

Expansion of Renewable Energy Sources in Chilean Electricity Auctions: Lessons from Policy Makers Perspectives

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Overview

A "Power Auction" is a widely used mechanism in Latin American countries to grant energy projects based on competitive bids. In Chile, since 2005, it is mandatory for electricity distribution companies to contract their energy requirements through competitive nondiscriminatory auctions (thus including renewables). A submitted bid with the lowest price is granted a long -term contract -typically, a power purchase agreement (PPA)- for the project. In 2014, important changes were introduced in the auction design with the goal of making it more competitive. The restructuring reforms on the power auction system has been a good step forward to improve the commercialization of renewables in the market and to enhance competition. As a result, in the latest and also largest energy auction ever, the Chile National Energy Commission (CNE) targeted to add a total generation of 12,430 GWh/year, consisting of five time blocks for 20 years from 2021, covering 30% of Chile's energy demand. Wind and solar photovoltaic (PV) projects were awarded around 40% of the energy auctioned. The competitive nature of auctions have resulted in decreased energy costs, increasing the number of renewable energy players in the bidding process. The results of last energy auction process show the most competitive prices ever registered for renewable technologies in the world. In this context, this paper analyses the recent Chilean experience by identifying the key policy factors that influenced the expansion of renewable energy technologies in the latest electricity auctions.

Methods

A Multi-Criteria Decision Analysis (MCDA) method -integrating Analytic Hierarchy Process (AHP) and Technique for Order Preference by Similarity to Ideal Solution (TOPSIS)- is proposed for the assessment of the Chilean auction schemes for RES-E using various evaluation criteria. Then, a probabilistic sensitivity analysis is conducted to analyze various different policy scenarios measuring the impact of variations on the current weights of the evaluation criteria.

Results

In the assessment of the main policy options that influenced the expansion of renewables in Chile, seventeen sub-criteria in two categories were used to assess five renewable alternatives for electricity generation. The results show that among the key policy drivers in the expansion of renewables in the auctions, the changes in the auction design was the most important one. The changes in the complementary policy elements are ranked second. According to the results, establishment of different time blocks, expansion of contract durations, and project realization are the most significant subcriteria that greatly favored renewable generators in the auctions. The weights of the criteria obtained for renewable energy alternatives show that solar energy was the most incentivized in the energy auctions.