MARKET MONITORING

Developments in the electricity and gas markets

Monitoring report 2023

Bundesnetzagentur

Monitoring report 2023 - Developments in the electricity and gas markets

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Bundesnetzagentur für Elektrizität, Gas,
Telekommunikation, Post und Eisenbahnen

Referat 615
Tulpenfeld 4
53113 Bonn
monitoring.energie@bundesnetzagentur.de

Bundeskartellamt

Arbeitsgruppe Energie-Monitoring
Kaiser-Friedrich-Straße 16
53113 Bonn
energie-monitoring@bundeskartellamt.bund.de

A Electricity

1. Electricity network overview

The network balance provides an overview of supply and demand in the German electricity grid in 2022. Supply comprised a total net electricity generation of 531.7 terawatt hours (TWh), including 9.2 TWh from pumped and battery storage and physical flows from other countries into Germany's general supply networks amounting to 50.1 TWh. Demand comprised a total of 444.2 TWh (2021: 467 TWh) of electricity delivered from the general supply networks to final customers (down 4.9% on the previous year). The drop in consumption is due to various factors, including Russia's invasion of Ukraine, high energy prices on the wholesale markets, the mild weather compared to the year before and the sluggish economy in the second half of 2022.[1] Consumption by industrial, commercial and other non-household customers totalled 311 TWh and by household customers 120.8 TWh. Consumption by pumped storage and battery storage amounted to 12.4 TWh.[2] A total of 35.5 TWh of electricity was fed into networks not classed as general supply networks. Network losses totalled 28 TWh, while physical flows from Germany's networks to other countries amounted to 75.2 TWh.[3]

2. Electricity generation

Germany's net electricity generation was slighter lower in 2022 due to the drop in consumption. At 531.7 TWh, it was 2.7% down on the 2021 level. Conventional power plants recorded a decrease in generation of about 32.9 TWh (10.1%). Generation from renewable sources was up 18 TWh (8.2%) on the previous year. Renewable generation accounted for about 45% of gross electricity consumption (5 percentage points higher than the year before).[4] The highest level of feed-in from wind and solar photovoltaic (PV) (74.6 gigawatt hours (GWh)) was recorded between 1pm and 2pm on 4 April 2022. The large increase in 2022 was mainly due to the high growth in wind and solar PV capacity and the very sunny year.

Electricity generation by lignite power stations amounted to 108.0 TWh, up 5.1% on the previous year. Generation by hard coal-fired power plants totalled 58.8 TWh, up 14.4% year-on-year.

Hard-coal and lignite power stations with a total capacity of 6.9 gigawatts (GW) returned to the electricity market in 2022 for a temporary period under the Maintenance of Substitute Power Stations Act (EKBG) in order to safeguard a stable and secure electricity and heat supply, following declaration of the gas alert level. On the basis of section 50a(4) of the Energy Industry Act (EnWG) in conjunction with the Electricity Supply Expansion Ordinance (StaaV), grid reserve power plants (except for natural gas power stations) and plants

[1] https://www.bmwk.de/Redaktion/DE/Dossier/konjunktur-und-wachstum.html (in German)

[2] The monitoring survey only covers battery storage systems with a net rated capacity of 10 megawatts (MW) or more per site.

[3] The individual figures for consumption add up to 582.9 TWh. There is a small difference of 1.1 TWh between this sum and the total amount of electricity supplied of 581.8 TWh. The difference is due to the large number of different market participants and the complexity of the data survey.

[4] Where the share of generation from renewables is taken to be about 47.4% or more, it is usually based on the definition of consumption as the "grid load" (as, for example, on the SMARD website).

from the third tendering round under the Act to Reduce and End Coal-Fired Power Generation (KVBG) that had been banned from coal-fired operation as from 31 October 2022 were allowed to return to the electricity market temporarily until 31 March 2024.

In addition, power plants on security standby under section 13g EnWG were transferred to the supply reserve in accordance with section 50d EnWG from 1 October 2022 until no later than 31 March 2024 in order to prevent supply shortages. These power plants were allowed to return to the electricity market from 1 October 2022 until 30 June 2023 following declaration of the gas alert level. All the operators of power plants transferred to the supply reserve opted to return to the market for this temporary period.

Electricity generation by natural gas power stations amounted to 65.6 TWh, down 15.6% on the previous year. One of the reasons was the high and largely increased natural gas prices on the spot and futures markets. In addition, the temporary return of coal power stations led to more electricity being produced using lignite and hard coal instead of natural gas. Nuclear generation decreased by about half year-on-year to 32.8 TWh. This significant reduction is due to the decommissioning of the Brokdorf, Gundremmingen and Grohnde nuclear power plants on 31 December 2021. Electricity generation by oil power stations reached 4.5 TWh, about the same as the year before.

Combined heat and power (CHP) plants

CHP plants generated 55.3 TWh of electricity in 2022 (down 11.4 TWh). Non-CHP electricity increased by 12.8 TWh to 142.5 TWh. The total amount of useful heat generated was 124.1 TWh (down 22.1 TWh). The primary energy source for the generation of electricity and useful heat was natural gas, accounting for 37.3 TWh of the total electricity and 53.8 TWh of the total useful heat produced. By contrast, the primary energy source for the generation of non-CHP electricity was lignite, which accounted for 86.1 TWh of the total.

The installed electrical capacity of the CHP plants increased in 2022 by 1.6 GW to 29 GW. The useful heat capacity grew by 2.1 GW to 56.4 GW. Natural gas is by far the most important energy source for CHP plants. It is used to fuel plants with a total installed electrical capacity of 16.4 GW and a total useful heat capacity of 26.6 GW.

Electricity generation capacity

The total installed generation capacity at the end of 2022 was 247.3 GW[5] (2021: 239.5 GW[6]). It comprised 96.9 GW of non-renewable and 150.4 GW of renewable capacity. Conventional capacity was down by 2.8 GW. This was due in particular to the decommissioning of nuclear and lignite power stations on 31 December 2021. By contrast, renewable capacity grew by 10.7 GW in 2022, compared to an increase of 8.6 GW from 2020 to 2021. Solar PV, onshore wind and offshore wind had the highest growth in capacity in 2022 (up 8.1 GW, 2.0 GW and 0.3 GW respectively). The installed capacity of installations eligible for payments under the Renewable Energy Sources Act (EEG) in Germany stood at 145.3 GW at the end of 2022 (2021: 134.2 GW), an increase of 11.1 GW (8.3%). A total of 220 TWh of renewable electricity was entitled to payments under the EEG in 2022, an increase of 8.0%.

Figures under the EEG

Payments to renewable energy installation operators under the EEG decreased year-on-year by 37.3% to €12.3bn. The average paid to operators under the EEG in 2022 was 5.6 cents per kilowatt hour (ct/kWh).[7] The decrease in these payments was due to the high electricity prices.

The share of all EEG payments attributable to feed-in tariffs has decreased steadily since 2010, falling to just around 17% in 2022. The largest decrease in feed-in tariffs was for onshore wind (down 96.5%). This was due above all to the high electricity prices. The share attributable to market premiums was 76%. Onshore wind, offshore wind and geothermal energy accounted for the largest share of market premiums. Other forms of direct selling accounted for 7%, of which hydropower and different types of gas had the largest shares (18% and 14% respectively).

The development corridors laid down in law were achieved for onshore wind, solar and biomass in 2022, but even more new installations are needed to meet the higher expansion targets for 2030. The installed capacity targets set for 2030 in the EEG 2023 and the Offshore Wind Energy Act (WindSeeG) are as follows: biomass 8.4 GW, solar 215 GW, onshore wind 115 GW and offshore wind 30 GW.

Auctions

Nearly all the auctions in 2022 were undersubscribed. In the year's first auction for onshore wind, bids still covered the volume auctioned. Price increases during the year led to a continual decrease in bids. The Bundesnetzagentur's price ceilings also contributed to the reversal in the trend.

There was a continual decrease in the volumes bid for in the solar and innovation auctions as well, due among other things to rising production costs and the massive increase in the volumes up for auction. The

[5] This includes power plants not currently in the market, for instance plants in the grid reserve or plants that have been shut down temporarily.

[6] The 2021 figure from the 2022 monitoring has been updated.

[7] The average EEG payment is calculated by dividing the total sum paid under the EEG in a year by the total amount of renewable electricity fed in during that year.

Bundesnetzagentur also issued two determinations setting price ceilings for these auctions with the aim of improving framework conditions and promoting competition.

The auctions for biomass and biomethane (biogas that has been extracted from the gas network and converted into electricity) in 2022 were undersubscribed, as they had been since their introduction. There was a reversal in the trend in the biomass auctions in 2023; this was again probably due to the Bundesnetzagentur setting a price ceiling.

In 2022, the Bundesnetzagentur auctioned one site for an offshore wind farm in the North Sea that had been subject to a pre-investigation by the Federal Maritime and Hydrographic Agency (BSH) to analyse the marine environment, seabed, and wind and oceanographic conditions. The offshore wind farm is due to start operation in 2027 with a capacity of 980 megawatts (MW). Several bids were submitted. The successful bid was one with an award price of 0 ct/kWh, for which, however, a company exercised a right of subrogation because it had originally planned an offshore wind farm on the site.

In 2023, the Bundesnetzagentur conducted two rounds of auctions for sites for offshore wind farms with a total capacity of 8,800 MW. This was the largest ever volume auctioned in a year.

Four non-centrally pre-investigated sites with a combined volume of 7,000 MW were first up for auction: three with a capacity of 2,000 MW each in the North Sea and one with a capacity of 1,000 MW in the Baltic Sea. The wind farms are due to go into operation in 2030. The awards were made for the first time in online dynamic bidding procedures. These procedures were necessary because eight zero-cent bids for each of the sites in the North Sea and nine zero-cent bids for the site in the Baltic Sea had been submitted. The successful bidders were the ones willing to pay the highest amount for each site. There was lively competition for all the sites, with prices successively increasing in a total of between 55 and 72 bidding rounds. The proceeds from the auctions amounted to €12.6bn.

The second round of auctions was for four pre-investigated sites in the North Sea with a combined volume of 1,800 MW. The awards were made for the first time in bidding procedures with qualitative criteria, which took account of factors such as the decarbonisation of the offshore expansion projects and the use of environmentally friendly foundation technologies as well as how much bidders were willing to pay. The wind farms are due to start operation in 2028. The auctions for the pre-investigated sites were influenced by rights of subrogation for three of the four sites. The qualitative criteria did not have a decisive effect on the awards.

A total of 90% of the proceeds from the two offshore wind power auctions in 2023 will go towards bringing down electricity costs and 5% each towards marine nature conservation and promoting sustainable fishing. The contributions for marine conservation and fishing must be paid to the federal budget within one year. The contributions for lowering electricity costs must be paid in equal annual instalments to the transmission system operators required to connect the offshore wind farms over a period of 20 years beginning when a wind farm becomes operational.

Current power plant capacity

The installed generation capacity in Germany's general supply networks as at 17 November 2023 amounted to 252.8 GW (net). Non-renewable capacity was about 3.1 GW lower than at the end of 2022, mainly because of the closure of the last three nuclear power plants, Isar 2, Emsland A and Neckarwestheim 2, on 15 April 2023.

Expected new capacity and closures

A total of 1,999 MW of new conventional generation capacity is expected to be installed by 2026.[8] A total of 13,447 GW of capacity is due to be taken out of operation.

3. Market concentration

Electricity generation

Market concentration in electricity generation and the first-time sale of electricity (not entitled to payments under the EEG) saw a decrease in 2022. The aggregate market share of the five largest companies by sales (CR5) (in the period under review RWE, LEAG, EnBW, Uniper and E.ON) on the market for the first-time sale of electricity in the German market area, including Luxembourg, in terms of generation volumes in 2022 was 63.5%, compared to 67.0% in 2021. The aggregate market share of the five largest suppliers (in the reporting period: RWE, EnBW, LEAG, Vattenfall and Uniper) of *German conventional* electricity generation *capacity* at the end of 2022 was 52.1%, also lower than the share in 2021 of 55.6%.[9] However, the decrease in capacity is related above all to E.ON, which is no longer one of the five largest suppliers in this area in the report for 2022. RWE is by far the largest in the group of five in terms of both the amount of electricity generated and the amount of generation capacity. The overall decrease in capacity is due to the implementation of the nuclear and coal phase-out, which involves a significant amount of conventional generating capacity exiting the market, including plants operated by the five largest suppliers. The closure of the last three nuclear power plants, which was originally scheduled for 2022, is not taken into account in this reporting period because the plants were in operation until 15 April 2023.

