Bundesnetzagentur

20 years
of responsibility
for networks

Annual Report 2017

Networks for the future

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The Bundesnetzagentur placed special emphasis on the area of consumer protection in 2017. We were able to help consumers with issues relating to their contracts or supplier switching both for telecommunications and for energy. We disconnected numbers and consistently issued fines.

We took action against surveillance devices like the Cayla doll and children's watches with an eavesdropping function. Electronic devices that were unsafe or caused radio disturbance were removed from the market on a large scale, as shown in a touring exhibition detailing our market monitoring activities.

We defined the deviations in broadband speed that from our point of view are in breach of contract, helping consumers to assert their rights. Through our Transparency Ordinance, we are playing an important role in ensuring that information on contract terms and conditions is standardised and up-to-date.

There was also an increase in postal complaints, usually due to problems in the delivery of letters and parcels. Our dispute resolution services for telecommunications and post were in high demand.

The President and Vice Presidents of the Bundesnetzagentur
Dr Wilhelm Eschweiler, Jochen Homann and Peter Franke (from left to right)

»We are driving the development of concepts to determine the contribution that regulation can make to the gigabit society, thus to the provision of fibre connections and 5G mobile communications.«

Again, in 2017, through our numerous decisions, we were able to play a part in ensuring competitive, efficient and user-friendly infrastructure in the network sectors.

When doing so, the Bundesnetzagentur placed special emphasis on the area of consumer protection right from the very start of the year. Most conspicuously, we have disconnected telephone numbers, consistently issued fines, and taken devices out of circulation that are not permitted.

We have been able to remove large numbers of products from the market, including surveillance devices, such as the Cayla doll, children's watches with an eavesdropping function, and electronic products that cause radio disturbance or offer insufficient protection against electric shock or fire. Examples of these are on display in the Market Monitoring's touring exhibition starting in the summer, which will be at our stand in Mainz on the Day of German Unity (Tag der Deutschen Einheit).

Our radio monitoring and inspection service is deployed to provide radio protection and secure communication at major events, such as the Tour de France – this also helps our work to become better known.

In internet broadband we have defined the deviations in speed that from our point of view are in breach of contract. By providing these definitions, and with the aid of our broadband speed test and apps, we are helping consumers to assert their rights.

In addition, through our transparency ordinance, we are playing an important role in ensuring that information on contract terms and conditions is standardised and up-to-date.

Overall, the volume of consumer enquiries and complaints has risen sharply again this year. This meant we were able to help consumers with issues relating to their contracts or supplier switching both for telecommunications and for energy. There was also an increase in postal complaints, usually due to a lack of letter delivery but primarily also for parcels, which was most probably caused by the boom in online retail sales.

As a consequence, our dispute resolution services for telecommunications and post were in high demand. Telecommunications regulation this year was again about access to the local loop. The right environment was created for companies to be able to fulfil the roll-out obligations for vectoring that they themselves had committed to.

At the same time, we are driving the development of concepts to determine the contribution that regulation can make to the gigabit society, thus to the provision of fibre connections and 5G mobile communications.

»The result of the first auction for offshore wind energy was a pleasant surprise. For the first time, bids for the generation of renewable electricity were awarded at market prices, thus without any additional support.«

We are currently discussing flexibility in fibre regulation and have commenced preparatory work on making the frequencies needed for 5G available. We intend to promote 5G standardisation through an open exchange platform.

Broadband deployment will also be driven forward by the decisions of our new ruling chamber, which has been set up as the national dispute settlement body in accordance with the Digital Networks Act. The ruling chamber has already made decisions that have achieved a balance between the interests of co-deployment and shared use.

The comprehensive range of data in our infrastructure atlas will also aid broadband rollout.

In the field of energy, the result of the first auction for offshore wind energy was a pleasant surprise. For the first time, bids for the generation of renewable electricity were awarded at market prices, thus without any additional support. The auctions for onshore wind energy and photovoltaic installations also led to a further decrease in award prices. We auctioned power from combined heat and power plants (CHP) for the first time and successfully. For the electricity market, we have given the public a useful tool in the form of the SMARD electricity market data platform, which has been met with widespread interest and support.

Important milestones have been reached in grid expansion for the approval of the major transmission line projects. The Bundesnetzagentur has held scoping conferences throughout the entire country for the DC corridors, comprising the underground cables that will transport electricity from the north of Germany to the south, as well as for numerous other projects, and has published the tasks of the transmission system operators still necessary for our decisions in its scopes of assessment.

The postal markets are undergoing considerable change at the moment. Although the growth in digital technology primarily offers space for innovation and new concepts, at the same time it puts traditional business models under pressure. We have been closely following the developments in the market and have pressed ahead with public discussion on the possible legal framework.

As regards rail, the newly-added ruling chamber has commenced work in accordance with the Rail Regulation Act. In addition to numerous smaller processes, it dealt with train path price approvals. In summer, conditions will be set out for the base

level and upper limit of costs vis-à-vis DB Netz AG and other undertakings. Together with numerous other proceedings on access to infrastructure, this will promote competition on the tracks.

Based on this performance, we consider the Bundesnetzagentur to be following the right path to its 20-year anniversary in 2018!

Jochen Homann
President of the Bundesnetzagentur

»We are closely following developments on the postal market. The growth in digital technology offers space for innovations and new concepts, yet at the same time it is putting traditional business models under pressure.«

ENERGY

Important tasks for the energy transition

As well as monitoring competition in the energy market, the Bundesnetzagentur also performs important tasks relating to the implementation of the energy transition. Auctions for renewable energy installations facilitate efficient capacity expansion and the network development plan is the basis of appropriate network expansion.

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The approval process for the important north-south lines SuedostLink and SuedLink are in full swing. All the relevant scoping conferences were held last summer. By the end of the year it was possible on this basis to publish all the scopes of assessment with further tasks for transmission system operators. Important milestones in the approval process were thus completed successfully.

The auctions for renewable energy installations by the Bundesnetzagentur have proven successful. They have released medium and long-term cost-cutting potentials which will result in a reduction in funding.

This is good news for all electricity consumers who contribute to funding renewable energy through the renewable energy surcharge.

Market watch

The amount of electricity generated in Germany from renewables has risen once again while generation from conventional sources of power continues to fall.

The 2017 Network Charges Modernisation Act is the beginning of the end of network charge avoidance. As a result, network charges have remained largely stable for household customers.

Electricity market

Development of conventional and renewable electricity generation

Net electricity generation across the whole of Germany increased in 2016 by 6.0 TWh to 600.3 TWh. Verified figures for generation outside the public power supply networks were not available for 2017 at the time of going to press. Electricity generation from non-renewable energy sources increased by 5.6 TWh in 2016. The volume of electricity generated in gas-fired power plants increased significantly in 2016 after several years of falling generation volumes (+18.2 TWh or 37.7%) once again reaching its 2012 level. In contrast, the volume of electricity generated from all other non-renewable energy sources fell. Nuclear power stations generated 6.8 TWh less electricity (–8.0%). Generation from black coal power plants fell by 2.7 TWh (–2.6%). Lignite-fired plants generated 2.1 TWh less electricity (–1.5%).

The share of renewables in gross electricity consumption in 2016 was 31.2%. Given the ongoing construction of additional capacity and a relatively windy year in 2017 in comparison with 2016, onshore wind energy installations may be expected to have generated more electricity; however, verified figures are not yet available. Offshore wind energy generation increased by 3.9 TWh.

2016 and 2017 were marked by further expansion of generation from renewable energy sources. Total generation capacities rose in 2016 to 212.0 GW. Of this 107.5 GW was non-renewable and 104.5 GW renewable energy capacity. Generation capacities increased most strongly for onshore wind power (4.2 GW) and solar power (1.5 GW). Verified figures for 2017 were not available at the time of going to press.

Household customers: Supplier diversity, supplier switching, network charges and prices

Supplier diversity and supplier switching among household customers

In the year 2016, final consumers were able to choose from an average of 130 electricity suppliers in their network area. Household customers have switched electricity suppliers much more frequently since 2006. The number of switches reached a new high of about 4.6m in 2016, up by around 595,000 on the previous year's figures. In addition, almost 2.4m household customers switched contracts with the same supplier.

In 2016, a relative majority of 40.9% of household customers were on non-default contracts with their regional default supplier. The percentage of household customers on default contracts stood at 30.6%, 28.6% of all household customers are now served by a supplier other than their regional default supplier. There was a corresponding increase in the percentage of customers who no longer have a contract with their default supplier.

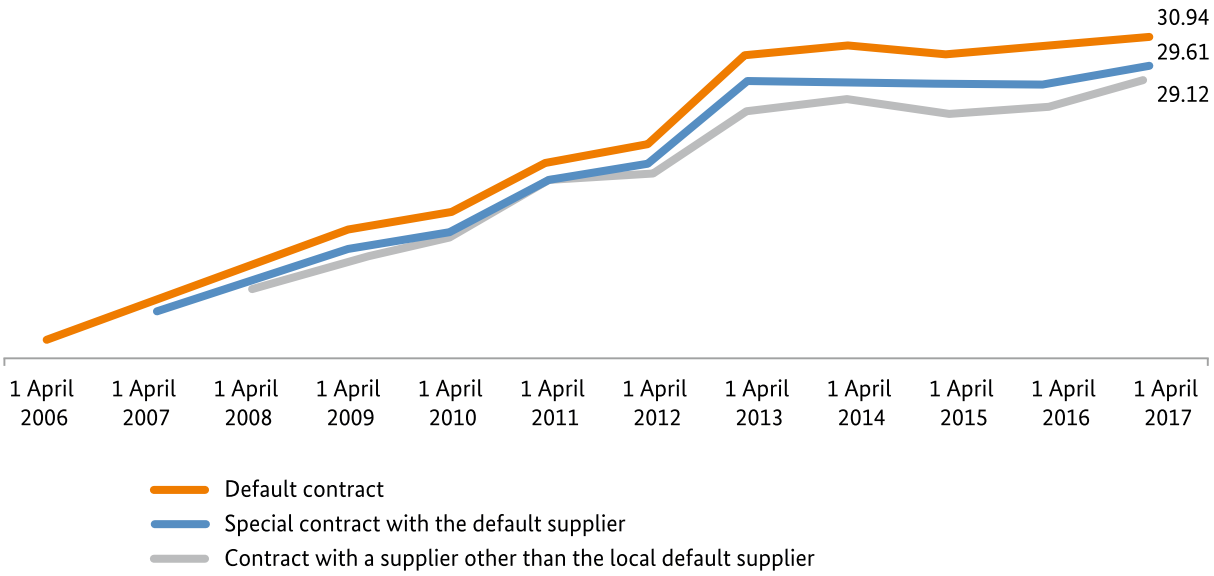
Network charges for household customers

The Network Charges Modernisation Act (NeMoG), which came into effect in 2017, includes measures designed to slow down the rate at which network charges are going up. For example, the NeMoG provides for the gradual elimination of avoided network charges for wind power plants and photovoltaic installations as well as their restriction for all other embedded generation plant ("avoided network charges" are payments by network users to embedded generation plant operators who receive these amounts in addition to the revenue from sales of electricity; see below: "Price setting under the Network Charges Modernisation Act"). The impact of the NeMoG on network charges in 2018 is already becoming apparent. A random sample-based evaluation of notifications by grid system operators carried out by the Bundesnetzagentur shows that distribution system operators recorded a substantial reduction in costs for avoided network charges in 2018 as a result of the NeMoG. As a result, network charges have remained largely stable for household customers. In the TenneT and 50Hertz control areas, average volume-weighted network charges fell by around 7% and 11% respectively, while they increased in the TransnetBW and Amprion control areas by around 4% and 2%. This stable development in DSO charges is noteworthy bearing in mind that upstream network costs at the TSO level for TenneT, TransnetBW and Amprion have risen – in some cases, quite considerably. The average volume-weighted network charges in the household customer area rose between 1 April 2016 and 1 April 2017 by almost 9% (+0.59 ct/kWh) to 7.30 ct/kWh.

Electricity prices for household customers

The electricity prices for household customers rose slightly in 2017 in all three contract categories. The following graph shows the change in household customer prices for all three types of supply contract. A weighted average price has been calculated for all three types of supply contract to ease comparison. In the consumption band between 2,500 kWh and 5,000 kWh this increased by 0.06 ct/kWh or 0.2% compared to 2016 and was 29.86 ct/kWh on 1 April 2017.

Development of household customer electricity prices per type of contract in the consumption band between 2,500 kWh and 5,000 kWh per year (previous years: consumption of 3,500 kWh/a)
in ct/kWh



Common German-Austrian electricity market
The Bundesnetzagentur and the Austrian energy regulatory authority E-Control signed a common framework for the introduction of a congestion management scheme for the exchange of electricity at the border between Austria and Germany on 15 May 2017. This will come into effect on 1 October 2018. Long-term capacity of at least 4.9 GW will be made available for exchanges from Germany to Austria. The practical implications of this agreement for consumers is that wholesale electricity prices in Germany and Austria will no longer be identical in every one of the year's 8,760 hours, but will deviate from each other for a few hours at a time.

Congestion management needs to be introduced because the transmission networks in Germany, Austria, Poland and the Czech Republic are not technically capable now, and according to scientific projections will not be fully capable even after expansion of the network, of transporting all the electricity traded between Germany and Austria.

At the present time, transmission system operators have to carry out expensive redispatch actions to stabilise the network. Without congestion management, there would be no change in the situation as network expansion would never be able to fully satisfy exchange requirements at this point.

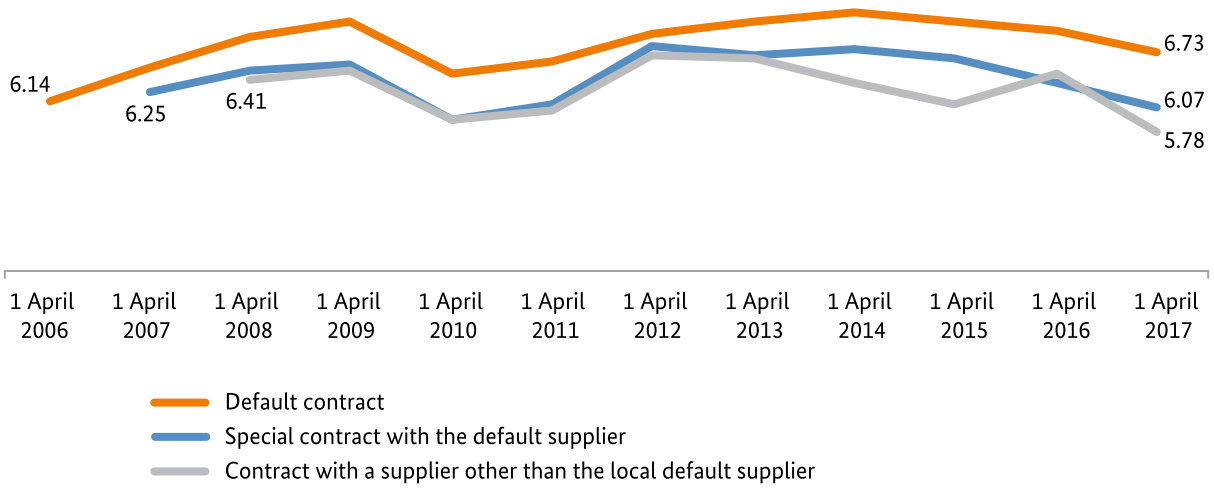
The relevant regulators, market players and network operators are all very closely involved in this process. Joint discussions are focusing on integrating the German-Austrian border in central European flow-based market coupling.

Gas market

Developments in the gas market
In the year 2016, final consumers were able to choose from an average of 90 gas suppliers in their network area. The number of household customers who switched supplier rose significantly yet again, by over 330,000 supplier switches to a new high of over 1.5 million. In addition, almost 780,000 million household customers have changed the energy supply contracts they have with their suppliers.

The majority of household customers are supplied under contracts with default suppliers on non-default terms. Just under a quarter of household customers use default supply. The percentage of household customers who have a contract with a supplier other than the regional default supplier once again increased and now stands at just below 26%.

Development of household customer gas prices per type of contract in the consumption band between 5,556 kWh and 55,556 kWh per year
in ct/kWh



On 1 April 2017, the average volume-weighted network charge for household customers was 1.50 ct/kWh, and is therefore unchanged from the previous year. The age structure of individual networks, in particular, has an impact on charges. More recently built networks have higher residual values, which increases specific capital costs and in turn leads to higher charges. As a result of their greater depreciation, older networks have lower residual values and therefore lower capital costs, thus in turn leading to lower charges.

The gas prices for household customers fell again in 2017 in all three contract categories. The following graph shows the change in household customer prices for all three types of supply contract. A weighted average price has been calculated for all three types of supply contract to ease comparison. Compared to 2016, this price fell in the consumption band between 5,556 kWh and 55,556 kWh by 0.39 ct/kWh and was 6.15 ct/kWh on 1 April 2017.

Merger of gas market areas: integration into a nationwide gas market area in Germany by April 2022

The Bundesnetzagentur completed its dialogue with the market on the further development of German gas market areas in spring 2017. In its published conclusions[1] the Bundesnetzagentur rated the development of German market areas as generally good. While the Bundesnetzagentur identified continuing development potential in the medium to long-term term trading horizon, it nonetheless takes the view that market players still have sufficient hedging options available, particularly owing to the liquid spot markets in the NCG and GASPOOL market areas, and access to the neighbouring liquid trading point TTF. The economic benefits of integrating the two German market areas were not expected to be very great and it was emphasised that there should be no deterioration in the capacity situation.

With the amendment of section 21 of the Gas Network Access Ordinance (GasNZV) in August 2017 the Federal Government has imposed the requirement on gas transmission system operators to form a single market area from the two existing market areas by 1 April 2022 at the latest. The Federal Government's goal is to establish uniform reference prices for all Germany's natural gas customers, to strengthen the German gas market by increasing liquidity and take account of future European developments, which could also involve the long-term emergence of a cross-border market area with German involvement.

[1] https://www.bundesnetzagentur.de/SharedDocs/Downloads/DE/Sachgebiete/Energie/Unternehmen_Institutionen/HandelundVertrieb/Gasmarkt/SchlussfolgerungenMarktdialog2017.pdf;jsessionid=3BCEC018EDF982D2D9F09BB9F1DBB1F0?__blob=publicationFile&v=3

Grid expansion and security of supply

The trend towards somewhat lower costs for all network and system security measures in 2016 was clearly not continued in 2017. In the long term, only grid expansion will help to avoid these costs.

Expansion of transmission system – establishing requirements

There is a broad consensus for Germany to gradually phase out nuclear energy by the year 2022. The German government's energy policy also envisages an incremental increase in the share of power derived from renewable sources. The changed power generation structure this transition entails calls for rapid and extensive development of the network infrastructure.

Germany has set itself the goal of covering at least 80% of its electricity requirements from renewable energy by the year 2050. This requires the construction of extensive renewable energy generating facilities. The energy produced in this way needs to be fed into the electricity grid and transported from the location where it is generated to the place where it is consumed. The functions of the transmission network are also being transformed by the phasing out of nuclear energy and by the European internal energy market. The existing extra-high-voltage network was not designed for these tasks. It is already at the limits of its capacity.

Since 2011, the Bundesnetzagentur has engaged in a regularly recurring procedure designed to establish requirements (known as the network development plan, NDP) and is responsible for the official proceedings for extra-high voltage grid expansion projects crossing national or federal state borders which follow. The expansion of offshore network connections for offshore wind farms is governed by the offshore network development plan (O-NDP). The O-NDP determines the number and chronological order of the required connection lines.

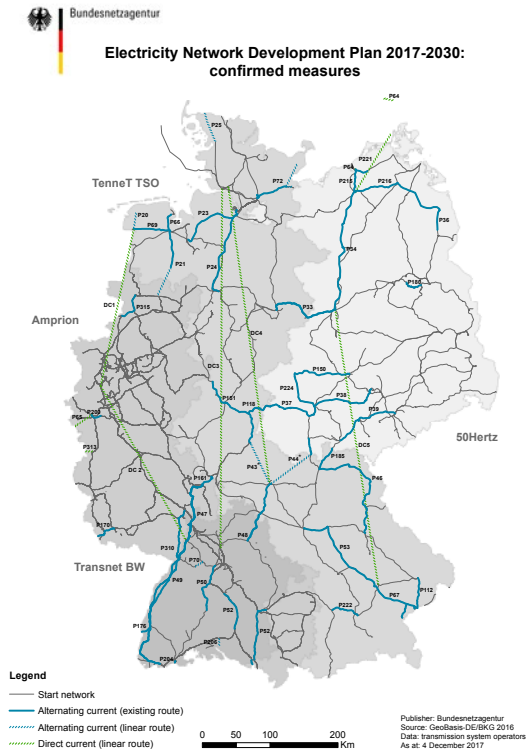
The NDP 2017-2030 completed in the year under review shows what the electricity grid would need to look like in 2030 to enable secure, economic and environmentally-friendly energy to be produced and to achieve the goals of expanding renewables.

The transmission system operators submitted their revised drafts for the NDP and the O-NDP 2017-2030 on 2 May 2017. The Bundesnetzagentur reviewed the second draft and published it with its own draft environmental report and provisional evaluation on 4 August 2017. Over 15,000 responses were received by the Bundesnetzagentur during the subsequent consultation involving both authorities and the general public.

The Bundesnetzagentur confirmed the NDP and the O-NDP 2017-2030 on 22 December 2017. 96 of a total of 165 onshore measures proposed by the transmission system operators during the procedure were con-

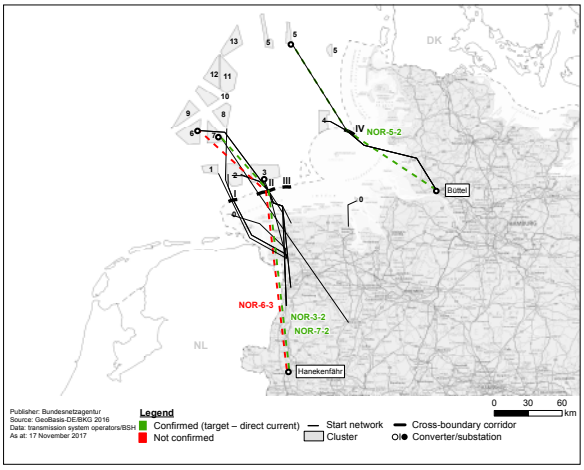
firmed. The Bundesnetzagentur has also confirmed nine ad-hoc measures which will be taken promptly to meet the network congestion problems which are anticipated following full phase out of nuclear power in 2023. These measures will benefit all network users by reducing congestion management costs.

Projects confirmed in NDP 2017-2030 (excluding point measures)

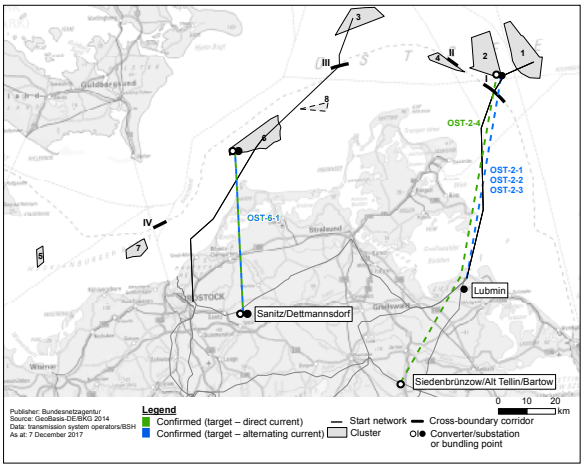


In the Offshore NDP 2017-2030 the Bundesnetzagentur confirmed two more transmission links each in the North Sea and Baltic Sea for the period 2026 to 2030. Together with the transmission links already confirmed in previous offshore network development plans, there are now a total of five transmission links in the Baltic Sea and three in the North Sea. These are the projects NOR52, NOR-3-2 and NOR-7-2 (North Sea) and OST21, OST22, OST23, OST-2-4 and OST-6-1 (Baltic Sea). These transmission links will foster the development of geographically-linked offshore wind farm areas (clusters) defined in the Federal Offshore Plan produced by the Federal Maritime and Hydrographic Agency (BSH). The O-NDP also defines a series of single links, the time at which they are commissioned and their planned completion dates.

O-NDP 2017-2030 projects in the North Sea



O-NDP 2017-2030 projects in the Baltic Sea



In the future, the need for transmission links will no longer be determined in a separate O NDP, but in an onshore NDP which in turn is based on the determinations of the Site Development Plan (for the first time with the NDP 2019-2030). The Site Development Plan will be produced for the first time in 2019 by the BSH in agreement with the Bundesnetzagentur. Amongst other things, the Plan stipulates the order in which areas in the North Sea and Baltic Sea will be made available by the Bundesnetzagentur for auction for wind parks which are planned to be commissioned after 2026. The plan also defines completion dates for the transmission links which will be needed for the development of these areas.

Grid expansion

Federal sectoral planning

The 16 projects identified in the Federal Requirements Plan Act as crossing national or federal state borders are subject to federal sectoral planning. The Bundesnetzagentur is responsible for these projects. The objective of this process is to obtain significant public involvement in finding routes that impact the least on people and the environment. These 500m to 1,000m wide corridors are where power lines will run in the future. In contrast to spatial planning procedures, the outcome of federal sectoral planning is legally binding for the following planning approval procedures. Detailed information about the procedure is available at: *www.netzausbau.de/5schritte/bundesfachplanung/de* and in our Federal Sectoral Planning brochure *www.netzausbau.de/publikationen*.

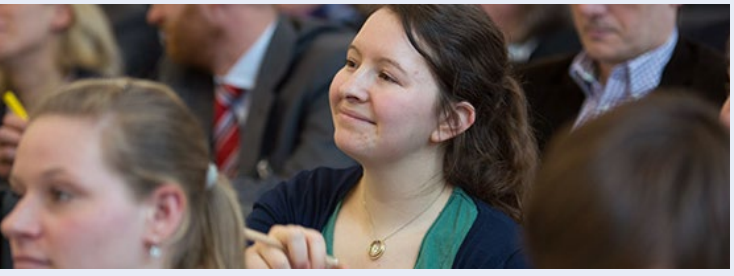
The status of the Federal Requirements Plan Act (BBPlG) projects which are currently in the federal sectoral planning procedure are summarised in the following. Detailed information about the status of the expansion projects is available on the website at *www.netzausbau.de/vorhaben* for each project.

Project no. 2 BBPlG (Ultranet)

The project promoters Amprion and TransnetBW have applied for federal sectoral planning under section 6 Grid Expansion Acceleration Act (NABEG) for sections of the project. The Bundesnetzagentur has defined the scope of assessment for all of the five sections. Section 8 NABEG documentation is available for three sections. This was established as being complete for one section and the procedures for the involvement of public authorities and the general public initiated under section 9 NABEG.

Scoping conferences successfully completed for SuedLink and SuedOstLink

The large SuedLink and SuedOstLink direct current lines will be used in future to transport electricity from Germany's windy north to the south of the country where more electricity is consumed. Priority will be given to transporting this electricity through underground cables. Commissioning is planned for 2025.



At the outset of a comprehensive public participation, six scoping conferences were held between May and July 2017 for the SuedOstLink and eleven scoping conferences for the SuedLink along the routes proposed by the transmission system operators. The participants from public authorities and associations as well as the interested general public provided a wide range of information in a constructive atmosphere, for example on straight lines and soil protection. The results of public participation will help the Bundesnetzagentur to define an environmentally and spatially compatible 500m to 1,000m wide route corridor that has the least possible impact on people and the environment. Underground cables can only be laid within this corridor.

Project no. 3 and 4 BBPlG ("SuedLink")

TenneT und TransnetBW have submitted section 6 NABEG applications for project 3 in five sections, and for project 4 in four sections. The Bundesnetzagentur has held scoping conferences for all sections and defined the scopes of assessment.

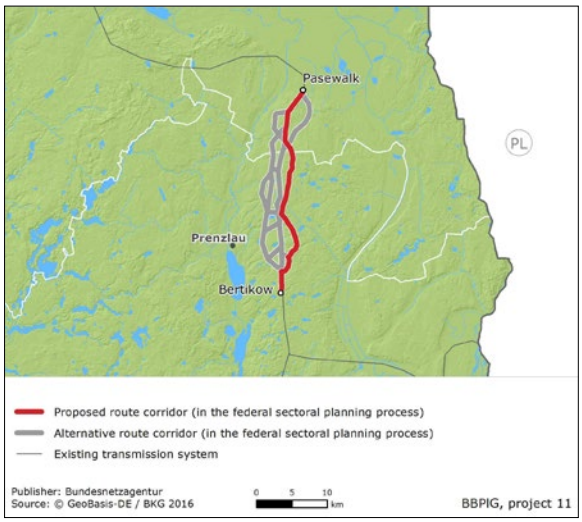
Project no. 5 BBPlG (Wolmirstedt–Isar)

The project promoters TenneT and 50Hertz have submitted joint applications for federal sectoral planning under section 6 NABEG for sections of the project. Scoping conferences have been held for all four sections and the Bundesnetzagentur has defined the scopes of assessment.

Project no. 11 BBPlG (Bertikow–Pasewalk)

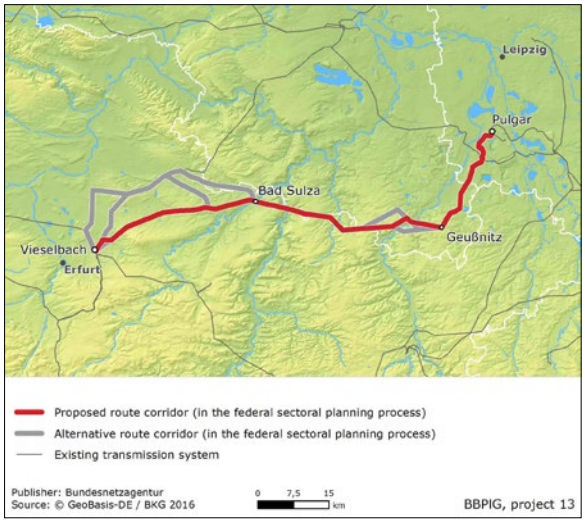
The Bundesnetzagentur defined the scope of assessment after holding the scoping conference. After submission by project promoter 50Hertz of the section 8 NABEG documents the Bundesnetzagentur established that they were complete and initiated procedures for the involvement of public authorities and the general public under section 9 NABEG. Under section 10 NABEG, the Bundesnetzagentur holds hearings to consider any objections which have been raised in good time with the project promoter and

those who have raised them. The non-public hearing was held on 10 and 11 January 2018 in Torgelow.



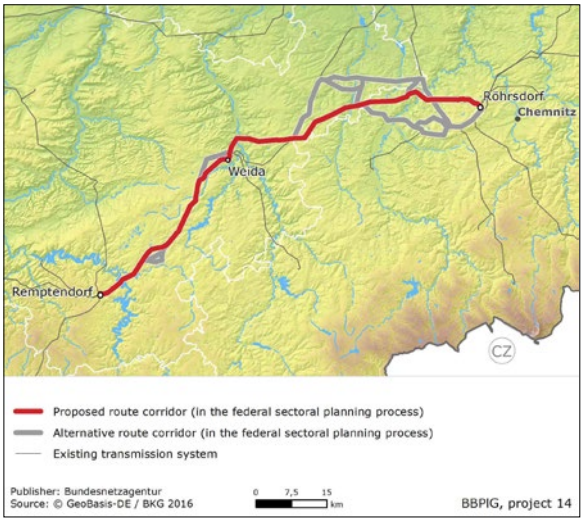
Project no. 13 BBPlG (Pulgar-Vieselbach)

The project promoter 50Hertz has applied for federal sectoral planning under section 6 NABEG for this project in four sections. The Bundesnetzagentur has held scoping conferences for three sections.



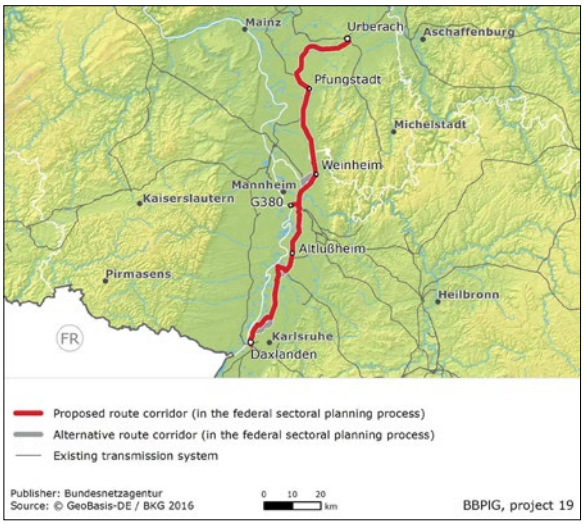
Project no. 14 BBPlG (Röhrsdorf – Weida – Remptendorf)

The project promoter 50Hertz has applied for federal sectoral planning under section 6 NABEG for this project in two sections. The Bundesnetzagentur has held application conferences for both sections and defined the study scope.



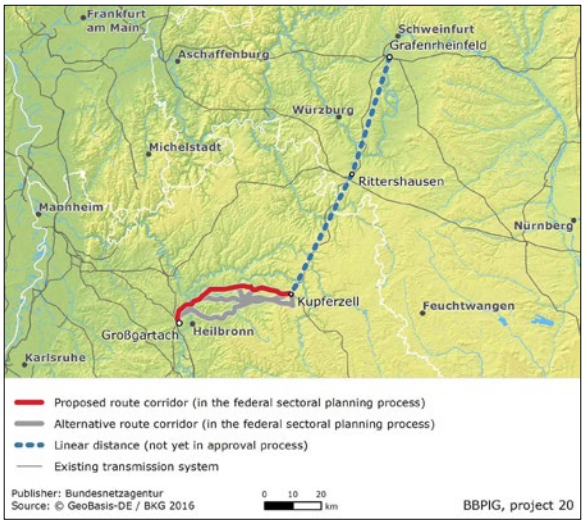
Project no. 19 BBPlG (Urberach – Pfungstadt – Weinheim – G380 – Altlußheim – Daxlanden)

The project promoters Amprion and TransetBW have submitted applications for federal sectoral planning under section 6 NABEG for sections of the project. The Bundesnetzagentur has already held a scoping conference for one of the three sections and has defined the scope of assessment. Applications for federal sectoral planning under section 6 NABEG have been made for the other two sections and are currently being checked for completeness.



Project no. 20 BBPlG (Grafenrheinfeld – Kupferzell – Großgartach)

The project promoters TransnetBW and TenneT have submitted applications for federal sectoral planning under section 6 NABEG for sections of the project. The Bundesnetzagentur has already held a scoping conference for one of the three sections and has defined the scope of assessment. The Bundesnetzagentur is expecting applications for the other two sections in the first quarter of 2018.



Monitoring the status of projects under the Power Grid Expansion Act (EnLAG) and the Federal Requirements Plan Act (BBPlG)

The Bundesnetzagentur documents the status of projects under the EnLAG and the BBPlG every quarter on its website at *www.netzausbau.de/vorhaben*.

