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Renewables cut annual electricity bills by one month in Türkiye

In 2025, renewable energy reduced households' annual electricity bills by an average of 9%, roughly equivalent to one month's worth of electricity bills over the year. This impact grew as renewables made up a larger share of generation, with bill reductions reaching up to 17% in the spring and summer months.

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Summary

Renewables, which are significantly cheaper to generate than fossil fuels, have taken an increasing share of Türkiye's power mix, putting downward pressure on electricity prices and, in turn, reducing consumer bills. Regulatory measures, such as enabling households to participate in demand-side management and removing the floor price mechanism in the electricity market could strengthen this effect even further.

- **In 2025, renewable-based generation lowered electricity bills by 9%, effectively meaning households paid for 11 months of electricity instead of 12 over the year.** In some months with a high share of renewable generation, savings for households reached up to 17%. Similar benefits were seen among higher-consumption users, with a typical industrial facility saving around $250,000 annually and commercial consumers about $30,000.
- **Renewable energy sources reduced wholesale electricity prices by 45%.** During hours when renewable generation was high and national electricity demand was relatively low, wholesale prices fell significantly compared to fossil-fuel-dominated hours. This price advantage largely remained even during times of higher demand.
- **With hourly demand-side management in households, annual savings could rise to the equivalent of two months of electricity bills.** By using meters that enable hourly tracking, and simple shifts in consumption towards lower-price hours, households could unlock additional savings beyond current levels.

As renewables claim a larger share of the power mix, their lower generation costs are driving down market prices compared to fossil fuels, a benefit that translates directly into lower electricity bills for end-users. To ensure these market savings are fully captured by households, Türkiye should prioritize streamlining the permitting process for rooftop solar and implementing residential demand-side management. Such steps will make the economic transition to clean energy both visible and lasting for the Turkish consumer.

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Renewable energy cuts bills by up to 17%

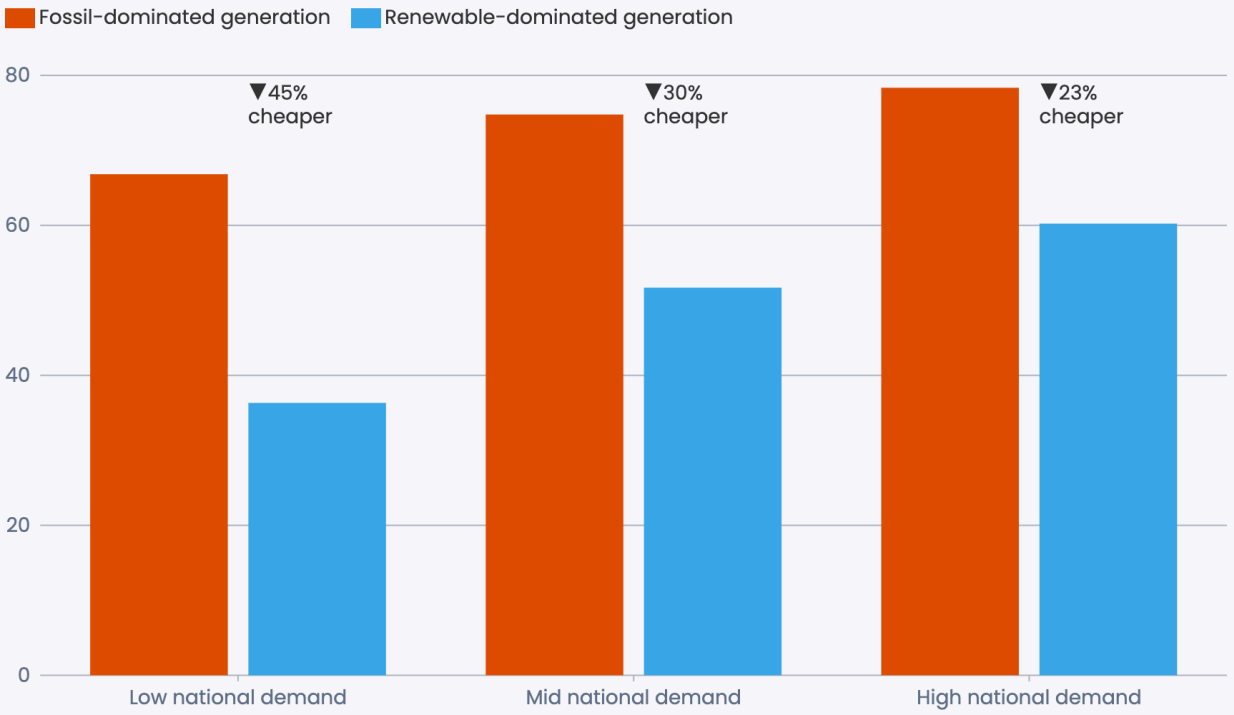
Electricity generation from renewable energy sources reduced wholesale electricity prices by up to 45%. This decline translated into an annual 9% savings on household electricity bills, roughly equivalent to one month's bill. During periods of high renewable output and low demand, these savings peaked at 17%.

