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Feasibility Study of Investment Development of a Clean Water Supply System for Increasing Water Source Discharge

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Abstract: The availability of clean water is a complex and urgent problem. Water is a natural resource that is very important for human survival. The problem faced is that the clean water system in the area where residents live is not running smoothly. To overcome this, a good clean water distribution network and good clean water system management are needed and are able to serve the clean water needs of residents in the area. In order to make this happen, quite a large investment is needed. One of them is by carrying out company investment in the form of increasing the capacity of the raw water supply system. Based on the background mentioned, the title of this research is Feasibility Analysis of Investment in the Clean Water System of the Wae Mbeliling Drinking Water Company, Lembor District. The settlement method for this calculation is for Feasibility Investment Analysis using the Net Present Value (NPV) method and the Break Event Point (BEP) method. From the results of the analysis, an NPV value of Rp. 678,904,405,208 (NPV > 0). So the investment in developing the production capacity and clean water network of Perumda Air Minum Wae Mbeliling, Lembor District, is worth continuing. An NPV value that is positive or greater than (> 0) indicates that the income is greater than the value invested. It was found that the return value occurred in the 4th year by marking the accumulation of positive profits starting from the 4th year. This explains that the investment in replacing the clean water distribution network of Perumda Air Minum Wae Mbeliling, Lembor District is feasible, because there is a proven return on investment. from the BEP value for 1 year.

Keywords: Investment feasibility, NPV, BEP, clean water

INTRODUCTION

In many developing countries, including Indonesia, the problem of access to clean water is still a very serious problem. Even though there have been efforts from the government and various related parties to increase access to clean water, there are still obstacles that hinder the optimization of clean water provision for the community. To meet standards for clean water, water must meet the requirements for the drinking water supply system. These requirements include physical, chemical, biological and radiological qualities, so that they are safe for consumption without causing side effects on health (Eryanto et al., 2021). Indonesia has abundant water resources in the form of rivers, lakes, reservoirs, reservoirs, shallow wells and artesian wells, however many Indonesians still have difficulty getting access to adequate clean water. The availability of clean water in Indonesia is a complex and urgent problem (Budiman et al., 2024).

In an effort to understand the challenges faced in maintaining adequate water supplies, there are several factors that influence them, including; first, the rapid population growth rate every year has a direct impact on the demand for clean water; Second, climate change also has an impact on the availability of clean water. Unstable rain patterns, drought and temperature changes can affect natural water sources and result in a decrease in the amount of water available; Third, water pollution has also become a serious problem that affects the quality of clean water.

This pollution comes from various sources, including industry, agriculture and domestic waste, which has become a threat to maintaining water quality and makes it unsafe for consumption, therefore efforts to control water pollution are very important; Fourth, the availability of clean water throughout Indonesia is not evenly distributed. This creates a gap between one region and another which needs to be managed wisely by the government so as not to cause conflict in society (Law No. 17, 2019).

West Manggarai is one of the districts in East Nusa Tenggara province which was ratified through Law Number 8 of 2003 concerning the establishment of West Manggarai Regency, in running the wheels of government, the Regent is assisted by regional apparatus organizations (OPD) to carry out government duties according to their respective duties and functions. , including one of which is the formation of the Wae Mbeliling Regional Drinking Water Company (PDAM) through Regional Regulation Number 10 of 2008, dated June 16 2008, and Regional Regulation Number concerning the change in the status of the Regional Drinking Water Company (PDAM) to become a Regional Public Drinking Water Company (PERUMDA Air Drinking), which is a transition from the West Manggarai Regency Clean Water Management Service Technical Implementation Unit (UPTD) to carry out one of the government's tasks, namely serving clean water to the community in all sub-district areas (Bura et al., 2023). PERUMDA Wae Mbeliling Drinking Water, currently manages and serves clean water for the community in four sub-district capital areas (IKK), namely the Komodo sub-district capital, the Lembor sub-district capital, the South Lembor sub-district capital and the Kuwus sub-district capital, apart from the four In this sub-district area, its management is still the responsibility of the West Manggarai Regency Public Housing and Settlement Areas and Land Service (DKRPP). This research is focused on re-analyzing the actual condition of the need for clean water to fulfill community needs in the Lembor IKK Unit technical service area based on the latest population population (BPS West Manggarai district in 2024), as a basis for calculating water needs and referring to standards of need. The daily minimum basic requirement for meeting living needs is 60 liters/person/day (Law No. 17, 2019). Water source measurements were carried out directly in the field to determine the actual condition of the source discharge as a comparison with existing data from PERUMDA Wae Mbeliling, West Manggarai district.

