

Compliance Analysis of Environmental Management and Monitoring of Hydropower Plant in East Java

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Abstract

Environmental documents (AMDAL and UKL-UPL) function as instruments in efforts to prevent environmental damage, but industry owners still need to carry out environmental management and monitoring properly, especially for hydropower activities in East Java Province. Moreover, supervision conducted by the government could have been more optimal. This is indicated by leadership that began in 2017 to 2019. In addition, there are discrepancies between environmental documents that are owned reality. This study analyzes industry owner's compliance levels in implementing environmental documents. The study used an observative method with a prescriptive analysis approach based on qualitative data. The results showed that most industry owners still needed to obey, so alternative policies were required. The recommended alternative is to adjust the environmental documents with direction and coordination from the relevant government agencies based on the constraints faced to increase compliance with the implementation of environmental monitoring.

Keywords: environmental documents, hydropower, compliance analysis, and environmental monitoring.

INTRODUCTION

Environmental documents are a reference in carrying out environmental management and monitoring activities. The activity was carried out to maintain the quality of the environment, especially in areas affected by the operation of hydropower. This is in accordance with Law Number 32 Year 2009 Article 22 paragraph (1) which states that "every business and / or activity that has a significant impact on the environment must have an AMDAL" and Article 34 paragraph (1) states that "every business and / or activities that are not included in the AMDAL mandatory criteria, are required to have UKL-UPL ". Environmental Impact Analysis (AMDAL) is a systematic process for identifying, predicting and evaluating the environmental impacts of project actions and proposals. This process is applied at the project planning stage before the project is decided as a form of project initiator commitment [1].

Environmental documents are also one of the bases in industrial supervision carried out by the government. This is stated in Law Number 32 Year 2009 concerning Environmental Protection

and Management article 71 paragraph (2) which states that "the minister, governor, or regent / mayor can delegate his authority in conducting supervision to the technical officer / agency responsible in the field of management of the environment".

Effective coordination and clarity of mandate between central, provincial and district / city government agencies related to environmental resource management is needed so that they do not overlap [2]. In addition, the initiator must carry out environmental management and monitoring consistently. This form of monitoring must be able to provide information related to the effectiveness of efforts to prevent significant negative impacts to anticipate related environmental risks that may occur [3].

Supervision of hydropower that already has environmental documents in East Java Province was only carried out in 2017 which then continued in 2018 and 2019. This shows that it is necessary to review the implementation of environmental management and monitoring in hydropower, especially the suitability of environmental documents with conditions in the field, as well as updates regulations applicable.

Based on the above it is necessary to conduct research to determine the condition of environmental management and monitoring of the proponent of hydropower and their level of compliance in implementing environmental

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documents. Besides analyzing the recommendations for the proponent according to conditions on the ground in order to increasingly be able to increase compliance in carrying out environmental management and monitoring obligations.

MATERIAL AND METHOD

The research objects are 7 (seven) hydropower plants located in East Java Province, have environmental documents, and have been monitored by the government in the period 2017 to 2019 and utilize the Brantas River Basin for operational activities.

To analyze compliance, compliance criteria were used which were adapted from the Environmental Compliance Monitoring Evaluation Form of the East Java Provincial Environment Office, accompanied by modifications according to the conditions of the research location, which refer to the PROPER assessment criteria in Minister of Environment Regulation No. 03 of 2014. These criteria are:

1. Environmental documents (ownership, implementation, and reporting).
2. Hazardous waste management (collection of types and volumes of waste produced; reporting; the amount of waste that is managed; and continued management of waste carried out by licensed third parties).
3. Control of air pollution, including emissions testing (monitoring, reporting, quality standards).
4. Control of air pollution, including ambient air quality (monitoring and reporting).
5. Control of water pollution, including management of domestic liquid waste (monitoring, reporting, quality standards, licensing of disposal of domestic liquid waste, and adherence to technical provisions).
6. Water pollution control, including monitoring water quality of water bodies (monitoring, reporting, quality standards).

Each criteria is divided into several levels and given a score of 0 to 2. Then the scores for all criteria are totaled and the total score will be obtained. The initiator's level of compliance based on the total score is classified in Table 1.

Table 1. Level of compliance

Total Score	Level of Compliance
0 – 12	not obey
13 – 24	not yet obedient
25 – 36	obedient

To find out the initiator's constraints in carrying out environmental management and monitoring, then using primary data from in-depth interviews with guide questions.