Current status of EnLAG projects

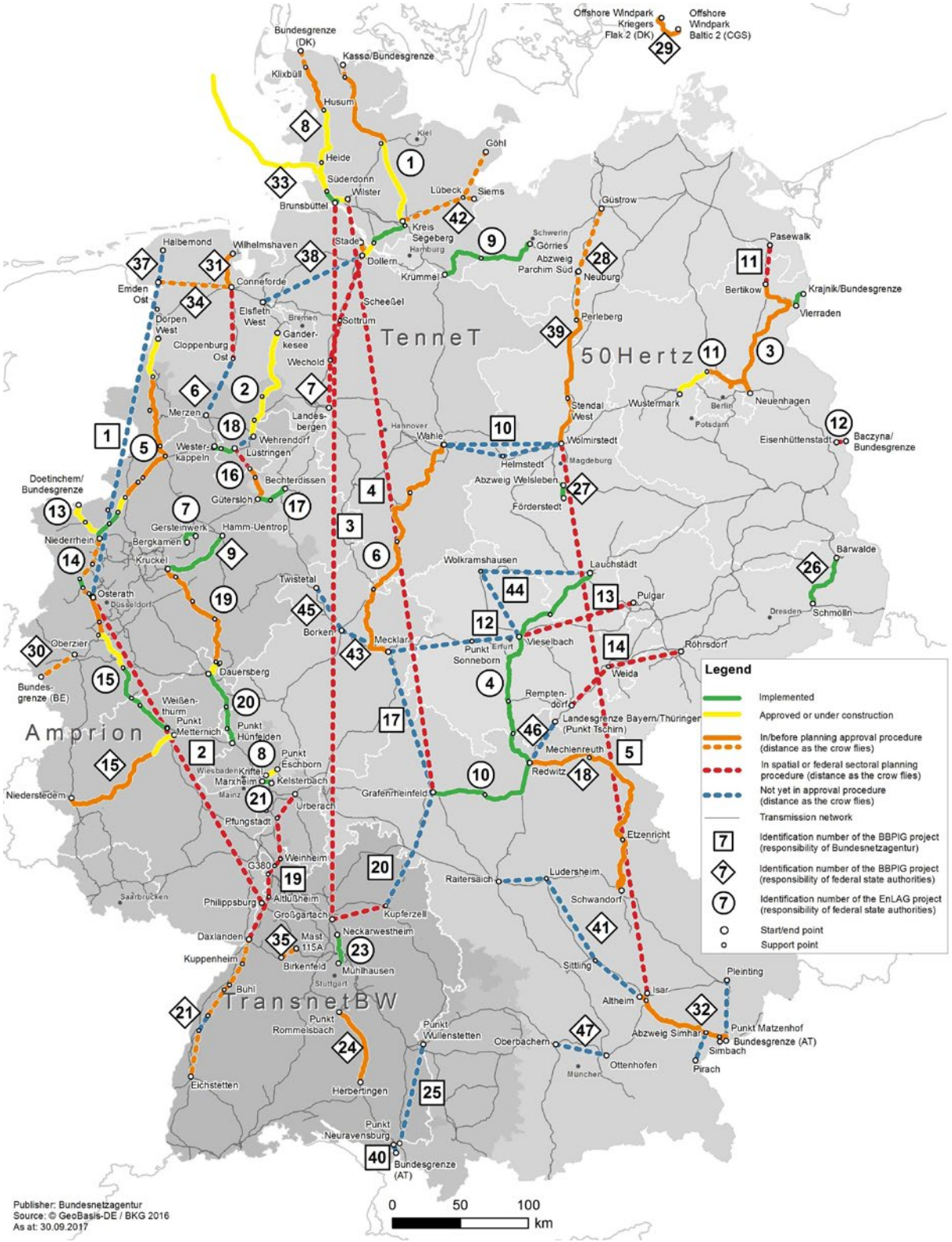
The lines detailed in EnLAG currently have a total length of around 1,800 km. Around 1,000 km of this length have been approved, of which approximately 750 km have been completed (around 40% of the total length). Another 600 km or so are currently at the spatial planning or planning approval stages. The TSOs expect around 45% of the kilometres of line provided for by the Power Grid Expansion Act (EnLAG) to be completed by the end of 2017. To date, none of the projects with pilot routes for underground cables has gone into full operation. Currently, the first 380-kV underground cable pilot project is underway in Raesfeld.

Current status of BBPlG projects

The lines detailed in the Federal Requirements Plant Act currently have a total length of around 5,900 km. Around 3,050 km of these are categorised in the network development plan as reinforcement measures. The total length of power lines will be largely determined by the route of the new direct current project linking the north and south of Germany. The route this project takes will become apparent in the course of the procedure. By the third quarter of 2017 approximately 450 km of the total route of around 5,900 km will be approved and around 150 km completed.

The following map shows the expansion status of EnLAG projects and BBPIG procedures as in the third quarter of 2017:

Power Grid Expansion Act and Federal Requirements Plan Act projects in the third quarter of 2017.



Participation and dialogue
The Bundesnetzagentur wishes to make the grid expansion process transparent for the general public. The Bundesnetzagentur goes beyond its statutory obligations and organises information and dialogue events as well as conferences on methods to improve transparency and the necessary acceptance of grid expansion.

The fifth science dialogue, which will be held in Bonn on 12 and 13 October 2017, will also provide a platform for the exchange of scientific views.

The consultation for the network development plans for the target year of 2030 by Bundesnetzagentur was accompanied by five information events. The aim of these events was to promote open dialogue on the required grid expansion and its anticipated environmental impact.

The Bundesnetzagentur provides a broad range of information about grid expansion from several sources, including on its website *www.netzausbau.de*, in films on grid expansion on YouTube, its newsletter, Twitter posts and brochures/flyers. Our grid expansion public liaison service can be contacted by post, by email, fax or by telephone by anyone who has questions or proposals relating to grid expansion.

Network and system stability: redispatch and feed-in management

The transformation of the electricity generation landscape places high demands on grids. Although the planned grid expansion takes account of these changes, it cannot keep pace with the rapid expansion of renewable energy installations. In addition, the large number of such installations now means that particular weather effects, such as storm fronts or long periods of strong sunshine, can result in high peak feed-in. This is also why so many more measures have been taken in recent years to maintain the security and reliability of the electricity supply system. Redispatching involves measures to intervene in the market-based operating schedules of generating units to shift feed-in geographically in order to take pressure off those elements of the grid which are under strain. In addition, feed-in management is used to temporarily curtail the priority feed-in of electricity from renewable energy and CHP installations if network capacities are not sufficient.

About one quarter less electricity was redirected in 2016, either through redispatch or feed-in management, compared to 2015. Unfortunately, this trend has not continued into 2017. Following an initial estimate, which has already been published by the transmission system operators 50Hertz and TenneT, the costs for the entire network and system stability in these two control zones have again risen to €1.2bn, ie are back to the high level of 2015. The information available to the Bundesnetzagentur for quarters I to III 2017 confirms this trend.

In the period from the first to the third quarter of 2017 a total of 10,120 GWh was redispatched. According to estimates produced by the transmission system operators, the costs of these measures amounted to €301.9m. Total unused energy resulting from feed-in management in the first three quarters of 2017 amounted to 3,209 GWh. The estimated compensation payments claimed by installation operators for this period amounted to €334m.

The information obtained from reports on redispatching and feed-in management measures are published every quarter at *www.bundesnetzagentur.de/systemstudie*.

Summary of measures (GWh)	1st quarter	2nd quarter	3rd quarter	4th quarter	total
	2015: 3,329	2015: 1,811	2015: 3,336	2015: 6,961	**2015: 15,436**
Redispatching (reduction + increase)	2016: 3,895	2016: 1,939	2016: 1,452	2016: 4,189	**2016: 11,475**
	2017: 5,548	2017: 2,546	2017: 2,026	2017: n/a	
	2015: 1,135	2015: 737	2015: 815	2015: 2,036	**2015: 4,722**
Feed-in management (reduction)	2016: 1,542	2016: 534	2016: 551	2016: 1,134	**2016: 3,743**
	2017: 1,412	2017: 1,363	2017: 434	2017: n/a	

Grid reserve, systemically relevant power plants and calls for expression of interest

On 28 April 2017, the Bundesnetzagentur published its assessment of reserve power plant requirements for the winter of 2017/2018 and the year 2018/2019. The assessment confirmed the results of the system analysis which was submitted to the Bundesnetzagentur in April 2017 by the four German transmission system operators in compliance with the Grid Reserve Ordinance (NetzResV). The reserve requirements analysis performed by the TSOs determines the measures which are needed to guarantee the secure and reliable operation of the grid.

It is usually the transport of electrical energy from sources in northern Germany to the main centres of consumption in southern Germany and Austria which is problematic. If there is not enough power plant capacity available on the market to rectify congestion in the system, the TSOs have to obtain deficit redispatch capacity from reserve power plants. For this purpose the TSOs establish the annual demand for reserve capacity during the entire period under review, taking account of requirements previously defined by the Bundesnetzagentur.

The Bundesnetzagentur then reviews, assesses, and publishes the outcome of this needs analysis in report form. The report for 2017/2018 identified 10,400 MW of required reserve capacity. 3,700 MW will be needed in 2018/2019. This reduction follows from the plan to introduce congestion management at the German-Austrian border on 1 October 2018.

Following the notification of planned closures received by the Bundesnetzagentur by 1 November 2017, approval has so far been given for 15 systemically relevant power generation units with a total capacity of 3,695 MW to be included as part of the grid reserve to ensure system stability. This enables the Bundesnetzagentur to ensure system stability by prohibiting the closure of systemically relevant power plants. These are now classified as backup power plants. Seven power plants with a total capacity of 2,947 MW, for which the operators had applied for temporary closure, have also been identified as systemically relevant for grid operations by the TSOs. These are now also backup power plants and are reserved for the exclusive use of TSOs.

The national reserve power plants are supported by contracted reserve power plants abroad. The key factor determining specific demand for foreign power plants in the grid reserve is the existing potential of national power plants in the grid reserve and the location of power plants in other countries. The greater the decongesting impact of the power plants offered as part of the call for expression of interest, the lower the total value that needs to be contracted.

Higher levels of security are now required for the operation of the transmission system, in part due to the amendment of the Reserve Power Plant Ordinance (now the Grid Reserve Ordinance). As a result, additional foreign grid reserve plants with a capacity of 1,725 MW were required for the winter 2017/2018 in addition to the 3,096 MW of foreign capacity already procured under contract by the TSOs. The procurement process, which was closely monitored by the Bundesnetzagentur, was concluded by mid-September 2017.

The costs for the grid reserve for the period from 2011 to 2016 amounted to around €678m and included the costs for reserving grid reserve plants and their deployment costs in Germany and other countries. The Bundesnetzagentur launched a total of 30 proceedings to determine grid reserve costs in 2017. Some of these proceedings also related to previous periods.

Special technical grid equipment (section 11(3) EnWG)

The four TSOs sent their report on the "Requirements for grid stability power plants under section 13k German Energy Industry Act (EnWG)" to the Bundesnetzagentur on 16 February 2017. The Bundesnetzagentur has evaluated the identified requirements for the construction of "around 2 GW" capacity to ensure grid stability under the old legal rules. Grid stability power plants are helpful in meeting the special challenges which will arise in the period between closure of the last nuclear power plants and completion of the major DC routes. On 31 May, the Bundesnetzagentur confirmed, under the legal rules applying at the time, that it considered the construction of new grid stability power plants appropriate in order to restore the security and reliability of the electricity supply system following decommissioning of 1,200 MW of generating capacity (corrective redispatch) needed to operate the transmission system. A decision has not been made on the location of these power plants.

The original version of section 13k EnWG was replaced in July 2017 by the new section 11(3) EnWG. Power plants which are now referred to as “special technical grid equipment” may only be used for corrective redispatch, that is to restore secure operations after important generation installations have been taken off the grid. Loads may also qualify as special technical grid equipment. The TSOs are now only required to submit analyses to the Bundesnetzagentur in which they demonstrate the need for special technical grid equipment; the Bundesnetzagentur will no longer perform a formal assessment or issue formal confirmation. The TSOs must also submit a procurement concept to the Bundesnetzagentur. This concept must describe the way in which the TSOs aim to procure the plant.

The procurement concept will be produced by the TSOs in close consultation with the Bundesnetzagentur and is scheduled for completion by early 2018.

Load increases in the network expansion area under section 13(6a) EnWG

In February 2017, the Bundesnetzagentur launched the procedure for determining a so-called voluntary "Use, don't curtail" commitment (FSV NSA) under section 13(6a) EnWG. This enables TSOs to contract with CHP installation operators in a "network expansion area" for the reduction of active power feed-in while continuing to supply electrical energy to maintain heat supplies. The aim is to avoid feed-in management measures (FIMM) in the network expansion area and, at the same time, to make new redispatch potential available.

The commitments entered into by the three TSOs affected (TenneT, Amprion and 50Hertz) were submitted to public consultation on 23 August. On the basis of the published responses, the TSOs were required to adjust their voluntary commitments. These were submitted by the TSOs again in December 2017 and the procedures were approved in January 2018 (procedures regulation).

Under the voluntary commitments a power plant is suitable for the economic and efficient elimination of congestion if the savings obtained from the avoided FIMM are projected to cover at least the required investment costs forecast over the five-year period following commissioning (terms of the contracts). This means that an across-the-board efficiency approach – ie one not related to grid costs – is adopted. This comprehensive efficiency approach takes no account of any redistribution effects (generated, for example, by additional network charges, surcharges, taxes and levies) which would be compensated by the TSO. This procedure is described in more detail in the voluntary commitment. This ultimately permits the TSOs to contract load increases as appropriate.

Gas network development plan

Gas NDP 2016–2026
The Bundesnetzagentur issued its request for modifications to the gas network development plan (NDP) 2016-2026 on 27 July 2017, thus confirming 112 of the 122 expansion measures proposed by the TSOs. These measures include a pipeline extension of 822.6 km and a compressor expansion of 429 MW with an investment volume of approximately €3.9bn. These confirmed measures mostly involve conversion from low-calorific L-gas to high-calorific H-gas and the connection of new storage facilities and gas-fired power stations.

The TSOs' expansion proposals also include five measures with an investment volume of €462m directly related to the planned Nord Stream expansion. The Bundesnetzagentur considered these measures to be too uncertain at the time of decision to be included in the NDP. They will therefore only be incorporated in the NDP when approval for the construction of the Nord Stream expansion has been granted by the responsible German authorities.

Three of the measures proposed by the TSOs do not yet have the degree of specification required for confirmation and must therefore be removed from the NDP. The TSOs themselves now consider two further measures to be no longer necessary and these will therefore be deleted.

The Bundesnetzagentur has also ordered the TSOs to incorporate a planned measurement and control system in the NDP as well, as the Bundesnetzagentur argues that it fulfils the legal criteria for a needs-oriented NDP measure.

The TSOs have complied with the request for modification and published the now binding Gas NDP 2016-2026 on 16 October 2017.

2017 Implementation Report
On 31 March 2017 the gas TSOs published the first gas NDP implementation report, which was the subject of consultation by the Bundesnetzagentur.

The TSOs reported on the commissioning of the Black Forest Pipeline, the expansion of the compressor in Scharrenstetten as well as on the first completion of conversion to H-gas in the Walsrode/Fallingbostel area. The MONACO 1 pipeline from the Austrian border to Munich is delayed owing to right-of-way negotiations and the late conclusion of the approval procedure.

The market participants want reporting to be more detailed in the future by, for example, including milestones in project planning, explanations for delays and, above all, information about the scheduling of capacity provision.

Gas NDP 2018-2028; first step: scenario framework
The scenario framework includes all the information which is relevant to the anticipated development of gas demand and supplies as well as the expected development of the required gas transport capacities in Germany, in this particular case for the period to 2028. The TSOs use the scenario framework to model the gas NDP 2018-2028.

The Bundesnetzagentur confirmed the scenario framework for the gas network development plan 2018-2028 on 12 December 2017 after a consultation with the market by the TSOs.

Modelling of the NDP will for the first time include a German LNG terminal at Brunsbüttel, along with the results of the more-capacity auction in which shippers were able to book the planned transport capacities provided by the Nord Stream expansion on a long-term basis.

One important focus of the scenario framework is security of supply. An innovation in this context is the proposal by the TSOs to perform an analysis of gas storage levels with regard to security of supply. The TSOs will also examine what network expansion measures would be needed if the TENP I Pipeline were to be out of operation for a longer period of time. Maintenance work is currently being performed on this gas pipeline, which is an important line of supply for southern Germany. The Bundesnetzagentur has ordered the TSOs to open this variant to public consultation as well.

In contrast, the TSOs do not wish at this time to include the merging of the two German gas market areas on 1 April 2022, arising from the amendment of the Gas Network Access Ordinance (GasNZV), in their modelling of the gas NDP 2018-2028. They argue that rational modelling requires that a common capacity model should first be developed.

The confirmation given by the Bundesnetzagentur is for a more transparent and plausible NDP. As an example, the individual expansion measures illustrated in project profiles and the associated maps are to be revised.

Consumer protection and advice

About 15,000 queries and complaints were sent to the energy consumer advice service last year. Key consumer concerns were billing, concealed price increases, delays in supplier switching and contractual disputes. More enquiries were also received concerning the introduction of modern metering equipment and smart meters. SMARD stands for electricity market data and is the Bundesnetzagentur platform for greater transparency in the electricity market.

Energy consumer advice service

The energy consumer advice service which the Bundesnetzagentur set up in 2011 is the central information source for energy consumers and provides private households information about their rights, action they can take and on general energy issues. The energy consumer advice service received around 15,800 queries and complaints in 2017, slightly more than in the previous year. Around 8,550 queries were received by telephone, 6,750 by e-mail and 500 by letter.

Complaints largely concerned billing, concealed price increases, delays in supplier switching and contractual disputes. Enquiries relating to the grid connection, network charges and changes in energy prices were also received.

Around 400 complaints were also received last year concerning unlawful telephone marketing. The telecommunications department is responsible for dealing with these offences. Consumers also had diverse questions concerning energy supply and contractual obligations.

Many more enquiries were received on the introduction of modern metering equipment and smart meters and the Bundesnetzagentur responded mid-year with an extensive presentation and FAQs list, particularly concerning mandatory installation, costs and data privacy (*www.bnetza.de/smartmeter*).

Tenants can now also obtain information about the new landlord-to-tenant electricity models supported under the Renewable Energy Sources Act (EEG) since mid-2017 (*www.bnetza.de/mieterstrom*).

Unfortunately, the Bundesnetzagentur found that information was often not provided about companies' obligation to participate in the free dispute resolution process offered by Schlichtungsstelle Energie e.V. in Berlin; the Bundesnetzagentur therefore demands that changes be made in this respect.

Increasing competition in the energy market requires greater transparency and more consumer information. Electricity labelling on advertising material and invoices to final consumers is therefore a necessary contribution to improved consumer protection. The Bundesnetzagentur issued more notices to companies

in 2017 concerning their designation obligations under the EnWG and, in the event of violations, has called for electricity labelling to be changed accordingly; to date all the companies contacted have complied.

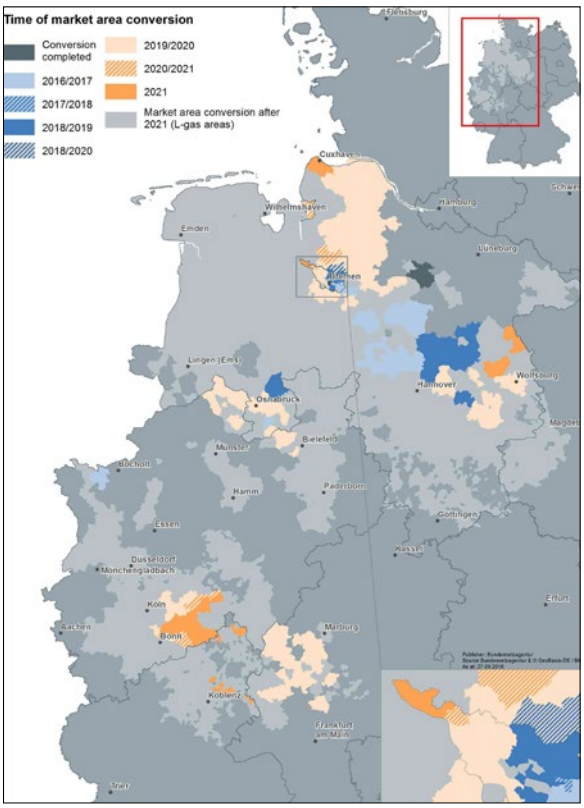
Conversion from L-gas to H-gas

Market area conversion, ie the changeover from L-gas to H-gas, will be a large-scale project for gas suppliers in Germany over the next decade. The areas of northern and western Germany which are currently supplied with L-gas will need to convert to H-gas as domestic production of L-gas declines and less is imported from the Netherlands. Current projections are for L-gas imports to Germany from the Netherlands to cease on 1 October 2029. The new natural gas supply infrastructure affects around four million households, businesses and industrial customers with an estimated 4.9m gas appliances. These appliances will need to be adapted step by step in the years up to 2029.

The market area conversion of German L-gas networks got off to a successful start in Schneverdingen in 2015. More distribution networks have been successfully converted since. In this connection, the Avacon Hochdrucknetz and Westnetz are important distributors between the transmission systems and municipal utilities and supply these and other municipal utility companies with gas. According to Open Grid Europe and Gasunie Deutschland Transport Services GmbH, a total of 22,000 appliances had been fully converted on schedule by April 2017. A further 92,000 appliances will need to be converted by the end of 2017. The number of appliances which will need to be converted each year will rise rapidly in the years ahead.

The adjustments are carried out in three steps. First of all, the service provider compiles a list of all appliances burning gaseous fuels in each household to find out how many are connected directly to the gas network. On the basis of data from this list, the project management team plans and schedules the adjustments to gas appliances. The next step is for all appliances to be adjusted. This generally requires the appliance's nozzles to be replaced. In the final step of the conversion process, 10% of appliances are inspected again to monitor quality.

The Bundesnetzagentur map shows the areas which will be converted by 2023; the entire L-gas area is shown in light grey hatching.



All German gas customers have been invoiced equally for the market area conversion costs since the beginning of 2017. Consumers will therefore not be required to pay any additional costs for the conversion of their appliances. The Gas Appliances Reimbursement Ordinance (GasGKErstV) gives owners of gas appliances an additional right to reimbursement, with retroactive effect from 1 January 2017, if their appliances must be replaced.

The responsible contact for consumers is always the local network operator. The Bundesnetzagentur recommends that affected gas customers take action as early as possible. Network operator websites provide information which is helpful for planning and estimating the time required as well as on other issues.

The Bundesnetzagentur has been informing household customers since 2015 with FAQs on this issue (*www.bnetza.de/marktraumumstellung*). Consumers will also find links here to their local gas network operators. On average, these webpages were used by over 3,000 consumers a month in 2017 – a figure which is growing steadily.

The Bundesnetzagentur organised the second information and discussion event (market area conversion forum) with the gas industry and consumer representatives in 2017. This event will be held again in Bonn in 2018.

Electric vehicles/charging stations

Electric vehicles

In an electricity market characterised by overcapacity, there is sufficient electrical energy available to develop electric mobility in Germany. Whether this remains the case depends on the energy policy framework.

Transfer of energy to the charging station, however, is a challenge for the distribution networks. Unusually large capacity will be required if, in the future, a large number of people in a particular residential area return home from work at about six in the evening and all want to charge their electric vehicle at the same time. This could be a problem for low-voltage networks; they are not designed to cope with such stresses and, if there is a high local concentration of charging infrastructure, networks could be pushed to their capacity limits.

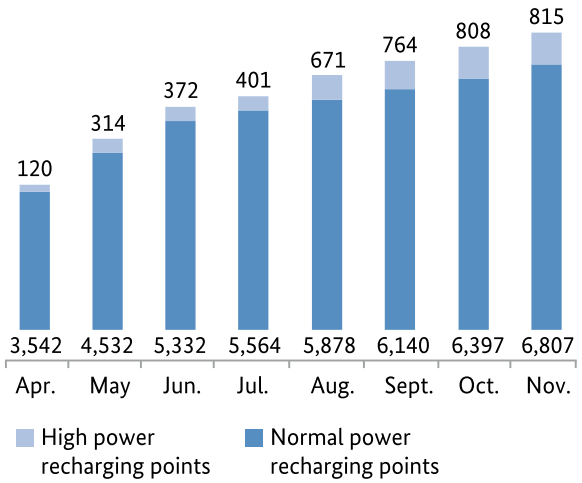
It is therefore very important for network operators to have sufficient information about the construction of private charging infrastructure. For this purpose, the distribution network operators should already be using the facilities available to them in the network connection conditions. Only if the additional loads are recognised will network operators be able to take the right measures. In addition, all charging stations will, like renewable energy generation installations, need to be fitted with control equipment which provides network operators with the technical means necessary to respond to critical situations. A mechanism also needs to be discussed which will allow adjustments to be made for the benefit of the network and which enables charging to be distributed over time and coordinated to provide individual car drivers the easiest possible charging facility. This will not do away entirely with the long-term need to expand the grid to accommodate eMobility, but it will bring about sensible reductions in this need.

If electromobility were to take off rapidly in an uncontrolled fashion, and if drivers were entitled to charge their vehicles in their own driveways, the integration of relatively controllable loads in the low voltage network would require significant expansion of the grid. That would be expensive. However, costs can be limited if electromobility is integrated in the low-voltage network intelligently. Of course, smart charging control which avoids grid expansion would also cost money. The control technology for the charging facility would be paid for by the provider of the charging station, however, and should not be paid for by all the other network customers. Incentives to make charging behaviour compatible with the network by means of higher or lower network charges will not work. This would be too inconvenient and would not be viable for individual drivers. A sensible incentive for restricting grid expansion appropriately might be put in place when connecting the charging facility itself: The desired charging capacity could be notified to the network operator who would then make a charge accordingly. This instrument is known as a building cost subsidy and is already familiar to electricity customers.

Charging Station Ordinance

Operators of publicly accessible charging points in Germany must notify the Bundesnetzagentur of the installation and shutting down of such points. Notification must be given of normal charging points as well as rapid chargers with more than 22 kW charging capacity which go into operation after the Charging Station Ordinance comes into effect. Charging equipment will be inspected to ensure it complies with technical requirements and the charging points comply with the Charging Station Ordinance. An interactive map of electric vehicle charging stations in Germany was published on the Bundesnetzagentur's website in April 2017 to enable consumers to see where charging stations are currently located in Germany (*www.bundesnetzagentur.de/ladesaeulenkarte*). This map includes the charging stations of all operators which have successfully completed the notification procedure and agreed to publication of the charging points. In order to provide consumers with as much information as possible, the Bundesnetzagentur also publishes the location of charging stations which are not subject to the Charging Station Ordinance but which have been voluntarily registered. The map is updated regularly and shows the precise locations and technical features of the illustrated charging stations. The map also shows distribution and concentration of registered charging stations across German states and districts. A datasheet, which provides the information shown on the map in table form, is also published every time the interactive map is updated. These data can be freely used by anyone. The following chart shows the increase in the number of normal charging points and rapid chargers shown on the map since it was first published in April 2017.

Number of published charging points



Start of SMARD

SMARD stands for electricity market data and is the Bundesnetzagentur platform for greater transparency in the electricity market. SMARD enables users to collate information about generation, consumption or data on electricity trading and system stability, nearly in real time, and to create their own graphs.

The Bundesnetzagentur's *www.smard.de* website has been online since the beginning of July. The system gives users a good overview of the data relevant to them on electricity generation and consumption as well as market and system stability. SMARD offers data categories on each topic and these data categories can be combined as individual graphs with just a few clicks.

As the electricity market is complex, the Bundesnetzagentur has embedded the data in an editorial framework. The "Electricity market topics" and "Electricity market explained" sections provide interesting information and useful knowledge for users with little previous experience.

The "German electricity market" section of SMARD provides a broad overview of Germany's electricity landscape and presents current electricity market figures transparently. There is also a map with all the power plants which participate in the German electricity market with a nominal capacity of at least 10 MW. Basic power plant data is provided with – where they exist – photographs of particular plants. Feed-in time series per production unit are also available for power plants with a nominal capacity of over 100 MW.

There is also an easy-to-use page on which all the data published in SMARD can be downloaded for further analysis.

SMARD creates added value for interested citizens as well as users who already have extensive knowledge of the electricity market and the stakeholders in the world of business, research and science.

Court proceedings regarding the publication of rulings by the Bundesnetzagentur

The second ordinance amending the Incentive Regulation Ordinance (ARegV) of 14 September 2016 makes changes to section 31 ARegV and expands the scope of data which must be published. This amendment enhances transparency for the interested public and also makes the cost elements of network costs easier to understand. The Bundesnetzagentur – and some federal state regulatory authorities – have notified network operators that they will publish the data referred to in section 31 ARegV on their websites. Some network operators have lodged objections to publication arguing that such data constitute operational and business secrets and that the Energy Industry Act (EnWG) does not provide a legal basis for the amendment of section 31 ARegV.

The Bundesnetzagentur's view is that the publication of data under section 31 ARegV is covered by the powers granted by the EnWG and that such data do not constitute operational business secrets. This view has been confirmed by the interim injunctions of a total of six higher regional courts. Only the Brandenburg higher regional court ruled otherwise in its summary proceedings.

In their proceedings in the main action, the higher regional courts of Schleswig and Düsseldorf have already ruled in favour of transparency. An appeal has been lodged with the Federal Court of Justice. The data of network operators which have not lodged a complaint or whose summary petitions have been rejected are published and periodically updated by the Bundesnetzagentur on the internet at *www.bnetza.de/netzentgelttransparenz*.

Rulings, activities and proceedings

Since 2017, the Bundesnetzagentur has also carried out the renewable energy auctions for onshore wind farms, biomass and CHP plants. Initial findings point to a decrease in payments under the Renewable Energy Sources Act (EEG), which amounts to relief for electricity consumers.

The report on the evaluation of minimum generation comes to the conclusion that approximately one quarter of the peak power plant capacity in Germany does not respond or responds only weakly to prices at the electricity exchange. However, only a small part of that amount is attributable to the so-called minimum generation.

Auctions under EEG and CHP Act

The Bundesnetzagentur has determined the level of payments for renewable energy installations for solar power, onshore wind power plants and biomass under the EEG and the Offshore Wind Energy Act (WindSeeG). Additionally, the first auction for combined heat and power plants (CHP) under the CHP Act and the CHP Auction Ordinance (KWKAusV) was also carried out.

Photovoltaic installations: all photovoltaic installations with an installed capacity of more than 750 kilowatts must have placed successful bids in the respective auction in order to qualify for payments under the EEG. In this sector, three auctions with an auction volume of 200 MW each were carried out.

The bid volume was significantly oversubscribed for all rounds of auction. In 2017, 340 bids were submitted, with a volume of 1,888 MW. 90 of them were successful. The value of winning bids has fallen in each successive auction - to a volume-weighted awarded price of under 5 ct/kWh in the third round.

Onshore wind plants: since the beginning of 2017 payments for onshore wind plants have also been determined by auction. All onshore wind plants with an installed capacity of more than 750 kW must participate in such auctions. In 2017, three auction rounds with an auction volume of 2,800 MW were carried out. The Bundesnetzagentur received a total of 747 bids with a volume of 7,655 MW in 2017. Each of the auction rounds was significantly oversubscribed. There were 198 winning bids with a total awarded volume of 2,824 MW. Citizens' energy companies were particularly well represented in the auctions, and received over 90% of the awards respectively. The volume-weighted prices awarded, which are based on a reference location, decreased in the three auction rounds from 5.71 ct/kWh to 3.82 ct/kWh.

In December 2017 the Bundesnetzagentur issued a determination that lowers the highest bid price that can receive an award to 6.30 ct/kWh for the four auction rounds in 2018. This is in response to falling prices for wind power plants and is meant to ensure that the specific characteristics of the 2017 auctions, the extended period of implementation for so-called citizens' energy companies, does not lead to market distortions for the year 2018.

At the bidding deadline of 1 September 2017 the Bundesnetzagentur held the first auction for **biomass installations.** The auction volume was 122,446 kW. 33 bids with a total bid volume of 40,912 kW were submitted. Due to the high rate of exclusion of nearly 30% owing to formal errors in the bid documentation submitted (five bids) and failure to meet the requirements for participation (four bids), only 24 successful projects with a volume of 27,551 kW received awards. The average volume-weighted price for winning bids was 14.30 ct/kWh.

CHP installations: in late 2017 the Bundesnetzagentur held the first auction round for combined heat and power (CHP) installations. Of the 20 bids with a volume of 225 MW that were submitted, seven bids with a total volume of 82 MW received awards. Despite an auction volume of 100 MW, only 82 MW could be awarded, as the next successful bid would have significantly exceeded the total auction volume. The high level of competition enabled a volume-weighted award price of 4.05 ct/kWh. No bids had to be excluded.

First auction for offshore wind farms

In spring 2017, the Bundesnetzagentur held the first auction for transmission links and funding for existing offshore wind farms under section 26(1) of the Offshore Wind Energy Act (WindSeeG). Taking into account the auction volume of 1,550 MW and the location of the offshore wind farms in so-called clusters in the North and Baltic Seas, awards were made for four bids. The total awarded bid volume was 1,490 MW. All of the successful projects are located in the North Sea. The average winning bid price was 0.44 ct/kWh, which fell well below expectation. The winners of the auctions apparently expect to achieve additional significant cost reduction by the time the installations go into operation in 2025 – for example through learning effects or technological advancements – thus making an economical operation of the offshore wind farms possible without (or only with minimal) financial support. However, it must be considered that the transmission link of the successful projects is paid for by electricity consumers through the network charges and that the wind farms may be operated for a period of over 25 years.

Low award prices lead to decreasing payments under the EEG

On 13 April 2017 the Bundesnetzagentur for the first time held auctions for offshore wind farm transmission links and funding. Another auction round will take place on 1 April 2018.

Successful projects are entitled not only to funding under the Renewable Energy Sources Act, but also to transmission links – financed through network charges – and have the possibility to operate the wind farm for 25 years.

1,490 MW of a total available auction volume of 1,550 MW were awarded. There were four successful bids, which were awarded at an average rate of 0.44 ct/kWh. The highest bid value was 6.00 ct/kWh, although some bids were as low as 0.00 ct/kWh, which do thus not intend to claim payments. All of the successful projects are located in the North Sea.

In the second auction, at least 500 MW are to be awarded for projects in the Baltic Sea.

Following the introduction of auctions for photovoltaic installations, the entry into force of the Offshore Wind Energy Act on 1 January 2017 has now also made offshore wind farms subject to a competitive funding scheme. The level of payment is now no longer determined by legislation, but rather by competitive auctions. For offshore wind farms that will go into operation after 31 December 2020, the Bundesnetzagentur will determine by auction as per the bidding deadlines of 1 April 2017 and 1 April 2018 which offshore wind farms will be entitled to transmission links and how high the funding will be for electricity generated in these installations. The winning projects are the ones with the lowest bids.

Offshore pilot wind installation

Furthermore, the Bundesnetzagentur, in agreement with the Federal Maritime and Hydrographic Agency, has granted an application for recognition of an offshore wind installation as a pilot project. An offshore pilot wind plant represents an innovative test of a cutting edge and demonstrably significant technology. Offshore pilot wind installations are eligible for payments determined by the highest value resulting from the regular auctions. This exception is restricted to 50 MW of installed capacity per year.

Evaluation of minimum generation

For some time now the long-term goal of achieving CO2-free and non-nuclear electricity generation has called for far-reaching structural changes in Germany's energy generation system. Currently, during periods of very low or even negative electricity prices on the exchange, conventional power plants feed electricity into the grid even when there is no economic incentive. Such price configurations occur in particular during periods of high electricity feed-in from renewable energy installations combined with low electricity demand. The phenomenon is often referred to in the media as "phantom electricity". The Bundesnetzagentur has examined the phenomenon in its first report on minimum generation, which was published on 11 April 2017. The legal basis for this examination is section 63(3a) of the Energy Industry Act (EnWG).

The report comes to the conclusion that, at a total of 23 to 28 GW, approximately one quarter of the peak power fed into the grid in Germany, does not respond or responds only weakly to prices at the electricity exchange. However, only a small part of that generation is attributable to the so-called minimum generation. Minimum generation is the minimum amount of electricity that power plants must feed into the grid to ensure grid stability. In the relevant hours analysed in 2015, minimum generation was only between 3 and 4.5 GW (excluding the shares for reactive power and short circuit power). Most of the conventional electricity generation in the hours analysed is attributable to the "conventional generation base". This is between around 19 and 24 GW, or 80% to 86% of the electricity generated by conventional power plants in the hours analysed.

The Bundesnetzagentur intends to expand its analysis in its follow-up report for 2019, and will base its analysis on a broader range of data and take a more in-depth look at reasons for the insensitivity to price signals of feed-in from the conventional generation base.

Discussion paper "Reactive power provision for network operation"

Against the background of increasing amounts of embedded power generation, the increasing use of cables and its influence on the demand for reactive power in the networks, discussions are focusing more and more on the reactive power needed to maintain voltage stability. The need to comply with European regulations on grid connection specifications has given the issue of "reactive power" added significance and led to intensive discussion within the industry. The Bundesnetzagentur is therefore working on a position paper on reactive power in network operation, which is intended to contribute to the discussion by providing structure and direction. Explanations and assessments of the existing technical and economic aspects of reactive power will help develop a position on the current and future treatment of questions relating to the issue of reactive power.

Discussion paper "Flexibility in the electricity supply system"

With the paper "Flexibility in the electricity supply system", presented in spring 2017, the Bundesnetzagentur takes up this issue in order to structure the debate in the energy sector and highlight some of the key points from a regulatory perspective. In many points the paper deliberately distinguishes between a network-related and a market-related perspective.

Flexibility in the market

As the percentage of renewables in the electricity mix rises, the actors in the system need more flexibility in order to efficiently guarantee security of supply. Technology neutrality and the creation of a level playing field are needed for the competitive provision of flexibility. Intervention in the market in the form of new funding instruments would, by contrast, be counterproductive. Existing price distortions, resulting for example from premiums for fixed electricity consumption or privileged treatment of self-consumption, must be removed.

Flexibility in the grid

In the future, situations may increasingly occur where the existing network infrastructure at both transmission and distribution levels will not be sufficient to provide the required transport capacity in the grid. Reasons for this include the decentralised growth in renewables, the instrument of peak shaving, increasingly intensive interactions with other countries, the increase and decrease in conventional generation capacity and the load-side response to intermittent generation, and the growth of new, flexible consumption systems such as electric vehicles and heat pumps with high simultaneous loads. In nearly every case, network expansion remains the most viable solution. The use of grid flexibility to manage congestion, however, helps to reduce these pressures on the networks and make the market outcome achievable.

For these scenarios, the Bundesnetzagentur proposes approaches in the distribution network for discussion. These approaches involve a flexibility toolbox, from which network operators can choose the most appropriate tool to mitigate congestion in their network. Likewise, producers (curtailment of renewable and conventional installations), storage facilities and loads can each offer flexibility that benefits the grid.

