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Factsheet: Dunkelflaute explained

A result of supply and demand

The price of electricity on the wholesale market results from **supply and demand**: if there is high level of electricity production and little demand, prices fall. If electricity is in short supply and demand is high, prices rise.

The latter situation repeatedly sparks discussions as to whether the current pricing system on the market works, particularly in times of a ‘dunkelflaute’, a dark doldrum, when there is little wind and not much sun.

Prices reflect the interplay between supply and demand on the electricity market.

The reference in short-term trading, on the so-called spot markets, is the price on the EPEX SPOT power exchange, a neutral trading platform for electricity, part of EEX Group.

Power prices fluctuate – up and down What does this mean?

Fluctuations in the electricity price are known as ‘volatility’: In the course of the energy transition to include more renewables into the grid, the rate of short-term price fluctuations is increasing, for example from hour to hour within a day. On the one hand, if supply exceeds demand, this can lead to low or even negative prices. On the other hand, price peaks can occur when supply is scarce.

Overall, major price peaks or dips only happen over a very few hours of a year: In 2024, the electricity price in Germany fell below zero for 459 hours; a share of 5 %. Prices of over € 300/MWh occurred 54 times, which corresponds to 0.6 % of the hours of the year.

This does not mean that a blackout is imminent or that the power market is not working.

So, what do price fluctuations indicate? They signal that more flexibility is needed. For example, in the form of storage systems and batteries, or through flexible consumption behaviour.

Volatility is the new normality in a grid which is being restructured. The answer to fluctuating electricity prices is flexibility.

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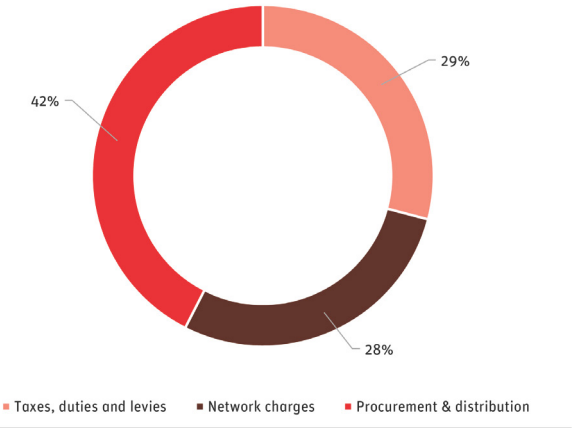
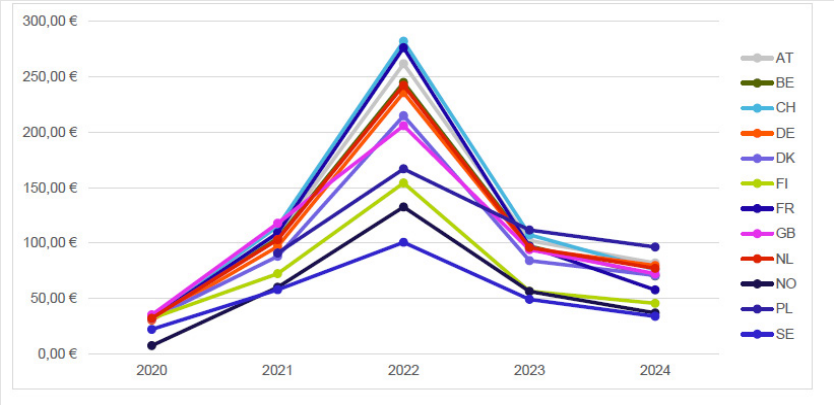
Price peaks do not mean that household electricity will be more expensive for consumers in total, because exchange prices are wholesale prices.

The wholesale price for electricity in Germany currently accounts for around **40 %** of the end consumer price, with the other components including taxes, levies, or grid fees.

Source: BDEW



Most end-consumers have agreed a fixed price with their supplier for the whole year, based on the annual average price. This means that individual price peaks over a few hours have no effect. In the long term, the expansion of renewable energies has a price-dampening effect.

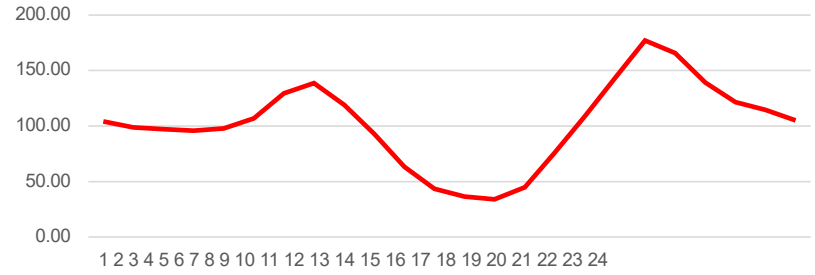


In 2023, the average hourly electricity price for the market area Germany/Luxembourg was € 95.18/MWh.

In 2024, the average hourly electricity price of € 79.57/MWh for this market area was significantly lower than in 2023, despite individual price peaks.

Why is flexibility important?

Daily electricity price curve March 2025 (MWh)



Electricity prices fluctuate depending on the time of day. There are typical consumption peaks with higher prices in the morning and evening, and a typical solar generation peak in the middle of the day with low prices.

Flexibility makes it possible to react to these fluctuations and to have a balancing effect by increasing or reducing production or consumption. This results in fewer price peaks, even in situations such as a ‘dunkelflaute’ or ‘hellbrise’ (lightbreeze).

More smart meters and alternative (flexible) electricity tariffs are needed so that consumers can also play a greater role in flexibility and benefit from it.

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What role do imports and exports play?

Power markets are interconnected across Europe, from Finland to Portugal, from Greece to Belgium. The means that the electricity supply is secured across national borders, providing advantages for everyone.

Electricity is automatically imported into Germany when electricity production abroad costs less. In the same manner, it is exported when electricity is particularly cheap in Germany.

Electricity imports do not mean that the national demand for electricity cannot be met by German power plants, but that electricity is cheaper elsewhere.

By connecting the electricity markets across Europe, called 'market coupling', all countries benefit from the most favourable electricity supply to meet demand. The regulator ACER, estimates the added value for the societies in Europe generated by market coupling at € 34 billion per year.

On the power exchanges:

EPEX SPOT, based in Paris, is an exchange which operates electricity spot markets. In the day-ahead auction, which takes place on every day of the year, power volumes are traded for every hour of the following day - with delivery the next day. On the intraday market, it is possible to trade electricity volumes at very short notice, up to 5 minutes before delivery.

The futures market for power is operated by derivatives exchanges, such as **EEX**. Here, trading participants can use the contracts offered to hedge against price change risks in the future – from a few days to 10 years in advance.

EEX offers its customers tailored products for various hedging periods, for more than 25 countries in Europe and Japan. EEX and EPEX SPOT are part of **EEX Group**.

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