European electricity market summary 2025

Generation and contribution by fuel type

Renewables: 1332.8TWh **Fossil fuels:** 741.2TWh **Nuclear:** 637.2TWh

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Contents

Q1 2026 Outlook

There has been a cold start to Q1 so far, with temperatures below seasonal averages pushing up gas consumption and prices. Gas storage is being depleted at a faster rate than usual, but concerns about a shortage remain low, with amply supply on global markets. Forecasts indicate that this period of colder weather will be somewhat short-lived, and milder temperatures can be expected in the next few days.

What does create concern amongst observers is the reliance on LNG imports from the United States, with approximately 60% of gas imports across 2025 originating from America. Given the recent threats by the Trump administration to annex Greenland, this is causing policymakers to consider how to reduce their reliance, should tensions continue to rise. Gas prices, and to a large extent, power prices will remain at the mercy of external geopolitical events, with energy policy remaining an important element for leaders to consider when responding to crises.

Ongoing peace talks between Russia and Ukraine are another factor, if talks are seen to be progressing toward a resolution, then that would push down gas prices in 2026.

Reducing the need for gas will mean an acceleration of decarbonisation. However, the proportion of renewable generation across 2025 did not rise, but in fact saw a small decrease, versus 2024. The primary cause was weather, with exceptionally low levels of rainfall leaving reservoirs depleted. The question for hydro is whether the underperformance across 2025 was simply because of a particularly dry year, or whether this is a pattern, with climate change possibly causing hydro generation to trend downward into the future.

One bright spot for decarbonisation across 2025 has been solar, with record-high solar generation across the year. This is set to continue into 2026, with Q1 likely to see the highest solar generation for any Q1 on record, although grid-scale producers are starting to see threats from ever-lower capture prices and more curtailment, thanks to a lack of storage and negative prices.

Dunkelflaute periods can place significant strain on the system, especially if hydro or nuclear availability is limited. French nuclear and Nordic hydro are crucial during these events, when wind and solar output is low and demand is high. Ultimately, weather conditions will determine the severity of system stress.

Negative prices are expected to persist in Q1 2026, largely driven by wind generation. They will be most frequent during low-demand periods such as nights and weekends. Commercial curtailment of renewables is increasing, with more generation switching off at negative prices, which is limiting how deeply prices fall compared with previous years.
Negative pricing is likely to continue until storage capacity or flexible demand increases materially.

Summary: Q1 2026 is expected to be characterised by:

- Volatility on gas markets, driven by weather and geopolitical turmoil

- Continued growth in solar, and weakness in hydro production

- Further growth in negative prices.

- The possibility of Dunkelflaute periods causing extreme prices

These dynamics highlight a complex reality: Europe's weather-driven power system can experience record-low prices alongside extreme evening peaks, exposing structural and geopolitical vulnerabilities in price formation.

Review of European electricity market for calendar year 2025

2025 has seen the proportion of renewable generation decline slightly compared with 2024, with an overall mixed outlook for future years. Despite this, the number of negative prices across Europe reached a record high, with several countries seeing more than 500 hours with negative prices. There was no reversal of the drop in demand seen after the 2022 gas crisis, with demand marginally lower than in 2024. Gas prices spiked during the first quarter, but remained low across the rest of the year, with periods of mild weather, healthy supply, and ongoing peace talks between Russia and Ukraine helping to keep prices low. The day-ahead market saw a big shift at the end of September when the granularity of the SADC moved from hourly to quarter-hourly trades, resulting in greater price volatility on the market, but also aligning it more closely with variable solar and wind generation. Iberia saw a blackout which lasted several hours, affecting millions of people, with an inability to regulate voltage with low volumes of synchronous generation the primary cause.

Key takeaways from this year are:

Decarbonisation growth stalls: 2025 has seen overall renewable generation decline versus the previous year, thanks to drops in both hydro and wind generation, while solar saw continued growth. Q1 was especially low, with the lowest renewable generation since 2023. Fossil fuel generation trends were also somewhat mixed, with the lowest coal/lignite generation on record, while gas generation saw a rebound, exceeding generation across 2023 and 2024.

