
The energy transition in Germany: state of play 2024

Review of key developments
and outlook for 2025

Moritz Zackariat, Katharina Hartz, Fabian Huneke
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Agenda

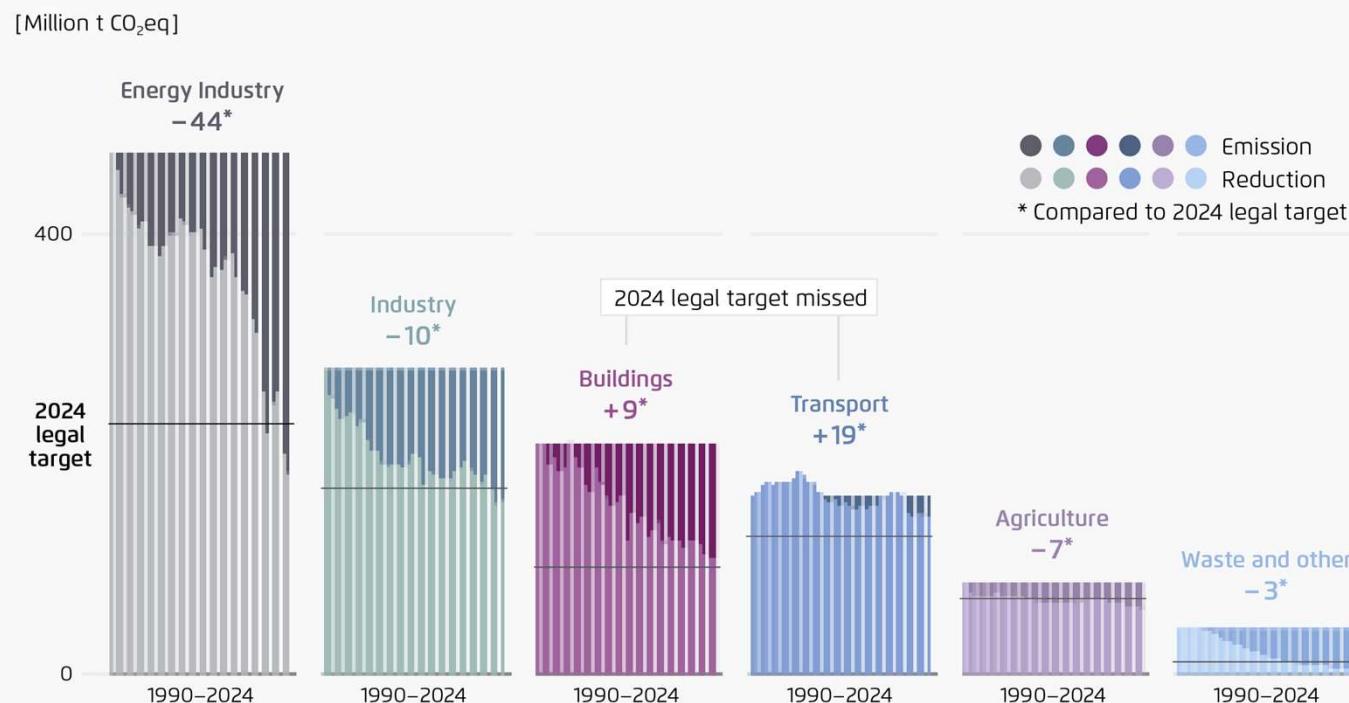
- Overview of German greenhouse gas emissions
 - Focus on the energy industry
 - Buildings, transport and industry
 - Outlook
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Germany's GHG emissions fell by approx 3% in 2024 compared to the previous year: from 18 to 656 MtCO₂eq

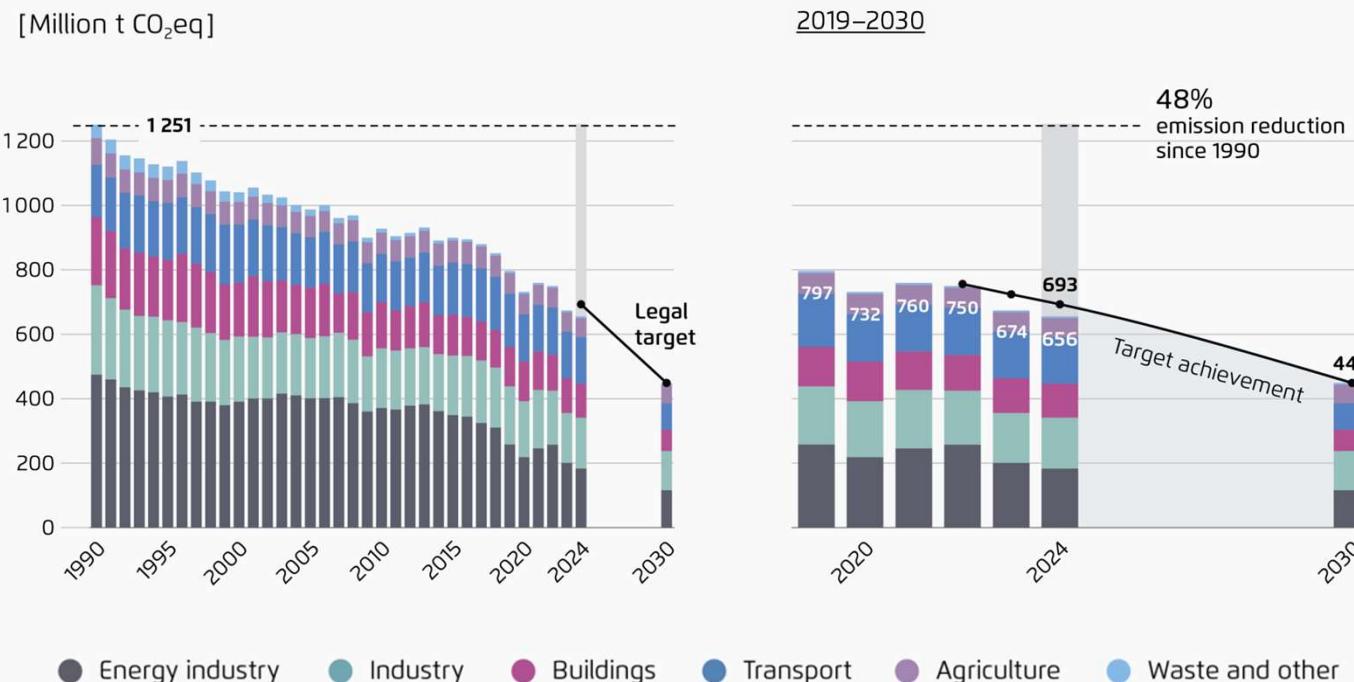
Development of GHG emissions since 1990 and comparison with the 2024 sector targets of the Climate Protection Act



- Compared to 1990, emissions have fallen by a total of 48%.
- Over 80% of the reductions come from the energy sector.
- The 2024 indicative climate target set by the new *Climate Protection Act (KSG)* will be exceeded by around 36 MtCO₂eq.
- However, the requirements of the *EU Effort Sharing Regulation* are not being met, as emissions from buildings and transport continue to stagnate.

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Development of GHG emissions by sector, 1990-2024

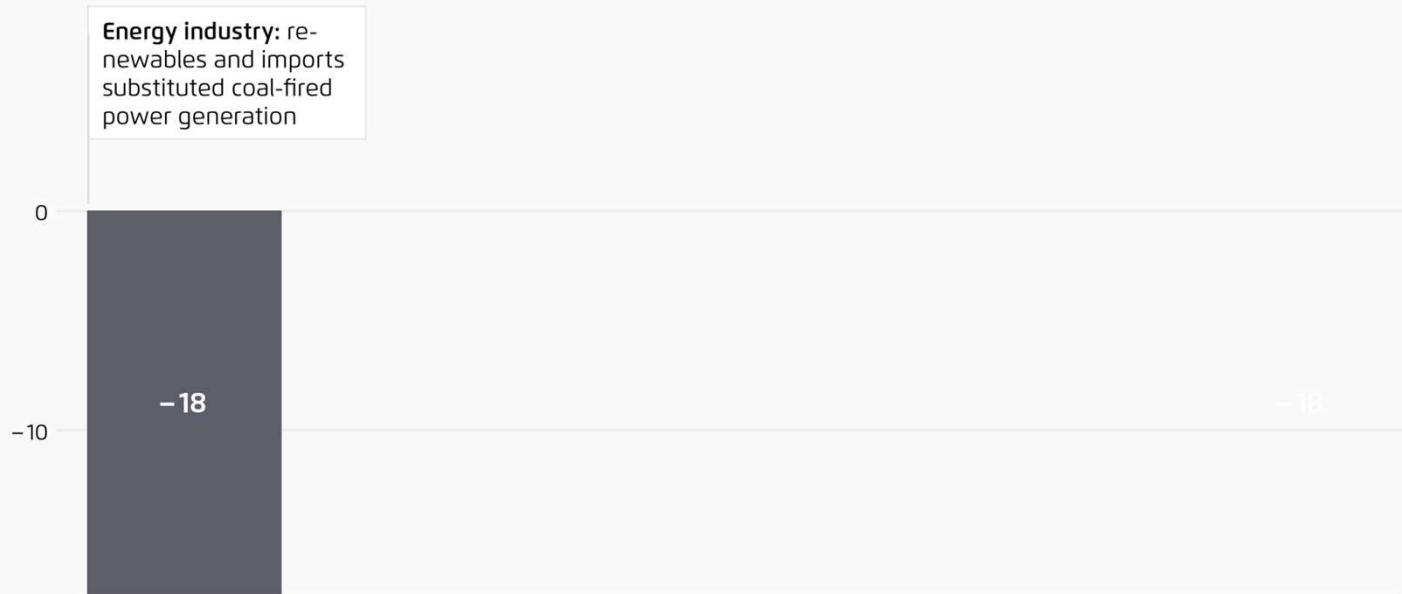


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Development of GHG emissions in 2024 compared to 2023

