WIFO ■ REPORTS ON AUSTRIA
11/2026

Key Indicators of Climate Change and the Energy Sector in 2026. Special Topic: Water as a Critical Resource

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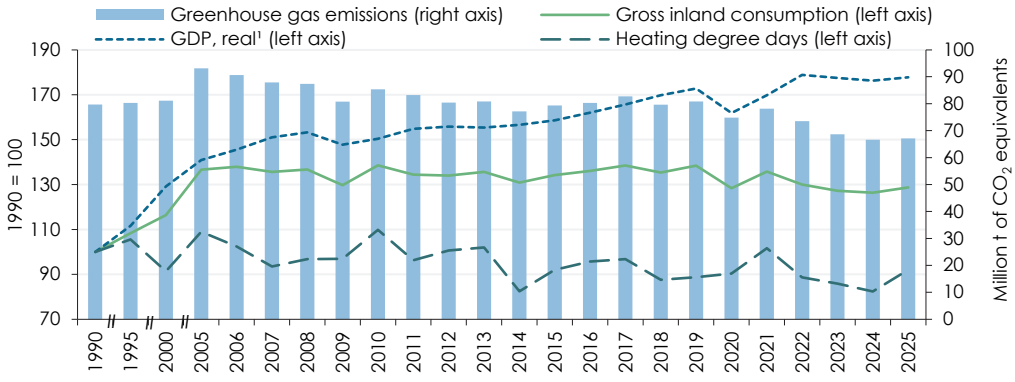
Key Indicators of Climate Change and the Energy Sector in 2026

Special Topic: Water as a Critical Resource

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- In 2024, the Austrian economy contracted (real GDP –0.8 percent); energy consumption (–0.7 percent) and greenhouse gas emissions (–3.0 percent) also continued to fall.
- The reduction in emissions was attributable to the economic downturn, favourable weather conditions (heating degree days down 4.1 percent, hydropower up 12.4 percent), the expansion of renewable energy technologies (wind power, photovoltaics up 16.6 percent) and persistently high energy prices.
- In 2025, despite rising energy consumption (+1.9 percent), a significant drop in hydroelectric power generation (–27.6 percent) and cooler weather (heating degree days +11.7 percent), greenhouse gas emissions rose only moderately by 0.7 percent (figures based on preliminary data). The continuous expansion of renewable energy and changes in consumption patterns in response to rising energy prices had a dampening effect.
- Water shortages resulting from extreme weather events not only destabilise the energy mix from renewable sources and agricultural productivity, but also pose a systemic threat to the resilience of value chains.

Greenhouse gas emissions, energy consumption, gross value added and heating degree days in Austria



In 2025, the trend of falling emissions reversed after three years – despite the continued expansion of renewable energy technologies. The expansion of industrial production and the weather-related increase in heating energy demand led to higher energy consumption in 2025 (Source: Environment Agency Austria; Statistics Austria; WDS – WIFO Data System, Macrobond. 2025: Statistics Austria, preliminary energy balance; Environment Agency Austria, short-term forecast. – ¹ Reference year 2015).

"In 2024, emissions fell across all sectors. In 2025, they rose significantly in the energy sector and among small-scale consumers due to weather conditions, whilst only emissions from transport continued to decline."

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October 2026

Key Indicators of Climate Change and the Energy Sector in 2026. Special Topic: Water as a Critical Resource

In 2024, the Austrian economy recorded a real GDP contraction of 0.8 percent, accompanied by a simultaneous decline in energy consumption (–0.7 percent) and greenhouse gas emissions (–3 percent). This emissions reduction is attributable to an interplay of structural and cyclical factors: persistently high energy prices, the deteriorating economic environment, mild weather conditions (heating degree days –4.1 percent), and the continued expansion of renewable energy technologies. According to preliminary data, this trend partially reverses in 2025: despite growing energy consumption (+1.9 percent), a recovering real GDP (+0.8 percent), a marked slump in hydropower production (–27.6 percent), and cooler weather conditions (heating degree days +11.7 percent), greenhouse gas emissions rise only moderately by 0.7 percent. The pronounced decline in hydropower production points to a systemically relevant vulnerability: water scarcity driven by extreme weather events destabilises not only the renewable energy mix and agricultural productivity but also threatens the resilience of entire value chains.

JEL-Codes: Q15, Q25, Q41, Q42, Q43, Q54 • **Keywords:** Climate change, climate policy, energy policy, agricultural production, environmental indicators, renewable energy, water

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Imprint: Publisher: Gabriel Felbermayr • Editor-in-Chief: Hans Pitlik (hans.pitlik@wifo.ac.at) • Editorial team: Tamara Fellinger, Christoph Lorenz, Tatjana Weber • Media owner (publisher), producer: Austrian Institute of Economic Research • 1030 Vienna, Arsenal, Objekt 20 • Tel. (+43 1) 798 26 01-0, https://reportsonaustria.wifo.ac.at/ • Place of publishing and production: Vienna • 2026/RoA/7496

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This 19th WIFO report on key indicators for climate change and the energy sector documents and analyses trends in 2024 and 2025. It is based on current data on greenhouse gas emissions in Austria (Environment Agency Austria, 2026a, 2026b, 2026c) and energy flows as reported in the energy balance (Statistics Austria, 2025b, 2026).

In 2024, greenhouse gas emissions continued to fall, as they had in the two previous years. In 2025, this trend reversed despite the ongoing expansion of renewable energy technologies. This year's special feature analyses how water scarcity affects energy production and agriculture, and how it thereby systematically influences critical value chains and production networks.

1. Climate and energy indicators

1.1 Low economic output, mild weather and climate policy measures curbed greenhouse gas emissions in 2024

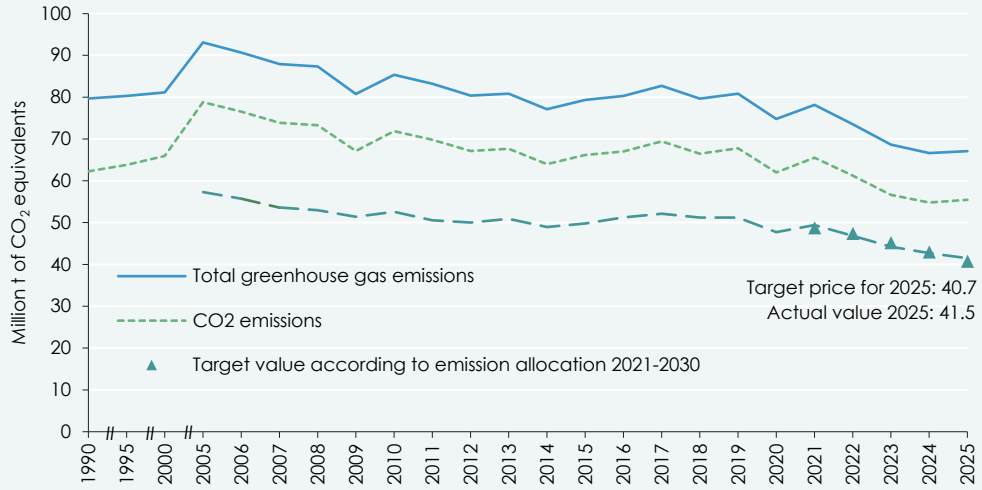
Austria's greenhouse gas emissions fell again in 2024, though by a smaller margin than in the previous year.

In 2024, Austria emitted fewer greenhouse gases for the third consecutive year (–3.0 percent). Total emissions amounted to 66.6 million t of CO_2 equivalents. This represents a 16.4 percent reduction compared with 1990 levels.

The reduction in emissions was due, on the one hand, to continued low economic growth, geopolitical uncertainty and

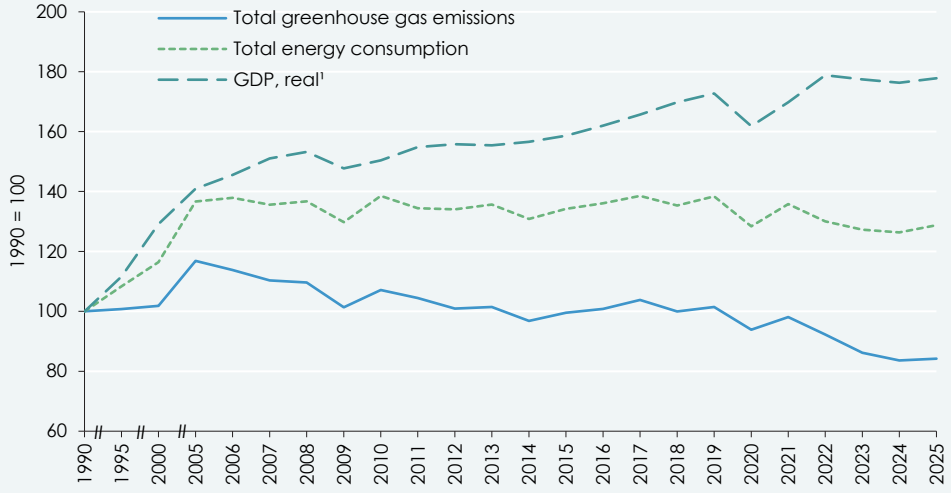
weather conditions that were even milder than in the previous year. On the other hand, climate policy measures such as subsidies for replacing heating systems in buildings, CO_2 pricing and the expansion of renewable energy had a dampening effect. Overall, this resulted in reduced consumption of fossil fuels across all sectors of the economy.

