MINISTRY OF NATIONAL DEVELOPMENT PLANNING / NATIONAL DEVELOPMENT PLANNING AGENCY

BAPPENAS

Alternative Financing for Sustainable Dam Operation & Maintenance

POLICY BRIEF

2021

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I Urgency of dam Alternative Financing for Dam O&M in Indonesia

Dam operations and maintenance activities are currently mostly sourced from the limited APBN and loan-funded programs. The need for the operating and maintaining dams cost will be highly dependent on the state budget, especially for single purpose dams. From all dams in Indonesia, 42% of dams are single purpose dams. Therefore, innovation is needed in the mechanism of dam management that can encourage the operation and maintenance of dams that are independent and sustainable.

II Issues in Dam O&M Cost and Financing

II.1 Limited Source of Fund for Dam O&M

The increasing demand for water from various sectors such as industry, domestic, agriculture, and so on has led to increased investment needs for the development of water resources infrastructure, especially dams. However, an increase in government assets in this sector is not always followed by an increase in operating and maintenance budgets that are proportionate to the needs of sustainable management. The water resources sector, unlike other infrastructure sectors in Indonesia, has not involved the private sector much in carrying out its development and management. Apart from the limitation of business feasibility studies in this sector, supportive regulatory support will contribute to increase investment potential for investors who are interested to invest in the water resources sector.

The increasing budget needs for O&M (Operation and Maintenance) are also related to the condition of water resources infrastructure, such as dams which are mostly categorized as old dams. More than 72% of dams in Indonesia are old dams. Operation and maintenance of old dams require greater costs than new dams. This is partly because to maintain and/or improve the performance of old dams, remedial and/or rehabilitation activities are required which costs are not small/not cheap. In addition, the Government's limited budget for dam O&M financing is one of the issues in dam management. The cost of the State Revenue and Expenditure Budget (APBN) for dam O&M owned by the Ministry of PUPR is still relatively low and below the average, which is ± Rp 500 million to Rp 1 billion. Whereas the minimum O&M cost for the dam is ± Rp 8 billion. Therefore, additional costs are needed outside the state budget in cooperation with the private sector in dam management.

Furthermore, most dams in Indonesia are built with a single function, mostly for irrigation. However, the existing dam is still relatively small compared to the ideal needs. For dams with a single function such as irrigation, the current trend is that irrigation land is reduced due to land conversion from irrigated land to urban land, especially in Java. An example is Situ

Gintung Dam, which has changed due to the conversion of irrigated land into residential land. At present Situ Gintung's function is raw water supply and flood control. Therefore, optimization and redefinition of the use of existing dams need to be done as an effort to maintain the sustainability of dam management. There are several alternatives for optimizing existing dams, for example 1) utilization for tourism, 2) utilization for water sports facilities, 3) utilization for mini hydro power plants, 4) use of an open reservoir area for Floating Solar Panels, 5) and others. These alternatives utilization can generate revenue that can be used to fund the need of dam maintenance.

II.2 Public Service Agency for Dam Management

Financial viability aspect is one of the important aspects of dam O&M. This is very crucial for the sustainability of dam operational activities if it only depends on APBN funds. This condition is also limited by the task of the dam operator (*Unit Pengelola Bendungan*/UPB) not being able to receive financial flows from external, even though there is potential for income that can be received by UPB, such as water resources management service fee/*biaya jasa pengelolaan sumber daya air* (BJPSDA). One option for this issue is the existence of the Public Service Agency/*Badan Layanan Umum* (BLU). BLU is an agency within the Government that is formed to provide services to the community in the form of providing goods and / or services that are sold commercially even though without prioritizing seeking profit and carrying out its activities based on the principles of efficiency and productivity.

State financial reform mandates a shift in the budgeting system from traditional to performance-based budgeting, so that the use of government funds becomes output-oriented. This change is very important because the need for funds is increasing but government resources are limited. This budgeting is carried out by modern governments in various countries. Enterprising the government is a paradigm to encourage service improvement by the government. The main principles contained in these two laws form the basis for government agencies to implement BLU financial management. BLU is expected to be the first step in reforming public sector financial management, in order to improve government services to the community.

III Regulation and Policy for Dam O&M Funding

Based on the provisions of Article 57 paragraph (3) of Law 17/2019, it is clearly stated that funding for water resource management can come from:

- State Revenue and Expenditure Budget (APBN);
- Regional Revenue and Expenditure Budget (APBD); and/or
- Other legitimate sources in accordance with the provisions of the legislation.

In Article 57 paragraph (7) it is explained that the Provision of Water Resources Infrastructure can be carried out through funding cooperation with private business entities or other state governments which is continued in paragraph (8) it is stated that the funding cooperation as

referred to in paragraph (7) **does not include work the same in the implementation of Operation and Maintenance of Water Resources.**

Based on Article 1 point 20 of Law 17/2019, Water Resources Infrastructure is a water building along with other buildings that support Water Resources Management activities, either directly or indirectly. The stages of Water Resources Management as regulated in Article 38 of Law 17/2019 include, among others, the implementation of the construction of Water Resources Infrastructure and the implementation of Operation and Maintenance of Water Resources.

