

Renewable Energy and Resources & Energy Materials and Fuel Cell Research

August 27-28, 2018 | Boston, USA

Analysis of wind energy potential: A case study of Kocaeli University campus

Ipek Caglayan, Anil Can Turkmen, Cenk Celik, and Halil Ibrahim Sarac
Kocaeli University, Turkey

In this study, a location in the campus of Kocaeli University has been selected where wind turbines are to be implemented. The obtained output power from wind energy will be examined. MERRA software and Windographer software have been used during this energy production study. The wind speed and direction analysis within 1 hour of resolution is being performed at some points by using MERRA program. Windographer automatically defines wind resource data such as wind speed, standard deviation, vertical wind speed, direction, temperature, pressure and relative humidity. Among the 4 point coordinates which are properly identified by the software, point "B" was selected. The annual wind data of the point "B" was analyzed and the annual amount of energy was calculated. In this study, GE 1.7-100 wind turbine was used. The generated energy and turbine output power was calculated. In this study, the output power of the selected turbine has been calculated using the software for modeling the wind speed at working altitude of the wind turbine. Thus, the producing power of the turbine has been calculated as 195 kW and energy in terms 1 704 959 kWh/year while considering the losses. Due to the selected point, the efficiency of the obtained energy of the wind turbine is %13, 2 without losses and %10, 9 with losses. The installation of the wind turbine at a selected point appears to be suitable. At selected points, the values, which were measured using the Windographer software, turned out to be similar to the given data. Generally, the measurement taken at the selected points does not always constitute to the timing and environmental conditions. In terms of timing and environmental conditions, the data obtained from MERRA and Windographer are commonly utilizing. The analysis, which is made, is valid for a single wind turbine installation. For installation of a wind turbine farm, as an addition to this analysis, some extra analysis software was used. This helps to achieve more realistic results for wind-turbine farm installation.

Biography

Ipek Caglayan has completed her BSc. degree at Kocaeli University and she is continuing her MSc. studies at Kocaeli University. She has worked on renewable energy specializing in Direct Borohydride Fuel Cells (DBFC) during her MSc. studies.

ipekcaglayan@hotmail.com

Notes: