World Academy of Science, Engineering and Technology
International Journal of Transport and Vehicle Engineering
Vol:14, No:12, 2020

Feasibility on Introducing an Alternative Solar Powered Propelling Mechanism for Multiday Fishing Boats in Sri Lanka

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Abstract : This paper presents a study on the feasibility of introducing a solar powered propelling mechanism to multi-day fishing boats as an alternative energy source. Since solar energy is readily available on the sea throughout the year, this free energy could be utilized to power multi-day fishing vessels. Multi-day boats have a large deck area where solar panels can be mounted above without much effort. This project involves studying the amount of power that can be generated using onboard solar panels and implementing an independent propelling system to run the boat. A chain drive system was designed to propel the boat, when the batteries are fully charged, from an electric motor using the same propeller. A 60 feet multi-day fishing boat built by a local boat manufacturer was chosen for the study. The service speed of the boat was around 6 knots with the electric motor, and the duration of cruising is 1 hour per day with around 11 hours of charging. 350-watt Mono-crystalline PV module, 75 kW HVH type motor, and 10 kWh lithium-ion battery packs were chosen for the study. From the calculations, it was obtained that the boat has 30 PV modules (10.5 kW), 5 batteries (47 kWh), The boat dimensions are 20 meter length of water line, 5.51 meter of beam, 1.8 meter of draught, and 77 ton of total displacement with the PV system net present value of USD 12445 for 20 years of operation and a payback period of around 8.2 years.

Keywords : multiday fishing boats, photovoltaic cells, solar energy, solar powered boat
Conference Title : ICEVST 2020 : International Conference on Electric Vehicles for Sustainable Transportation
Conference Location : Rome, Italy
Conference Dates : December 10-11, 2020