[Million t CO₂eq]



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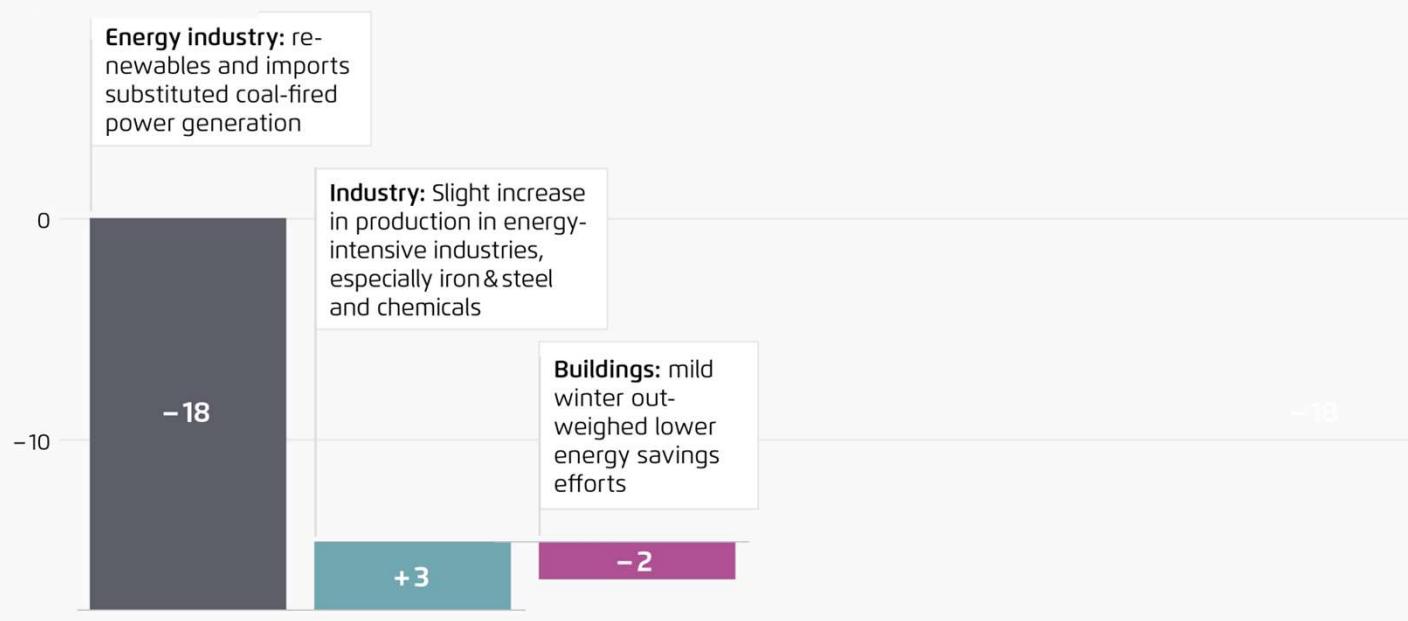


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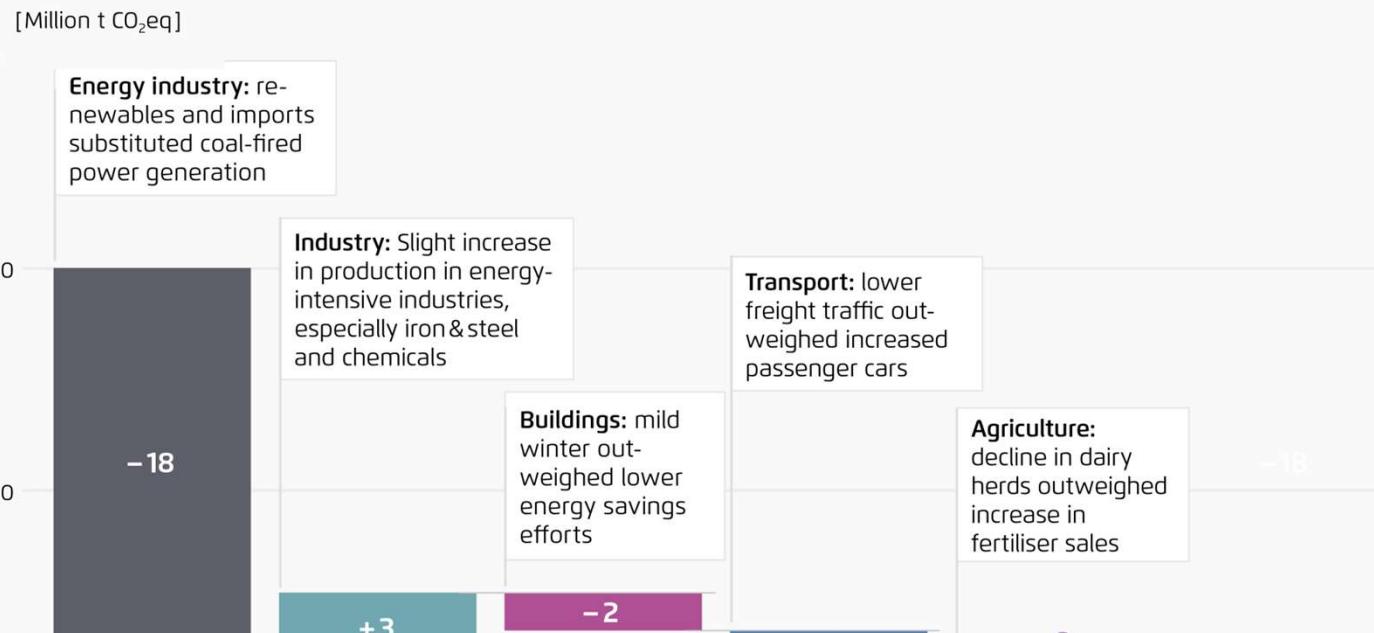
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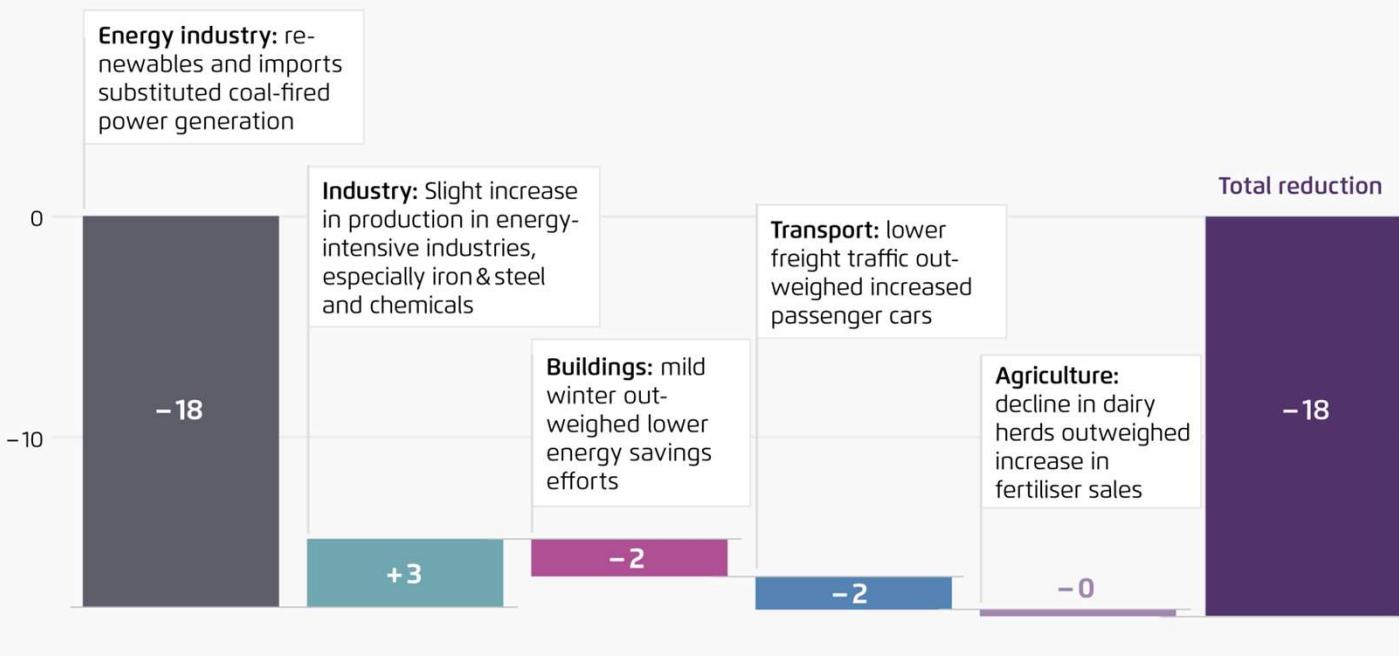


