

Rancang Bangun Piko hidro Terapung Pada Irigasi Persawahan

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ABSTRACT

As the economy grows and population growth, energy use in Indonesia increases rapidly. The role of energy in life is so important to achieve the needs of human life such as in terms of development, environment and as a support in the world of the national economy. On the other hand, the requirement to raise people's standard of living is access to reliable and affordable energy in line with the increasing needs of the community regarding energy, especially electric energy. PLN electricity supply is still unable to reach a certain area due to the geographical conditions of the region that are not possible. Most of Indonesia's population is engaged in agriculture. One of them is the cultivation of food crops. Most farmers use irrigation to irrigate their rice fields. In addition to irrigating rice fields, this irrigation water flow can also be used for power generation, seeing the need for electricity for lighting in rice fields that are not affordable by the national electricity supply. Natural potential in the form of irrigation flows, streams, or waterfalls can be utilized into small-scale power plants. Therefore, the design of the Floating Pico hydro Power Plant (FPHPP) was carried out. PiTera (Floating Pico hydro) is a Pico hydro Power Plant (PHPP) that can float above the surface of the water. PiTera can utilize rice field irrigation flow and river flow to generate electrical energy, the power generated by the generator will then be stored on the battery which will then be supplied dc load and AC load that utilizes inverter as a converter of DC voltage to AC. The constituent components used in PiTera are Permanent Magnet Generator (PMG), waterwheel, charger controller, VRLA battery, pontoon/buoy, pulley, and inverter. Based on the results of the tests conducted, the rotation speed of turbines and generators capable of being produced at 27 rpm and 162 rpm in the first test pool with mechanical power of 21.94 watts, and the rotation speed of turbines and generators capable of being produced in the second testing pool of 15 rpm and 90 rpm with mechanical power of 6.77 watts.

Keywords: Energy, PLN, Irrigation, Floating Pico hydro Power Plant, PiTera, PMG, Waterwheel, Charger Controller, VRLA Battery, Pontoon, Pulley, Inverter..