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Optimization of deployment of new WEC device in real sea conditions in the perspective of sustainability increment of human pressure on coastal ecosytems

Francesco Paladini de Mendoza (1), Simone Bonamano (1), Sergio Scanu (1), Danelli Andrea (2), and Maximo Aurelio Peviani (2)

(1) Laboratory of Experimental Oceanology and Marine Ecology, University of Tuscia, Civitavecchia, Italy, (2) Research on Electric System, RSE, Milano, Italy

As long as attention toward climate change remains high in public perception, renewable energy is important for policy agendas worldwide. Based on the Blue Energy Communication, marine renewable energy resources play a key role in Europe's energy portfolio; they also provide the EU with new opportunities to fuel technological innovation, commercial activity, and competitiveness. Nevertheless, ocean energy is in an early stage, and it still needs strong efforts in research and development, both with regards to technological and non-technological barriers. In recent years in Mediterranean Sea the designing of WECs is mainly oriented toward onshore devices to be installed in coastal structures and in particular ports. This could reduce the management and installation costs of WECs and improve the sustainability of port activities toward CO_2 reduction. In this context RSE and LOSEM work to optimize the deployment of a new WEC device in the port of Civitavecchia. In this work we present an overview about the wave resource assessment obtained by measurements (ADP and wave buoys) conducted in front of the site of installation of WEC, the forecast system developed to predict available wave energy and prevent from possible damages induced by extreme events on device. In addition, the laboratory tests of WEC prototype on wave flumes have leads to the power matrix determination that give a preliminary evaluation of annual energy that can be exploited. These preliminary results are used to frame the energy prospects within the energy demand of the port and to estimate the impact on CO_2 reduction.