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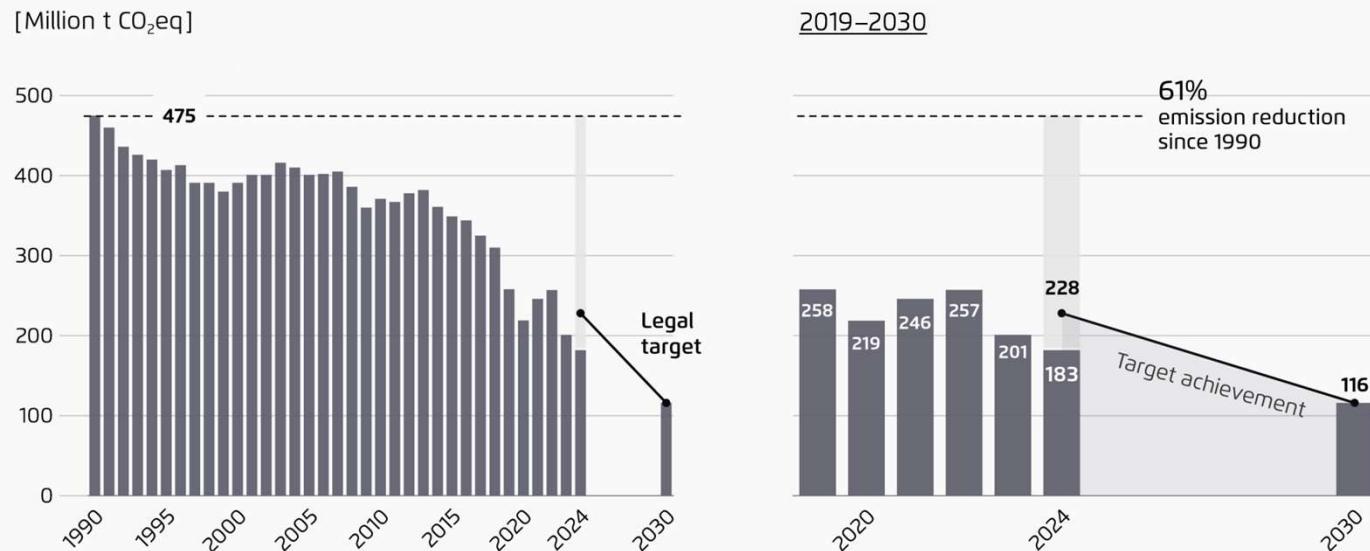
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19 TWh less coal-fired electricity reduced energy industry emissions by 9%; renewable energy (+12 TWh) and imports (+12 TWh) filled the gap

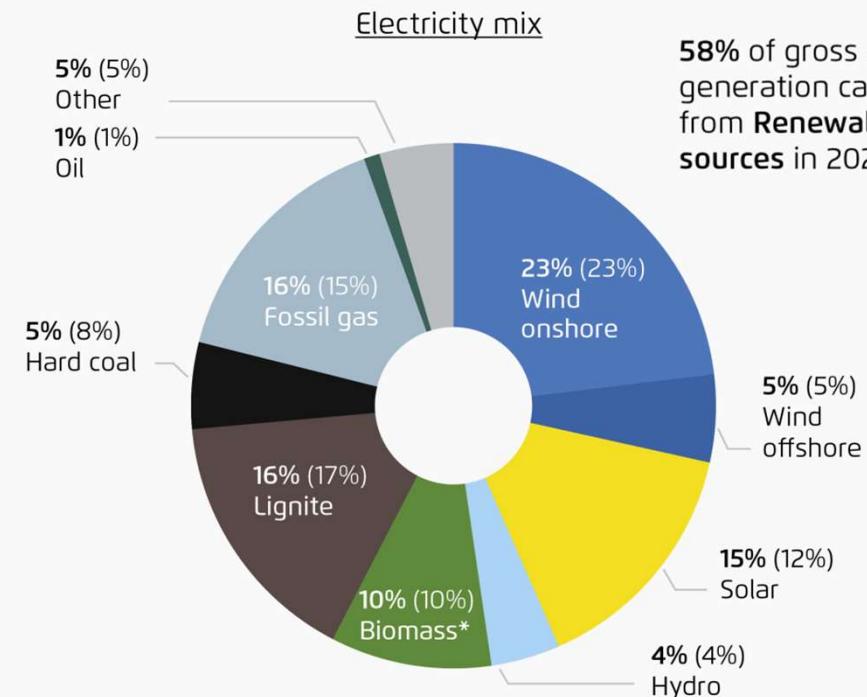
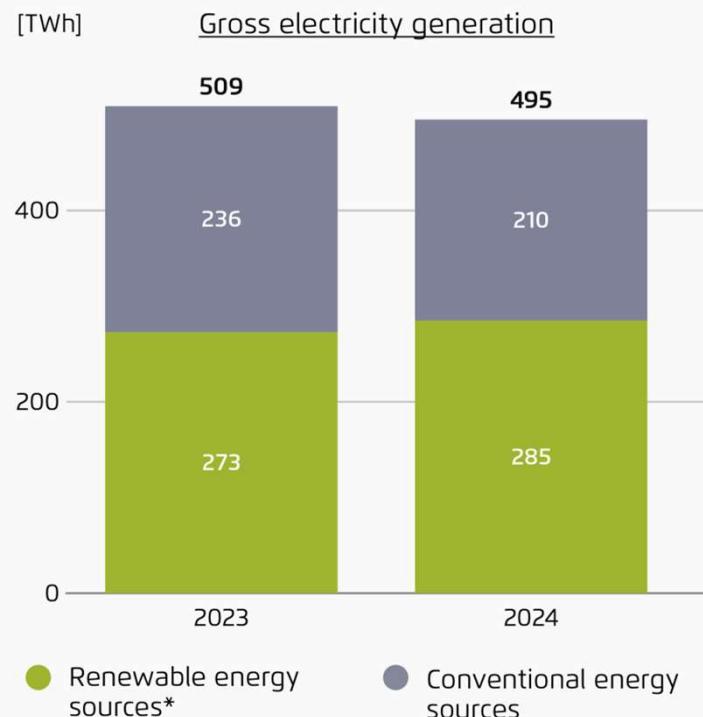
Development of GHG emissions in the energy industry, 1990-2024



- 6 GW of coal-fired power plants (16% of installed capacity) were decommissioned.
- Coal-fired power generation fell to a historic low of 10 TWh.
- Renewable energy achieved a record year with 285 TWh.
- Natural gas electricity generation remained the same compared to 2023, nuclear energy falls by 7 TWh.
- Net electricity imports rose to 5% of electricity demand in 2024; in 2023 it was just 2%.