The Bundesnetzagentur's discussion proposals, if they are to be feasible from a regulatory standpoint and have a prospect of success, require specific general conditions. These include stronger unbundling rules and a distinctly higher level of transparency regarding network situations and the flexibility instruments needed and used. It is also necessary to implement a proactive, efficient and well-ordered procedure for the grid flexibility measures used by distribution system operators, as well as for physical and economic balancing measures. The approaches assume the sustainability of large liquid markets allowing non-discriminatory trading in order to reduce congestion through grid expansion.

Following the publication of the discussion paper, the Bundesnetzagentur received a positive response and a large number of discussion requests. Since then, it has been engaged in an ongoing and intensive dialogue with associations and individual companies.

Cases of suspicion in wholesale energy trading

The Bundesnetzagentur has registered a total of 4,179 market participants in wholesale energy trading.[2] In its surveillance of wholesale energy trading with regard to insider trading and market manipulation, it receives information on suspicious activity by the participants of organised market places. These and other persons involved in professional transactions are required to notify the Bundesnetzagentur in the case of a suspected breach of the prohibition of insider trading and market manipulation. For this they use the European Notification Platform of ACER.[3] The Bundesnetzagentur follows up on these reports with investigations of its own.

The number of reported cases of suspicious activity has increased steadily between 2012 and 2017. This can be explained by the fact that those reporting cases of suspicious activity received clear guidance from ACER,[4] thereby establishing a clear procedure for reporting such cases. The Bundesnetzagentur has also intensified cooperation with the energy exchanges.

Altogether 40 reports of suspicious activity have been submitted so far, compared to 15 in 2017.[5] Of the 40 cases, 16 cases have been dropped, 14 cases are still being investigated, 10 of which with cross-border rele-

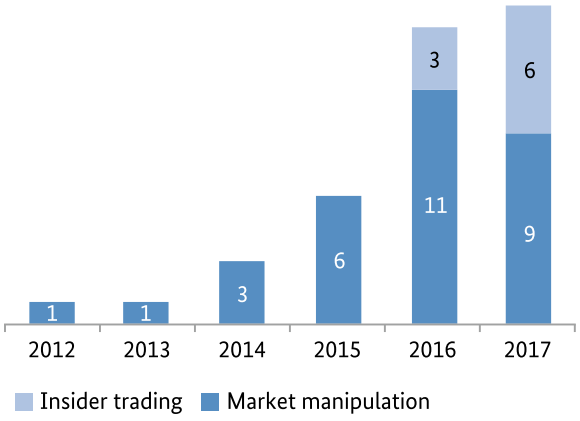
[2] As of: 31 December 2017
[3] https://www.acer-remit.eu/np/home
[4] http://www.acer.europa.eu/Official_documents/Other%20documents/4th%20Edition%20ACER%20Guidance%20REMIT.pdf
[5] As of: 31 December 2017

vance are being investigated in cooperation with the regulatory authorities of other EU Member States. In 2017, the Bundesnetzagentur initiated formal administrative fines proceedings against several participants.

While between 2012 and 2015 only cases of market manipulation were reported, since 2016 several cases of insider trading have also been reported. In some cases of insider trading, the suspicious activity pertains to transactions that were conducted prior to publication of, for example, power plant failures. Cases of market manipulation include actions in which orders are placed with no intention of executing them, or in which certain trading behaviour leads to the exclusion of other market participants. The Bundesnetzagentur is also investigating possible breaches of the prohibition of insider trading and market manipulation relating to the activity of market participants which, on 17 October 2017, led to very high prices in the use of tertiary reserve.

The following diagram shows the number of cases of suspected breaches reported between 2012 and 2017, divided into market manipulation and insider trading:

Number of reported cases of suspected breaches



Determination of base level to set the revenue caps for gas networks during the third regulatory period

The third regulatory period for gas distribution and transmission system operators began on 1 January 2018 and will last until 2022. In 2017, the Bundesnetzagentur carried out the cost examination according to the rules of the Gas Network Charges Ordinance (GasNEV) to determine the base level used to set the revenue caps for the gas network in the third regulatory period.

In total, 172 gas supply network operators under the Bundesnetzagentur's own or delegated responsibility were required to submit to the Bundesnetzagentur the documents required to set the base level. 82 network operators are taking part in the standard procedure and 90 are taking part in the simplified procedure. The aim of this cost examination was to calculate the gas network operators' necessary operating costs.

During the course of 2017, the Bundesnetzagentur set the base level for the revenue caps of the 82 gas network operators within the framework of the standard procedure as well as of the larger number of network operators within the framework of the simplified procedure.

Start of cost examination for electricity

On 1 January 2019, the third regulatory period for electricity network operators will begin. It will last five years. In 2017, the Bundesnetzagentur initiated the necessary preparations for setting revenue caps. To determine the base level used to set the revenue caps, the Bundesnetzagentur must carry out a cost examination according to the provisions of the Electricity Network Charges Ordinance (StromNEV). The results of the cost examination for distribution system operators also form the basis for efficiency benchmarkings, which are to be carried out starting in April 2018. The cost examination takes place according to section 6 ARegV in the second calendar year prior to the start of the regulatory period, based on the data of the last full financial year. 2016 is considered as base year. The network operators submitted the required data in the so-called standard procedure (including efficiency benchmarking) by 30 June 2017.

Within the framework of the cost examination, the Bundesnetzagentur examines the costs of 104 network operators taking part in the standard procedure. This includes the four TSOs responsible for one control area. The 100 DSOs included in this examination, together with the 99 DSOs under the responsibility of the regulatory authorities of the federal states who are also examined within the context of the standard procedure, form the base population for efficiency benchmarking. Furthermore, the Bundesnetzagentur examined 103 network operators within the context of the so-called simplified procedure. The further procedure to set the revenue cap will last until the end of 2018.

In summer 2017, based on the cost-relevant data received, the Bundesnetzagentur opened procedures for setting the annual revenue caps for the third regulatory period (electricity). In autumn 2017 the Bundesnetzagentur then established the survey of transmission system operators used to carry out the relative generic network analysis for the third regulatory period. The efficiency scores of the TSOs for the third regulatory period are determined by way of the relative generic network analysis method and not by way of an international efficiency benchmarking.

Approval of expansion factors and transfer of networks

On 30 June 2017, for the last time, electricity DSOs were able to apply for an adjustment of their revenue cap based on an expansion factor. The resulting adjustment of the revenue cap takes place on 1 January of the following year. In 2017, the Bundesnetzagentur received 94 applications for approval of an expansion factor in the electricity sector. From 2017 and the previous years, rulings were issued on a total of 195 applications for approval of an expansion factor.

On 30 June 2016, gas DSOs were for the last time able to apply for an adjustment of the revenue cap based on consideration of an expansion factor. Rulings were issued on a total of 50 applications from 2016 and the previous years.

When a new network operator takes over the electricity or gas networks within the framework of concession competition, the share of the revenue cap of the part of the network to be transferred must be appropriately set based on the application by the network operators involved. With the amendment of the 2016 Incentive Regulation Ordinance, a provision for network transfers was introduced that does not require a congruent application on the part of the network operators involved. If the network operators do not submit a congruent application, the regulatory authority will set the transferred share of the revenue cap ex officio as of the seventh month after grid operations begin. The new regulation also prescribes a calculation method for the event of an ex officio decision on the part of the regulatory authority. Accordingly, the share of the revenue cap for the second regulatory period is calculated based on the capital costs of the part of the network being transferred plus a lump sum for the remaining costs incurred for the part of the network being transferred.

For the second regulatory period, the Bundesnetzagentur received approximately 340 applications concerning transfers of revenue caps. By 2017, 281 applications were decided upon.

Gas network operators submitted 212 applications for network transfers for the years 2012 to 2016; of these 146 were decided upon, 112 in 2016.

Efficiency benchmarking for gas DSOs and TSOs

For the network operators taking part in the standard procedure, both those under the Bundesnetzagentur's own responsibility and those under the responsibility of the federal states, the cost examination was followed by efficiency benchmarking. This were carried out separately for DSOs and TSOs. The efficiency benchmarking procedures juxtapose the multi-faceted and complex supply services provided by the network operators with the necessary resources used. The network operators' supply services were represented by using various structural parameters. The determination of the resources used by individual network operators is based on the results of the cost examination previously carried out. Within the framework of model analyses, the relative cost efficiency of each individual network operator was determined by comparing the all DSOs or TSOs to each other. This serves to identify which network operator carries out the same supply services with the lowest costs.

One consortium of consultants was tasked to carry out each of the efficiency benchmarking procedures. Network operators and industry associations were consulted on methodology and parameter selection

within the framework of a presentation held at the offices of the Bundesnetzagentur. This consultation and the possibilities of commenting before and after the event ensured that the industry was always involved in the various stages of the efficiency benchmarking process.

For network operators taking part in the simplified procedure, a blanket efficiency score of 93.46% was determined based on the efficiency scores from the second regulatory period.

The revenue caps will be set in 2018. Regarding the determinations of the revenue caps of network operators taking part in the simplified procedure, initial decisions were sent out in 2017.

Determination of the general sectoral productivity factor for operators of gas supply networks

Under section 9(3) of the Incentive Regulation Ordinance, the Bundesnetzagentur is required to determine the general sectoral productivity factor (hereinafter: Xgen) before the beginning of each regulatory period for the entire duration of the regulatory period using state-of-the-art methods. The Xgen is a component of the revenue cap formula pursuant to Annex 1 of the Incentive Regulation Ordinance and serves as a corrective factor, since the consumer price index (CPI) used for the revenue cap naturally does not provide an exact reflection of network operators' cost price development. Through the simulation of competitive forces, the Xgen also allows potential increases in productivity during the course of the regulatory period to be passed on to network customers in the form of lower prices. Both are achieved by representing, in the Xgen, the development of the cost price in the energy sector compared to the overall economy using the so-called cost price differential factor and the development of the productivity of the overall economy compared to that of the energy sector.

The determination of the Xgen factor, taking into account data from network operators from all of Germany, must take place for a period of at least four years. The Bundesnetzagentur determines a separate nationwide value for electricity and gas supply networks. The expert opinion by WIK (Wissenschaftliches Institut für Infrastruktur und Kommunikationsdienste GmbH), commissioned by the Bundesnetzagentur, identified and assessed two suitable methods for determining the Xgen factor: the Malmquist and the Törnquist Index. The Malmquist Index uses data from the three efficiency benchmarkings in the area of gas networks, while the Törnquist Index uses data from the financial statements from the years 2006 to 2016 and calculates productivity changes based on an output-input calculation.

On 20 September 2017, the Bundesnetzagentur initiated the procedure for determining the general sectoral productivity factor for operators of gas supply networks for the third regulatory period (ref no: BK4-17-093). The affected market participants were given the possibility to comment by 8 December 2017 within the framework of consultations held from 12 October 2017, as well as follow-up consultations held from 24 November 2017.

In December 2017, there was still no final value for the general sectoral productivity factor based on calculations using the Malmquist Method. This is due to the lack of available data and thus of interim results for the third regulatory period, which are needed to calculate the final Malmquist value. After evaluating the comments submitted, the Bundesnetzagentur thus decided on 13 December 2017, by way of preliminary order, to set the general sectoral productivity factor for operators of gas supply networks in the third regulatory period at 0.49%. The preliminary order ceases to be effective as soon as the Bundesnetzagentur's final decision enters into force.

The Xgen factor for operators of electricity supply networks in the third regulatory period will be determined in 2018, after a corresponding survey for the Törnquist Index and the efficiency benchmarking for electricity are carried out.

Abuse proceedings on avoided network charges

In autumn 2017, the Bundesnetzagentur initiated two abuse proceedings. In the first case, RWE Generation SE is involved in a dispute with the distribution system operator Westnetz GmbH regarding a claim to avoided network charges for the coal-fired power plant Westfalen (Block E) in Hamm-Uentrop. The network operator is refusing to make payments. It must now be decided whether this form of feed-in is considered "embedded generation" that meets the conditions of section 18 StromNEV.

In another case, münsterNetz GmbH is demanding from Westnetz GmbH a simultaneous aggregation of multiple consumption points into one consumption point for the purpose of determining the annual load price ("pooling").

Pricing within the framework of the Network Charges Modernisation Act

In July 2017 the Network Charges Modernisation Act (NeMoG) took effect. Under this legislation, starting in 2019 the network charges of the transmission system operators will be gradually adjusted so that as of 1 January 2023 they will be at a uniform level throughout the country. The Bundesnetzagentur supported such a uniform pricing in its 2015 report on the network charges scheme. Details will be laid out in a separate ordinance that is yet to be issued.

Furthermore, the Network Charges Modernisation Act specifies that as of 2019 offshore connection costs are removed from network charges and financed through a nationally uniform surcharge.

Finally, the NeMoG provides for the gradual elimination of avoided network charges for wind and photovoltaic installations and restrictions for all other embedded generation facilities. As of 2018 the new reference basis for the calculation of avoided network charges for conventional power plants is the reference price list from the year 2016. The prices for avoided network charges were capped at the 2016 level. In establishing the reference price list, the costs for offshore grid connections and underground cables are also removed from 2016 network charges as costs that are not avoidable by distributed feed-in.

In the period of preliminary pricing by network operators, the Bundesnetzagentur encouraged the implementation of the reference price lists as of 15 October 2017 in order to minimise the need for price adjustments as of 1 January.

The avoided network charges for new wind and photovoltaic installations will be eliminated already as of 1 January 2018, and for new conventional power plants as of 1 January 2023.

The effects of the first step towards the removal of avoided network charges are already evident in the (preliminary) network charges for 2018, which the network operators published on 15 October 2017. Despite the in part significant increase in upstream network costs at TSO level, network charges for household and commercial customers in the low and medium voltage range have either remained largely stable or are even in sharp decline, depending on the control area. This is due in part to the declining costs for avoided network charges as a result of the NeMoG.

Notification by meter operators

Electricity network operators who in the future wish to continue metering operations as default meter operators for modern metering equipment and smart metering systems were required under section 45(3) of the Metering Act (Messstellenbetriebsgesetz – MsbG) to notify the Bundesnetzagentur of this by 30 June 2017. In addition to their intended function as default meter operators, they were required to provide information as to the meter points to be equipped with intelligent metering technology.

The notifications covered a total of 50.9 million meter points operated by 899 operators of public supply networks and networks categorised under section 110 EnWG as closed distribution networks. Of these network operators, only seven do not intend to continue activity as default meter operators for smart metering systems. 892 of them reported that, within the framework of their activities as default meter operators, they plan to install smart meters on a total of 6.5m units. Installation of smart technology is mandatory in the case of consumers with an annual consumption of over 6,000 kWh (65% of mandatory installation cases reported), power plants with an installed capacity of over 7 kW (18% of mandatory installation cases reported) and for controllable consumer devices, which under section 14a EnWG is eligible for payment of reduced network charges (17% of mandatory installation cases reported). In addition to the mandatory installation cases, an optional installation commitment was reported for 44.5m meter points. This is the case when the consumer's annual consumption is 6,000 kWh or less, and the installed system capacity does not exceed 7 kW.

Approvals within the framework of the European network codes and guidelines in the electricity sector

In the year under review, the Bundesnetzagentur issued a number of approvals based on European regulations in the electricity sector, which are now fully in effect. In addition to the regulations that already entered into force in 2015 and 2016, including the regulations establishing guidelines on capacity allocation and congestion management (CACM) and forward capacity allocation (FCA), the regulations establishing network codes on requirements for grid connection of generators (RfG), on demand connection (DCC) and on requirements for grid connection of high voltage direct current systems and direct current-connected power park modules (HVDC), in 2017 the regulations establishing guidelines on electricity transmission system operation (SO) and on electricity balancing (EB) and establishing a network code on electricity emergency restoration of the transmission system entered into effect.

In addition to providing support in developing the modalities and methods to be approved, the focus of the Bundesnetzagentur's activities was on the approval necessary – at national, regional and union level – of the proposals developed by the TSOs or nominated electricity market operators (NEMOs) according to individual regulations. In accordance with the deadlines of the regulations, the Bundesnetzagentur must issue a ruling within two or six months of submission of the respective application for approval.

With regard to the FCA regulation, the Bundesnetzagentur approved the TSOs' proposals on the requirements for a single allocation platform as well as for sharing the costs of establishing, developing and operating the single allocation platform (SAP proposal), the regionally specific annexes to the Harmonised Allocation Rules (HAR) for long-term transmission rights, adopted by ACER on 2 October 2017, as well as the design of long-term transmission rights of the capacity calculation region CORE.

With regard to grid connection regulations, in 2017 the Bundesnetzagentur published the criteria for granting exemptions to the grid connection requirements for certain systems under the RfG, DCC and HVDC regulations. Furthermore, the power-generating modules of five manufacturers were classified as "emerging technology" in accordance with the RfG regulation. The regulation contains provisions that largely exempt recognised "emerging technologies" from the regulation's set of requirements.

Standardised terms of contract for the marketing of loads as system balancing energy

Demand-side management can enable larger consumption facilities to supply system balancing energy in the form of secondary control power or tertiary reserve. If the supplier of balancing energy is not also the energy provider or balancing group manager for the respective consumption point, however, the implications of supplying system balancing energy on the energy supply contract must be taken into consideration. This is the case with so-called third-party aggregators, for example. Third-party aggregators collect the flexibility of several installations and market it together. There had so far been no standards in place regulating the implications for energy supply contracts; from a market standpoint, this represents a significant barrier for the marketing of loads as balancing energy.

Based on a proposal developed by industry associations at the suggestion of the Bundesnetzagentur, the Bundesnetzagentur has now established standard terms of contract for supply contracts when loads are marketed as balancing energy. These standard contract terms are meant to give consumption facilities easier access to the balancing energy market, while at the same time removing distortions of competition for both balancing energy providers and electricity suppliers. This determination gives the companies sufficient leeway to adjust the contractual provisions to their specific needs and to develop them further. Under the Electricity Network Access Ordinance, however, suppliers can also exclude the provision of balancing energy by way of an explicit agreement.

The standard terms of contract for supply contracts apply to market communication, balancing group settlement as well as supply and payment obligations. The determination does not regulate the terms of marketing balancing energy itself, such as pre-qualification of the installations, for example. These are laid out in the corresponding framework agreements of the TSOs, which must apply in a non-discriminatory way to all suppliers of balancing energy.

Göttingen conference on the digitisation of the energy industry

Within the framework of the Bundesnetzagentur's cross-sectoral work on digitisation, the annual scientific conference on energy held in Göttingen was focused on the digitisation of the energy sector. Digitisation affects all actors in the industry, from transmission and distribution system operators to traders, suppliers and energy service providers, to industrial and household customers. New opportunities and challenges are emerging for individual market participants, as well as for the function of the energy supply system as a whole. At the same time, it must be determined to what degree there is a need for regulatory framework adjustment. The conference was therefore divided into three thematic blocks focusing on the specific, foreseeable impacts of digitisation, on the design and function of markets, information security and on the resilience of a digitally linked energy supply system and the regulatory instruments of unbundling and cost regulation.

In keeping with the conference's aim to facilitate a better mutual understanding of the current significance of digitisation for individual actors and processes in the energy business, experiences from outside of the energy sector were also incorporated into the event.

In addition to panel discussions, three expert forums were held for a more in-depth look at the following topics: 1) Blockchain technology: What can this technology really do for the energy economy?; 2) Changes in company management in the energy industry, in particular for network operators – What will be more efficient, what will be more expensive?; 3) Development of new products as exemplified by the housing sector and neighbourhood solutions, where there are very real synergies coming about between the electricity, heating and mobility sectors.

The 2018 Göttingen conference on current issues in the energy industry took place on 14 and 15 March 2018 and dealt with auctions as an instrument of energy regulation. At the time of publication, details of the conference programme were not yet available.

International cooperation

Again in 2017, the Bundesnetzagentur's international cooperation activities focused on the implementation and implementation monitoring of the gas network codes and guidelines.

The Bundesnetzagentur also provides advisory support to the Federal Government in the implementation of the integration of the European internal energy market.

European internal energy market – implementation tasks

Grid connection

The network codes relating to grid connection must be applied as of mid-2019. Until then, the TSOs and DSOs must draw up minimum technical requirements for the connection to their networks, taking into account the specifications of these network codes. The Bundesnetzagentur supervises compliance with minimum technical requirements and, in exceptional cases, issues exemptions in accordance with specifications provided for in the network codes.

Balancing energy (electricity balancing GL)

Within the framework of the guideline on electricity balancing, the TSOs must develop harmonised rules for the cross-border exchange of balancing energy. Exchanges must be set up for, inter alia, secondary and tertiary reserve. The Bundesnetzagentur provides support for these developments and approves the modalities or methods submitted by the TSOs.

Capacity allocation and congestion management (CACM GL)

In 2017 the regulatory authorities and ACER issued approvals within the framework of the CACM GL. In this context, approvals were issued for the rules for the day-ahead firmness deadline, for the NEMOs' plan for establishing and carrying out the market coupling operator functions, for a common TSO network model, for the method for provision of generation and load data and for the distribution of the TSOs' congestion revenues. Together, all of these rules form the foundation for the European internal electricity market, and their approvals represent important steps towards the achievement of this goal.

Of particular relevance for the German market is the capacity calculation method for the "CORE" capacity calculation region, which was submitted in September 2017. This is a further development of the flow-based method of capacity calculation in the Central Western Europe (CWE) region. The flow-based method of capacity calculation will take account of the whole grid instead of only the cross-border transmission capacity. Better coordination between the TSOs involved is also essential, so that more capacity can be made available for cross-border trade.

Forward capacity allocation
A significant milestone in the coordinated allocation of cross-border forward capacity was the "Guideline on Forward Capacity Allocation"; here, key implementation steps were taken already in 2017. These include both the adoption of harmonised Europe-wide auction rules and commitments for acquired transmission rights, as well as the approval for the establishment of a single allocation platform.

Network codes and guidelines for gas and the further development of the internal market in natural gas

In 2017 European cooperation was again focussed on implementation and implementation monitoring of the network codes and guidelines for gas.

Overview of network codes and guidelines for gas to be implemented by the Bundesnetzagentur:

- Guidelines for Congestion Management in Contractual Congestion Events (Congestion Management Procedures – CMP)
- Network Code on Mechanisms for Capacity Allocation in Gas Transmission Systems (NC CAM)
- Network Code on Gas Balancing in Gas Transmission Networks (NC BAL)
- Network Code on Interoperability and Data Exchange (NC IO)
- Network Code on Harmonised Transmission Tariff Structures (NC TAR)

The Bundesnetzagentur was actively involved in developing the implementation reports of the Agency for the Cooperation of Energy Regulators (ACER) on the network codes for gas balancing, interoperability and data exchange, as well as the general monitoring report on the gas market. Furthermore, the Bundesnetzagentur ensures compliance with the network codes and guidelines by the gas transmission system operators and, within the framework of ACER and CEER working groups, coordinated its activities with the other European regulatory authorities.

In addition to the implementation of the existing legislative specifications, the Bundesnetzagentur was also actively involved in the discussion of the design of the internal market in natural gas in the context of the process led by the European Commission: "Quo Vadis EU gas market regulatory framework – Study on a Gas Market Design for Europe".

Further development of the internal energy market's Clean Energy for all Europeans Package (CEP)

With the "Clean Energy for All Europeans Package", the European Commission, at the end of 2016, presented a comprehensive legislative package on the further integration of the internal European energy market and defined the following objectives:

- Energy efficiency must be the top priority;
- The EU must assume global leadership in the area of renewable energies;
- Consumer interests should be strengthened.

Specifically, the Commission published the following legislative proposals:

- Electricity regulation (amended version of Regulation (EU) No. 714/2009 on conditions for access to electricity networks
- Amended version of Renewable Energy Directive 2009/28/EC
- Directive on common rules for the internal market in electricity (amended version of Directive 2009/72/EC on Common Rules for the Internal Market in Electricity)
- Regulation on measures to safeguard security of electricity supply (replaces Directive 2005/89/EC on Security of Supply)
- Amended version of ACER Regulation (EC) No. 713/2009
- Revisions of Energy Efficiency Directive 2012/27/EU and Energy Performance in Buildings Directive 2010/31/EU
- Proposed regulation on governance of the Energy Union

The "Clean Energy for All Europeans Package" contains additional non-legislative documents, including a statement on energy innovation, a task plan for planned measures in the area of ecodesign for the period 2016-2019, a report on energy prices and costs as well as the report on the final result of the Sector Inquiry on Capacity Mechanisms.

The year 2017 was characterised by the debate on legislative proposals both in the European Parliament and in the European Council.

Among the central topics of discussion were the design of bidding zone configurations, the calculation of cross-border capacities and the handling of priority feed-in access for renewable energies. Other controversial questions were those pertaining to the new actors proposed by the Commission, such as the issues of design, liability and responsibility for so-called regional operations centres and the design, composition and tasks of the so-called EU DSO Entity, the Active Consumers and the Renewable Energy Community. There is also discussion regarding the Commission's proposal to exclude power plants from participating in capacity markets if they exceed the level of 550g CO2/kWh.

The Bundesnetzagentur acts in an advisory function to the Federal Government in the assessment of the legislative package and makes proposals for improvements. In 2017 the Bundesnetzagentur was also actively involved in the positioning of the Council of European Energy Regulators CEER and the Agency for Cooperation of Energy Regulators ACER with regard to the European Commission's "Clean Energy for all Europeans Package" (CEP). This work resulted in a series of "Regulatory White Papers" that provided a critical analysis of the various topics dealt with in the CEP (eg self-generation and energy communities, funding for renewables, consumer protection, new technologies).

ACER decisions, Market Monitoring Report

For the sixth time, ACER and CEER published the Market Monitoring Report, which consists of four volumes: Electricity Wholesale Markets, Gas Wholesale Markets, Electricity and Gas Retail Markets and Consumer Protection and Empowerment. In parallel, CEER published an extensive report on the retail market. The Bundesnetzagentur was actively involved in both reports, including by chairing the relevant working groups.

International cooperation

Florence School of Regulation (FSR)
Together with the Florence School of Regulation, the Bundesnetzagentur held its 9th joint forum on regulatory and legal issues in the energy sector in October 2017. In addition to the topic of the European Commission's "Clean Energy for All Europeans Package", the focus of this year's event was primarily on future challenges at distribution system level. There was also intensive discussion on the topic of gas security of supply.

International delegations
The Bundesnetzagentur regularly receives international delegations in order to engage in an exchange of information with experts on issues relating to the energy transition and network expansion. The Bundesnetzagentur also supports the Federal Ministry of Economic Affairs and Energy in these activities. In 2017 there were a total of 14 visiting delegations, including from Botswana, Japan, Norway and Ukraine. In addition to the energy transition, discussions increasingly focussed on European market integration.

Capacity increase DK_West-DE, costs of capacity measure

Regular strain on the grid in northern Germany has in the past led to situations in which the interconnection capacities at the DE-DK(West) border, in particular during phases of high winds, could not be made available to the market for maintaining network security; through the continued growth of renewables, this capacity has gradually had to be reduced in past years. Relevant information by market participants led to an interim agreement by the responsible ministries of both countries, adopted on 5 May 2017, to allow more Danish energy exports into Germany again, until grid expansion can provide the necessary relief. Under this agreement, annually increasing levels of minimum capacity for both directions have been agreed upon, which are created through counter trades going in the opposite direction to the market price trend and which are paid for using congestion revenues. The costs of the measure are capped at €40m per year.

Incremental capacity – market-based procedure to create additional gas transport capacities

The amended version of Commission Regulation (EU) 2017/459 establishing a network code on capacity allocation mechanisms in gas transmission systems of 16 March 2017 provides for a new procedure for the market-based calculation of demand for additional gas transport capacities at cross-border and market-area interconnection points (so-called Incremental Capacity Procedure). At the same time, the Regulation establishes rules for implementing the calculated demand for the new gas transport capacities to be created.

The regulation stipulated that starting in 2017, TSOs had to carry out a market survey at each market area border to determine the new gas transport capacities that must be created. At the borders where additional demand for gas transport capacities has been determined, they have initiated planning and consultation measures for concrete project proposals. The Bundesnetzagentur has actively supported this procedure from the start. In particular, the Bundesnetzagentur has developed, for the purpose of an economic test, a calculation tool pursuant to Article 22 NC CAM to increase transparency, which is available to network users and TSOs for download in German and English on the Bundesnetzagentur's website. (*https://www.bundesnetzagentur.de/DE/Sachgebiete/ElektrizitaetundGas/Unternehmen_Institutionen/NetzentwicklungundSmartGrid/Gas/IncrementalCapacity/IncrementalCap_node.html*).

Implementation of the network code on transmission tariff structures for gas

The Bundesnetzagentur has begun implementation of Commission Regulation (EU) 2017/460 establishing a network code on harmonised transmission tariff structures for gas, which came into effect on 6 April 2017. For this purpose, several workshops were held with the affected transmission system operators and industry representatives. On 19 July 2017 the Bundesnetzagentur issued the determination of requirements for implementation of, inter alia, the Network Code on Harmonised Transmission Tariff Structures in Incentive Regulation (BK9-17/609). This determination implements the Regulation in the national regulatory framework where issues of tariffs are involved. The determination also provides for data collection and requires the transmission system operators to submit a report on setting tariffs. This serves as preparation for the regulatory decision provided for in the NC TAR on the concrete tarification methodology among transmission system operators as of 1 January 2020. In order to meet these data reporting obligations, ACER depends on the support of the national regulatory authorities. In 2017, this support was focused on the preparation and presentation of information to calculate the revenue cap for German TSOs.

From the Ten Year Network Development Plan to the third Union List of projects of common interest

A future-proof energy supply system in Germany depends on close cooperation with our European partners. Cooperation between European transmission system operators in an association (ENTSO-E) and between European regulatory authorities is indispensable in light of the growing internal energy market. Among the tasks of the associations is to develop and publish a non-binding European network development plan for gas and electricity every two years, the so-called Ten Year Network Development Plan (TYNDP). This serves to calculate the future need for network expansion for a period of approximately ten to fifteen years. The main areas of focus are the expansion of cross-border transmission lines, the integration of renewables and the mitigation of congestion in the transmission system.

Since June 2013, EU Regulation No. 347/2013 on guidelines for European energy infrastructure (TEN-E Regulation) has been in effect. It is meant to help achieve the European Union's energy and climate policy objectives, such as completing the internal market in energy and guaranteeing security of supply. In order to ensure that the common European objectives are achieved, network expansion projects in the area of energy infrastructure that are already considered necessary at national level are, as a rule, characterised as "projects of common interest" (PCIs). These are meant to fill existing gaps in the European energy infrastructure. The projects must also have an underlying economic, social and environmental benefit and have a positive impact on the energy industry of at least two Member States.

After publication of the TYNDP on 20 December 2016, the third Union-wide PCI list of 23 November 2017 is now in effect. Like previous lists, this list was compiled with the active support of the Bundesnetzagentur, together with the Federal Ministry for Economic Affairs and Energy. It contains 13 German PCIs in the electricity sector, 12 of which received the additional designation "E-Highway", which is meant to underline the relevance of the projects for Europe. New in the list are a German-French smart grid project (the so-called Smart Border Initiative) and the second interconnector between Belgium and Germany. The third PCI list also contains one PCI in the gas sector and two in the oil sector with German involvement.

TELECOMMUNICATIONS

Shaping the digital revolution

The digital transformation is opening up opportunities for a better quality of life, innovative business models and a more efficient economy. The Bundesnetzagentur is working on intelligent framework conditions that help to utilise digital potential and successfully meet new challenges.

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The Bundesnetzagentur took a number of important steps to improve broadband rollout in 2017. In July it finalised the remaining technical, operational and legal details of the use of vectoring in proximity areas. An agreement was also reached on the charges for the alternative Virtual Unbundled Local Access (VULA) product. This will enable further broadband rollout and safeguard competition.

The Transparency Ordinance for telecommunications came into force in June 2017. The enhanced transparency requirements and information obligations this brings make it easier for consumers to select products in the telecommunications market. Among other things, providers must now draw up a product information sheet for every product with internet access. This gives end customers the opportunity to review the essential contractual provisions at a glance before concluding a contract.

In July 2017 the Bundesnetzagentur published a communication on discrepancies in broadband speeds in fixed networks. This defines the conditions under which providers are considered not to be meeting the contractually agreed performance levels. It aims to enable consumers to provide evidence of non-compliance on the part of providers – including in the context of potential legal disputes.

Market watch

The number of high-speed broadband connections increased again in 2017. In particular, there was growing demand for connections with speeds of at least 30 Mbps.

Telecommunications markets as a whole

External revenue

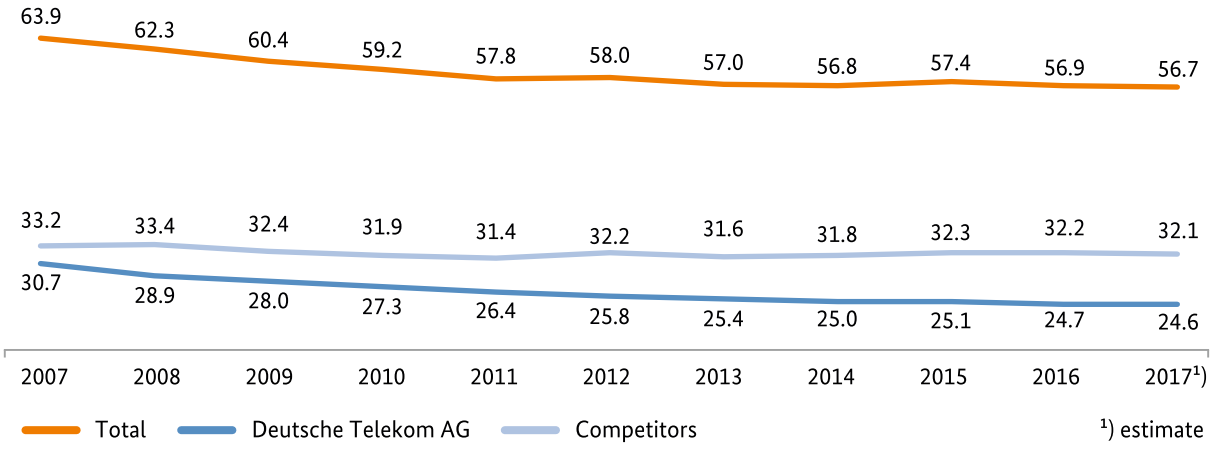
According to the Bundesnetzagentur's preliminary calculations, external revenue in the telecommunications market amounted to around €56.7bn in 2017. This represents a year-on-year decrease of €0.2bn.

A breakdown of revenue by provider shows that the revenue of both competitors and Deutsche Telekom AG (DTAG) in 2017 was €0.1bn below its 2016 level. The revenue of competitors fell to €32.1bn and that of DTAG to €24.6bn.

As in the previous year, competitors accounted for a market share of around 57% in 2017.

A breakdown of revenue by market segment shows that – as in the last two years – the largest share of revenue was attributable to mobile services. Accounting for 47%, the market share of mobile services was more than that of conventional telecommunications networks (38%). Owing to a steady rise in external revenue, the market share of HFC networks rose from 9% in 2016 to 10% in 2017.

External revenue in the telecommunications market
€bn



External revenue by segment						
	2015		2016		2017[1]	
	€bn	in %	€bn	in %	€bn	in %
External revenue in the telecommunications market	**57.4**		**56.9**		**56.7**	
External revenue in conventional telecommunications networks	**22.15**	100	**21.96**	100	**21.59**	100
Via retail	17.02	77	16.78	76	16.97	79
Via wholesale	4.50	20	4.60	21	4.35	20
Other external revenue	0.63	3	0.58	3	0.27	1
External revenue in HFC networks	**5.07**	100	**5.26**	100	**5.47**	100
Via retail	4.73	93	4.92	94	5.12	94
Via wholesale	0.08	2	0.07	1	0.06	1
Other external revenue	0.26	5	0.27	5	0.29	5
External revenue from mobile services	**26.96**	100[2]	**26.46**	100[2]	**26.45**	100
Via retail (excluding terminal equipment)	18.54	69	18.65	70	18.75	71
Via wholesale	2.86	11	2.93	11	2.93	11
Via terminal equipment	4.22	16	3.20	12	3.24	12
Other external revenue	1.34	5	1.68	6	1.53	6
Other external revenue	**3.18**	100	**3.17**	100	**3.19**	100

1) estimate

2) Totals may deviate from rounded cumulative figures.

Conventional telecommunications networks

In the conventional telecommunications networks segment, which includes networks based on copper and optical fibre cables, the decrease in revenue is expected to have continued in 2017. External revenue was almost 2% less than in the previous year.

External revenue in external telecommunications networks consists of revenue via retail, wholesale and other external revenue. Revenue via retail is generated from services for private, commercial and public sector subscribers. It accounted for 79% in 2017. Wholesale services for fixed-network and mobile operators and service providers outside of the DTAG group accounted for one fifth of external revenue. These services include wholesale products for voice traffic and telephony, broadband and internet, and infrastructure services.

HFC networks

The external revenue of HFC (hybrid fibre-coax) network operators continued to rise. In 2017 revenue increased by 4% to €5.47bn. The lion's share of this revenue (94%) was attributable to retail.