EEG electricity

In terms of the volume of electricity generated entitled to payments under the EEG, as with the first-time sale of electricity, the share of the five largest companies in the German market area (RWE, LEAG, EnBW, Uniper and E.ON) in 2022 was about 5.6%. The share in 2021 was around 6.4%, although the fact must be taken into account that the five companies included Vattenfall in 2021 and not Uniper. In terms of EEG generation capacity, as with the first-time sale of electricity (RWE, EnBW, LEAG, Vattenfall and Uniper), the share of the five largest producers (RWE, LEAG, EnBW, Vattenfall and Uniper) in 2022 was about 3.1%, compared to 3.6% in 2021.

Market power report

Another decisive parameter for assessing market power in the field of electricity generation is the analysis made in the Bundeskartellamt's market power report to determine the extent to which a company's power plant fleet is indispensable for meeting the demand for electricity.[10] The analysis of general market

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[8] The new capacity only includes electricity generating plants that are currently in trial operation or under construction with a net rated capacity of 10 MW or more per site because these projects are sufficiently likely to be implemented.

[9] The figure from the Monitoring Report 2022 was corrected (see below).

[10] See for here and below: Bundeskartellamt: Wettbewerbsverhältnisse im Bereich der Erzeugung elektrischer Energie 2022, Marktmachtbericht, August 2023, page 7 et seq.

developments found that RWE had consolidated its power on the market for the first-time sale of electricity in the period from 2022 to the first quarter of 2023. The proportion of time in which it was not possible to meet the demand for electricity without RWE was also well above the threshold for presuming market dominance (5% of the hours in a year). The capacity of LEAG and EnBW was also increasingly indispensable for meeting demand. In addition, the number of market situations in which the only factor restricting the market-related scope of action of domestic electricity producers was imports, or unused foreign power plant capacity, increased in 2022 to 5.9% of the hours of the year.

Background and outlook

The closure of the last three nuclear power plants and planned closures of coal power stations have led and will lead to further decreases in the aggregate market share of the five largest producers and consequently in the degree of market concentration in terms of capacity. However, such a decrease in the degree of concentration as a result of closures also leads to a reduction in available capacity and therefore increases the competitive weight of the remaining capacity; this is reflected in the residual supply index (RSI), which is used as the basis for the analysis in the market power report. The fact must also be taken into account that hard coal-fired power plants that were taken out of the reserve and reactivated in 2022 because of the energy crisis have been deactivated again or are due to be deactivated in 2023 or 2024.

Electricity retail markets

As in previous years, the Bundeskartellamt assumes for 2022 that there is no single dominant undertaking in the two largest electricity retail markets. In 2022, the four largest companies by sales (CR4) (currently E.ON, RWE, EWE and N-Ergie) on the national market for the supply of interval-metered customers sold a total of 50.8 TWh. Their aggregate market share was 21.1%. In 2021, they sold 63.7 TWh and their market share was 25.8%.[11] In 2022, the cumulative sales of the four largest companies (currently E.ON, EnBW, Vattenfall and EWE) on the national market for the supply of standard load profile (SLP) customers on special contracts (non-default contracts and excluding heating electricity) amounted to about 49.7 TWh, compared to 41.2 TWh for the same companies in 2021. The aggregate market share of the four companies on this market in 2022 was about 44.2%, compared to 36.1% in 2021. The share of the four largest companies in both markets is still well below the statutory threshold for presuming (joint) market dominance (section 18(4) and (6) of the Competition Act (GWB)), despite a significant year-on-year increase in the market for SLP customers.

With regard to the supply of **SLP customers** on default contracts, for which regional markets are defined, the local default suppliers each have a monopoly in their individual supply/network area. The cumulative sales of the four largest companies across all default supply areas in Germany (again E.ON, EnBW, Vattenfall and EWE) amounted to 14.4 TWh of the total amount of electricity sold under default contracts of around 31.5 TWh; this corresponds to a share of about 45.9%, compared to about 42.0% in 2021.[12]

[11] A direct year-on-year comparison is not possible because in 2021 GETEC was one of the four largest companies by sales.

[12] This is a fictitious figure that only serves to illustrate the market conditions because the Bundeskartellamt's decision-making for default supply is based on regional (network area-related) markets and not a national market.

With regard to the supply of SLP customers with heating electricity, for which regional markets are also defined, the four largest companies (currently E.ON, EnBW, Vattenfall and Lichtblick) still have a relatively strong position both in a large number of individual supply areas and across all the supply areas.[13] The cumulative sales of the four largest companies across all the supply areas in Germany amounted to about 6.9 TWh of the total of 13.1 TWh for heating electricity, which corresponds to a share of 52.2%, compared to 54.7% in 2021.[14]

4. Network structure data

The four transmission system operators (TSOs) and 803 distribution system operators (DSOs) took part in the data survey for the Monitoring Report 2023. As at 4 August 2023, a total of 866 DSOs (2022: 865) were registered with the Bundesnetzagentur.

The circuit length at the TSOs' networks amounted to 36,300 kilometres (km) in 2022. The total number of final customer market locations in the TSOs' networks was 414. All of these market locations are interval-metered.

As at 31 December 2022, the DSOs' total circuit length at all network levels was about 2.2mn km. The total number of final customer market locations in all the DSOs' network areas was about 52mn. The majority of the DSOs included in the data analysis (631 or 76%) have short to medium length networks (underground and overhead cables) of up to 1,000 km. This means that the majority of the DSOs' underground and overhead lines are accounted for by about 172 companies.

The annual peak load in 2022 of 78.83 GW was registered on 1 February 2022 between 12.30pm and 12.45pm (2021: 81.37 GW on 30 November 2021 between 11.45am and 12.00pm). The annual peak load is the highest simultaneous demand for electrical capacity in a year from all customers connected to the general supply networks, including line losses. It indicates the highest demand for capacity that the energy supply network must at least be able to meet.

5. Network expansion

Current status of expansion in the transmission networks

As at 31 December 2022, 119 projects with a total length of approximately 14,054 km were listed in the Federal Requirements Plan Act (BBPlG) and the Power Grid Expansion Act (EnLAG): 25 projects had already been completed and another 14 had been at least fully approved; 52 projects were still at the approval stage; and 28 projects were waiting for submission of the initial applications for federal sectoral or spatial planning.

The total length of the EnLAG projects as at 31 December 2022 was some 1,821 km:

[13] Lichtblick took over a large number of heating electricity customers from innogy (formerly RWE) (condition as part of the E.ON/innogy merger case (M.8870)).

[14] This is a fictitious figure that only serves to illustrate the market conditions because the Bundeskartellamt's decision-making for the supply of heating electricity to customers is based on regional (network area-related) markets and not a national market.

- about 8 km were in the spatial planning procedure;
- about 128 km were in or about to start the planning approval procedure;
- 329 km had been approved and were under or about to start construction;
- 1,356 km had been completed.

The total length of the BBPlG projects was some 12,233 km:

- about 3,719 km were about to start the approval procedure;
- about 742 km were in the federal sectoral or spatial planning procedure;
- about 5,891 km were in or about to start the planning approval or notification procedure;
- 778 km had been approved and were under or about to start construction;
- 1,103 km had been completed.
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DSOs' future grid expansion requirements

The 82 largest electricity DSOs' expected grid expansion requirements for the period up to 2032 amount to about €42bn. These DSOs reported 3,366 individual grid expansion measures with a volume of €16.46bn and measures based on additional, more generalised plans for the lower (medium voltage to low voltage) network levels with a volume of €25.48bn.[15] About 32% of the 3,366 individual measures reported are under construction, 25% are at the planning stage, and 43% are "envisaged". The reinforcement, optimisation, new build and replacement measures cover a total length of about 93,136 km. Further information can be found in the report on the status and expansion of the distribution networks.[16]

6. Investments by electricity network operators

In 2022, investments in and expenditure on network infrastructure by the network operators amounted to about €13,119mn (2021: €13,556mn) (both figures under commercial law).[17] The total comprised €8,843mn of investments and expenditure by the DSOs and €4,276mn by the four TSOs. Investments by the TSOs in 2022 were down by about 19% on the previous year (2021: €4,677mn, 2022: €3,917mn), while investments by the DSOs were up by 18% (2021: €4,835mn, 2022: €5,733mn). Both the TSOs and the DSOs planned higher investments for 2023.

7. Electricity supply disruptions

For the year 2022, 855 network operators reported 157,245 interruptions in supply at low and medium voltage level for the calculation of the system average interruption duration index (SAIDIEnWG). This is a decrease of

[15] The figures only cover expansion measures that are designed to increase transmission capacity.

[16] www.bundesnetzagentur.de/netzausbau

[17] Investments and expenditure are defined in the glossary. The values under commercial law do not correspond to the implicit values included in the system operators' revenue cap in accordance with the provisions of the Incentive Regulation Ordinance (ARegV).

9,370 interruptions compared to the year before. The figure of 12.2 minutes per year per connected final customer for the low and medium voltage levels is below the previous year's average of 12.7 minutes. The reliability of supply thus remained at a high level in 2022.

8. Congestion management

The volume of congestion measures (electricity-related and voltage-related adjustments through redispatching, countertrading and grid reserve use) in 2022 was 19% up on the year before at 32,772 GWh. This includes redispatching measures for renewables with a volume of 8,063 GWh. In 2022, curtailments of renewable electricity due to electricity-related and voltage-related congestion amounted to about 3.3% of total renewable generation. This means almost 97% of the renewable energy generated could be transported and used.

Generally speaking, the increase in the volume of congestion management measures is due to the growth in wind capacity, which is located relatively far from demand centres, changes in the conditions for electricity trading with other countries, and delays in network expansion. The following specific factors also had an effect in 2022:

- Low water levels and coal transport: in the first quarter of 2022, long dry periods led to lower water levels on the Rhine, preventing vessels from carrying full loads of coal. This affected the operational readiness of power plants in southern Germany. The higher degree of use of the power lines running from north to south resulted in an increase in the need for redispatching measures.
- Electricity exports and flows: a lower level of availability at French nuclear power plants led to an increase in electricity exports and changes in the flows from east to west.
- Closure of the Gundremmingen C nuclear power plant: the plant's closure at the end of 2021 resulted in a higher level of utilisation of the power lines in southern Germany.
- Weather conditions: several storms in February 2022 and strong winds in April led to an increase in wind generation and the degree of network utilisation.
- More cost transparency: the introduction of "Redispatch 2.0" means that the network operators are now also responsible for economic balancing for curtailments of renewables and CHP plants. This has led to a shift in the associated costs, which are visible in the costs for positive redispatching. This shift aims to make the overall structure fairer and more efficient, and thus avoid costs, but increases the redispatching volumes and costs visible in this case.

The costs for congestion management measures for the whole of 2022 were provisionally put at about €4.2bn, well above the previous year's figure (2021: €2.3bn). The increase of just over 83% in the costs is due to the increase in the volume of measures and especially to the large rise in fuel prices (coal, gas and oil). Further information on congestion management is available on the Bundesnetzagentur's website at https://www.bundesnetzagentur.de/Systemstudie (in German).

9. Electricity network tariffs

There was a clear increase in the volume-weighted network tariffs (including meter operation charges) for household customers for 2023 (up 1.2 ct/kWh). The volume-weighted average network tariff for household customers with an annual consumption of 2,500 kWh to 5,000 kWh was 9.35 ct/kWh.

The arithmetic mean tariffs for non-household customers for 2023 are higher than the previous year's levels. The network tariffs (including meter operation charges) for commercial customers increased by about 8% to 7.42 ct/kWh (2022: 6.85 ct/kWh). The network tariffs (including meter operation charges) for industrial customers increased by about 12% to 3.30 ct/kWh (2022: 2.96 ct/kWh).

These increases confirm the information provided last year by the DSOs under the Bundesnetzagentur's responsibility about the provisional network tariffs for 2023. Reasons include rising congestion management costs for some DSOs, investments in the networks, and increasing costs for the procurement of loss energy due to higher electricity prices on the exchange. A number of DSOs also anticipated a decrease in volumes because of energy-saving measures.
Average TSO tariffs in 2023 were largely stable compared to 2022. This is due to financing under the Electricity Price Brake Act (StromPBG), which kept the TSOs' revenue caps at 2022 levels. In 2023, uniform network tariffs across the country were applicable for the first time. The last stage of the national harmonisation process meant that not all of the TSOs' tariffs remained exactly the same.

Based on information from a random sample of DSOs under the Bundesnetzagentur's responsibility about the provisional network tariffs for 2024, there will be another noticeable increase in average DSO network tariffs in Germany. Reasons include a further increase in the costs for the procurement of loss energy due to higher electricity prices on the exchange and the start of the fourth regulatory period. In 2024, the cost level in the cost examination with the base year 2021 will be factored into the network tariffs for the first time. The network costs recognised for the operators under the Bundesnetzagentur's responsibility are higher than those recognised in the last cost examination with the base year 2016. A number of DSOs again anticipate a decrease in volumes. The federal government raised the possibility of a financial contribution towards the TSOs' transmission network costs for 2023. In light of this, the TSOs were largely able to keep their network tariffs stable. The possible financing depends, however, on implementation in law.

