The Main Factors that Make Up a Wind Energy Production System: Case Study of a Wind Farm Located on the Northern Coast of the Rio de Janeiro

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Abstract

One of the ways to diversify the power grid and reduce its dependence on non-renewable energy sources is through the use of systems that produce wind energy. Wind energy is defined as the kinetic energy contained in moving air masses (wind). It can be harnessed by converting the translational kinetic energy into rotational kinetic energy, with the use of wind turbines. Currently, the growing demand for wind energy is being driven by a number of factors: the context of supply and demand for energy on a global scale, environmental issues, especially climate change, and the evolution of the technology in the wind energy sector. The object of this paper is the study of a wind farm, located in the municipality of São Francisco do Itabapoana – RJ - Brazil. The objective of this research is to identify and describe in detail the main factors that make up systems that produce wind energy. This research opted to use the case study methodology since the case study analyzes an individual, family, group, or community in order to perform an in-depth inquiry so as to examine the life cycle or some particular aspect of the object being studied. During data analysis, the research perceived that a wind energy production system is composed of three fundamental factors: a region with wind potential suitable for the production of energy; energy turbines appropriate for the wind potential in the region; as well as a highly qualified management and maintenance team.

Key words: Wind farm, system for wind energy production, wind turbine, wind potential.