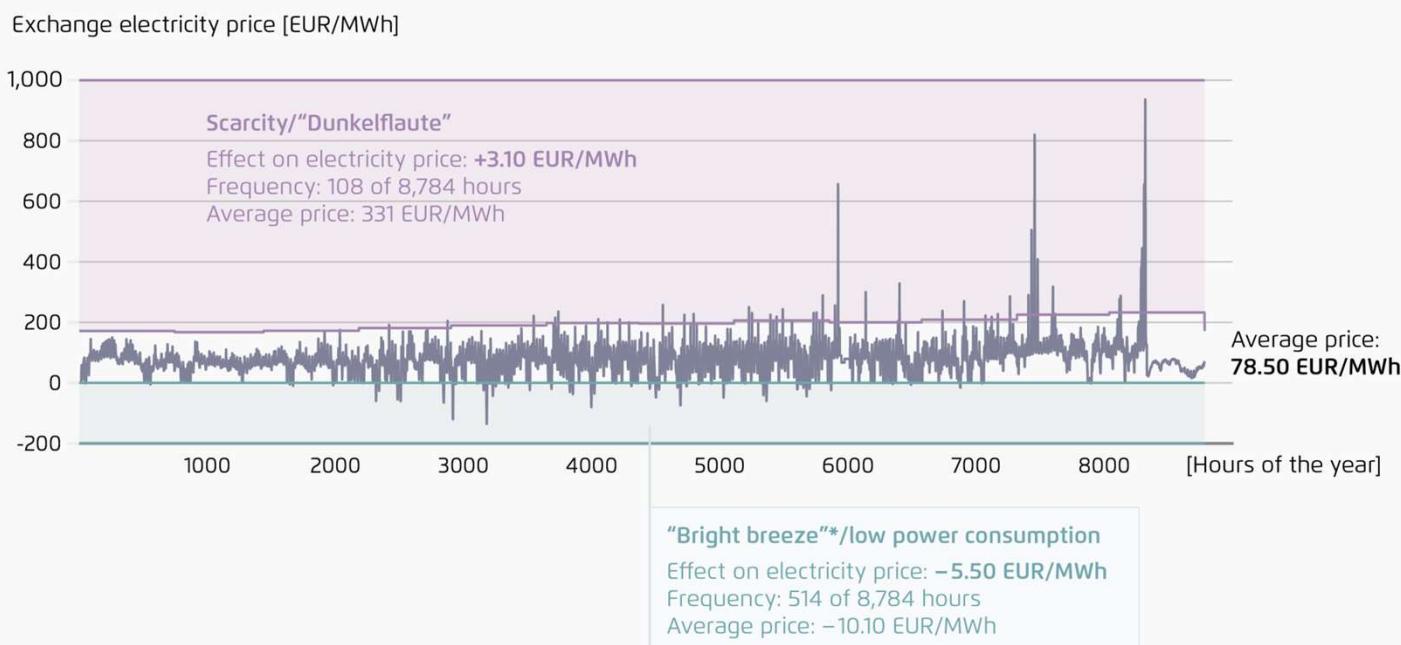
Renewable energy sources achieved a new power generation record of 285 TWh

Electricity mix 2024, values for 2023 in brackets (right)



The price-reducing effect in phases with high levels of renewable energy outweighed phases with very high prices during *Dunkelflauten*

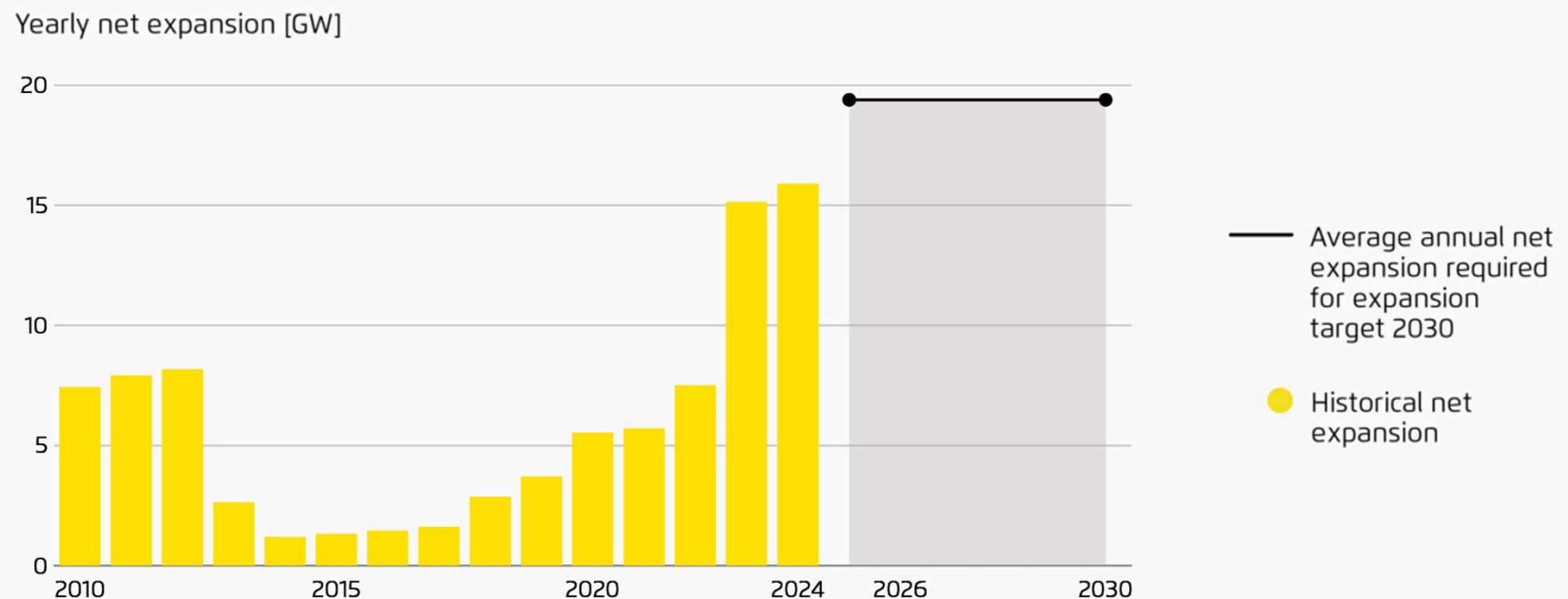
Influence of very high and very low hourly electricity prices on the average electricity price, 2024



- In 2024, *Dunkelflauten* were observed between 5-7 November and 12 December.
- These led to an increase in electricity prices of around 3.10 EUR/MWh on an annual average.
- Phases with a very high supply of renewable energy compared to demand reduced the electricity price by an average of 5.50 EUR/MWh.

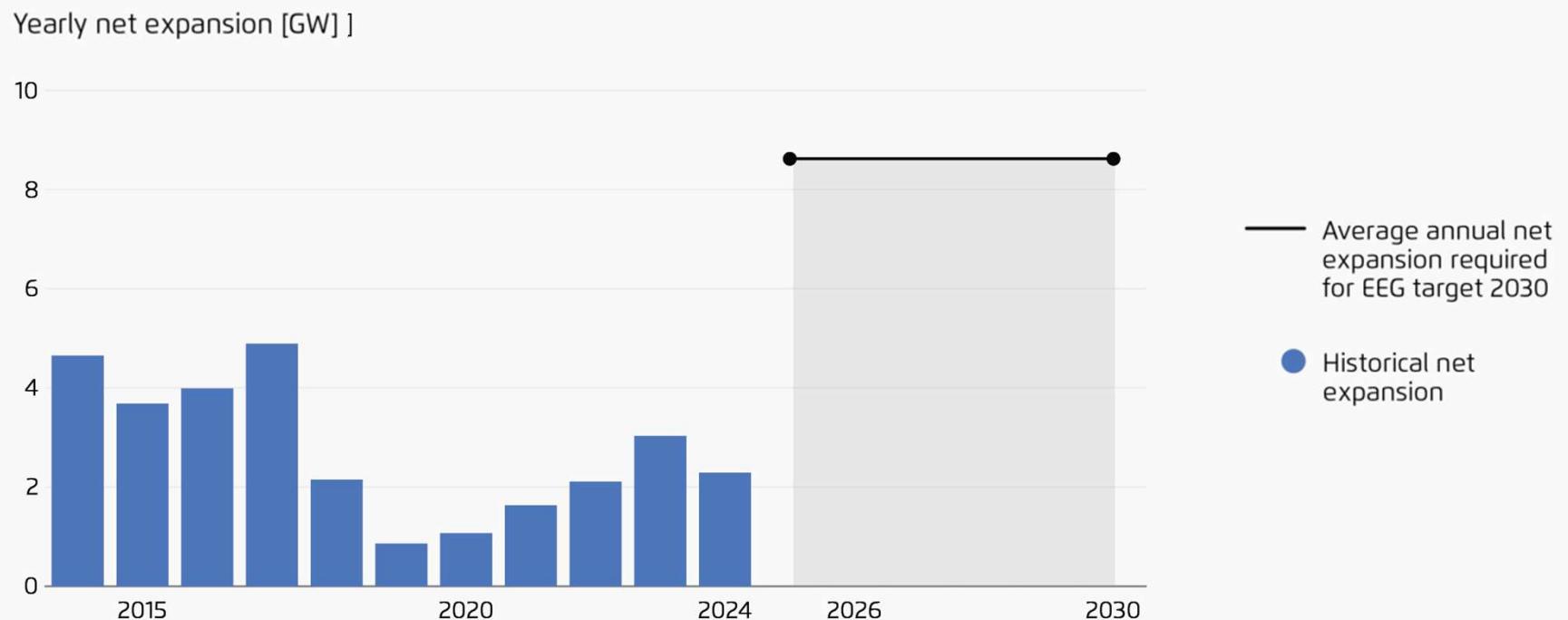
Photovoltaics exceeded their expansion record from 2023 by over 16 GW; 10 GW were built on roofs and 6 GW were ground-mounted