10. Electric vehicles/charging stations/load control

Electric vehicles/charging stations

Publicly accessible electric vehicle charge points must meet certain minimum technical requirements. The operators of charging infrastructure accessible to the public have to notify the Bundesnetzagentur of their infrastructure so that compliance with the requirements can be checked as set out in the Charging Station Ordinance (LSV). The Bundesnetzagentur publishes monthly figures and information on publicly accessible charging infrastructure based on the operators' notifications on its website at https://www.bundesnetzagentur.de/DE/Fachthemen/ElektrizitaetundGas/E-Mobilitaet/start.html (in German).

In 2022, as in the previous two years, there was an increase of about 40% in the number of publicly accessible electric vehicle charge points. At the end of 2022, more than 82,000 publicly accessible charge points with a total power above 2.5 GW were in operation. The Bundesnetzagentur publishes comprehensive data on a regular basis at https://www.bundesnetzagentur.de/ladeinfrastruktur (in German).

Load control

Section 14a EnWG gives DSOs at the low voltage level the ability to use consumers' flexibility to avoid localised overloading. DSOs can conclude agreements with final customers with controllable devices such as heat pumps, electric vehicles and night storage heaters allowing the DSOs to control the consumption of the devices in return for a reduced network tariff.

In 2022, agreements were in place for a total of 1,808,565 controllable consumer devices, about as many as the year before (down 4,442). There was another decrease in the number of night storage heating systems covered by such agreements, while there was a slight increase in the number of heat pumps and electric vehicles.

11. Costs for system services

The net costs for system services, which are passed on to final customers, were considerably higher in 2022 than in 2021 at about €5.8bn (2021: €3.4bn). Major costs were the costs for congestion management at about €4.2bn (2021: €2.3bn), contracting frequency containment reserves (FCR), automatic frequency restoration reserves (aFRR) and manual frequency restoration reserves (mFRR) at a total of €0.6bn (2021: €0.6bn), and loss energy at €0.8bn (2021: €0.5bn).

12. Balancing services

There was another slight year-on-year decrease in the average volumes of the three qualities of balancing services tendered in 2022. The volume of FCR tendered amounted to 555 MW (2021: 562 MW). The average volume of positive aFRR tendered was 1,996 MW (2021: 2,092 MW), while the average volume of negative aFRR tendered was 1,901 MW (2021: 1,972 MW). The average volume of positive mFRR tendered was 922 MW (2021: 1,098 MW) and the average volume of negative mFRR tendered was 422 MW (2021: 576 MW).

The average monthly volume of aFRR and mFRR used in 2022 was similar to the previous year. April again had the highest average volume of these two types of reserves used with 235 MW, up 11 MW on the previous year.

The upper price limit for balancing energy of €9,999 per megawatt hour (MWh), which had been introduced by decision BK6-20-370 of 16 December 2020, was suspended following a decision by the Federal Court of Justice (BGH). The technical upper price limit of €99,999/MWh was therefore applicable again for an interim period. Since the European target model for balancing energy went live on 22 June 2022, a harmonised European upper price limit for balancing energy of €15,000/MWh has applied. At the same time, cost-based calculation of the imbalance price was replaced by price-based calculation in accordance with the provisions of Commission Regulation (EU) 2017/2195. Imbalance prices are now based on the prices on the European platforms for the exchange of balancing energy, PICASSO (aFRR) and MARI (mFRR). This series of changes led to a large increase in the imbalance price especially in the first half of 2022. The average volume-weighted imbalance price in the case of a short portfolio was €454.78/MWh, an increase of 129% on the previous year. The average volume-weighted imbalance price in the case of a long portfolio was negative €16.54/MWh (2021: €16.77/MWh).

13. Cross-border electricity trade

Electricity exports again exceeded imports in 2022. Germany's electricity exports were up slightly in 2022 compared to a year earlier. Cross-border trade volumes for electricity amounted to 94 TWh in 2022 (2021: 93 TWh), comprising about 60 TWh of exports and about 33 TWh of imports. This makes Germany still one of Europe's biggest electricity exporters. Germany's export balance in 2022 was therefore about 27 TWh.

14. Wholesale electricity markets

The situation in the energy markets has intensified further in the wake of Russia's invasion of Ukraine in February 2022. Although markets have slightly recovered since September 2022, wholesale electricity prices were much higher and very volatile in the year as a whole. The trend in the prices largely mirrors that in natural gas prices. As gas-fired power plants tend to set the prices in spot trading at times of peak demand, the increase in gas prices several times over led to a similar increase in prices on the electricity exchange (merit order principle). Price developments were slowed towards the end of 2022 by the reactivation of power plants on security standby and the return of reserve power plants to the market, although gas power plants still tend to set the prices when demand for electricity is high. There was also a decrease in the trading volume and liquidity of the wholesale electricity markets in 2022.

Spot market trading volumes

There was a year-on-year decrease of about 10% in the total trading volume of the coupled day-ahead midday auctions (classed as spot market trading) from 218.7 TWh in 2021 to around 196.5 TWh in 2022. The total volume comprised 154.3 TWh on EPEX SPOT, 33.3 TWh on Nord Pool and 8.9 TWh on EXAA. The volume of the independent day-ahead 10.15am auction on EXAA for the German bidding zone amounted to about 1.2 TWh in 2022.

Developments on the intraday market were different, with a year-on-year increase in the total trading volume of about 5 TWh or 7% to 79.1 TWh. There was an increase in the intraday trading volume on EPEX SPOT to 70.4 TWh, with intraday auctions accounting for about 8.1 TWh and continuous intraday trading 62.3 TWh. The volume of continuous intraday trading on Nord Pool in the Germany/Luxembourg bidding zone amounted to about 8.7 TWh in 2022, more than twice the volume in 2021 of 4.2 TWh.

Futures market trading volumes

On-exchange futures trading volumes recorded even larger decreases than spot trading. In 2022, the on-exchange trading volume for German power futures amounted to 898 TWh, down about 38% on the previous year. The decrease was due to factors including the uncertain market environment caused by Russia's war in Ukraine, high levels of volatility in wholesale prices and rising inflation during the year. Trading for German power futures in 2022 was primarily for contracts for 2023 as the fulfilment year with about 451 TWh. Trading for longer-term contracts for each of the subsequent years was down on the previous year.

Volumes traded off-exchange via broker platforms also recorded decreases. The total volume traded by these brokers in 2022 amounted to about 2,704 TWh compared to 3,512 TWh in 2021. Developments in trading volumes can also be followed through the London Energy Brokers' Association (LEBA), although it does not represent all broker platforms surveyed. There was a decrease in the volume of transactions brokered by LEBA members. The trading volume for German power brokered by LEBA members decreased by about 52% from 4,345 TWh in 2021 to 2,074 TWh in 2022.[18]

The volume of over-the-counter (OTC) clearing of German power futures on EEX decreased by about 20% in 2022 to 1,393 TWh. This volume accounted for about 61% of the relevant total trading volume on EEX, compared to 55% in 2021. OTC clearing has accounted for the majority of futures trading since 2019. There was also a decrease in the volume registered for clearing with the LEBA. The registered volume for German power futures in 2022 was about 1,238 TWh, about 60% of the total OTC volume brokered by LEBA members. This means that OTC clearing accounts for the majority of the total trading by LEBA members.

German power options play no role in exchange trading on EEX; there were again no such transactions. However, there are German power options that are agreed off-exchange and cleared on EEX. In 2022, German power options agreed off-exchange and cleared OTC on EEX amounted to 41 TWh. This is 3% of the total volume of German power futures traded. The volume of OTC clearing of options in 2022 was about 56% down on the previous year.

Spot market prices

Prices on the wholesale electricity markets have increased considerably and are fluctuating mainly because of the above-mentioned geopolitical situation and electricity supplier insolvencies. The arithmetic annual average baseload day-ahead price on the spot market in 2022 was about €234.53/MWh, an increase of about 141% on the previous year's average of €97.12/MWh.

There were numerous extreme baseload and peak load prices in the coupled auctions in 2022. The range of the middle 80% of the graded baseload prices in 2022 increased to €310.2/MWh, compared to only €144.54/MWh in 2021. There was also a large increase in the range of the middle 80% of the graded peak load prices from €172.78/MWh in 2021 to €692.54/MWh in 2022.

Negative baseload and peak load prices were recorded on only one day.[19] The lowest baseload price of negative €1.43/MWh and the lowest peak load price of negative €1.49/MWh were both recorded on 31 December 2022. In 2021, the lowest baseload price was negative €8.23/MWh and the lowest peak load price negative €19.56/MWh. The highest baseload and peak load prices were both higher than the year before. In 2022, the highest baseload price was €691.11/MWh, about 62% up on the previous year's highest price of €427.50/MWh. It was recorded on 26 August 2022. The highest peak load price for 2022 was recorded on the same day and was €720.26/MWh, about 41% up on the previous year's highest price of €510.52/MWh.

Futures market prices

[18] See LEBA Monthly Volume Reports.

[19] Negative prices are prices signals on the electricity market that occur when, for example, a high level of inflexible electricity generation coincides with a low level of demand. Inflexible electricity sources cannot be shut down and started up again quickly without considerable expense or need to keep operating because of other supply obligations (heat, industrial processes, balancing reserves contracts). Financial support in the case of negative prices may also be a significant factor contributing to negative prices.

There was also a large increase in the average prices for year-ahead futures. The annual average price for German power futures traded for 2023 was €298.86/MWh, about 238% up on the previous year's average for futures traded for 2022 of €88.42/MWh. The annual average price for Phelix peak year futures in 2022 was €400.17/MWh, about 273% up on the previous year's average of €107.23/MWh.

There was also a large increase in 2022 in the prices for front year futures; prices reached their highest level at the end of August and fell again by the end of the year. The German power peak year futures price was about €121.63/MWh at the beginning of the year and about €238.85/MWh at the end of December. Prices increased over the course of the year and especially in the summer months; the highest prices were recorded on 26 August 2022, when they reached €985/MWh for base year futures and as much as €1,295/MWh for peak year futures.

15. Retail electricity markets

Contract structure for non-household customers

In 2022, about 1,370 electricity suppliers (individual legal entities) provided information on the market locations served and on the amount of electricity supplied to interval-metered customers (2021: 1,411). The 1,370 electricity suppliers include many affiliated companies, hence the number of suppliers is not equal to the number of competitors acting independently of each other.

In 2022, interval-metered customers were supplied with just under 240.2 TWh of electricity at 391,977 market locations, compared to about 246.6 TWh at 376,086 market locations in 2021. A total of 99.9% of this amount was supplied under non-default contracts. It is still unusual, but not impossible, for interval-metered customers to be supplied under default supply or fallback supply. About 0.23 TWh of electricity was supplied to interval-metered customers under default or fallback supply. This is about 0.1% of the total volume supplied to interval-metered customers.

About 21.6% of the total volume delivered to interval-metered customers was supplied under a contract with the default supplier on non-default terms and about 78.3% under a contract with a legal entity other than the local default supplier. In 2021, 24.0% of the total volume was supplied under non-default contracts with the default supplier and 75.9% under contracts with other suppliers. Developments in the past few years show that default supply and non-default contracts with the default supplier are playing an increasingly less important role in the acquisition of interval-metered customers in the electricity sector.

Contract structure and competitive situation for household customers

There was a slight decrease in the number of different electricity suppliers from which household customers could choose. In 2022, final customers could choose between an average of 157 suppliers (not taking account of corporate groups) (2021: 167). The average number of suppliers for household customers in Germany was 136 (2021: 147).

In 2022, 39% of the total volume delivered to household customers was supplied under a contract with a supplier other than the local default supplier. Overall, about 61% of the volume is still provided by default suppliers (under either default or other contracts). About 24% of the volume delivered to household customers was supplied under a default contract, about the same as in the year before (2021: 25%). As in the previous year, about 37% of the total volume delivered to household customers was supplied under a non-default contract with the local default supplier (2021: 37%). The strong position held by default suppliers in their service areas was therefore more or less unchanged from the year before. The share of green electricity in the total volume of electricity supplied to household customers in Germany also increased in 2022 to 43% (2021: 37%).

Supplier switches by non-household customers

The volume-based switch rate across all consumption categories above 10 MWh/year was 12.6%, compared to 10.7% the year before. The switch rate for non-household customers has been more or less constant for several years. The rise in energy prices, to which a number of non-household customers were able to react, may be one of the reasons for the increase in the rate in 2022. The monitoring survey does not analyse what percentage of non-household customers have switched supplier once, more than once or not at all over a period of several years.

