SUMMARY

Dwi Mahenra Sukma, *Department of Water Resources Engineering, Faculty of Engineering, University of Brawijaya, April 2018, Study of Small Hydropower Plant Planning in Warkapi River Distrik Tanah Rubuh Kabupaten Manokwari Provinsi Papua Barat, Academic Supervisor:* Suwanto Marsudi.

West Papua is one of the provinces in Indonesia that still lack of electricity supply, electricity energy production is needed to be increased. To resolve this problem, in the Tanah Rubuh District there is a river that is Warkapi river that has the potential can be energy source with the contruction of Small Hydropower Plant.

From the observation, the selected design flood discharge 100 year period to be 502.66 m^3/dt. While the selected mainstay discharge 45% to be 7.232 m^3/dt used as the plant discharge. In this hydropower using sabo weir because the dominant material in the river Warkapi is gravel and small stones, which when using ogee type or round type then it will not last long can be destroyed by a rock. The thickness of weir is 2 meters and the height 1.5meters, the effective width of river is 30.693 meters. The other civil components in this hydropower such as intake, feeder canal, settling basin merged with forebay, drain door, penstock, and tailrace.

In this warkapi hydropower uses turbin are 2 unit of horizontal Francis type, with 4915.540 kW or 4.92 MW power produced and 27867417.89 kWh or 27.87 GWh energy produced in a year. The result of economic analysis from this hydropower is feasible to built, it is supported by Benefit Cost Ratio is 1.112, Net Present Value is Rp. 50,596,548,800,53, Internal Rate of Return is 5.14% and payback period is 18 years.

Keyword: electric, discharge, hydropower, penstock, economic analysis

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