



Strategies for the Use of Tidal Stream Currents for Power Generation

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Indonesia is one of the priority countries in Southeast Asia for the development of ocean renewable energy facilities and The National Energy Council intends to increase the role of ocean energy significantly in the energy mix for 2010-2050. To this end, the joint German-Indonesian project "Ocean Renewable Energy ORE-12" aims at the identification of marine environments in the Indonesian Archipelago, which are suitable for the efficient generation of electric power by converter facilities. This study, within the ORE-12 project, is focused on the tidal stream currents on the straits between the Indian Ocean and Flores Sea to estimate the energy potentials and to develop strategies for producing renewable energy. FLOW module of Delft3D has been used to run hydrodynamic models for site assessment and design development. In site assessment phase, 2D models have been operated for a-month long periods and with a resolution of 500 m. Later on, in design development phase, detailed 3D models have been developed and operated for three-month long periods and with a resolution of 50 m. Bathymetric data for models have been obtained from the GEBCO_08 Grid and wind data from the Global Forecast System of NOAA's National Climatic Data Center. To set the boundary conditions of models, tidal forcing with 11 harmonic constituents was supplied from TPXO Indian Ocean Atlas (1/12° regional model) and data from HYCOM+NCODA Global 1/12° Analysis have been used to determine salinity and temperature on open boundaries. After the field survey is complete, water level time-series supplied from a tidal gauge located in the domain of interest (8° 20' 9.7" S, 122° 54' 51.9" E) have been used to verify the models and then energy potentials of the straits have been estimated. As a next step, correspondence between model outputs and measurements taken by the radar system of TerraSAR-X satellite (DLR) will be analysed. Also for the assessment of environmental impacts caused by tidal stream current power plants, studies are being conducted in a cooperation with CRM (Coastal Research & Management) company.