Renewable energy lowered wholesale electricity prices

In 2025, wholesale electricity prices decreased during hours when electricity generation was dominated by renewable energy, while prices rose during fossil-heavy hours. Renewable-heavy generation drove down prices by around 23% during peak consumption hours compared to fossil fuels. This impact was even more pronounced during periods of lower national electricity demand, with prices up to 45% lower.

In 2025, renewables lowered wholesale electricity prices at every consumption level

National day-ahead market wholesale electricity price, $/MWh



Source: EPİAŞ, Ember calculations

* Consumption levels were calculated by dividing the actual hourly consumption data for 2025 into three quantiles. Each category contains an equal number of hours.

While renewables triggered a significant drop in wholesale electricity prices, the impact is only partially passed through to end-consumers. The main reason is that wholesale electricity prices only affect the energy component of the bill, leaving distribution charges and other billing items unchanged.

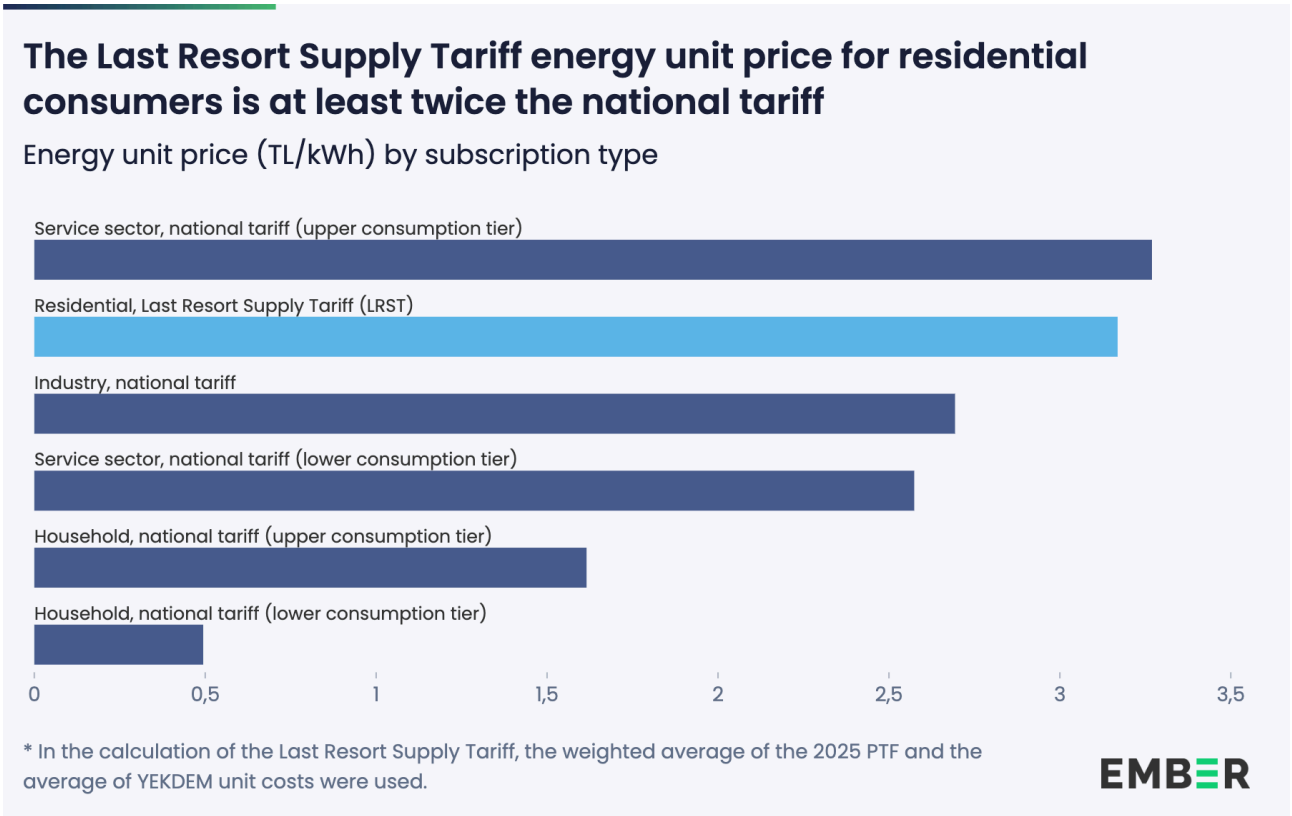
Bills for 2.5 million households are set to double

