

Abstract

24th IERE General Meeting and PLN Indonesia Forum
November 19–22, 2024

Planned Pilot Project: 2 x 20 kW Ocean Current Power Plant

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Keywords: *Current-Power-Generation*

Abstract

One of the most abundant sources of new and renewable energy (NRE) in Indonesia is the energy derived from the movement of seawater. This energy is harnessed from the kinetic energy of ocean currents flowing through the straits between Indonesia's islands. Ocean current energy represents a promising marine energy source, with relatively rapid advancements in its technology.

To address the challenges of the energy transition era and advance towards clean energy, PT PLN (Persero) Research and Development Institute is conducting research on the Ocean Current Power Plant Pilot Project, which has a capacity of 2 x 20 kW.

The power plant is designed with a trimaran floating system to simplify maintenance and eliminate the need for heavy equipment, especially given its placement in remote areas. The design integrates turbine components with a floating platform, featuring vertical turbine blades positioned beneath the platform's hull. These turbines are engineered to harness energy from strong and consistent ocean currents, aiming to maximize the efficiency of ocean current utilization.

The low rotational movement generated by the turbine is transmitted via a vertical shaft system, which is stabilized by bearings and, in some cases, a rudder stock. The bearing system ensures the shaft remains aligned and facilitates smooth rotation. The rudder stock, akin to a ship's steering mechanism, helps regulate the shaft's rotation and links the turbine to the gearbox. This setup drives a horizontal Permanent Magnet Generator (PMG), which efficiently converts mechanical energy into electrical energy.