

Public Private Partnership in Development and Operation of Warnasari Port of Cilegon City

Rommy Dwi Rahmansyah, ST

Master of Civil Engineering in Management and Construction Engineering, Faculty of Civil Engineering,
University of Persada Indonesia-YAI

Abstract: *The development and operation of the Warnasari Port by the Cilegon City Government must be carried out immediately. By granting rights to manage 45 hectares of land to PT. The CilegonMandiri Port development will soon be realized. With limited costs and experience, the financing model will be carried out through the Public Private Partnership (PPP) mechanism. This study aims to examine the feasibility of investment and the mechanism of cooperation between the government and the private sector. A port construction and operation scenario has been prepared. The amount of investment, expenditure and income has been made. After an analysis using investment criteria, it can be concluded that, Net Present Value = Rp. 1,994,758 (in million rupiahs), Gross B / C = 1.8, Net B / C = 2,71, Profitability Index = 3,17, IRR = 26.21%, Pay Back Period 7.1 years, BEP = 9.95 years. Thus the project is feasible and profitable. Sensitivity analysis by changing interest rates, investment costs and income to see the effect on the acceptability of an alternative investment. From the results of the investment feasibility study, the profit calculation obtained by PT. Pelabuhan Cilegon Mandiri and the City Government of Cilegon if a Public Private Partnership is collaborated with a private company. Profit received by PT. The Port of Cilegon Mandiri is 9,383,215 (in million rupiah). While the profit received by the City Government of Cilegon reached 998,386 (in million rupiah).*

Keywords: Public Private Partnership (PPP), Ports, Cilegon, NPV, IRR, Benefit Cost Ratio, Payback Period, BEP, Sensitivity Analysis

1. Introduction

Cilegon city is in a very strategic geographical position. Directly adjacent to the Sunda Strait which is the Indonesian Archipelago Sea Channel (ALKI 1) with the busiest international ship traffic in Indonesia. The city of Cilegon is also on the Sunda Strait, a gate that connects two large islands in Indonesia, namely Java and Sumatra. The Government of the City of Cilegon saw considerable opportunities in the port infrastructure sector and included them in the RPJMD.

Location of the Cilegon City Port development based on the Cilegon City Spatial Planning (RTRW) Year 2010 - 2030 that has been determined through the Cilegon City Regulation No. 3 of 2011 is in the area designated for the Port and Warehousing Area.

PT. PelabuhanCilegon Mandiri, as a BUMD, has been legally granted the right by the Government of the City of Cilegon to use a 45-hectare Warnasari land and a capital of 91 billion rupiah from the swap exchange of the Kubangsari Port with PT. Krakatau Steel.

Formulation of the Problem

Based on the background description described above, the formulation of the problem in this paper is to determine the feasibility of investment and determine the most profitable model of Public-Private cooperation..

Research Purposes

- 1) Determine financial feasibility of Warnasari Port development
- 2) Develop a model or financing scheme for the development of Warnasari Port

2. Theoretical Basis

Port

Regulations regarding port include:

- PP no. 61 of 2009 concerning Ports
- Transportation Decree no. 53 of 2002 concerning Ports
- The National Port acts as a national container transport feeder and place for loading and unloading national public goods, and is near the 50-mile national shipping lane.

Public-Private Partnership Bidang Infrastruktur

This decade, PPP schemes are widely used in infrastructure projects in Indonesia (Alfen et al., 2009; Jensen, 2017; Utama, 2010). The concept of PPP is defined as cooperation in a broad context between the public and private sectors in infrastructure and other services (ADB, 2008). The PPP scheme aims at realizing sectoral reforms and public investment, while fulfilling social obligations. Another view defines PPP as a way for the government to replace traditional methods related to public service contracts through competitive tenders (G. A. Hodge & Greve, 2007). PPP schemes are widely adopted in various infrastructure projects because these schemes bring innovation, creativity, cost efficiency, deal with budget constraints, risk allocation and strengthen public management (Chan, Lam, Chan, Cheung, & Ke, 2010; European Commission, 2003; G. Hodge, Greve, & Boardman, 2017; Mouraviev, Mouraviev, Kakabadse, & Kakabadse, 2016). In this case, the private sector is assumed to be more efficient, innovative and has a comparative advantage so that this scheme is expected to bring knowledge, managerial and technology transfer.

Asian Development Bank (2008) classifies PPP schemes into six types, namely service contracts, management contracts, rental contracts, build operate transfers (BOT), concessions and joint ventures. In the Indonesian context, BOT and concessions are the most commonly used schemes

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especially in the infrastructure sector such as roads, bridges, ports, terminals and electricity (Joesoef, 2011). To regulate this, Indonesia already has a cross-sector regulatory framework to accommodate PPP in various fields (Bappenas, 2016b).