Figure 1: **Greenhouse gas emissions in Austria and the Kyoto target**



Source: Environment Agency Austria, Greenhouse Gas Inventory 1990-2024. 2025: Environment Agency Austria, short-term forecast.

Figure 2: **Greenhouse gas emissions and growth in Austria**



Source: Environment Agency Austria; Statistics Austria; WDS – WIFO Data System, Macrobond. 2025: Statistics Austria, preliminary energy balance; Environment Agency Austria, short-term forecast. – [1] Reference year 2015.

For sectors outside the emissions trading scheme, the cap under the Effort-Sharing Regulation 2018/842/EU (European Commission, 2018) was 43 million t of CO_2 equivalents. Actual emissions were slightly lower at 42.7 million t of CO_2 equivalents. Emissions in the emissions trading sector also fell slightly compared with 2023 (–0.5 million t of CO_2 equivalents, or –2.2 percent), reaching 23.9 million t, of which 5.9 million t were attributable to energy generation and 18 million t to industry.

1.2 Emissions in 2025 higher for the first time in four years

In contrast to the period from 2022-2024, the Environment Agency Austria's nowcast for 2025 (Environment Agency Austria, 2026b) shows an increase in greenhouse gas emissions of 0.5 million t, or 0.7 percent, to

Economic growth and cool weather drove up energy consumption and emissions in 2025.

In 2024, emissions fell across all sectors. In 2025, they rose significantly in the energy sector and among small-scale consumers due to weather conditions, whilst only emissions from transport continued to decline.

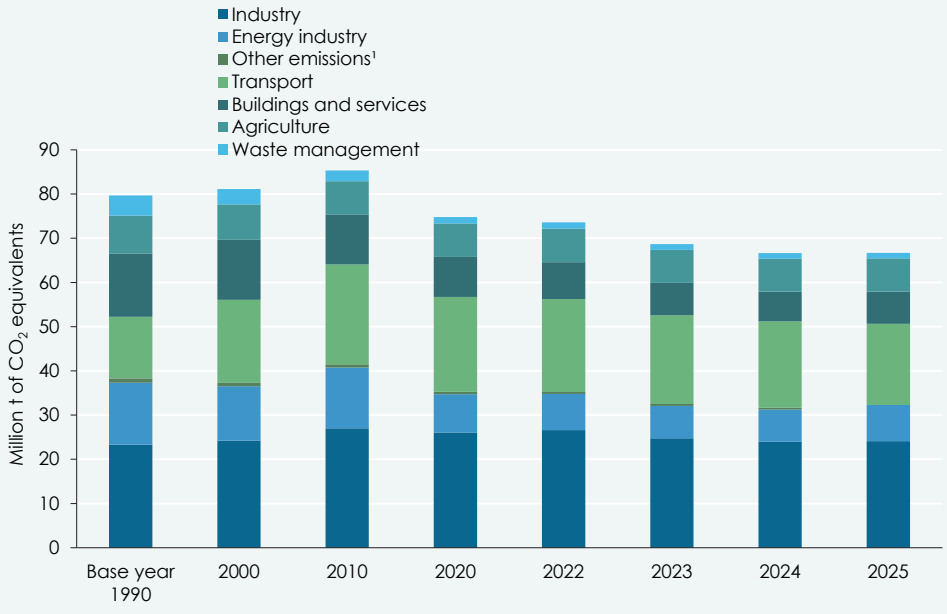
67.1 million t of CO_2 equivalents. The long-standing decline thus came to a halt for the time being. This was driven by a 1.9 percent rise in energy consumption (2024 –0.7 percent), which was attributable both to economic growth of 0.8 percent and to colder weather, with 11.7 percent more heating degree days than in the previous year. As emissions rose slightly less sharply than economic output, emission intensity fell in 2025 for the eighth consecutive year, albeit only marginally by –0.2 percent (2024 –2.3 percent). Emissions and economic output thus developed almost in parallel for the first time in years.

Although sectors outside the emissions trading scheme emitted 41.5 million t in 2025 – 2.8 percent less than in the previous year – the target of 40.7 million t was exceeded. At the same time, emissions within the emissions trading scheme rose by 6.9 percent, primarily due to energy supply.

1.3 Energy sector and buildings drove the rise in emissions in 2025

By 2024, greenhouse gas emissions had fallen across all sectors. The largest relative decline was recorded in the small-scale consumption sector (buildings and services), at –7.8 percent, which corresponded to a reduction of 0.6 million t CO_2 equivalents, bringing its share of total emissions down to 10.1 percent. In absolute terms, industrial emissions fell most significantly (–0.8 million t of CO_2 equivalents or –3.2 percent); however, at 36.0 percent, industry remained the largest emitter. Emissions from the transport sector fell by 2.8 percent and accounted for 29.3 percent of total emissions. By contrast, the energy sector (public electricity and district heating generation as well as oil refining) emitted 7.3 million t of CO_2 equivalents, which was barely less than in the previous year (–0.6 percent); its share stood at 10.9 percent. Agriculture accounted for 11.2 percent (–0.4 percent) and the waste management sector, with 1.3 million t (–3.2 percent), for 1.9 percent of total emissions. Compared with 1990, increases were observed only in industry (+2.9 percent) and transport (around +40 percent), whilst the other sectors reduced their emissions, in some cases significantly: most notably waste management (–72.6 percent), domestic consumption (–52.7 percent) and the energy sector (–48.2 percent).

Figure3: **Sources of greenhouse gas emissions in Austria**



Source: Environment Agency Austria, Greenhouse Gas Inventory 1990-2024. 2025: Environment Agency Austria, short-term forecast. – [1] Military, fluorinated greenhouse gases, CO_2 transport and storage.

The increase forecast for 2025 (+0.7 percent or +0.5 million t of CO_2 equivalents) is concentrated in weather-dependent sectors: the energy sector emitted 8.2 million t, an increase of 12.6 percent, with its share rising to 12.2 percent; in the small-scale consumption sector, which is predominantly driven by space heating demand, emissions rose by 7.9 percent. In industry, they remained virtually unchanged (+0.6 percent) despite a return to economic growth; in transport, they fell for the fourth consecutive year, dropping by 6.0 percent – the sharpest decline since the pandemic year of 2020. At 18.3 million t, the transport sector emitted fewer greenhouse gases than in 2000 (18.8 million t); its

share of total emissions stood at 27.3 percent in 2025. Agriculture accounted for 11.2 percent (+1.0 percent), whilst waste management accounted for 1.8 percent (–2.9 percent).

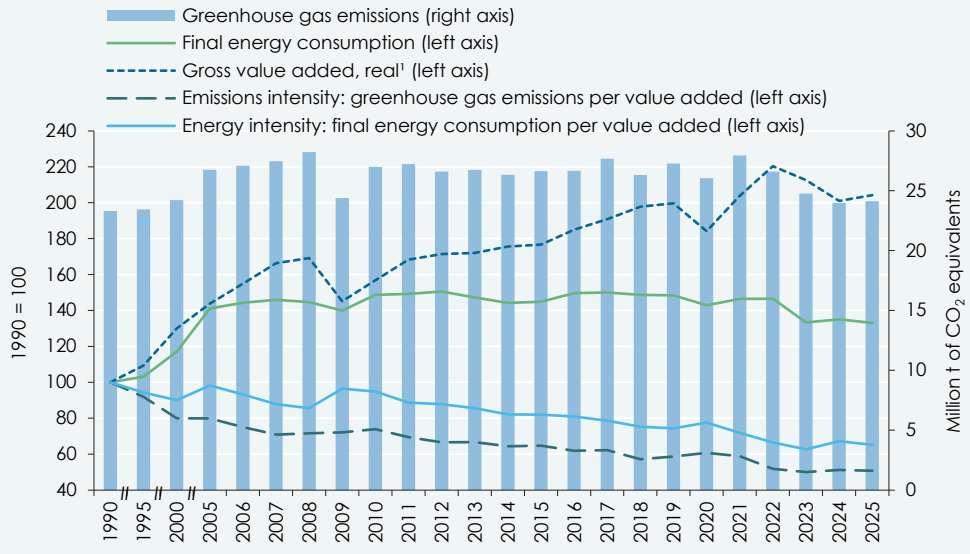
1.4 Industrial emissions rose more slowly than value added in 2025

In 2024, Austria's industry once again emitted fewer greenhouse gases than in the previous year (–3.2 percent). However, the decrease in emissions was primarily due to the sharp fall in gross industrial value added of 5.4 percent. Of the total 24.0 million t of CO_2 equivalents, around 14.8 million t were attributable to process emissions, which fell by 3.1 percent compared with the previous year, primarily due to lower, cement and ammonia production. By contrast, energy consumption in industry rose slightly by 1.3 percent to around 288 petajoules (PJ). This marked a temporary reversal of the decoupling of energy consumption and emissions: both emissions intensity (+2.4 percent) and energy intensity (+7.1 percent) rose again in 2024. The reduction in emissions was therefore driven more by weaker industrial activity than by efficiency gains.

