The Wrong Suspect

When electricity prices explode, many point at wind turbines and solar roofs. The data tell a different story — and the cheapest solution to the problem has long been parked outside our office doors.

An opinion piece

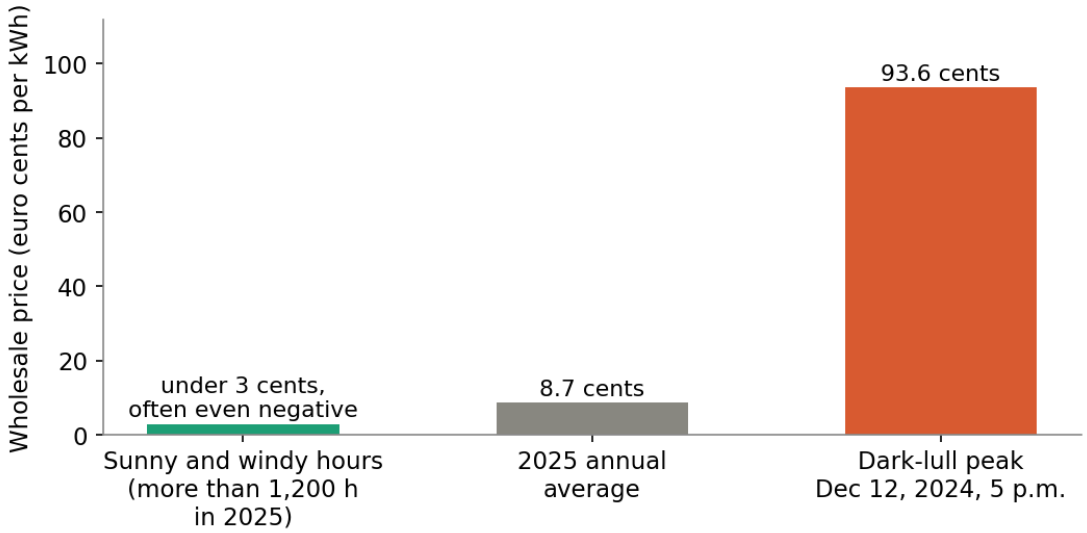
It was December 12, 2024, shortly after 5 p.m., when electricity in Germany became, for one hour, about as expensive as it had ever been: 93.6 cents per kilowatt-hour on the wholesale market — more than ten times the usual level. The country lay under what Germans call a Dunkelflaute, a dark lull: barely any wind, barely any sun, plus an early winter evening on which millions of households switched on lights, stoves and heating all at once. The outrage followed promptly, and it quickly settled on a culprit: the energy transition. Anyone who relies on the weather, so the argument went, should not be surprised by extortionate prices. It is a catchy story, and it is told ever more loudly the closer the next power bill comes. It has just one flaw: it confuses cause and effect.

How the price of electricity really comes about

To understand what happened that December evening, one has to know how prices are formed on the power exchange. Electricity is auctioned there hour by hour. The cheapest suppliers win first — and today those are almost always wind and solar plants, because their "fuel" costs nothing. If their output is not enough, the more expensive power plants come into play in turn: first coal, then gas. And now the decisive rule of this auction: the last, most expensive plant still needed sets the price — for everyone. When wind and sun deliver in abundance, the expensive reserve stays out of the game and the price falls, on sunny middays even below zero. When both fail, gas-fired plants take command of the price tag.

The figures for 2025 tell exactly this story. On average, a kilowatt-hour cost 8.7 cents on the wholesale market. In more than 1,200 hours — always when wind and sun were delivering — the price lay below three cents, often even in negative territory. It became expensive only when both were absent: the unusually wind-poor winter drove prices up, and every single price spike of the year fell in hours of weak renewable output. The record prices of December 2024 were, incidentally, thoroughly investigated by Germany's Federal Network Agency and Federal Cartel Office — and no manipulation whatsoever was found. It was simply the auction principle meeting an empty shelf. Whoever claims that wind turbines make electricity expensive is, at heart, claiming that the umbrella is to blame for the rain.

Of all this, only part reaches the price at home: of the roughly 37 cents a German household pays per kilowatt-hour in 2026, only about a third goes to actually buying the electricity; the rest is grid fees, taxes and levies. That many citizens notice nothing of the bargain hours has a simple reason, too: most are on fixed-price contracts that iron out the ups and downs of the exchange — including the supplier's risk premium. Those with a dynamic tariff and a smart meter, by contrast, already see the giveaway hours on their own bill and can shift the washing machine or the car charge right into them. And the wholesale price remains the foundation on which everything else rests — it decides whether industrial companies invest here or move away.



