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Feasibility Study of the Development of a Drinking Water Supply System (SPAM) Investment of Cibulakan Springs Perumda Drinking Water Tirta Rahaja Bandung District – West Java

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Abstract: Along with population growth and rapid development in Bandung Regency, demand for clean water is increasing. The development of a clean water supply system for Perumda Drinking water Tirta Raharja certainly requires a study of the feasibility of investing in the development of a drinking water supply system (SPAM) from the Cibulakan spring of Perumda Drinking Water Tirta Raharja, Bandung district so that it can be known to what extent the process is beneficial for the community and of course for the Government. The settlement method in this calculation for Feasibility Investment Analysis uses the Net Present Value (NPV) method and the Break Event Point (BEP) method. From the results of the investment feasibility analysis from the financial aspect with the Net Present Value (NVP) investment assessment, an NPV value of IDR 518,181,911,866 (NPV > 0) was obtained. So, the development of a Drinking Water Supply System (SPAM) from the Cibulakan springs of the Tirta Raharja Drinking Water Company, Bandung Regency is worth continuing. An NPV value that is positive or greater than (> 0) indicates that the income is greater than the value invested. The results of the Break Even Point (BEP) investment assessment showed that the return value occurred in the 14th year with the accumulation of negative profits being marked as positive after the 14th year. This explains that the investment in developing a Drinking Water Supply System (SPAM) from the Cibulakan springs of Perumda Drinking water Tirta Raharja in Bandung Regency is worth running, because there is a return on investment as proven by the BEP value for 7 years.

Keywords: Investment Feasibility, NPV, BEP, Drinking Water

INTRODUCTION

In Indonesia, the government's responsibility for providing clean water is regulated in Article 5 of Law Number 7 of 2004 concerning Water Resources, where the state guarantees every person's right to obtain water for minimum daily basic needs to fulfill a healthy, clean life, and productive. However, in reality, the government has not been able to meet the water needs of all people in Indonesia (Sriyana, 2010). This is supported by data obtained through the Central Statistics Agency which states that 21.1% of the Indonesian people do not have access to clean water (Central Statistics Agency, 2020). The drinking water supply system is one of the uses of water resources and sanitation management as a form of protection and preservation that needs to be carried out by the Government (Hidayati, 2017).

Perumda Drinking Water is usually established by regional governments, such as districts or cities, to manage the clean water supply system in order to meet the community's drinking water needs. The main tasks of Perumda Drinking Water include taking water from natural sources such as rivers, lakes, drilled wells, or other water sources, processing this water into clean water suitable for consumption, distributing clean water through pipe networks to homes and public facilities, as well as maintaining water quality and carrying out necessary infrastructure maintenance. The main objective of Perumda Drinking Water is to ensure that the community has adequate access to clean water that is safe for consumption.

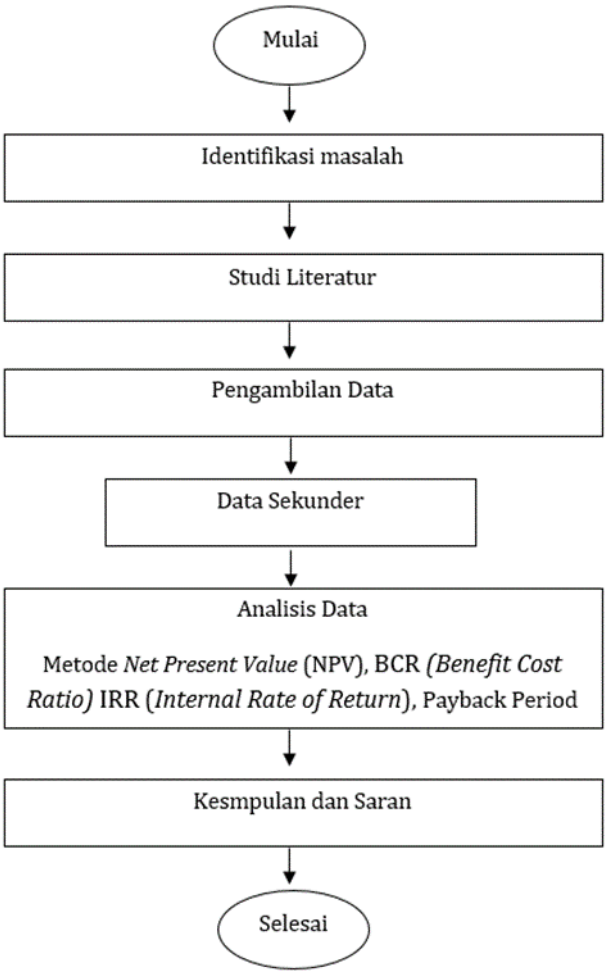
"Perumda Drinking Water Clean Water System" refers to the clean water supply system operated by the Regional Drinking Water Company (Perumda Drinking Water). Perumda Drinking Water is a company established by the regional government to manage the provision of clean water for communities in the region. Regional Drinking Water Companies (Perumda Drinking Water) are regionally owned business entities that are responsible for the supply, production, distribution and service of drinking water in an area.