In 2025, industrial emissions rose again. According to the latest data from the Environment Agency Austria, industrial emissions rose by 0.6 percent to 24.1 million t CO_2 equivalents, whilst gross value added in industry increased for the first time since 2022 (+1.6 percent) and energy consumption fell by 1.4 percent to around 284 PJ. However, the corresponding decline in emissions (–0.9 percent) and energy intensity (–3.0 percent) only partially offset the rise seen in 2024. Both indicators remain above their 2023 low. As emissions grew more slowly than value added, a relative decoupling of the two variables occurred in 2025. Absolute decoupling would occur if emissions were to fall whilst value added continued to grow.

In 2024, industrial emissions fell whilst value added declined. In 2025, they rose slightly, though at a slower rate than value added.

Figure 4: **Greenhouse gas emissions, energy consumption and gross value added of industry**



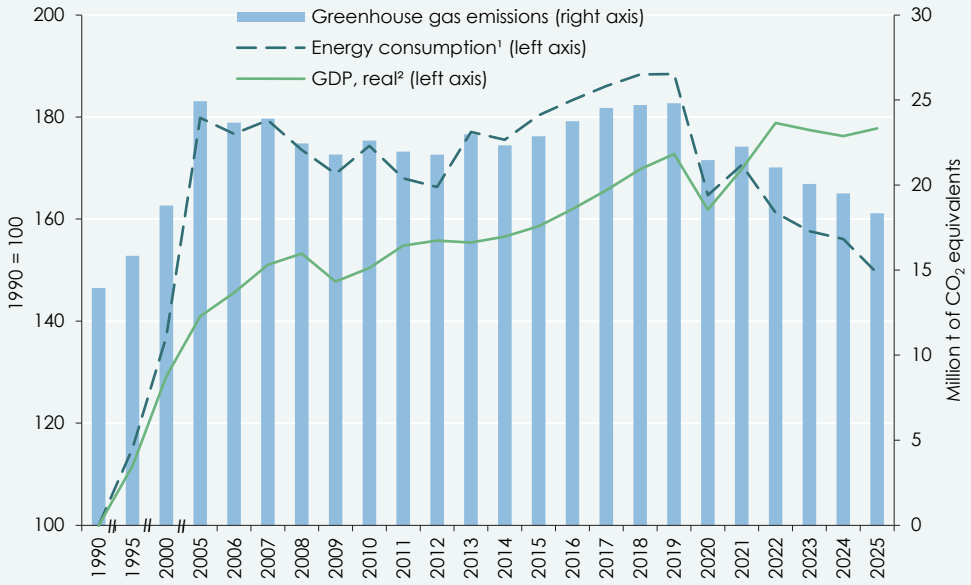
Source: Environment Agency Austria; Statistics Austria; WDS – WIFO Data System, Macrobond. 2025: Statistics Austria, preliminary energy balance; Environment Agency Austria, short-term forecast. – ¹ Manufacturing companies including mining, at basic prices, reference year 2015.

1.5 The decline in transport-related emissions continues

Traffic-related emissions fell in 2025 for the fourth year running, reaching 18.3 million t of CO_2 equivalents (–6.0 percent compared with the previous year). This was 26 percent lower than in 2019, even though, according to road traffic counts, the volume of passenger car and lorry traffic had almost returned to the levels seen at that time. There are several reasons for the lower emissions: on the one hand, behavioural changes – the export of fuel in vehicle tanks via transit traffic and fuel tourism has fallen significantly since 2020, and high fuel prices are likely to encourage more economical driving. Secondly, the vehicle fleet and fuel mix are changing: electric vehicles are increasingly replacing internal combustion engines, and the sharp rise in the blend of non-fossil fuels (HVO) in 2025 is further reducing emissions. This is also likely to explain why, in 2025, energy demand from transport fell by 4.3 percent – a slightly smaller decline than that of emissions.

Changes in behaviour and fuel additives are reducing transport emissions.

Figure 5: **Greenhouse gas emissions and energy consumption in the transport sector and growth in Austria**



Source: Environment Agency Austria; Statistics Austria; WDS – WIFO Data System, Macrobond. 2025: Statistics Austria, preliminary energy balance; Environment Agency Austria, short-term forecast. – [1] Excluding air transport, and therefore comparable with the emissions data from the greenhouse gas inventory. – [2] Reference year 2015.

1.6 Greenhouse gas emissions from domestic consumption are rising again

Cooler weather led to a rise in emissions and energy consumption in 2025.

In the household, services and agriculture sectors, both final energy consumption (–2.7 percent) and greenhouse gas emissions (–7.8 percent) fell significantly in 2024. As a large proportion of consumption in these sectors is attributable to space heating, the lower number of heating degree days (–4.1 percent) and a marked decline in the share of heating oil and natural gas in the energy mix helped to reduce emissions.

In 2025, on the other hand, both final energy consumption (+6.2 percent) and greenhouse gas emissions (+7.9 percent) rose significantly. This was due to a marked increase in heating degree days (+11.7 percent compared with the previous year). Greenhouse gas emissions from small-scale consumption reached 7.3 million t of CO_2 equivalents. Per capita, emissions rose at a slightly slower rate (+7.6 percent) due to population growth.

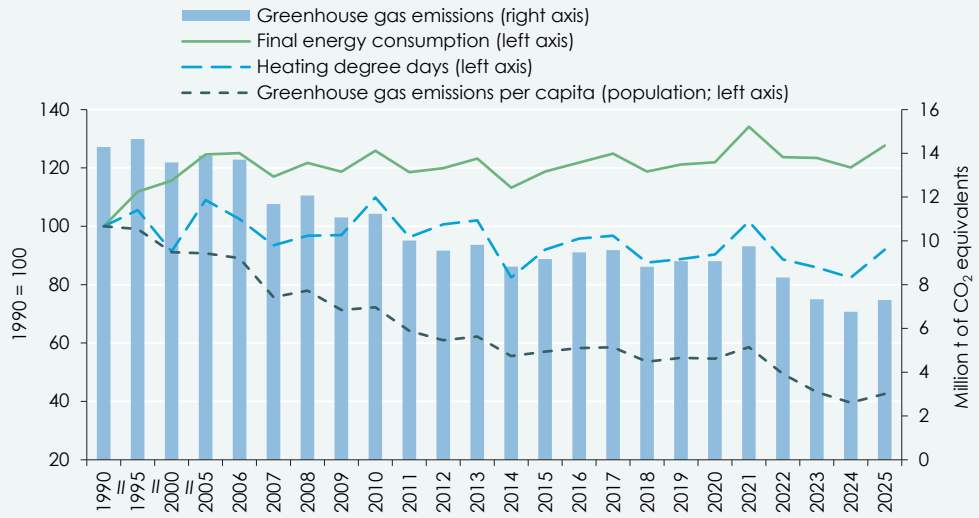
1.7 Greenhouse gas emissions from public electricity and district heating generation were significantly higher

Energy input for public electricity and district heating generation[1] reached a new high of 354 PJ in 2024. This was driven not only by particularly favourable conditions for hydroelectric power (+18 PJ or +12.4 percent) and wind power (+4 PJ or +15.2 percent), but also by the strong expansion of photovoltaics (+5 PJ or +18.2 percent). Emissions, however, fell only slightly (–2.2 percent to 4.5 million t of CO_2 equivalents), as the additional electricity generated was primarily exported.

The year 2025, by contrast, brought less favourable conditions for wind power (–2 PJ or –7.3 percent) and, in particular, hydropower (–45 PJ or –27.6 percent); energy consumption fell significantly (–7.9 percent) to 327 PJ. By contrast, energy generation from photovoltaics (+6 PJ or +20.5 percent) and natural gas (+12 PJ or +21.2 percent) was markedly higher than in the previous year. The use of natural gas increased year-on-year due to electricity demand, but also because of heating demand resulting from the colder weather. This combination led to more emission-intensive electricity and heat generation (5.3 million t of CO_2 equivalents; +20.0 percent).