The net result was that the percentage of generation from fossil fuels climbed by one percentage point, to 27%, while the clean percentage dropped by a single point to 73%. Low rainfall across much of Europe saw reservoir levels decline to unusually low levels across many countries, limiting the extent of hydro generation compared to previous years.

There were also troubling signs in the development of further offshore wind projects, with a German offshore wind tender for 2.5GW of capacity in the North Sea failing due to a lack of bids. Offshore wind projects are seeing delays and other difficulties as due to higher costs and supply chain disruption. This has resulted in the levelized cost of energy (LCOE) rising by an estimated 40-60% across Europe since 2020, with roughly 60% of projects facing delays or cancellations compared with the 2022 pipeline. There were more positive signs in other parts of Europe, with the fist auction for offshore wind energy in Poland being successfully concluded, with a total of 3.4GW of wind set to be built in the Baltic Sea, and another 900MW of offshore wind set to be build off the coast of Ireland. Over in America, political concerns are further compounding the issue, with five large offshore wind projects recently being frozen by the federal government, with leases being suspended for 90 days in response to “national security concerns.” Observers have wondered if Europe could become a “safe haven” for offshore wind developers if conditions in the US continue to be hostile toward new projects.

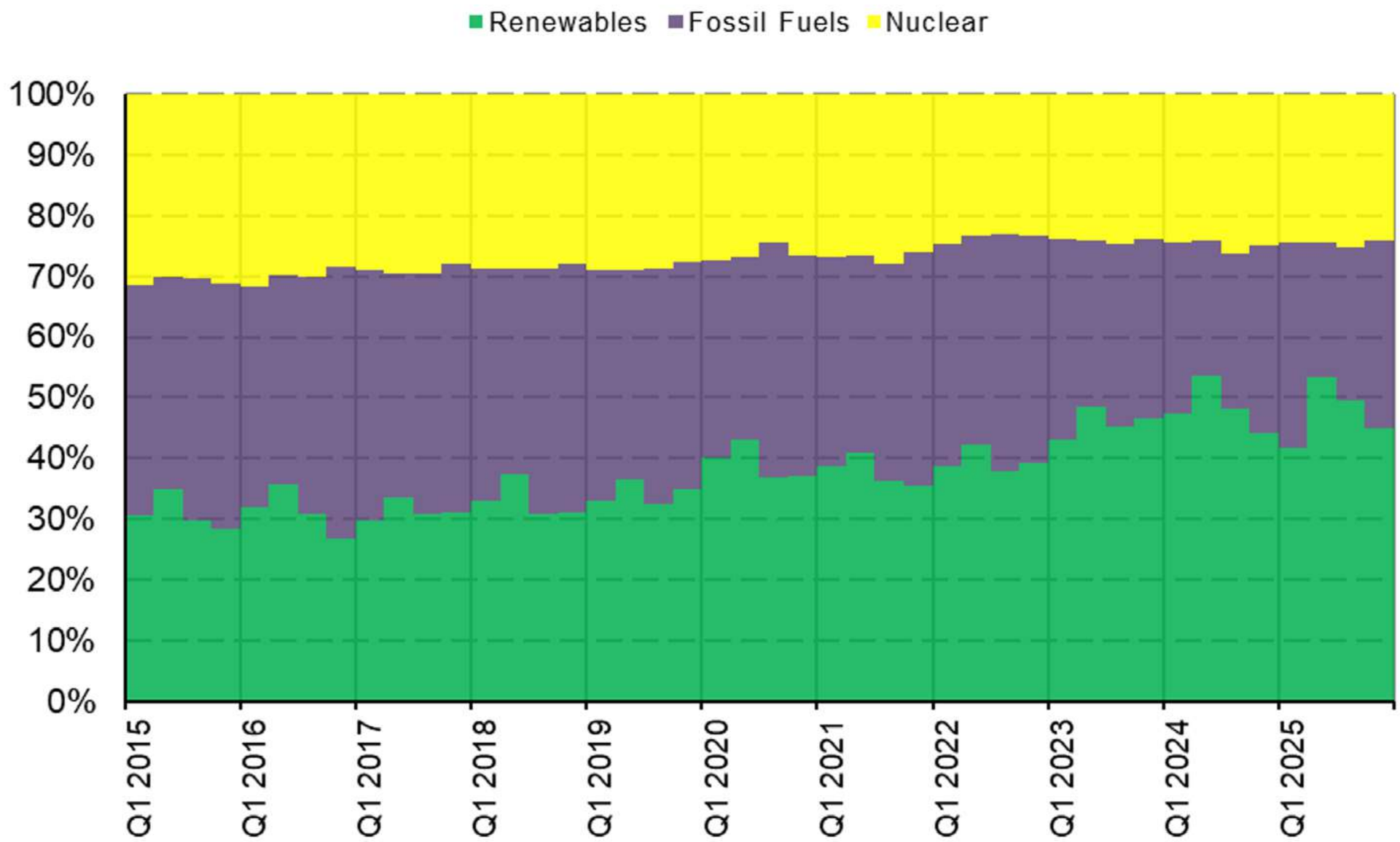

Figure 1: Share of generation by source

