

POLLUTION PREVENTION IN THE PORT OF TANJUNG EMAS SEMARANG WITH THE GREEN PORT SOLAR ENERGY PROGRAM, FOR THE PORT POWER SYSTEM, CURRENT STATUS AND FUTURE PROSPECTS

ZAINAL ARIFIN, M.M. ¹, NURSYAMSU, S.E., M.Si., M.M. ²,

RAHMAT SANTOSO, S.Si.T., M.Si.³ and DAPID RIKARDO, M.M. Tr. ⁴

^{1,2,3,4} Lecturer, Banten Shipping Polytechnic, Indonesia.

E-mail: ¹Znl33stip@gmail.com, ²nursyamsu5173@gmail.com, ³capt.davidricardo@gmail.com,

⁴rahmat@poltekpel-banten.ac.id

Abstract

Green port implementation world developments in ports in Indonesia. Research methods used is analytical descriptive with a qualitative approach. That data collected through literature study. The research results show that Green ports have been implemented in various ports in the world as efforts to reduce the negative impact of port activities on environment. The implementation of Green Ports in Indonesia is still ongoing limited and there needs to be further efforts to increase awareness and support from relevant stakeholders. In this case, it is important to the government and port industry in Indonesia must be strengthened policies and regulations that support green implementation harbor. Apart from that, there is a need for education and training regarding ports managers and workers to improve understanding and skills in implementing out environmentally friendly practices. Overall, this research provides overview of the application of Green Ports in the world and challenges faced in implementing it in Indonesia. Implications of This research is the need for closer collaboration between parties government, port industry and society in advancing and supports Environmentally Friendly Port practices to achieve sustainable development in future.

Index Terms: Green Port, Port, Implementation.

INTRODUCTION

National development, as mandated by the 1945 Constitution, is carried out based on development principles sustainable and environmentally friendly. Law Number 32 of the Year 2009 concerning Environmental Protection and Management (UUPPLH) stated that the quality of the environment has decreased threatens the environment and the survival of humanity and living creatures others, so it is necessary to protect environmental management seriously and consistently by all stakeholders, so that far from pollution that can damage the current and future environmental order come. An environmentally friendly port was created from a concept called a green port. Environmentally friendly ports or often too called an ecoport, the role of the green port concept aims to be balancing operations in an economical and ecologically sound port. This requires management from several responsible parties Ports are supported by operational facilities, utilizing resources efficient for ship operations at the port. Port Development environmentally friendly according to Minister of Transportation Regulation No.51 of 2015 regarding the operation of sea ports which have been amended by

regulations Minister number PM 146 of 2016 (article 19 paragraph 2) mandates that to ensure and maintain environmental sustainability at the Port, Port Authority must provide pollution prevention and guarantee facilities. It can be said that an environmentally friendly port is a program. Green port is not only to prevent pollution but is also friendly environment.

There were several obstacles before The green port concept is applied at Tanjung Emas Port, Semarang, namely limited resources have limited resources power, both in financial terms and implementing personnel the green port concept may not be a top priority if resources used for operational needs daily. Then Lack of awareness and understanding yet fully aware of its importance environmental sustainability or don't understand how to do it yet apply the green concept ports and Implementation technical challenges green environment involves certain technical challenges such as availability of infrastructure required in the new system already available. Tanjung Emas Harbor, Semarang through the implementation of the green port concept, the company contributes in reduce negative impacts on environment and promote use of new and renewable energy Semarang's Tanjung Emas port has been do a lot of programs environmentally friendly, such as movement planting trees in the terminal area by awareness of employees and work partners the importance of sorting waste with use the application for each employees are not only focused on environmental business growth.

This research is aimed at implementing the green port concept in Tanjung Emas Port and future prospects in Greport development. Under development port with the green port concept aspects are required which is the deciding factor concept development the based on international regulations and domestic government regarding maritime environmental protection as a reference.

