

Abstract

Given the limited resources of fossil fuels and destructive effects of dams and environmental costs of energy transfer to the remote areas, it is anticipated that in the future, use of the river current energy to establish small hydroelectric power plants is spread. In this thesis, by carrying out studies on the part of the Karoon River in Khuzestan province, the hydroelectric power potential of the river current is assessed. Since similar studies in this area has been carried out on the river with a minimum flow rate of 150 cubic meters per second, the water level of approximately 2 to 4 meter and the average speed between 1 to 2 meters per seconds, therefor after the initial investigation on a number of rivers in the country, it was found that Karoon River somewhat has all the three factors mentioned above. Therefore this river was chosen as the case study for the above mentioned research. In order to do the study, first, the flow rate, speed and depth of the river recorded through existing hydrometric stations were analyzed, then using a two-dimensional numerical model MIKE21, tools were obtained for the numerical simulation of the hydraulic conditions of the river within the study area. Using these tools which has been verified and validated with measured data, recoverable energy density in different parts of the study area at different hydraulic conditions (including maximum, medium and minimum recorded flow) was calculated and the places with the appropriate energy density for electricity production are identified and presented. At the end, considerations related to the power production as well as suitable turbines for use are investigated.

Keywords: potential assessment, Energy, Hydropower, Current, River



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