SADC shift to quarter-hourly granularity: at the end of September 2025, the Single Day-Ahead Coupled (SDAC) market, which covers 27 countries across Europe, introduced quarter-hourly trading intervals, having previously only been hourly. This change was made in order to better integrate intermittent renewable generation and to allow for the more efficient allocation of cross-border capacity. This shift in granularity has resulted in a "saw-tooth" pattern consisting of a repeating series of spikes and falls, with market participants and IT systems needing time to adjust.

Cross-border price convergence has weakened where interconnectors still clear hourly, leaving some zones exposed to sharper, local scarcity prices. Improved day-ahead signals have reduced imbalance volumes and aFRR activations, which automatically adjust output within seconds to minutes to rebalance the system. At the same time, volatility and negative prices are appearing in new patterns. Overall, the market is becoming more tightly linked from day-ahead to balancing. This benefits fast, flexible assets, but needs better data, quicker interconnector access, and careful tuning to avoid price spikes and uneven effects.

Demand remains subdued: since 2022 there has been a significant drop in demand, with demand across 2025 down by 3.8% and 8.2% compared with 2022 and 2021 respectively, while it was 0.3% lower than 2024. This trend of declining demand continues despite predictions from regulators that it will rise in the future thanks to electrification of transport, heating, and AI-related data centre construction. There is ongoing debate as to the cause, with one driver being the loss of industry, with high energy prices driving offshoring and closure of various industrial enterprises across Europe. Another driver is a boom in rooftop "behind-the-meter" solar, which shows up as negative demand.