Historical and future solar expansion required for German Renewable Energy Sources Act (EEG) expansion target 2030

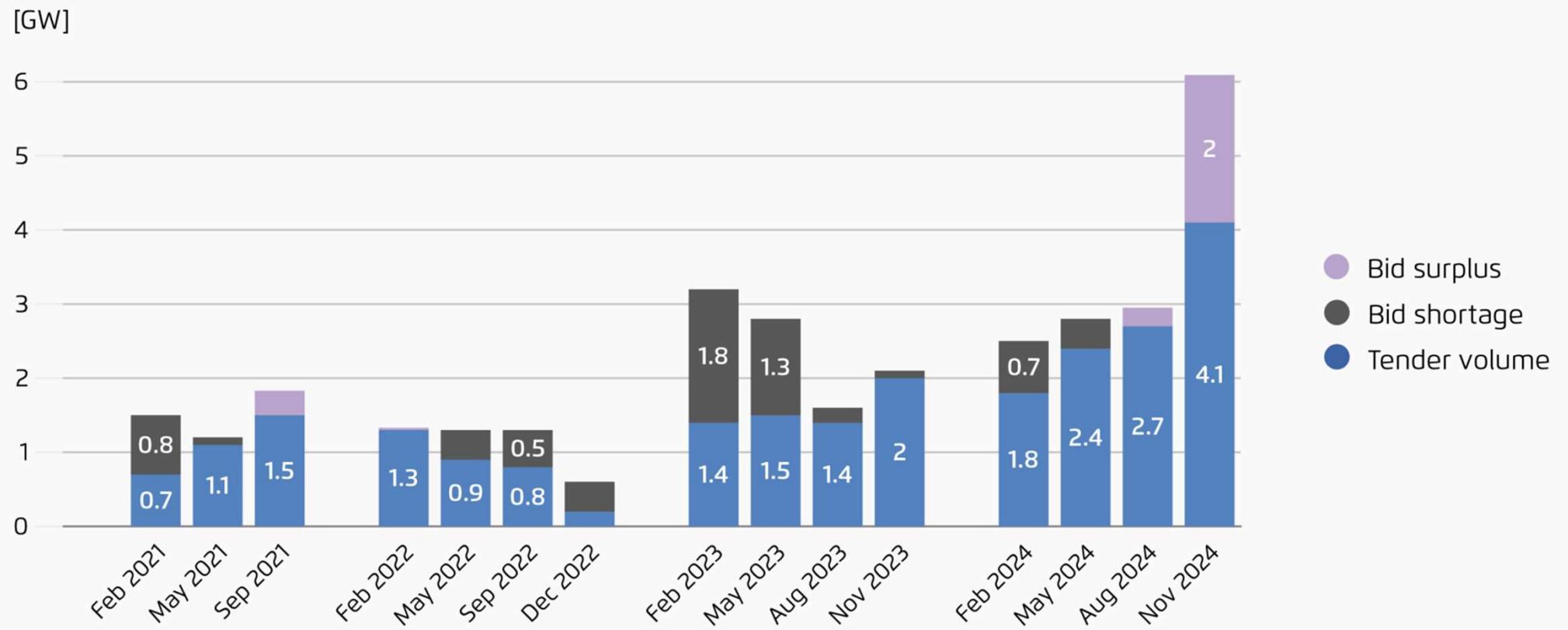


The expansion of onshore wind power was still too low in 2024, but there are clear signs of an increase

Historical and future onshore wind expansion required for EEG expansion target 2030

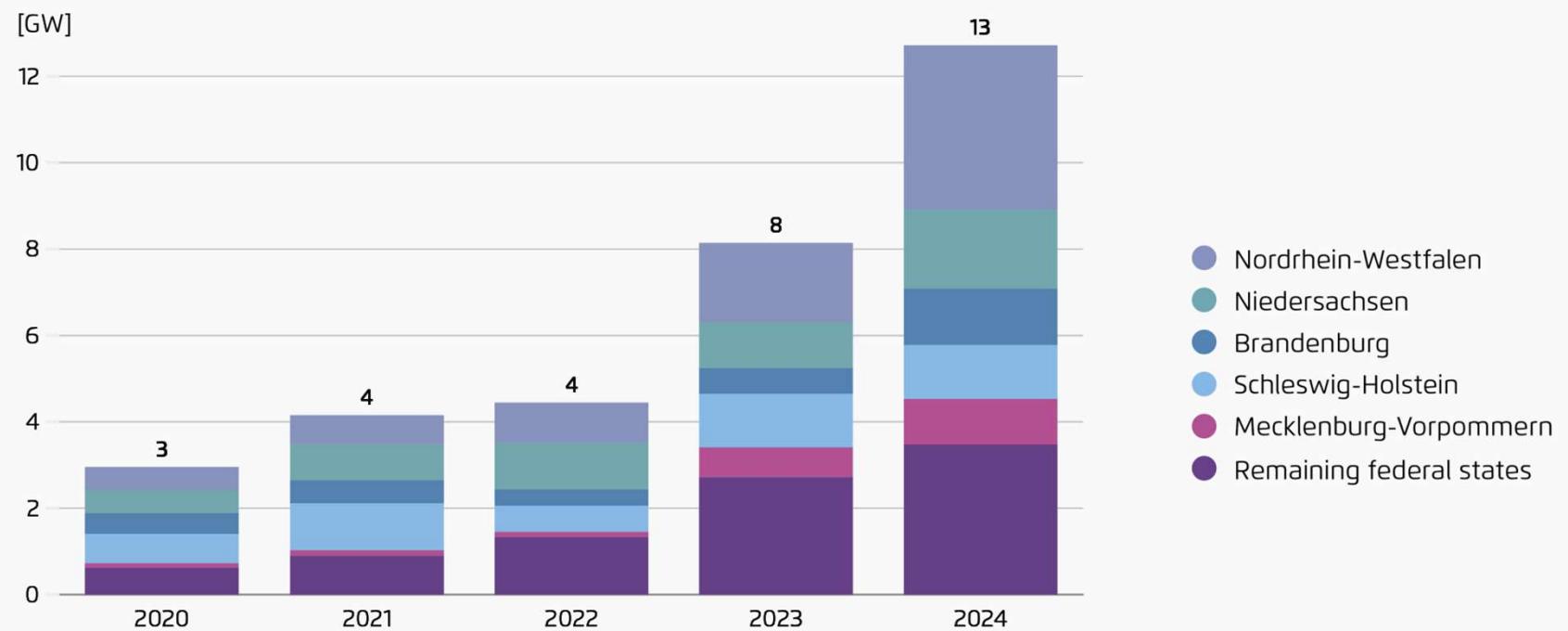


Wind onshore tenders in the second half of 2024 were significantly oversubscribed for the first time in three years



