

# COBENEFITS STUDY

September 2022

Executive  
Summary  
Update

## Increasing industrial competitiveness and hedging against fossil price volatility with renewables in Turkey

Assessing the co-benefits of decarbonising Turkey's power sector





## Imprint

This COBENEFITS Policy Report has been realised in the context of the project “Mobilising the Co-Benefits of Climate Change Mitigation through Capacity Building among Public Policy Institutions” (COBENEFITS).

This project is part of the International Climate Initiative (IKI). The Federal Ministry for the Environment, Nature Conservation, and Nuclear Safety (BMU) supports this initiative on the basis of a decision adopted by the German Bundestag. The COBENEFITS project is coordinated by the Institute for Advanced Sustainability Studies (IASS, lead) in partnership with the Renewables Academy (RENAC), the Independent Institute for Environmental Issues (UfU), International Energy Transition GmbH (IET) and in Turkey the Istanbul Policy Center (IPC) at Sabanci University.

September 2022

**Technical implementation:** Saeed Teimourzadeh, Osman Bülent Tör, Ebru Voyvoda, Göktürk Poyrazoğlu – EPRA, METU and OZU

**Editors:** David Jacobs, Dursun Bas, Ümit Şahin, Franziska Sperfeld, Laura Nagel, Sebastian Helgenberger – IET, IPC, UfU, and IASS

## Acknowledgements

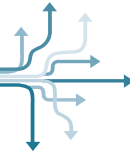
We particularly highlight and acknowledge the strong dedication and strategic guidance of the COBENEFITS Council members from the ministries of Energy and Natural Resources (MoENR), Environment, Urbanisation and Climate Change (MoEUCC), Treasury and Finance (MoTF, formerly Ministry of Economics, MoE), Foreign Affairs (MFA), Trade (MoT) and, Industry and Technology (MoIT). Their contributions during the COBENEFITS Council meetings guided the project team to frame the topics of the COBENEFITS Assessment for Turkey and to ensure their direct connection to the current political deliberations and policy frameworks of their respective ministries.

Supported by:



based on a decision of  
the German Bundestag





# Executive Summary

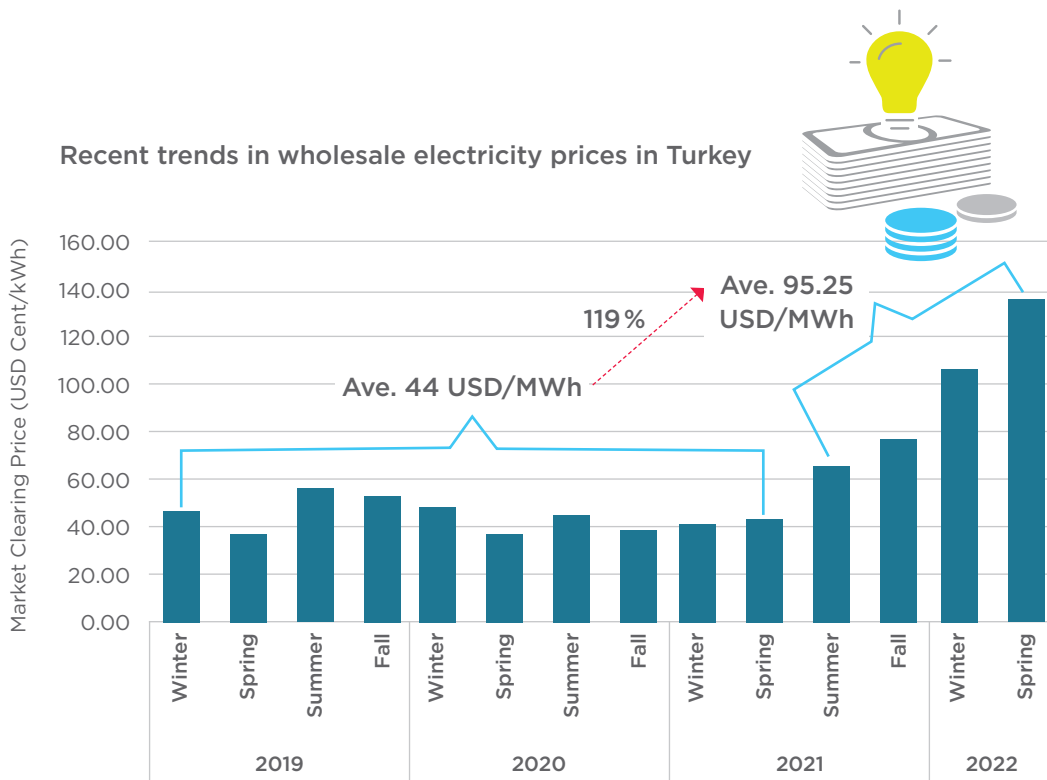
Update September 2022



*This updated Executive Summary draws on results of and accompanies the COBENEFITS Study "Increasing industrial competitiveness and hedging against fossil price volatility with renewables in Turkey" (IASS/IPC/UfU/IET, 2022)*