RESULT AND DISCUSSION

1. Level of Compliance

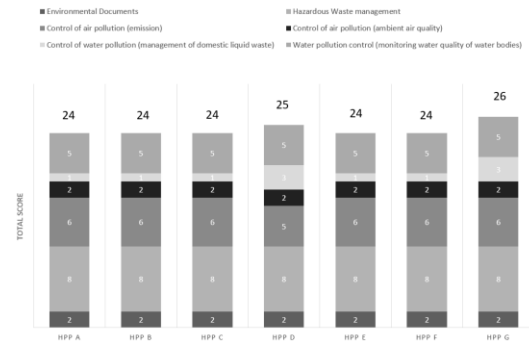


Figure 1. Graph of recapitulation of the initiator's level of compliance

Based on Figure 1., 2 (two) research objects are considered to have been obedient in environmental management and monitoring and as many as 5 (five) research objects are considered not obedient. For environmental document criteria, refer to Government Regulation Number 27 of 2012 concerning Environmental Permit Article 73 so that all hydropower plants have environmental documents that apply the same as environmental permits and have done reporting.

As for the management of hazardous waste, all hydropower plants have been obedient in management, namely identifying the source of generation, including data collection of types and volumes produced, packaging, and giving symbols according to their character, recording in the waste log book, routine reporting, up to the transportation of waste carried out by third parties licensed.

For air pollution control criteria, especially generator emission testing, all hydroelectric power plants that have generators routinely record the duration of their operational time in a log sheet and report it. To meet the generator emission test quality standards, most of the hydropower still meets the standard. As for ambient air quality testing, all hydroelectric power plants have conducted tests even though they are not routine and have reported them.

Regulations that refer to this criterion are Government Regulation Number 41 of 1999 concerning Air Pollution Control Article 30.

Ambient air quality standards refer to East Java Governor Regulation Number 10 of 2009 concerning Ambient Air Quality Standards and Emissions from Immovable Sources in East Java for Standards. The Ambient Quality category for Industry or Other Business Activities while the generator emission quality standard refers to the Minister of Environment Regulation No. 13 of 2009 concerning Emission Quality Standards for Immovable Sources for the Oil and Gas Business and / or Activities for the Emission Process Burning category from Internal Combustion Engines.

For water pollution control criteria, especially the management of domestic wastewater, some hydroelectric power plants are limited to monitoring and complying with a number of technical provisions without reporting, testing samples, and applying for a disposal permit. Minimum management of domestic liquid waste has been carried out, this is in accordance with Regulation of the Minister of Environment and Forestry Number 68 Year 2016 concerning Domestic Waste Quality Standards Article 3 but not in accordance with Article 4 paragraph 3 which requires monitoring to include the recording of processed domestic wastewater every day, records of discharge and pH of domestic wastewater every day, there are results of laboratory analysis of domestic wastewater conducted at least 1 (one) time in 1 (one) month. In addition, all hydroelectric power plants have not regulated permits to dispose of domestic liquid waste as required in Article 7 paragraph 1 of this regulation. The things above that underlie why the level of compliance with this criteria is still low.

In terms of controlling water pollution (monitoring water quality of water bodies), all hydropower plants have routinely monitored and reported the results of monitoring on a regular basis, even though in the 2017 to 2019 period there were still a number of parameters that did not meet the established quality standards in accordance with Government Regulations Number 82 of 2001 concerning Management of Water Quality and Water Pollution Control.

2. Obstacles in Conducting Environmental Monitoring

Based on research, there are many similarities in the work process of hydropower generation so that the forms of environmental monitoring have similarities. During carrying out environmental monitoring, the hydropower plant

as the initiator admitted experiencing several obstacles related to:

a. Authority in the management of raw water sources for operational generation.

Based on research it is known that the person in charge of the availability of water for plant operations throughout the hydropower plant is a different institution. All hydropower plants as initiators of generation have cooperation agreements with water supply institutions related to the maintenance and maintenance of reservoirs to achieve the sustainability of the generation and management of water resources operations. This cooperation agreement is actually aimed at providing water resources management services for hydroelectric power plants in the Brantas River area, in the form of operations, maintenance and other activities so that water resources are beneficial for the proponent of hydropower. Furthermore, the cooperation agreement produced programs that must be implemented by both parties, hereinafter referred to as the Water Resources Management Services Program (PJPSDA).

One of the obligations of a hydroelectric initiator for a reservoir manager is to pay dues in accordance with the use of surface water based on the kWh recording of transactions where the fee is determined by the government. Meanwhile, the responsibility of the reservoir management for the proponent of hydropower is one of them is to carry out sediment dredging and garbage cleaning by taking into account environmental aspects so that the operation of the plant does not experience interference. But in reality up to now several programs have not been able to run optimally, especially the supply of generation water quality.

Some hydropowers complain that the water used for operations is far from high quality. Based on the quarterly water quality monitoring report in 2019 from the reservoir management which was received by all the proponents of the hydropower also showed that the quality of the water class was of poor status (heavily polluted).