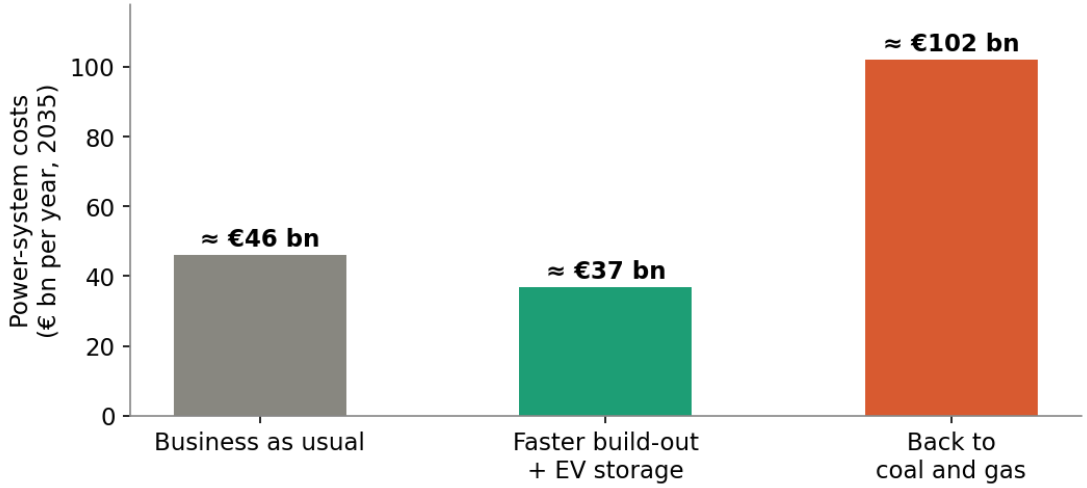
The exchange price and the weather: when wind and sun deliver, electricity is almost free. When they are absent, gas plants set the price — up to the record peak of the December 2024 dark lull. (Data: Fraunhofer ISE, Federal Network Agency)

What the energy transition really costs — and what not having it would cost

Honesty requires saying: today's system is not free. The federal government pays around 18 billion euros a year in pledged support for renewable installations. Within that lies a genuine annoyance that critics rightly denounce: many installations have been promised a fixed remuneration — if the exchange price falls to or below zero in sunny hours, the state refunds operators the difference. The cheaper the electricity on the exchange, the more expensive it paradoxically becomes for the federal budget. Almost three billion more goes on interventions in the grid — for instance when wind turbines have to be curtailed because power lines are missing, and their operators are compensated for it. Add the costly expansion of transmission lines. All told, a good 40 billion euros a year, and nobody should talk that sum down.

The decisive question, however, is: compared with what? Imagine Germany had never built a wind turbine and covered its electricity demand to this day with a fossil fleet of coal and gas plants. The 1,200 bargain hours would not exist — in every single hour of the year, fossil plants would dictate the price. All fuels would have to be imported, at world-market prices and world-market moods. Above all: for every tonne of carbon dioxide emitted, power plants in Europe must buy emission allowances — currently around 80 euros per tonne, with a politically intended upward trend, because the EU tightens the supply of these allowances year after year; experts expect prices of around 140 euros for 2035. These costs land in full on the power bill. And whoever now demands simply abolishing the levy overlooks two things: even at a CO_2 price of zero, imported coal and imported gas would remain more expensive than wind and sun, whose fuel costs nothing — and a German solo run against the European emissions-trading system is legally not on offer anyway. The balance of the thought experiment is sobering for the nostalgics: even today, pure coal-and-gas power would on average be more expensive than the existing mix. And by 2035 the fossil system would come to around 100 billion euros annually — roughly double the cost of the chosen path. Add the risk familiar to anyone who has ever put everything on one card: when the gas price exploded in 2022, the already-high share of renewables noticeably cushioned the shock. A purely fossil Germany would have felt it at full force on every single kilowatt-hour.