Supplier switches by household customers

There was a clear decrease in the number of supplier switches in 2022 to just over 4mn. The switch rate based on the total number of household customers was 8.2% (2021: 9.7%). The large increase in electricity prices in the wake of Russia's invasion of Ukraine had a noticeable effect on customers' switching behaviour as well. The large reduction in supplier switches also reflects the much more limited choice of attractive new-customer contracts. There was, for a time, no incentive to switch from the traditionally more expensive default tariffs to a competitive tariff because no or only a few, more expensive offers were available.

Contract switches by household customers

In 2022, the number and volume of changes of contract with the existing supplier increased by nearly 100%, compared to a clear decrease of about 16% in 2021.[20] About 3mn household customers (with a total consumption of about 7.5 TWh) changed their existing contract with their supplier (2021: 1.5mn with a total of 3.7 TWh).

Terminations and disconnections

In 2022, suppliers (default suppliers and their competitors) terminated a total of 205,083 customer contracts because, for example, customers were late paying their bills. Overall, 91% (186,900) of these terminations were for non-default contracts. The average level of arrears that led to a supplier terminating a contract with their customer was €170. A smaller proportion (9% or 18,183) of the terminations were for default contracts. The termination of a default supply contract is only permitted under stringent conditions. The supplier must not be under an obligation to provide default supply. It must therefore be economically unreasonable for the default supplier to continue supply.

The number of disconnections carried out by the network operators in 2022 was 208,506, representing a decrease of 11% compared to the previous year (2021: 234,926). The number of disconnection notices issued by

[20] A customer's change to a new electricity tariff with the same electricity supplier at their own request.

suppliers to household customers was very much higher, although it was lower than the year before. The number of notices issued was approximately 3.7mn, of which about 676,000 were passed on to the network operator with a request for disconnection (2021: 4mn notices and 740,000 requests). One of the reasons for the decrease in the number of disconnections is presumably the introduction in December 2021 of stricter conditions for disconnecting customers on default contracts (Electricity Default Supply Ordinance (StromGVV)). A look at the number of disconnections over the course of the year shows that there were fewer disconnections in the energy-intensive first and fourth quarters than in the rest of the year.

Prepay systems

Closely related to the topic of disconnections and terminations is also that of prepay systems under section 14 StromGVV, such as cash meters and smart card readers. The default supplier is entitled to require advance payment for electricity consumption in a billing period if, based on the individual circumstances, there are grounds to assume that the customer will not meet their payment obligations or meet them in time. According to 306 electricity suppliers, a total of some 13,000 household customers on default contracts had cash or smart card meters, or comparable prepayment systems, in 2022 (2021: 19,670). In 2022, 1,945 prepay systems were newly installed and 1,760 existing ones were removed. The numbers of such systems are therefore still very low. Costs for meter operation of a cash or smart card meter, or a comparable prepayment system, averaged €25.90 per year and meter in 2022.

Electricity prices for industrial customers – annual consumption of 24 GWh

The average total price, without VAT and possible reductions, for an annual consumption of 24 GWh as at 1 April 2023 was 23.25 ct/kWh, up by 0.74 ct/kWh or about 3% on the previous year's average of 22.51 ct/kWh. There was an increase above all in the component controlled by the supplier from 12.77 ct/kWh in 2022 to 16.70 ct/kWh in 2023. The end of some surcharges may help to explain why there was only a slight increase in the total price. The EEG surcharge, which stood at 3.72 ct/kWh the year before, no longer applies at all. By contrast, the net network tariff increased year-on-year from 2.94 ct/kWh to 3.30 ct/kWh.[21] This is not necessarily the tariff that was actually payable by final customers because the electricity price brake was already in place (section 5(2) paras 1 and 2 StromPBG). In addition, the setting of a reference price may have had the effect of a price anchor to a certain extent.

These prices apply to an (industrial) customer with an annual consumption of 24 GWh not eligible for any of the statutory reductions available (such as in the network tariff, concession fee or electricity tax). The price component not controlled by the supplier for an industrial customer eligible for these reductions would be 0.43 ct/kWh, compared to 6.15 ct/kWh for a customer not eligible for any reductions. Customers meeting the requirements in the relevant statutory provisions are eligible for reductions in the network tariff, concession fee, electricity tax and the surcharges under the CHP Act (KWKG), section 19 of the Electricity Network Tariffs Ordinance (StromNEV) and section 17f EnWG. The eligibility requirements differ for each of the possible reductions. The monitoring survey does not collect data on whether there are any cases in practice in which all the possible maximum reductions are, or can be, claimed.

[21] The figures for industrial customers are based on information from 192 electricity suppliers (2021: 197).

Electricity prices for commercial customers – annual consumption of 50 MWh

In the second category of an annual consumption of 50 MWh, the typical consumption of a commercial customer, the average total price without VAT on the reporting date of 1 April 2023 was 33.06 ct/kWh, up by 7.41 ct/kWh or about 28.0% on the previous year's average of 25.65 ct/kWh.[22] This is quite close to the electricity gross reference price set in section 5(2) paras 1 and 2 StromPBG, which suggests that the reference price may have acted as a pricing guide. The increase is largely due to the rise in the price component controlled by the supplier. This rose by 10.02 ct/kWh or 91% from 11.03 ct/kWh in 2022 to about 21.05 ct/kWh. Overall, the price component controlled by the supplier makes up about 64% of the total prices, compared to only about 43% the year before. The end of the EEG surcharge and the surcharge under the Interruptible Loads Ordinance (AbLaV) for customers in this consumption category mitigated a further increase in prices. It should be noted that in these consumption categories the arithmetic mean does not reflect the considerable spread of the network tariffs and the heterogeneity of the network operators.

Electricity prices for household customers

Data was collected from the suppliers operating in Germany on the prices for household customers as at 1 April 2023. There was a very large increase in the average price (including VAT) to 45.19 ct/kWh (2022: 36.06 ct/kWh). This average is calculated by weighting the prices for the individual contract models for an annual consumption of 2,500 kWh to 5,000 kWh to obtain a reliable indicator for the electricity price for household customers in Germany.

The electricity price is made up of a component controlled by the supplier (energy procurement, distribution and margin) and a component not controlled by the supplier (such as levies and taxes). The component not controlled by the supplier accounted for 48% of the price in 2023 and was much smaller than in the previous year (2022: 62%), while the component controlled by the supplier accounted for about 52% and was therefore considerably larger (2022: 38%). The reason is the large increase in wholesale prices in recent years, which has had an effect in particular on the energy volumes procured under long-term arrangements by suppliers. These volumes (procured one, two or three years in advance) make up about 90% of the total procured by suppliers for 2023.

The average price for household customers on default contracts with an annual consumption of 2,500 kWh to 5,000 kWh increased in 2023 to 47.88 ct/kWh (2022: 35.70 ct/kWh). The average price for customers on a non-default contract with their default supplier was 44.81 ct/kWh (2022: 34.86 ct/kWh). The price for customers on a contract with a supplier other than their local default supplier increased by about 18% to 43.99 ct/kWh (2022: 37.22 ct/kWh). In 2023, prices for customers with a supplier other than their local default supplier were again lower than prices with the default supplier. The previous year's trend of prices with the local default supplier being lower than prices with other suppliers therefore did not continue. This is presumably due to the suppliers' different procurement strategies. While default suppliers tend to have longer-term procurement strategies, suppliers not operating as a default supplier presumably usually procure

[22] The figures for commercial customers are based on information from 905 electricity suppliers (2021: 940).

their energy at shorter notice and were therefore able to benefit sooner from the more recent fall in wholesale prices.

Surcharges

In 2022, the network operators passed on about €10.455bn in surcharges to the network users. This total comprises the EEG surcharge (€6.43bn), the offshore network surcharge (€1.47bn), the section 19 StromNEV surcharge (€1.21bn), the KWKG surcharge (€1.33bn) and the interruptible loads surcharge (€0.015bn).

The costs of financial assistance under the EEG were originally forecast at €12.96bn. The large increase in exchange prices for electricity in 2022 led to a large rise in the TSOs' revenue from marketing electricity eligible for fixed payments. In addition, the sum of EEG assistance payments was much smaller than forecast because of the high wholesale electricity prices. The costs of EEG financial assistance were therefore much lower than forecast. The EEG surcharge was reduced to 0 ct/kWh with effect from 1 July 2022. As from 2023, financial assistance for the expansion of renewable energy is part of the federal budget.

The interruptible loads surcharge was levied for the last time for 2022 because the relevant ordinance is no longer in force.

Electricity price brake

The sharp rises in energy costs have led legislators to relieve the burden on gas, electricity and heat customers. The idea behind the StromPBG is to lessen the burden on electricity customers. The relief will be financed mainly through a levy on the surplus revenue earned by operators of electricity generating plants (with a capacity above 1 MW) who have benefited from the increase in electricity prices on the wholesale markets.

The price brake applies from 1 March 2023 until 31 December 2023, with back payments for January and February 2023 being made in March 2023.[23] The Bundesnetzagentur is responsible for ensuring that the levy on surplus revenue is imposed correctly and for overseeing the overall system of incoming and outgoing payments under the StromPBG.

The levy on surplus revenue earned by operators of electricity generating plants is one way of refinancing the relief payments. Electricity producers must submit a self-assessment. The deadline for the self-assessment to report levy payments for the first accounting period (December 2022 to March 2023) was 31 July 2023. By the beginning of August 2023, about 80% of the 12,000 operators of electricity generating plants subject to the levy had submitted a full self-assessment, reporting a total sum of about €406mn in levy payments to finance the relief. These figures are expected to increase as a result of late reports.

The Bundesnetzagentur checks the electricity producers' self-assessments in order to determine the exact amount payable. It can also take action as provided for by the StromPBG against plant operators who have not submitted a self-assessment in order to set the amount to be paid.

[23] As at 2 November 2023.

Consumer advice and protection

The energy consumer advice service is the national point of contact for consumers who want information on their rights in the energy sector, applicable legal regulations or dispute resolution options. In the period up to 30 October 2023, the Bundesnetzagentur received a total of 58,080 telephone, email, online and letter queries and complaints (compared to 23,585 in the same period in 2022). This represents a year-on-year increase of more than 140%. The increase is primarily due to a much higher number of telephone calls. The number of consumers calling the advice service in the period up to 30 October 2023 was 29,393 (compared to just under 7,000 in the same period in 2022). These figures do not include complaints about unsolicited marketing calls for electricity or gas supply contracts, which are recorded separately. In addition, 4,900 written complaints were received in the period from 1 January to 31 October 2023.

The majority (nearly 70%) of the queries and complaints received were about electricity. About 25%, considerably more than in previous years (2022: just under 20%), were about gas.

One of the main topics of interest in both sectors was prices. This was triggered in particular by the introduction of the electricity and gas price brakes. Consumers had specific questions about eligibility for relief, general questions about the effects of political developments on energy prices, and specific questions about their monthly payments and energy bills.

There was an increase in interest about switching energy suppliers and in questions about disconnecting from gas, installing heat pumps and the possibility of using solar PV installations and wallbox chargers.

Up-to-date consumer information and further information on the topics mentioned here are available online at www.bnetza.de/verbraucherservice-energie (in German).

16. Heating electricity

Contract structure and supplier switching

The volume of electricity supplied for heating was lower than in the previous year. One of the possible reasons is customers cutting back on the amount of electricity they use – saving on heating, lowering temperatures – because of the ongoing energy crisis and the mild start to the winter at the end of 2022. Another reason is the shift in the technology used, with customers replacing old night storage heating systems with modern heat pumps when making renovations. According to the volumes reported by about 1,107 suppliers of heating electricity (2021: 1,181 suppliers), about 13.1 TWh of heating electricity was supplied to customers at just under 1.98mn market locations. This corresponds to an average supply of just under 6,612 kWh per market location. This compares to the previous year's figures of just under 7,210 kWh per market location and a total volume of 14.3 TWh supplied to 1.98mn market locations.

The volume supplied for night storage heating systems amounted to just under 8.4 TWh at 1.24mn market locations. This compares to a volume for heat pumps of just over 4.5 TWh at about 0.74mn market locations. Night storage heating accounts for the largest share of consumption, with about 65.8% of volume and 62.4% of market locations. The share of heat pumps compared to night storage heating has steadily increased over the years. The total number of market locations supplied for heat pumps increased year-on-year by about 5.9%, while the total number of night storage heating systems fell by about 3.2%. This is also reflected in the shares in the total volume sold and the number of market locations supplied for heating electricity. In 2022, heat pumps accounted for as much as 37.6% of market locations and 34.2% of the volume, compared to 35.6% and 31.2% the year before.

The figures on consumption volumes and market locations provided by the DSOs in the monitoring survey roughly correspond to the results of the supplier survey. According to the data from 804 DSOs (2021: 809), a total of 12.4 TWh of heating electricity was supplied to just under 2.1mn market locations (night storage heating and heat pumps) in 2022. The DSOs do not provide separate figures for night storage heating systems and heat pumps.