The implementation of the construction of Water Resources Infrastructure and the implementation of non-construction is carried out by the Central Government and/or Regional Governments in accordance with their respective authorities based on programs and activity plans. In the event that the Central and/or Regional Governments have limited budgets to carry out Water Resources Management activities which include the said Resource Infrastructure construction activities, based on the provisions of Article 57 paragraph (7) the Central Government and/or Regional Governments may undertake funding cooperation with business entities. private sector or other state government. However, in paragraph (8) and Article 57 it is stated that the funding cooperation does not include cooperation in the implementation of Operation and Maintenance of Water Resources.

Meanwhile, for funding related to the provision of Water Resources Infrastructure, paragraph 7 states that funding can be done through cooperation with private business entities or other state governments. However, this does not include cooperation in the implementation of Operations and Maintenance of Water Resources.

Based on Article 41 paragraph (1) of Law 17/2019, the Implementation of Operation and Maintenance of Water Resources consists of maintaining water sources as well as the operation and maintenance of Water Resources Infrastructure; of which the Operation and Maintenance of Water Resources is meant to include regulation, implementation, monitoring, and evaluation activities to ensure the preservation of the functions and benefits of Water Resources and their Infrastructure. The implementation of Operation and Maintenance of Water Resources is carried out by the Central Government and/or regional governments in accordance with their respective authorities and may involve community participation.

However, in relation to the limitation of the scope of funding cooperation as regulated in Article 57 paragraph (7) and (8) of Law 17/2019, an analysis has been carried out based on the assumption whether funding cooperation with business entities can still be carried out as long as the services provided by the business entity does not include a single unit, namely operation and maintenance.

The involvement of the private sector and the community in water resources operational activities, especially the operation of dams/reservoirs, is partly because operational activities are sensitive. Sensitivity in this case means that the operational activities of the reservoir/dam are related to the use of reservoir water which is directly related to the livelihood of many people. In accordance with the mandate in the 1945 Constitution Article 33 paragraphs (2) and (3), that: (2) Production branches which are important to the state and which affect the livelihood of the people are controlled by the state; (3) The earth and water and the natural

resources contained therein shall be controlled by the state and used for the greatest prosperity of the people. Therefore, dam/dam operational activities that lead to the use of reservoir water need to be carried out by the Government, in this case the Ministry of PUPR and Dam Management.

Thus, it can be assumed that in addition to construction activities for water resources infrastructure, **private business entities can be involved through a cooperation scheme to carry out Water Resources Maintenance activities.**

IV Performance Based Contract as an Alternative Financing for Sustainable O&M

In terms of financing the dams O&M, one of the financing cooperation schemes that can be used is the Performance Based Contract (PBC). Performance indicators are closely related to the measurement of payments for service providers. In general, PBC uses a lump sum payment scheme with a fixed price component, where after the cooperation agreement is agreed and there is an increase in costs, the service user will not pay for the price increase that occurs. In other words, the service provider will bear all the excess financing. In this regard, each component or scope of the contracted operation and maintenance work will use a lump sum payment system.

In the PBC scheme, there are 2 (two) main things that will be used as main indicators in determining the framework for dam maintenance cooperation, namely the potential for income generation and fulfilment of dam performance aspects.

In accordance with the functions of the dam and its potential to generate income potential, these activities cannot be entirely used as a source of income or do not meet the financial feasibility to be used as a source of revenue for maintenance activities, in which these maintenance activities require a large amount of cost.

So we need another activity that has the potential to be a source of funding for dam maintenance. One that is estimated to have potential income is the use of the reservoir inundation area to become a Floating Solar Power Plant. The Floating Solar activity in the inundation area of the reservoir/dam is considered to be quite potential because it can generate income from electricity sales activities. In addition, this Floating Solar activity can be a source of renewable energy and can slow down the process of evaporation of water in puddles of reservoirs/dams, so that it is in line with aspects of environmental sustainability in dams/reservoirs.

Cooperation for dam maintenance and provision of Floating Solar PV using PBC with a PPP procurement scheme. The scope of the Business Entity in the PPP for Dam Maintenance and Provision of Floating Solar on the Dam is as follows:

- Dam maintenance and monitoring;
- Planning and Construction of a Floating PLTS Facility;
- Operation and maintenance of PLTS Floating Facilities;

- Transfer of ownership of the Floating PLTS Facility assets to PJPK at the end of the cooperation period; and
- Obtain the necessary financing and provide equity of at least 30% (thirty percent) of the estimated value of the cooperation