[https://www.cobenefits.info/wp-content/uploads/2022/06/COBENEFITS-Turkey\\_Industrial-competitiveness.pdf](https://www.cobenefits.info/wp-content/uploads/2022/06/COBENEFITS-Turkey_Industrial-competitiveness.pdf)

The recent crises in energy markets, particularly natural gas procurement difficulties, has increased the wholesale electricity price in Turkey. The average wholesale electricity price from winter of 2019 up to spring of 2021 was 44 USD/MWh which was increased to 95.25 USD/MWh. The results in this report are updated results of the COBENEFITS Study "Increasing industrial competitiveness and hedging against fossil price volatility with renewables in Turkey", accounting for the new trends in electricity prices.

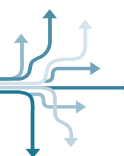


## Key policy opportunities:

- **Policy opportunity 1:** A higher share of renewables can significantly reduce **average wholesale electricity prices**. The industrial sector, in particular, can benefit from cost reductions, which in turn will improve the sector's economic competitiveness. Compared with the currently planned scale-up of wind and solar PV until 2030 (BAU scenario: business as usual), a scenario with a high share of renewables (Advanced Renewables Scenario) can reduce wholesale electricity prices by 9.4 % on average. This would amount to total savings of TRY 16.5 billion (USD 4 billion) in 2030 alone. Compared with a market lacking any renewables, a high-renewables scenario can reduce wholesale market prices by 31.3%, amounting to total cost savings of up to TRY 85.27 billion (USD 17.7 billion) in 2030 alone.
- **Policy opportunity 2:** The **average retail electricity price** for the industrial sector can be reduced by 7.75 % in 2030 when comparing current renewable energy expansion plans with the more rapid expansion of wind and solar PV under the Advanced Renewables Scenario. This would amount to total electricity cost savings of TRY 7.37 billion (USD 1.53 billion) for the industrial sector in 2030 alone. Compared with an electricity market lacking any renewables, the Advanced RE scenario is predicted to reduce the average retail electricity price by 27 %. This can amount to electricity cost savings for the industrial sector of TRY 25.6 billion (USD 5.3 billion) in 2030 alone. For energy-intensive industries such as the metallurgical industries, savings can amount to TRY 7.96 billion (USD 1.65 billion) in 2030 alone.
- **Policy opportunity 3:** Renewable energy procurement can reduce the **risks associated with fuel price volatility**. Assuming a 31% increase in fuel prices (gas price) by 2030, this would increase average retail electricity prices for industrial consumers by 5.3% based on current RE expansion plans, and by as much as 18.4% in a market lacking any renewables. However, with high shares of renewables, the same increase in fuel price would only lead to a 2.9% increase in average retail electricity prices, thus protecting industrial consumers from price shocks.



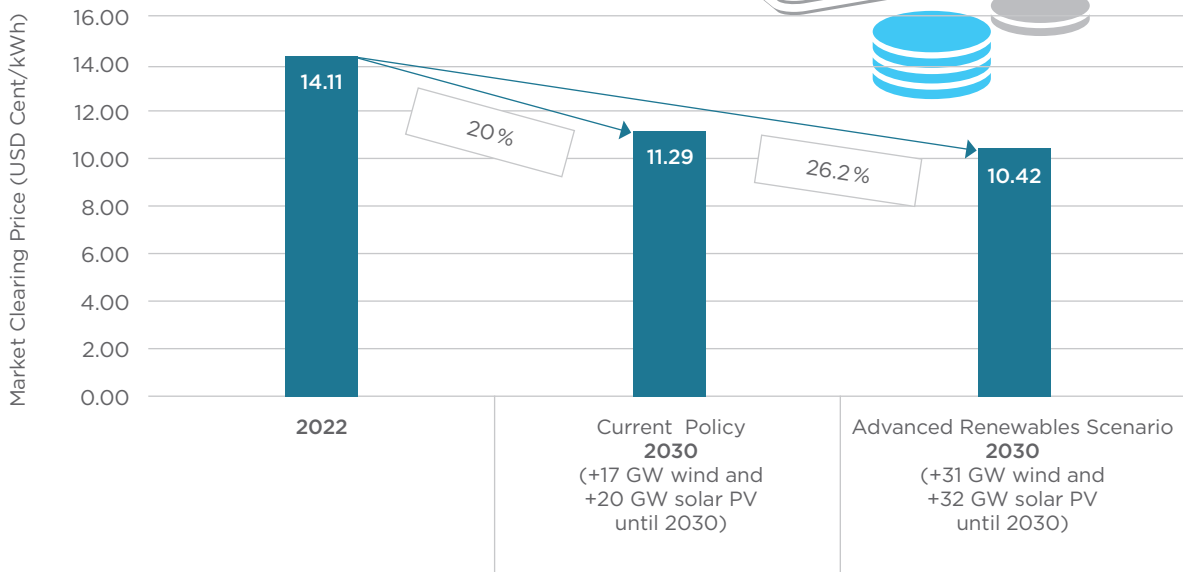
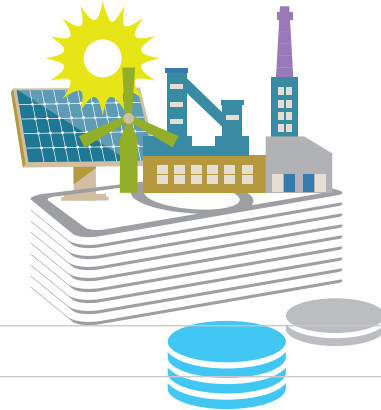
Renewable energy deployment will have spillover effects on the Turkish economy, such as job creation and an increase in GDP. © Green Energy Futures CC BY-NC-SA 2.0