In Türkiye, electricity bills follow a regulated tariff structure that extends beyond wholesale market fluctuations. The national electricity tariff – covering residential, industrial and service sectors – is set by the Energy Market Regulatory Authority (EMRA).

The national tariff's per-unit energy charge varies by customer type and consumption level, with the residential tariff currently benefiting from a government subsidy of approximately 55%.

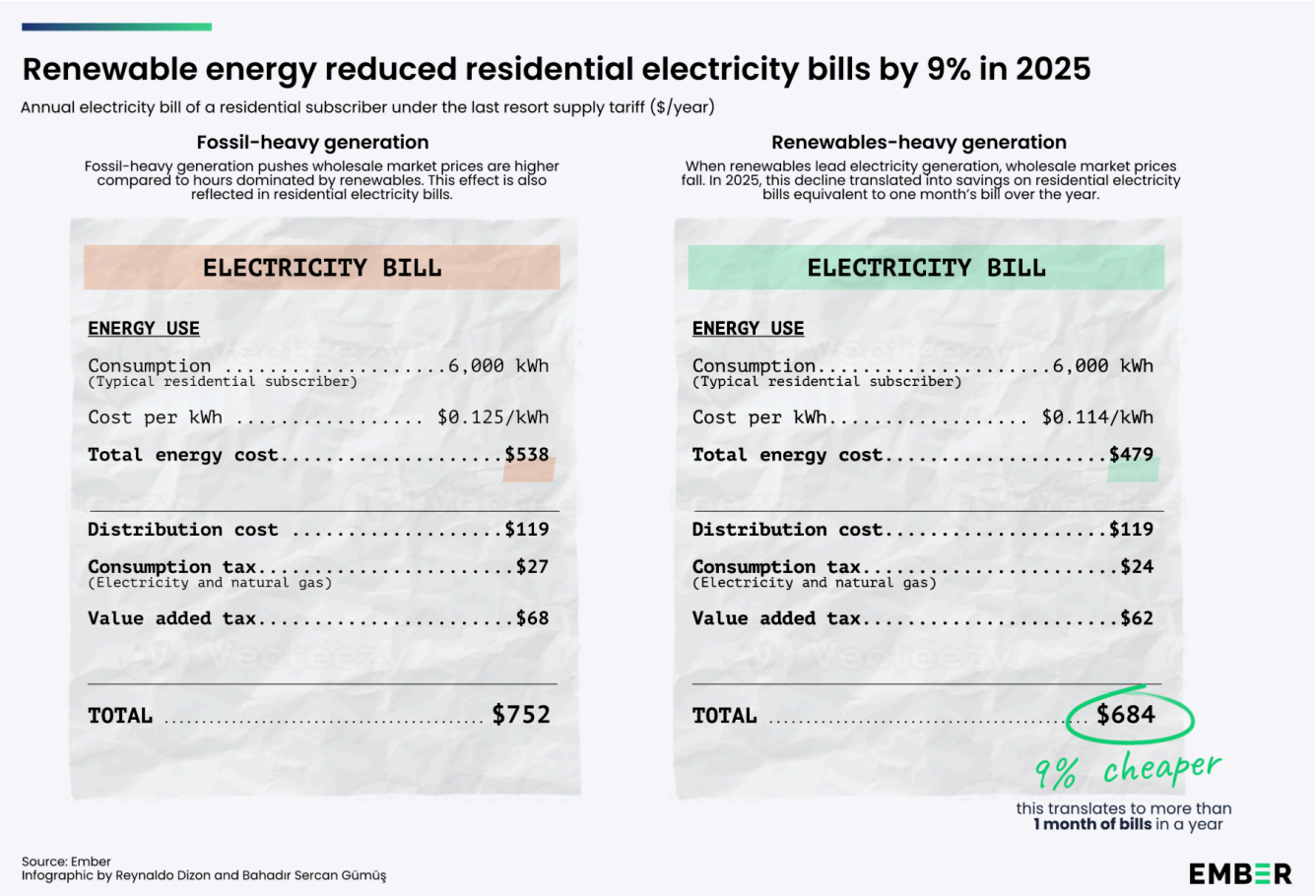
The subsidized national tariff applies an annual consumption limit of up to 4,000 kWh, while the threshold for service and industrial customers is 15,000 kWh. Any consumption exceeding these thresholds is billed under the Last Resort Supply Tariff (LRST), which reflects actual market costs without public subsidies.