Permissions for onshore wind power tripled within two years

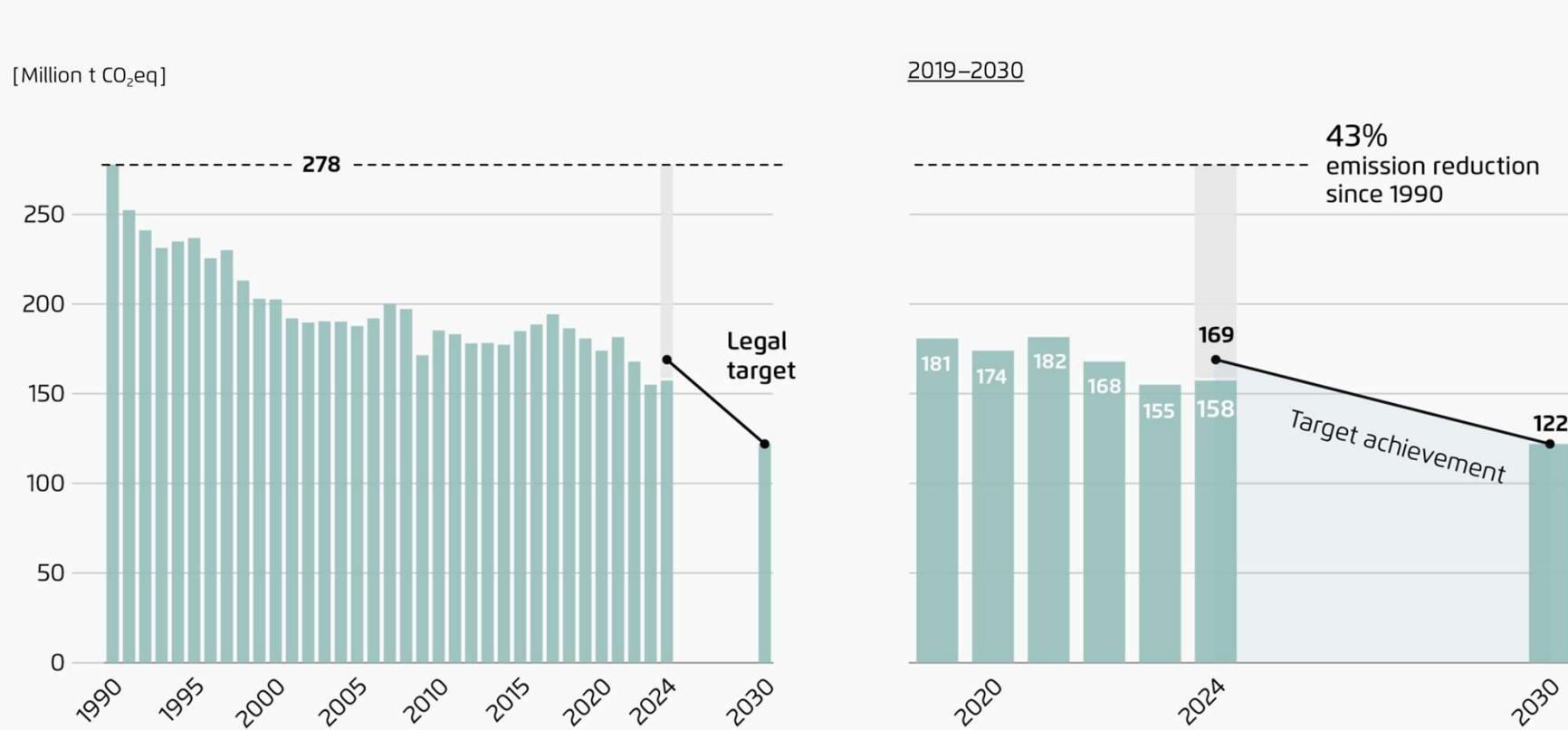
Permits for wind turbines by federal state, 2020-2024



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Industrial emissions increased by 2% in 2024, but need to fall by 23% by 2030



21 | Agora Energiewende (2024) according to UBA (2024a) - 2024: Estimate by Agora Energiewende based on AGEB (2024a/c), Destatis (2024a/b), WV Stahl (2024) and Aluminium Deutschland (2024). Target path derived from the Climate Protection Act.

Like the economy at large, investments also decreased; economic policy uncertainty exacerbated the situation

Development of gross fixed capital formation index in Germany, 2019-2024



22 | Agora Energiewende (2024) according to destatis (2024i) - Gross fixed capital formation is made up of investment in equipment, construction and other investments.
Price-adjusted, chain index (2019=100).

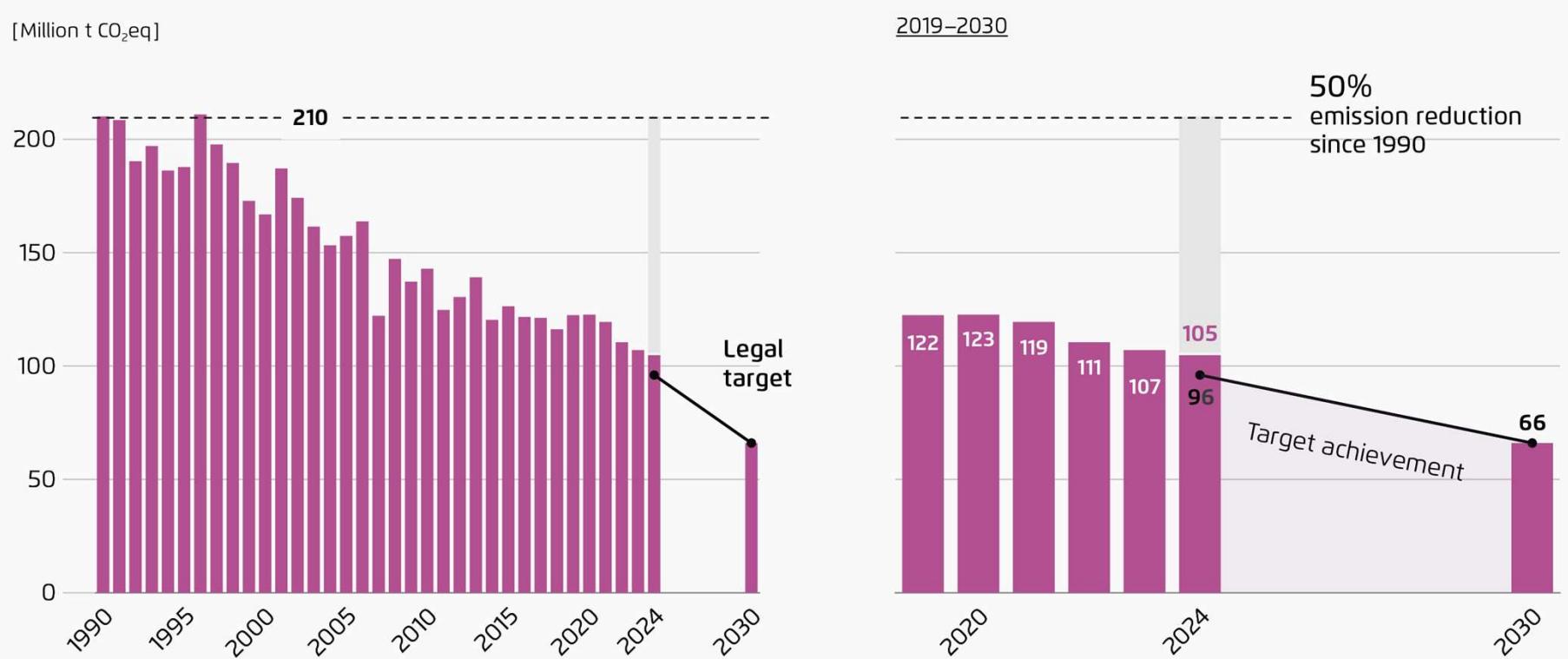
Industrial customers paid less on average in 2024 than in the previous year; prices normalised to pre-crisis levels for commercial customers

End-customer electricity price trend for industry and businesses, 2019-2024



23 | Agora Think Tanks (2024), bdew (2024a) - However, the consumer price index rose by 19.6 % between 2019 and 2024. Bandwidths due to short-term/long-term procurement strategy.
* SPK = Strompreiskompensation: Electricity price compensation of 1.0, 1.4, 1.3, 2.9, 4.2 and 3.4 centst/kWh taken into account from 2019 to 2024.

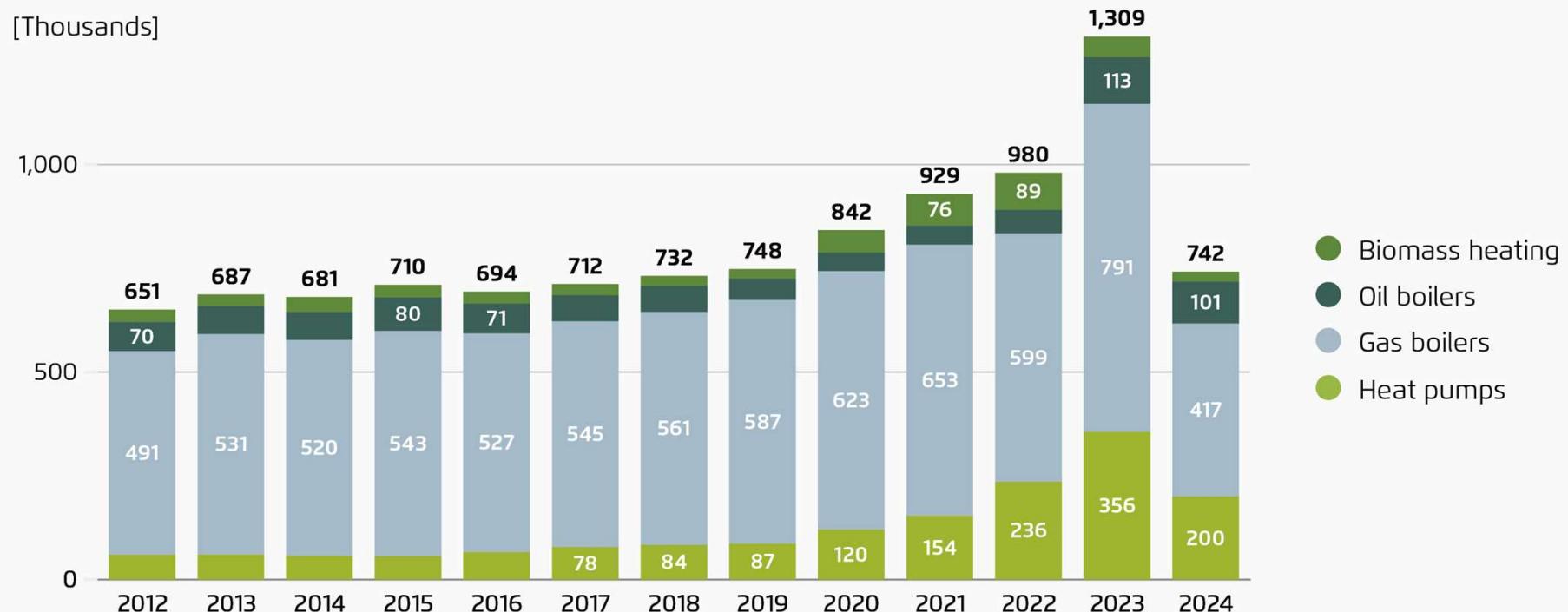
The buildings sector lags behind its target, but benefited from warm winters and halved emissions compared to 1990