Investment Feasibility Analysis

Assessing investment feasibility can be done by the following methods:

- 1) Net Present Value (NPV = Net Present Value)
- 2) Benefit Cost Ratio
- 3) Internal Rate of Return (IRR = Internal Rate of Return)
- 4) Profitability Index (IP = Index Profitability)
- 5) Return Period (PP = Period Payback)
- 6) Break Even Point (BEP = Break Even Point)

Net Present Value

Net Present Value is the equivalent amount that represents the difference between equivalent expenditure and equivalent revenue from an investment cash flow for a given interest rate. To calculate the Net Present Value we need a conversion factor that will be used to change a nominal value in the future to the present.

To find out this conversion factor, it is needed:

i = interest rate used (in the form of assumptions)

n = years in the "future" in terms of "present" for a certain nominal value.

While the formula used to determine NPV is: $P(i) = \sum_{t=0}^N \frac{At}{(1+i)^t}$

Or $P(i) = \sum_{t=0}^N Ai \left(\frac{P}{F}, i\%, t\right)$

Pay Back Period

Pay Back Period is the length of time required to return all expenses from all income equivalents. To get the return period the following formula is used: $0 = -P + \sum_{t=1}^N At \left(\frac{P}{F}, i\%, t\right)$

Benefit Cost Ratio

Benefit Cost Ratio is the ratio between all equivalent income with all equivalent expenses over a period of time. This analysis is used to justify economically a public project. An investment is said to be feasible if it has a B / C Ratio greater than or equal to one.

BCR analysis uses the following equation: $BCR = \frac{Benefit}{Cost}$

Internal Rate of Return

This method is used to calculate the rate of return needed so that the equivalent value of all investments equals the equivalent value of income. This analysis is useful as a comparison to the MARR value of investors. An investment is considered attractive if the MARR value is smaller than the IRR. This method is used as additional information that will strengthen the results obtained from the Net Present Value method.

It can be systematically stated:

$$NPW = \sum_{t=0}^N Ft(1+i)^{-t} = 0$$

$$\sum_{t=0}^N Rt \left(\frac{P}{F}, i\%, t\right) - Et \left(\frac{P}{F}, i\%, t\right) = 0$$

Where:

R_t = net acceptance that occurred in the t -period

E_t = net expenditure incurred in the t -period including the initial investment (P)

Analyze project proposals with IRR, giving the following indications:

- a. $IRR >$ desired rate of return RRR, project received.
- b. $IRR <$ required rate of return (i), project rejected.

Profitability Index

Profitability index (IP), which shows the ability to generate profits per unit investment value. Index profitability is the present value of cash inflows divided by the present value of outflows. This method is calculated by comparing the present value of benefits with the present value of costs. In general the equation is:

$$\frac{\sum_{t=0}^n \frac{c(t)}{(1+i)^t}}{\frac{(c0)}{(1+i)^0}}$$

If the result is > 1 , the proposed project can be accepted.

Break Even Point (BEP)

Break Even point is the main return point where total revenue = total cost ($TR = TC$). The break-even point provides a clue that the level of production has generated income as much as the production costs incurred. Besides being able to state the relationship between production volume, unit price and profit, break-even analysis provides information about the relationship between fixed costs and variable costs.

Investment Scenario

Based on the results of the initial feasibility study that has been carried out, the construction of the Port of the City Government of Cilegon is carried out in 3 (three) stages. For the first phase of development Land use in this first phase of development requires + 15 Ha of total land + 45 Ha. Development includes:

1. A liquid bulk dock with a capacity of 150,000 DWT
2. Dry bulk dock with a capacity of 70,000 DWT
3. Trestel with dimensions of 1090 x 15 m2
4. Storage tank
5. Dry bulk warehouse
6. Ship Unloader crane
7. Conveyor
8. Loading / unloading Arm
9. Piping
10. Open Storage
11. Access Road

3. Research Methodology

The research location is the place where the development of the Warnasari harbor in the City of Cilegon is Warnasari Village, Citangkil District, Cilegon City. The main actors are the City Government of Cilegon and PT. Cilegon Mandiri Port as the holder of 45 hectares of land management rights.