Mobile services

External revenue from mobile services amounted to €26.45bn in 2017, just under the 2016 level of €26.46bn. Some 71% of this external revenue was attributable to retail business (excluding terminal equipment) and 11% to wholesale business. As in the previous year, revenue from terminal equipment accounted for 12%.

The distribution of revenue between mobile network operators and mobile service providers shows that, despite a steady rise in the share of service providers, network operators remain dominant. In 2017 80%

(€21.25bn) of revenue was attributable to network operators and 20% (€5.20bn) to service providers. Service providers have increased their share by four percentage points in three years, from 16% in 2014 to 20% in 2017.

External revenue from mobile services

	2014		2015		2016		2017[1]	
	€bn	%	€bn	%	€bn	%	€bn	%
Total	**26.12**	**100**	**26.96**	**100**	**26.46**	**100**	**26.45**	**100**
Network operators	21.94	84	22.22	82	21.44	81	21.25	80
Service providers	4.18	16	4.74	18	5.02	19	5.20	20

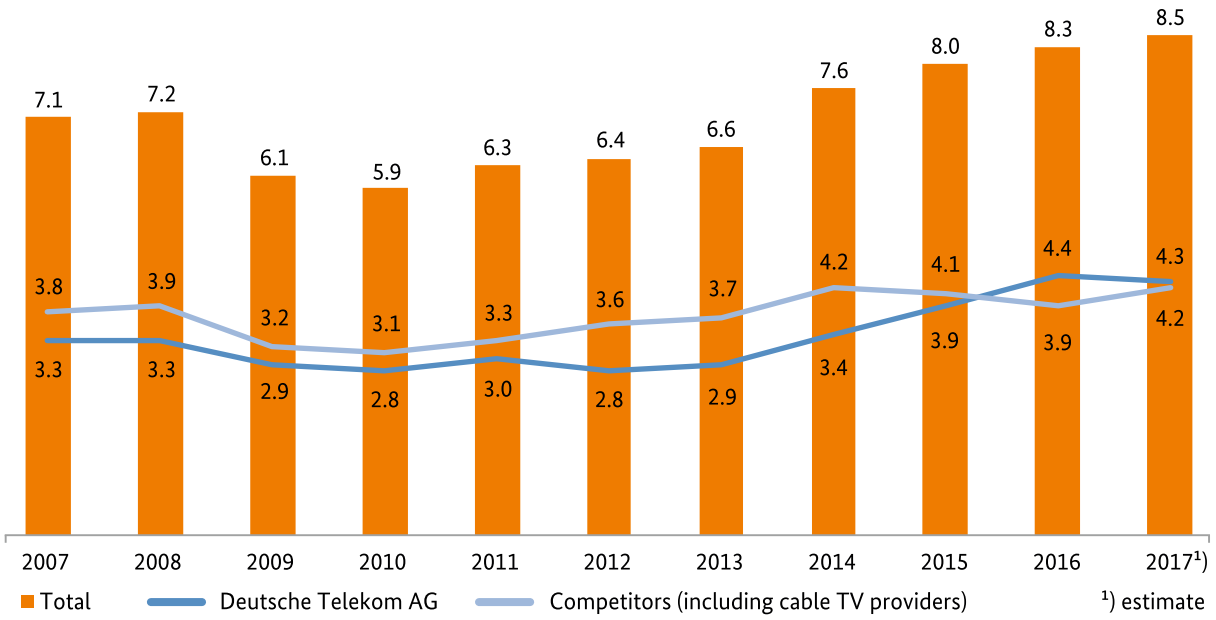
[1] estimate

Investments in fixed assets

According to currently available data, investments in fixed assets in the telecommunications market increased once again in 2017. Amounting to €8.5bn, they surpassed the 2016 level by €0.2bn. This increase was driven by higher investments by competitors.

They invested €4.2bn in 2017 compared with €3.9bn in 2016. This represents an increase of almost 8% on the part of competitors, while DTAG's investments decreased by €0.1bn to €4.3bn in 2017.

Investments in fixed assets in the telecommunications market
€bn



Companies mainly invested in new broadband network infrastructures, resulting in new opportunities in the areas of broadband coverage and bandwidths. In 2017 this accounted for around 69% of all investments in fixed assets. Approximately 14% was attributable to the maintenance of existing broadband network infrastructure and around 17% to other investments. These included investments in subscriber terminal equipment, the expansion of data centres and investments in customer support.[1]

Competitors increased their share of total investments in the telecommunications market from 47% in 2016 to 49% in 2017. By contrast, DTAG's share fell from 53% in 2016 to 51% in 2017.

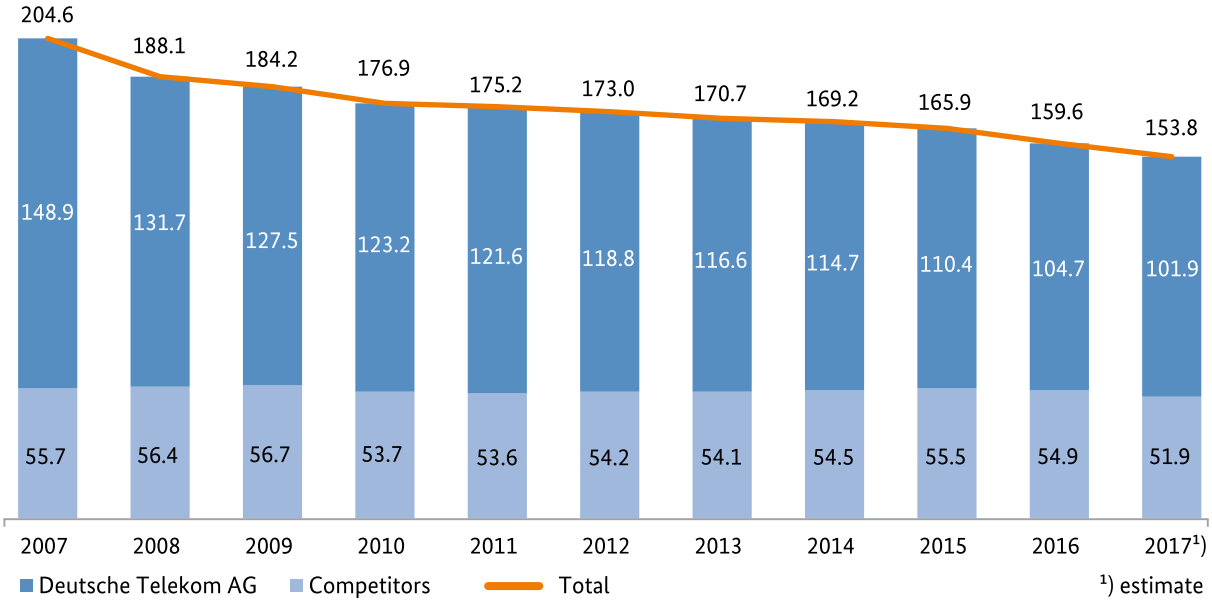
Investments in the fixed network concentrated on the rollout of optical fibre networks, the upgrading of cable networks and the changeover to IP-based networks. In mobile networks, the focus was on the rollout of LTE networks.

Since the market opened up in 1998 through to the end of 2017, companies have invested a total of €145.0bn in fixed assets in the telecommunications market. Of this amount, more than half (52%) is attributable to competitors (€75.5bn) and 48% (€69.5bn) to DTAG.

Employees

According to initial calculations, 153,800 people were employed by companies in the telecommunications market at the end of 2017, which is around 5,800 or 4% less than at the end of 2016. The staff numbers of both competitors and DTAG decreased in 2017 – by 5% year on year to 51,900 in the case of competitors and by almost 3% to 101,900 in the case of DTAG.

Employees in the telecommunications market
Thousand



[1] When interpreting the data, it should be noted that the assignment of investments to the categories "existing broadband network infrastructure", "new broadband network infrastructure" and "other" may have been subject to different interpretation by the companies surveyed in order to collect information for this report. In addition, not all companies were able to provide a breakdown of their data. These companies are not included in the calculation of shares.

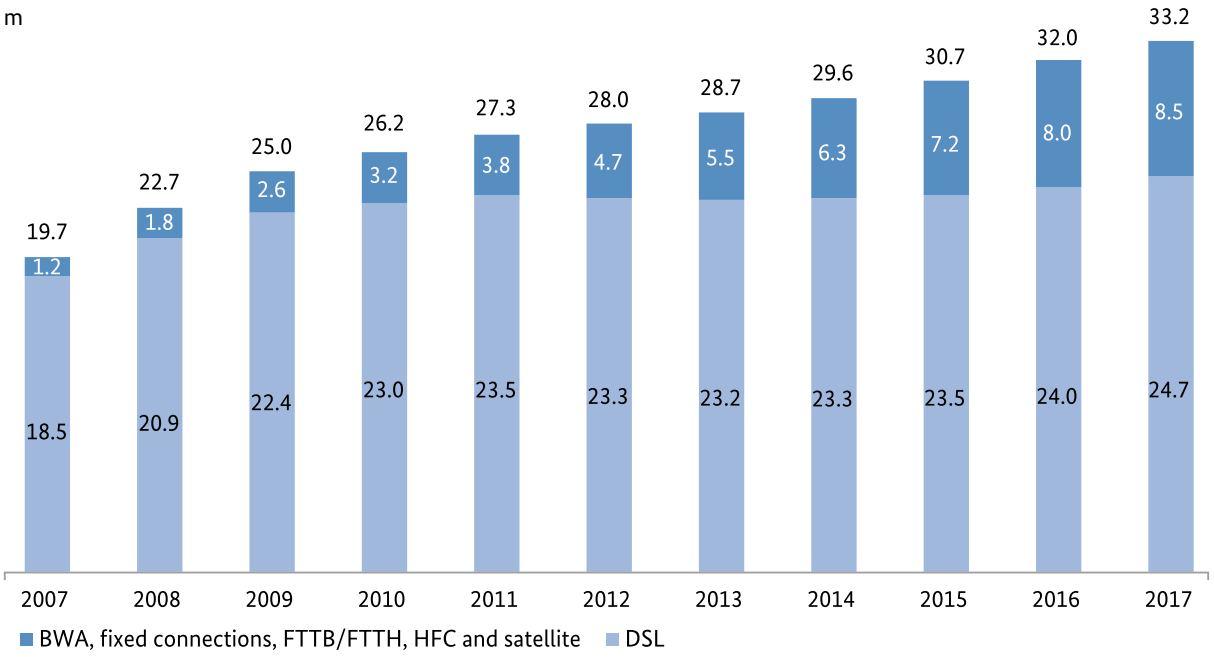
These developments have been influenced by two factors. First, companies are being forced to realise efficiency potential due to increasing competition. Second, recent years have been characterised by technological advances, the innovative potential of which is best realised in a competitive environment. The investments made have enabled the provision of more telecommunications services of a better quality by fewer employees. This increase in productivity is particularly marked in the telecommunications sector.

Fixed network

Broadband connections

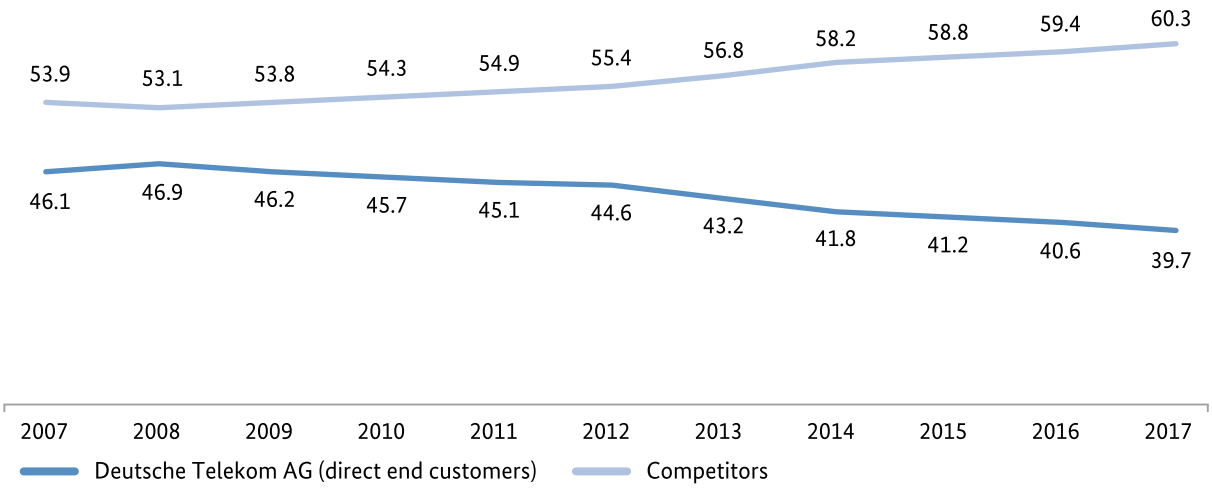
The number of broadband connections rose again by approximately 1.2m to around 33.2m at the end of 2017. This corresponds to a year-on-year increase of just under 4%.

Broadband connections in fixed networks



The majority (74%) of broadband connections are based on various DSL technologies. Together, all other technologies accounted for approximately 8.5m connections. Most of these were based on HFC networks (7.7m), while just under 0.8m were based on fibre-to-the-building (FTTB) or fibre-to-the-home (FTTH). Less than 0.1m connections were broadband wireless access (BWA), fixed connections or satellite connections.

Share of broadband connections in fixed networks
%



DTAG's competitors were able to expand their share of the broadband market slightly.

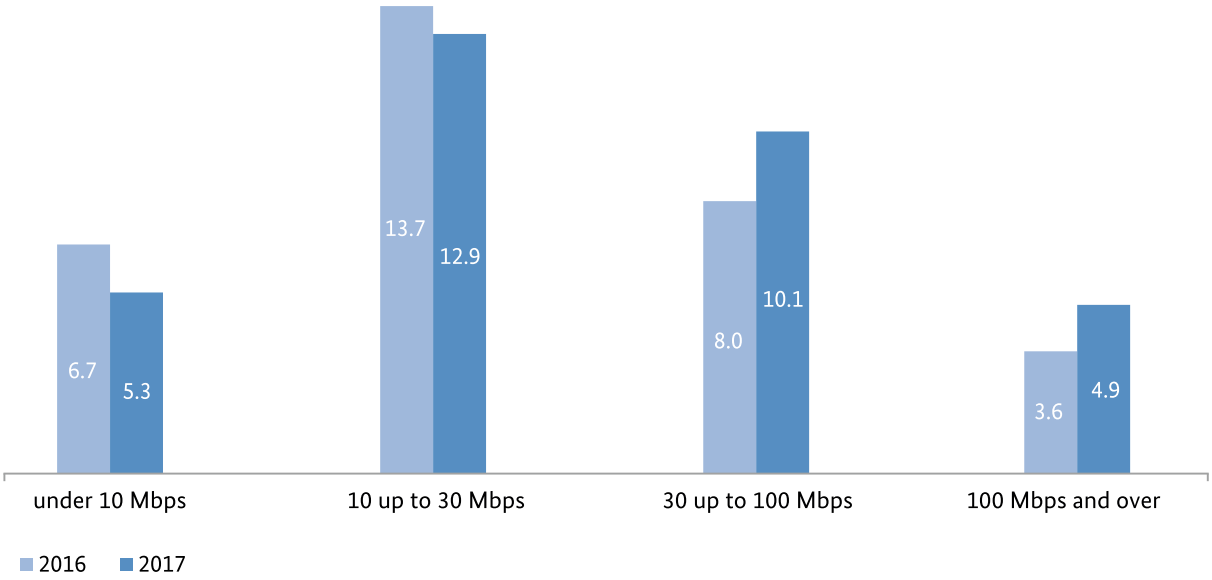
With regard to retail business, they had achieved a market share of around 60% of all broadband connections by the end of 2017.

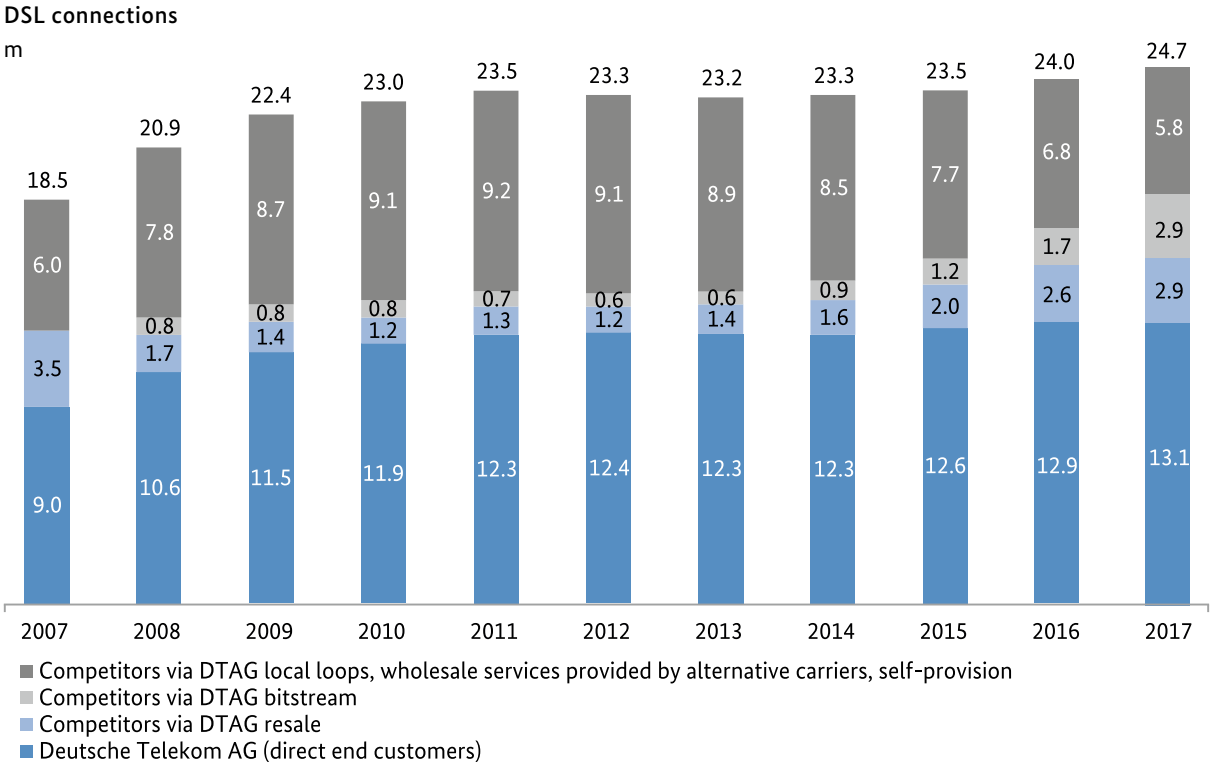
Transmission rates

The number of broadband connections with high nominal transmission rates increased again in 2017.

In particular, both the supply and demand of connections with speeds of at least 30 Mbps or at least 100 Mbps rose in 2017. By contrast, the number of broadband connections with speeds of less than 30 Mbps fell.

Distribution of fixed-network broadband connections by speed
m





DSL connections

In total, there were approximately 24.7m operational DSL connections at the end of 2017, around 13.1m of which were attributable to direct end customers of DTAG and around 11.6m to competitors, which primarily marketed DSL connections to customers on the basis of the specific wholesale products of DTAG and alternative carriers. Based on these figures, DTAG's competitors had achieved a market share of around 47% by the end of 2017.

In recent years, the growth of the DSL market has been driven primarily by the positive development of the number of VDSL connections. With around 9.9m connections (2016: 7.2m), VDSL accounted for a share of around 40% of all DSL connections at the end of 2017. Around 4.2m VDSL connections were provided by DTAG's competitors and around 5.7m direct VDSL connections by DTAG.

It is currently expected that vectoring technology will lead to a further rise in the spread of VDSL. In theory, this technology currently enables transmission rates of up to 100 Mbps.

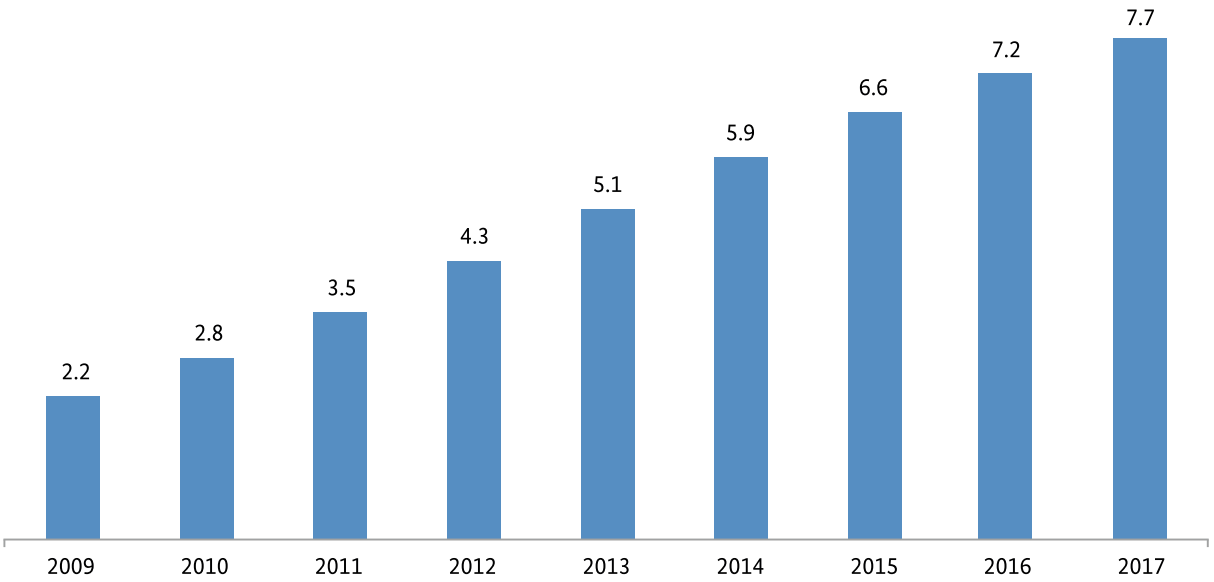
At the wholesale level, the increasing significance of VDSL also led to a considerable rise in demand for specific DTAG VDSL wholesale products. Demand for bitstream wholesale products was especially high, with a year-on-year increase in the number of products sold of approximately 1.2m. By contrast, demand for DTAG's high bitrate, unbundled local loops fell further.

Broadband connections via HFC networks

At the end of 2017 there were around 7.7m connections via HFC networks. Of these, almost 3.6m had delivering speeds of over 100 Mbps. The increase of around 500,000 compared with the previous year saw a continuation of the trend of slowing growth observed in recent years. The combination of optical fibre and coaxial cables and the DOCSIS 3.0 transmission standard enables broadband services with download speeds of up to 400 Mbps.

Broadband connections via HFC networks

m



Broadband connections via FTTB/FTTH

Thanks to their outstanding technical properties, optical fibres are considered to be the ideal infrastructure for data transport and the transmission medium of the future. Limited by geographical availability, demand for both FTTB and FTTH is still relatively low. At the end of 2017 there were 396,000 FTTB connections and around 360,000 FTTH connections. With over 2.7m connections available to customers, the potential offered by this infrastructure is much greater.

Satellite broadband connections

Around 26,000 customers were using satellite systems to access the internet from virtually any location at the end of 2017. User numbers for this technology remain low due to the price advantage and higher speeds of cable-based alternatives. However, satellite internet connections can make a contribution to ensuring full broadband coverage in regions where other technologies are not, or not sufficiently, available.

Data volumes

The data volume per fixed-network broadband connection has risen sharply in recent years. While consumers generated a total volume of roughly 28bn GB in 2016, initial calculations suggest that they will generate around 33bn GB in 2017. This would correspond to an average data volume per broadband connection per month of over 80 GB.

Bundled products

Bundled products which, in addition to a broadband connection, include at least one other telecommunications service (fixed-network telephony, TV or mobile services[2]) in a single contract are now offered as standard by companies in their marketing to end customers. In many cases, it is no longer possible to purchase these services separately. Consumers who enter into a fixed-network and mobile contract with the same provider can also take advantage of additional discounts and exclusive offers by bundling the two contracts.[3] By offering such measures, providers are seeking to increase customer loyalty to their products.

[2] No distinction is made between mobile voice and mobile data services. In this context, a bundled product is generally understood to be either the joint marketing of at least two telecommunications services for one price or the separate marketing of individual products, with a discount granted when several services are purchased.
[3] This type of advantage programme is generally included in the definition of bundled products used for data collection purposes. However, the surveyed companies did not classify such products as bundled products.

At the end of the first quarter of 2017 DTAG and its competitors were providing around 30.8m bundled tariffs. Accounting for 23.2m customers, bundled products with two services were by far the most common of these. The majority of these bundled products consist of an IP-based telephone service in addition to a broadband connection.

At the end of the first quarter of 2017 around 7.6m customers had bundled products consisting of three services. Around 93% of these consisted of a broadband connection, a telephone service and a TV service. Some 7% had a mobile component instead of a TV service.

The number of tariffs with four services is still relatively low. Only a few thousand customers currently have this type of bundled product.

However, it should be noted that the above products which represent a combination of two separate fixed-network and mobile postpay contracts are not considered to be a bundle of three (fixed-network internet and fixed-network telephony combined with mobile services) or four (fixed-network internet, fixed-network telephony and TV combined with mobile services) services, but rather a bundle of two or three services. If this were taken into account in line with the definition of bundled products in footnote 2, the number of bundled products with two services would fall significantly and the number of bundled products with three or four services would increase accordingly. Irrespective of the counting method used, the most common type of bundled products are those consisting of broadband and telephony.

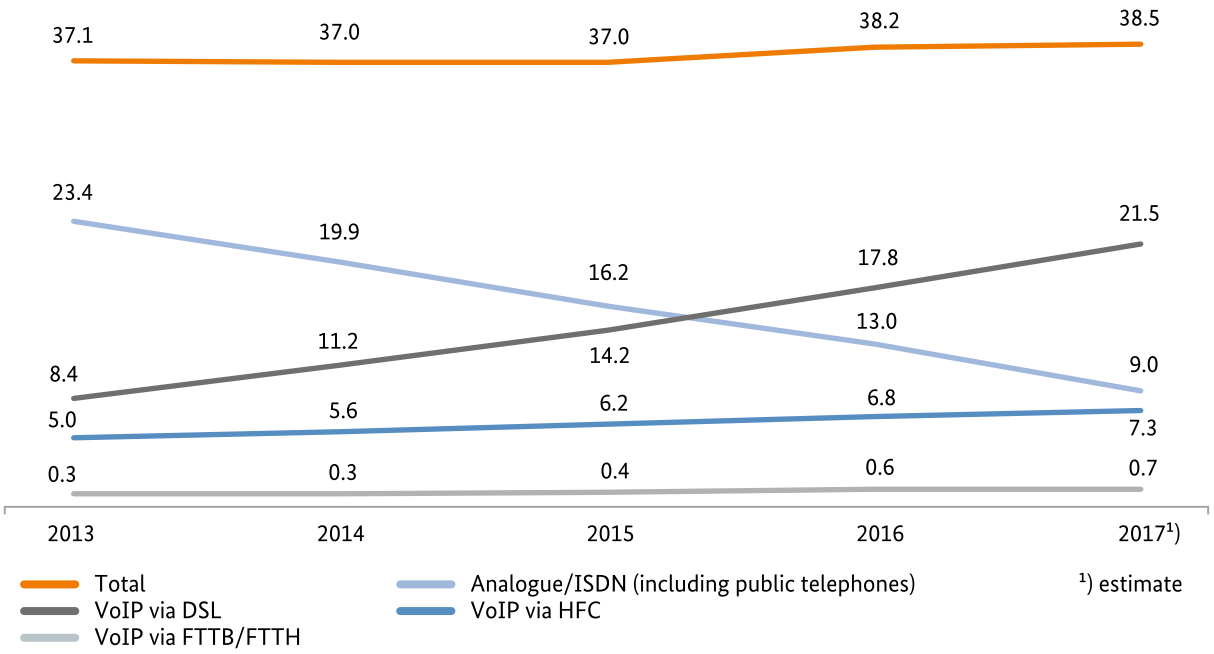
Telephone connections

The last few years have seen contrasting trends in voice communication using conventional telephone lines (analogue/ISDN) on the one hand and access to IP-based voice services (VoIP via DSL, HFC, FTTB/FTTH) on the other.

While demand for IP telephony has increased, there has been a decline in the use of conventional telephone lines. Optical fibre telephony (FTTB/FTTH) continues to play only a marginal role. Overall, demand for voice communication services from fixed networks rose slightly in 2017 compared with the previous year.[4]

Total number of telephone connections

m



Telephone lines and IP-based voice services – competitors' shares

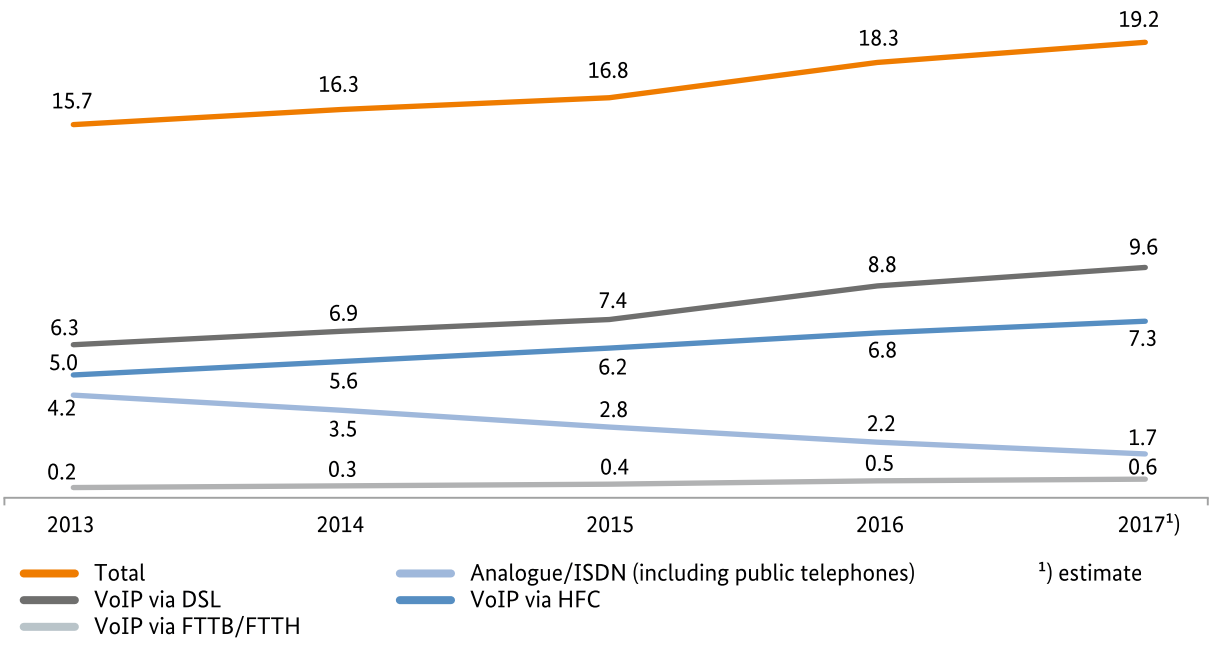
	2015		2016		2017[1)]		
	Total stock	Competitors' share	Total stock	Competitors' share	Total stock	Competitors' share	
	m	%	m	%	m	m	%
Analogue lines	**9.95**	8.1	**8.20**	8.0	**5.48**	0.42	7.7
ISDN basic rate lines	**6.13**	32.5	**4.70**	33.0	**3.45**	1.25	36.2
ISDN primary rate lines	**0.086**	34.9	**0.086**	34.9	**0.084**	0.03	35.7
Public telephones	**0.028**	3.6	**0.025**	4.0	**0.023**	0.001	4.3
VoIP via HFC	**6.21**	100.0	**6.81**	99.9	**7.33**	7.32	99.9
VoIP via FTTB/FTTH	**0.428**	91.8	**0.559**	89.4	**0.699**	0.600	85.8
VoIP via DSL	**14.21**	51.8	**17.77**	49.5	**21.46**	9.56	44.5
Total connections	**37.04**	45.3	**38.15**	48.1	**38.52**	19.18	49.8

[1)] estimate

At the end of 2017 the Bundesnetzagentur estimates that there were around 21.5m DSL lines used for VoIP (a year-on-year increase of 21%). The number of HFC connections used for telephony increased by approximately 8% to 7.3m. By the end of 2017 the number of voice lines in optical fibre networks had also risen to approximately 0.7m. At the same time, the number of conventional fixed-network analogue lines, ISDN basic rate lines and ISDN primary rate lines fell to around nine million. These lines are gradually being replaced by IP-based technologies, which now account for an estimated 77% of connections. The total number of public payphones (coin- and card-operated) stood at around 23,000 at the end of 2017.

Telephone connections from alternative subscriber network operators

m



[4] From 2016 onwards the number of VoIP connections via DSL provided by alternative subscriber network operators was revised upwards on the basis of new findings. No adjustments were made before 2016. However, it can be assumed that, following years of decline, there were also positive developments in the total number of telephone lines and IP-based voice services before 2016.

DTAG's competitors had an estimated 19.2m telephone lines and access points to IP-based voice services at the end of 2017. While the number of analogue and ISDN basic rate lines provided by alternative subscriber network operators decreased further, their share of IP-based voice services continued to rise.

Relative to the number of fixed-network telephone connections provided by DTAG's competitors, DSL lines for VoIP accounted for a share of around 50% in 2017, which is significantly more than that of conventional analogue and ISDN lines (around 9%). At the same time, the share of DSL lines for VoIP was significantly higher than that of voice lines in HFC and optical fibre networks. Overall, an estimated 91% of all competitors' lines were based on IP technologies at the end of 2017. For alternative subscriber network operators, conventional telephony via analogue and ISDN lines is now of little relevance.

The fixed-network voice communication services of alternative subscriber network operators were primarily operated on the basis of contracts on access to the DTAG local loop, or using the alternative providers' own local loops.

Call minutes in fixed networks

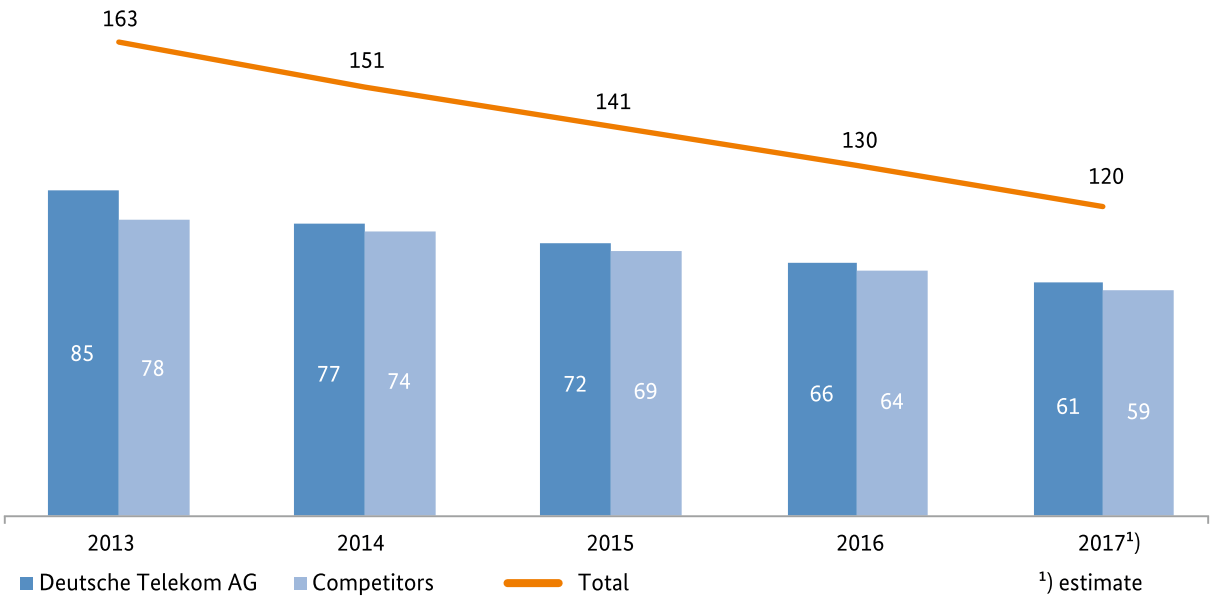
The volume of call minutes[5] within conventional telephone networks and IP-based fixed networks continued to decrease. According to the Bundesnetzagentur's estimates, the total volume of outgoing call minutes in fixed networks amounted to around 120bn minutes in 2017.

This decrease is likely to be due, among other things, to the increasing use of internet-based mobile communication services (over-the-top services) and, to some extent, to a shift in calls to mobile networks.

Calls within German fixed networks amounted to an estimated 103bn minutes in 2017. According to an initial forecast, around 80% of these were billed via flat rates. In addition, calls to national mobile networks accounted for around 9bn minutes (around 24% flat rate) and calls to foreign fixed and mobile networks for an estimated 8bn minutes.