## Key Findings:

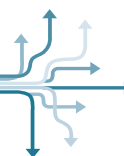
- **Historical savings:** In the past five years, **average wholesale electricity prices** have declined by 22% due to an increase in renewable energy sources (with zero marginal costs). This results in annual savings of TRY 17.6 billion (USD 3.7 billion) compared with an electricity system lacking any renewables. When analysing the average retail electricity price, a reduction of 15.2% was observed, resulting in total savings of TRY 9.47 billion (USD 1.96 billion).
- **Future savings potential:** In the coming 10 years (2021–2030), renewable energy has potential to provide even greater savings in the industrial sector. By shifting from current deployment plans (BAU) to the Advanced Renewables Scenario, the **average retail electricity price** will decline by 7.75%, resulting in total savings of TRY 7.37 billion (USD 1.53 billion) in the year 2030 alone.
- **Hedging against fuel price risk:** Renewable energy procurement can reduce the economic and societal risks associated with **fuel price volatility**. Assuming a 31% increase in fuel prices (gas price) by 2030, this would increase retail electricity prices for industrial consumers by 5.3% based on current RE expansion plans and by as much as 18.4% in a market without any renewables. However, with high shares of renewables, this increase in fuel price would only lead to a 2.9% increase in retail electricity price, thus protecting industrial consumers from price shocks.
- **Macro-economic benefits:** By reducing electricity prices and increasing the economic competitiveness of the industrial sector, **exports** are expected to increase by TRY 34.4 million (USD 6 million), amounting to a 0.48% increase in **GDP**. By making the Turkish industrial sector more competitive internationally, it can grow more rapidly, with the prospect of creating up to **42.000 new jobs**.
- **Climate benefits:** **By increasing the shares of renewables in Turkey's electricity mix, CO<sub>2</sub> intensity will decrease by 5%** with a shift from the currently planned BAU capacities (17 GW wind, 20 GW solar PV) to the Advanced Renewables Scenario (31 GW wind, 32 GW solar PV). Compared with an electricity market lacking any renewables, CO<sub>2</sub> intensity is reduced by 9%, amounting to 12 million metric tonnes less CO<sub>2</sub> emitted in 2030. This will likely increase export opportunities for Turkish industries, with the proposed EU Carbon Border Adjustment Mechanism (CBAM) looming on the horizon.

By moving from current policy to an ambitious decarbonisation scenario, Turkey's industrial sector can save TRY 7.37 billion in the year 2030 alone.



Renewables can reduce electricity prices and mitigate the risks of price volatility.  
© Shutterstock/sujinun gosiyaaphan