Investment feasibility is done to evaluate whether an investment is feasible or not, by considering several aspects. The purpose of assessing these aspects is to identify potential failures in activities that may not be profitable (Prasetya and Marleno 2020). Sometimes, when making decisions, management can ignore this, which results in errors in decision making. Investment feasibility analysis can provide an idea of whether the investment to be made can provide profits, the extent of the profits, and whether the profits are maximum or not (Rendy and Marleno 2020). A comprehensive investment feasibility analysis process allows decision makers to make informed and rational decisions about whether a project is worth running or not.

Finance is an important aspect in analyzing the feasibility of an investment because it provides an overview of the potential returns and profits that can be obtained from the investment. The Net Present Value method calculates the difference between the present value of an investment and the present value of net cash receipts (operational and terminal cash flow) in the future. If the present value of future net cash receipts is greater than the present value of the investment, then the project is said to be profitable and therefore accepted. Break Event Point (BEP) is used to measure the breakeven point where total revenue is equal to total cost. Comprehensive and accurate analysis of financial aspects is very important in assessing investment feasibility and making the right investment decisions.

METHODOLOGY

This research aims to conduct a Feasibility Analysis of Investment in developing a clean water system at the Tirta Raharja Drinking Water Company, Bandung Regency, West Java. The type of data in this research is secondary data. Secondary data is data obtained directly from the clean water system agency at Perumda Drinking Water Tirta Raharja, Bandung Regency, West Java including: The amount of production and distribution of the clean water system at Perumda Drinking Water Tirta Raharja, Bandung Regency, West Java, Investment and operational costs for the Drinking Water Supply System (SPAM) from Cibulakan Springs, Tirta Raharja Drinking Water Company, Bandung Regency – West Java. Benefits of developing a clean water system distribution network from Cibulakan Springs, Tirta Raharja Drinking Water Company, Bandung Regency - West Java. Plans for developing the clean water system distribution network at Perumda Drinking Water Tirta Raharja, Bandung Regency, West Java and related Bank Negara Indonesia (BNI) interest rates. The Cost Budget Plan (RAB) is taken from the party implementing the project. Feasibility Investment Analysis using the Time Value of Money Concept method, Net Present Value (NPV) Method and Break Event Point (BEP) Method. The research flowchart or research steps can be seen in Figure 1 below:



Picture 1. Flow Chart Research

RESULTS AND DISCUSSION

Net Present Value (NPV)

Net Present Value (NPV) is the result of the process of discounting all future cash flows to their present value. By calculating the present value of all cash inflows and outflows over the life of the project, then subtracting the initial costs, we can figure out the difference. NPV reflects the difference between revenues and costs of building a project. Each income and expense must be discounted first before the difference between the two can be calculated for each year. By tracking these cash flows over a set investment period, we can determine the NPV value. Each year, this cash flow will increase along with the difference between income from water sales and operational and maintenance costs. By using an interest rate of 10% and taking into account the residual value at the end of the horizon year, the NPV analysis calculation is tabulated as in Table 1.

Table 1. Net Present Value from 2023 to 2042

Years	*Net Cash Flow*	P/F;10%;n	PV (Rp)
	a	b	c = a*b
2025	- 2.208.314.135	0,909	- 2.007.558.305
2026	- 1.467.135.035	0,826	- 1.212.508.293
2027	- 935.718.835	0,751	- 703.019.410

2028	125.855.115	0,683	85.960.737
2029	921.117.315	0,621	571.941.382
2030	1.749.654.665	0,564	987.634.445
2031	2.611.467.165	0,513	1.340.095.576
2032	3.506.554.815	0,467	1.635.833.700
2033	4.434.917.615	0,424	1.880.837.998
2034	5.396.555.565	0,386	2.080.605.784
2035	6.391.468.665	0,350	2.240.170.776
2036	7.419.656.915	0,319	2.364.131.350
2037	8.481.120.315	0,290	2.456.678.455
2038	9.575.858.865	0,263	2.521.622.926
2039	10.703.872.565	0,239	2.562.421.989
2040	11.865.161.415	0,218	2.582.204.825
2041	13.059.725.415	0,198	2.583.797.051
2042	14.287.564.565	0,180	2.569.744.073
2043	15.548.678.865	0,164	2.542.333.241
2044	16.843.068.315	0,149	2.503.614.781
		NPV	29.586.543.082

Source: research processing data 2024

From the NPV calculation results for the pipeline network development project, an NPV value of IDR 518,181,911,866 was obtained (NPV > 0). So, the investment in developing production capacity and clean water networks for 3 sub-districts in Bandung Regency is worth continuing.