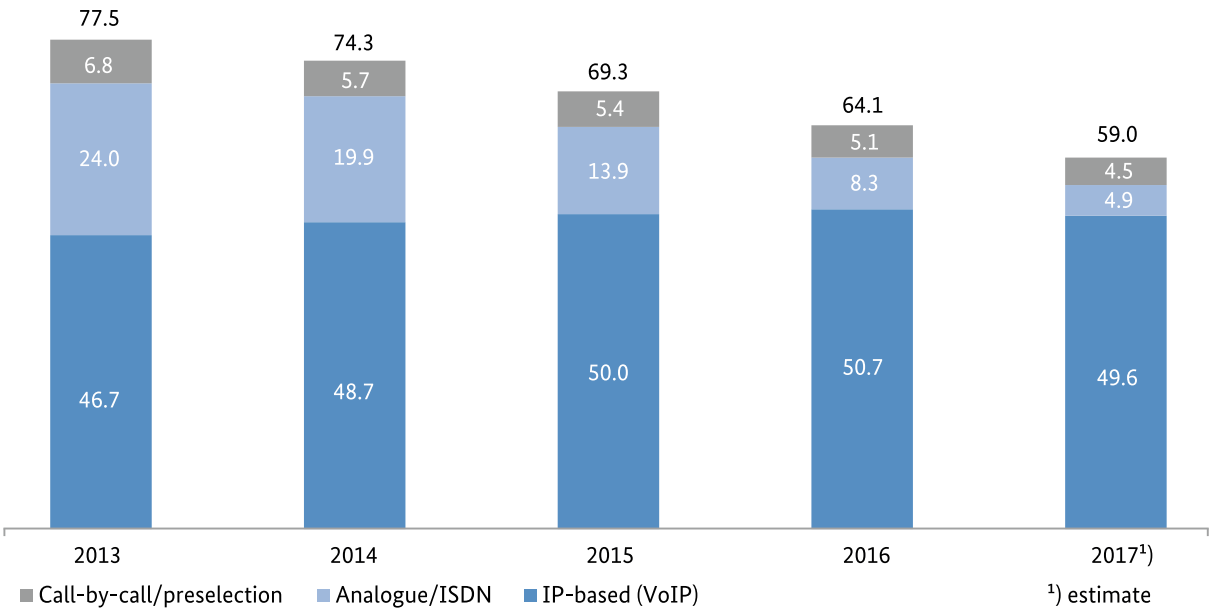
In total, around 59.0bn call minutes had been handled by DTAG's competitors by the end of 2017. The majority of these calls (49.6bn minutes) were made via IP-based networks. The volume of calls (4.9bn) made via conventional analogue or ISDN lines continued to fall.

Outgoing call minutes in fixed networks
bn



[5] Calls within Germany, international calls, and calls to German mobile networks.

Call minutes via alternative providers
bn



Due, among other things, to DTAG's ongoing switch to IP-based network technology, this trend was also increasingly evident at DTAG. At the end of 2017 around half of the 61bn call minutes handled by DTAG were handled via IP technology.

The Bundesnetzagentur estimates that around 66% of all calls – ie two thirds of all call minutes within fixed networks – were being handled via IP technology by the end of 2017.

Based on initial forecasts, indirect call-by-call and preselection calls handled by alternative providers[6] accounted for a total of 4.5bn minutes – or just under 8% – of all calls handled by competitors at the end of 2017. Despite a decrease in the number of lines with preselection in the DTAG network, preselection call volumes exceeded call-by-call.

With regard to individual call segments, the Bundesnetzagentur estimates that DTAG's competitors were able to maintain their shares of domestic calls, calls to foreign fixed and mobile networks and calls to national mobile networks.

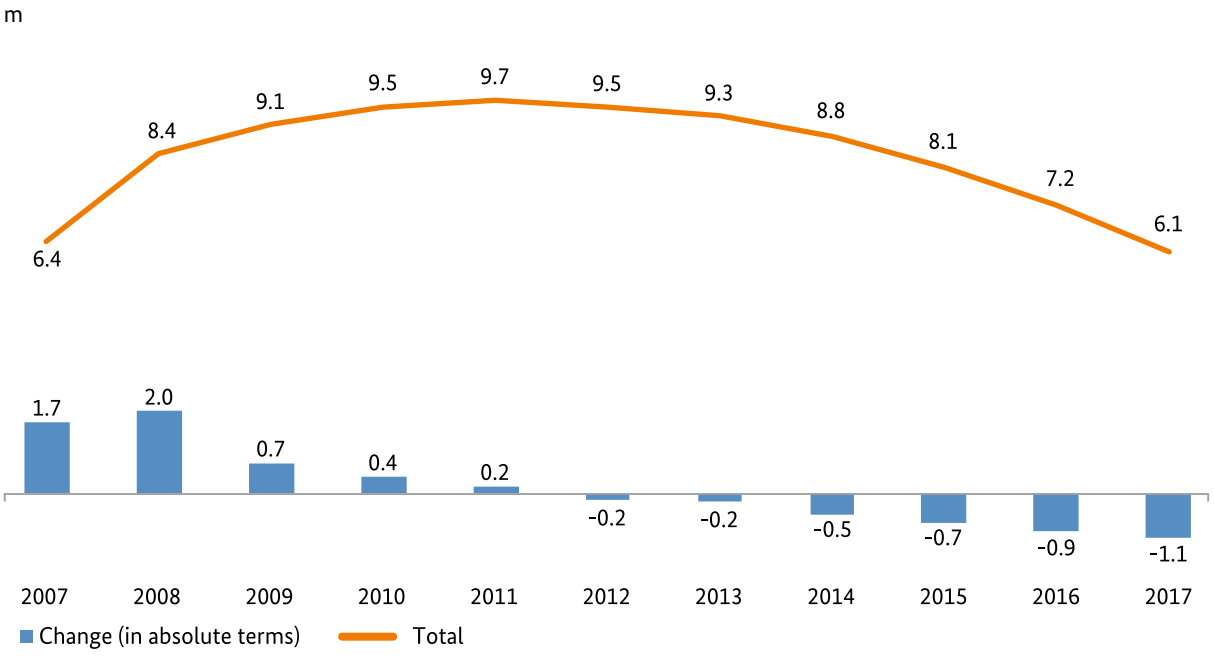
In general it should be noted when interpreting the above-mentioned call minutes that certain traffic volumes are not currently included in the Bundesnetzagentur's database. These primarily include voice transmission by over-the-top providers which do not operate their own fixed-network lines or telecommunications networks and which offer internet-based services independent of network infrastructure (eg DSL, HFC or optical fibre).

Subscriber lines

The number of local loops leased by DTAG's competitors in 2017 fell again by approximately 1.1m year on year.

[6] Call-by-call and preselection call minutes in 2014 and 2015 were adjusted on the basis of new findings.

Volume of leased subscriber lines



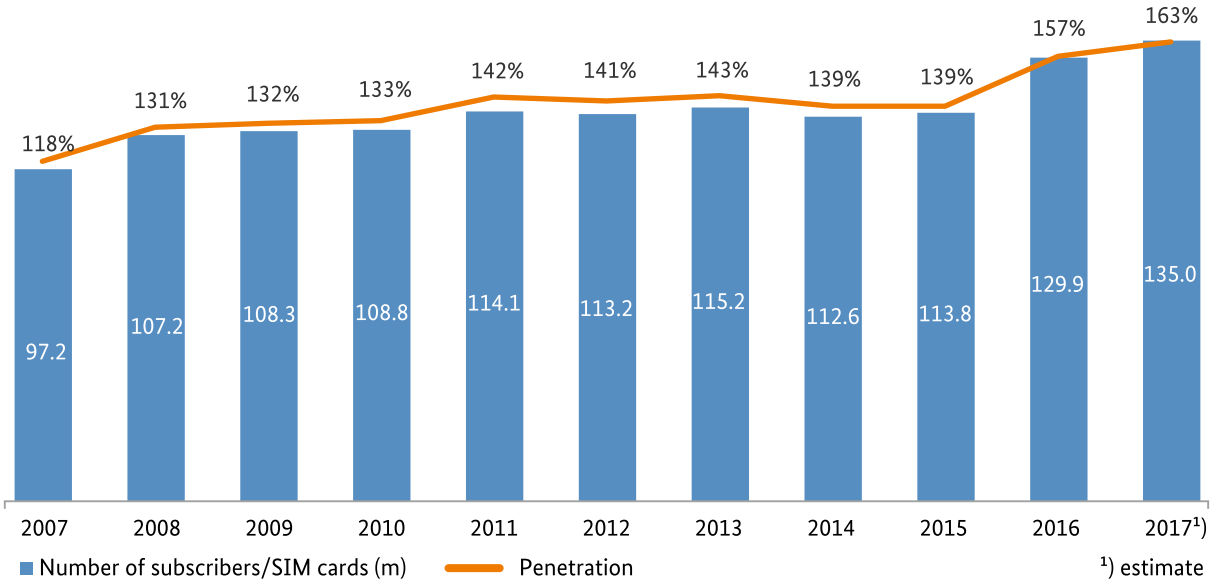
The decline in the significance of local loops as a wholesale product is likely to be due mainly to a shift in demand for wholesale services to DTAG's VDSL-based wholesale products.

Mobile communications

Subscribers

At the end of 2017 there were 135.0m SIM cards activated by network operators (end of 2016: 129.9m).[7] Some 17.6m of these SIM cards were used for data communication between devices (M2M) (end of 2016: 11.1m).

Subscribers and penetration in mobile communication networks



[7] There is no uniform definition of the number of SIM cards specified in the publications of network operators. Each company decides for itself how to count SIM cards and when adjustments are required.

Statistically speaking, each inhabitant has around 1.6 SIM cards. However, the use of two or three devices means that these devices are not in constant use. If only active SIM cards are taken into account, the actual number is lower. SIM cards are defined as active if they have been used for communication in the last three months or if an invoice has been generated for the SIM card in this period. On this basis, data collected by the Bundesnetzagentur suggest that there were 109.7m active SIM cards at the end of 2017 (end of 2016: 109.4m), 25.6% of which were attributable to service providers (2016: 23.6%). M2M and IoT (Internet of Things) cards are not included in these figures.

Around 894,000 SIM cards were used at a fixed location. The number of LTE SIM cards in active use had increased to around 44.9m by the end of 2017 (end of 2016: 36.5m).

Active postpaid cards accounted for a share of 64% at the end of 2017 compared with 60% in the previous year.

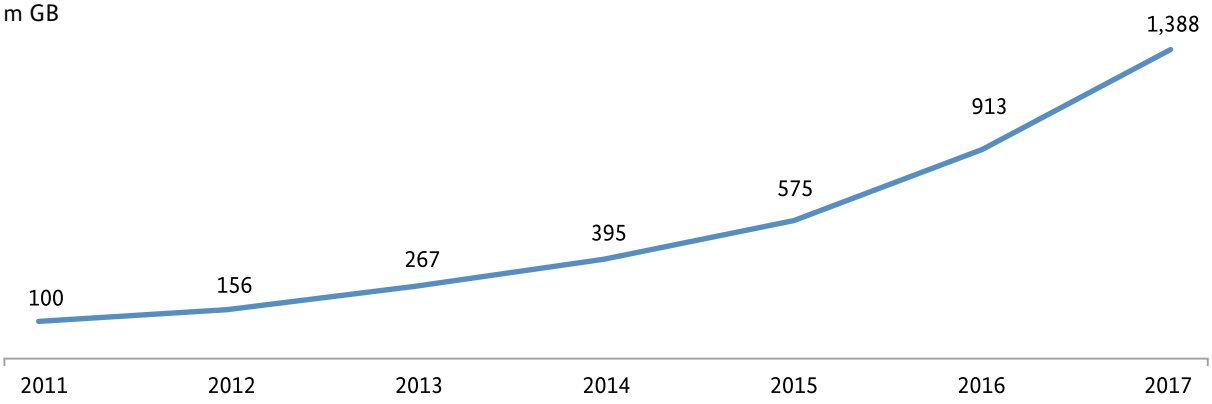
Traffic volumes and usage

Mobile broadband

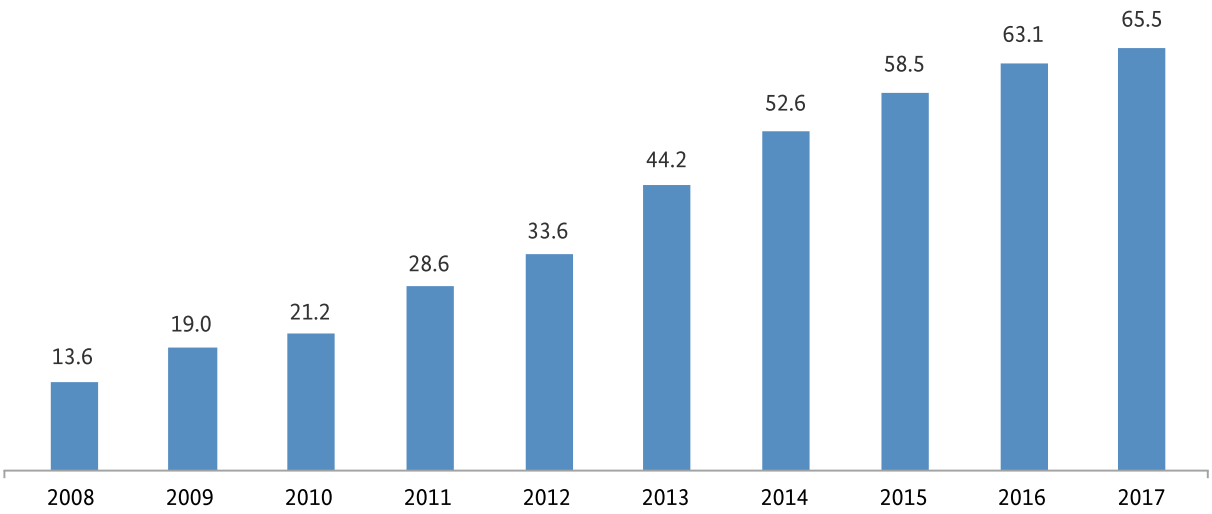
Mobile data volumes increased by 52%. In 2017 1,388m GB of data were transmitted via mobile communication networks (2016: 913m GB).

In order to use mobile data transmission services, the number of SIM cards being employed in UMTS- and LTE-enabled devices had risen once again to 65.5m at the end of 2017 compared with 63.1m in 2016.

Mobile data volumes
m GB



Number of regular UMTS and LTE users
m



Text messaging

The decline in the use of the Short Message Service (SMS) first observed in 2013 continued in 2017. The number of text messages sent fell to 10.4bn in 2017 compared with 12.7bn in 2016. An average of just under seven text messages were sent per SIM card per month. Text messages are increasingly being replaced by messaging apps.

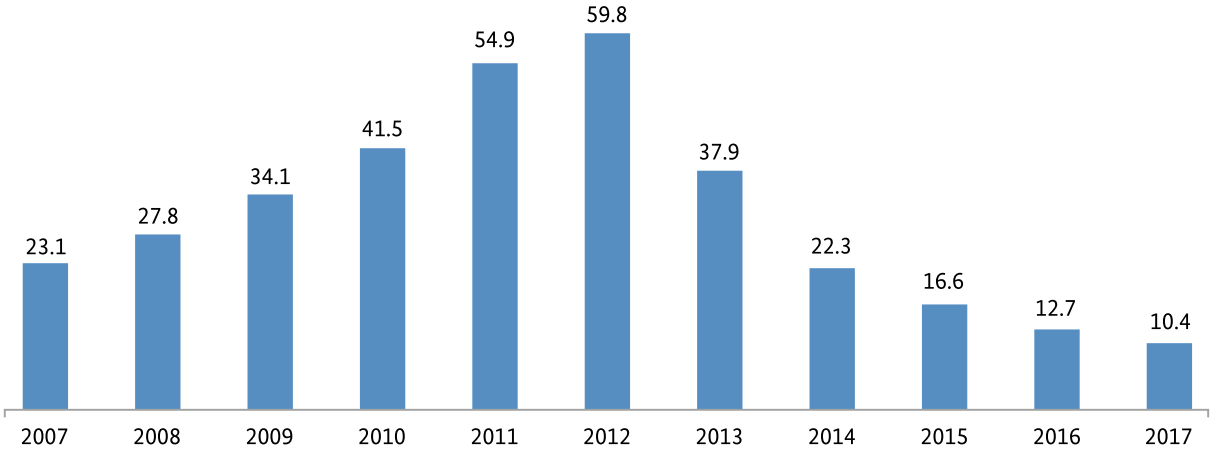
Call minutes

Some 115bn minutes of outgoing calls were made by mobile subscribers in Germany in 2017. This was roughly consistent with the volume in the two previous years.

In 2017 monthly revenue (excluding terminal equipment and VAT) per registered SIM card was around €11.80. The average data volume included in this amount has increased almost eightfold since 2012.

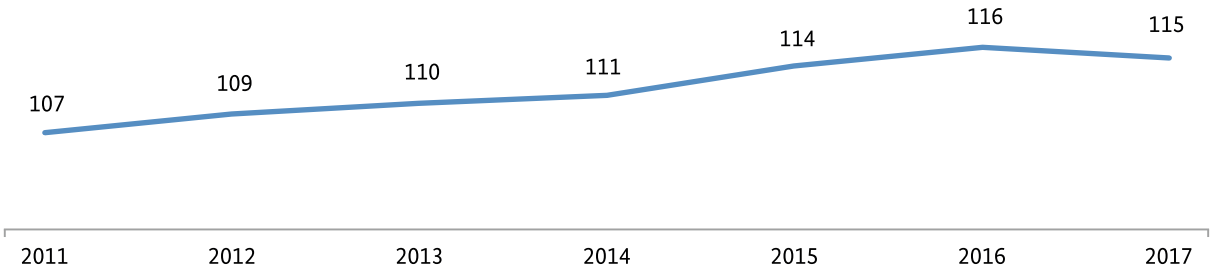
SMS sent

bn

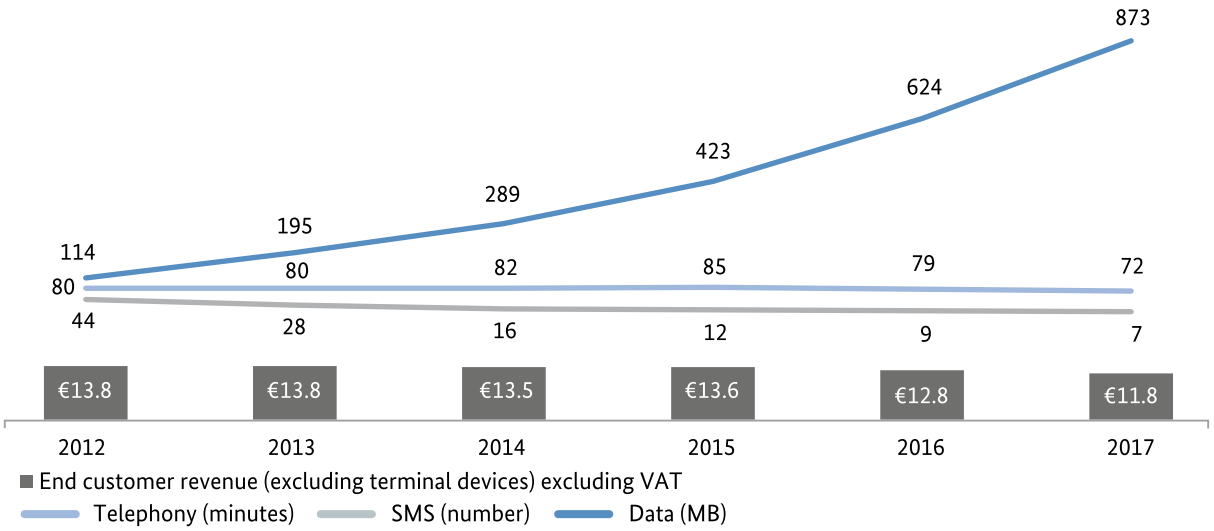


Outgoing call minutes in mobile networks

minutes (bn)



Revenue and services per SIM card per month



Infrastructure and network coverage
The LTE rollout continued at a brisk pace. At the end of 2017 there were 48,146 LTE base stations (2016: 44,100).

DTAG had achieved LTE network coverage in relation to the population of 94% by the end of 2017 compared with 91% for Vodafone and 82% for Telefónica Germany. For all providers, this represents a slight increase compared with the previous year.

Key figures and competitors' shares

The following table provides an overview of selected key figures and competitors' shares in the telecommunications market for the period from 2015 to 2017.

Key figures	2015	2016	2017
Revenue (€bn)	57.4	56.9	56.7 [1]
Investments (€bn)	8.0	8.3	8.5 [1]
Employees	165,900	159,600	153,800 [1]
Total fixed broadband connections (m)	30.7	32.0	33.2 [2]
– DSL	23.5	24.0	24.7
– HFC	6.6	7.2	7.7
– FTTB/FTTH	0.4	0.6	0.8
– Other	0.2	0.2	0.1
Broadband penetration rate (% of households) [3]	77	79	82
Total fixed telephone lines/access points (m)	37.0	38.2	38.5 [1]
– Analogue/ISDN (including public telephones)	16.2	13.0	9.0 [1]
– VoIP via DSL	14.2	17.8	21.5 [1]
– VoIP via HFC	6.2	6.8	7.3 [1]
– VoIP via FTTB/FTTH	0.4	0.6	0.7 [1]
DTAG leased subscriber lines (m)	8.1	7.2	6.1
Mobile subscribers (SIM cards in m) [4]	113.8	129.9	135.0
Mobile penetration rate (% of inhabitants) [4] [5]	138.9	157.4	163.1

Competitors' shares %	2015	2016	2017
Revenue	56	57	57 [1]
Investments	51	47	49 [1]
Fixed broadband connections	59	59	60
DSL	46	46	47
Fixed telephone lines/access points	45	48	50 [1]

[1] Forecast figures
[2] Totals may include differences due to rounding.
[3] Number of households according to Eurostat
[4] According to network operators' publications
[5] Number of inhabitants according to the Federal Statistical Office (DESTATIS)

Consumer protection and advice

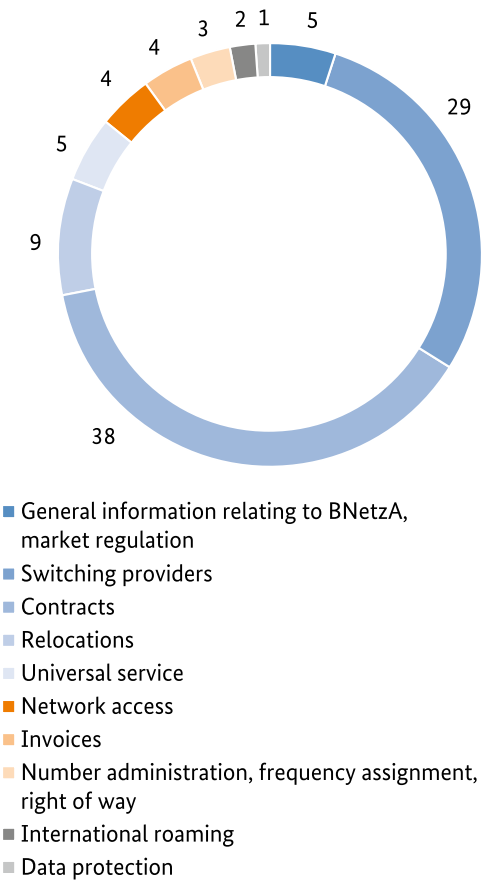
The Bundesnetzagentur's consumer advice service received around 290,000 enquiries and complaints in connection with telecommunications this year. Frequent grievances included questions about the content of contracts and problems regarding the provision of connections.

Fines totalling €1.2m were imposed in 2017 due to unsolicited marketing calls and cold callers hiding their identity. In one particularly serious case, the Bundesnetzagentur imposed the maximum fine of €300,000.

General consumer enquiries and complaints

The Bundesnetzagentur's consumer advice service is an important point of contact for consumers who require support in resolving problems with telecommunications providers. It offers consumers comprehensive advice on their rights in the telecommunications market. Once again, the number of enquiries and complaints – around 81,000 – remained high in 2017.

Main subjects of enquiries and complaints in connection with telecommunications
%



The main subjects of complaints were contracts, switching providers, relocations and the provision of connections.

Many complaints related to discrepancies in the implementation of the contract content, including performance data and price issues, or to problems with contract conclusion or the termination of contracts. As well as contractual information obligations, a large number of enquiries concerned issues that fall within the scope of civil law. Under the Out-of-Court Legal Services Act, the consumer advice service is unable to

provide advice on such matters. However, a solution can often be offered by forwarding complaints to the relevant provider or by recommending that consumers seek legal advice.

Customer service was a frequent source of complaint. Further recurrent problems included technicians not turning up for line provision or fault clearance appointments, or appointments being postponed at short notice.

Many requests for advice also related to switching providers. The aim in this context is to prevent service interruptions for consumers and to allow consumers to take their existing number to the new provider.

Consumer enquiries often related to the possibility of terminating contracts when moving home, especially when the same service is not available at the new location.

Consumers also contacted the consumer advice service for advice on invoicing complaints. Individual invoice items were called into question when, for example, consumers believed there to be no basis for the invoiced costs. A considerable number of invoicing requests also related to the use of the new "roam like at home" mechanism from 15 June 2017. This mechanism means that people pay domestic prices for mobile phone calls, irrespective of where they are travelling in the EU.

Analysis shows that consumers seek information on the tasks of the Bundesnetzagentur and on market regulation measures on a fairly regular basis. The free choice of routers proved to be a particularly popular topic. Consumers also sought information on data protection regulations and ways to protect personal data.

Another topic of interest was the IP migration of Telekom Deutschland GmbH, which has been under way since 2014. With IP-based telephony, which is also used by other providers, voice communication is transmitted in packet-switched mode. DTAG wants to migrate all fixed-network connections by 2018.

Among other things, consumer enquiries related to how this migration will affect terminal equipment and special safety-related services (eg medical alarms, security alarms, fire alarms). Moreover, many consumers are concerned by the instances where the IP technology has failed during the changeover phase and also by the fact that existing contracts are being altered and terminated by companies during the course of the IP migration process.

The introduction of IP-based technology is subject to little regulatory control. Nonetheless, the Bundesnetzagentur has been engaging in a structured dialogue with DTAG and other stakeholders since 2015 with the aim of actively supporting the IP migration process. A key outcome of this dialogue is the establishment of a test centre for special services at DTAG. Here, tests can be conducted to determine, among other things, which medical alarm systems are compatible with IP technology. MSAN POTS[1] cards were also introduced in 2016. These translate analogue or ISDN telephony signals into IP signals. For customers who only use voice services, this offers a complete substitute for their existing services, meaning that consumers who only wish to use voice services, both now and in future, do not need to be actively migrated or have their contract terminated. There are some exceptions to this in "special areas". The MSAN POTS card is also intended to ensure the continued provision of telephone services in the event of a local power cut.

Dispute resolution

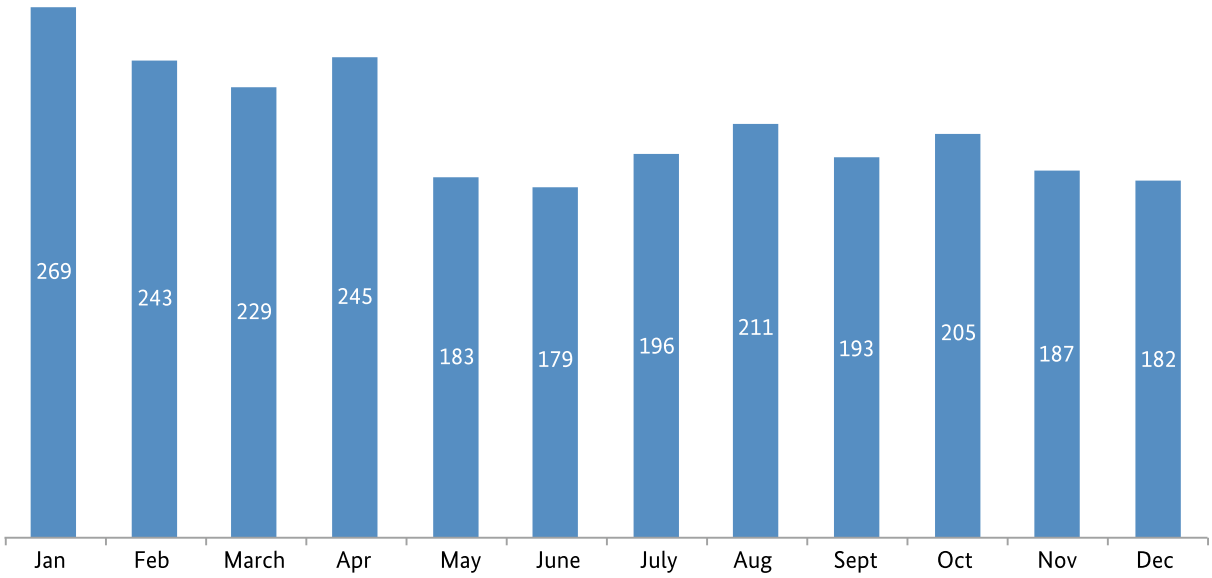
The telecommunications consumer dispute resolution panel acts as an intermediary between customers and telecommunications providers. Dispute resolution provides a fast and cost-effective alternative to civil proceedings. It aims to find mutually acceptable solutions, and thus avoid legal disputes.

The number of applications for dispute resolution by the consumer dispute resolution panel increased again in 2017 owing to the extensive media coverage of the Consumer Alternative Dispute Resolution Act, the additional reporting obligations for companies and the fact that the service is now provided free of charge.

The Bundesnetzagentur received a total of 2,522 requests for dispute resolution in 2017 (2016: 1,972 applications). It also received 1,885 other enquiries and requests for assistance (2016: 875 requests), ie requests for information from consumers and enquiries as to whether a particular set of circumstances could be resolved through conflict resolution.

[1] MSAN POTS = Multi Service Access Node-Plain Old Telephone Service.

Dispute resolution applications per month in 2017



In the 288 proceedings under way, the examination of applications or consultation with the parties concerned is not yet complete.

In 39% of closed cases (860 cases), the application for dispute resolution was dismissed as the prerequisites for initiating proceedings were not met.

Of the remaining 1,374 dispute resolution proceedings, the parties reached an agreement in 50% of cases. In the majority of cases, an agreement was reached before a settlement proposal was made.

In 25% of closed cases (337 cases), the applications were withdrawn – because the matter had been resolved, for example. In 25% of cases (346 cases), the respondent chose not to take part in the (voluntary) dispute resolution proceedings, without offering a solution to the issue at hand.

The percentage of cases pertaining to contractual matters was 50%. Most contentious matters related to the termination of contracts or the provision of contractually agreed performance levels, whereby lengthy periods of connection downtime and available data transmission rates were particularly common grievances.

The percentage of billing complaints was 21%. Most of these related to unreasonable call charges and subscription costs. Most technical problems related to fault processing (11%). The remaining 18% of proceedings related mainly to line disconnection and difficulties switching providers and relocating. A complete overview of the dispute resolution panel's activities can be found in the dispute resolution panel's activity report, which is published annually.

Switching providers

When a switch of providers occurs, telecommunications providers and network operators have a legal obligation to ensure that there is no disruption to the service before the contractual and technical requirements for the switch have been met. Any disruption to the service must not last more than one calendar day. As part of the escalation process, the Bundesnetzagentur forwards consumer complaints directly to the relevant companies in each case if, in contravention of the statutory regulations, service is interrupted for more than one day when switching providers. The companies are obligated to bring each case to a successful conclusion within a short period.

The number of complaints relating to switching providers fell slightly, remaining at a relatively stable level compared with the previous years: in 2017 the Bundesnetzagentur represented consumer interests in around 17,600 cases (including repeat enquiries). Around 3,130 escalation cases were initiated, which is consistent with the level in 2016. The proportion of cases in which errors in the switching process lead to

cases being escalated to the Bundesnetzagentur is therefore estimated to be well below 1% for fixed-network connections. As such, it can be assumed that more than 99% of switches are completed without incident.

In addition, all available legal resources are channelled into ensuring that regulations on switching providers are implemented in accordance with the law. Based on the findings obtained from the escalation procedure, the Bundesnetzagentur assesses whether companies are in breach of their obligations as recipient or donor providers and, in the event of systematic violations, takes action.

Transparency measures – entry into force of the Transparency Ordinance

The Transparency Ordinance for telecommunications came into force in June 2017. The enhanced transparency requirements and information obligations this brings make it easier for consumers to select products in the telecommunications market.

As a core element of this, telecommunications providers must draw up a product information sheet for every product that enables end users to access the internet. Consumers can therefore see the essential contractual provisions – including available data transmission rates, the duration of the contract, conditions for renewing and terminating the contract, and monthly costs – quickly and easily before concluding a contract.

To ensure that the information to be published is presented in a consistent and user-friendly manner, the Bundesnetzagentur has prepared templates for different types of contract as well as guidelines on how to draft product information sheets. The published templates are the result of a public consultation involving not only providers but also consumer protection associations and consumers.

With up-to-date information on the conditions for contract termination now provided on monthly bills, it is also much easier for consumers to switch providers if they wish to do so.

Moreover, consumers now have the right to information on reliable measurement results for their internet connection. The service provider must therefore inform consumers of possible ways to test the speed, for instance by making them aware of the Bundesnetzagentur's measuring tool, which is available at *www.breitbandmessung.de*. It must be possible to save measurement results so that consumers can carry out several measurements and reliably document any discrepancies. All consumers can therefore find out what data transmission rate is being provided and inform their provider of any discrepancies between the actual and the contractually agreed data transmission rate.

In the period under review an increasing number of consumers contacted the Bundesnetzagentur to report discrepancies between actual performance levels and the contractually agreed download speeds.

The Bundesnetzagentur has developed a complaints procedure for discrepancies in fixed networks. Above all, this sets out the formal requirements for complaints in the event that the contractually agreed speeds are not being met and no solution can be found between the end user and the provider. To ensure that only substantiated complaints are forwarded to providers, the Bundesnetzagentur asks that consumers measure the speed of their internet access service beforehand using the broadband measurement tool provided by the Bundesnetzagentur, taking account of the recommendations for carrying out measurements. Although this method has not been used by many consumers so far, the complaints procedure has resulted in positive outcomes for the majority of consumers. Moreover, many consumers have already sought information about the options available to them.

Many providers have nominated a contact person to ensure that any enquiries the Bundesnetzagentur receives about contract transparency can be dealt with quickly. In the event of the contractually agreed data transmission rate not being met, consumers also have the option of contacting the Bundesnetzagentur to request the initiation of dispute resolution proceedings.

The Bundesnetzagentur cannot force providers to terminate contracts early or compensate consumers, either through dispute resolution proceedings or through the complaints procedure. The solutions proposed by companies are assessed by the Bundesnetzagentur.

Discrepancies in fixed-network broadband transmission rates

On 4 July 2017, the Bundesnetzagentur issued a position paper (ref 485/2017) expanding on the ambiguous legal terms in Article 4(4) of Regulation (EU) 2015/2120 on, among other things, measures concerning open internet access. The Regulation states that any significant discrepancy, continuous or regularly recurring, between the actual performance of the internet access service regarding speed and the performance indicated by the provider of internet access services is deemed to constitute non-conformity of performance. A national consultation in April/May 2017 preceded the publication.

Besides addressing the substance of the ambiguous legal terms ("significant discrepancy, continuous or regularly recurring, [...] regarding speed"), the paper also contains the Bundesnetzagentur's guidelines for the verification process using the test for measuring broadband speeds. The paper aims to make the process more user friendly for consumers, including in the event of a legal dispute, with the focus on the speeds specified in providers' contracts.

In the Bundesnetzagentur's view, a significant discrepancy, continuous or regularly recurring, in download speeds is deemed to exist if:

1. at least 90% of the maximum speed given in the contract is not recorded at least once on at least two days of testing;
2 the normally available speed is not reached in 90% of the measurements; or
3. the speed falls below the minimum speed agreed in the contract on at least two days of testing.

Only one occurrence of one such discrepancy is required.

For consumers wishing to verify their broadband speeds using the test provided by the Bundesnetzagentur, the Bundesnetzagentur recommends taking at least 20 separate measurements on at least two different days. The measurements must be taken via a LAN connection and using an installable version of the test software.

The Bundesnetzagentur held a workshop with market participants on 25 July 2017 covering the planned installable version of the measuring tool. A test version was then made available to them at the end of 2017.

The position paper, the statements received in connection with the consultation, and an evaluation of these statements can be found on the Bundesnetzagentur's website at *www.bundesnetzagentur.de/breitbandgeschwindigkeiten*.

For additional information on this topic and the complaints procedure for consumers, please turn to page 65.

Quality of broadband connection services

The Bundesnetzagentur's test for measuring broadband speeds remained popular in its second year, with many consumers using the service to measure the speed of their internet connections. The number of tests conducted has quadrupled since the first year.

The Bundesnetzagentur published its report for the second year (1 October 2016 to 30 September 2017) in January 2018. The report is based on a total of 437,192 valid measurements for fixed broadband lines and 245,143 for mobile broadband connections.