At this point, the objection reliably arrives: but nuclear power! Had we only kept the reactors, everything today would be fine and cheap. That, too, does not survive contact with the facts: after a good four decades, Germany's reactors had reached the end of their design life — anyone who wants to rely on nuclear power for the long run has to build new plants, and Europe is currently demonstrating what that means. The new builds at Flamanville in France and Olkiluoto in Finland went online more than a decade late and at a multiple of the planned cost; Britain's Hinkley Point C reactor was guaranteed an inflation-indexed purchase price running for decades that is heading toward the equivalent of 15 to 20 cents per kilowatt-hour by the mid-2030s — a multiple of what new wind and solar parks need. Cheap nuclear power exists in old depreciation tables, not on new construction sites.

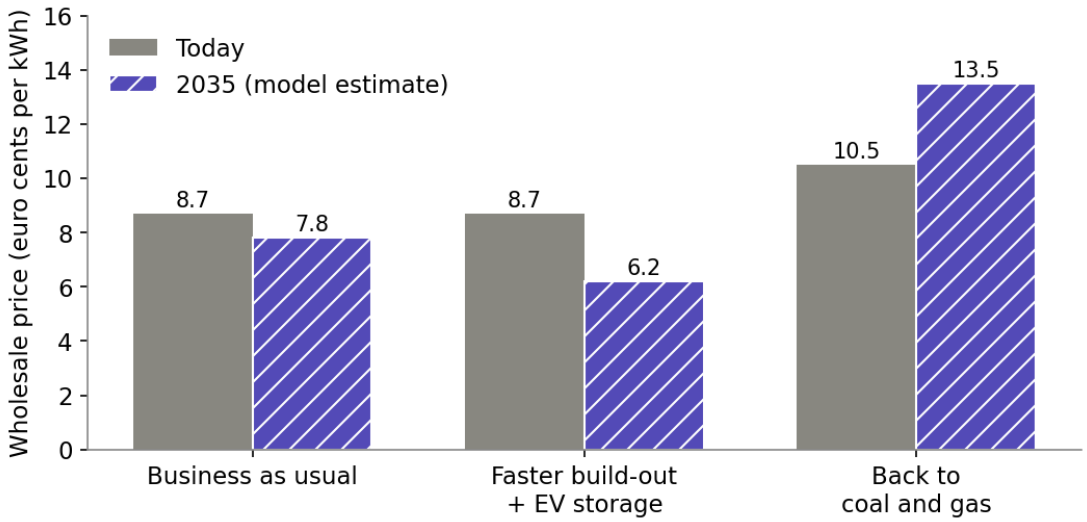


The full bill for 2035: support schemes, grids, fuels and CO_2 costs taken together, falling back on coal and gas would be by far the most expensive path. (Model calculation based on the sources listed)

The real weakness — and the solution in the car park

Does that mean all is well? No. Today's system has a real weakness, and its name is not wind turbine but missing storage. Germany produces electricity in abundance at midday and throws part of it away; in the evening it buys back dearly. The solution does not have to be invented — it is parked a million times over in our car parks. Modern electric cars can not only take in electricity but also feed it back; the principle is called "bidirectional charging". If, in 2035, just half of a realistic fleet of nine million electric cars took part, the grid would have storage power at its disposal exceeding all of Germany's pumped-hydro plants several times over — enough to close the evening gap of a dark lull for hours on end. Researchers at the Fraunhofer institutes put the possible relief for the energy system at up to 8.4 billion euros per year; participating households could earn several hundred euros annually. Above all, the

dreaded price spikes would be capped and the waste of the midday surpluses ended — and with it the support paradox: every kilowatt-hour that lands in a car battery at midday instead of going to the exchange for nothing relieves the federal budget at the same time. Two objections deserve an honest answer. First, the worry about one's own car: nobody gets drained — the owner decides how much reserve must remain in the battery, and modern batteries cope with the additional charging cycles over the vehicle's entire lifetime; most outlast it. Second, the limit of the idea: car batteries smooth hours and days, not weeks. For the rare long dark lull, the country will still need reserve power plants — just far fewer of them, and they would have to fire up far less often.



Three paths, one price tag: with EV storage, the wholesale price falls markedly by 2035; falling back on coal and gas would raise it by half. (Model calculation. Actual 2025 wholesale price — 8.7 cents — per Fraunhofer ISE; the present-day value of the fossil path stems from the thought experiment in the text.)

