

ABSTRACT

RELIABILITY ANALYSIS OF RENEWABLE ENERGY POTENTIAL FOR HYBRID POWER-PLANT PLN-MICROHYDRO-PHOTOVOLTAIC AT DUSUN MARGOSARI

By

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Hybrid system is one kind of renewable energy which nowadays, has been being developed in so many areas throughout Indonesia especially Dusun Margosari (Margosari Village). Hybrid system that is being used in this research is a combination between micro-hydro powerplant, photovoltaic powerplant, and PLN grid, so the index of reliability loss of load probability (LOLP) of that combination can be concluded.

A micro hydro powerplant can potentially produce 3235 watt in 2012. By the end of 2013 it produced up to 4931 watt, and it produced 3626 watt by the end of 2014. The power produced by the micro hydro power plant may vary due to the rain level and the river flow. The energy that might be generated by the power plant shall be combined with photovoltaic power plant which produced 319.2 watt averagely per year and also combined with PLN grid that needs 33300 watt averagely per year. Furthermore, this system's LOLP index can be concluded, so an optimum system can be designed and can be implemented in such rural area, Dusun Margosari.

An optimum LOLP index score so far concluded from this research is combination 1 that gives 2.2849% of LOLP index at 2012, means that the system is only having 8.3397 days of blackout per year. In 2013 it gives us 0.6129% of LOLP index which means that the system is only having 2.2370 days of blackout per year. In 2014 it gives us 1.0795% of LOLP index which means that the system is only having 3.9402 days of blackout per year.

Keywords—Hybrid System, Microhydro, Photovoltaic, Reliability, Loss of Load Probability (LOLP).