Suppliers were also asked how the heating electricity they supplied was divided between network areas where they were the default supplier and network areas where they were not the default supplier. The share of heating electricity supplied in 2022 by a legal entity other than the local default supplier was slightly lower than the year before. In 2022, about 38.1% of the total volume of heating electricity supplied was accounted for by suppliers other than the default supplier (2021: about 38.8%). There was also a slight decrease in the percentage of heating electricity market locations not served by the default supplier from 37.9% to 36.2%. The share accounted for by non-default suppliers in 2022 is therefore more or less the same as in the previous years. The most recent major change in the market structure was in 2019 and 2020 when E.ON and Innogy merged. The merger was only cleared subject to certain commitments, among other reasons because of competition problems in the heating electricity sector. E.ON SE's heating electricity business was subsequently sold to Lichtblick SE. Irrespective of the conditions set by the European Commission, Innogy SE's heating electricity business was transferred to a new E.ON subsidiary, Deine Wärmeenergie GmbH & Co. KG, when E.ON acquired control of Innogy SE. The two companies still jointly account for a large share of the volumes delivered by non-default suppliers.

According to the data provided by the DSOs, the supplier switching rate in the heating electricity segment based on the number of market locations was lower in 2022 than in the previous year, and was even lower than in 2017. In 2022, supplier switches involved only about 87,750 heating electricity market locations with a total heating electricity volume of about 507.5 GWh. The switch rate in terms of both volume and the number of market locations is 4.1%, compared to 4.6% in terms of volume and 5.3% in terms of the number of market locations in 2021. The decrease in the switch rate is presumably due to the fact that, for a time in 2022, only very few alternative offers or very expensive new-customer contracts were available from most heating electricity suppliers, as identified by the Bundeskartellamt in the Westenergie/Rheinenergie/rhenag proceedings (margin no 139).

Price level

According to the data provided by the suppliers, the arithmetic mean of the total gross price (including VAT) for night storage heating was 36.31 ct/kWh on 1 April 2023, up by about 45% on the previous year's level of 25.07 ct/kWh. The arithmetic mean of the total gross price for electricity for heat pumps was 36.90 ct/kWh, also up by about 44% on the previous year's level of 25.55 ct/kWh.[24] This is quite close to the electricity gross

[24] The figures are based on information on electricity prices for night storage heating systems from 856 suppliers (2021: 877) and for heat pumps from 876 suppliers (2021: 868).

reference price set in section 5(2) paras 1 and 2 StromPBG, which suggests that the reference price may have acted as a pricing guide. According to the explanatory notes on the amendment of the StromPBG and the introduction of a reference price for heating electricity, the reference price for electricity (including heating electricity), at the time 40 ct/kWh, was higher than the prices charged separately for heating electricity and was not used much. The new reference price for heating electricity was not introduced until 1 August 2023 and is about 28 ct/kWh.[25]

The main reason for the increase in heating electricity prices is the rise in procurement costs as a result of the energy crisis. The part of the electricity price for night storage heating systems that is controlled by the supplier, which comprises procurement costs, distribution costs and the supplier's margin, increased year-on-year by about 124% from 10.21 ct/kWh to 22.90 ct/kWh. The part of the electricity price for heat pumps controlled by the supplier also increased by about 122% from 10.48 ct/kWh to 23.25 ct/kWh on 1 April 2023. The components controlled by the supplier make up about 63% of the total price of electricity for both night storage heating systems and heat pumps, while taxes, surcharges and concession fees account for about 37%. Unlike the year before, the EEG surcharge and the section 18 AbLaV surcharge no longer applied, but this was not sufficient to lessen the price increase.

In addition, there were a number of changes for heat pumps that are not taken into account in the above analyses. One change was that section 22 of the Energy Financing Act (EnFG) set the CHP and offshore surcharges payable for electricity for heat pumps with a separate meter to zero. The total gross price for electricity for heat pumps including this reduction would be just 35.36 ct/kWh and therefore lower for the first time than the price for electricity for night storage heating systems. A number of companies have already updated their list of prices for heat pumps to take this into account.

17. Electricity metering

The undertakings reported a total of 52,689,369 meter locations for electricity. The German state of North Rhine-Westphalia has the highest number of meter locations, with more than 11mn.

A total of about 5.2mn final customers are affected by the mandatory installation of smart metering systems within the meaning of section 29 in conjunction with sections 31 and 32 of the Metering Act (MsbG). The majority of these are final customers with an annual electricity consumption of between 6,000 and 10,000 kWh at nearly 2mn meter locations. There are also about 1.2mn meter locations for consumer devices covered by section 14a EnWG. A total of 225,100 mandatory smart metering systems across all final customer categories were installed, up by 95,100 on the year before. In addition, almost 45,000 optional smart metering systems were installed for customers with a consumption of less than 6,000 kWh. As in previous years, there was also an increase in the installation of mandatory modern metering equipment.

In 2022, there was again a clear trend away from electromechanical meters in the SLP customer category, which includes all household customers. Overall, the number of electromechanical meters has fallen by about 3.5mn. There was consequently a large increase in the number of modern metering devices as defined

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[25] See Article 2 of the Act amending the Act on the Brake on Gas and Heat Prices, the Act on the Electricity Price Brake and other energy, environmental and social legislation (EWPBGuaÄndG).

in section 2 para 15 MsbG that are not connected to a communications network. Modern metering equipment is now in use at a total of about 17.1mn meter locations.

Total investment in and expenditure on metering increased in 2022 by about €20mn to some €754mn, about €82.7mn below the forecast. This year's forecast of a total of €936mn is higher than the figure forecast the previous year. The total investment volume of some €754mn in 2022 includes about €380mn for smart metering systems and modern metering equipment, up by approximately €21mn on the year before. The forecast for 2023 indicates another clear increase to about €557mn.

B Gas

1. Gas network overview

In 2022, approximately 154.5 TWh of gas was delivered to final customers from the transmission system operators' (TSO) network (2021: 188.7 TWh). The volume of gas delivered was thus about 18% less than the level of the previous year. Total gas delivered from the network of the distribution system operators (DSOs) amounted to 641.4 TWh in 2022, down by almost 169 TWh or about 21% compared to the previous year (2021: 810.2 TWh).

The total amount of gas available in Germany was about 1,404.4 TWh in 2022, of which 47 TWh came from domestic sources, while 1,441 TWh was imported. In 2022, the annual storage balance – the difference between the gas that entered and exited storage in a year – was minus 93.7 TWh. The negative storage balance figure means that overall, less gas was withdrawn from storage than was injected into it. Moreover, 10.4 TWh of biogas upgraded to natural gas quality was fed into the German natural gas system in 2022.

Just over 38% (513.9 TWh) of the gas available was exported to Germany's neighbours. About 20% less gas (795.9 TWh from 998.9 TWh in 2021) was fed out to final customers.

With regard to gas transmission networks, the quantity of gas procured directly on the market by mostly large final customers (industrial customers and gas-fired power stations) – in other words not using the classic route via a supplier, and instead approaching the network operator as a shipper (paying the transport charges themselves) – amounted to 59.9 TWh (2021: 79.3 TWh), equivalent to about 39% of the total quantity of gas supplied by the TSOs to final customers. As regards gas distribution networks, the amount of gas procured without a conventional supplier contract amounted to 34.8 TWh, compared with 45.9 TWh in 2021, corresponding to a share of just over 5% of the DSOs' total gas supplies.

The difference between the offtake volumes of the system operators, 795.9 TWh (2021: 998.9 TWh), and the gas delivered by gas suppliers, 766.9 TWh (2021: 908.9 TWh) is comprised of the amount of gas procured directly on the market by final customers and survey-related variations.

The total quantity of gas supplied by general supply networks in Germany fell in 2022 by 203 TWh or about 20% year-on-year to 795.9 TWh. The quantity of gas supplied to household customers as defined in section 3 para 22 of the Energy Industry Act (EnWG) fell by just over 15% to 254.9 TWh (2021: 300.8 TWh). Gas supplies to gas-fired power stations with a nominal capacity of at least 10 MW decreased by about 17% to 85.4 TWh (2021: 102.7 TWh). Based on the reported volumes of gas sold by suppliers to standard load profile (SLP) and interval-metered customers, about 443.8 TWh went to interval-metered customers and about 352.1 TWh to SLP customers. The majority of SLP customers are household and smaller commercial customers.

2. Market concentration

Concentration in the individual gas markets did not change significantly in 2022 despite the decline in gas sales, which was due in particular to the large drop in Russian gas deliveries and possibly also to an increased focus on measures to use less gas. However, there were changes in the market structure as Gazprom Germania GmbH – along with its gas storage subsidiary, astora GmbH – was initially put under the fiduciary management of the Bundesnetzagentur and then renamed Securing Energy for Europe GmbH (SEFE). The Federal Ministry for Economic Affairs and Climate Action (BMWK) ordered SEFE to be nationalised on 14 November 2022, since when it has been fully owned by the Federation.[26]

Underground gas storage facilities

The underground storage facilities connected to the German gas network and relevant to the depiction of concentration had a maximum usable volume of working gas of about 297.1 TWh on 31 December 2022 (31 December 2021: 291.3 TWh). The aggregate working gas volume of the three companies with the largest storage capacities was about 194.6 TWh on 31 December 2022 (31 December 2021: 195.0 TWh), which corresponds to a share of about 65.5% of the total volume. This proportion has seen only a very small decline from the previous year (66.9%), so the level of market concentration here is still high.

Gas retail markets

During the 2022 reporting year, sales from suppliers to SLP customers totalled 346.1 TWh of gas (2021: 402.7 TWh) and to interval-metered customers 418.7 TWh (2021: 508.3 TWh), which was around 16% lower total sales than in 2021.[27] As well as measures taken to reduce gas consumption and safeguard supply and a warmer than average winter, these figures can be explained by the high and volatile market prices (see also section IB14), which led to lower demand. Of the total amount supplied to SLP customers in 2022, about 294.1 TWh was under non-default contracts (2021: 348.9 TWh) and 52.1 TWh was under default contracts (2021: 53.7 TWh).

The cumulative sales of the four largest companies to SLP customers were 95.3 TWh, of which about 79.7 TWh was under non-default contracts, while to interval-metered customers they were about 109.7 TWh. The aggregate market share of the four largest companies by sales was thus 28.2% for SLP customers (2021: 25.5%) and 26.2% for interval-metered customers (2021: 24.4%). Although both these figures are slightly higher than in the previous year, they are still well under the statutory thresholds for presuming market dominance (section 18(6) of the Competition Act (GWB)).[28]

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[26] In an order of 14 November 2022, the BMWK took capital measures under section 17a of the Energy Security of Supply Act (EnSiG), leading to a full change of ownership and nationalisation at SEFE. Since then, SEFE has been wholly owned by the Federation. The fiduciary management by the Bundesnetzagentur ended at midnight on 15 December 2022.

[27] "Sales" here and in the whole section on gas retail markets refers to the amount delivered by suppliers to their customers in units of energy.

[28] When considering these percentages, it should be noted that the monitoring survey of gas suppliers has a high but not complete market coverage, so the figures are only approximate.

3. Market area conversion

Over the next few years, gas supplies in north-western Germany will continue to be converted from L-gas to H-gas. The new natural gas supply structure will affect more than four million household, commercial and industrial customers with an estimated 4.9mn appliances burning gaseous fuels. All of these appliances must gradually be converted from L-gas to H-gas. Gastransport Nord, Gasunie Deutschland Transport Services, Nowega, Open Grid Europe and Thyssengas are the TSOs directly affected by the market area conversion. Between 2023 and 2027, about 4,300 more conversions will be carried out for interval-metered customers and about 2.1mn for SLP customers.

From a total of 33 network operators, 723,747 appliances were registered in 2022, of which 284,449 (39.3%) were condensing boilers and 70,423 (9.7%) self-adaptive appliances. The proportion of condensing boilers had been 45.6% in 2021 and that of self-adaptive appliances 11.3%. During the reporting period, 412,279 appliances were adapted for SLP customers and 848 for interval-metered customers. A total of 7,480 appliances that were to be adapted could not be, a proportion of 1.0% (2021: 1.7%).

A total of 1,999 customers made use of the entitlement for a €100 rebate granted under section 19a(3) EnWG for the purchase of a new appliance that does not require adaptation in the course of market area conversion (2021: 2,281). There was a clear increase in the number of customers making use of the reimbursement granted under the Gas Appliance Reimbursement Ordinance (GasGKErstV), 290 compared to 241 the year before.

The conversion costs are shared evenly across all gas customers in Germany in the form of a charge. In 2022 this charge amounted to €0.7335/kWh/h/a. In 2023 it increased to €0.7547/kWh/h/a due to the increase in the number of appliances to be converted and the expected drop in the level of exit capacity likely to be booked or ordered annually in all networks in the country. The charge for 2024 was set at €0.6711/kWh/h/a.

