

Simulation of electricity generation by marine current turbines at Istanbul Bosphorus Strait - DTU Orbit (08/11/2017)

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In this work, several simulations and analyses are carried out to investigate the feasibility of generating electricity from underwater sea currents at Istanbul Bosphorus Strait. Bosphorus is a natural canal which forms a border between Europe and Asia by connecting Black Sea and Marmara Sea. The differences in elevation and salinity ratios between these two seas cause strong marine currents. Depending on the morphology of the canal the speed of the flow varies and at some specific locations the energy intensity reaches to sufficient levels where electricity generation by marine current turbines becomes economically feasible. In this study, several simulations are performed for a 10 MW marine turbine farm/cluster whose location is selected by taking into account several factors such as the canal morphology, current speed and passage of vessels. 360 different simulations are performed for 15 different virtual sea states. Similarly, 8 different configurations are analyzed in order to find the optimum spacing between the turbines. Considering the spatial variations in the current speed within the selected region, the analyses are performed for three different flow speeds corresponding to +/- 10% change in the average value. For each simulation the annual energy yield and cluster efficiency are calculated. (C) 2015 Elsevier Ltd. All rights reserved.

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