In the fixed network, 71.6% of users across all bandwidth classes and providers recorded at least half of the maximum download data transfer rates agreed in their contracts, whilst for 12% of users, the maximum download rates were met in full or exceeded. These figures are virtually on a par with those from the prior-year period (2015/2016: 70.8% of users recorded at least half of the maximum transfer rates agreed, 12.4% at least the maximum rates).

The ratio of actual to agreed maximum data transfer rates for mobile broadband connections was once again below that for fixed broadband connections. 18.6% of users across all bandwidth classes and providers recorded at least half of the maximum download data transfer rates agreed in their contracts, whilst for 1.6% of users, the maximum download rates were met in full or exceeded. The percentage of users achieving the agreed mobile data transfer rates was thus lower overall than in the prior year (2015/2016: 27.6% of users recorded at least half of the maximum transfer rates agreed, 3.4% at least the maximum rates).

The measurement results are dependent on the tariff agreed between the user and their provider. As such, the test for measuring broadband speeds does not provide a basis for making statements regarding the level of coverage or availability of broadband internet access services.

The annual reports containing the results of the broadband measurements can be downloaded at *www.breitbandmessung.de*. This website also makes the results available in the form of interactive graphics and tables.

As part of its broadband measuring campaign, in 2017 the Bundesnetzagentur set up a portal in which telecommunications providers can register the information on tariffs and data transfer rates required by the German Telecommunications Transparency Ordinance. Tariff information is used, for example, to avoid consumers having to enter all tariff details relevant to the measurement by hand. All of the information registered by the provider is entered into a database and updated regularly. The consumer can select the appropriate tariff from the database on the basis of specific attributes (provider, contractually agreed maximum download rates, tariff name) when using the broadband speed test.

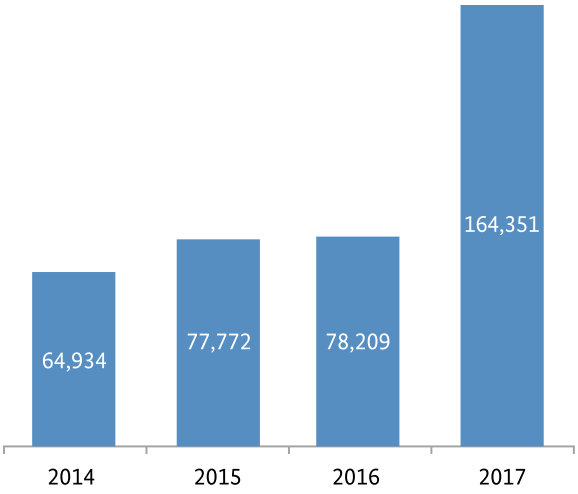
Combating number misuse

The Telecommunications Act places responsibility on the Bundesnetzagentur for combating number misuse. This could involve the Bundesnetzagentur imposing fines for breaches of number use, particularly with regard to consumer and customer protection issues. Most of the cases pursued in this context relate to frequent breaches of the Act's consumer protection provisions and the Unfair Competition Act. Consumers are given effective protection against disturbances and financial losses caused by unfair business practices.

In 2017, the Bundesnetzagentur received 164,351 written complaints and enquiries in connection with number misuse, in addition to 26,861 telephone enquiries and complaints relating to number misuse and nuisance marketing calls. Compared with the previous year (78,209 and 22,338 respectively), the number of complaints more than doubled.

The Bundesnetzagentur has improved its online complaints form to make it even easier to submit complaints online. This is a very popular option and the information received enables the Bundesnetzagentur to take even more effective action against anti-competitive business models. Complaints can now be recorded faster than ever and examined for leads on consumer protection measures.

Written complaints and enquiries

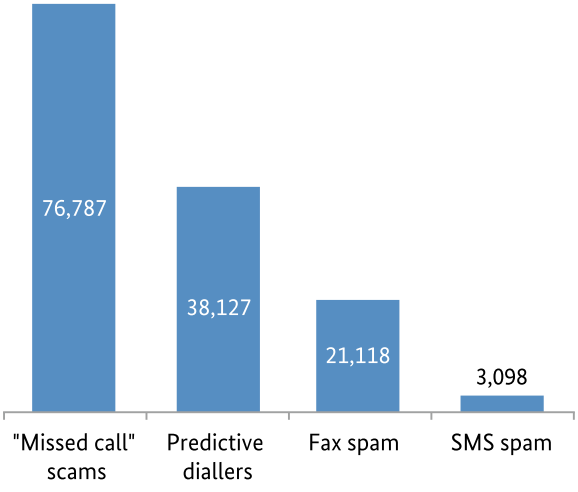


The Bundesnetzagentur opened 4,481 administrative proceedings last year. In 235 cases the Bundesnetzagentur ordered the disconnection of 700 phone numbers. Billing and collection bans were also issued for 1,871 telephone numbers. In two cases the Bundesnetzagentur banned prohibited business models. All actions taken in connection with number misuse are published in a list of measures (*www.bundesnetzagentur.de/Massnahmenliste*).

The Bundesnetzagentur thus continued its successful efforts to combat fax and text message spam, harassing calls, the improper use of call queuing, the circumvention of the Telecommunication Act's consumer protection provisions, and misleading postal spam.

The majority of complaints were received in the following areas:

Focus of the written enquiries and complaints



Bundesnetzagentur combats "missed call" scams

In 2017, the Bundesnetzagentur received over 76,000 complaints in connection with "missed call" scams. These bait calls are generally designed to lure the recipient into calling back a number that will incur heavy charges. In many recent cases, the numbers shown in the call list were foreign numbers that could be easily mistaken for German area codes.

The Bundesnetzagentur has ordered the activation of a price indication service in mobile communication networks from 15 January 2018 to provide no-cost information on the charges associated with specific country codes. The aim is to help consumers avoid making costly return calls and applies to the following country codes (non-exhaustive list):

Burundi (00257); Chad (00235); Serbia (00381); Seychelles (00248); Tunisia (00216); Ivory Coast (00225); Guinea (00224); Sudan (00249); Morocco (00212); Tanzania (00255); Benin (00229); Mali (00223); Uganda (00256); Madagascar (00261); Albania (00355); Bosnia and Herzegovina (00387); Somalia (00252); Liberia (00231); Maldives (00960); Yemen (00967); Macedonia (00389); Sierra Leone (00232); Global Mobile Satellite System (00881).

Anti-competitive conduct stands out as a main subject of complaints. Sanctions are imposed regularly on breaches in this area, particularly violations of the Unfair Competition Act.

"Missed call" scams

76,787 complaints were received in connection with "missed call" scams, in particular ones displaying telephone numbers from outside of Germany. This area is a key focus of efforts to combat misuse and protect consumers.

The Bundesnetzagentur has ordered the activation of a price indication service in mobile communication networks to provide no-cost information on the charges associated with specific country codes. Consumers will now be told that they are calling a premium-rate number outside of Germany before charges are incurred. The aim is to prevent consumers from making unwanted return calls.

The Bundesnetzagentur also issued billing and collection bans to ensure that consumers can neither be billed for the costs of calls to such numbers nor pursued for recovery of the debt.

Predictive diallers

The Bundesnetzagentur once again received a substantial number of complaints (38,127; plus 758 complaints concerning unknown call attempts) in connection with unreasonable call behaviour by call centres. The Bundesnetzagentur clusters these complaints under the heading "predictive diallers". Predictive diallers are computer programmes that dial multiple phone numbers simultaneously. When one call is answered, the remaining calls are terminated and the numbers re-dialled at a later point in time.

The Bundesnetzagentur has introduced a process to warn companies about complaints at an early stage and, where relevant, give them the opportunity to correct their call behaviour in existing campaigns to the benefit of consumers. The process precedes the instigation of abuse proceedings and has been used by the Bundesnetzagentur since 1 July 2017. It allows the Bundesnetzagentur to make companies practising unreasonable call behaviour aware that they are committing violations at an early stage and to inform them in writing of the legal situation. The companies in question are also called upon to examine and modify their call behaviour to prevent continued unreasonable call attempts from being made in the future. If yet further complaints are received regarding unreasonable call attempts by the company, the Bundesnetzagentur reserves the right to take further steps in accordance with section 67 of the Telecommunications Act.

The new process has been a success in the majority of cases to date, with the exception of one in which a company continued to commit violations, resulting in the need for further enforcement action. It is still too early to make a final assessment of how effective the notification process is; however, so far it has offered a fast and efficient method of taking action against predictive dialler-related complaints.

Fax spam

Following a decline in the number of fax spam-related complaints received in the previous year to 16,083, the figure rose once again to 21,118, putting the number of complaints back up to the same high level recorded in 2015. The Bundesnetzagentur responded to the complaints with a number of measures, including ordering the disconnection of phone numbers in 116 cases. The Bundesnetzagentur will continue to combat unsolicited fax spam using the resources available.

SMS spam

The number of complaints received in connection with SMS spam fell by around three quarters compared with 2015, mainly due to the Bundesnetzagentur's active work in this area. It regularly orders the disconnection of phone numbers belonging to the sending parties and any contact phone numbers contained within the text messages themselves. The Bundesnetzagentur takes this step to ensure that the unlawfully advertised service is no longer available and that no further text messages can be sent from the sending party's number.

The updated version of section 111 of the Telecommunications Act, which came into effect on 1 July 2017, also contributed to reducing the number of complaints received. Prior to this, SMS spam was often generated using prepay cards. The new rules require users to be able to verify that the information provided when registering the card is correct, eg by way of a suitable identification document. The Bundesnetzagentur will continue to take an active stance against SMS spam and order the disconnection of phone numbers where it finds that violations have been committed.

Consumer protection guidelines for mobile payments

Issues related to the billing of third-party services via mobile phone bills constituted a further focus of the Bundesnetzagentur's work. In the past, consumers have complained about non-transparent third-party services listed on their mobile phone bills, caused in part by opaque services that could be purchased virtually unnoticed at the touch of a button.

The amended version of the Telecommunications Act empowers the Bundesnetzagentur to set billing-related guidelines. The aim of this change is to protect consumers effectively against the billing of unwanted third-party services on their mobile phone bills. Comprehensive question catalogues were published in parallel for consultation, directed primarily at companies, expert groups and consumer organisations affected by the change. The document can be found online at

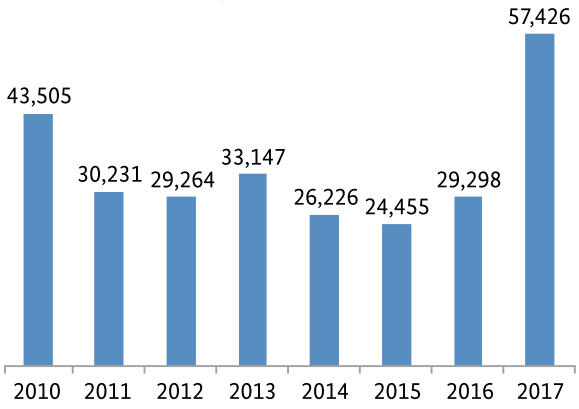
www.bundesnetzagentur.de/mitteilung697-2017

Combating nuisance marketing calls

Nuisance marketing calls continue to be heavily financially motivated. Marketing calls without the consumer's express consent or calls where the caller hides or even falsifies the telephone number are just some of the unfair practices being used.

At 57,426, the number of written complaints received about cold calling in 2017 reached an unprecedented level and was virtually double that of the year before.

Written complaints about unsolicited marketing calls



The rise in the number of complaints confirms the economic significance of efforts to combat nuisance marketing calls and highlights how necessary it is for the Bundesnetzagentur to take consistent action against violations.

The Bundesnetzagentur has identified several drivers behind this increase, which likely include its decision in 2016 to extend disclosure practices, resulting in a greater willingness among consumers to report offences. As a result, last year the Bundesnetzagentur issued a number of press releases on cases it felt were of interest to the public. Since the start of 2017, the Bundesnetzagentur has published an online list of all fines it has imposed.

The energy supply, telecommunication, and insurance and finance sectors remained the main subject of complaints. In 2017, the Bundesnetzagentur once again received a considerable number of complaints relating to criminal wrong-doing (such as phishing attacks) that fell outside of its responsibility. In such cases, the Bundesnetzagentur works closely with the criminal prosecution authorities to ensure appropriate sanctions are taken.

Alongside the rise in the number of complaints, the number of fines imposed also climbed year on year to €1,159,500, up from €895,849 in 2016. In one particularly serious case, the Bundesnetzagentur was compelled to impose the maximum fine within its powers of €300,000. Some 2,500 complainants had contacted the Bundesnetzagentur about marketing calls in which the caller had either falsely identified themselves as belonging to a local energy company or as a partner of the local energy company, with the aim of getting the consumer to switch providers.

Additionally, the Bundesnetzagentur closely monitored the review of regulations designed to protect consumers against dubious business practices. The Bundesnetzagentur submitted statements and proposals on legislative initiatives (eg concerning legal recourse, the granting of procedural rights for the Bundesnetzagentur in legal proceedings, and the introduction of documentation obligations for call centres and their clients), which were taken into account extensively in the final report. Even the Bundesnetzagentur's more aggressive PR work was highlighted positively in the report.

Action to combat misleading geographic telephone numbers

A mandatory requirement for users of geographic telephone numbers is a link to the respective locality, ie their network access or residence/place of business must be based in the local network area in question. Where geographic telephone numbers are used for advertising purposes, consumers must be able to rely on the fact that the telephone number genuinely belongs to a business in the relevant locality.

Geographic telephone numbers are sometimes used and advertised in the media to feign a local presence in violation of this requirement. Such misuse is particularly prevalent in certain service sectors, such as locksmith services, drain cleaning services and removal firms or house clearance services. In actual fact, the companies concerned do not operate business premises in the local network area in question and do not make clear and specific reference in their advertising to the fact that phone calls are forwarded to another locality: doing so would serve to eliminate any accusations of simulating local proximity.

Administrative proceedings were thus opened against a considerable number of providers to impose sanctions on competition law and numbering infringements. The proceedings resulted in a ban on the prohibited advertising of geographic telephone numbers to feign a local presence.

In one particular case, the Bundesnetzagentur ordered the disconnection of 52,000 telephone numbers used by businesses to give the impression of local proximity. A disconnection order was issued on the basis of section 67 of the Telecommunications Act. The 52,000 geographic telephone numbers had been provided to a reseller by a network operator. The reseller had unlawfully assigned the numbers – with disregard for the locality – to various companies, including a provider of house clearance services. In two further cases, the Bundesnetzagentur ordered the disconnection of around 500 and 15,300 geographic telephone numbers respectively. It appears that providers of locksmith services had purported to the network operator that they wished to become resellers of telecommunications services. In actual fact, the supposed resellers assigned the phone numbers to themselves or to shell companies in various geographic areas using fake addresses.

Universal service

In 2017, 2,911 consumers wrote to the Bundesnetzagentur for support with matters concerning the provision of basic telecommunication services. Universal services are a minimum set of services to which all end users must have access at an affordable price. Deutsche Telekom provides the basic service in Germany on a voluntary basis. For consumers, a large number of complaints submitted to the Bundesnetzagentur were prompted by delays in the provision of a telephone line. Here, the Bundesnetzagentur is regularly able to ensure a speedy and, in most cases, satisfactory resolution for consumers thanks to a special workflow coordinated with Deutsche Telekom.

The provision of public payphones and cardphones is likewise part of the universal service. At the end of 2017 an inventory of payphones and cardphones listed around 23,000 phones. Mobile communications have continued their extensive spread, now having reached more than 109.7 million SIM cards. This market development and the full coverage nationwide that has been attained with landlines have reduced demand for public telephones. Despite the measures adopted in the past, the number of extremely uneconomic locations of public telephones remains at a high level.

Text and video relay service

The text and video relay service enables deaf and hearing-impaired people to have access to customary "voice" telephony. To do so, they set up a video or data link to the text and video relay service, which then translates the message into spoken language. Conversely, the recipient's message is translated into sign language or written language. Through the text and video relay service, deaf and hearing-impaired people are able to make and receive calls to and from anybody participating in the service.

The Bundesnetzagentur has put the regular operation of this service out to tender since 2009. Tess – Sign & Script – Relay-Dienste für hörgeschädigte Menschen GmbH has been commissioned to provide the service until the end of 2018.

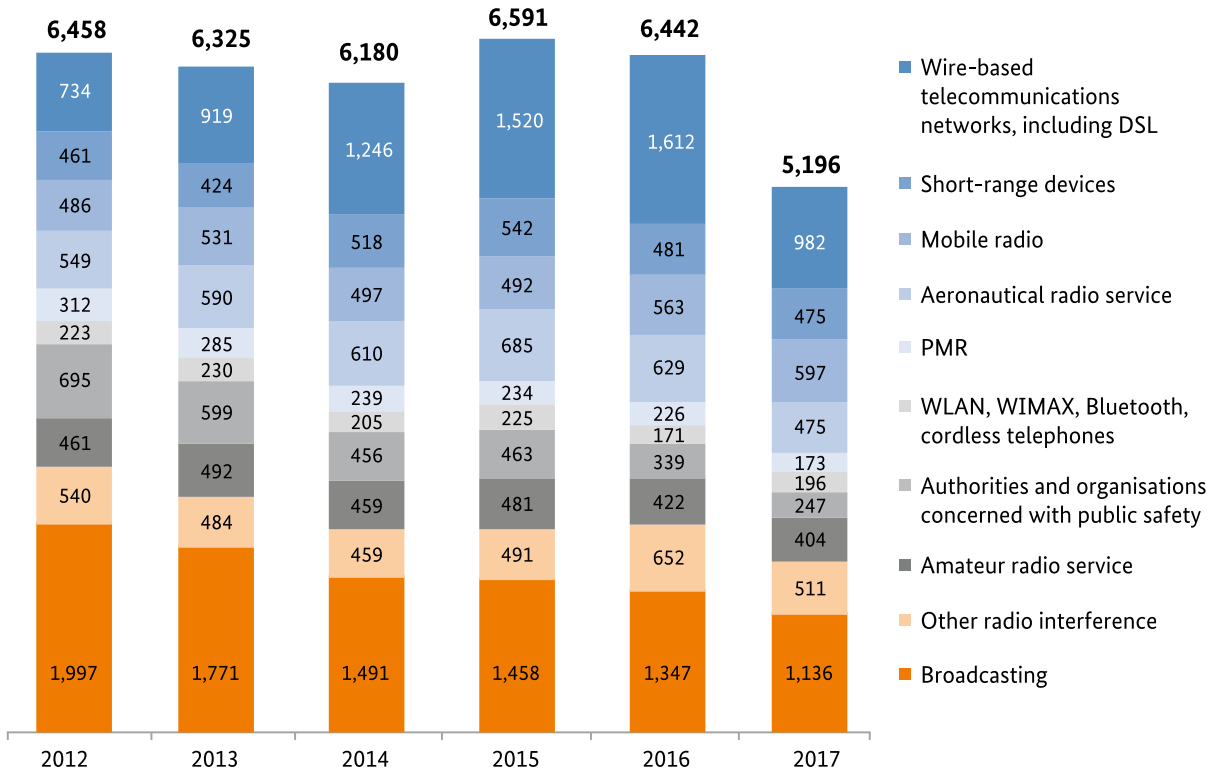
The Bundesnetzagentur once again took appropriate measures in 2017 to ensure that the text and video relay service would also be financed by the providers of publicly available telephone services. Any remaining surpluses will be distributed in full to the telecommunications companies that were called upon to make payment.

Investigating interference – the radio monitoring and inspection service

In 2017, consumers and institutions got in touch with the Bundesnetzagentur's radio monitoring and inspection service in connection with over 64,000 cases of radio interference. One-to-one support was given in more than 15,000 incidences. The radio monitoring and inspection service identified 5,196 cases of local radio interference and electromagnetic disturbances in 2017. These included 769 in security-related areas, such as the aeronautical service, rescue services, and police, fire brigade and rail radio communications.

The number of interferences cleared on site by the radio monitoring and inspection service fell slightly in 2017, due to the implementation of the Federal Fees Act which specifies that fees may be charged in connection with fault resolution. The Special Fees Ordinance for the Electromagnetic Compatibility of Equipment Act and the Radio Equipment Act, which came into effect in October 2017, now clarifies that no fees will be charged for interferences caused through no fault of the consumer.

Development of interference volumes by topic cluster from 2012 to 2017



New regulation on collecting prepay customer data

The Act improving information exchange in the fight against international terrorism has strengthened section 111 of the Telecommunications Act, thus guaranteeing a valid basis for information requests from security authorities. Under the new rules, prepaid mobile service providers are explicitly required as from 1 July 2017 to check new prepay customers' details by requiring certain proof of identity. The Bundesnetzagentur has issued two administrative orders (no 61/2016 and no 67/2017) approving further suitable procedures for verifying customer data. The first round of checks to ensure compliance with the new provisions has already resulted in administrative proceedings and administrative offence proceedings being opened.

Storage of traffic data

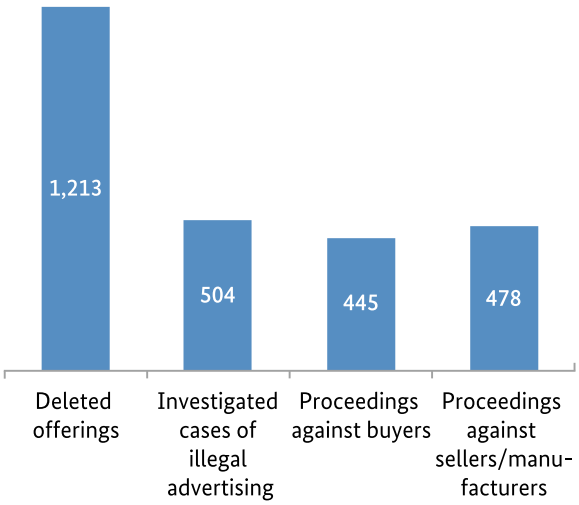
The obligation since 1 July 2017 to store traffic data in accordance with section 113b of the Telecommunications Act led to a number of applications for injunctive relief being filed against the Bundesnetzagentur. In the second instance, the Higher Administrative Court of North Rhine-Westphalia (ruling 13 B 238/17 of 22 June 2017) ruled that the plaintiff was not obliged to store the telecommunications traffic data required by the Act until the legally binding conclusion of the principal proceedings, on the basis that the obligation contravenes European law. Accordingly, the Bundesnetzagentur is taking no steps to implement these storage obligations vis-à-vis all companies affected until a legally binding conclusion is reached in the principal proceedings.

Misuse of transmitting equipment

In 2017, the Bundesnetzagentur expanded its activities to combat the use of prohibited cameras with a transmission function and bugging devices. Internet-connected toys were the main focus, and action was taken against the Cayla doll, the i-Que robot, and remote-controlled cars with integrated cameras that have a transmission function. Children's watches with a listening function were also banned at the end of the year. Working closely with the Bundesnetzagentur, manufacturers have taken steps to transform their products into lawful transmitting equipment: in one case, the manufacturer implemented mandatory updates on children's smartwatches to delete the eavesdropping function.

Due to the willingness of the manufacturers, sellers and platform operators to cooperate with the Bundesnetzagentur, it was not necessary to issue any notices in 2017. 129 cases were closed with a warning. A further 245 cases against buyers were also terminated following voluntary destruction of the devices in question. 96 cases were closed with enforcement by notice. In 55 cases, criminal charges were pressed.

Misuse of transmitting equipment



Contact with market players and authorities in China

From its activities monitoring the markets over several years, the Bundesnetzagentur is aware that a large number of non-compliant products originate from the Far East. The Bundesnetzagentur is thus pushing for cooperation with the Chinese authorities to establish a basis for exchanging information. In particular, the Bundesnetzagentur wants to inform market players in China at a local level about the basic standards that apply to products in the EU. The aim is to use these contacts and information to stop at the source the import of non-compliant products onto the European market.

An agreement to exchange risk profiles for e-commerce with products for wireless audio streaming has already been reached. Such products attract negative attention from the Bundesnetzagentur's market surveillance team particularly frequently because they transmit illegally over frequencies that in Germany are allocated exclusively to safety-relevant radio systems, for example, those used for police, rescue service and aeronautical communications.

Rulings, activities and proceedings

The Bundesnetzagentur has begun identifying nationwide demand for spectrum in the 2 GHz and 3.6 GHz bands to ensure that spectrum for the rollout of the fifth-generation mobile standard, 5G, is provided in line with demand.

In addition, the Bundesnetzagentur has finalised the technical, operational and legal details for the use of vectoring near a main distribution frame.

Framework conditions for local loop access

On 31 July 2017, the Bundesnetzagentur ruled on the final technical, operational and legal details for the deployment of vectoring near a main distribution frame. Moreover, it approved the charges for the virtual unbundled local access (VULA) product to be offered by Telekom Deutschland GmbH (Telekom) as a substitute.

Following the ruling made during the examination of Telekom's reference offer – the regulatory conditions in five agreements had to be updated to take account of the introduction of vectoring in the vicinity of a main distribution frame – a standard form of contract that meets the statutory criteria of completeness, reasonableness, fairness and timeliness is now in place. The contract contains the specific technical, operational and legal details pertaining to the use of vectoring near a main distribution frame, including in particular the rules on cancelling local loops used for VDSL at the main distribution frames and the rules on migrating to other wholesale products. The contract also covers the substitute VULA product, which must closely replicate the characteristics of the unbundled local loop. Lastly, it regulates the financial compensation payable to competitors who can no longer access unbundled local loops in the vicinity of a main distribution frame because vectoring has been deployed.

The charges for the substitute VULA product to be offered by Telekom where vectoring is rolled out near a main distribution frame were also approved in the ruling of 31 July 2017 in line with the efficient operator benchmark.

Users of a VULA product must pay €7.48 a month to Telekom in order to connect the end customer. On top of this, annual charges of €871.47 are payable for access to vectoring infrastructure, especially the multi-service access node. As this infrastructure is used both by users of VULA products and by Telekom itself, the related costs had to be split between Telekom and the other providers. The Ruling Chamber followed the principle of causation when

determining the distribution of costs. Costs are distributed in line with the share of DSL lines that Telekom is expected to realise with its own end customers as well as bitstream or resale wholesale products on the one hand and users of VULA products on the other.

These decisions have now finalised the specifics regarding the deployment of vectoring near a main distribution frame. The countdown for rolling out vectoring near a main distribution frame (27 months for Telekom's nationwide rollout, 15 months for competitors who have filed a rollout commitment) began on 9 November 2017. The Bundesnetzagentur will monitor the progress of the rollout and document its status.

Layer 2 bitstream charges

In late November, the Bundesnetzagentur published its proposed new charges for access to Telekom Deutschland GmbH's layer 2 bitstream. A public consultation gave respondents the opportunity to comment on these proposed charges from 6-22 December 2017.

Under the proposal, competitors will have to pay €18.02/month to Telekom for a VDSL line with 16/25/50 Mbps, while the price for VDSL with 100 Mbps will stay at €19.10. The monthly charge for ADSL will be €15.17.

The charges also cover the transport of data traffic under bitstream access, known as "included traffic". Where included traffic exceeds a certain volume in total or in individual quality classes (real time, streaming, and critical application), an additional transport charge becomes due. However, as previously, included traffic was calculated so as to accommodate the expected medium-term demand for bandwidth.

In addition to the key monthly access charges, approval was also given for the one-off charges for provision and cancellation of layer 2 bitstream access and the annual charges for the connection on the network side between Telekom and the bitstream users.

Competitors committing to a minimum VDSL access quota under Telekom's "contingent model" will continue to pay the imputed charge of €16.55 for the VDSL 16/25/50 Mbps lines. The monthly charge for VDSL 100 Mbps under the contingent model is to have an imputed value of €18.55 (previously €19.10). Competitors first make a one-off payment to Telekom for the whole quota and are then entitled to a discounted price for the individual lines during the multi-year term. The quicker the provider markets its quota of lines, the quicker it recoups the one-off payment, thus bringing down the imputed total cost of €16.55/€18.55 per month even further.

The proposed charges have been approved provisionally effective 1 December 2017 following the expiry of the previous approval on 30 November 2017.

Rates for fixed call origination and termination

The Bundesnetzagentur approved the fixed-line interconnection rates for Telekom Deutschland GmbH on 21 July 2017 for the period from 1 January 2017 to 31 December 2018. Under the new rules, the pure LRIC model recommended by the European Commission in its Termination Rates Recommendation was applied for the first time in place of the efficient operator benchmark used previously. The new method is consistent with mobile termination rates, which are also set using pure LRIC.

The approval covers the rates for basic call termination services within Telekom's own network and for routing calls from the Telekom network to competitors' networks, as well as the charges based on these rates for optional and additional services. The rates apply to calls still being routed via PSTN interconnection points and calls via NGN interconnection points.

A charge of €0.0010/min was approved for call termination. The call origination rate approved for routing calls from the Telekom network to competitors' networks is €0.0023/min.

The termination rates were determined using a benchmarking model. The model looked at all EU countries that calculate and set their rates in accordance with the pure LRIC model recommended by the European Commission in its Termination Rates Recommendation. Unlike the full costing approach followed previously, the pure LRIC model only takes account of the incremental (ie purely additional) costs of providing call termination.

In addition to the call charges, in the period under review the Bundesnetzagentur also periodically re-approved the rates for other fixed-network interconnection services that must be provided by the company with single market power and are thus regulated, such as the charges for interconnection access (ICA), configuration and physical access for collocation.

Moreover, on 20 October 2017 the Bundesnetzagentur definitively approved the call termination rates of 74 alternative providers in the applicants' respective fixed access networks and, where relevant, for ICA.

These termination rates are in line with the rates approved for Telekom (€0.0010/min) and were applied to the alternative access network operators in order to comply with the regulatory order issued on 20 December 2016, which requires rates to be approved on the principle of symmetrical efficiency.

Rates for local loop and IC collocation

On 30 November 2017, the Bundesnetzagentur approved Telekom Deutschland GmbH's (Telekom) rates for collocation services in connection with local loop access at the main distribution frame and network interconnection.

The approvals cover the charges for numerous administrative and technical services provided as part of the design, project planning, provisioning, leasing and dismantling of collocation rooms and spaces and the technical facilities required there (such as air conditioning and ventilation, low-voltage power supply and connecting cables), as well as ancillary costs.

On 19 December 2017 the Bundesnetzagentur approved the "total cost flat rates" that Telekom had agreed with two operators as part of projects to completely dismantle local loop collocation rooms. The dismantling of collocation spaces is growing in relevance in light of the plans by various companies to migrate their platforms completely from the local loop to wholesale bitstream products.

The electricity charges that competitors must pay Telekom for operating their technology in the collocation spaces were approved on 27 November 2017 as part of a periodic review.

The rate is set at €0.2046/kWh and is valid until 30 November 2018.

VHF broadcast transmission charges

On 31 March 2017, the Bundesnetzagentur set the rates that Media Broadcast GmbH can charge to individual radio broadcasters for transmitting VHF broadcasts.

An ex post review process launched in early February found that the original charges were not lawful as they were in breach of the prohibition on price squeezing. In these cases, the gap between the charge for the (co-)use of antennas and the charges for transmitting VHF broadcasts was patently insufficient to allow an efficient company to generate an adequate return on capital employed, thus inhibiting the competitiveness of other transmission service providers.

By contrast, the charges set by the Bundesnetzagentur are in line with statutory requirements; the price-squeezing effect has thus largely been eliminated. The Bundesnetzagentur reduced the charges payable by competitors to Media Broadcast GmbH for the joint use of their VHF antennas, whilst the charges for transmitting VHF broadcasts have been raised slightly in individual cases by up to 2.5% from the previous level. The decision took due consideration of the special interests inherent in broadcasting.

Approval of leased line rates

Telekom Deutschland GmbH is required to grant access to the terminating segments of leased lines with bandwidths of 2 Mbps to 155 Mbps (carrier leased lines) including access to the necessary collocation facilities and additional services. The access rates charged by Telekom are subject to approval. In addition to the yearly access charges, which were most recently approved in a separate process in 2016 with effect from 1 January 2017, the Bundesnetzagentur must approve one-off charges for items such as one-off connection fees, fast repair and other extra services.

Telekom submitted follow-up applications for these one-off charges for which approval was due to expire. Separate applications were filed for the leased line types CLL-SDH and CLL-Ethernet. The charges were approved definitively effective 1 July 2017 in each case.

Potential review of costs for customer data

The Bundesnetzagentur examined an application from eight publishers requesting a review into the costs for customer data. The publishers claimed that their cooperation partner Deutsche Telekom AG (DTAG) was charging them excessive costs for customer data, since supposed cost reductions were not being passed on to buyers within reason. Moreover, they alleged that the costs were being spread unequally amongst buyers and not in line with the principle of causation.

The Bundesnetzagentur did not open ex post rate review proceedings. Following an initial examination, the Bundesnetzagentur found in particular no evidence of exploitative pricing and no objectively unjustified unequal treatment that could be considered discriminatory practice. Neither could the Bundesnetzagentur uphold the claim that DTAG's billing was not in line with the principle of causation.

Storage of traffic data (compensation)

Changes to the law have required businesses to retain traffic data since 1 July 2017. This obligation remains valid following the fast-track ruling by the Münster Higher Administrative Court.

Companies that comply with the statutory obligation to retain traffic data may be able to file an application for compensation on the grounds of undue hardship. Ruling Chamber 2 reviews and, where necessary, determines a reasonable level of compensation to which companies are entitled who have suffered undue hardship owing to outlays in connection with implementing the Telecommunications Act provisions on data retention. One application for compensation was submitted to Ruling Chamber 2 in 2017. The company then withdrew its application in September 2017 after being asked multiple times to provide evidence of the undue hardship and confirm compliance with the data retention provisions.

Preliminary examination into dispute resolution proceedings relating to mobile resale activities

At the request (dated 30 August 2017) of another provider who is planning to offer Wi-Fi on public transport via the network of a mobile network operator, on 24 October 2017 the Bundesnetzagentur opened a preliminary investigation into the resale of mobile applications, ahead of dispute resolution proceedings.

This was prompted by a public invitation to tender in which the competitor had successfully bid to operate a Wi-Fi system on local public transport. The provider had planned to use a mobile communications product from a mobile network operator to deliver the mobile connection required for the system. The contract for the product contained a clause prohibiting the resale of the product to third parties. The company asked the Bundesnetzagentur to verify to what extent the clause is or is not legally permissible.

During the verification process, the mobile network operator agreed to make a special offer to the competitor for the resale of a suitable service. The process was thus closed without dispute.

Forward-looking assignment of spectrum for digital infrastructure expansion

The digital transformation continues apace, bringing with it growing consumer demand for high data rates and ever-increasing mobility. Digital infrastructure that can cope with the demands of tomorrow calls for high capacities, high availability and low latency. The right spectrum for the data highways of the future is key. It is the Bundesnetzagentur's aim to make the resources available to market participants as early as possible and in line with needs.

In the future, these digital data highways will be upgraded to offer 5G. Spectrum assignment conditions that promote the rapid and highly competitive expansion of 5G infrastructure are thus essential.

The Bundesnetzagentur published its key elements paper on the expansion of digital infrastructure for consultation on 27 June 2017. The key elements address spectrum bands suited to 5G. The UMTS spectrum in the 2 GHz band will be re-awarded for this purpose.

5G pioneer bands have also been identified, in particular the 3.6 GHz band. With a view to promoting the nationwide expansion of high-performance next-generation mobile networks, the majority of 3.6 GHz spectrum is to be made available early for nationwide assignments. At the same time, smaller and medium-sized businesses are to have access to the spectrum they need to realise local and regional business models. Many new business models are also likely to emerge for the first time during the course of the digital transformation.

The Bundesnetzagentur published some points of orientation in December 2016. This document offered an early indication of the available spectrum bands and initial considerations regarding assignment, and gave commentators the opportunity to respond. In particular, the consultation was also an opportunity to identify future business models and scenarios for the application of 5G spectrum.

The Bundesnetzagentur used this as the basis for its key elements paper and simultaneously began identifying demand for nationwide assignments in the 2 GHz and 3.4 to 3.7 GHz ranges. In so doing, the Bundesnetzagentur prompted the start of the process to make key 5G spectrum available.

Companies had until 30 September 2017 to notify the Bundesnetzagentur of their spectrum needs. The information they provide is used by the Bundesnetzagentur to prepare its spectrum scarcity forecast. If a potential scarcity of spectrum is identified, the law requires spectrum to be awarded by way of open, transparent and non-discriminatory proceedings. This would require the Bundesnetzagentur to rule on key aspects including the interpretation of service provider obligations and needs-based coverage of the population with high-performance broadband. The Bundesnetzagentur plans to make the 5G spectrum available before the end of 2018.

Meeting mobile broadband coverage obligations

The assignment of the 700 MHz, 900 MHz, 1800 MHz and 1452 to 1492 MHz spectrum bands auctioned in 2015 included a coverage obligation that required each mobile network operator to provide mobile broadband coverage to the population with transmission rates of at least 50 Mbps per sector. The goal is to make transmission rates of 10 Mbps and over generally available to all households.