The method used in this research is a descriptive - quantitative method, namely the results of calculations and translations from field data processing are described and depicted as they are. Investment feasibility analysis is important to provide an overview of the investment to be made. Will the investment provide profits, how big the profits will be, and whether the profits will be maximum or not. In the context of this research, the results of the investment feasibility analysis are expected to ensure that the performance of the Clean Water system that has been implemented is able to meet community needs and produce the expected level of service. The need for drinking water in an area will basically increase from year to year along with the rate of population growth (Rival Sibuea et al., 2022). The growth rate of development and population increase in Lembor sub-district has a direct impact on increasing people's need for drinking water.

Many people in the Lembor sub-district area in general and especially people in the Lembor IKK Unit technical service area experience difficulties in meeting the clean water needs of the people in the Lembor sub-district because it tends to decline, especially during the dry season (Nuryani & Santoso, 2020). Therefore, it is necessary to conduct a survey of new water sources that can be used to supplement the water sources that are currently being used to meet the raw water needs for drinking water in Lembor sub-district so that the problem of vulnerability to meeting drinking water needs in Lembor sub-district can be resolved.

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METHODOLOGY

This research is a descriptive which uses statistical data and statistics to produce applicable insights. In the context of descriptive research design, the researcher's main focus is to describe the situation or case being studied. It is a theory-based approach that involves the collection, analysis, and presentation of collected data. By using this approach, researchers can provide a deeper understanding of the reasons and methods for carrying out research.

This research aims to find answers to the problems presented in the problem formulation, namely conducting a Feasibility Analysis of Investing in the Development of a Clean Water Supply System to Increase Water Source Discharge in the Lembor IKK Unit Technical Service Area, Lembor District, West Manggarai Regency. Following are several stages of research:

1) Conduct a review of existing problems as stated in the problem formulation, research objectives and benefits of the research.
2) Collect primary data and secondary data.
3) Conduct a study (analysis) of technical feasibility based on applicable regulations and calculation methods in accordance with established calculation standards.
4) Obtain the results of development cost planning (cost) and carry out an analysis of the benefits obtained from the existing calculation results.
5) Conduct an analysis of economic and financial feasibility using existing standards and calculation formulas, such as NPV and BEP
6) Produce a decision whether the feasibility of the investment is feasible or not in terms of continuing the development of the planned activities.
7) Conclusions and Suggestions, namely the final results of the research carried out and providing suggestions for input on the research results so that they can be useful for the development of activities and the development of science in the future.
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The research flowchart or research steps can be seen in Figure 1 below:

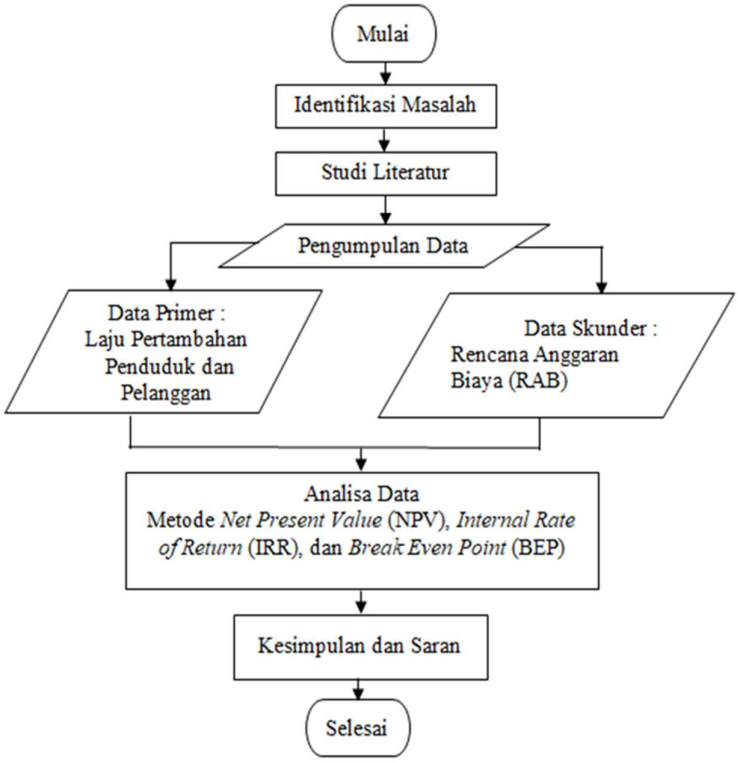

Figure 1. The research flowchart

RESULTS AND DISCUSSION

Net Present Value (NPV)

Net Present Value (NPV) is based on the concept of discounting all cash flows to their present value. By discounting all cash inflows and cash outflows over the life of the project to their present value and then calculating the net figure, the difference will be known.