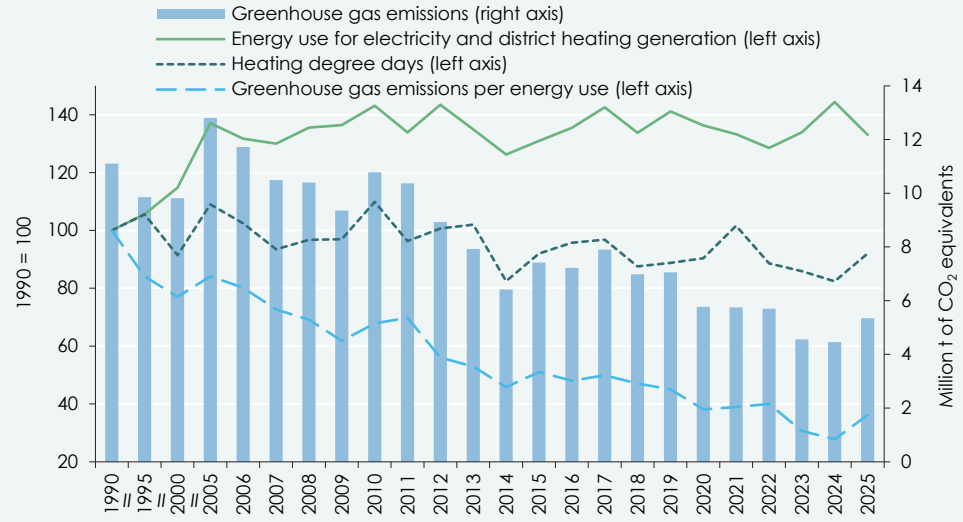
[1] The energy sector (see Chapter 1.3), on the other hand, also includes oil refining.

Figure 6: **Greenhouse gas emissions and energy consumption of private households, services and agriculture as well as number of heating degree days**



Source: Environment Agency Austria, Statistics Austria. 2025: Statistics Austria, preliminary energy balance; Environment Agency Austria, short-term forecast.

Figure 7: **Greenhouse gas emissions and energy use for electricity and district heating generation by energy supply companies**



Source: Environment Agency Austria; Statistics Austria; WDS – WIFO Data System, Macrobond. 2025: Energy consumption according to WIFO estimates based on the preliminary energy balance; emissions according to the Environment Agency Austria, short-term forecast.

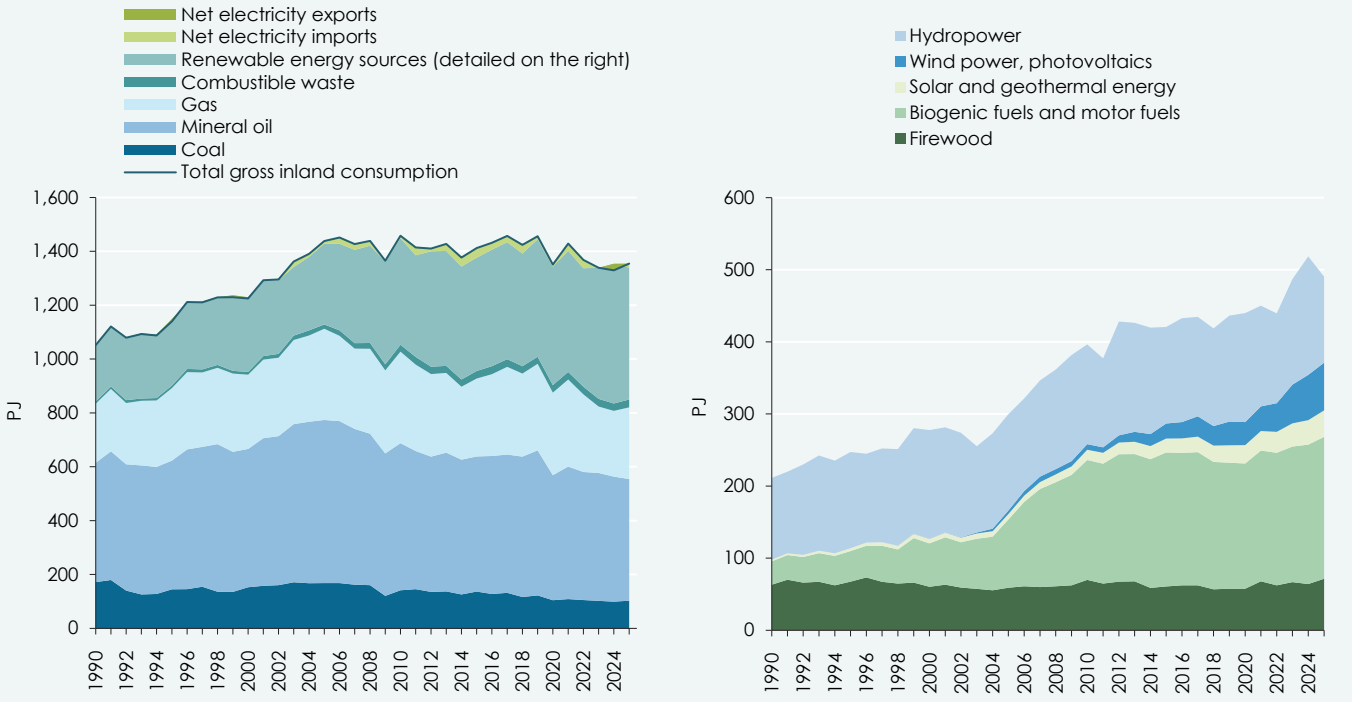
1.8 Slight increase in gross domestic energy consumption

Gross domestic energy consumption rose moderately by 1.9 percent in 2025 compared with the previous year. This increase is primarily attributable to the expansion of industrial production and the weather-related rise in heating energy demand amongst end consumers. By contrast, generation from renewable energy sources fell significantly by 5.5 percent in 2025. The main factor behind this was the significantly lower water flow compared with the previous year, which had seen high levels of rainfall, resulting in a slump in hydroelectric power generation (–27.6 percent). This was only partially offset by higher generation from wind and photovoltaics (+5.7 percent). As a result, Austria once again became a net electricity importer, with a net import volume of 14.8 PJ. Within the renewable energy mix, the use of firewood (+11.4 percent) and heat and electricity generation from solar and geothermal sources (+7.7 percent) recorded notable increases. At the same time, however,

The significantly lower water flow in 2025 reduced electricity generation from hydropower by 27.6 percent.

consumption of fossil fuels also rose; natural gas consumption increased by 8.8 percent, whilst coal consumption rose by 3.6 percent. Only crude oil saw a decline in sales volume, down by 2.7 percent.

Figure 8: **Gross domestic consumption by energy source in Austria**



Source: Statistics Austria, Energy Balance 1970-2024, preliminary Energy Balance 2025.

The cost advantage over Germany has been eroded.

1.9 Industrial electricity price

Electricity prices for industry remain significantly higher than in 2021. Large consumers with an annual consumption of 20 GWh to 70 GWh paid an annual average of 161 € per MWh in Austria in 2025, excluding refundable taxes and levies. This is higher than the EU average (136 €) and 2.1 times the price level in the USA (76 €). What is striking is the convergence with Germany: in 2016, electricity in Austria was still more than a quarter cheaper (72 €), whereas by 2025 the two countries were almost on a par. The increase compared with 2024 was due to levies: the price excluding taxes and levies fell by 10 €, but non-refundable levies rose from 4 € to 20 €.

Since 2026, Germany has been providing relief to energy-intensive industries for half of their consumption, capping the cost at a maximum of 50 percent of a wholesale reference price; 50 € per MWh forms the lower limit of the calculation. Grid charges, taxes and levies remain unaffected. Austria is planning a similar support scheme from 2027. As the subsidies are paid out retrospectively, they are not reflected in the price data.