***Break Even Point* (BEP)**

Break Even Point (BEP) is the point at which total revenue equals total costs, so that no profit or loss occurs. In simpler terms, BEP is the point at which a business breaks even, where they make no profit or loss. To calculate BEP, you need to consider fixed costs and variable costs as well as the selling price per unit.

By knowing the BEP, you can carry out strategic planning to reach or even exceed the break-even point. This may involve adjusting prices, controlling costs, improving operational efficiency, or other marketing strategies to increase revenue and break even more quickly or with better results. The fixed costs are depreciation costs, while the variable costs are operational and maintenance costs as in Table 2.

Table 2. Break Even Point (BEP)

Year to	Year	Accumulation Income Water Sales	Amount Cost Shrinkage	Cost Operational and Treatment	Accumulation Profit
		a	b	c	d = a- b- c
1	2025	19.469.060.910	3.315.796.376	19.216.547.181	- 3.063.282.647
2	2026	19.756.903.400	3.315.796.376	19.216.547.181	- 2.775.440.157
3	2027	19.769.529.000	3.315.796.376	19.216.547.181	- 2.762.814.557
4	2028	20.310.369.950	3.315.796.376	19.216.547.181	- 2.221.973.607
5	2029	20.526.658.425	3.315.796.376	19.216.547.181	- 2.005.685.132

6	2030	20.742.946.900	3.315.796.376	19.216.547.181	- 1.789.396.657
7	2031	20.959.235.375	3.315.796.376	19.216.547.181	- 1.573.108.182
8	2032	21.175.523.850	3.315.796.376	19.216.547.181	- 1.356.819.707
9	2033	21.391.812.325	3.315.796.376	19.216.547.181	- 1.140.531.232
10	2034	21.608.100.800	3.315.796.376	19.216.547.181	- 924.242.757
11	2035	21.824.389.275	3.315.796.376	19.216.547.181	- 707.954.282
12	2036	22.040.677.750	3.315.796.376	19.216.547.181	- 491.665.807
13	2037	22.256.966.225	3.315.796.376	19.216.547.181	- 275.377.332
14	2038	22.473.254.700	3.315.796.376	19.216.547.181	- 59.088.857
15	2039	22.689.543.175	3.315.796.376	19.216.547.181	157.199.618
16	2040	22.905.831.650	3.315.796.376	19.216.547.181	373.488.093
17	2041	23.122.120.125	3.315.796.376	19.216.547.181	589.776.568
18	2042	23.338.408.600	3.315.796.376	19.216.547.181	806.065.043
19	2043	23.554.697.075	3.315.796.376	19.216.547.181	1.022.353.518
20	2044	23.770.985.550	3.315.796.376	19.216.547.181	1.238.641.993

Source: research processing data 2024

This explains that investment in developing production capacity and clean water networks for 3 sub-districts in Bandung Regency is worth continuing. This is worth carrying out, because there is a return on investment as evidenced by the BEP value for 14 years.

CONCLUSION

Investment feasibility from a financial aspect is by assessing the Net Present Value (NVP) investment to obtain an NPV value of IDR 518,181,911,866 (NPV > 0). So, the development of a Drinking Water Supply System (SPAM) from the Cibulakan springs of the Tirta Raharja Drinking Water Company, Bandung Regency is worth continuing. An NPV value that is positive or greater than (> 0) indicates that the income is greater than the value invested.

Investment feasibility from a financial aspect is that by assessing the Break Even Point (BEP) investment, the return value is obtained in the 14th year, marked by the accumulation of minus profits becoming positive after the 14th year. This explains that investment in developing a Drinking Water Supply System (SPAM) from the Cibulakan spring, the Tirta Raharja Drinking Water Company, Bandung Regency, is feasible, because there is a return on investment as evidenced by the BEP value for 7 years.

Based on the results of the analysis from research carried out to invest in developing production capacity and clean water networks for 3 sub-districts in Bandung Regency, in the future, considerations need to be made to obtain greater profits, it is necessary to reduce the level of leakage and water loss to a minimum. Preventive measures and regular maintenance of plumbing infrastructure can help reduce leaks and unnecessary water losses.

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