24 | Agora Energiewende (2024) according to UBA (2024a) - 2023, 2024: Agora Energiewende estimate based on AGEB (2024d), BNetzA (2024p), bdew (2024j), DWD (2024). Target path derived from Climate Protection Act. 2023: Adjustment after data update.

After a record year in 2023 with 356,000 heat pumps sold, the heating market dropped sharply by 43% in 2024

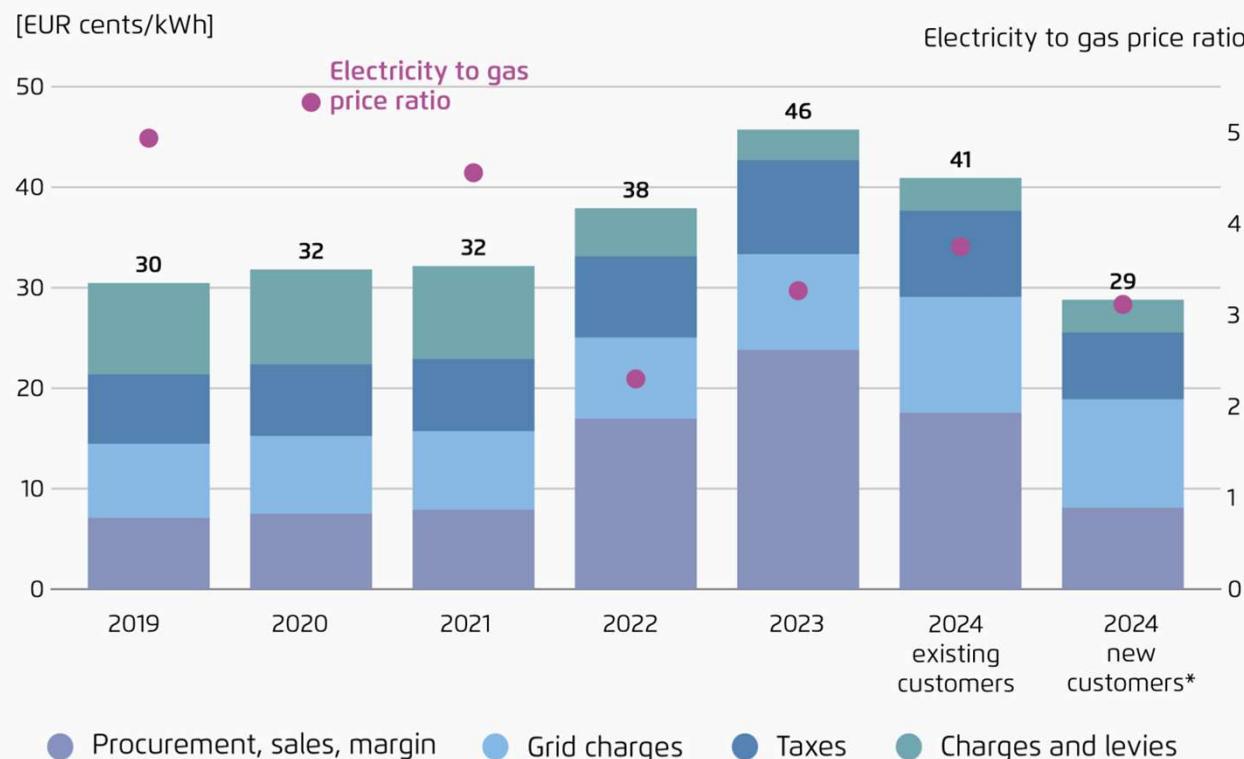
Sales structure for heat generators, 2012-2024



25 | Agora Energiewende (2024) according to BDH (2024) - 2024: Agora Energiewende forecast. Gas and oil: condensing and low-temperature boilers, biomass: logs, pellets, combination boilers, wood chips, heat pumps: air-to-water, brine-to-water, water-to-water and others

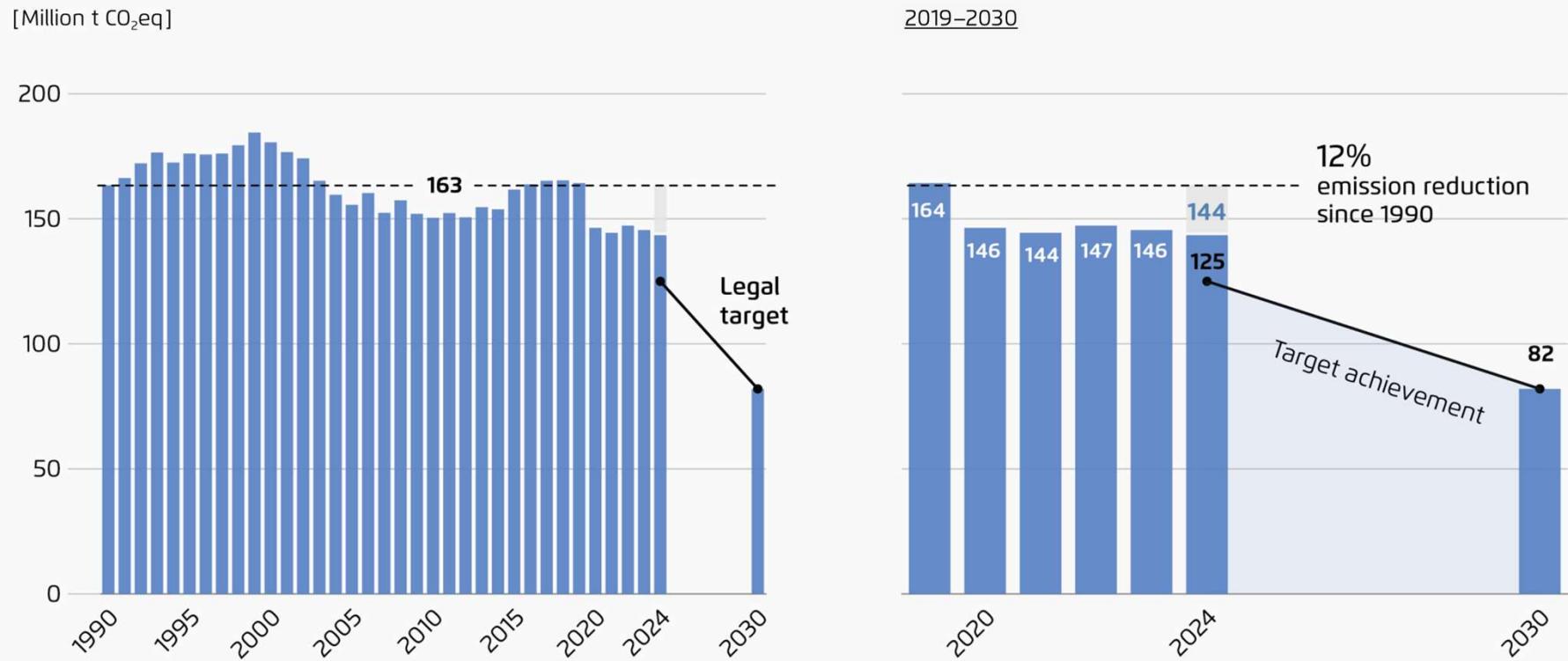
Electricity prices fell in 2024 compared to the previous year, but the electricity:gas price ratio is still too high