Apart from this, there is no direct impact on the gas bills of individual customers. It is not allowed to charge consumers for hours worked or for materials needed for the technical adjustment of appliances. Rather, the network operators bear the costs and then get them reimbursed from the charge.

In 2022, the market area conversion was again overshadowed by Russia's war on Ukraine, which triggered uncertainty among many people about the security of supply after the conversion to H-gas. Network operators and companies carrying out the adjustments responded to this uncertainty by providing transparent information. Overall, the market area conversion is on schedule and making good progress. More information on it may be found in section **Fehler! Verweisquelle konnte nicht gefunden werden.**.

4. Gas imports and exports

Gas imports

Gas flows from Russia to Germany were last at a normal level of around 1,800 GWh/day on 10 May 2022. The halting of Russian gas deliveries to Poland and Bulgaria has so far had no impact on gas imports to Germany. Following Russia's imposition of sanctions on Gazprom Germania and almost all the company's subsidiaries, the volumes of gas flowing through Ukraine to Waidhaus in Germany fell by more than 25% from one day to the next as a result of the reduction in transit flows. On 14 June 2022, gas flows from the Nord Stream 1 pipeline were at about 60% of maximum capacity, but were reduced to 40% the following day. As from

11 July 2022, they fell to zero, because, it was announced, of planned maintenance work on the Nord Stream 1 pipeline scheduled until 21 July 2022. Gas flows through Nord Stream 1 resumed on 22 July 2022 and were at about 40% of maximum capacity. On 27 July 2022, there was another, announced reduction in gas flows from Nord Stream 1 to around 20% of maximum capacity. These reduced gas flows through the Nord Stream 1 pipeline were then suspended indefinitely on 2 September 2022, reportedly for technical reasons. On 26 September 2022, a sudden drop in pressure, caused by an explosion, was identified first in Nord Stream 2's pipe A and then in both Nord Stream 1 pipes. The presumed attacks on the Nord Stream 1 and 2 pipelines did not have any effect on the gas supply. No gas had been delivered through Nord Stream 1 since the beginning of September anyway, and Nord Stream 2 had never been put into operation.

The total volume of natural gas imported into Germany in 2022 was 1,441 TWh. Imports to Germany were thus down by 17 TWh from the previous year's figure of 1,458 TWh. The most important sources of imported gas in Germany in 2022 were Norway, the Netherlands and Belgium, with a total volume of 983 TWh or about 68% of all imports to the country. In view of the conflict in Ukraine, Russian gas deliveries lost their significant role. The share of Russian pipeline gas in 2022 was just 21% (2021: 63%). The Netherlands, as an established and liquid European trading hub and point of arrival for liquefied natural gas (LNG) shipments and a country with connections to natural gas fields in Norway and the United Kingdom, is an especially significant source of imports for Germany. In addition, Germany's first floating LNG terminal (floating storage and regasification unit (FSRU)) started operation in Wilhelmshaven in December 2022. It was joined by two more such terminals in Lubmin and Brunsbüttel in January and March 2023.

Gas exports

In 2022, the total volume of natural gas exported by Germany was 513.9 TWh. Based on the previous year's figure of 749 TWh, exports from Germany fell by 235 TWh. Gas was mainly exported to Czechia, Poland and Austria (415 TWh).

Gas production

Germany has its own sources of gas, but these have been losing significance due to the increasing exhaustion of the large deposits and the resulting natural decline in output from year to year. The reserves-to-production ratio of the raw gas reserves has been falling for years. It dropped from 7.4 years in 2021 to 7.3 in 2022.

5. Biogas

A total of 238 plants injected biogas into the network in 2022 (2021: 233). The total contractually agreed input capacity was 2.624mn kWh/h (2021: 2.548mn kWh/h). The annual injection of biogas was 10,158.1mn kWh (2021: 10,141.5mn kWh).

The costs incurred from the connection of biogas injection facilities are spread among all networks in the market area in accordance with the requirements of section 20b of the Gas Network Tariffs Ordinance (GasNEV). The costs for biogas passed on by gas network operators to all network users amounted to about €180mn in 2022 (2021: €192mn). That was the equivalent of about €0.0177 per kWh of biogas injected (2021: €0.0191/kWh), which is approximately the same as the average over several years as there is a close correlation between the network operators' costs and injected volumes. More information on the injection of biogas may be found in section **Fehler! Verweisquelle konnte nicht gefunden werden.**.

6. Underground gas storage facilities

Germany's gas storage facilities are key to the supply of gas, in particular in the winter months. The total maximum usable volume of working gas in underground storage facilities as at 31 December 2022 was 286 TWh (2021: 279 TWh). Of this, 140 TWh (2021: 137 TWh) was accounted for by cavern storage, 125 TWh (2021: 120 TWh) by pore storage and 21 TWh (2021: 22 TWh) by other storage facilities.

The entry into force of the Gas Storage Act on 30 April 2022 and the introduction of statutory requirements for storage levels serve to further increase security in the supply of gas in Germany. The storage level requirements were originally 80% on 1 October, 90% on 1 November and 40% on 1 February of each year. These requirements were raised again by a ministerial ordinance on 29 July 2022. The targets for 1 October and 1 November were increased to 85% and 95% respectively, while the target for 1 February was left at 40%.

The target storage level of 85% for 1 October 2023 was already reached by the end of July 2023. The 1 November target of 95% was reached on 25 September 2023. Storage levels on 2 November 2023, the editorial deadline for the monitoring report, stood at 99.91%. The charge valid under section 35e EnWG to secure the storage level requirements for gas storage facilities (gas storage neutrality charge) was €0.59/MWh from 1 January 2023. Since 1 July 2023, it has been €1.45/MWh. More information on gas storage facilities may be found in section **Fehler! Verweisquelle konnte nicht gefunden werden.**.

7. Network structure data

All 16 TSOs took part in the 2023 Monitoring Report data survey. As at 31 December 2022, the length of pipelines in the transmission system was about 43,300 km and included around 3,500 exit points for delivery to final customers, redistributors or downstream networks including the points at which gas can be taken off for delivery to storage facilities, hubs, and conditioning or conversion plants. The number of registered final customer market locations in the transmission system was 529.

As at 2 November 2023, a total of 704 gas DSOs were registered with the Bundesnetzagentur, 665 (just over 95%) of whom took part in the 2023 monitoring survey. As at 31 December 2022, the total length of pipelines in the gas distribution system including house connections was around 527,000 km and included about 10.8mn exit points for delivery to final customers, redistributors or downstream networks including the points at which gas can be taken off for delivery to storage facilities, hubs, and conditioning or conversion plants. As at 31 December 2022, there were 14.5mn registered final customer market locations in the gas distribution network. The number of market locations for household customers as defined in section 3 para 22 EnWG was 12.9mn. The majority of gas DSOs (585 operators) have short to medium length systems of up to 1,000 km, and 90 DSOs have gas systems with a total length of more than 1,000 km.

There are a total of around 6,700 entry points to the gas distribution networks, of which 478 are for emergency entry only. A look at the number of market locations served by the DSOs shows that only 29 DSOs supply more than 100,000 each, the same as in 2021. Of the total of 14.5mn market locations supplied by the DSOs in Germany, some 48% (6.9mn or 326 TWh offtake volume) of the total gas supplies are served by DSOs that supply more than 100,000 customers. The majority (around 57%) of DSOs active in Germany supply between 1,000 and 10,000 gas customers.

8. Gas network expansion

The sea change in energy policy has made it necessary to speed up significantly the transition from natural gas to green and climate neutral gases, such as hydrogen. The inclusion of LNG requires the existing gas networks to be adapted as well. These developments have had a major influence on the Gas Network Development Plan (NDP) 2022-2032, reflecting these new realities.

Following the submission of the draft Gas NDP 2022-2032 by the TSOs, the Bundesnetzagentur carried out a written consultation of all actual and potential network users from 16 May to 13 June 2023. The Bundesnetzagentur then takes this as the basis to examine the Gas NDP 2022-2032. The process is concluded with a request for amendment. The TSOs then have three months to make the required amendments.

9. Investments by gas network operators

TSOs

In 2022, the 16 German gas TSOs invested a total of €820mn (2021: €679mn) in network infrastructure. Of this, €587mn (2021: €420mn) was accounted for by investments in new builds, upgrades and expansion projects and €233mn (2021: €259mn) by investments in network infrastructure maintenance and renewal.

Across all TSOs, expenditure on maintenance and repair of network infrastructure amounted to €446mn in 2022 (2021: €358mn), with expenditure lower than in the previous year but within the usual range of fluctuation. The TSOs' planned expenditure for 2023 is €480mn.

DSOs

Over 600 gas DSOs reported a combined investment volume of €1,445mn in network infrastructure for 2022 (2021: 1,736mn). Investments in new builds, upgrades and expansion accounted for €795mn of the total (2021: €1,101mn), while €650mn went into maintenance and renewal (2021: €635mn). The projected total investment for 2023 is €1,450mn.

Service and maintenance expenses, based on the data provided by the DSOs, totalled €1,191mn in 2022 (2021: €1,204mn). The projected investment in servicing and maintenance for 2023 is €1,250mn.

The level of DSO investment depends on the length of their gas pipeline network and the number of market locations served as well as other individual structure parameters, including, in particular, geographical conditions. While 143 of the surveyed gas DSOs reported investments of between €1mn and €5mn, 58 gas DSOs made investments totalling more than €5mn.

Of the surveyed gas DSOs, 239 reported total expenditures in the bracket between €100,001 and €500,000, while 53 gas DSOs reported expenditures totalling more than €5mn.

10. Capacity offer and marketing

In the 2021/2022 gas year, the total firm entry capacity offered across the Germany-wide market area Trading Hub Europe (THE) was 549.0 GWh/h, which was just over 1% more than in the year before

(2020/2021: 543 GWh/h). About 39%, or 212.8 GWh/h, of the total entry capacity was firm, freely allocable capacity (FZK; 2020/2021: 242 GWh/h).

The total firm exit capacity offered in the THE market area in the 2021/22 gas year was 367.5 GWh/h, corresponding to a small decrease of 1.4% (2020/2021: 372.8 GWh/h). It should be noted that not every TSO offers all capacity products. The aggregated values therefore cannot be projected onto each individual TSO.

A comparison of the data on entry and exit capacity reveals a number of differences. For instance, it is apparent that, overall, in the 2021/2022 gas year more entry capacity was booked than exit capacity. Consequently the total volume of entry capacity booked was 337.4 GWh/h, significantly exceeding the exit capacity booked, which amounted to a total of 213.7 GWh/h. One reason for this is that a large share of the entry capacity bookings is used to supply final customers connected to downstream distribution networks. The German gas network access model does not oblige suppliers to book equivalent exit capacity when supplying gas in this way. In addition, the analysis of the entry and exit capacity bookings clearly illustrates that, during the period under review, most bookings were for longer-term capacity products.

Across Germany, the TSOs reported a nominated quantity of 1,699 TWh in 2022 at all entry points where there is a nomination obligation (2021: 1,882 TWh). In contrast, nominated quantities at exit points were considerably lower, totalling 806 TWh (2021: 905 TWh). The reason for the significantly lower figure on the exit side is that gas for domestic use in particular is withdrawn from the transmission network at exit points where there is no nomination obligation. The exit points where there is a nomination obligation are cross-border and market area interconnection points and connection points to storage facilities and domestic production. Network connection points to final customers, on the other hand, are not subject to a nomination obligation. More information on available capacity may be found in section **Fehler! Verweisquelle konnte nicht gefunden werden.**.

11. Gas supply disruptions

In 2022, the average interruption in supply per connected final customer was 1.52 minutes (2021: 2.18 minutes), which is somewhat below the long-term average of 1.54 minutes a year. This figure shows that the German gas network still has a high quality of supply even during a time of crisis. There was a large variation in the interruption times among the federal states, ranging from 0.08 minutes in Hamburg to 5.85 minutes in Saxony-Anhalt. More information on gas supply disruptions may be found in section **Fehler! Verweisquelle konnte nicht gefunden werden.**.

12. Gas network tariffs

The average volume-weighted network tariff including the charges for metering and meter operation for household customers (volume-weighted across all contract categories) was 1.89 ct/kWh as at 1 April 2023. This was a significant rise of about 17% from the previous year (2022: 1.62 ct/kWh). For commercial customers, as at 1 April 2023 the arithmetic mean of the network tariff including the charges for metering and meter operation was 1.48 ct/kWh (2022: 1.25 ct/kWh). For industrial customers, as at 1 April 2023 the arithmetic mean of the network tariff including the charges for metering and meter operation was 0.39 ct/kWh (2022: 0.44 ct/kWh).