The coverage obligation applies to households and is designed to ensure the focus is on covering the population – not just geographic areas – with broadband. Each mobile network operator is obliged to reach 97% of households in each federal state and 98% nationwide. Additionally, they must guarantee full coverage along major travel routes (national motorways and high-speed railway lines) where practicable and technically feasible.

All mobile network operators must comply with the coverage obligation from 1 January 2020 and are entitled to use their spectrum packages in their entirety to do so.

The Bundesnetzagentur has created a concept to verify the coverage obligation on households and also set the defining parameters. The mobile network operators submitted coverage maps prepared on this basis. Using the coverage maps it received, the Bundesnetzagentur identified what it calls reference areas that take account of both the federal states and the different settlement structures. The Bundesnetzagentur then verified the selected reference areas using its radio monitoring and inspection service. Using the measurements taken, the Bundesnetzagentur was able to determine how precisely the mobile network operators replicated actual coverage in their coverage maps.

An additional concept was developed for coverage along major travel routes. This called for the challenges involved in providing mobile coverage at high speeds to be balanced against consumer interests in having maximum coverage.

Whilst the coverage obligation only applies from 2020 onwards, the Bundesnetzagentur is supporting the expansion of mobile broadband coverage at this early stage and significant progress can already be seen. Looking ahead, the expansion is likely to continue advancing apace.

Consultation on the Digital Networks Act

The Digital Networks Act, which came into force on 10 November 2016, transferred numerous key tasks to the national dispute resolution panel. The panel mediates on issues such as disputes over the shared use of passive infrastructure or the coordination of civil works and adopts binding decisions where needed.

With a view to supporting future rulings by the national dispute resolution panel and voluntary negotiations between market participants involved, the Bundesnetzagentur drafted a consultation paper on rates-setting in both of these scenarios – the co-use and coordination of civil works/co-laying of cables. In respect of the co-laying of cables, the legislature explicitly mandates the Bundesnetzagentur in accordance with section 77i(4) of the Telecommunications Act to publish the cost allocation principles applicable. However, for the sake of consistency any discussion of the models for co-laying rates must be in direct relation to those for co-use rates.

In particular, the consultation sets out how the rate models could be structured so as to tap the maximum potential for synergies targeted by the Digital Networks Act whilst retaining first-time investment incentives for telecommunications companies. In this respect, the Act requires rates to be set on fair, reasonable and non-discriminatory terms. As a result, the legislature has determined that the repercussions for business plans are also to be taken into account in addition to the extra costs incurred by co-use or co-laying. The methodology outlined in the consultation builds on this and should ensure that neither planned co-use nor co-laying activities negatively affect the original business plans or associated profitability analyses for telecommunications companies.

Following publication or after the consultation, as the case may be, the Bundesnetzagentur analyses the statements submitted by market participants.

Statements on broadband expansion funding

The federal government aims to achieve nationwide coverage with broadband connections of at least 50 Mbps by 2018. Expansion activities by the private telecommunications sector alone are not enough to meet this target, thus assisted expansion is gaining momentum.

Subsidised networks that form part of the assisted broadband expansion must be organised such as to ensure they remain open to competition and sustainable in future so that private investment is not prevented or hindered by state aid. This includes granting third parties access to the assisted infrastructure.

The Bundesnetzagentur examines and gives feedback on the access conditions, including the prices, specified in the agreements between the organisations granting the aid and the network operators receiving the aid. This process is intended to secure effective, open network access for third-party providers in the respective regions and thus give local consumers a choice of providers. In 2017 the Bundesnetzagentur reviewed well over 200 agreements.

Germany registered three virtual unbundled local access (VULA) products with the European Commission in September 2016. On 11 August 2017 the European Commission approved these three products for use in the deployment of vectoring in assisted regions under the NGA framework. The approval applies in equal measure to assisted broadband programmes under the General Block Exemption Regulation.

For clarification purposes, the European Commission added that other recipients of aid could also deploy vectoring without having to register their VULA product separately provided the product is an effective virtual substitute for the physical unbundling and its characteristics exactly replicate one of the three approved VULA products.

Net neutrality

On 15 December 2017 the Bundesnetzagentur issued an order in accordance with section 126(2) of the Telecommunications Act regarding the StreamOn add-on option from Telekom Deutschland GmbH. The order prohibited certain elements of StreamOn, which is available under the Magenta Mobil mobile tariff. However, Telekom may continue to offer the StreamOn service. The Bundesnetzagentur's actions uphold the European rules on net neutrality and roaming (Commission Regulation (EU) 2015/2120) (please also refer to the section entitled "International roaming" from page 88 onwards).

The StreamOn option is a zero-rating service that can be added at no cost by customers on the Magenta-Mobil[2] M and L and MagentaEins[3] M and L plans. The service lets customers stream audio and video from partner companies without using up their monthly data volume and was launched on 19 April 2017.

The Bundesnetzagentur has prohibited the capping of data transmission rates at 1.7 Mbps for video streaming under one of the tariffs ("L"). This slowing down of data transmission violates the principle of equal treatment for all data traffic. This principle is a cornerstone of European rules on net neutrality regulation; a cornerstone which has transformed the internet into an engine of innovation.

The cap on broadband speeds reduces the maximum video quality to SD. This constitutes unequal treatment of internet traffic, since video streaming under the L tariff is handled differently to other services, such as audio streaming, e-mail, gaming or video conferences. Unequal treatment of this nature neither constitutes reasonable traffic management nor is it justifiable on any other exceptional grounds. In particular, there is no objective technical reason as to why video streams should have to be transmitted at a slower rate. Under net neutrality rules, the performance capability of an individual network does not

[2] A type of mobile postpay contract at Telekom.
[3] A bundled contract at Telekom comprising two separate postpay contracts for fixed-network and mobile services.

justify the permanent capping of data transmission rates for data-intensive traffic like videos. Neither can StreamOn customers consent to waiving the fundamental principle of the equal treatment of all data traffic. The European legislature explicitly decided against recognising such consent as an exception, as any other decision would open up to discussion precisely the end-user rights that net neutrality aims to protect.

Capping video streaming services at 1.7 Mbps means that videos can only be viewed in low resolution on smartphones and other mobile devices. 480p quality signifies a step backwards compared with the standard video resolutions available today.

Telekom's other MagentaMobil tariffs and the tariffs for MagentaEins customers are not affected by the Bundesnetzagentur's instructions regarding net neutrality.

Telekom must implement the orders by 31 March 2018. If it fails to do so, the Bundesnetzagentur can impose a fine. The decision is not yet legally binding.

In 2016, the Bundesnetzagentur published its first annual report on net neutrality in Germany covering the period from May 2016 to April 2017. Commission Regulation (EU) 2015/2120 requires national regulatory authorities to publish annual reports on their monitoring activities and findings and submit these reports to the European Commission and BEREC. The annual report covers the following topic clusters: safeguarding access to the open internet, transparency measures, oversight and enforcement, and sanctions.

Infrastructure atlas – a single information point

Launched in 2009, the infrastructure atlas contains data on infrastructure that is generally available for co-use in connection with the expansion of broadband networks, in particular fibre-optic cables, ducts, radio towers and masts. At present, some 1,200 network operators and local communities provide data for the atlas.

Since the Digital Networks Act came into force on 10 November 2016, the infrastructure atlas has been transformed into a new single point of government information.

The overview previously used for planning purposes is now being supplemented by detailed information for the joint use of passive network infrastructure and information about civil works in public supply networks. The single information point also makes standard contracts on co-use by owners or operators of public supply networks available and gives out general information about civil works.

Additional data on traffic lights, street lighting and sewage pipes will be added in the future, and data on publicly subsidised infrastructure will also be collected.

In September 2017, the existing data suppliers committed to delivering enhanced data and almost 600 agreements had been renegotiated by the end of 2017. The standard agreements provided by the Bundesnetzagentur met with a positive response.

Extensive IT system upgrades to power the new infrastructure atlas began in early 2017. The changes include technical modifications and add-ons that have become necessary following the implementation of the Digital Networks Act and the associated extra activities for the Bundesnetzagentur. The presentation of the infrastructures will improve significantly as the update work progresses, with the data to be shown on a larger scale (maximum 1:10,000). The data will be less coarse than previously (maximum scale: line feature width 10 metres; point feature diameter 20 metres).

Over the last few years, the infrastructure atlas has become a key planning tool for the build-out of broadband connectivity. The added detail and supplementary information will improve the service further. In particular, the inclusion of data on civil works for coordination and cable co-laying purposes will be a useful addition to the infrastructure atlas and introduce added transparency when planning broadband expansion work.

Promoting machine-to-machine communications using public mobile networks

A major growth area for the telecommunications industry is the automated exchange of information between objects such as vending machines, vehicles or measuring units (eg electricity, gas and water meters) or with a central data processing unit. Many of the applications are intended for use in more than one country or even globally. The terminal equipment required for the applications is usually produced for the world market. It is expected that machine-to-machine (M2M) communication will gain an increasing toehold in particular in the automotive industry (connected cars), households (smart home) and the energy sector (smart meters).

The Bundesnetzagentur issued rules on the use of mobile phone numbers in other countries that will make it even easier to market M2M applications worldwide. Mobile numbers with Germany's country code may be used outside of Germany for M2M applications. Vice versa, terminal equipment with foreign phone numbers may be marketed in Germany.

In the case of extra-territorial use, foreign network operators must indicate when foreign numbers are used in Germany. This is only required in the opposite case (ie where German mobile phone numbers are used abroad) if the network operator does not already take part in the automated or manual information procedure. Using this approach, the Bundesnetzagentur or the security authorities can identify the user (such as a vehicle owner) should an M2M phone number demonstrate irregular behaviour. After consultation with market participants and a discussion with the security authorities, the scope of the indication requirement was limited to the absolute minimum necessary. The goal is to avoid hindering the development of the market.

IMSIs were approved for marketing outside of Germany last year. They are used by mobile terminal equipment to log in to a network via the radio interface.

"Digital transformation in the network sectors" position paper

The core of the digital transformation is enabling smart connectivity across all economic sectors. At the same time, the markets are more complex and dynamic than ever before. This creates enormous opportunities and potential but is not without its challenges. The "Digital transformation in the network sectors" position paper published in June 2017 takes a systematic look at digital changes in the network sectors and identifies areas in which regulatory action is needed. It offers further input to discussions on digital economic and regulatory policy for the network sectors first prompted by the Federal Ministry for Economic Affairs and Energy's white paper entitled "Digital platforms".

The Bundesnetzagentur's paper finds the establishment of sector-specific competition oversight to be essential if the multi-faceted challenges posed by the digital transformation are to be properly structured. Although regulatory decisions will still be taken on the basis of market observations and market delimitations, dynamic market trends call for a more flexible view of markets and business models. The continued build-out of high-performance, secure network infrastructure remains at the centre of the intelligent networking of business and society.

New regulatory issues are another aspect that all regulated network areas have in common. Data-driven business models that increasingly offer a range of product and service bundles from a single source are gaining momentum. More and more, the processes underpinning the models are playing out in what are known as value networks. In particular, direct access to the customer, ie sovereignty over the customer interface and customer data, is becoming a major factor in competition.

In light of this, it is clear there is a growing need to view topic clusters, such as the digital transformation and connectivity across economic sectors, the use of data and the creation of online platforms, as a whole. Greater meshing of these areas calls for a more end-to-end approach to digital regulatory policy. This applies not only to competition and market issues, but also – and above all – to the area of consumer protection.

OTT market data survey

In recent years, OTT communication services like e-mail, messenger and internet telephony services that compete with traditional telecommunication services such as text messaging and voice telephony have been gaining traction.

The Bundesnetzagentur collected information about the use of these services in the first survey of its kind in mid-2017. Gaps in the responses received make it difficult to draw definitive conclusions.[4] However, some trends can be observed: OTT services appear to be the biggest driver of the decline in traditional telecommunications services both in voice telephony and text messaging. By contrast, e-mail services appear not to be losing ground despite the apparently high relevance of messaging services. It is possible that messaging services are seen as complementary to e-mail services rather than being used as a substitute.

Technical regulation

Standardisation of the fifth generation of mobile technology/International Mobile Telecommunication 2020 (IMT 2020)

5G, the fifth generation of mobile communications, is set to become a key technology for connected society. Standardisation work is due to finish as early as around 2020.

In July 2017, the federal government adopted a 5G Strategy for Germany. As part of the Strategy, the Bundesnetzagentur set up a 5G dialogue platform to give user industries such as the automotive and automation sectors and manufacturers of medical devices the opportunity to voice their demands in connection with 5G standardisation.

By actively promoting standardisation activities on the global stage, the Bundesnetzagentur works to ensure the implementation of regulatory framework conditions in technical standards, in particular with respect to the efficient use of mobile spectrum.

Emergency calls

Germany's telephone networks and lines are being migrated from analogue/ISDN technology to IP technology. Emergency call lines are also being migrated. The technical standards applicable to typical IP emergency call lines were developed in collaboration with the relevant federal state ministries and finalised in January 2016. In consideration of these standards and the technical advancements in telecommunications networks, a revised version of the Technical Directive on Emergency Calls was drafted and submitted for public consultation in January 2017. The amended version now also covers the technical characteristics of emergency calls via IP networks and from IP emergency call lines.

Public safety

Storage of traffic data

The Act introducing a storage obligation and a maximum retention period for traffic data of 10 December 2015 led to the inclusion of a number of new sections (sections 113a to 113g) in the Telecommunications Act. The new provisions place responsibility with the Bundesnetzagentur for such matters as the general obligation under section 113a(1), for traffic data transmission issues under section 113c, and for ad hoc issues relating to the traffic data storage obligation.

[4] 58 of the 140 companies surveyed responded. As data was being collected for the first time, not all companies had ad hoc access to the data requested. Moreover, not all companies were able to provide backdated data for 2015 and 2016. Some companies were opposed to providing data.

Due to pending proceedings opened by an internet service provider seeking injunctive relief, the Bundesnetzagentur is not currently issuing orders to implement the storage obligation in section 113b of the Act.

Telecommunications intercepts, provision of information in accordance with section 110 and section 113(5) of the Telecommunications Act
In 2017, the Bundesnetzagentur once again carried out checks on the companies covered by the obligation and thus ensured a consistently high standard of implementation of the legal requirements.

Version 7.0 of the Technical Directive setting out the technical details for implementing legal measures for the interception of telecommunications and the provision of information of traffic data came into force in June 2017, implementing the new rules of the Telecommunications Act and the Telecommunications Interception Ordinance. The new version was drafted in consultation with the authorised bodies and with the involvement of the associations of the companies affected and the manufacturers.

Automated information procedure in accordance with section 112 of the Telecommunications Act
The Bundesnetzagentur's automated information procedure is an accepted and legally watertight investigative tool that contributes to public safety in Germany.

Authorised bodies (police, criminal police offices, federal and state protection authorities, emergency dispatch centres) can send requests to the Bundesnetzagentur for customer data, such as names, addresses and telephone numbers, via an automated and highly secure system 24 hours a day. The Bundesnetzagentur passes on the requests to the telecommunications companies and forwards the responses received from all the companies contacted to the authorities. At present, 107 authorities are registered as authorised bodies, with 116 companies taking part in the scheme.

Up to 120,000 requests for names and telephone numbers are received each day from authorities and emergency dispatch centres. The number of requests received has been increasing substantially for several years. In 2016, the Bundesnetzagentur processed 10.26 million requests. In 2017, this number grew to 12.75 million. The latest statistics and further information can be found at *http://www.bnetza.de/aav*

Technical safeguards
Protecting the privacy of telecommunications and personal data, protecting systems against faults or interference, and managing the risks to the security of telecommunications networks and services are the key objectives of section 109 of the Telecommunications Act. In 2017, the Bundesnetzagentur received 215 new security concepts which it examined for compliance with the statutory provisions in section 109(4) of the Act. 107 spot checks were carried out on site to check the implementation of the security concept. 23 incidents classified as security violations within the meaning of section 109(5) of the Act were reported to the Bundesnetzagentur.

The updated version of the Telecommunications Act dated 23 June 2017 included changes to the obligation to notify the Bundesnetzagentur of security violations as set forth in section 109(5). In future, companies must inform both the Bundesnetzagentur and the Federal Office for Information Security of security violations without delay. With a view to implementing this change to the law, the previous implementation concept in version 3.0 was revised in conjunction with the Federal Office for Information Security and the new version (4.0) published in the Bundesnetzagentur's Official Gazette and on the Bundesnetzagentur website on 22 November 2017.

Electronic trust services:
new activities in the wake of the Trust Services Act

The Trust Services Act came into force last year, bringing with it a number of new activities for the Bundesnetzagentur in the area of electronic trust services.

The Bundesnetzagentur successfully set specialised criteria for appointing private certification bodies in accordance with Article 30(1) of the eIDAS Regulation and focussed on improving access to electronic trust services and securing their long-term availability even after a provider has ceased operation.

The Bundesnetzagentur made recommendations for users and providers of electronic trust services, examined the accessibility of services, and reviewed the options for deploying simplified identification processes. The start of efforts to establish the trust infrastructure required by section 16(5) of the Trust Services Act that will allow qualified electronic certificates and qualified electronic timestamps (permanent directory) to be verified on a permanent basis laid the foundation for long-term reliability and legal certainty when using electronic trust services.

International cooperation

Roaming surcharges were definitively abolished with effect from 15 June 2017. Since then, customers generally pay the same price as at home for calls, texts and mobile data wherever they are in the EU. The Bundesnetzagentur is monitoring compliance with the roam like at home principle by roaming providers.

Work on international committees

The Bundesnetzagentur has long been committed to working closely with European regulatory groups on the international stage. The Body of European Regulators for Electronic Communications (BEREC) takes a central role. Established in 2010, BEREC brings together representatives of the Bundesnetzagentur and the regulatory authorities of the other Member States. BEREC's objective is to develop and promulgate regulatory best practices, such as common approaches, methodologies and guidelines for implementing the EU regulatory framework, so as to safeguard independent, consistent and high-quality regulation of the electronic communications markets. BEREC advises the European Commission and the national regulatory authorities on implementing the EU regulatory framework for electronic communications, with the aim of creating an internal market within Europe.

BEREC is composed of a Board of Regulators and a Management Committee. The Board of Regulators is overseen by the Management Committee and comprises representatives of European regulatory authorities and representatives of the European Commission. BEREC's specialised work on various issues is carried out within a number of expert groups that include numerous experts from the Bundesnetzagentur.

BEREC is represented by a Chair and four Vice-Chairs appointed by the Board of Regulators for a term of one year. Dr Wilhelm Eschweiler, Bundesnetzagentur Vice President, was Chair of BEREC in 2016. As outgoing Chair in 2017, Dr Eschweiler supported the 2017 BEREC Chair Sébastian Soriano (ARCEP).

The Bundesnetzagentur has also been a member of IRG, an independent group of European regulatory authorities formed on the basis of an EU regulation, since 1997. Within the group, the regulatory authorities collaborate more closely on a variety of issues, including those outside BEREC's responsibility.

In addition, the Bundesnetzagentur is involved in the work of the European Mediterranean Regulators Group (EMERG) and the Eastern Partnership Regulators Network (EaPRegNet). Both groups receive funding from the European Commission under the European Neighbourhood Policy and offer platforms for regulatory authorities from non-EU countries to share regulatory practices with EU Member States and vice versa.

Article 7 and 7a procedures

The European legislature adopted the procedures under Articles 7 and 7a of Directive 2002/21/EC with the goal of promoting a single market in the European telecommunications sector. These procedures aim to ensure that measures planned by the national regulatory authorities (such as establishing single market power, setting rates) are not contrary to European law. The process requires regulatory authorities to notify the European Commission of their draft decisions. If the Commission has serious doubts as to the compatibility of a draft measure with the law, it can open what is known as a "Phase II" investigation. During the investigation, the regulatory authority may not definitively adopt the draft measure.

BEREC's main role in the investigation is to form an ad hoc working group dedicated to examining the measure. The working group is composed of experts from the other national regulatory authorities who weigh the Commission's serious doubts and the draft measure against each other and submit a BEREC opinion within a very short timescale. The opinion must be adopted by the BEREC Board of Regulators by majority decision and forwarded to the European Commission. The Commission must then take utmost account of the opinion when making its final recommendation. The Commission may ask the regulatory authority to amend or withdraw its draft measure; however, the authority may decide not to amend or withdraw the measure but must then provide a reasoned justification for its decision.

The number of Phase II investigations reported on by BEREC has by and large remained stable since last year. In 2017, BEREC opinions were drawn up and adopted for five investigations opened by the European Commission compared with four in 2016 (two additional BEREC opinions were adopted in early 2016 relating to cases from December 2015). In each case, BEREC generally shared the Commission's serious doubts, but also agreed with some of the arguments put forward by the regulatory authorities concerned.

Even after the Bundesnetzagentur decided to move from the efficient operator benchmark (which the Commission had objected to in previous Phase II procedures) to the pure LRIC model for setting fixed termination rates, in 2017 the Commission opened two Phase II procedures on planned measures related to rates setting. In an attempt to harmonise rates across Europe, the Bundesnetzagentur had applied the pure LRIC model to bring the rates in line with the European level on the basis of market benchmarking. Its justification for this had already been given in the regulatory order on fixed termination rates on which the decision to change methods was based. In both procedures (DTAG's termination rates and those of alternative providers), the BEREC opinions shared the Commission's serious doubts, but the Bundesnetzagentur decided within its scope of discretion to definitively adopt each of the draft measures.

Digital Single Market strategy

The Bundesnetzagentur advises the Federal Ministry for Economic Affairs and Energy and the Federal Ministry of Transport and Digital Infrastructure and through its work with BEREC gives input on various dossiers on the Commission's Digital Single Market strategy. These cover areas including the ePrivacy Regulation and the revision of the regulations on electronic communications.

The Commission presented its proposal for an ePrivacy Regulation on 10 January 2017. The Regulation was to replace the existing ePrivacy Directive and was originally to take effect with the new General Data Protection Regulation on 25 May 2018. The draft Regulation fleshes out the Directive and incorporates new elements to improve the security of electronic communications (including privacy by default, privacy by design).

In late October 2017, the European Parliament submitted its opinion on the draft, in which it called for stronger user rights. The EU Council is still in negotiations and the Regulation is expected to come into effect in the second half of 2018.

Revision of the regulatory framework for electronic communications, including the BEREC Regulation

On 14 September 2016, the European Commission presented its proposals for revising the European regulatory framework for electronic communications. The proposals form a central part of the Commission's Digital Single Market strategy. The core of the package of proposals comprises the European Electronic Communications Code, which brings the four sector-specific Directives (Framework, Access, Authorisation and Universal Service) all under a single Directive. The package also includes a proposal for updating the BEREC Regulation, an action plan for 5G, and a WiFi4EU initiative. The legislative package aims to pave the way for the Digital Single Market in Europe in light of the spread of digital technology.

The main issues addressed by the proposed Code are
- access regulation,
- spectrum management
- extension of the scope to cover OTT communication services,
- universal service
- consumer protection, and
- institutional set-up (in conjunction with the draft BEREC Regulation).

The Bundesnetzagentur contributes from its regulatory experience to the review of the telecommunications framework through its work with the Federal Ministry for Economic Affairs and Energy and the Federal Ministry of Transport and Digital Infrastructure. It was also able to present its ideas under the BEREC Vice-Chair in 2017 in discussions with the European institutions, other regulatory authorities and the various market players.

Negotiations in the European Council and European Parliament led to the start of informal trialogue meetings in late October 2017. It seems likely that the packet of measures will be adopted in 2018.

International roaming

International activities

Regulation (EU) 2015/2120 definitively abolished roaming surcharges from 15 June 2017. Since then, customers generally pay the same price as at home for calls, texts and mobile data wherever they are in the EU. The Bundesnetzagentur closely monitors compliance with the roam like at home principle and, where necessary, has taken enforcement action.

The last step of the process to offer roaming at the same cost as at home was the adoption of Regulation (EU) 2017/920 on roaming on 17 May 2017, which laid the necessary foundation – in particular by introducing rules at the wholesale level. The new roaming rules then resulted in a need to update the guidelines from BEREC, which help to ensure a consistent application of the new rules on wholesale roaming access. The Bundesnetzagentur was actively involved in both the preparation and revision phases.

The Bundesnetzagentur obtained data on roaming from the national mobile operators in 2017 as part of its regular data collection. The roaming data was used in the reports drawn up by BEREC in connection with an analysis of the European roaming market and to improve the transparency of information about roaming services for consumers.

Roaming charges abolished in Europe

Since 15 June 2017, customers have been able to use their mobile rate plans across Europe just like at home. Unlike in the past, providers can no longer apply surcharges for calls, text messages and mobile surfing in EU Member States, Liechtenstein, Iceland and Norway. Customers now pay the same price as at home for calls and texts wherever they are in the EU.

Mobile providers will still be able to apply surcharges in two exceptional cases. Firstly, the rules allow mobile providers to agree a fair use policy with their customers to prevent abusive or anomalous use. The aim of the policy is to stop customers from roaming permanently. Secondly, mobile providers can apply to the Bundesnetzagentur to levy roaming surcharges if they can provide evidence that they are unable to cover the costs of providing regulated roaming services and that this jeopardises their domestic business model.

National activities
The Bundesnetzagentur held two workshops with mobile roaming providers domiciled in Germany ahead of the launch of roam like at home. The workshops were designed to instil confidence in the roaming providers when implementing the brand-new roam like at home rules so as to ensure a seamless transition for consumers.

The Roaming Regulation places the responsibility for monitoring and implementing these rules in Germany with the Bundesnetzagentur. The Bundesnetzagentur took action in several cases calling for roaming providers to comply with the rules. In one incidence, the Bundesnetzagentur took steps in accordance with section 126 of the Telecommunications Act by prohibiting elements of Telekom Deutschland GmbH's StreamOn option related to roaming in the EU. StreamOn is a zero-rating service. Within Germany, data used for the streaming services of partner companies is not deducted from the customer's monthly data volume; however, data is deducted when the customer is outside of Germany. The Bundesnetzagentur considers this to be a violation of the roam like at home rules.

In the Bundesnetzagentur's view, the same terms should apply to the mobile service whether the customer is at home or travelling within the EU, ie StreamOn partner services should not be deducted from the inclusive data volume.

Net neutrality

A key focus of net neutrality activities was on the practical experiences gained with the European rules on net neutrality – Regulation (EU) 2015/2120 – which came into force on 30 April 2016.

BEREC published a report on the application of net neutrality rules and its own guidelines. The report found that the national regulatory authorities had consistently applied the basic principles of net neutrality – such as the prohibition on the blocking of applications or the discriminatory handling of certain data traffic – and that Regulation (EU) 2015/2120 had been implemented uniformly. As such, the BEREC guidelines have proven to be a suitable tool to help the national regulatory authorities perform their oversight and enforcement activities in line with the Regulation. Another BEREC report provided information on existing instruments and measures designed to help identify contractual, commercial and technical practices that may not be compatible with the European rules on net neutrality.

The "Net neutrality measurement tool specification" report details a measurement system (based on a previous BEREC method) that allows the quality of internet access services to be monitored on a regular basis. BEREC published a further report entitled "IP interconnection in the context of net neutrality", coordinated by the Bundesnetzagentur, recommending that national regulatory authorities monitor market trends in particular to check that disputes are still being resolved without the need for regulatory intervention. Regulatory authorities with the necessary powers could opt to collect data on interconnection markets, it said, and the authorities should continue to exercise caution when considering the need for regulation.

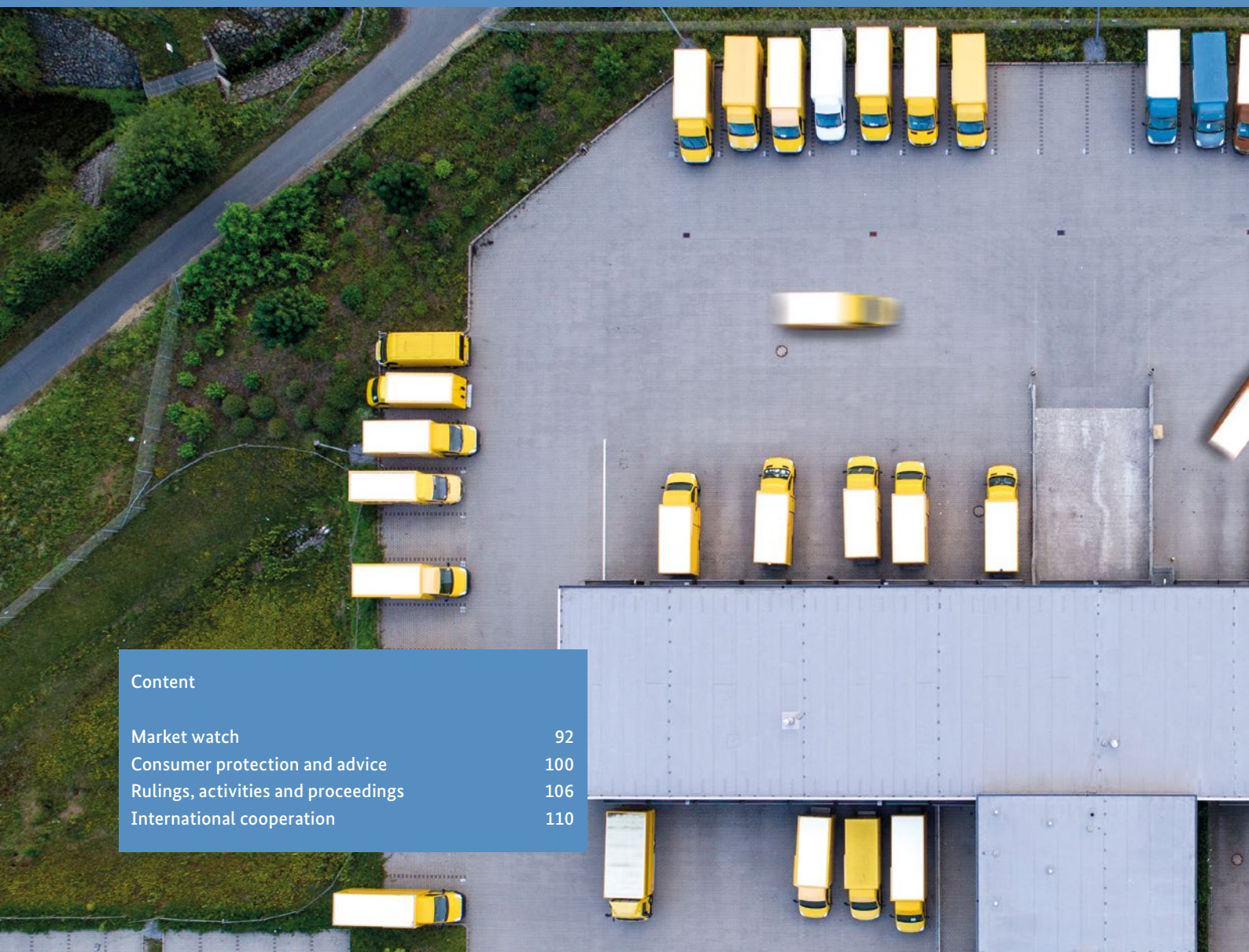
Revision of harmonised standards following the new Radio Equipment Directive (2014/53/EU)

The Bundesnetzagentur continues its determined efforts to revise existing Harmonised Standards and help draft the new Harmonised ETSI standards. As the new Directive left such a short window of time for amending the over 200 Harmonised Standards, it was not possible to finalise all of the necessary standards by the close of the one-year transition period (deadline: 12 June 2017). Moreover, the Bundesnetzagentur is still working on further improvements in particular with regard to receiver parameters which are to be incorporated into the Harmonised Standards in due course.

POST

Postal markets gain momentum

Postal markets are an important economic factor. This is borne out by last year's developments. The postal sector's performance is of fundamental importance to other branches of the economy. Booming e-commerce and increasing digitisation stimulated the markets and above all drove parcel volumes to new highs. Delivery processes and low-cost delivery options were optimised. Great importance was attached to reliability and quality.



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Last year, the parcels market's growth led to the roll-out of many new business models. Extensive product portfolios and creative ideas aim at satisfying customers' needs and desires. Companies tended to align their product offerings more to customer needs. Same-day delivery is now quite common, especially in densely populated regions. Low-priced delivery options and enhanced delivery alternatives, such as rapid redirection of parcels to other delivery addresses, and up-to-date online tracking were more or less standard fare in 2017.

Even the letters market benefitted from online trading in spite of competition from e-mail and instant messaging. Not only conventional letters, but also an increasing number of small goods such as electronic components and books were sent via the letter post service, calling for new players and the establishment of sophisticated business concepts on the part of letter service operators.

Whilst welcoming all these positive developments, people continued to attach great importance to the quality and functional capabilities of the postal services. In the Bundesnetzagentur's perception, however, consumer interests were not always adequately looked after. An impression that was further strengthened by the steep rise in the number of complaints and requests for alternative dispute resolution. In certain regions in Germany no post was delivered at all for weeks on end. In some parts of Berlin and Brandenburg people were particularly hard hit.

This is why the Bundesnetzagentur deems it essential to strengthen consumer protection standards and to combine these with strong and effective enforcement mechanisms and sanctions.

Last year, most large parcel carriers refused to take part in the voluntary and cost-free dispute resolution procedure. Yet this procedure is often the only means of achieving an amicable agreement. A stricter postal dispute settlement procedure could prove useful.

Market watch

The boom in online trading and customised delivery models led to significant growth rates in the CEP market, especially the business-to-consumer (B2C) segment. The German letters market, unlike that in other European countries, remained relatively stable.

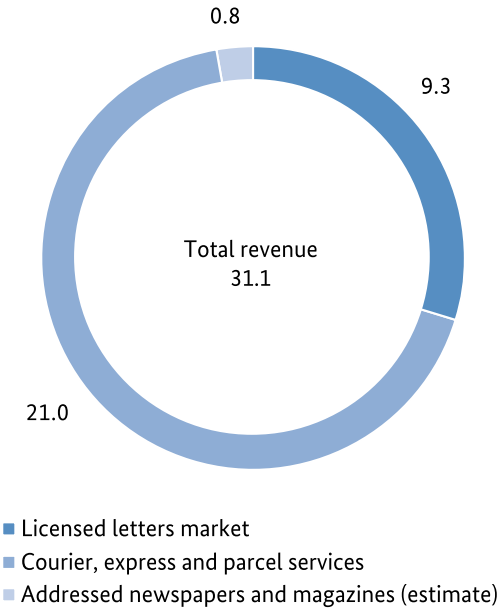
Postal markets

The positive trend in the postal markets is expected to continue in 2017. The courier, express and parcel (CEP) market will benefit from the predicted growth in online trading.

In 2016, postal market revenues totalled €31.1bn, representing a year-on-year increase of about 4.5% (revenues 2015: c. €29.8bn).

Postal markets include the CEP market, the conveyance of letters weighing up to 1,000 grammes (licensed sector) and the delivery of addressed newspapers and magazines. The CEP segment was the main growth driver.

Revenues in the postal markets: 2016
€bn



In 2016, revenues in the CEP market rose by about 4.1%. Volumes increased by about 6.6%.

Letter mail revenues totalled approximately €9.3bn, representing an increase of about 4.8% (2015: c. €8.9bn). Especially competitors reported rising revenues and volumes compared with the previous year.

The press distribution services (advertisements, daily and weekly newspapers, magazines) reported an average decline of just over 1% for the period 2010-2015. During that period, only the magazines market reported a slight increase. Precise figures for 2016 were not yet available at the time when this report went to press. In view of developments in the preceding years and the ongoing decline of print media, a slight decrease in volumes is also expected for 2016.

Letter services

Revenues and volumes

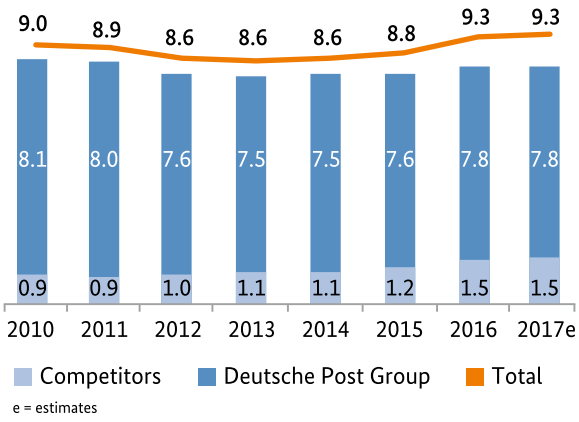
Revenues in the letters market rose from €8.8bn in 2015 to €9.3bn in 2016. Revenues and volumes are expected to remain stable in 2017. The price increase for letter-post items and a shift in product mix may account for the rise in revenues. A higher number of large items are being sent as more and more articles are being transported via the letter post service.

Book and goods shipments sent via Deutsche Post AG declined over the past seven years (2010: c. 0.14bn items, 2016: c. 0.09bn items).

Deutsche Post Group competitors reported an increase in revenues from about €1.2bn in 2015 to €1.5bn in 2016. The companies anticipate a further increase in revenues in 2017 of about €91m, an increase of about 6.2% (not visible in the figure below due to rounding).

Deutsche Post Group generated revenues of about €7.8bn in 2016 (2015: c. €7.6bn). Revenues in 2017 are expected to reach the previous year's level.