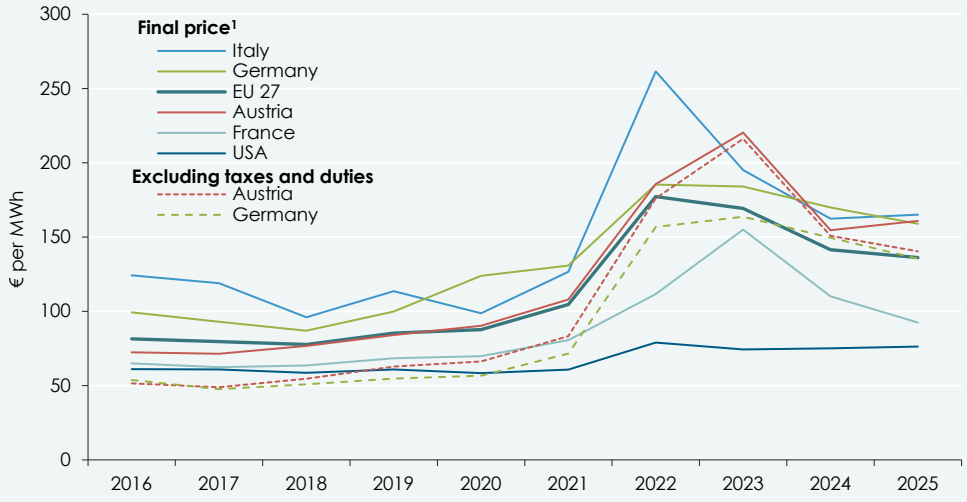
As the increase in photovoltaic capacity was hardly matched by any increase in electricity generation, the market value of photovoltaics fell.

1.10 Capacity, utilisation and market value by electricity generation technology

Austria is primarily expanding its photovoltaic (PV) capacity; however, capacity utilisation and the time of generation determine the volume of electricity and the market value per installed megawatt (MW). With a 15 percent increase in PV capacity, the amount of electricity fed into the grid between July 2025 and June 2026 was only 2 percent higher than in the previous comparable period. Fewer full-load hours and a lower day-ahead price reduced the market value per MW by 16 percent to just over 31,000 € (Figure 10). This points to cannibalisation: more PV electricity depresses the exchange price during sunny hours (Hirth, 2013). Following 2025, drought also characterised the course of 2026 to date and hampered electricity generation from hydropower: run-of-river and storage power stations each generated 11 percent less from July 2025 to June 2026 than in the previous period. Higher prices cushioned the decline; run-of-river power retained the highest market value at 409,000 € per MW. Wind turbines, by contrast, generated 4 percent more electricity and achieved a 9 percent

higher price; wind power was the only technology to increase its market value (+11 percent to 219,000 € per MW). This may provide an incentive for further expansion. Year-on-year, the total import balance for all electricity generation technologies rose from 1.1 TWh to 6.3 TWh.

Figure 9: **Trends in industrial electricity prices in selected countries**



Source: Eurostat (nrg_pc_205), EIA Electric Power Monthly, Table 5.3. – ¹ EU excluding refundable taxes and levies.

Figure 10: **Capacity, utilisation and market value by electricity generation technology**

July 2024 to June 2025 and July 2025 to June 2026

		Average installed capacity (MW)	Generation or net flow (GWh)	Full-load hours (h)	Average day-ahead price (€ per MWh, volume-weighted)	Calculated spot market value (€ per MW)
Photovoltaics	2024-2025	8,318	5,940	714	52	37,085
	2025-2026	9,574	6,031	630	50	31,324
Run-of-river	2024-2025	5,890	26,388	4,480	93	417,379
	2025-2026	5,932	23,366	3,939	104	408,592
Natural gas	2024-2025	4,231	7,983	1,887	138	260,195
	2025-2026	4,270	6,963	1,631	128	208,873
Wind power	2024-2025	4,046	8,443	2,087	95	197,667
	2025-2026	4,127	8,774	2,126	103	219,270
Pumped storage	2024-2025	3,571	5,226	1,463	138	202,550
	2025-2026	3,957	4,548	1,149	148	170,323
Reservoir water	2024-2025	2,532	3,948	1,559	109	169,489
	2025-2026	2,545	3,503	1,376	122	167,523
Biomass	2024-2025	552	2,001	3,622	102	368,181
	2025-2026	573	1,842	3,213	107	344,221
Net imports or exports	2024-2025	-5,795	4,670		-109	95
	2025-2026	-9,157	2,818		-99	100

Source: ENTSO-E Transparency Platform, WIFO calculations. Generation, hourly net imports and the calculated day-ahead market value are totalled for each period; installed capacity is averaged on a time-weighted basis. Full-load hours $= \frac{\text{generation}}{\text{average capacity}}$; the price achieved is the generation-weighted day-ahead market price. Net imports or exports: For each hour, the balance of all directed physical cross-border flows is calculated: negative balances are net imports, positive balances are net exports. The price column shows the Austrian day-ahead price weighted by the respective hourly net electricity volume. Capacity, full-load hours and market value are not reported. Pumped-storage plants report the gross value of the discharge.

1.11 Further improvement in the foreign trade balance for energy sources

Austria was once again a net importer of electricity in 2025.

According to preliminary data for 2025, Austria's balance of trade in energy sources improved once again compared with the previous year, both in volume terms and in nominal terms. Both nominal revenue from energy exports (–19.8 percent) and nominal expenditure on energy imports (–19.6 percent) fell. The volume of energy exported remained virtually constant (+2.1 percent; 2024: 201.5 PJ), whilst the volume imported fell by 72.8 PJ (–7.6 percent).

Notable in 2025 were the slump in electricity exports (–16 percent) and the sharp rise in electricity imports (+36 percent). The latter meant that Austria once again became a net importer of electricity. Another notable development was the decline in net imports of natural gas by 110 PJ, accompanied by an 8.8 percent increase in consumption (see Chapter 1.8). The main reason for this was the withdrawal of gas from domestic storage facilities, which in 2025 were very well stocked with natural gas imported in the previous year. Also worth noting is the sharp fall in net imports of diesel, both in nominal terms and in volume terms (2025 –56.5 percent and –27.3 percent respectively). This is primarily attributable to a change in consumption behaviour due to rising prices (see Chapter 1.5).

1.12 Falling energy prices reduced the cost burden on households in 2024

Energy expenditure on housing fell in 2024, yet the proportion of income spent on this in the lowest income quintile remains high.

In 2024, the most recent year for which figures are available, average monthly energy expenditure by private households fell to 169 €, a saving of just under 5 percent compared with the previous year (178 €). This reflected a mild winter and a further reduction in energy consumption, as well as the fall in energy prices. As in the previous year, energy expenditure accounted for 3.4 percent of household income.

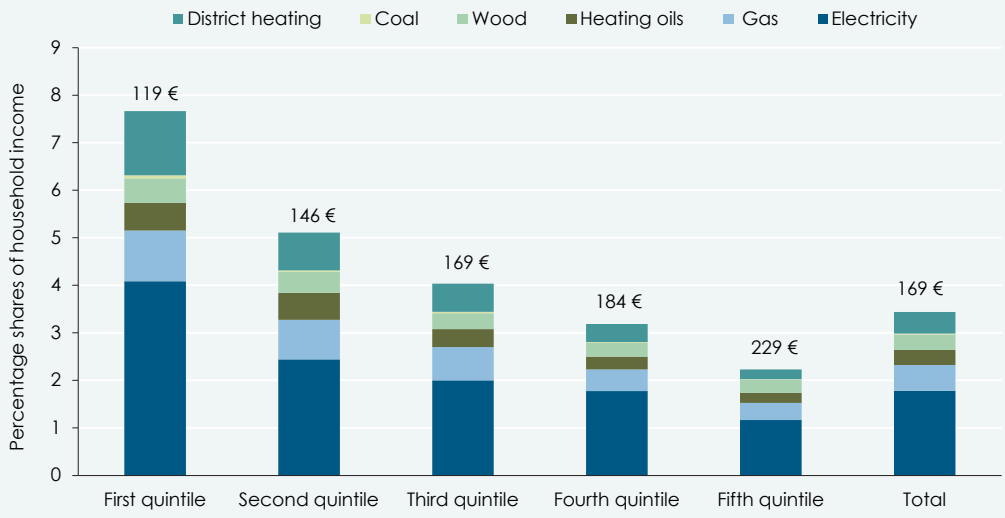
In the lowest income quintile, however, the burden remained high: here, energy expenditure accounted for 7.7 percent of household income, meaning that low-income households continued to spend a disproportionately large share of their budget on energy. Measures to improve energy efficiency are particularly important for vulnerable households in order to reduce their cost burden.