For example in the case of HPP C where the hydropower plant had to work more in cleaning the trash rack because it was often full of garbage. HPP C uses water from the first dam in the hydropower cascade system where the water is highly polluted because it is sourced from the activities of urban residents.

This will affect the implementation of environmental monitoring in the aspect of water

quality degradation listed in the hydropower environment document where the authority to manage water quality before entering the turbine is not the responsibility of the hydropower plant. The quality of water coming out of the turbine through the tailrace is very dependent on the quality of water entering the intake. This is what underlies quality standards on the results of water quality testing is very difficult to be fulfilled in the 2017 to 2019 timeframe.

b. Regulations and parameters of surface water quality test on hydropower intake and tailrace are not appropriate.

Referring to the work process of hydropower where there is no addition of any chemicals in it, namely only flowing water through turbines, testing the physical, chemical, and biological parameters of the water quality test needs to be adjusted again. This is reinforced by the statement in the attachment to the explanation of Article 38 paragraph (1) of Government Regulation Number 82 of 2011 concerning Water Quality Management and Water Pollution Control: "... Water that comes out of a hydroelectric power turbine does not constitute the remainder of hydropower activities, so not included in the provisions of this Article. "

Moreover, the period of testing the quality of water in several hydropower plants as much as 1 (one) month is considered burdensome, bearing in mind that the cost of analyzing laboratory samples for all parameters is not cheap so the initiator decides to carry out water quality testing once every 3 (three) months.

c. The application of the Minister of Environment and Forestry Regulation No. 68 of 2016 in domestic wastewater treatment has not been able to accommodate conditions in the field.

Based on observations during the study, the source of wastewater generation in hydropower plants only came from employee domestic activities. The number of employees in each hydropower is also an average of 40 to 48 people. This makes the initiator pay close attention to the principle of cost and benefit in carrying out domestic wastewater treatment. Fulfillment of technical provisions in accordance with regulatory requirements is deemed to be inadequate to meet such principles as the provision of flow meters, analysis of wastewater sample services to the management of liquid

waste disposal permits. Especially if you want to make a small-scale wastewater treatment plant that only accommodates the area of the hydropower plant, it is necessary to track and dismantle the drainage path and replace the existing septic tank with a liquid waste treatment unit that has been required and in accordance with the provisions.

As is known if the initiator already has a disposal permit, the initiator is also required to carry out monitoring at least once a month by attaching the results of laboratory tests. This made several hydropower plants decide to cooperate with external parties with permission to manage their domestic liquid waste so that it can be treated at the nearest sludge treatment plant. Moreover, in the future the number of employees will be reduced considering the company's efficiency efforts so that it will also have an impact on volume generation.

3. Obstacles in Conducting Environmental Monitoring

According [2], efforts to increase proponent's compliance in the implementation of environmental management and monitoring can be done using 7 (seven) planning stages including problem identification, goal formulation, alternative policies, alternative criteria, assessment of alternative policies, recommendations and plans for implementing policies.

a. Identification of problems

The implementation of environmental monitoring that has been carried out by the proponent of hydroelectric power activities in East Java still needs to be improved. Five of the seven research objects were assessed as being disobedient. This is indicated by the still low level of monitoring and periodic reporting in the measurement of ambient air quality, compliance with emission testing quality standards, management of domestic wastewater, and compliance with water quality monitoring of water bodies. Especially in the effort to carry out monitoring, the proponent still has technical and non-technical obstacles. Based on the description above, it is necessary to conduct an appropriate policy analysis in an effort to increase the compliance of the proponent in carrying out environmental monitoring.

b. Purpose Formulation

Referring to the conditions of the proponent's compliance in carrying out environmental monitoring along with the constraints faced, this

policy analysis aims to increase the proponents' compliance with the implementation of environmental management and monitoring with an adapted strategy.

c. Policy Alternatives

Determination of the policy requires several alternative options by taking into account the existing conditions and obstacles. Alternatives are chosen based on the level of accuracy, effectiveness, and efficiency, although each alternative has advantages and disadvantages. In an effort to increase proponent compliance with environmental management and monitoring activities, 3 (three) alternatives are used as follows :

Alternative I : Adapt environmental documents to real conditions in the field.

The proponent proposes to environmental agencies both at the district and provincial level according to their authority to ask for direction and coordination in the study of changes in the environmental monitoring matrix and its analysis supported by data in the field so that new environmental management and monitoring policies can be formulated and more in line with the latest conditions.

Alternative II : Meet aspects that are still lacking in the implementation of environmental monitoring.

