

## An Investigation of the Impact of Renewables on Turkish Electricity Prices Using Machine Learning Techniques

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**Statement of the Problem:** What is the impact of rising rate of renewables on the electricity prices in Turkey? Given that the renewables are subsidized, what would be the impact on the total welfare in Turkey? The impact of renewables on electricity prices was found to be negative for most cases, including the Turkish case. Many studies point to welfare benefits after counting for the subsidies. Our paper aims to reply these questions using machine learning techniques, which before, have been used to show the impact of renewables on the electricity prices for the case of Spain.

**Methodology & Theoretical Orientation:** Machine learning techniques appeared to be a powerful tool to predict electricity prices. Using XGBoost, a tree based machine learning algorithm we predicted the electricity prices when generated by the renewable resource and when generated by conventional resources and observed the price difference.

**Findings:** We found that wind energy appears to drop electricity prices between 0.30 euros per MWh (when generated rather than by stonecoal) to 3.73 euros per MWh (when generated rather than by natural gas) for the year 2020. For the former years the results appear similar.

**Conclusion & Significance:** Our findings support the former analysis by the scholars, for the case of Turkey. But the difference appears to be greater when machine learning techniques are used.

Impact of wind energy on prices (in € terms)	2015	2016	2017	2018	2019	2020
Natural gas	-3.03	-4.58	-2.47	-1.33	-3.78	-3.73
Lignite	-3.82	-3.60	-3.76	+0.26	-1.46	-1.14
stonecoal	-3.52	-6.39	-8.02	+0.04	-2.74	-0.30
Imported coal	-2.91	-4.94	-1.61	-2.68	-3.40	-1.96

### Biography

Gokce Kurucu has her expertise in microeconomics and industrial organization. Her recent research interests include energy markets. Sümeyye Kaplan has a bachelors degree in management and working through her masters thesis in Konya Food and Agriculture University.