Table 1: **Foreign trade in energy sources**

	Exports				Imports				Net			
	2020	2023	2024	2025	2020	2023	2024	2025	2020	2023	2024	2025
	Million €											
Coal	1	11	5	4	462	1,035	605	637	– 461	– 1,025	– 601	– 634
Crude oil	0	0	0	0	2,174	4,437	4,458	4,005	– 2,174	– 4,437	– 4,458	– 4,005
Heating oil	0	0	0	0	15	41	21	21	– 15	– 41	– 21	– 20
Petrol	370	638	570	642	244	688	642	532	125	– 50	– 73	109
Diesel fuel	453	859	737	624	2,030	4,114	3,469	1,813	– 1,577	– 3,256	– 2,732	– 1,189
Natural gas	348	720	349	275	1,995	4,968	2,819	1,892	– 1,647	– 4,248	– 2,471	– 1,617
Electricity	1,121	4,159	2,850	2,073	884	2,181	1,349	1,847	238	1,978	1,501	225
Total	2,294	6,386	4,510	3,618	7,805	17,463	13,363	10,748	– 5,511	– 11,077	– 8,853	– 7,130
	PJ											
Coal	0.0	0.0	0.3	0.0	102.3	104.0	99.3	103.5	– 102.3	– 104.0	– 99.0	– 103.5
Crude oil	0.0	0.0	0.0	0.0	319.8	321.6	324.7	351.4	– 319.8	– 321.6	– 324.7	– 351.4
Heating oil	19.5	16.3	17.2	13.2	2.8	0.1	0.1	0.1	16.7	16.3	17.1	13.1
Petrol	39.0	27.8	28.1	35.5	22.1	28.5	29.7	26.4	17.0	– 0.7	– 1.6	9.1
Diesel fuel	39.5	36.6	35.5	50.9	165.5	153.2	148.9	133.3	– 126.0	– 116.6	– 113.4	– 82.4
Natural gas[1]	91.4	43.9	27.9	28.3	636.2	377.3	284.7	175.2	– 544.8	– 333.4	– 256.8	– 146.9
Electricity	80.4	77.8	92.5	77.8	88.3	77.6	68.1	92.6	– 7.9	0.3	24.4	– 14.8
Total	269.8	202.5	201.5	205.8	1,337.0	1,062.3	955.4	882.6	– 1,067.2	– 859.8	– 753.9	– 676.8

Source: Statistics Austria, Energy Balance 1970-2024, preliminary Energy Balance 2025, foreign trade statistics; WDS – WIFO Data System. – [1] The current Energy Balance no longer includes natural gas transit through Austria. The figures shown here for natural gas imports and exports are taken from the foreign trade statistics and also include transit.

Figure 11: **Share of energy expenditure on housing in household income 2024**

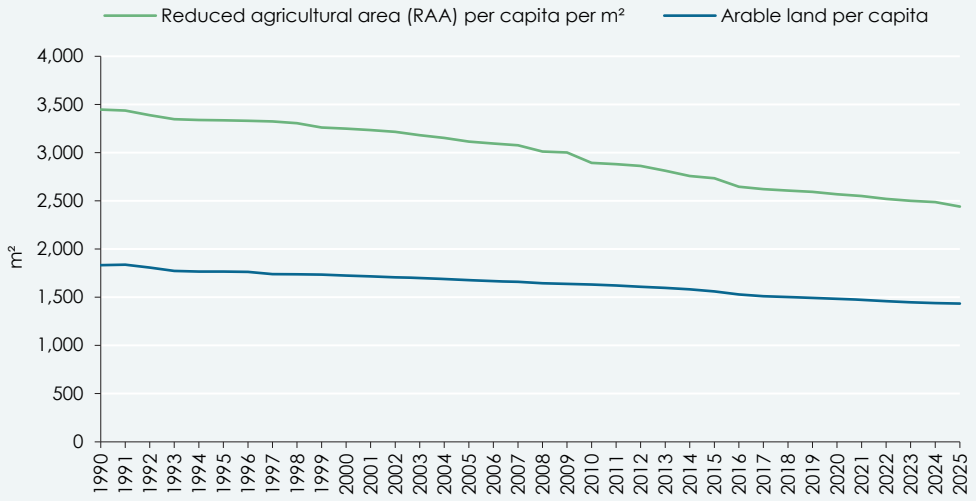


Source: EU-SILC.

2. Agricultural production and nitrogen balance in Austria

Agriculture and forestry make an important contribution to numerous ecosystem services, such as climate protection through the sequestration of carbon in living biomass (Meyer et al., 2023) and the conservation of biodiversity. Furthermore, through the production of food and animal feed, agriculture plays a central role in food security. In Austria, however, the area under agricultural use has been steadily declining for decades (Figure 12). In 2024, 1,320,800 ha of arable land were under cultivation – a decrease of around 85,600 ha (6 percent) compared with 1990. In addition, approximately 1,182,000 ha of permanent grassland and 66,000 ha of permanent crops were under cultivation. Per person, with 2,441 m² of reduced agricultural area (RAA) and 1,435 m² of arable land, around one-third less land was available for food production than in 1990.

Figure 12: **Trends in agricultural land per capita**



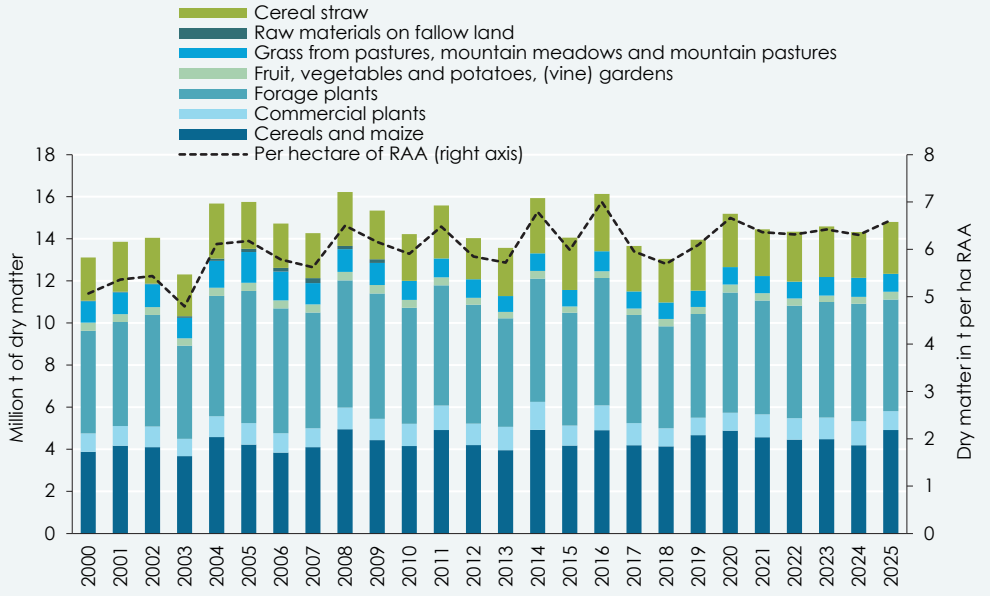
Source: WIFO calculations based on Statistics Austria (various years), arable land cultivation and crop yields, as well as Statistics Austria, annual average population figures. The actual productive capacity of the soil is taken into account when determining the reduced agricultural area (RAA). The RAA comprises areas with normal yield potential (arable land, private gardens, orchards, vineyards, vine and tree nurseries, single- and multi-cut meadows, cultivated pastures) as well as extensively used permanent grassland areas (pastures, mountain meadows, mountain pastures and mountain hayfields), converted using reduction factors.

Since 1990, the area of agricultural land has been steadily decreasing. Stagnating production and population growth have led to a lower per capita availability of agricultural produce.

The production of economically usable biomass by the agricultural sector does not follow the downward trend in arable land area, due to slightly rising yields per hectare and the expansion of maize production; however, it has largely stagnated for decades (Figure 13). The considerable annual fluctuations are primarily due to weather conditions. The stagnation in biomass production is problematic given the rise in demand, which in turn stems from population growth (Statistics Austria, 2025a). Without changes in dietary habits, this will lead to a decline in the self-sufficiency rate for numerous agricultural commodities[2], meaning that, as dependence on imports increases, domestic agriculture contributes less and less to food security.

A sufficient supply of nutrients (nitrogen, phosphorus and potassium) is essential for soil fertility and thus for the production of biomass, which serves as food and animal feed or as a raw material for industrial applications. Nutrients are removed from the soil when the crop is harvested. Replenishing these nutrients with fertilisers is therefore a prerequisite for high yields of crops. In agriculture, readily soluble mineral and organic fertilisers (e.g. farm manure, compost) are used. However, over-fertilisation has a negative impact on the environment. Nutrients that are not taken up by plants can leach into groundwater and surface waters or – particularly in the case of nitrogen fertilisers – escape into the atmosphere in gaseous form.

Figure 13: **Production of economically usable biomass by agriculture in Austria**



Source: Statistics Austria (various years), arable land cultivation, crop harvest; WIFO calculations based on Buchgraber et al. (2003); DLG feed value table; Resch (2007). Straw is a by-product of grain production (excluding maize); a standardised grain-to-straw ratio of 1 : 0.9 is assumed. Loss factors for forage production according to Buchgraber et al. (2003). The actual yield potential of the soil is taken into account when determining the reduced agricultural area (RAA). The RAA comprises areas with normal yield potential (arable land, private gardens, orchards, vineyards, vine and tree nurseries, single- and multi-cut meadows, cultivated pastures) as well as extensively used permanent grassland areas (pastures, mountain meadows, mountain pastures and mountain hayfields), converted using reduction factors.