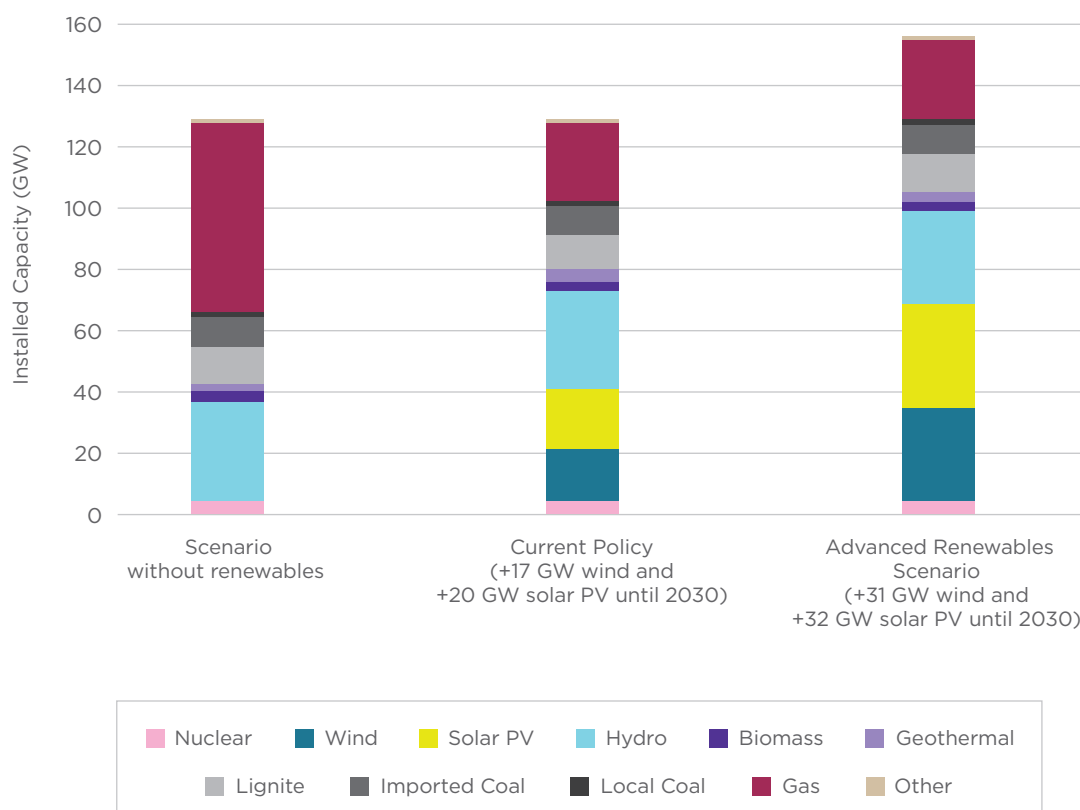




The study analyses both the real-world historical savings achieved between 2015 and 2020 as well as potential future savings based on various scenarios until 2030. Under the Current Policy Scenario (BAU), total capacity additions of 17 GW wind energy and 20 GW solar PV are assumed by 2030. This scenario is based on projections and assumptions made by various public stakeholders in Turkey, such as the Ministry of Energy and Natural Resources (MENR) and the Turkish Electricity Transmission Corporation (TEİAŞ). In the Advanced Renewables Scenario, capacity additions of 31 GW wind energy and 32 GW solar PV are expected up to 2030. This is based on a scenario developed by the SHURA Energy Transition Center as part of the report “Increasing the Share of Renewables in Turkey’s Power System: Options for Transmission Expansion and Flexibility”. Finally, a third scenario assumes that no renewables at all would be deployed in the Turkish electricity sector. In this case, it is assumed that all renewable capacity would be replaced with efficient gas-based power plants. The comparison with this hypothetical scenario can show the total cost savings associated with renewable energy deployment in Turkey.

The wholesale electricity market is simulated through a market simulation engine. The wholesale and retail electricity prices are calculated through a statistical analysis. The macro-economic effects on the Turkish economy are based on a dynamic applied general equilibrium model with a horizon of 2030.

**Installed power generation capacity in selected scenarios in 2030 (GW)**



## COBENEFITS

### Unlocking social and economic co-benefits for a just and sustainable energy future

The COBENEFITS project supports national authorities and knowledge partners in countries worldwide to connect the social and economic co-benefits of decarbonising the power sector to national development priorities and to mobilise these co-benefits for early and ambitious climate action. The project supports efforts to develop enhanced NDCs with the ambition to deliver on the Paris Agreement and the 2030 Agenda on Sustainable Development (SDGs) and to enable a Just Transition.

COBENEFITS facilitates international mutual learning and capacity building among policymakers, knowledge partners, and multipliers through a range of connected measures: country-specific co-benefits assessments, online and face-to-face training, and policy dialogue sessions on enabling policy options and overcoming barriers to unlock the identified co-benefits in the target countries.

### COBENEFITS Executive Report Update September 2022

## Contact

#### COBENEFITS project director

Sebastian Helgenberger, Institute for Advanced Sustainability Studies (IASS)  
sebastian.helgenberger@iass-potsdam.de

#### COBENEFITS focal point Turkey

Ümit Şahin, Istanbul Policy Center Sabanci University  
umit.sahin@sabanciuniv.edu

[www.cobenefits.info](http://www.cobenefits.info)

 @IKI\_COBENEFITS



Supported by:



Federal Ministry  
for the Environment, Nature Conservation,  
Nuclear Safety and Consumer Protection

based on a decision of  
the German Bundestag

