

Abstract

Economic Analysis of Wind and Solar Energy Sources of Turkey

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Renewable energy sources have become very popular in the last years in electricity generation thanks to the technological developments, the increase in the price of fossil fuels and the environmental concerns. These factors have also prompted Turkey to utilize her very rich renewable energy sources to meet the demand increasing around 7% annually. In this study, solar and wind energy potential of Turkey is analyzed in terms of its economics to find out whether these sources are real alternatives to fossil fuels in electricity generation. Before this analysis, wind and solar energy technologies and costs and wind and solar energy potential of Turkey are discussed. Then, models are set up for five technologies which are onshore wind, offshore wind, solar PV, solar trough and solar tower technologies models to calculate cash flows which are used to calculate payback, NPV, IRR, LCE and shut-down price to conduct economic analysis. In addition to base case scenario, uncertainty analysis is done for the most promising technologies which are onshore wind and solar tower technologies by evaluating NPV and LCE under uncertain environment. The main finding of these analyses is that only onshore wind projects are attractive in Turkey; none of other technologies is attractive. However, with a minor increase in the regulated price for solar thermal electricity, tower plant projects will also be attractive.