Under current regulations, 2.5 million households are expected to fall under the LRST in 2026. Consequently, their electricity bills are likely to more than double compared to those remaining on the national tariff. However, the growing share of renewable energy in total electricity generation is working in the consumer's favor, helping to mitigate the impact of these bill increases.



Renewables cut one month's worth of bills in a year

While billing structures prevent the full wholesale price drop from reaching end-users, the impact of renewables remains significant. Thanks to renewables, electricity bills for households under the LRST fell by 2% to 17% on a monthly basis in 2025 (see: Methodology). The annual average of this effect increased from 7.4% in 2024 to 9.1% in 2025 – essentially providing LRST households with savings equivalent to roughly one full month's electricity bill.



On the other hand, bills for industrial and service sector customers are higher than residential due to higher value-added tax rates and higher cost coefficients. As a result, price drops driven by renewables are even more pronounced for these customer groups. Indeed, the savings for an average industrial facility exceed 9.5%, which corresponds to approximately $250,000 per year for an average industrial facility in Türkiye, and around $30,000 for a commercial establishment (see Methodology).

Demand management could boost household savings

The LRST determines energy unit prices by weighting wholesale market costs. For industrial and commercial customers, this weighting is based on their hourly consumption and the corresponding wholesale electricity prices. In contrast, residential pricing relies on a national daily average consumption across Türkiye.

