Countries in the world have committed to pay more attention to environmental aspects in all activities carried out primarily in reducing CO2 and reducing pollution from industries, such as the United States Congress which has planned to reduce CO2 pollution by 83% by 2050 (Dornfeld, 2013). The writing of this article will discuss several approaches taken by PT. Tirta Investama of Pandaan regarding Green Industry practices as part of corporate responsibility in implementing Corporate Social Responsibility (CSR) programs with innovative approaches.

2. Literature Review

2.1 Green Industry

Some articles explain the implementation of GM by reducing, reusing and recycle different types of industries, such as in general manufacturing industries (Bey, Hauschild, and Mcaloone, 2013; Luken and Van Romepaey, 2008; Masoumik, Abdul-rashid, and Olugu, 2015); ceramic floor / tile industry by making changes to the use of raw materials, efficiency of energy and water consumption (Gabaldon-estevan, Criado, and Monfort, 2014); rubber industry (Marimin et al., 2014); the automotive industry by implementing water treatment used in production, and using materials that are more environmentally friendly (Drohomeretski et al., 2014); reduce food waste in food manufacturers by remanufacturing, repackaging, selling at a discount, donations to social institutions, waste management (Garrone et al., 2016); and the metal casting industry (Arulrajah et al., 2017). Other examples of GM implementation are recycling pad-batch washing waste water in the textile industry by oxidation processes (Tezcanl, Nadeem, and Dizge, 2016), reuse of biological sludge in the paper and cardboard industry (Huber et al., 2014), and waste water reuse in the electronics industry (Eksangsri and Jaiwang, 2014).

2.2 Innovation Approach

Amabile (1996, p. 1154-1155) in Mudiantono and Nur Khamidah said that innovation is a successful application of creative ideas in the company. Innovation is a company mechanism to adapt in a dynamic environment. Therefore, the company is required to be able to create new assessments, new ideas and offer innovative products and improve service performance that satisfies customers. Continuous innovation in a company is a fundamental need that will be able to create competitive advantage, so that innovation is an important function of management because innovation will determine a superior business performance. Innovation becomes increasingly important as a tool for survival, not only growth but also in increasingly intense competition and environmental uncertainty, then technical innovation has a strong and positive influence on company performance.

3. Research Methods

Data collection is done through field observations, in-depth interviews and through documentation so that it is expected to produce comprehensive data / information. Whereas the focus of this study is on the efforts of the object of research in minimizing the company's waste through innovative approaches sourced from internal companies.
4. Results And Discussion

4.1 'Juminten' Approach (Friday Peeking Energy)

In government regulation number 70 of 2009 concerning energy conversion Article 10 paragraph 1 regulates the obligation of energy conversion efforts for companies to carry out energy supply activities but in that regulation there is no article that must use a certain method in the conversion or energy efficiency program. In the field of energy efficiency, many innovation programs were developed by PT. Tirta Investama of Pandaan Factory, one of which is Juminten. Friday's 'Juminten' program is one of the activities that takes time for 1 hour rest (11.30-12.30 WIB) by turning off the production machine and the utility used. The program officer of 'Juminten' by involving top level management, where they conduct periodic field inspections to turn off unused machines. Then the achievement of KWH when 'Juminten' was reported weekly history, this 'Juminten' activity was able to save energy by 792.00 KWH per year in 2015, 6075.24 KWH per year 2016 and 18618.73 KWH in 2017. This is as presented in the following table:

| Table 1. Results of Periodic Inspection of the Achievement of the 'Juminten' Program of PT. TIV of Pandaan |
|----------------------------------|
| Detail                          | 2013   | 2014   | 2015   | 2016   | 2017   | Unit     |
| KWH Before                      | 0      | 0      | 3168.00| 38016.00| 38016.00| KWH      |
| KWH After                       | 0      | 0      | 2376.00| 31940.76| 19397.27| KWH      |
| Total Saving Energy             | -      | -      | 792.00 | 6075.24 | 18618.73| KWH/Year |

This Juminten program continues to be carried out even though in the regulation there is no obligation to carry it out. This 'Juminten' activity that is carried out periodically also provides behavioral changes to employees of PT. Tirta Investama of Pandaan to be more concerned about energy efficiency increases, teamwork solidarity among employees and beyond general practice so that part of their commitment to energy savings.

The design of the 'Juminten' program is an act outside the common practice of fellow national-level AMDK industry sectors capable of providing significant achievements. The advantage of this 'Juminten' method is that it can make PT. Tirta Investama of Pandaan as a national-level pioneer in the bottled water (AMDK) industrial sector that implements shutting down the engine at rest on Friday as part of the energy performance key indicator (KPI) program

4.2. Approach to the Re-Setting of SBO 1500 Line-2 Engine Pressure

Government Regulation No. 41 of 1999 concerning Air Pollution Control has regulated and obliged each company to minimize air pollution but in the regulation there is no specific method to use. PT. Tirta Investama of Pandaan has initiated the emission reduction through re-setting the pressure of the 1,500 Line-2 SBO engine. Thus the method of reducing emissions is not done in order to fulfill the obligations in the regulation.