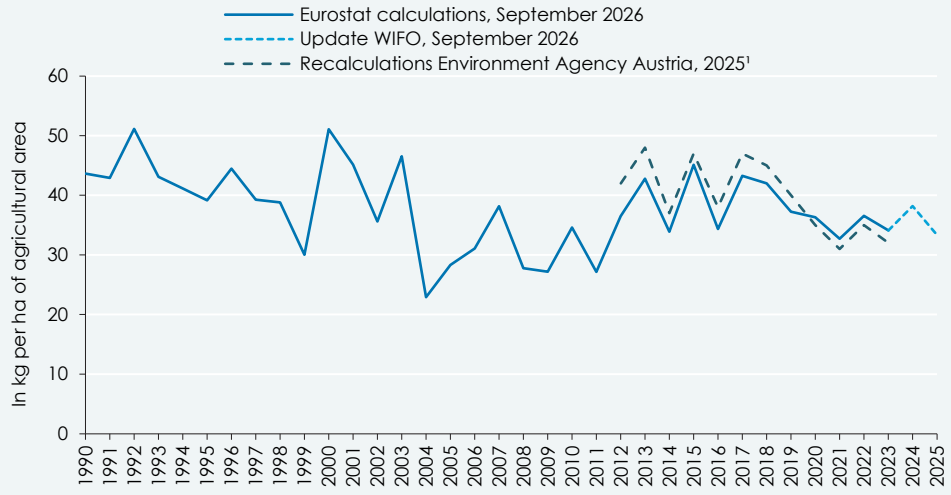
The nitrogen balance, calculated in accordance with the OECD and Eurostat (2013) methodology, takes into account not only fertilisers but also the fixation of atmospheric nitrogen via the root systems of plants (particularly legumes) and atmospheric deposition. The resulting nutrient inputs are compared with the removal via the crop yield. A positive balance means that more nitrogen has been added to the agricultural cycle than has been removed. The higher the surplus, the greater the risk of undesirable side-effects (inputs into groundwater, greenhouse gas emissions). A reduction in mineral fertiliser use is beneficial for the environment and is often associated with economic advantages as well.

[2] The self-sufficiency rate describes "the extent to which domestic production (domestic generation) is able to meet domestic consumption (domestic use)" (Statistics Austria, 2023). Domestic consumption comprises consumption by persons, animals and industry. Where the self-sufficiency rate is below 100 percent, domestic production only partially meets demand; where it is above 100 percent, however, it exceeds domestic demand, meaning that agricultural produce can be stored or exported.

The amount of nitrogen fertiliser applied in Austria has been declining slightly since 1990 (Figure 14). The annual fluctuations are, on the one hand, due to the nutrient requirements of crops, which cannot be predicted at the time of fertilisation. On the other hand, the statistics record the quantities sold on the market rather than those actually applied.

Nitrogen (fertilisation) is necessary for the production of biomass and for ensuring high yields in the long term, but at the same time it is a significant source of emissions.

Figure 14: **Nitrogen balance**



Source: Eurostat, Gross Nutrient Balance (online data code: aei_pr_gnb, as at February 2026; https://doi.org/10.2908/ AEI_PR_GNB, data retrieved on 28 August 2026); Environment Agency Austria (2025), WIFO calculations. – [1] Recalculation for the years 2000-2023 commissioned by the Federal Ministry of Agriculture, Forestry, Climate and Environmental Protection, Regions and Water Management, using new nutrient coefficients relevant to Austria.

3. Special topic: Water as a critical resource

In 2026, Austria faces exceptionally high water stress[3]. The reasons for this are significant precipitation deficits, which have fundamentally altered water availability, as well as extreme heat, which affects evaporation and thus the water balance[4]. This section provides an overview of the cascading effects of water scarcity on energy production and agriculture, as well as potential disruptions to value chains and systemic vulnerabilities.

3.1 Water stress in Austria in 2026

The summer of 2026 brought exceptional heat to Austria. According to Geosphere Austria[5], average temperatures in several regions exceeded the long-term averages by between 3 °C and 5 °C. Heat-driven atmospheric patterns and precipitation deficits of between 21 percent and 43 percent compared with the normal value (1991-2020) have significantly reduced water availability in critical catchment areas and groundwater reserves. Eastern and northern Austria have been particularly affected. Higher temperatures are also influencing snowmelt in the Alps and shifting seasonal runoff towards spring. This can reduce water availability for agriculture and electricity generation in late summer; however, the extent and timing of the shortages vary regionally and depend on the year.

Water availability in critical catchment areas and groundwater reserves was significantly reduced in the summer of 2026.

The official measurement series from the Austrian Hydrographic Service document current trends in groundwater levels, surface water bodies and other components of the water cycle at numerous monitoring stations[6].

3.2 Impacts on energy production

The available evidence shows a significantly lower level of hydropower generation during the dry summer of 2026. Hydropower generation fell from 3,318 GWh in July 2025 to 1,787 GWh in July 2026, causing its share of renewable generation to shrink from around 70 percent to 50 percent[7].

The reduced availability of water restricts the flexible use of hydropower during peak demand periods.

[3] Water stress occurs when demand for water exceeds the available supply or when the quality of the available water is limited (UN-Water definition).
[4] https://geosphere.at/de/aktuelles/news/trockenste-periode-in-oesterreich-in-176-jahren-messgeschichte.
[5] https://klimaportal.geosphere.at/.
[6] eHYD, electronic hydrographic data, Hydrographie Österreich, https://ehyd.gv.at/#/cpegel/bgrau/abl,gew,hwwarn/@47.71554,13.35584,7z.
[7] ENTSO-E Transparency database. Excluding pumped-storage. This figure describes the share of

The reduced water availability has fundamentally limited Austria's flexibility to use hydropower to cover peak loads. Power station operators are able to feed significantly less energy into the grid during peak load periods in the afternoon and evening, when electricity consumption peaks. This leads to a reliance on less flexible generation sources, increased electricity imports, grid balancing problems and higher "redispatch" costs[8].

Although thermal power stations do not use water directly to generate energy, they are reliant on cooling water. Low outflows and high water temperatures limit the available cooling capacity and can therefore impair electricity generation at thermal power stations.

Water scarcity can therefore, together with other factors such as fuel prices, demand, grid bottlenecks and the availability of renewable energy, have a significant impact on the electricity market.

3.3 Impact on agriculture

In 2026, persistent drought led to reduced yields and crop failures, fodder shortages and water scarcity across all regions of Austria.

The persistent drought poses major challenges for many agricultural holdings – for example, due to significant crop yield declines and fodder shortages. Consequently, this may limit the availability of agricultural raw materials and increase prices and procurement costs[9]. Sinabell et al. (2026) devote a separate article to the drought damage of 2026, the relief measures adopted and risk management in agriculture.

Interregional trade in virtual water is concentrated in a few regions in the Mediterranean and in irrigated agriculture.

During dry spells, irrigation requirements in arable farming increase. At the same time, farms compete with other users for the available water. Irrigation options can influence yields and, in the medium term, cropping decisions. Drought also affects pasture and hay production and can increase the need for purchased fodder. This results in additional costs for dairy and beef farms; the extent of these costs depends on regional rainfall patterns, fodder availability and the prices of water, energy and animal feed.

Austria's most productive vegetable and fruit-growing regions in the east and southeast were hit particularly hard by the drought. According to expert estimates, regional agricultural production of irrigated crops in the Marchfeld will have fallen by 35 to 50 percent by 2026, whilst comparable declines in western regions are estimated at 20 to 30 percent. Despite significant declines in yields, there are therefore considerable regional disparities. Small farms generally have fewer resources to respond to drought events and suffer relatively greater economic losses than larger farms[10].

3.4 Impacts on value chains

Water scarcity can affect downstream businesses and trading partners via value chains. Meyer et al. (2026) examine these interdependencies for 303 European regions (NUTS 2) and, based on WaterGAP and Aqueduct data, identify those areas where a high concentration of virtual blue water exports[11] coincides with high water stress indicators[12].

Only around one-tenth of the virtual blue water contained in the final demand of the EU 27, Norway and the UK originates from the same NUTS-2 region in which final consumption takes place. Around half comes from other European regions and around two-fifths comes from countries outside the EU. Given this composition, most European consumers are likely to be dependent on freshwater from other regions. Trade therefore plays an important role, and regional water security cannot be deduced from local balances alone. Even regions with moderate local water scarcity may be at risk if the water included in their final consumption originates from areas with limited water resources.