The proponent continues to carry out environmental management and monitoring in accordance with the environmental documents owned, but with improvements made to aspects that are deemed lacking up to the technical implementation of monitoring in the field.

Alternative III : Increase personnel capability to support the implementation of existing environmental documents.

The proponent conducts training and competency certification to increase the capability of the personnel who are given the authority to carry out the obligations stated in the environmental documents that they have

d. Alternative Criteria

In the selection of alternative policies there are standard criteria that are taken into consideration. The criteria include technical feasibility, economic feasibility, political feasibility, and administrative feasibility. For policy making as an effort to increase proponent compliance with environmental management and monitoring activities can use these criteria with some adjustments [2].

e. Policy Alternative Assessments

All policy alternatives need to be assessed so that it can be seen which alternative is more appropriate to be recommended then applied. The assessment step starts from determining the variables and the magnitude of the value of each variable in each criterion and its sub criteria. Variable values are the same scale to see which variables influence the least. Variables that have low influence are considered small and variables that have high influence are considered large.

f. Recommendation

The alternative policy that will be recommended is the alternative with the highest accumulation of values as shown in Figure 2., realistic, and provide benefits for the future, but still by considering each of its strengths and weaknesses.

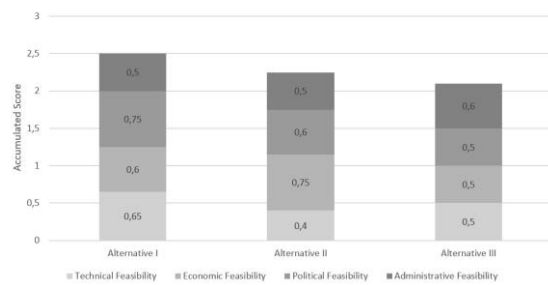


Figure 2. Graphic cumulative comparison of scores on each alternative

According to the criteria of eligibility, alternative I: adjusting environmental documents to real conditions in the field is stated as the most likely alternative to be applied in accordance with the objectives to be achieved. Therefore the recommended policy alternatives are based on the highest cumulative value and have technical, economic, political and administrative suitability, where the alternative is very effective in technical feasibility, very optimal in economic efficiency, easily accepted by the proponent or the government, as well as politically and legally not against the rules.

g. Policy Implementation Plan

Implementation of the selected alternative policies is expected to be implemented well. Therefore, it is necessary to take several action steps that must be carried out by the proponent as an effort to increase compliance in environmental monitoring. The intended action steps are as follows:

1. Procurement and allocation of funds to make changes to environmental documents.

2. Appoint personnel who will be given responsibility to oversee the program.
3. Coordinate with the district and provincial environmental agencies, in accordance with their authority, and submit requests for guidance relating to the adjustment of environmental documents that will be carried out by the proponent and all its problems. At this stage, it will be concluded the type of adjustment of environmental documents based on their needs by referring to the criteria listed in the Minister of Environment and Forestry Minister's Regulation Number P.23 of 2018 concerning Criteria for Changing Business and / or Activities and Procedures for Changing Environmental Permits.
4. If the type of environmental document made in the form of an AMDAL, the initiator can do it himself or ask for help from other parties both individuals and parties who are members of the service provider institutions. The requirements for the document compiler are to have a certificate of competency compilation of the AMDAL. This is in accordance with Article 11 of Government Regulation No. 27 of 2012.
5. During the process of compiling changes in environmental documents, the proponent should continue to coordinate with the environmental service both in terms of justification analysis, evaluation, supporting data, adjusting the type of environmental impact until a mutual agreement is reached until the document is ready and suitable for trial.
6. When the environmental documents resulting from the changes have been tried and corrected (if any) then submitted to be approved by the authorized environmental agency so that it can be used as a guide by the proponent in the implementation of environmental management and monitoring.

CONCLUSION

1. Out of the seven research objects, only two were declared obedient, while the rest were assessed as being disobedient. All objects have environmental documents and report them periodically to the relevant government agencies. Besides that, it has also conducted hazardous waste management according to procedures, carried out air pollution control which includes testing ambient air quality and generator testing although not routine, conducting water pollution control in the form of liquid waste management and monitoring water body water quality even

though certain aspects have not been able to meet the required criteria.

2. Initiators of hydroelectric power plants state that in carrying out environmental management and monitoring often experience some fundamental technical and non-technical obstacles. These things greatly affect the results of the reports that have been routinely carried out up to the time when the supervision carried out by the government.

3. Recommendations for the proponent to be able to increase compliance in carrying out environmental monitoring, that is to immediately coordinate with government agencies in accordance with their authority to adjust environmental documents owned based on conditions on the ground, and discuss any obstacles encountered in their implementation.

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