One of the programs developed in reducing emissions by PT. Tirta Investama of Pandaan is decreasing the pressure setting of the 1,500 SBO machines from 28 bars to 25 bars. This reduction is done by modifying the settings on the machine without making changes to the components while keeping the engine pressure requirements sufficient. This program shows that it is able to contribute to the reduction of emissions in 2016 by 23.34 tons of CO2. The new program implemented in 2016 became a reliable approach outside the general practice of the industrial sector of the AMDK industry in East Java.
4.3 Lap Majun (majun wipe) Substitution with WYPALL Tissue

Substitution approach for lap majun and tissue wypall in reducing B3 waste is one of the methods developed by PT. Tirta Investama of Pandaan to reduce B3 waste in maintenance activities. In Government Regulation Number 74 of 2001 and Number 18 of 1999 an example of government regulation Number 85 of 1999 regulates Every company is obliged to manage B3 waste but is not required to use a particular method. Thus, the method of substituting lap majun with tissue wypall is done not in order to fulfill the obligations in the regulation.

The number of lap majun used for maintenance activities was quite high, recorded in 2015 lap majun waste amounting to 6.67 tons so that the cost of managing B3 waste also tended to be high in innovation in solving this problem by substituting tissue wypall for maintenance activities and eliminating the use of lap majun. The absolute results of this program were able to reduce the number of Wypall tissue B3 produced to 1.74 tons in 2016 and provide a cost savings of Rp. 67,072,997. -.

4.4. Development of Integrated Waste Management Based on Purwosari Industrial Estate - Pandaan

In the management of Non B3 waste, PT. Tirta Investama of Pandaan's factory has carried out non-B3 waste processing carried out by the company's internal and Recycle Business Unit (RBU). To be able to realize the Extended Product Responsibility (EPR) policy, PT. Tirta Investama - Pandaan's factory synergizes with the Garbage Bank built by the company that has been established, so that there is Integrated Waste Management in one industrial area in Pandaan area - Purwosari between internal companies, RBU and Community-based Waste Bank (community) in one industrial area in Pandaan - Purwosari. The program that synergizes these three parties is able to reduce 305.2 tons of non-B3 waste and develop the Extended Producer Responsibility (EPR) Program. In this governance system, Non-B3 waste that is able to be managed and reduced not only in PP, PET, HDPE type plastic bottles with all its variants, but also has managed organic waste developed into compost.

4.5. Improvement Setting Final Rinse 5 Gallon

Improvement Setting Final Rinse 5 Gallon is one of the innovations developed in the field of water efficiency by changing settings from 2.2 bar to 1.95 bar. This activity is able to produce competitive advantages in the form of guaranteed water supply for other needs and is able to produce water efficiency from the original 4,870,000 Liters in 2015 rose to 6,332,000 liters in 2016.

4.6. Optimizing Wastewater Recycle System

Optimization of Wastewater Recycle System conducted at PT. Tirta Investama Pandaan Factory by using IPAL Waste Treatment System with Bibble Diffuser without Anaerobic Tank. Innovations are made through the addition of components in the design dimension in the form of shortening the influence distance of wastewater by recycle and integrating between WWTP units and recycle units in the same building. The result is able to produce BOD water pollution reduction: 0.03 Ton; COD: 0.08 Ton; TSS: 0.01 Ton; Fat Oil: 0.01 Tons.

4.7. Wareh Sapan

Wareh Sapan, which means Sapan Spring Source is one of the biological conservation programs developed in an integrated manner in Sapan block of arjuno mountain of Pasuruan. This program has been initiated since 2009, always involving the community and stakeholders in the process of planning, implementation, maintenance and monitoring. The innovations developed are through productive planting of mangosteen and coffee and Sapani as endemic plants. For monitoring using the tagging online community method, namely tree tagging using community-based GPS.
4.8. Integrated Community Development (ICD)

Integrated Community Development (ICD) is one approach taken in the Community Empowerment Program through the Integration of three pillars, namely education, environment, and economics. Community empowerment innovation in the field of education was carried out through the *sodaqoh sampah* (charity garbage) approach at 9 PAUD institutions in Sukorejo, Prigen and Gempol Districts and integrated with the Green Waste and Cooperative Bank Program.

5. Closing

Innovation is the key to the success of industrial companies to improve the competitiveness of companies, especially in realizing the existence of companies as green industries. Through this study, it is known that PT. Tirta Investama of Pandaan in order to realize the existence of its company as a green industry has carried out various innovative approaches, and has proven to have significant results. The 'Juminten' approach was successfully carried out with 18618.73 KWH saving energy, with the SBO 1,500 Line-2 engine pressure re-setting approach the company succeeded in reducing emissions by 23.34 tons CO2, while with the lap majun and tissuewypall substitution approach the company decreased the number of B3 amounting to 6.67 tons with high management costs to 1.74 tons, of course with more efficient waste management costs. The Integrated Waste Management Approach Based on Purwosari - Pandaan Industrial Area has also contributed to the reduction of waste of 305.2 tons, water conservation through the Final Improvement Setting Rinse 5 Gallon capable of providing 6,332,000 liters of water, Optimizing the recycling system of wastewater capable of reducing water pollution with BOD: 0.03 Ton; COD: 0.08 Ton; TSS: 0.01 Ton; Fat Oil: 0.01 Ton; and the Kehati program through Wareh Sapen, and community development through Integrated Community Development also has a positive impact on the environment and the community around the industry.

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