As Meyer et al. (2026) show, intra-European trade in virtual water is concentrated in a few regions in the Mediterranean. This concentration is pronounced at both national and regional levels. Spain, Italy and Greece account for the largest share of intra-European exports of virtual water. At NUTS-2 level, the concentration is even more pronounced: 12 regions account for around half of all interregional exports of virtual water within the EU 27. Andalusia alone accounts for around 11 percent.

A breakdown by sector shows that irrigated agriculture is the most significant channel for

hydropower in renewable generation and should not be equated with a decline in installed generation capacity.

[8] "Redispatch" costs arise when grid operators have to intervene to prevent the electricity grid from becoming overloaded.

[9] For a quantitative assessment of trends in Austrian agricultural prices, reference should be made to the current price and production statistics from Statistics Austria as well as data on individual products.

[10] https://storymaps.arcgis.com/stories/36c8f260645943a98d7f1b51c96adc46.

[11] Virtual water exports refer to the water "embedded" in exported goods and services, which was consumed during their production and is thus indirectly transferred from the exporting country to other countries. Blue water refers to the fresh water available and usable on the surface and underground, i.e. water in rivers, lakes, reservoirs and groundwater aquifers. Green water refers to rainwater stored in the soil, which is utilised through evaporation and plant transpiration (evapotranspiration) and does not run off but remains within the soil-plant system (see Global Commission on the Economics of Water, 2024, Chapter 2).

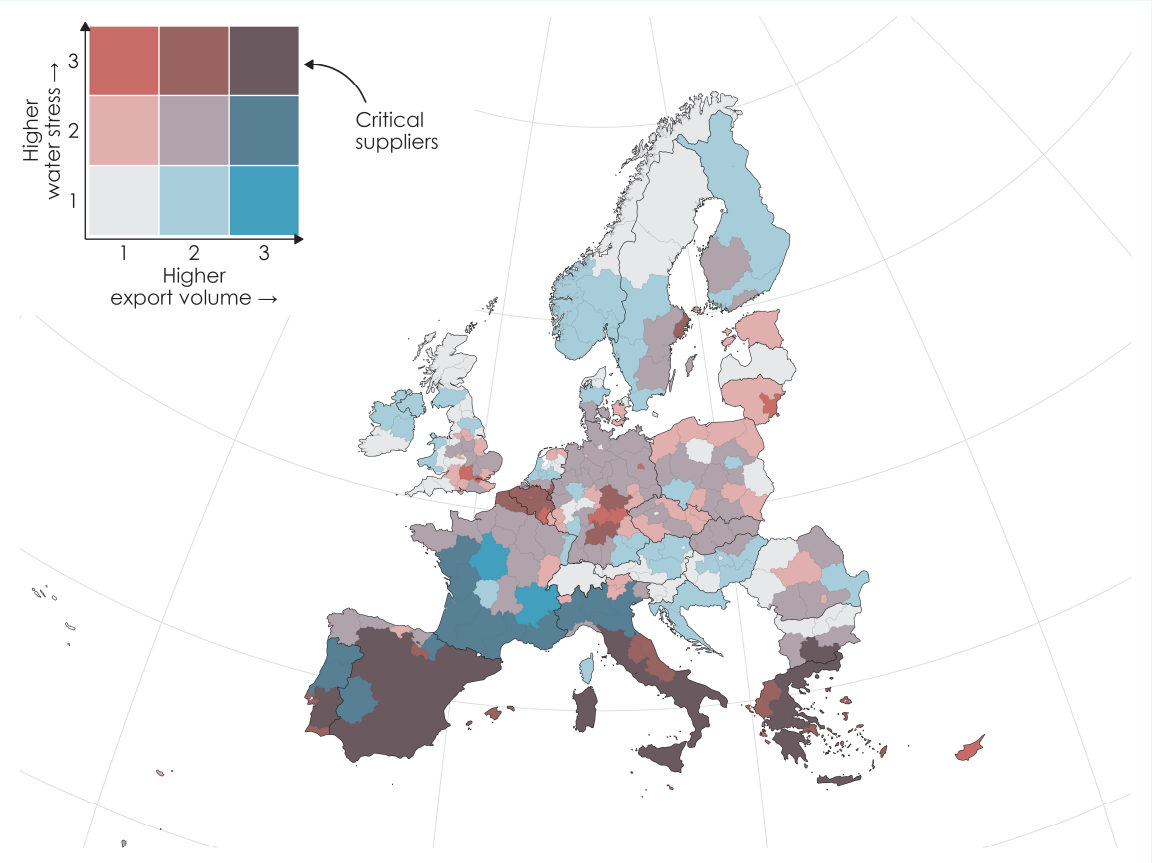
[12] The study by Meyer et al. (2026) is based on trade patterns from 2017 and is therefore not an empirical analysis of the Austrian water crisis of 2026. The study by Konar et al. (2012) describes the conceptual background to global virtual water trade.

the transfer of risks associated with the water contained in products. It accounts for around 81 percent of interregional exports of virtual water. The manufacturing sector has the second-largest share (11 percent), whilst thermal power generation and livestock farming each account for only 4 percent.

To assess vulnerability, the interregional export intensity of virtual water was combined with aqueduct baseline indicators for water stress. According to the results, 145 European regions are both significant exporters of virtual water and subject to high water stress (Figure 15; for details, see Meyer et al., 2026).

Figure 15: **Critical suppliers of virtual water: export volumes and water stress**

Virtual water exports to other regions (EU 27, Norway, the UK; million m³, interregional only) versus baseline water stress (WRI Aqueduct)



Sources: FIGARO 2017, WaterGAP 2.2d, WRI Aqueduct 4.0, Meyer et al. (2026). Water exports classified according to Log-Jenks thresholds (million m³), water stress: WRI Aqueduct Baseline Water Stress (0-5). Dark areas . . . high export volumes and high water stress (supply chain bottleneck).

Water-related risks can thus have cross-border and cross-sectoral repercussions. Even if local water balances appear stable, water risks can have a destabilising effect on domestic regions via value chains. Monitoring of water availability must therefore also take account of supra-regional production networks.

3.5 Policy options

Austrian water management is based on the Water Rights Act[13] and the National Water Management Plan 2021 (NGP 2021; Federal Ministry of Agriculture, Forestry, Climate and Environmental Protection, Regions and Water Management, 2021). The official WISA portal[14] provides details of the water bodies designated in accordance with the Water Framework Directive, as well as information on their status and planned measures. In the event of local bottlenecks, decisions under water law are taken by the competent authorities on the basis of the specific situation and the relevant authorisations.

For the ongoing monitoring of the water cycle, the Austrian Hydrographic Service

[13] Water Rights Act in the Federal Legal Information System, https://www.ris.bka.gv.at/GeltendeFassung.wxe?Abfrage=Bundesnormen&Gesetzesnummer=10010290.

[14] https://www.bmluk.gv.at/themen/wasser/wisa.html.

makes verified measurement data on groundwater, surface waters and other hydrological parameters available on its online portal, eHYD. In the electricity sector, Austrian Power Grid[15] and the European Network of Transmission System Operators (ENTSO-E)[16] publish data on generation, consumption, exchange and grid operation. These data form a basis for assessing the supply situation and cross-border electricity trade; however, they do not allow for the specific implementation of daily cross-sector crisis protocols or a particular increase in imports to be deduced from them.

Medium- and long-term adaptation options can increase resilience to water supply shortages.

Medium-term adaptation options include, amongst others, water-saving irrigation, additional storage facilities and drought- and heat-tolerant production methods. These are promoted and implemented through various agricultural and climate policy programmes.

Long-term adaptation requires the integration of climate risks into water and infrastructure planning. The Second Austrian Assessment Report on Climate Change by the Austrian Panel on Climate Change (Huppmann et al., 2025) brings together the scientific evidence on the impacts of climate change, risks and adaptation strategies in Austria. The Austrian Strategy for Adaptation to Climate Change[17] addresses, amongst other things, measures in the fields of water management, agriculture and infrastructure. The NGP 2021 and the ongoing hydrological monitoring via eHYD provide the institutional and data-related foundations for this. Measures to reduce water consumption and a broader, more diversified supply chain structure can increase resilience; specific effects depend on the respective implementation and regional conditions.

3.6 Conclusions

Water stress in Austria in 2026 presents a systemic challenge that extends far beyond direct issues of water availability. The knock-on effects of water scarcity on energy production and agriculture highlight the interconnected nature of modern economies and the vulnerability of value chains to regional resource constraints. An effective response requires coordinated policy-making across sectors and levels of government, taking into account both the immediate allocation of resources and the long-term building of resilience. Mitigating anthropogenic climate change is of fundamental importance in this regard.

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