For the Germany-wide market area THE, on 25 November 2022 the TSOs published adjusted entry and exit tariffs for firm, freely allocable annual capacity for 2023 of €6.03/kWh/h/a (2022: €3.51/kWh/h/a). On 25 May 2023, the TSOs published the entry and exit tariffs for firm, freely allocable annual capacity for 2024, which will be €5.10/kWh/h/a from 1 January 2024. The tariff for the booking of firm, freely allocable entry and exit capacity will be around 15% lower in 2024 than it was in 2023.

The distribution network tariffs for 2024 provisionally reported on 15 October show a decline across all customer groups. The figures are based on a random sample of network operators under the responsibility of the Bundesnetzagentur. No firm statements on the precise extent of the decrease can be made at the time of going to press. It is due to lower costs for the use of downstream network levels, resulting from factors including lower prices for compressor energy in the transmission systems as well as sales forecasts that are higher than the year before.

13. Balancing gas and imbalance gas

As gas is mainly purchased on the exchange, procurement prices for external balancing gas are on the same level as general market prices.

The gas auction system was launched on 1 October 2022. Companies can offer volumes of gas via the balance responsible party. THE, which is responsible for the German gas market area, can now accept offers to reduce gas consumption in the event of shortages, which will stabilise the networks if needed.

A balancing neutrality charge for interval-metered and SLP customers is payable, in line with the GaBi Gas 2.0 determination, to make up the expected shortfall from the use of balancing gas and imbalance gas. It is borne by the balance responsible parties that serve exit points connecting users with either standard load profiles or interval metering. For the period of validity as of 1 October 2022, a neutrality charge of €5.70/MWh was levied for SLP customers and €3.90/MWh for interval-metered customers. From 1 October 2023, both these charges will be cut to €0/MWh.

14. Wholesale gas markets

The situation in the natural gas markets changed dramatically in the wake of Russia's invasion of Ukraine. This primarily involved the gradual cessation of direct supply with Russian gas. It took some time for this to be replaced with other natural gas imports and, since the end of 2022, with increased deliveries of LNG. Although some normality returned to the markets towards the end of the second half of 2022, wholesale prices were much higher in the year as a whole and were very volatile. This trend has continued in 2023, albeit at a somewhat lower level.

Volume of gas trading

There was strong volume growth on the European gas exchanges in 2022, shown here using the example of the European Energy Exchange AG and its subsidiaries (EEX).[29] From the exchange perspective, this was due to

[29] There are other gas exchanges as well as the leading one, EEX, such as CME Group and ICE. There are plans to include these in the energy monitoring in the coming years.

factors including the greater demand for exchange-traded hedging instruments because of the uncertain market environment caused by Russia's war in Ukraine, high levels of price volatility and rising inflation during the year.[30] The total volume of trade, including cleared volume, in the German national market area THE since its formation in October 2021 was about 1,754 TWh in 2022, corresponding to growth of 164.2% year-on-year (2021: 664 TWh). The volume traded on the spot market also rose in 2022 to about 1,106 TWh compared with about 582 TWh in 2021. The focus of spot trading in 2022, as in the previous years, was on day-ahead contracts. The futures trading volume rose from around 82 TWh in 2021 to about 649 TWh, almost eight times higher (691%). EEX considered that the main reason for this growth was the greater need for hedging and reduction of the counterparty credit risk, as hedging in consumption-related market segments is gaining relevance for market participants.

Day-ahead prices

The (unweighted) annual average for THE in the European Gas Spot Index (EGSI) published by EEX was €124.98/MWh in 2022. The previous year, the comparative values for the daily reference price up to September 2021 were €30.29/MWh for NCG and €30.33/MWh for GASPOOL and from October 2021 €95.67/MWh for THE, which corresponds to a 2022 price rise of about 312.5% for NCG and GASPOOL and about 30.6% for THE. The EGSI monthly average throughout 2022 ranged from €81.06/MWh in February to €235.18/MWh in August. The strong rise in the EGSI, which was already becoming evident in the fourth quarter of 2021, continued until August 2022, after which the index fell significantly again.

The European Gas Index Deutschland (EGIX) is based on exchange transactions concluded in the relevant front-month contracts (THE). In 2022, the EGIX ranged from €81.62/MWh in March to €234.51/MWh in September. The (unweighted) average of the 12 monthly values was €132.94/MWh, the equivalent of an about 244% increase year-on-year from €38.64/MWh.

The (unweighted) average of the monthly border prices (as calculated by the Federal Office for Economic Affairs and Export Control (BAFA)) was €79.26/MWh in 2022, compared with €26.02/MWh in 2021 (up 204.6%). This development shows that the EGIX rose much more strongly than average BAFA prices in 2022.

Over-the-counter wholesale trade

The nine broker platforms participating in this year's data monitoring reported having brokered natural gas transactions for delivery to Germany for an uncleared total volume of 2,010 TWh (2021 with nine brokers: 2,392 TWh), of which 766 TWh was for contracts with delivery in 2022 and a delivery time of at least one week. The decline of approximately 15.9% year-on-year in the total volume of the brokers, which is particularly evident in the delivery periods Y+2 and Y+3, is likely to be due to a reticence to buy in a time of much higher and volatile prices and possible expectations of falling prices in the course of trading on the part of customers.

Short-term transactions on the spot market with a delivery period of less than a week only made up about 8.6% of the trading reported by the nine broker platforms for 2022 (2021: 5.2%), with the other 91.4% relating

[30] EEX Group Finanzergebnisse 2022, page 9.

to the futures market. Transactions for the current and the next year were thus the clear focus of the brokers in natural gas trading.

While the gas traded in 2022 (including spot trades) made up about 46.7% of the total volume, about 38.6% was traded for the following year, 2023, up from 33.5% the previous year. A share of about 14.6% was taken by transactions with delivery times in 2024 and beyond, down from 26.3% the year before.

Trading at virtual trading points

The gas volumes nominated at the THE virtual trading point dropped only slightly to 3,639 TWh in 2022 from 3,807 TWh the year before, with about 91.9% of the nomination volume being taken up by H-gas and the remaining 8.1% by L-gas.

As in the years before, the monthly nomination volumes display seasonal variations. In the months of May to September 2022, the monthly nomination volume at the virtual trading point was no more than 277 TWh. The lowest nomination volume was about 237 TWh in June 2022 and the annual peak was 373 TWh in December 2022.

There has been a slight year-on-year drop in the number of active trading participants in THE since October 2021.[31] It averaged 415 per month for H-gas in 2022 and 192 for L-gas, down from 424 and 197 respectively the year before.

15. Retail gas markets

Number of suppliers

The disruption on the gas market related to the Russian attack on Ukraine, which temporarily resulted in a huge rise in wholesale prices, led to some energy suppliers leaving the market in the course of 2022. A total of 21 energy suppliers told the Bundesnetzagentur during 2022 that they would stop supplying household customers. Five of them were exclusively gas suppliers. By the editorial deadline of this report on 2 November 2023, 13 energy suppliers had ended their activities in 2023, with a further five planning to cease them by the end of the year. This development meant that 2022 was the first time the number of active gas suppliers for all final customers in the different network areas fell. The number of gas distribution systems in which more than 100 gas suppliers were active dropped from 70.3% to 63.8%. Across the country, each household customer could choose from an average of 111 gas suppliers (2022: 113 gas suppliers). The number of gas suppliers active nationwide fell from 65 in 2021 to 52 in 2022.[32] It remains to be seen whether this trend will continue or whether it was a one-off effect of the temporarily very sharp increase in gas procurement costs on the business and procurement strategy of some gas suppliers.

[31] An active participant in the virtual trading point is one who has made at least one nomination in the relevant month.

[32] In order to determine the number of gas suppliers active nationwide, if a supplier is active in more than 500 network areas they are counted as active across all of Germany.

Procurement strategies of gas suppliers

Despite the striking developments in the wholesale markets, no significant differences between the procurement strategies of 2021 and 2022 may be identified. Just over 50% (2021: 48%) of the gas suppliers taking part in the survey had a mixed procurement strategy of short-term and long-term procurement. About 46% (2021: 47%) of the gas suppliers had only long-term procurement, while just over 4% (2021: 5%) used only short-term procurement to acquire the gas volumes needed. There are no major differences in the procurement strategies for the supply of household and non-household customers.

Contract structure of non-household customers

Interval-metered customers were supplied with just over 418.7 TWh of gas in 44,225 market locations in 2022.[33] These are all non-household customers (industrial and commercial customers, gas-fired power plants). Over 99% of this supply took place on non-default contracts with the default supplier (97.7 TWh) and contracts with suppliers that are not the default supplier (320.7 TWh).[34] It is unusual, but not impossible, for interval-metered customers to be supplied under default supply or fallback supply. Around 0.3 TWh of gas was supplied to interval-metered customers under default or fallback supply. This is less than 0.1% of the total volume supplied to interval-metered customers.

About 23.3% of the total volume delivered to interval-metered customers was supplied under a contract with the default supplier on non-default terms (2021: 22.8%) and about 76.6% was supplied under a contract with a legal entity other than the default supplier (2021: 77.1%). These figures show that default supply plays only a marginal role in the supply of interval-metered customers with gas and also that the local default supplier is of only secondary importance in the supply of customers via non-default contracts.

Contract structure of household customers

The temporarily high gas prices for household customers led to moderate changes in the existing contract structure for these customers. The proportion of default contracts saw a slight rise from 16% to 18% of volume in 2022 for the first time since 2010. At the same time, the proportion by volume of non-default contracts with the default supplier (47%) and contracts with a supplier other than the local default supplier (35%) each fell by one percentage point. Of the around 243.5 TWh[35] supplied by gas suppliers to household customers, 43.3 TWh was under default contracts, 115.4 TWh under non-default contracts with a default supplier and 84.8 TWh under contracts with a supplier other than the local default supplier.

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[33] In the 2022 reporting year, 904 gas suppliers (individual legal entities) provided data on the market locations served and volume consumed by interval-metered customers in Germany, ie almost exclusively non-household customers (2021: 932). These gas suppliers include affiliated companies, hence the number of suppliers is not equal to the actual number of independent competitors.

[34] In accordance with section 36 EnWG, default supply only relates to household customers. Where "default supply" for non-household customers is used in the section below, it refers to "fallback supply".

[35] The volume of gas delivered to household customers as defined in section 3 para 22 EnWG was 254.9 TWh in 2022 and deviates from the figure of 243 TWh reported by gas suppliers due to incomplete data reports from gas suppliers.

Supplier switches by non-household customers

The total number of market locations of both household and non-household customers with a supplier switch dropped 39.3% from 1,992,882 in 2021 to 1,210,175 in 2022. The offtake volume of gas affected by a supplier switch also dropped steeply to 78.7 TWh from 107.6 TWh the previous year (down 26.9%). This decline indicates that it was hardly possible or much less easy to get better contractual terms by switching supplier in the year under review owing to the much higher prices in the relevant period.

Customers with at least 0.3 GWh/year (including gas power stations) are all non-household customers. In this group, the volume-based switch rate barely changed in 2022 (10.4% compared to 10.2% the year before).

Supplier switches by household customers

The number of household customers changing supplier fell by about a third to 1.15mn. The adjusted number of supplier switches in 2021 was about 1.64mn.When looking at 12.9mn household customers (according to DSO figures), the resulting overall numbers-based supplier switching rate for household customers is 8.9%, down from 12.9% in 2021. The volume of gas affected by supplier switching was 25.1 TWh in 2022. A lack of alternatives and general uncertainty caused by the very volatile wholesale prices may be reasons for the clear decrease in switches.

Contract switches by household customers

In 2022 the number and volume of changes of contract with the existing supplier rose by about 59%, following a significant drop of 30% in 2021.[36] The volume-based contract switching rate rose from 3.1% to 5.5%. In absolute terms, that meant that 0.76mn gas customers decided to change their contract, an increase of about 40%. These figures indicate that households with high consumption were most likely to move to a new contract while staying with their existing supplier.

Gas disconnections

The number of disconnections carried out by the network operators in 2022 was 22,987, representing a decrease of about 15% compared to the previous year (2021: 26,905). The overwhelming majority of disconnections occurred when customers were late paying their bills. About 65% of disconnections related to default contracts and 35% to non-default contracts.[37] About 30% of disconnections were carried out in the second and another 30% in the third quarter of the calendar year; that is to say, outside the heating season. About 4% of household customers on default contracts who were disconnected were disconnected more than once in a calendar year. Among those on non-default supply, nearly a third were affected by a disconnection more than once in 2022.

Around 60% of the gas suppliers surveyed also said they had voluntarily decided not to disconnect their customers. About half of those surveyed had already decided not to disconnect customers during the

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[36] A customer's change to a new gas tariff with the same gas supplier at their own request.