Why the company car park is decisive

One detail decides success or failure here, and it is criminally neglected in the political debate: during the day, when the sun produces the surpluses, the cars are not at home. They are at the employer's. Whoever wants to steer the midday sun into car batteries therefore needs one thing above all — charging points in company car parks.

That this is no mere theory is shown by MicroChemicals, a speciality-chemicals maker in Ulm, with a model it calls "dual charging": when the company's solar roof produces more electricity than the business currently needs, employees charge their cars for free with the surplus; when the sun does not suffice and the battery has to be filled anyway, they charge at the regular price — each person decides for themselves. The result is striking: this price signal alone shifts almost all charging into the surplus hours; in the sunny months, practically not a single paid charge is booked any more. Employees drive almost for free and need no charging station of their own; the company gains staff loyalty and a better climate balance — at costs that barely register, because the given-away electricity would otherwise have been fed into the grid for a few cents. It is, in miniature, exactly the logic the larger power system needs: consumption migrates to wherever electricity is abundant right now.

For such pioneering examples to become the rule, policymakers must act — concretely. First, in tax law: that employees may charge tax-free at their employer's is so far only a temporary permission; the rule should be made permanent and complemented by a simple guarantee: whoever feeds electricity from their car back into the grid must not be punished with tax forms and accounting bureaucracy — a generous exemption threshold for such earnings would suffice. Second, in infrastructure: workplace charging points must pay off for companies, through accelerated depreciation or targeted subsidies, sensibly coupled to solar roofs above the parking spaces, as some German states already require. Third, in technology: manufacturers must be obliged to build the common standard for feeding back into every car instead of locking customers into closed island solutions — and without smart meters across the board, every "power plant on wheels" remains theory; the embarrassingly slow rollout of these meters by international standards is an annoyance an industrial nation cannot afford. At least one thing has happened: the absurd double burden under which fed-back electricity paid grid fees twice was abolished in 2026. That was the first step. It must not take another ten years until the second.

The wrong trial

Germany's electricity-price debate is currently prosecuting the wrong defendant. It is not the renewables that make electricity expensive, but the hours in which the country stands without them — and a system that has learned to produce cheaply but not yet to store cleverly. Whoever wants to go back to coal and gas prescribes consumers not relief but the most expensive of all options, complete with full dependence on world-market prices. And the

beneficiaries of the rebuild would not just be the drivers: capped price spikes, fewer reserve power plants and avoided grid expansion lower the power bill for everyone — including those who will never own an electric car. The republic's cheapest battery has long been bought and paid for; it is parked outside the office from nine to five. All politics has to do is hand it the plug.

Sources and data

All scenario values are model estimates (as of June 2026) intended to convey orders of magnitude, not forecasts. Key sources:

Fraunhofer ISE: Public electricity generation and exchange prices 2025 (annual review).
https://www.ise.fraunhofer.de/de/presse-und-medien/presseinformationen/2026/oeffentliche-stromerzeugung-2025-wind-und-solar-erstmals-als-doppelspitze.html

Federal Network Agency / Federal Cartel Office: Investigation of the price spikes during the dark lulls of 2024.
https://www.bundesnetzagentur.de/SharedDocs/Pressemitteilungen/DE/2025/20251021_Preisspitzen.html

FfE: German exchange electricity prices (EPEX Spot) in 2025.
https://www.ffe.de/veroeffentlichungen/deutsche-strompreise-an-der-boerse-epex-spot-im-jahr-2025/

Cleanthinking: Fact check on redispatch and curtailment costs 2025.
https://www.cleanthinking.de/faktencheck-redispatch-drei-milliarden/

Finanztip: CO_2 price — current level and projections (Ariadne, EWI).
https://www.finanztip.de/co2-steuer/

pv magazine / Fraunhofer ISI & ISE for Transport & Environment: Relief potential of bidirectional charging.
https://www.pv-magazine.de/2024/10/30/bidirektionales-laden-kann-das-deutsche-energiesystem-bis-2040-jaehrlich-um-84-milliarden-euro-entlasten/

ingenieur.de: Bidirectional charging from 2026 — legal framework and savings potential.
https://www.ingenieur.de/technik/fachbereiche/verkehr/bidirektionales-laden-ab-2026-so-wird-ihr-e-auto-zum-kraftwerk/

Strompreisampel: Composition of the German household electricity price 2026.
https://strompreisampel.de/strompreis-zusammensetzung