3.1 Data collection technique

The data used in the study consisted of two types, namely:

- 1) Primary Data is data that is directly taken from the object of research from the original source. The primary data needed is obtained through direct interviews with experts using a questionnaire with research parameter variables based on the planning stage and the feasibility study stage. From the questionnaire and interviews with some of these experts, input / comments related to this research were obtained. These inputs include the identification and types of research parameters, the addition and reduction of the number of research parameters and so on. There are 3 experts consisting of experts from the field of practitioners, academics and government. Then proceed again using the same pattern in the form of a questionnaire with experts on the parameters of the study including those that have added or subtracted in order to obtain reinforcement of the research results.
- 2) Secondary Data is supporting data that can be used as a reference in conducting value engineering analysis. Secondary data based on theoretical literature taken from books, references, journals and previous studies, including:
 - a) Warnasari Port data and information
 - b) Amount of trade traffic
 - c) Number of ships leaning
 - d) Port sector revenue potential
 - e) Port Budget Activity Data

3.2 Analysis Method

Analisa yang dilakukan dalam penelitian ini, meliputi :

a) Descriptive analysis

This analysis is carried out to obtain an overview of the implementation of research from experts through interviews that contain several research parameters based on the planning stages and stages of the feasibility study related to the research.

b) Analysis / evaluation of existing conditions and problem identification

This analysis uses a desk study method for data on the existing condition of port land, condition of the research area related to the process of port development and operation, development planning documents, feasibility study documents, steps taken by both the Cilegon City Government and PT. The Port of Cilegon Mandiri is in the process of developing and operating the port. In addition, problems that will arise in the process of port construction and operation will also be identified. From this analysis will get initial information on the current condition of the research object which is the basis for further analysis.

c) Analysis of port development needs

Within the limits of the research it has been stated that this research will only analyze the development needs of the Warnasari Port only in Phase I. This analysis will describe the infrastructure that will be built in Phase I along with other facilities until the port can start operating.

The design criteria for Phase I are based on the cargo to be

served by the Warnasari Terminal which is divided into two types of cargo namely Dry Bulk and Bulk Bulk.

d) Analysis of development cost needs

In accordance with the needs of the port development, an analysis of the costs of port infrastructure and other facilities will then be carried out. All cost components will be calculated so that the value of port investment is obtained in Phase I. The amount of the cost requirement is based on the Feasibility Study document prepared by PT. Pelabuhan Cilegon Mandiri.

e) Financial feasibility analysis

This analysis aims to determine the financial aspects of port construction and operation. In the financial aspect, it examines project components that require funding and is estimated for revenue and profit potential. After that a financial feasibility study will be conducted on the construction and operation of the port.

f) Analysis of Public Private Partnership partnership models or schemes

The P3 model chosen will affect the financial feasibility of port construction and operation. In this analysis, the most beneficial P3 cooperation scheme will be chosen from the side of the Cilegon City Government and PT. Pelabuhan Cilegon Mandiri. The cooperation model will be limited for 20 years.

4. Discussion of Research Results

4.1 Investment Feasibility Analysis

In developing an activity especially a profit-oriented commercial activity, there needs to be an in-depth study of various aspects. One of the most important requirements before making a decision to make an investment is reviewing the financial aspects. The financial feasibility study / assessment of the planned port development activities aims to assess whether the activity is feasible to be developed in terms of the economy and business. Basically in assessing financial feasibility it is necessary to look at the comparison of the value of benefits and the value of costs incurred.

The things that need to be done in financial analysis are:

- Calculate the Cost of Investment Capital (CAPEX) and Working Capital
- Contain Operating Costs (OPEX)
- Calculate Projection of Revenue
- Calculating Risk Costs
- Project Feasibilities

After calculating the above, the next step is to determine whether the project is financially feasible or not. To determine this, the standard eligibility assessment procedure is carried out using Net Present Value (NPV), (Internal Rate of Return) and Payback Period measurements.

Investment Capital Costs

Investment costs are costs incurred before an operational activity is carried out such as infrastructure development costs, equipment purchase costs, costs for development

activities (feasibility study, basic design, DED), utility costs, and others. Working capital costs are costs that must be provided to meet the needs of production costs up to a time where the company can obtain revenue from the sale of products that can be used to finance its production.

The investment cost component in this analysis consists of investment costs for Infrastructure consisting of trestle work, docks, warehouses, tanks and access roads and investment costs for equipment consisting of ship unloaders, main conveyor systems, conveyor systems for warehouses, loading arms and bridges weigh it. The total investment cost for the Warnasari Port Development Project in Phase I is **Rp.1.464.108.089.566,-**.

Income

Port revenue for Phase 1, the total cargo target is 4,500,000 tons per year which will increase progressively every year to reach 12,000,000 tons per year where the total dock capacity for Phase 1 is 12,000,000 tons per year.