THEORETICAL STUDY

a. Solar Energy

Solar energy is energy obtained from the conversion of solar thermal energy into resources in other forms through the use of special equipment (Alamsyah, 2019). Solar energy is a promising and promising renewable energy source the greatest potential compared to other energy resources. Additionally, solar energy is also considered an environmentally friendly solution to address the problem of needs global energy. The level of availability of solar energy in an area is one factors to consider in implementing solar energy systems in the region (Afif, 2022). Solar energy in Indonesia has a potential of more than 200 GW with efficiency photovoltaic technology available today. However, the use of solar energy in Electricity generation is still less than 100 MW. The potential for solar energy is spread across throughout Indonesia, with potential spread across the West Kalimantan region (20 GW), South Sumatra (17 GW) and East Kalimantan (13 GW) (Tampubolon & Adiatama, 2019). Solar energy is primary energy which is extraordinary because it is not polluting and it can't be finished. Solar energy is one of the energies that is being developed currently by the Indonesian government because as a tropical country, Indonesia has the potential for solar energy is quite large (Widayana, 2012)

b. Greenport

According to Wachjoe et al (2020) the concept of a green port was created so that a port can adapt to various external impacts. Green Port is run by paying attention to environmental impacts and economy without damaging the environment around the port. This concept you must also pay attention to the amount of resources and energy available use, strengthen management in environmental management, creating port ecology and accelerating development sustainable. Meanwhile, according to Kristanto et al (2020) that green port is a new concept for port development represents an important change. Green Port is a port that has integrity in social, economic, cultural and other. This concept supports social balance, development economy and environment that go hand in hand, and pay attention efficient resources. The green harbor is also a symbol from ecology and management good environmental management for sustainable port development. Green port is a concept that upholding efficient use of resources that is also friendly in activities, operations and environmental management port and also economical for the port and customers. This means that it is an aspect that is really paid attention to in this concept are environmental aspects, port operational aspects, and economic aspects. Green Port is a supporter of change economic development and also serves to balance consumption from the environment and economic interests in order to be able to controlled environmental changes around the port

MATERIALS AND METHODS

This research uses this type of research with a qualitative approach, where stated Qualitative research is a research method describe problems regarding data/or programs experiences experienced by researchers. This research was implemented at the Tanjung Emas Port, Semarang. The informants in this research were selected randomly purposive, namely informants chosen because certain considerations, especially related to Concept issues Green Harbor (Greenport) at the port of Tanjung Emas Semarang.

DISCUSSION

Based on research carried out by researchers while conducting practice at the Port of Tanjung Emas Semarang, This research has a main objective to confirm directly and detailed various problems encountered in the field. One of the main focus of this research is "Implementation of the Green Port Concept at Tanjung Emas Port, Semarang. For achieve these goals, researchers collect data through interviews in depth with several informants

A green port is an environmentally friendly port concept aims to reduce negative impacts on the surrounding environment, including reducing greenhouse gas emissions in the port sector. According to (Prasojo et al., 2015) Green Port is port development sustainability that not only meets environmental needs, but also good increase in profits. Harbor. The purpose of the green port is to increasing the efficiency of existing resources, reducing the negative impact of surrounding environment, to improve the level of environmental management and improve the quality of the natural environment around the port (Perawati et al., 2017). Another thing that is prioritized in the development of green ports is the ability of a port to master

information and communication technology so that the technology and employees are in accordance with the technology is a real need. The Greenport port concept is put forward 3P principles (People, Planet and Profit) Apart from pursuing company profits as well must pay attention to and be involved in fulfilling the welfare of society (people) and actively contribute to preserving the environment (planet) (Sarwito & Priyanga, 2021). Here are some port strategies green things that can be done to reduce emissions in the port sector

1. Using more efficient and environmentally friendly technology: More efficient and environmentally friendly technology, such as engines more fuel efficient and more efficient battery technology, can reduce greenhouse gas emissions resulting from activities in harbor. intends to save energy and reducing air pollution in the Panjang port environment by replace the captive power loading and unloading equipment (Container Crane), which so far uses captive power in the form of an engine onboard (diesel-genset) replaced with electricity supply from the grid PLN (Rodrigues et al., 2021). Existing diesel-generators are used as a stand-by unit that will be operated when the electricity supply is PLN goes out or is interrupted
2. Using alternative fuels: Using alternative fuels, such as biofuel or LNG (liquid natural gas), can reduce gas emissions greenhouses produced by ships and vehicles in port
3. Optimizing logistics and transportation: Optimizing logistics and transportation can reduce the number of ships and vehicles passing through ports and reduce waiting time and transportation time of goods
4. Using renewable energy: Using renewable energy, such as solar and wind energy, can help reduce material use fossil fuels and reducing greenhouse gas emissions in the port sector
5. Before Implementing a sustainable energy and environmental management system: Ports can implement energy and environmental management systems sustainable way to reduce energy use, minimize
6. Providing alternative refueling infrastructure: Ports can provide alternative refueling infrastructure, such as biofuel or LNG, for ships and vehicles passing through the port. Educate and involve stakeholders: Involve stakeholders, e.g entrepreneurs, workers and local communities, in a reduction campaign emissions can help increase awareness and commitment to reducing greenhouse gas emissions in the port sector waste, and reduce greenhouse gas emissions

