

Understanding the Dynamics of the Renewable Energy Transition: Determinants and Future Projections under Different Scenarios

Fatih Yilmaz

King Abdullah Petroleum Studies and Research Center (KAPSARC), Saudi Arabia
fatih.yilmaz@kapsarc.org

Abstract

The current structure of the global energy system has severe environmental consequences that necessitate an urgent transformation toward more sustainable alternatives. Besides many available mitigation actions, e.g., enhancing energy efficiency, deploying nuclear energy, switching fuels, and adopting carbon capture technologies, renewable energy (RE) has been the most widely applied one in many countries, especially for the power sector. Many countries have declared ambitious RE targets to meet their NetZero goals. However, the question remains whether these ambitious targets are achievable? Using the RE transition potential index (RETPI), this paper provides an empirical analysis to map countries' RE transition potentials to their future transition performances. The empirical model is then used to predict countries' RE transition performances by 2030 under different scenarios. Our empirical results show that the RETPI can explain a significant portion of the heterogeneity across countries' future RE transition performances. Using the RETPI to construct a scenario analysis, we show that under reasonable assumptions, the current level of average NhRE share at the country level (i.e., around 6% as of 2018) could reach to a range between 14.5% and 22.2% by 2030 depending upon the adaptation of slow, medium, and fast transition scenarios. We discuss the scenario results at different levels, including region and income groups, as well as country levels.

Keywords: Renewable Energy, Energy Transitions, Scenario Analysis

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