Electricity prices for household customers, 2019-2024



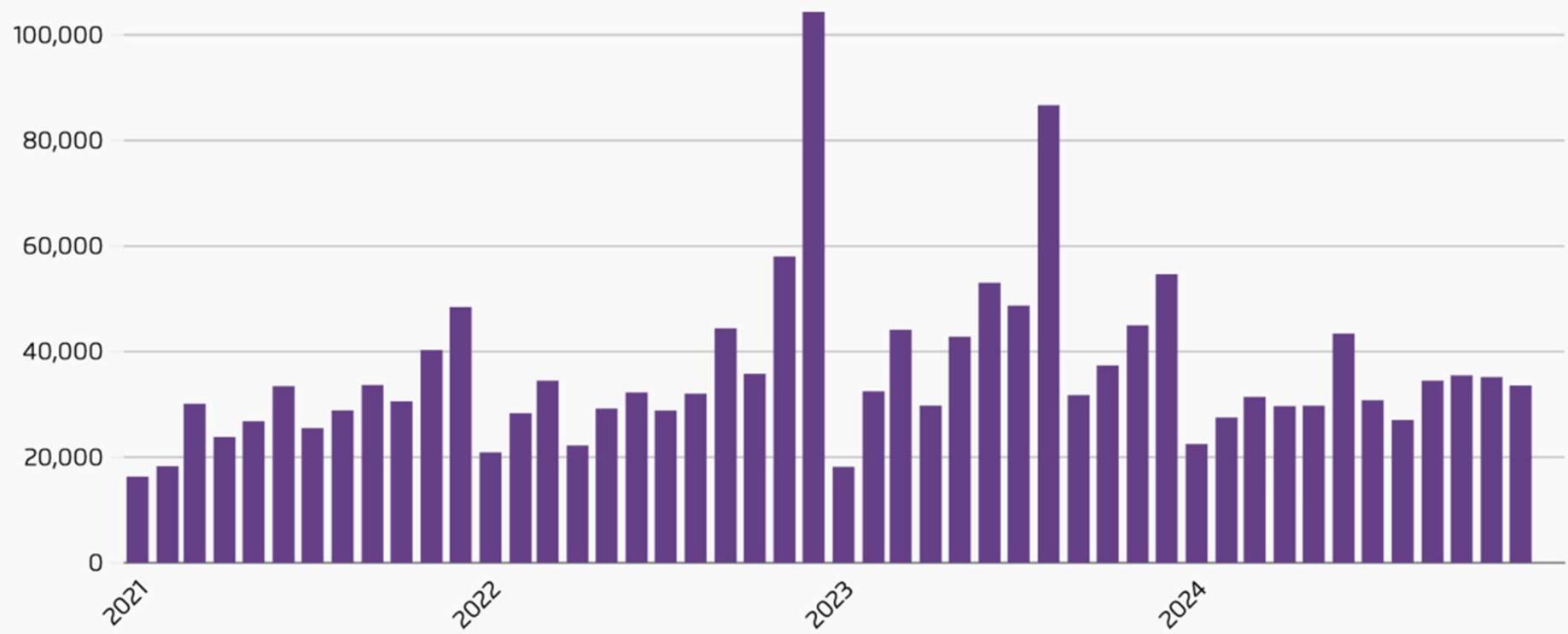
- New customer electricity prices for households were 29 cents/kWh, still below the the 2019 price level.
- Heating with heat pumps became more economically attractive for new customers compared to gas.
- For heat pumps to be perceived as more attractive, electricity should cost less than 2.5 times as much as natural gas.
- However, the 2024 ratio was still around 3 times.

At 144 Mt, GHG emissions were 12% instead of 23% lower than in 1990: national target exceeded, European* obligations jeopardised

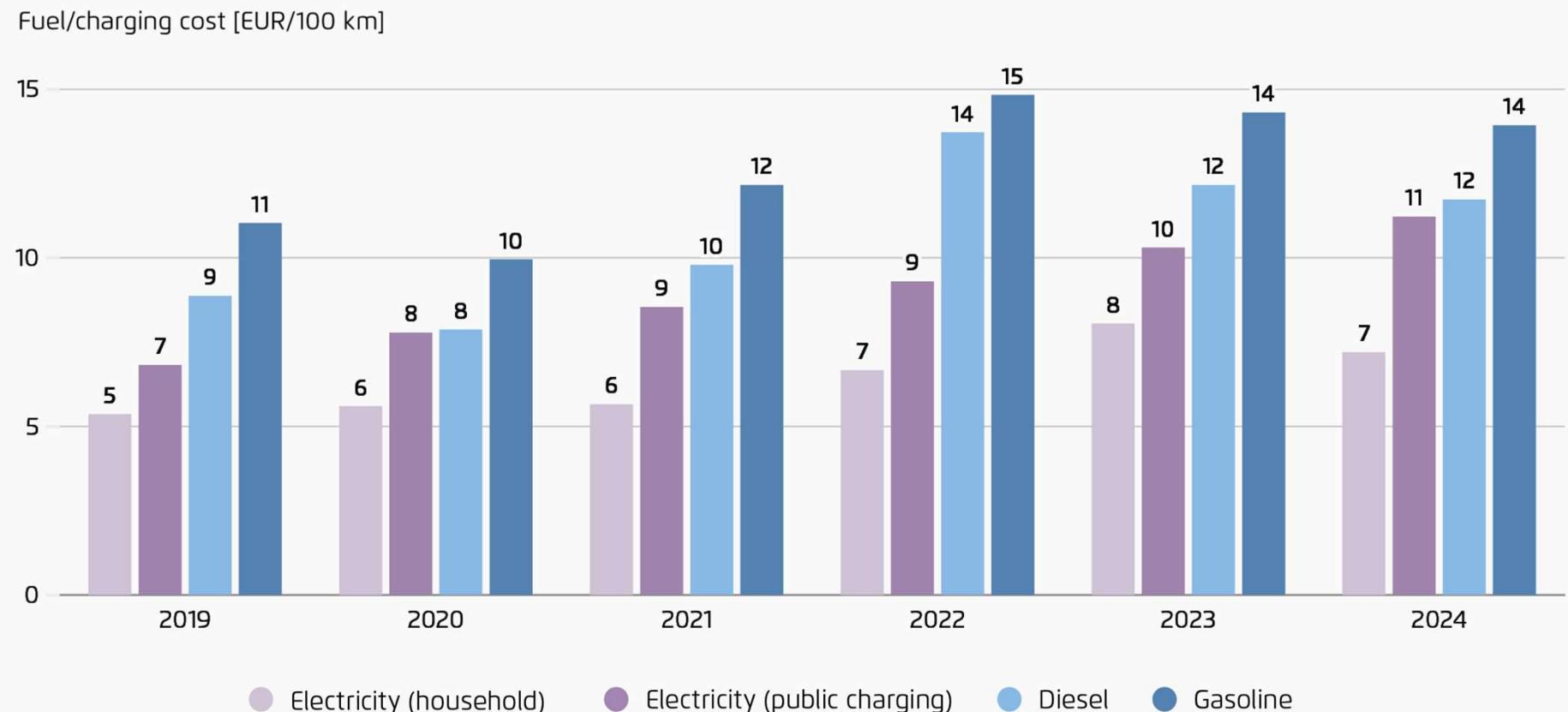


27% decline in new registrations of electric vehicles in 2024: while new registrations were stable overall, the e-car share shrank to 13.5%

Monthly new registrations of battery-electric vehicles, 2021-2024



Driving a car using household electricity cost half as much as using gasoline and slightly less than using diesel with normal public charging



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Outlook

- Power sector as driving force:
The expansion of renewable energy and electricity grids has gained significant momentum.
- This means that rapidly increasing quantities of renewable electricity will be available in the foreseeable future – and the rising supply will cause electricity exchange prices to fall.
- This electricity is the key to finally generating the necessary momentum in the demand sectors and structurally reducing emissions in buildings, industry and transport.
- However, if the switch in the demand sectors from fossil fuels to electricity-based solutions such as electric vehicles, heat pumps and electric boilers continues to stall, electricity costs will rise.
The reason: the larger electricity grid would then not be well utilised, resulting in rising grid charges.
- The central tasks of the coming legislative period are therefore:
 1. Create planning certainty, incentivise private investment in climate-friendly technologies and thus finally give momentum to the transformation in the buildings, transport and industrial sectors.
 2. Sustainably reduce electricity costs and enable flexible electricity procurement.

Thank you for your attention

Do you have any questions or comments?

Moritz Zackariat: Moritz.Zackariat@Agora-Energiewende.de

Katharina Hartz: Katharina.Hartz@Agora-Energiewende.de

Fabian Huneke: Fabian.Huneke@Agora-Energiewende.de

www.agora-energiewende.de