The calculated tariff components are as follows:

- Dock Services
- Wharf dues
- Basic scout tariff (per movement)
- Variable Scout rates (per GT / movement)
- Fixed Delay Rates (per ship / hour)
- Variable Delay Rates (per GT / hour)
- Unloading / Loading Services

- Dry Bulk Feed
 - Non Bulk Dry Feed
 - Breakbulk
 - Liquid
- Warehouse Leasing
 - Dry Bulk Feed
 - Non Bulk Dry Feed
 - Breakbulk (Open Storage)
 - Storage Tank
- Feeding
 - Bulk Feeding to Truck
 - Bagging
 - Breakbulk Feeding
 - Liquid Feeding
- Weighing Services
- Port Facility Service

Operating costs

Operating costs included in the calculation for the Warnasari Port are:

- Personnel Cost; These costs are incurred for personnel salaries, salary costs for officials and employees, human resources.
- M / E and Civil Work; These costs are incurred for maintenance and maintenance needs related to mechanical, electrical, civil works.
- ICT, Security and Safety; These costs are incurred for needs in terms of telecommunications and port security.

- Office Vehicle: These costs are incurred for the needs of official vehicles during the operation.
- Training & Insurance; These costs are incurred for training and insurance needs.
- Operating costs: These costs are incurred for needs that are directly related to the service operation process such as: a permit, accommodation, office equipment, etc.
- Leasing costs; Costs arising from delayed payments.
- Contingency costs; These costs are incurred for the needs of things that can not be suspected.
- The amount of inflation is 5%

Determination of Factor Discounts

The discount factor used in this calculation refers to wacc. WACC is used based on ROI from similar companies, namely PT. Pelindo III, which operates in the area adjacent to the location of the port of Warnasari. Big discount factor used in the calculation is 14.40%.

Investment Feasibility Analysis Results

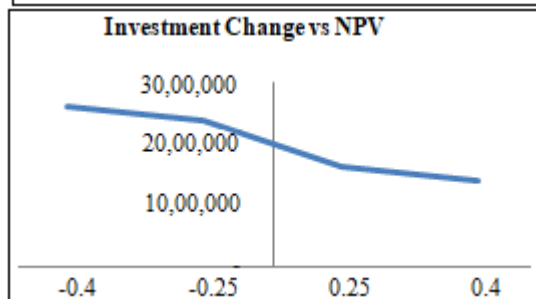
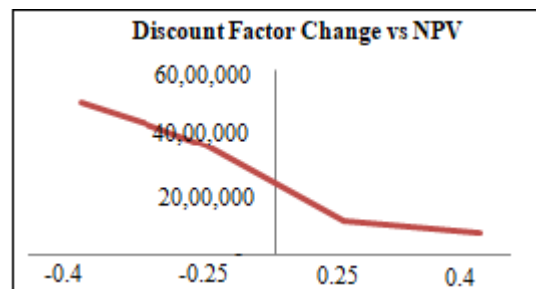
From the calculation results obtained:

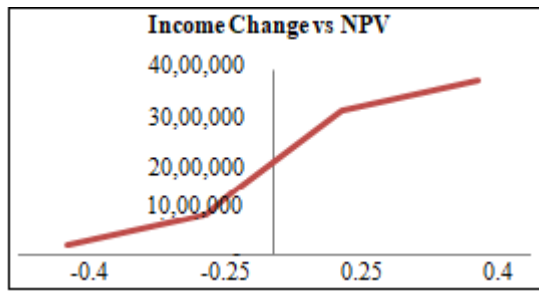
No	Indicator	Value
1.	NPV	1.994.758 (juta rupiah)
2.	Gross B/C	1,8
3.	Net B/C	2,71
4.	Profitability Index	3,17
5.	IRR	26,21 %
6.	Payback Period	7,1 years
7.	BEP	9,95 years

Analysis Sensitivity

In conducting a Sensitivity Analysis, several scenarios are arranged so that they will get several alternative results from the investment feasibility calculation. In this study the sensitivity analysis was carried out as follows:

- 1) Increase and reduce investment costs by 40%.
- 2) Increase and reduce investment costs by 25%.
- 3) Increase and decrease factor discount by 40%.
- 4) Increase and decrease factor discount by 25%.
- 5) Increase and reduce income by 40%.
- 6) Increase and reduce income by 25%.





From the results of the analysis of the sensitivity above, it can be seen that the largest NPV occurs when the discount factor decreases by 40% where the NPV becomes 5,035,548 million rupiah. The lowest NPV value occurs in the condition of a large decrease in income by 40% where the NPV becomes 205,143 million rupiah. At this lowest NPV condition although NPV along with several other parameters such as B / C and positive PI, however, has a BEP of 18.9 years. The timeframe is very close to the investment period of 20 years.