Table 1. Net Present Value from 2025 to 2044

Year	*Net Cash Flow*	P/F;10%;n	PV (Rp)
	a	b	c = a * b
2025	58.658.386.744	0,909	53.320.473.550
2026	62.599.614.684	0,826	51.707.281.729
2027	62.772.488.284	0,751	47.142.138.701
2028	70.177.848.984	0,683	47.931.470.856
2029	73.139.337.334	0,621	45.419.528.484
2030	76.100.825.684	0,564	42.920.865.686
2031	79.062.314.034	0,513	40.558.967.099
2032	82.023.802.384	0,467	38.305.115.713

2033	84.985.290.734	0,424	36.033.763.271
2034	87.946.779.084	0,386	33.947.456.726
2035	90.908.267.434	0,350	31.817.893.602
2036	93.869.755.784	0,319	29.944.452.095
2037	96.831.244.134	0,290	28.081.060.799
2038	99.792.732.484	0,263	26.245.488.643
2039	02.754.220.834	0,239	24.558.258.779
2040	05.715.709.184	0,218	23.046.024.602
2041	08.677.197.534	0,198	21.518.085.112
2042	11.638.685.884	0,180	20.094.963.459
2043	14.600.174.234	0,164	18.794.428.574
2044	17.561.662.584	0,149	17.516.687.725
			678.904.405.208

From the results of the NPV calculation for the pipeline network development project, an NPV value of Rp. 678,904,405,208 (NPV > 0).

Break Even Point (BEP)

To calculate BEP, several variables are needed, namely fixed costs, variable costs and income

Tabel 2. Break Even Point (BEP)

Year	Accumulated Water Sales Revenue	Amount of Depreciation Expenses	Accumulated Operational and Maintenance Costs	Accumulated Profits
	a	b	c	d = a- b- c
2023	80.833.372.460	826.067.016	22.174.985.716	57.832.319.728
2024	84.774.600.400	826.067.016	27.151.186.416	56.797.346.968
2025	84.947.474.000	826.067.016	22.174.985.716	61.946.421.268
2026	92.352.834.700	826.067.016	28.423.781.716	63.102.985.968
2027	95.314.323.050	826.067.016	22.174.985.716	72.313.270.318
2028	98.275.811.400	826.067.016	30.280.617.866	67.169.126.518
2029	101.237.299.750	826.067.016	22.174.985.716	78.236.247.018
2030	104.198.788.100	826.067.016	31.970.967.716	71.401.753.368
2031	107.160.276.450	826.067.016	22.174.985.716	84.159.223.718
2032	110.121.764.800	826.067.016	33.794.418.166	75.501.279.618
2033	113.083.253.150	826.067.016	22.174.985.716	90.082.200.418

2034	116.044.741.500	826.067.016	35.750.969.216	79.467.705.268
2035	119.006.229.850	826.067.016	22.174.985.716	96.005.177.118
2036	121.967.718.200	826.067.016	37.840.620.866	83.301.030.318
2037	124.929.206.550	826.067.016	22.174.985.716	101.928.153.818
2038	127.890.694.900	826.067.016	40.063.373.116	87.001.254.768
2039	130.852.183.250	826.067.016	22.174.985.716	107.851.130.518
2040	133.813.671.600	826.067.016	42.419.225.966	90.568.378.618
2041	136.775.159.950	826.067.016	22.174.985.716	113.774.107.218
2042	139.736.648.300	826.067.016	44.908.179.416	94.002.401.868

CONCLUSION

Investment feasibility from a financial aspect is by assessing the Net Present Value (NVP) investment. The NPV value is Rp. 678,904,405,208 (NPV > 0). So, the investment in developing the production capacity and clean water network of Perumda Air Minum Wae Mbeliling, Lembor District, is worth continuing. An NPV value that is positive or greater than (> 0) indicates that the income is greater than the value invested.

The feasibility of investing from a financial aspect is by assessing the Break-Even Point (BEP) investment. The return value is obtained in year 1, marked by the accumulation of positive profits starting from year 1. This explains that the investment in replacing the clean water distribution network of Perumda Air Minum Wae Mbeliling, Lembor District is feasible, because there is a return on investment as evidenced by the BEP value for 1 year.

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