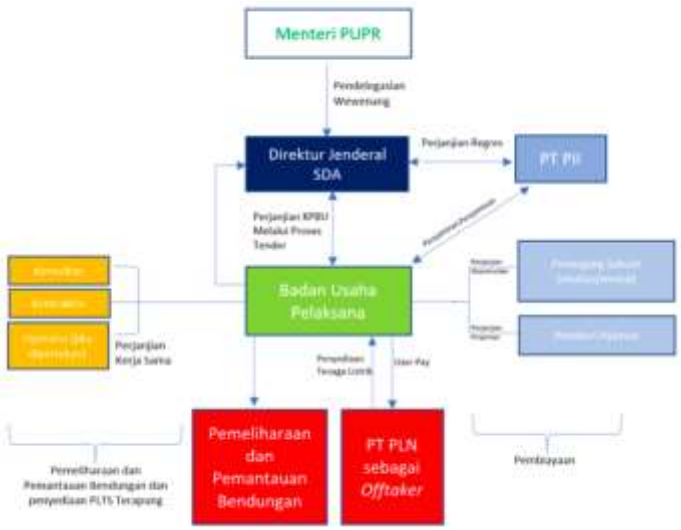

Figure IV.1 Project Structure Scheme

The PPP project structure can be seen in the Figure IV.1 which shows the relationship between the parties in the cooperation.

The form of cooperation in the maintenance and monitoring of dams and the provision of Floating Solar PV (Built-Operate-Transfer/BOT), was chosen because:

- The land and the inundation area of the dam are government assets. The selected business entity/*badan usaha pelaksana* (BUP) is required to carry out maintenance and monitoring of the dam as well as to provide Floating Solar PV infrastructure facilities.
- The selected BUP must maintain the dam and provide Floating Solar PV facilities during the cooperation period and hand over the Floating Solar PV facilities to the government at the end of the cooperation period, in a condition that is still feasible to operate.
- In carrying out maintenance and monitoring of dams as well as the provision of Floating Solar PV, **reliable, experienced, and financially capable operators are needed** to fulfil dam maintenance and monitoring performance indicators as well as providing facilities, operation and maintenance of Floating Solar PV. With the limited government budget, the option to cooperate with business entities in carrying out dam maintenance and the provision of Floating Solar PV facilities as a development of the reservoir utilization function is a priority.
- Efficiency maximization. The experience of business entities in carrying out dam maintenance can certainly maximize cost efficiency without reducing the performance standards.
- Risk allocation. The selection of the BOT scheme for the provision of facilities and the operation of the Floating Solar PV coupled with the scope of dam maintenance and

monitoring can serve as a model for the Government's efforts to obtain alternative funding in carrying out dam maintenance and improving the function of dam utilization. The risk of the installation of Floating Solar PV and operational facilities that will be borne by the Business Entity as the development of the utilization of the dam function is the right step.

- Transfer of knowledge. It is hoped that this collaboration will lead to a transfer of knowledge in more efficient and effective dam maintenance so as to increase the service life of the dam and the provision of Floating Solar PV facilities to improve the function of dam utilization.

V Recommendation

Recommendations that can be taken into consideration in policy evaluation are:

1. Scope of PBC

   It is necessary to do further regarding the scope of PBC in the maintenance of the existing dam based on the results of the assessment of the existing condition. Dam maintenance must be able to run properly and produce the expected output according to the results of the life cycle analysis.

2. Identify Benefits and Potential Income

   It is necessary to carry out a comprehensive analysis of the potential benefits and other income in the dam that has the potential to generate additional income without disrupting the main function of the dam and can contribute to the need for dam maintenance costs.

3. Identification of Stakeholders

   Identification of possible stakeholders involved in the cooperation, including the progress of the formation of BLU, the possibility of the Multiple Persons in Charge of Cooperation Projects (PJPK), and identification of prospective Business Entities.

4. Contribution Form

   The form of the business entity's contribution to the maintenance of the dam can be in the form of cash and non-cash. For cash, the business entity will make a cash contribution to the dam manager which will be used for maintenance costs. For this scheme, it will require a BLU at the dam operator to be able to manage the existing cash. The second scheme is that dam maintenance activities are carried out directly by business entities. For this scheme, it must be ensured that the business entity has the competence to carry out

REFERENCES

1. Rencana Pembangunan Jangka Menengah Nasional (RPJMN) 2020-2024

2. Directorate of Irrigation and Water Resources, Bappenas (2022), Rencana Kerja Tahun 2022
3. Directorate of Lake and Dam, MPWH (January, 2022), Information of Dams and Lakes
4. Directorate of O&M, MPWH (September, 2021), Kebutuhan AKNOP, Pembentukan UPB dan Penyampaian Strategi Pemanfaatan PLTA/M
5. Dam Asset Management and Implementation of Performance Based Contract Study, Bappenas (2021)
6. Law No. 17 of 2019 concerning Water Resources
7. PUPR Ministerial Decree No. 27/2015 concerning Dams
8. PUPR Ministerial Decree No. 6/2020 concerning Amendments to the Regulation of the Minister of Public Works and People's Housing Number 27/PRT/M/2015 concerning Dams
9. Presidential Regulation of the Republic of Indonesia Number 38 of 2015 concerning Public Private Partnership in the Provision of Infrastructure