Financing or Collaboration Scheme

In the case of parties involved in the Public Private Partnership (P3) scheme in the construction and operation of the Warnasari Port, it can be described as follows:

- 1) The person in charge of the Cooperation Project (PJPK) is the Cilegon City Government, represented by the mayor of Cilegon.
- 2) Equity sponsors are PT. Pelabuhan Cilegon Mandiri (PT.PCM)
- 3) P3 Company is a private company that will later collaborate with PT. PCM in the construction and operation of ports
- 4) The contractor is the party who will carry out the construction and management.
- 5) Financial institutions are banks and selected financial institutions.
- 6) Public is the people of the City of Cilegon.

The financing model or scheme in the construction and operation of the Warnasari Port is as follows:

- Cilegon City Government gives concessions to PT. Port of Cilegon Mandiri (PT. PCM) with the release of HPL of 20 Ha land in Phase I.
- PT. PCM is obliged to provide a dividend to the City Government of Cilegon at 2% of net profit.
- Cilegon City Government obtained land rent from the joint venture.
- PT. PCM entered into a joint venture with a private company PT. X (for example).
- PT. PCM made a land area of 45 hectares with an assessment of Rp. 2,000,000 per m² or Rp. 900,000,000,000 as capital. This value is used as a share ownership of 51%.
- PT. X deposited a cash fund of Rp. 600,000,000,000 as initial capital for initial construction and Rp. 250,000,000,000.- for operations. This value is used as ownership interest of 49%.
- PT. PCM is entitled to a profit of 51% of net profit.
- PT. X gets a gain of 49% of net profit.
- Funding for initial investment in the construction and purchase of port equipment using funds paid by PT. X

and the shortfall is 70% using a loan with 5% interest.

The advantage

Public Private Partnership collaboration is a joint venture. In this collaboration, PT. PCM cooperates with a private company, PT. X where both of them deposit shares. Ownership of PT. PCM by 51% and PT. X by 49%.

The results of the calculation of net income to be received by PT. PCM and Cilegon City Government can be seen in table 4-15. In the table it can be seen that the total profit received by PT. PCM at the end of the collaboration was 9,383,215 million rupiah. Profit for the City Government of Cilegon originating from land rent and dividends amounting to 998,386 million rupiah.

5. Conclusion

- 1) The calculation results show that the scenario of development and operation of the Warnasari Port used is "Eligible" for investment. The calculation results can be summarized as follows:
 - NPV has a positive value of Rp. 1,994,758,000,000
 - Gross B / C is 1.80
 - Net B / C is 2.71
 - Profitability Index is 3.17
 - IRR of 26.21%.
 - Payback Period for 7.10 years
 - BEP for 9.95 years
- 2) The results of sensitivity analyzes that have been carried out with changes in discount factors, investment capital costs and income still show a positive NPV. The two extreme results obtained on NPV can be summarized as follows:
 - Reducing the discount factor by 40% where the NPV becomes Rp. 5,035,548,000,000
 - Decrease in annual income by 40% where the NPV becomes Rp. 205,143,000,000
- 3) The Public Private Partnership collaboration scenario is a joint venture. The results of the calculation of net profit at the end of 20 years of work are:
 - PT. PCM Rp. 9,383,215,000,000
 - Cilegon City Government Profit Rp. 998,386,000,000
- 4) In a very pessimistic scenario where there is a 40% decrease in annual income, the cooperation period can be extended to 30 years. The calculation results for the 30-year collaboration can be summarized as follows:
 - NPV has a positive value of Rp. 612,078,000,000
 - Gross B / C is 1.23
 - Net B / C is worth 1.52
 - Profitability Index is 1.94
 - IRR of 15.87%.
 - Payback Period for 10.77 years
 - BEP for 18.90 years
- 5) The Public Private Partnership scheme implemented can provide benefits and accelerate the implementation of development in addition to providing capital solutions.

6. Suggestion

- 1) In an effort to develop port infrastructure using a Public Private Partnership scheme, more detailed regulations are

needed for each form of cooperation used. This regulation is needed to clearly regulate the implementation of each form of cooperation.

- 2) In using the Public Private Partnership scheme for port infrastructure development, an independent supervisory body is needed to support the maximum implementation.
- 3) The government can provide facilities for the private parties involved in the implementation of the Public Private Partnership to support further development.
- 4) For PT. PelabuhanCilegon Mandiri in continuing the port development in the next stage can use the same scheme to get profit.

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