Efforts to reduce emissions in the port sector must be carried out consistently continuously by the authorities and all stakeholders involved to creating a healthier and more sustainable environment around the port. According to (Angriyani et al., 2021) Social and Environmental Responsibility is the Company's commitment to participate in economic development sustainability to improve the quality of life and the environment beneficial, both for the Company itself, the local community and society in general. The Green Port strategy is an effort to control all factors human physical environment in the Port sector which may give rise to or Prevent harm to physical development, health and endurance living Living Creatures

At this time, green port management in Indonesia is still experiencing various challenges and problems, especially in terms of control and law enforcement against illegal trade in prohibited goods enter the port.

The Indonesian government has done various things efforts to improve green port management, including by tighten supervision and inspections at ports, increase coordination between related institutions and agencies, as well as applying technology and The latest information system to facilitate monitoring and reporting. Besides Meanwhile, the government has also implemented several programs and policies to promoting the development of green ports to encourage ports in Indonesia to adopt environmentally friendly practices.

Sustainable development of green ports in Indonesia, where Ports must be able to improve economic performance and sustainability ecologically and also social welfare for society. As are we know that the port is a very strategic area, as a point the meeting between land and sea modes and as an economic route country. Ports in countries. The green port concept is not only focused on economic and financial aspects, but also needs to be followed by aspects port environment and operations (Ahmadi et al., 2016).

CONCLUSION

Environmental Problems in the Port Sector Port Activities This has an impact on increasing pollution in the port area. Impact the environment not only at the port, but also around the port, apart from It also requires an active role from ships anchored at the port reduce the risk of pollution, such as by choosing more fuel environmentally friendly, Renewable Use of Heavy Equipment in Ports and managing waste well, the Port Sector has a big impact on the environment, especially in terms of greenhouse gas emissions. Water pollution and sound and land use are some of the environmental problems that exist faced by the Port sector are water pollution, greenhouse gas emissions, noise pollution, and land use.

Green port strategy for reducing emissions in the port sector, green ports are a port concept environmentally friendly which aims to reduce negative impacts on the surrounding environment, including reducing greenhouse gas emissions in the sector Ports, green port strategies that can be implemented to reduce emissions in the Port sector using more efficient technology, Using alternative fuels, Optimizing logistics and transportation, Using renewable energy, Implementing an energy and environmental management system sustainable, Providing alternative fuel filling infrastructure.

Status Current Green Port Management in Indonesia Currently, management Green ports in Indonesia are still experiencing various challenges and problems, especially in terms of control and law enforcement against illegal trade of prohibited goods entering the port. Implementation of Green Ports in Indonesia Sustainable development green ports in Indonesia, where ports must be able to improve economic performance and ecological sustainability and welfare social for society.

References

- 1) Ahmadi, N., Kusumastanto, T., & Siahaan, E. I. (2016). Development Strategy of Green port Study: Cigading Port-Indonesia. *Jurnal Warta Penelitian Perhubungan*, 28(1), 9–26.
- 2) Bergqvist, R., & Monios, J. (2019). Green Ports in Theory and Practice. In *Green Ports: Inland and Seaside Sustainable Transportation Strategies* (pp. 1– 17). Elsevier. <https://doi.org/10.1016/B978-0-12-814054-3.00001-3>
- 3) ESPO. (2016). ESPO / EcoPorts Port Environmental Review 2016.
- 4) Ningrat, A. (2022b). Analisis Indikator Kinerja Pelabuhan Hijau. *FROPIL (Forum Profesional Teknik Sipil)*, 10(2). <https://doi.org/10.33019/fropil.v10i2.3128>.
- 5) Rodrigues, J., Kaming, P. F., & Koesmargono, A. (2021). Evaluasi Pelabuhan Tibar Timor-Leste Dengan Indikator Hijau. *Jurnal Teknik Sipil*, 16(2), 134–143