[37] Non-default contracts mean both non-default contracts with the default supplier and contracts with a supplier other than the local default supplier.

pandemic. Suppliers often accommodated customers by offering them special or individual payment arrangements. There was a large increase in 2022 in the number of customers in payment difficulties being offered payment by instalment. Gas suppliers made over 160,000 offers of payment by instalment in 2022, which was accepted in about 36,000 cases (around 23%). The average length of time between an actual disconnection and a reconnection was 40 days, according to network operators. Around 2,400 disconnections were for more than 90 days. The reasons for these longer periods of disconnection may have been customers' long-term inability to pay, vacant properties or faulty customer equipment that could not be reconnected for safety reasons.

There was a small decrease of about 3% in disconnection requests from gas suppliers to network operators in 2022 (169,000 from 174,000 in 2021). The number of disconnection notices issued by gas suppliers, however, was about 10% higher. The absolute number of disconnection notices was 1.1mn in 2022 (2021: 1mn). As there is sometimes a gap between the issuing of a disconnection notice and the actual disconnection, it may be assumed that some of the disconnections notified in 2022 only took place the following year. According to the gas suppliers, the time from the first, unsuccessful demand for payment and the first reminder is 14 days on average. Between the first reminder and the disconnection request there is an average of 30 days, but in some cases much more. The average time between the disconnection request and the final notice of disconnection is about 14 days.

The amount of payment due when a disconnection notice is issued varies greatly, but the average is about €130.[38] According to the network operators, 17,403 market locations were successfully reconnected in 2022 following a disconnection (2021: 20,286). This figure is about 14% lower than in 2021. Unlike the disconnections, most of the reconnections of previously disconnected connections take place at the beginning of the heating period, in the fourth quarter of the year.

Disconnections always incur additional costs. While some gas suppliers only pass on the costs of the network operator that carried out the disconnection/reconnection, a proportion of suppliers additionally charge their customers for carrying out a disconnection. The network operators charged gas suppliers an average fee of about €58 (excluding VAT) for disconnecting a supply. They charged suppliers an average fee of about €69 (excl VAT) for reconnecting a supply. Customers were charged an average disconnection fee of about €50 (including VAT) by suppliers applying the general calculation in accordance with section 19(4) of the Gas Default Supply Ordinance (GasGVV). Suppliers not applying the general calculation charged customers an average of about €55 (inc VAT). Customers were charged an average reconnection fee of about €58 (inc VAT) by suppliers applying the general calculation and about €62 (inc VAT) by those not applying the general calculation. Gas suppliers charged an average of €3 plus reminder fees for sending a reminder to household customers who were late paying their bills and there are usually two dunning levels.

[38] Under a default supply contract, the interruption of supply may only be carried out if the customer is two monthly payments and €100 or more in arrears. If no monthly instalment has been agreed, the customer must be at least one sixth of the projected annual amount in arrears.

Terminations

Despite issuing disconnection notices and orders, only a small number of gas suppliers actually terminate supply contracts with their customers. Moreover, the termination of a default supply contract is only permitted under stringent conditions. There must be no obligation to provide basic services or the requirements to disconnect gas supply must have been met repeatedly and the customer must have been warned of contract termination because of late payment. In 2022, gas suppliers (default suppliers and their competitors) terminated their contractual relationship with a total of 55,233 gas customers (2021: 41,363) due to the customers' failure to fulfil a payment obligation. About 93% of these terminations related to contractual relationships outside the default supply. Reasons frequently cited for terminating contracts included reaching the final dunning level and missing two or three partial payments without any prospect of fulfilling the claim. The average level of arrears for a household customer that led to a contract being terminated was about €180 in 2022.

Prepay systems

Closely related to the topic of disconnections and terminations is also that of prepay systems under section 14 GasGVV, such as cash meters and smart card readers. The default supplier is entitled to require advance payment for gas consumption in a billing period if there are grounds to assume, based on the individual circumstances, that the customer will not meet their payment obligations or meet them in time. According to 25 suppliers, a total of 900 household customers had cash or smart card meters, or comparable prepayment systems, in 2022 compared to 931 in 2021. There were 144 new installations of prepay systems and 115 existing ones were removed in 2022. The numbers of such systems are therefore still very low. Costs for meter operation and metering averaged €27 and €15 respectively per year and meter. The yearly standing charge for gas customers was €130 on average, while the average unit price for gas charged using a prepayment meter was 13 ct/kWh.

Gas prices for industrial customers for annual consumption of 116 GWh

The arithmetic mean of the overall price (excluding VAT) for an annual consumption of 116 GWh ("industrial customer")on the reporting date of 1 April 2023 was 7.75 ct/kWh, an increase of about 14.6% year-on-year (2022: 6.76 ct/kWh). [39] The war in Ukraine probably contributed to this development. This amount is rather close to the gas reference price for industrial customers (not including gas power stations) under section 9(3) para 2 of the Act on the Brake on Gas and Heat Prices (EWPBG), which suggests that the reference price may have acted as a pricing guide. The overall price is composed of an average of 5.2% of components that cannot be controlled by suppliers: network tariffs, charges for metering and meter operation and concession fees. Another non-controllable component for suppliers is the gas tax of 0.55 ct/kWh and the carbon levy of 0.5461 ct/kWh.[40] The gas tax and carbon levy together make up about 14.1% of the average total price (excluding VAT), down from 16.2% in 2021. About 80.7% (2022: 77.3%) of the overall price is the components controlled by the supplier (gas procurement costs, distribution costs and margin). THE's current gas balancing

[39] The price questions were answered by 84 suppliers (2021: 87). More information on the answering of the price questions by the gas suppliers surveyed may be found in section **Fehler! Verweisquelle konnte nicht gefunden werden.**.

[40] The carbon levy was introduced in 2021.

neutrality charge for interval-metered customers is €3.90/MWh for the period from 1 October 2022 to 30 September 2023. Moreover, since 1 November 2022 the gas storage neutrality charge has been part of the gas price. It was 0.059 ct/kWh (net) until 1 July 2023, when it rose to 0.145 ct/kWh.

Gas prices for commercial customers for annual consumption of 116 MWh/a

The arithmetic mean of the overall price (excluding VAT) for an annual consumption of 116 MWh ("commercial customer") was 12.11 ct/kWh, an increase of 4.92 ct/kWh or about 68.3% from the previous year's price of 7.19 ct/kWh.[41] This amount is rather close to the gas reference price for final customers that are not industrial customers under section 9(3) para 1 EWPBG, which suggests that the reference price may have acted as a pricing guide. An average of about 22.2% (2022: 35.0%) of the overall price was made up of cost items not controlled by the supplier, such as network tariffs, the gas tax, concession fees and the carbon levy. Around 77.8% (2022: 65.0%) relates to items that allow scope for business decisions. THE's current gas balancing neutrality charge for SLP customers is €5.70/MWh for the period from 1 October 2022 to 30 September 2023. Moreover, since 1 November 2022 the gas storage neutrality charge has been part of the gas price. It was 0.059 ct/kWh (net) until 1 July 2023, when it rose to 0.145 ct/kWh. The average net amount of the non-controllable components rose from 2.44 ct/kWh in the previous year to 2.70 ct/kWh, mainly due to higher concession fees and network tariffs. The residual price component controlled by the supplier rose by 4.73 ct/kWh (from 4.69 ct/kWh as at 1 April 2022 to 9.42 ct/kWh as at 1 April 2023), thus by around 100.9%. Here, too, the effects of the war in Ukraine are likely to have played a major role.

Gas prices for household customers

The volume-weighted, average gas price for household customers across all contract categories was 14.80 ct/kWh as at 1 April 2023 (2022: 9.88 ct/kWh), an increase of about 50% on the previous year. In the average price across all contract categories, the largest price component "energy procurement, distribution and margin", which makes up around 73%, nearly doubled from 5.5 ct/kWh to 10.77 ct/kWh. The share of the state-controlled price components such as value-added tax, natural gas tax, the carbon levy and concession fees is historically low at 14.4% (2022: 27.8%). The main reason for this is that the Act temporarily reducing the value added tax rate for the supply of gas via the natural gas network (GasUStSG) retroactively cut the rate of VAT on gas deliveries from 1 October 2022 to the end of March 2024 from 19% to 7%.[42] The proportion of network tariffs was 12.8% in 2023 (2022: 16.5%).[43] The average network tariffs thus rose about 16% from 1.63 ct/kWh to 1.89 ct/kWh.

When looking at the price level of the three contract types, it is clear that default supply prices had risen most strongly by the reporting date of 1 April 2023, whereas in the year before the prices of the non-default competitors had seen the highest increases. This change in trend may be explained by the different procurement strategies and willingness to take risks. The data of the last two reporting dates show that the more short-term procurement strategy on the wholesale markets that many competitors tend to pursue can

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[41] The price questions were answered by 748 suppliers (2021: 757). More information on the answering of the price questions by the gas suppliers surveyed may be found in section **Fehler! Verweisquelle konnte nicht gefunden werden.**.

[42] As at the editorial deadline for the Monitoring Report 2023.

[43] Including upstream network costs, charges for metering and for meter operations.

bring financial advantages and disadvantages for gas customers. The volume-weighted average gas price for customers on a default contract as at 1 April 2023 was 16.25 ct/kWh (2022: 9.51 ct/kWh), corresponding to an increase of around 70% compared to the previous year. On 1 April 2023, the volume-weighted price for customers under a non-default contract with the default supplier was 14.52 ct/kWh, an increase of about 61% compared to 2022 (9.02 ct/kWh). The volume-weighted price for a contract with a supplier other than the local default supplier as at 1 April 2023 was 14.44 ct/kWh, a rise of just over 32% compared to the previous year (2022: 10.95 ct/kWh).

Lawmakers made changes in the rules for pricing in the default and fallback supply to strengthen the rights of consumers. From 1 November 2022 onwards, it was no longer allowed to have different prices for existing and new customers in the default supply. Fallback supply prices, however, may be higher than default ones and they may be adjusted on the first or fifteenth of any month. Price data for the fallback supply, which was recorded for the first time as at 1 April 2023, showed that the average was 18.42 ct/kWh, about 13% more than the average default supply price. On 1 January 2022, the proportion of gas suppliers with higher fallback supply prices had been at a low level of about 14%. This proportion peaked at about 60% in the months of November and December 2022 and January 2023. Since then, the share of suppliers with higher fallback supply prices has been steadily falling until, by the fourth quarter of 2023, only about 14% of gas suppliers expected to have to offer higher fallback supply prices.

Energy price brakes

The sharp rises in energy costs have led legislators to relieve the burden on gas, electricity and heat customers. In 2023, for example, prices for natural gas were limited for a basic share of consumption, as set out in the EWPBG. The main idea behind the energy price brakes is that customers receive financial relief based on their forecast consumption. For private households, associations and small and medium-sized businesses with an annual consumption of up to 1.5mn kWh – that is to say, almost all customers supplied under a standard load profile – the scheme gives them reduced prices for 80% of their forecast annual consumption. Customers who manage to keep their consumption below 80% of the forecast can also keep the relief for their reductions as a "reward" for saving energy. From March 2023, the gas price was capped at 12 ct/kWh for private households for 80% of the amount they had consumed in the previous year. More information on developments in the gas retail sector may be found in section **Fehler! Verweisquelle konnte nicht gefunden werden.**.

Consumer advice and protection

The energy consumer advice service is the national point of contact for consumers who want information on their rights in the energy sector, applicable legal regulations or dispute resolution options. Current data and information specially focused on gas may be found in the subsection "Retail" in the section "Developments in the electricity markets" (see section IA15).

16. Gas metering[44]

The undertakings reported a total of 13.68mn meter locations for gas. North Rhine-Westphalia was the German state with the most meter locations (over 3.63mn), followed by Lower Saxony (2.02mn) and Baden-Württemberg (1.34mn).

Investments

Total investment and expenditure were down about €15mn to around €228mn in 2022, leaving expenditure around €24mn below the planned investment amounts. The forecast for 2023 totals €250mn, around the same level as last year. Of the total of about €228mn in 2022, around €36mn went to investments in new installations, upgrades and expansion, €71mn to investments in maintenance and renewal, and about €121mn on expenditure.

[44] Data based on responses from 635 undertakings.

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Tulpenfeld 4

53113 Bonn

Bundeskartellamt

Kaiser-Friedrich-Straße 16

53113 Bonn

Ordering address | Contact

Bundesnetzagentur für Elektrizität, Gas,

Telekommunikation, Post und Eisenbahnen

Referat 615 - Marktbeobachtung, Monitoring Strom/Gas, SMARD

Tulpenfeld 4

53113 Bonn

monitoring.energie@bundesnetzagentur.de

www.bundesnetzagentur.de

Tel. +49 (0)228 14-5999

Fax +49 (0)228 14-5973

Bundeskartellamt

Arbeitsgruppe Energie-Monitoring

Kaiser-Friedrich-Straße 16

53113 Bonn

energie-monitoring@bundeskartellamt.bund.de

www.bundeskartellamt.de/

Tel. +49 (0)228 9499-555

Fax +49 (0)228 9499-400

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