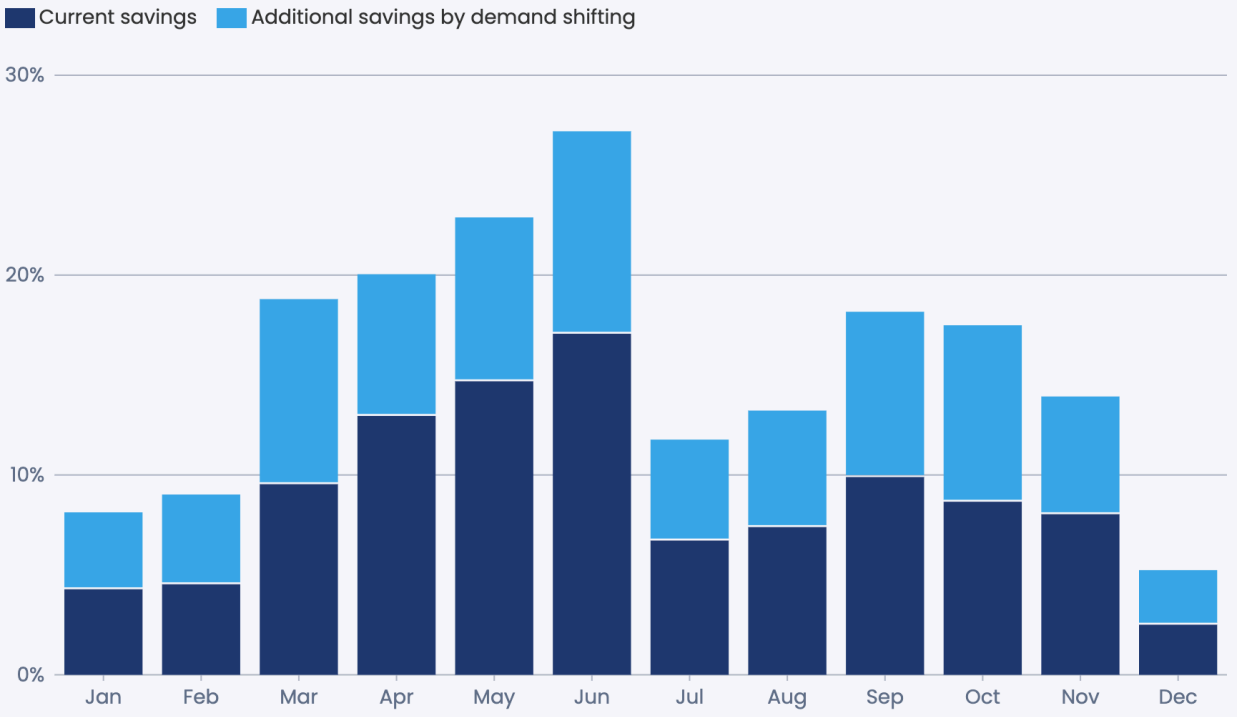
This methodology prevents households from benefiting from hourly demand management. For example, shifting the use of appliances like dishwashers or washing machines to off-peak hours – when prices are lower – yields no financial benefit for the consumer.

To illustrate the potential impact of household demand management, a scenario was created in which consumption is shifted to hours with lower electricity prices (see Methodology). Under this scenario, shifting usage to off-peak hours in 2025 would increase annual bill savings from 9.1% to 15.7%. Effectively, this would double the savings to the equivalent of two months' worth of electricity annually.

The magnitude of these savings fluctuates monthly. Electricity prices vary throughout the year based on seasonal national demand and the share of renewables in total electricity generation. Prices are driven down most sharply when low demand coincides with high renewable output; conversely, the reduction is more constrained during peak periods. In this context, for a household practicing demand management, monthly bill reductions could range between 5% and 27%.

Monthly savings on residential electricity bills can exceed 20% through demand shifting

Cost-saving impact of renewable electricity generation on bills (%)



Source: EPİAŞ, Ember calculations

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Negative pricing could further reduce bills

As the share of renewable energy in electricity generation grows, periods of high generation and relatively low demand can create a supply surplus, driving wholesale electricity prices down significantly. During uniform demand drops — such as on public holidays — prices can fall to the current market floor of 0 Turkish Lira. In 2025, wholesale electricity prices were zero for a total of 42 hours, all recorded between 09:00 and 15:00, when solar generation was at its peak.

Removing the zero-price floor to allow for negative pricing could unlock even lower costs during peak renewable hours. Negative prices would not only lower

daily averages but also incentivize storage and flexible consumption, ensuring low-cost power is utilized more effectively within the system.