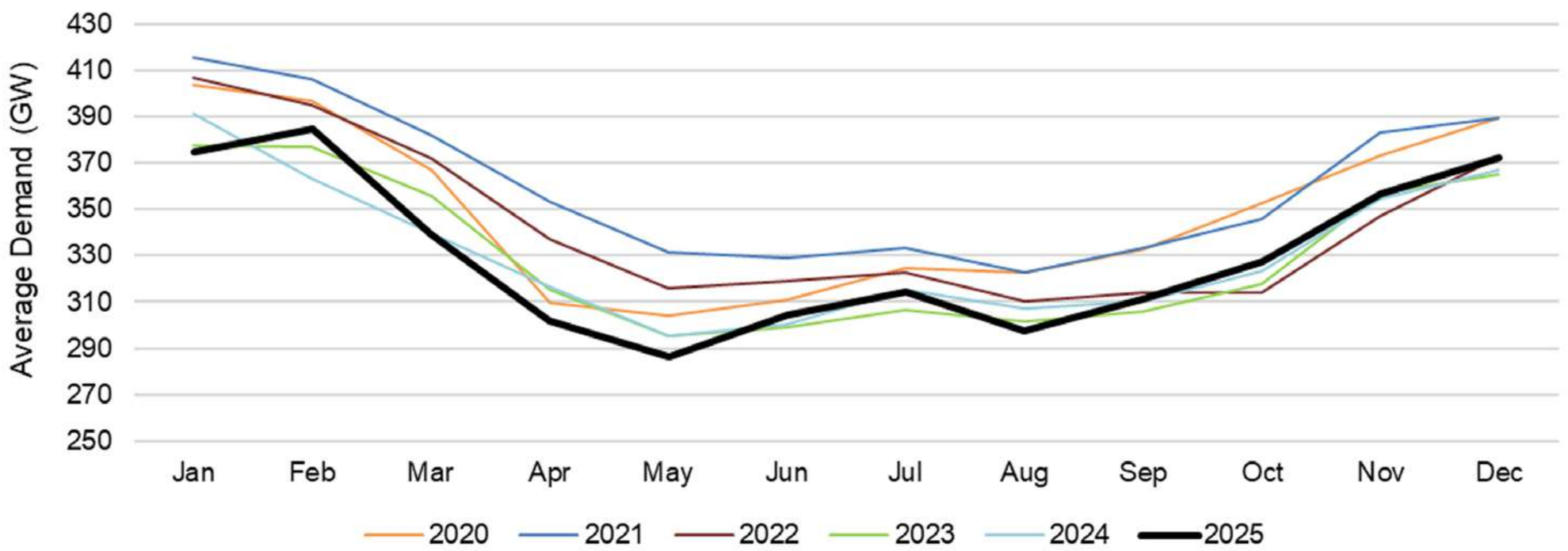

Figure 2: European demand by month

Record number of negative prices across Europe: with the Netherlands, Spain, Germany, Belgium, France, and the SE2 price zone in Sweden all seeing more than 500 hours*. While Poland, Czechia, Finland, and Denmark, are not far behind, with each of them having over 300*. Overall, the increasing buildout of wind and solar and a lack of demand-side response is causing the number of zero or negatively priced hours (and since the change in granularity, quarter-hours) in the day-ahead market to increase in the vast majority of European countries, with one prominent exception being Italy, which did not have any due to internal regulatory constraints. As renewables displace conventional power during the solar peak, the demand for fossil generation and imports has significantly widened the price gap between the solar peak and the evening peak.

Consensus is divided on whether this rise in negative price represents market dysfunction or simply an incentivising of flexibility via price signals. The cause is intermittent renewables, which can create a surplus of electricity on especially sunny/windy days, as well as a lack of storage and flexible demand. The majority of such hours occur in the summer, when demand is lower and solar outturn higher, with trends experienced simultaneously across multiple parts of Europe, causing difficulties in attempts to export away excess generation. 2026 is likely to see even more instances, as demand remains stable while solar capacity continues to grow.

