

AN ASSESSMENT OF WIND POWER PROSPECTS IN THE BRAZILIAN HYDROTHERMAL SYSTEM

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Despite the need to reduce greenhouse gases, thermoelectric power plants were the main winners in electricity auctions held until 2009. This study evaluates the possibility of improving the prospects of increasing the clean and renewable energy mix. The new official energy plan for 2030, prepared for the Brazilian Government by the Energy Research Company (EPE¹), forecasts a relative increase in thermal generation using natural gas, coal and nuclear energy. In contrast to this plan, this study considers wind generation as a complement to hydropower rather than fossil and nuclear energy. Previously, the analysis of seasonal complementarities in Brazil between average inflow hydraulic energy (ANAh) and average inflow wind energy (ANAw) has been generally focused on an intra-annual period. However, in this study, an initial effort is made to analyze the multiannual complementarities of the two sources. The wind technology learning curve in Brazil and worldwide was investigated, and the results show the potential of competitiveness of wind power compared with other sources, such as nuclear power, gas and coal. The replacement of thermal-based expansion by wind power was simulated by a comparative analysis of the net present value (NPV) of fuel, operation, maintenance and capital costs, including the potential learning time, of both scenarios. The NPV results indicate that the total costs of wind generation represent 57% of the total thermal costs, showing its potential attractiveness and that it facilitates the reduction of the emission of greenhouse gases. Taking into account the population and the stabilization of energy demand in the 2040s, the possibility of meeting the energy demand of Brazil through renewable and sustainable energy sources, mainly hydropower and wind power, is demonstrated.

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¹ The abbreviation in Portuguese for Empresa de Pesquisa Energética

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