Rooftop solar, with a potential of at least 120 GW in Türkiye, represents another powerful tool for sustainable bill reduction. By allowing on-site consumption, these systems eliminate transmission and distribution losses, improve efficiency, reduce grid load, support system reliability and directly lower end-user energy costs, providing tangible relief to household budgets.

Unlocking this potential depends on regulatory frameworks that simplify residential solar installations. Simplifying bureaucratic procedures during installation and speeding up approval and grid connection processes will make these investments more attractive and accessible. As a result, more households will be able to reduce their electricity bills through self-generation.

Supporting materials

About Ember

Ember is an independent energy think tank that aims to accelerate the clean energy transition with data and policy. Its vision is a clean, electrified energy system for all. It gathers, curates and analyses data on the global energy system, publishing this openly and accessibly. It uses data-driven insights to shift the conversation towards high impact policies and empower other advocates to do the same. Founded in 2008 as Sandbag, it formerly focused on analysing and reforming the EU carbon market, before rebranding as Ember in 2020. Its diverse team brings together energy analysts, data scientists, communicators and team-builders based around the world in over 20 countries, including Australia, Brazil, Colombia, Germany, India, Indonesia, Poland, South Africa, Türkiye, the UK and US.

Methodology

Last resort supply tariff (LRST) bills are calculated as follows:

$$Bill = (MCP + YEKDEM) * KBK + distribution\ cost + consumption\ tax + VAT$$

The market clearing volumes and the resulting Market Clearing Price (MCP) in the Day-Ahead Market (DAM) were obtained using data from the EPİAŞ Transparency Platform. According to the billing method, the MCP for each hour of the day is multiplied by the corresponding DAM clearing volume to calculate a weighted daily MCP. The arithmetic monthly average of these weighted daily MCPs is then

taken to determine the final MCP value used for billing. To this value, the Renewable Energy Support Mechanism unit cost (YEKDEM unit cost) for the relevant month is added. The total is then multiplied by the "Coefficient Set by the Market Authority" (KBK), determined by EMRA, to obtain the final energy unit price. This coefficient is 5% for households and 9.38% for industrial and commercial customers.

Next, the distribution charge is calculated by multiplying the consumption volume by the distribution unit price set by EMRA. Subsequently, a consumption tax of 5% on the energy unit price is applied, and value-added tax (VAT) is calculated at 10% for households and 20% for commercial and industrial customers. Finally, all components are summed to produce the final bill.

To calculate the bill-reducing effect of renewable energy, the method described above is repeated for each month. In this case, hourly electricity consumption within the month is divided into four categories — low, low-medium, medium, and high — based on the hourly consumption levels for that month. Within each category, hours in which the share of renewable generation exceeds 50% are defined as renewable-weighted hours. The difference between average electricity prices during renewable-weighted hours and fossil-weighted hours (when renewable share is below 50%) is calculated across all eight categories. In the final step, a hypothetical scenario is created in which prices during renewable-weighted hours occur at the same level as fossil-weighted hours. The difference between the resulting monthly bill in this scenario and the actual bill reflects the cost reduction attributable to renewable energy.

Average annual consumption for different customer groups in Türkiye was obtained from EMRA's 2024 Annual Electricity Market Sector Report. Average annual consumption for industrial customers was calculated at 255,189 kWh and for service sector customers at 27,883 kWh. For households, average consumption was assumed to be 6,000 kWh annually, as the number from the EMRA's report falls below the LRST annual consumption limit.

The effect of renewable energy on day-ahead wholesale electricity prices was analyzed using the same method described above, but dividing consumption

into three levels instead of four for 2025. In the LRST study, four consumption levels were preferred to allow for more precise numerical calculations.

To calculate bill reductions from load shifting in households, the hourly profile of a typical daily consumption (16.7 kWh) for a household LRST customer with 6,000 kWh annual consumption in 2025 was created using actual data. It was then assumed that roughly one-quarter of daily consumption could be shifted to hours when electricity prices are relatively low.

For monthly bill calculations, conversion from Turkish Lira to US Dollars was done using the exchange rate on the median day of the relevant month.

Acknowledgements

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