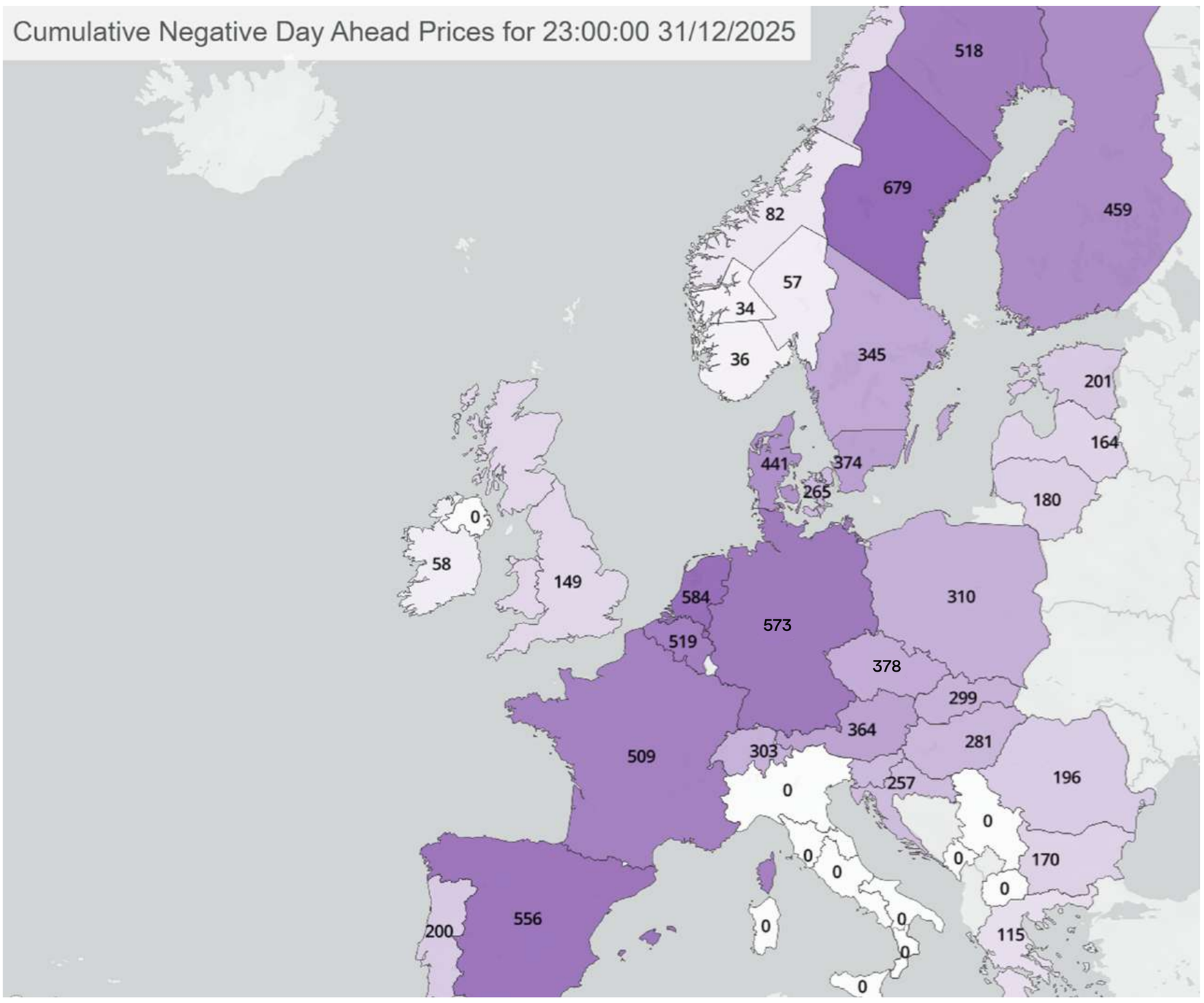

Figure 3: Cumulative negative day-ahead prices across Europe for 2025

*Anaysis of price from 01/10/2025 are based on hourly averages

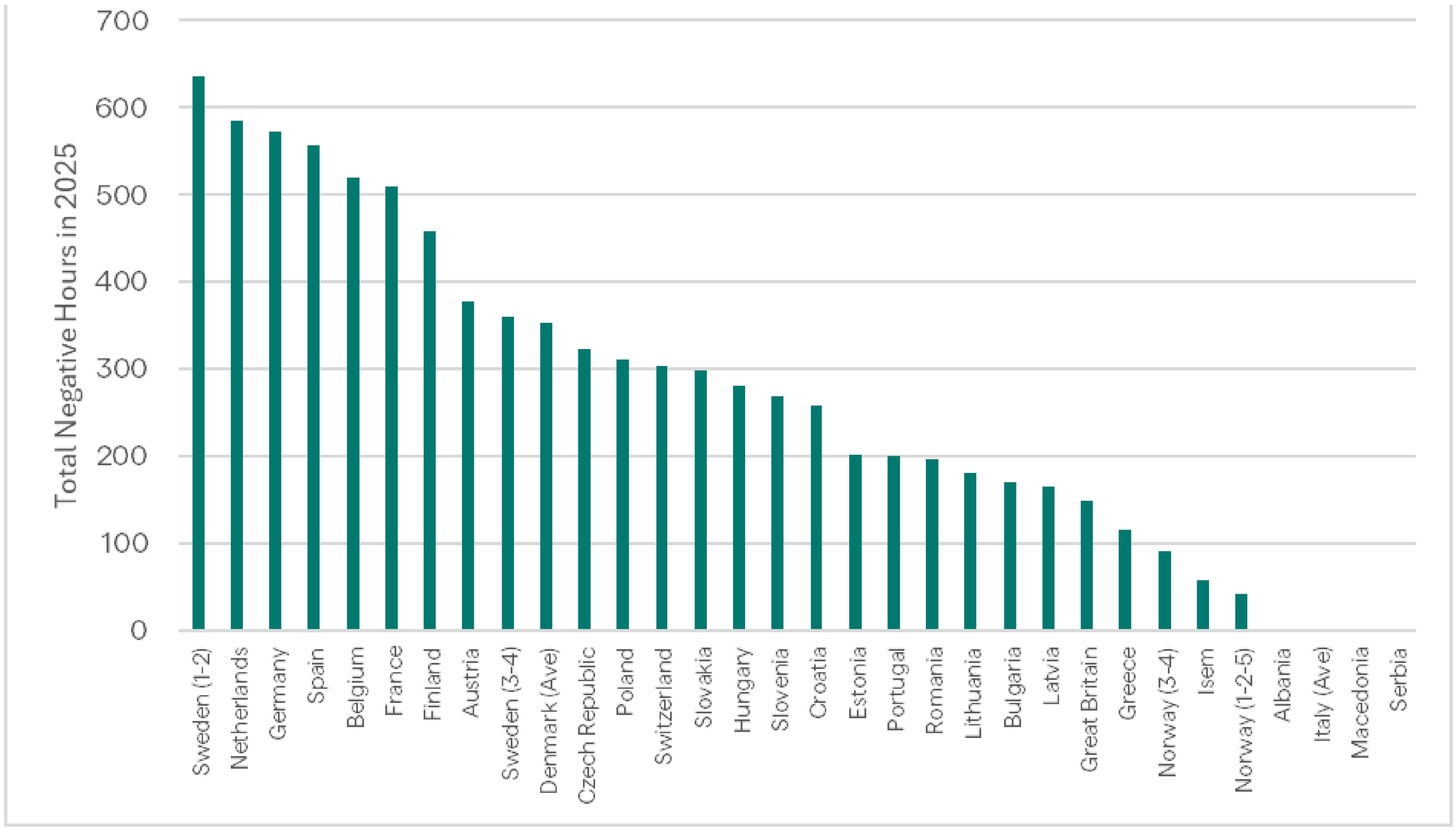

Figure 4: Number of negative prices in 2025 per country

Gas prices spiked in Q1, lower for the remainder of the year: reaching €57.96/MWh in February, driven by cold weather, renewed concerns over Russian gas supply to Europe through Ukraine and wider geopolitical risk, including tensions in the Middle East and prospective US trade measures. From mid-February onwards, a combination of milder temperatures, improving supply sentiment, reports of potential peace talk between Russia and Ukraine and a series of storms (Amy, Claudia, and Bram) boosting renewable output pushed prices steadily lower.

Beyond the first quarter, gas prices remained below €42/MWh for the rest of the year. Even so, the early-year spikes were enough to lift the annual average gas price to about €36/MWh, up slightly from about €34/MWh in 2024.

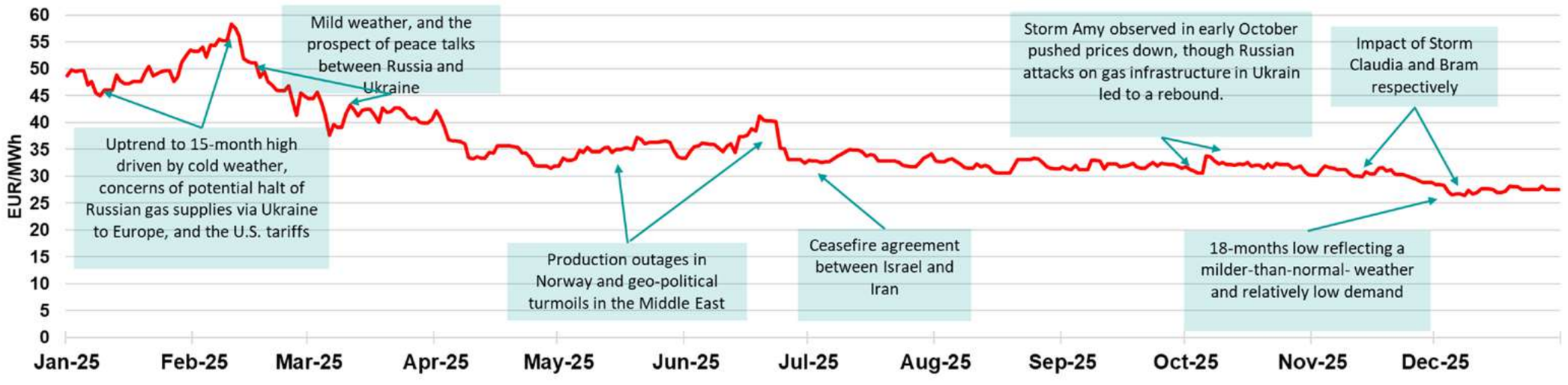

Figure 5: TTF Prevailing Gas Price, 2025

Blackout across the Iberian peninsula plunges millions into darkness for 10 hours or more: with approximately 15GW of generation (60% of Spain's supply) going offline in about 12 seconds. In the days that followed, many different theories were posited, freak weather, cyber-attacks, frequency or inertia issues. It was later determined that a failure in voltage regulation caused a chain-reaction, tripping substations and interconnectors across the region.

Concerns had been raised that parts of the Spanish grid were run with a high-share of non-synchronous generation resulting in limited synchronous reserves and voltage stability margins. Although only two countries were impacted by the blackout, the trends that left the grid vulnerable are being replicated across Europe, with resilience to fluctuations in frequency and voltage becoming an increasing concern. There are solutions, but will require time and money to implement.

Appendix: Supporting tables

Table 1 shows key statistics on generation for 2025 and all previous years since 2016.

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
TOTAL GENERATION BY FUEL (TWh)										
Biomass	69.6	78.1	90.6	94.1	97.1	100.2	93.5	89.8	93.1	93.3
Coal/Lignite	602.1	625.0	605.6	463.6	384.6	450.1	471.9	353.1	298.3	286.9
Gas	427.9	467.2	464.3	569.6	542.9	540.0	516.8	430.2	396.7	446.0
Hydro	470.5	434.9	482.1	454.6	496.1	494.8	409.2	461.4	480.5	427.4
Nuclear	816.1	808.7	809.6	806.4	719.2	759.2	639.7	634.0	654.8	637.2
Oil	12.8	14.0	12.6	13.4	12.7	14.0	12.1	11.4	9.0	6.9
Peat	6.4	6.0	6.5	5.8	3.9	4.2	4.1	2.6	2.1	1.3
Solar	96.7	103.3	108.2	113.9	133.2	146.4	181.3	211.4	250.6	284.5
Waste	14.6	15.4	15.7	15.6	15.2	16.6	15.6	16.4	16.3	16.2
Wind	278.8	334.5	349.3	397.5	440.8	430.2	480.3	534.1	534.6	511.4
FOSSIL FUELS	1049.2	1112.2	1089.0	1052.3	944.0	1008.3	1004.9	797.3	706.1	741.2
RENEWABLE (INCLUDES WASTE)	930.2	966.2	1045.9	1075.7	1182.4	1188.2	1179.7	1313.0	1375.1	1332.8
TOTAL	**2795.6**	**2887.2**	**2944.5**	**2934.3**	**2845.6**	**2955.6**	**2824.3**	**2744.4**	**2736.0**	**2711.2**
Fossil Fuel Percentage	38%	39%	37%	36%	33%	34%	36%	29%	26%	27%
Clean Percentage	62%	61%	63%	64%	67%	66%	64%	71%	74%	73%
Renewable Share of Clean Power	53%	54%	56%	57%	62%	61%	65%	67%	68%	68%
SHARE OF GENERATION (%)										
Biomass	2.5%	2.7%	3.1%	3.2%	3.4%	3.4%	3.3%	3.3%	3.4%	3.4%
Coal/Lignite	21.5%	21.6%	20.6%	15.8%	13.5%	15.2%	16.7%	12.9%	10.9%	10.6%
Gas	15.3%	16.2%	15.8%	19.4%	19.1%	18.3%	18.3%	15.7%	14.5%	16.5%
Hydro	16.8%	15.1%	16.4%	15.5%	17.4%	16.7%	14.5%	16.8%	17.6%	15.8%
Nuclear	29.2%	28.0%	27.5%	27.5%	25.3%	25.7%	22.6%	23.1%	23.9%	23.5%
Oil	0.5%	0.5%	0.4%	0.5%	0.4%	0.5%	0.4%	0.4%	0.3%	0.3%
Peat	0.2%	0.2%	0.2%	0.2%	0.1%	0.1%	0.1%	0.1%	0.1%	0.0%
Solar	3.5%	3.6%	3.7%	3.9%	4.7%	5.0%	6.4%	7.7%	9.2%	10.5%
Waste	0.5%	0.5%	0.5%	0.5%	0.5%	0.6%	0.6%	0.6%	0.6%	0.6%
Wind	10.0%	11.6%	11.9%	13.5%	15.5%	14.6%	17.0%	19.5%	19.5%	18.9%
FOSSIL FUELS	37.3%	38.3%	36.8%	35.7%	33.0%	34.0%	35.4%	29.0%	25.7%	27.3%
RENEWABLE (INCLUDES WASTE)	33.3%	33.5%	35.5%	36.7%	41.6%	40.2%	41.8%	47.8%	50.3%	49.2%
CHANGE SINCE 2016 (%)										
Biomass		12%	30%	35%	40%	44%	34%	29%	34%	34%
Coal/Lignite		4%	1%	-23%	-36%	-25%	-22%	-41%	-50%	-52%
Gas		9%	9%	33%	27%	26%	21%	1%	-7%	4%
Hydro		-8%	2%	-3%	5%	5%	-13%	-2%	2%	-9%
Nuclear		-1%	-1%	-1%	-12%	-7%	-22%	-22%	-20%	-22%
Oil		9%	-2%	4%	-1%	9%	-5%	-11%	-30%	-46%
Peat		-6%	2%	-9%	-39%	-34%	-36%	-59%	-67%	-80%
Solar		7%	12%	18%	38%	51%	87%	118%	159%	194%
Waste		5%	7%	7%	4%	13%	6%	12%	11%	11%
Wind		20%	25%	43%	58%	54%	72%	92%	92%	83%
FOSSIL FUELS		6%	4%	0%	-10%	-4%	-4%	-24%	-33%	-29%
RENEWABLE (INCLUDES WASTE)		4%	12%	16%	27%	28%	27%	41%	48%	43%

Table 1: Yearly generation summary

Notes on the report

The figures used in the report refer to data provided through ENTSO-E which have been aggregated by Montel into a European total. This data does sometimes suffer from outages or gaps in reporting but is considered to be generally complete. This report is based on the most recently available data as at quarter and year ends.

Included Countries:		
Albania	Germany	Norway
Austria	Great Britain	Poland
Belgium	Greece	Portugal
Bosnia & Herzegovina	Hungary	Romania
Bulgaria	I-SEM	Serbia
Croatia	Italy	Slovakia
Czech Republic	Latvia	Slovenia
Denmark	Lithuania	Spain
Estonia	Montenegro	Sweden
Finland	Netherlands	Switzerland
France	North Macedonia	

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