Letters market revenues
€bn

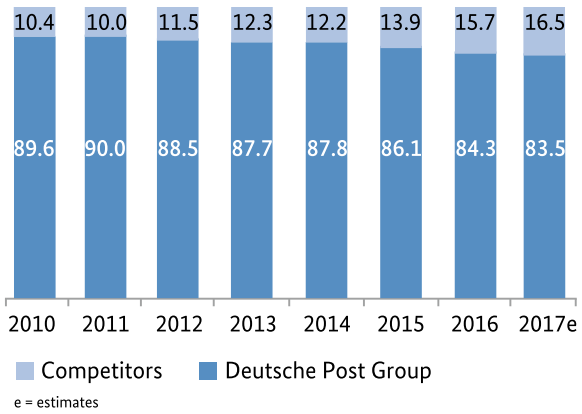


e = estimates

Market shares

Deutsche Post Group's share dropped from 86.1% in 2015 to 84.3% in 2016. The competitors' share of revenues rose again in 2016 to 15.7% (2015: 13.9%).

Revenue-based market shares in the letters market
%

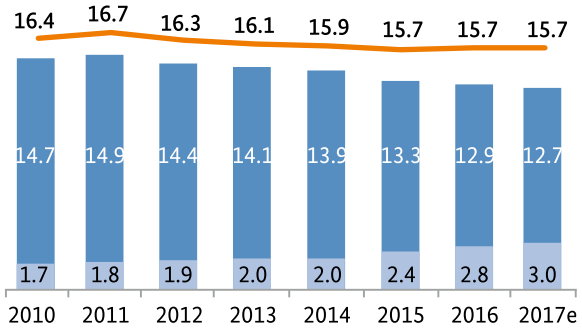


e = estimates

In 2016, total volumes remained stable at about 15.7bn items (2015: c. 15.7bn items). Deutsche Post Group's volumes decreased by about 3% to 12.9bn items (2015: c. 13.3bn items).[1]

Competitors were able to consolidate their position. About 2.4bn items were handled in 2015. This figure rose to 2.8 items in 2016. Compared with 2015, competitors' volumes rose by about 16.4%.

Letters market volumes
Billion items



e = estimates

Deutsche Post Group expects a slight decrease in volumes in 2017 (c. 0.2bn items) whereas competitors anticipate an increase of about 0.2bn items. Competitors hence expect Deutsche Post Group's moderate decrease to be more than offset in 2017.

[1] Volumes are constantly being validated so some figures deviate from those given in the Postal Activity Report 2016/2017.

In spite of the positive trend from a competitive viewpoint, Deutsche Post Group still retains its dominant position in the letters market. The large competitors were able to stabilise or strengthen their market position. As in previous years, this group was the main growth driver. In 2016, the number of companies active in the letters market and generating revenues between €1m and €10m rose sharply to 101 (2015: 86 companies). More than 500 companies reported generating revenues in the letters market. About 370 carriers claimed not to have earned any revenues in the postal sector.

Licensed letter service operators by revenue*
(without Deutsche Post Group)

Revenue	Up to €100,000	> €100,000 to €500,000	> €500,000 to €1m	> €1m to €10m	> €10m	Total number
2010	~ 330	108	44	93	20	595
2011	~ 330	117	42	90	22	601
2012	~ 350	113	36	103	28	630
2013	~ 350	94	42	94	26	606
2014	~ 325	97	28	92	27	569
2015	~ 325	102	26	86	35	574
2016	229	116	39	101	46	531

* This breakdown only covers companies active in the market and the number is therefore lower than that of licensed operators.

Competitive structure
Setting the number of competitors in relation to their revenues in the letters market reveals the different weighting of the companies active on the market. The ten best-performing companies (about 1.1% of all competitors) generated about 43.5% of total revenues earned by all competitors.

Access services
When bulk mailers or competitors transfer items to Deutsche Post Group, Deutsche Post AG charges a lower rate to account for preliminary work such as pre-sorting or franking.

The revenues earned from access mail remained stable year-on-year, totalling €4.57bn in 2016 (2015: c. €4.60bn).

Deutsche Post AG introduced a new discount on 1 January 2018, called the infrastructure discount. This discount is only granted for access mail and sets off the rise in access mail rates which also came into effect on 1 January 2018. The infrastructure discount will lead to a higher level of automation of access mail revenue protection in the short to medium term.

The digitisation of the letter services to which the discount is coupled meets with the Bundesnetzagentur's approval. However, since the Bundesnetzagentur, competitors and senders were concerned about the time scale of the launch, the Bundesnetzagentur carried out a market survey. The survey revealed that many customers and postal firms would not be in a position to meet the technical requirements by 1 January 2018. In December 2017, Deutsche Post AG decided on a transition phase lasting until 30 April 2018 in which less stringent requirements would apply, easing the Bundesnetzagentur's concerns about the infrastructure discount.

Domestic letters weighing up to 1,000 grammes
In 2017, the majority of letter-post items requiring a licence (excluding access services) were destined for addresses in Germany. About 4.68bn items were handled and revenues totalled about €3.05bn. Competitors handled about 2.49bn items in this segment and earned revenues of €1.1bn. Companies reported delivering about 47.7% of these items. 52.3% were delivered by cooperation partners or handed over to consolidators.

Service of documents
Revenues from the service of documents rose slightly to about €124m (2015: about €120m). Both Deutsche Post Group and competitors reported moderate increases.

Volumes revealed a similar positive trend (2016: about 48m documents, 2015: about 46m documents). Deutsche Post Group expects revenues to decline by about €6m in 2017 whereas competitors expect revenues to rise by about €1m.

National stamp prices

The stamp price for standard letters remained unchanged at €0.70. It has been in force since 1 January 2016 and will remain so until 31 December 2018. For the first time since 2010, the letter price increase introduced in 2016 exceeded the increase in the consumer price index.

International stamp prices

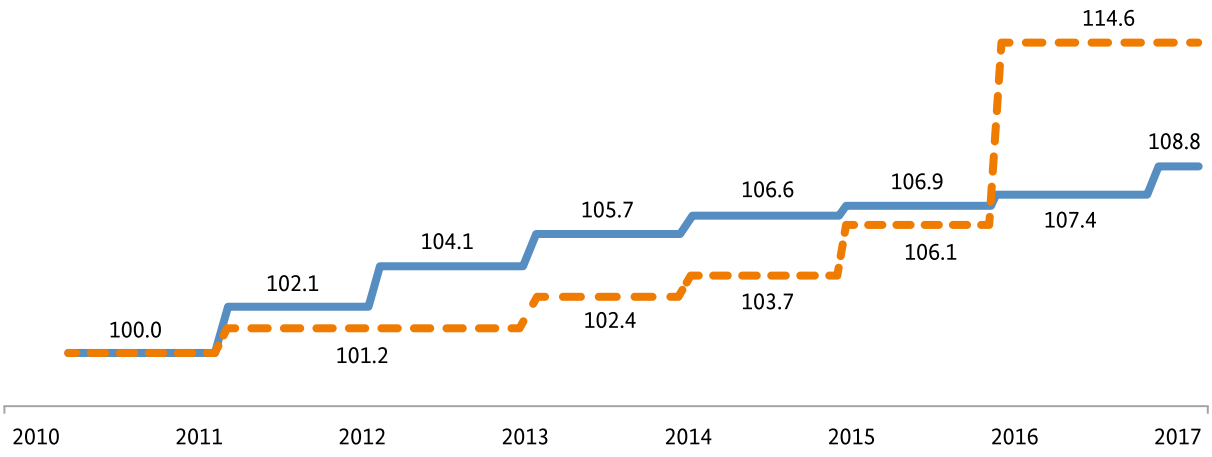
The European average price for a domestic letter (D+1) is €0.88 (nominal price) or €0.86 (real price). However, since the quality of delivery of the selected products fall outside the normal scope in Denmark and Italy, it makes sense to leave these two countries out. If Denmark and Italy are eliminated from the calculations, the nominal and real price is €0.72 and €0.70, respectively, showing that the German price for a standard letter equals the European average.

Stamp prices for letters* 2010 to 2017
(€)

Year	2010–2012	2013	2014	2015	2016	2017
Standard letter up to 20 g	0.55	0.58	0.60	0.62	0.70	0.70
Compact letter up to 50 g	0.90	0.90	0.90	0.85	0.85	0.85
Large letter up to 500 g	1.45	1.45	1.45	1.45	1.45	1.45
Maxi letter up to 1,000 g	2.40	2.40	2.40	2.40	2.60	2.60
Postcard	0.45	0.45	0.45	0.45	0.45	0.45

* Prices as at 1 January each year

General price trend and DPAG letter prices



Cost of living index (expenditure on products in basket of goods for private households in Germany); cost of living 2010 = 100%

Deutsche Post AG letter price index (weighted prices for the postcards and standard, compact, large and maxi letters); Deutsche Post AG prices 2010 = 100%

International letter price comparison standard letters

Country	Nominal price standard domestic letter	Real price standard domestic letter
DK	€3,63	€3,55
IT	€2,80	€2,74
IS	€1,64	€1,44
NO	€1,43	€1,42
FI	€1,30	€1,27
IE	€1,00	€0,98
CH	€0,93	€0,94
HR	€0,86	€0,85
FR	€0,83	€0,80
GB	€0,76	€0,75
BE	€0,79	€0,76
NL	€0,78	€0,76
SE	€0,73	€0,72
PL	€0,73	€0,74
GR	€0,72	€0,71
DE	€0,70	€0,68
LU	€0,70	€0,68
SK	€0,70	€0,68
AT	€0,68	€0,66
EE	€0,65	€0,62
CZ	€0,59	€0,57
PT	€0,63	€0,61
LV	€0,57	€0,55
ES	€0,50	€0,50
HU	€0,50	€0,48
LT	€0,45	€0,43
BG	€0,43	€0,43
CY	€0,41	€0,41
SI	€0,40	€0,39
RO	€0,31	€0,31
MT	€0,26	€0,25

Source: websites of the postal operators/Eurostat

Courier, express and parcel (CEP) services

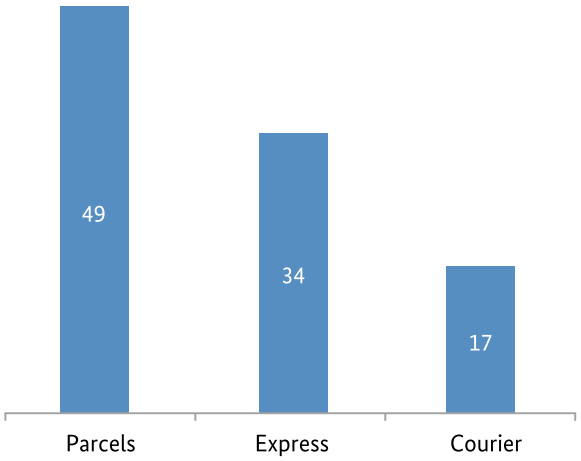
The positive trend in the CEP market continued. Revenues totalled €21bn, representing a year-on-year increase of around 4.1% (2015: c. €20.1bn).

Market structure

As in the previous year, with 49% the parcel segment accounted for most of the revenues (2015: about 47%). 34% of the revenues were generated in the express market (2015: about 34%), about 17% in the courier market (2015: 17%).

Revenue shares CEP market 2016

%



Source: MRU GmbH

The market boundaries are increasingly blurred. Changes in consumer behaviour and the expectation of different, customised delivery options for the final mile render it increasingly difficult to distinguish between the various markets. Especially where the delivery of B2C items within a specific time slot is concerned, it is hardly possible to distinguish between the courier and the express market. From a procedural perspective these items would be classified as express items. These items have therefore been excluded from the 2016 courier market.

Revenues in the CEP market increased, with changes in the different markets varying considerably. The parcels sector reported an increase of 7.7%, the express market an increase of 3.9% whereas revenues in the courier market (adjusted for B2C items) declined by about 5%.

Volumes increased year-on-year by about 6.6%. The change in volumes differed in the three CEP markets. With about 8.1% in the parcels sector and about 3.9% in the express market, considerable growth had been achieved. Courier volumes (adjusted for B2C items)

CEP market revenues
€m

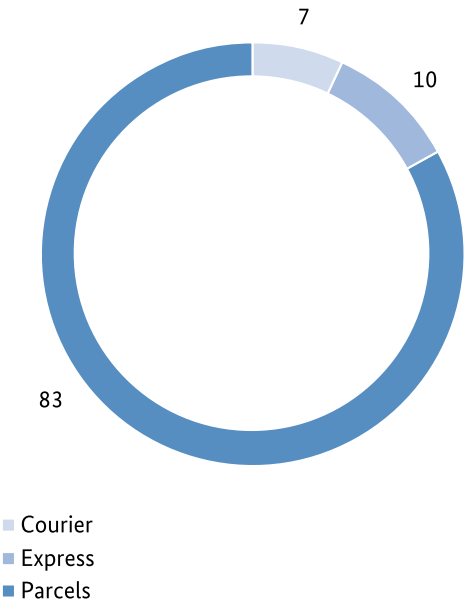
Year	2013	2014	2015	2016*	Change
Courier	3,741	3,778	3,794	3,606	–5.0 %
Express	6,414	6,555	6,824	7,090	+3.9 %
Parcels	8,434	8,996	9,528	10,266	+7.7 %
Total	18,589	19,330	20,146	20,962	+4.1 %

* Revenue in the courier market excluding B2C

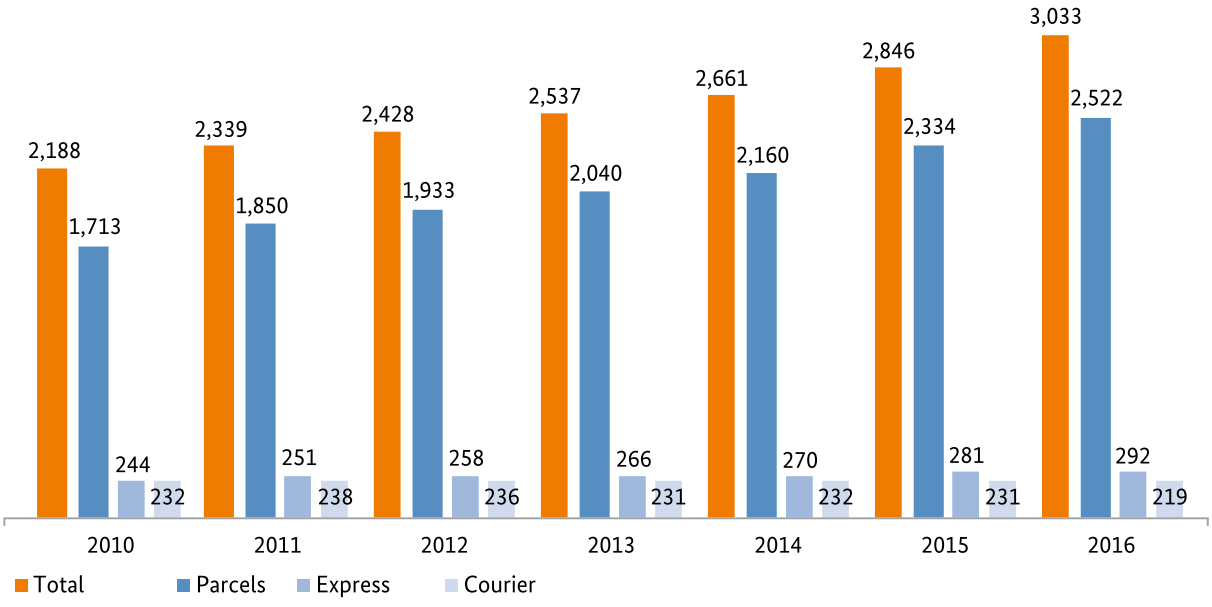
declined by about 5%. Increased anticipation of specific addressee needs, shorter delivery periods and customised delivery options enabled volume growth which will probably continue in 2017. The change in volumes largely corresponds to the revenue performance.

At 83% the parcels sector reported the highest volume in 2016 (2015: about 82%). Approximately 10% of items were handled by the express market (2015: about 10%), followed by the courier market with about 7% (2015: about 8%).

CEP market shares 2016
%



CEP market volumes
Million items



Workforce development

Letter services
The licensed letter service operators had a total number of employees in 2016 of 176,214 (full-time employees, part-time staff, mini-jobbers). The number of Deutsche Post Group staff decreased slightly year-on-year to 146,826 (2015: 148,669 employees). Competitors' number of employees increased considerably to 29,388 (2015: 20,215 employees). The rise in the number of employees working for the competitors may be attributable to the growth in revenues and volumes.

CEP services
The CEP markets had a total number of employees in 2016 of about 395,500 (2015: about 380,000 employees). The rise is due to increasing volumes. The final mile accounts for the greatest increases. Greater customisation and hence more frequent deliveries together with a rise in the number of large and heavy items that are shipped (eg white goods, furniture) led to more staff being employed.

Market access

Licensing
During the period from 1998 to 2017 the Bundesnetzagentur issued more than 3,100 licences to individuals and companies for the conveyance of letters weighing up to 1,000 grammes. In 2017, 54 new licences were issued (2016: 108 new licences). In the year under review, 43 licensed operators withdrew from the market (2016: 120 withdrawals). Fewer licences were applied for than in the previous year. The number of licences issued more or less corresponded to the number issued in 2015. The exceptionally high number of new licensees in 2016 was due to a new business model being rolled out along the border to Switzerland giving rise to a high number of licence applications. (see page 99 of last year's Annual Report for further details). Compared with 2016, market withdrawals fell sharply but numbers remained stable due to the fact that many licences were returned following a systematic review of all licence holders in 2016. There are more than 1,000 valid licences.

Service of documents
As complaints had been received about the quality of the service of documents, the Bundesnetzagentur in 2017 wrote to the twelve German Default Courts as bulk mailers in the service of documents market, requesting information about their experience with delivery problems. The survey revealed comparatively low error levels so that the impression of large-scale delivery problems had been misleading. In view of the overall positive picture gained, the Bundesnetzagentur refrained from taking measures beyond the quality assurance requirements specified in the licensing procedure and hearing the cases brought before it.

Cooperation with customs authorities
With effect from 16 November 2016, the Bundesnetzagentur signed a cooperation agreement with the customs authorities. The agreement concerns cooperation to combat illegal employment. The authorities inform each other if there is evidence that a postal service operator fails to comply with essential working conditions such as paying the minimum wage or social security contributions. If there are reasons to suspect that this may be the case, the Bundesnetzagentur and the local main customs office may jointly investigate a company. Last year, the Bundesnetzagentur and the customs authorities jointly investigated postal licence holders.

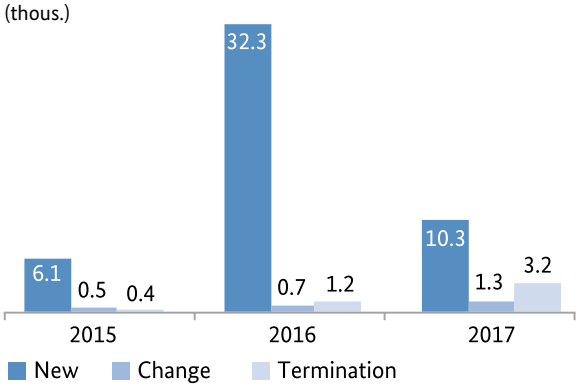
Administrative offence proceedings
The Bundesnetzagentur may issue warnings and impose fines for breaches of the provisions in the German Postal Act. Most breaches concern the conveyance of letters without a licence and the failure to comply with the notification obligation. All breaches committed in 2017 fell into the latter category. The Bundesnetzagentur issued 65 warnings and imposed 11 fines (in some instances after a warning). The fines imposed in 2017 totalled more than €3,000. Some of the breaches had been committed by foreign firms conveying cross-border parcels. They had been discovered by the police during traffic checks.

Notification obligation
Operators of licence-exempt postal services are required to notify the Bundesnetzagentur in writing and within one month when they commence, change or cease operations. The following licence-exempt activities must be notified: (i) conveyance of letter items each weighing more than 1,000 grammes, (ii) conveyance of addressed parcels weighing up to 20 kg, (iii) courier services, (iv) conveyance of books, catalogues, newspapers or magazines by companies also operating letter or parcel services, and (v) conveyance of letter items each weighing up to 1,000 grammes as a subcontractor of a licensed operator. Certain processes forming part of conveyance must also be notified

(eg acceptance or collection of postal items, sorting, forwarding, conveyance, delivery of postal items).

In 2017 the Bundesnetzagentur continued the notification obligation information campaign it had launched in 2016. The agency also expanded the advisory services offered during on-site checks. Here again, the focus was on parcel shops providing postal services merely as a by-product. As in the previous year, the Bundesnetzagentur received many notifications, most of them again being new notifications (10,311). The number of notifications dealing with changes or service termination rose compared with previous years (1,254 and 3,196, respectively). This is primarily due to the fact that the large postal operators are attaching greater importance to the correct notification of their subcontractors.

Notifications received 2015 to 2017
(thous.)



By the end of the year, 61,835 postal firms had notified their operations, ie had commenced or changed but not ceased operations.

Postal market checks/data protection

In 2017, the Bundesnetzagentur investigated the premises of 930 postal operators. Most of these checks were routine checks. To a lesser extent checks had been prompted by specific circumstances. Most of the checks focused on controlling postal secrecy and data protection (776 checks).

Since parcel volumes continue to rise, the Bundesnetzagentur in 2017 again turned its attention primarily to parcel shops. It discovered a steep rise in inappropriate parcel storage. In some instances parcels were stacked in publicly accessible areas where the senders' and addressees' data were clearly visible. Nor were the parcels adequately protected against theft. The Bundesnetzagentur will repeat its checks to determine whether or not conditions have improved.

As in previous years, the number of complaints about postal secrecy and data protection received by the Bundesnetzagentur in 2017 increased. In most cases consumers complained about having found items addressed to them in publicly accessible areas rather than their letter box or about having received items destined for other addressees. Another cause for complaint was that delivery notification cards had been attached to the outside of doors or letter boxes and were hence publicly visible. The Bundesnetzagentur repeatedly pointed out to postal operators that this contravened postal secrecy obligations.

In one case the Bundesnetzagentur objected to a postal operator's work instructions for letter deliveries which stated that items were also to be deposited in letter boxes even if a box was too small. If there was no letter box, items were to be deposited in front of the front door or clearly visible in the entrance hall. If the letter box or the doorbell bore no name, post was to be delivered if the addressee was known to the person delivering the mail. After the Bundesnetzagentur's complaint the postal operator brought its work instructions into line with legal provisions.

The annual information exchange between the Bundesnetzagentur and the Federal Commissioner for Data Protection and Freedom of Information also touched upon the General Data Protection Regulation coming into force in May 2018. One of the major issues concerned the impact of the new Regulation on cooperation when reviewing postal legislation. Other topics dealt with the assessment, from a data-protection perspective, of new delivery options and of the delivery improvements announced by some operators, and with how incorrect redirections are handled.

Consumer protection and advice

Consumer complaints hit a new high in 2017. Delayed or no postal delivery annoyed people. Requests for dispute resolution were in vain because most postal operators decline to take part in alternative dispute resolution procedures.

Consumer advice

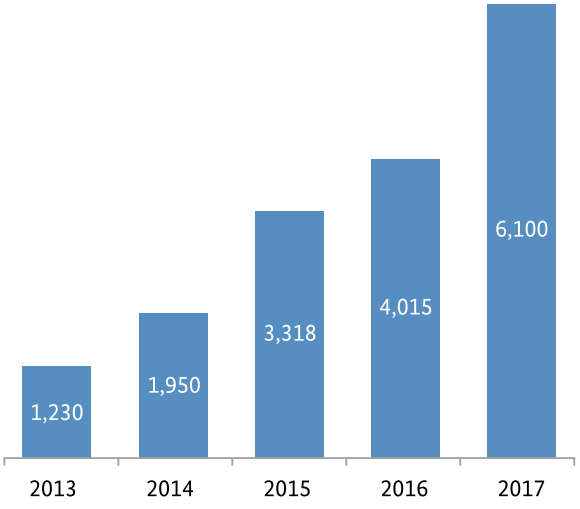
The postal consumer advice team is often a main port of call for helpless or disgruntled customers with letter and parcel delivery problems. Most customers had already gone through a frustrating period, dealing with hotline services and reluctant call centres. The postal consumer advice team is on call every day. As an independent entity it follows up on every complaint to determine whether the provision of basic postal services is at risk. The team requests clarification from the postal operator concerned and insists that the shortcomings be remedied.

Complaints

Consumer complaints about the postal markets have been on the rise for years, but with 6,100 in 2017, they reached an all-time high. In 2016, 4,015 complaints had been received, ie 2,000 less than in 2017, and the number in 2015 (3,318) was just about half the 2017 figure. About 54% of the complaints received concerned letter conveyance and delivery by Deutsche Post AG.

The Bundesnetzagentur is increasingly concerned about these developments, especially in light of the universal service requirements laid down in the Postal Universal Service Ordinance. On the one hand, the Bundesnetzagentur deems the number of complaints to be the tip of the iceberg since many people lodge their complaints with the postal operator concerned, consumer organisations or local media. On the other, the rise indicates that there are persistent problems in the letter delivery market, with their impact varying in intensity from one location to the next.

Written complaints 2013 to 2017



There was a dramatic rise in complaints in the last three months of 2017, due also to delivery problems in certain parts of Berlin, notably Charlottenburg-Wilmersdorf. In ten delivery districts no letters were delivered at all for more than a fortnight. About 14,500 households were affected. Deutsche Post AG said that the interruption in delivery had been due to short-term staff shortages, large letter volumes, and an incorrect assessment of the situation.

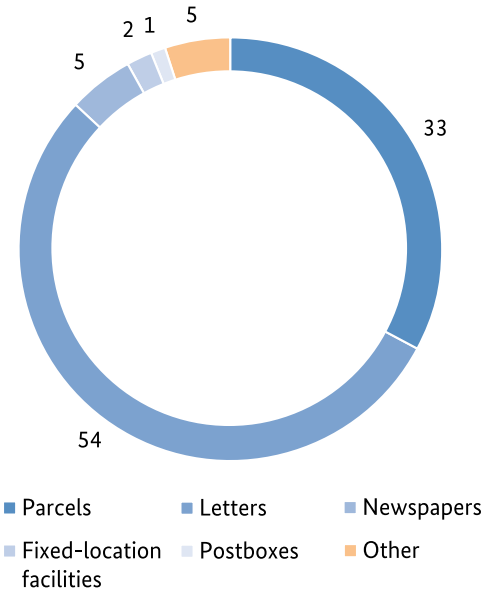
The number of collective complaints also increased noticeably. About 4,000 subscribers lodged complaints with newstrade distributors about non-delivery or late delivery of newspapers or magazines. The complaints were collectively submitted to the Bundesnetzagentur.

The Bundesnetzagentur also received about 2,050 telephone enquiries and complaints about postal issues, approximately 250 more than in the previous year.

The Bundesnetzagentur takes every complaint seriously. Deutsche Post AG was requested on several occasions to submit detailed reports and clarification. These requests had been triggered by increased coverage in the mass media and an increase in the number of enquiries from politicians.

Most written complaints (about 54%) concerned the letters market. Just under 33% related to the parcels market. Hence the previous year's trend to a higher number of complaints about parcels did not continue.

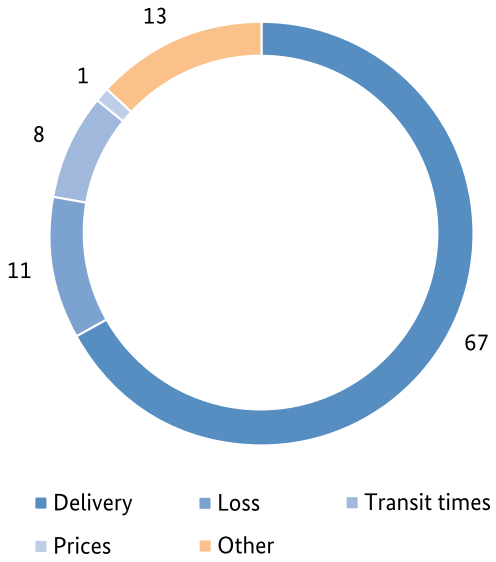
Reasons for complaints: 2017
%



Letters and parcels
Most of the complaints (over 60%) concerned delivery problems. This applies both to letter and to parcel delivery.

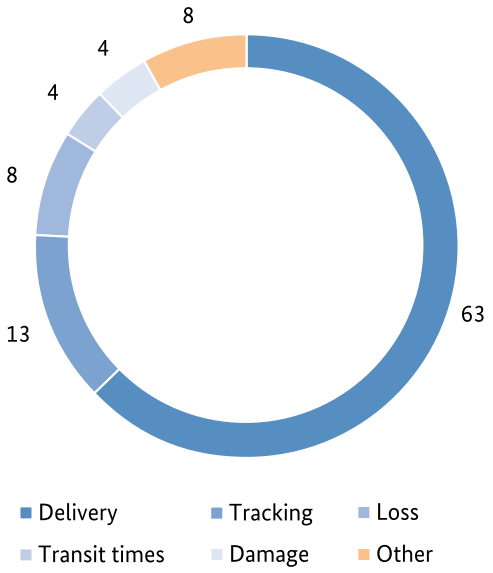
The main causes for complaint concerning letters were that on certain weekdays no mail was delivered at all, that the number of mis-delivered letters or about deliveries to neighbours increased, or that items were returned without any obvious reason. Long transit times, lost items and prices also gave cause for complaint.

Reasons for complaints – letter deliveries: 2017
%



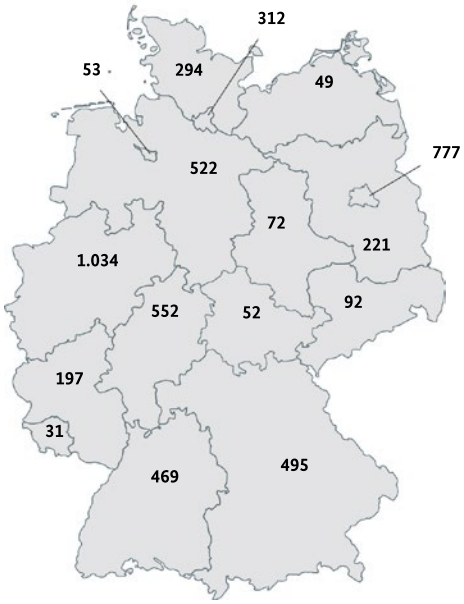
An increasing number of consumers complained that they had received a delivery card although they had definitely been at home without an attempt having been made by the postal delivery worker to deliver the parcel. Complaints also increased about incorrect, misleading or ambiguous information in the parcel tracking systems and about parcels not being delivered at the specified time.

Reasons for complaints – parcel deliveries: 2017
%



A comparison by federal state reveals that as in the previous year the majority of complaints (1,034) came from North Rhine-Westphalia, followed by Berlin with 777, Hesse with 552 and Lower Saxony with 522 complaints. Putting the number of complaints in relation to the population of the federal states yields a different picture. With 2.21 complaints per 10,000 inhabitants Berlin takes the lead, followed by Hamburg with 1.75 complaints per 10,000 inhabitants.

Complaints by federal state: 2017



Universal service

The Postal Universal Service Ordinance specifies the content and scope of basic service provision (universal service). This Ordinance also defines certain quality standards for letter and parcel services. The Ordinance defines delivery frequency and modalities, number and distribution of fixed-location facilities and postboxes, and average letter and parcel transit times.

Daily delivery
Letter and parcels have to be delivered at least once daily. This includes Saturday. Letters must be dropped in the letter box or handed over to the addressee, unless collection has been agreed. Should this not be possible, mail may be left with a neighbour, unless the addressee has issued instructions to the contrary. Parcels must also be delivered to the addressee or a neighbour.

In 2017, the requirements set out in the Ordinance had been met. Yet since complaints relating to the requirements in the Ordinance are on the rise, the Bundesnetzagentur occasionally has doubts about the provision of the universal service in parts of the country. It is therefore essential to observe future developments.

Fixed-location facilities and postboxes
Under current legislation there must be at least 12,000 fixed-location facilities in Germany where customers can conclude contracts for the conveyance of letters and parcels. At least one fixed-location facility must be available in districts with more than 2,000 inhabitants. In districts with more than 4,000 inhabitants or that have the function of a central location under regional planning provisions, it must be guaranteed that customers are not farther than 2,000 metres from their nearest fixed-location facility.

These requirements were met in the year under review. In 2017 Deutsche Post AG alone operated a total of 13,011 branches or agencies for letter and parcel services (as at 30 November 2017). Other postal firms operated 14,416 fixed-location facilities across Germany in 2016 (figures for 2017 were not available at the time when this report went to press).

However, these service points are not always accessible to private customers and do not necessarily comply with the requirements in the Ordinance. They may not be available in all towns or large districts. According to data provided by the five major parcel carriers (Deutsche Post DHL, DPD, GLS Germany, Hermes Logistik Gruppe and UPS), the number of parcel shops across Germany at which parcels could be collected or deposited rose from about 39,000 in 2016 to about 55,000 in 2017.

Another of the statutory requirements is that sufficient postboxes must be provided in Germany so that customers in urban areas are, as a rule, within 1,000 metres of a postbox. This requirement was met in 2017 by Deutsche Post AG alone as it operated a total of 110,581 postboxes (as at end September 2017). In some towns and districts other postal operators have installed their own postboxes without complying with the requirements in the Ordinance, as in the case of the fixed-location facilities.

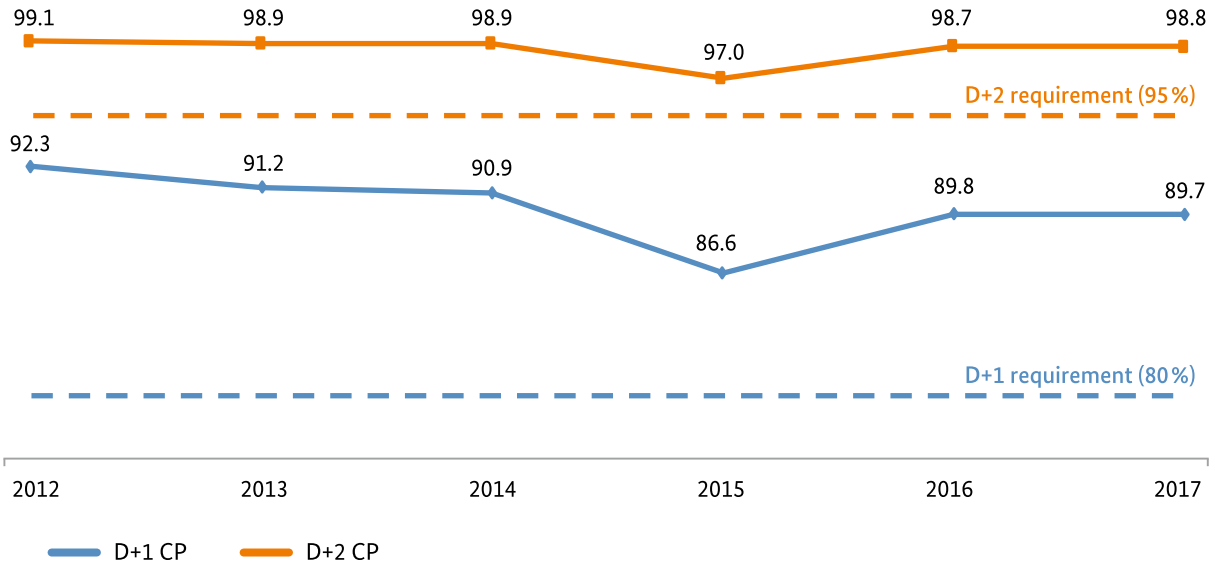
Since collections are of importance to many people and small to medium-sized enterprises, the Bundesnetzagentur took a closer look at Deutsche Post AG's collection strategy. Many postboxes are only collected in the morning. Whereas in 2011, 60,200 postboxes were collected in the afternoon as well, this number had dropped to 48,182 in 2017 (as at 30 June 2017).

Transit times/quality measurements

Under the Postal Universal Service Ordinance, at least 80% of domestic letters must be delivered on the working day after deposit (D+1). 95% of domestic letters must be delivered within two working days (D+2). Deutsche Post AG commissions an external quality and market research institute to measure its transit times. The measurement is certified by TÜV Rheinland. The results are presented to the Bundesnetzagentur on a quarterly basis.

Deutsche Post AG's transit times for letter mail, consumer perspective 2012 to 2017

Transit times (%)



Consumer survey
In 2017, the Bundesnetzagentur charged a market and opinion research institute with a representative telephone survey of private individuals and small to medium-sized enterprises to collect reliable data on current postal service requirements and possibly the need for changing the universal postal service.

The survey targeted private individuals at least 18 years of age and staff working in the mailing department of small and medium-sized enterprises. The survey focused on the need for letter services, but also covered parcel conveyance, especially expectations regarding personal delivery to addressee. The survey was based on the quality requirements in current postal legislation, ie on an assessment of the following criteria: delivery frequency, transit times and the accessibility of postal branches and postboxes.

The questionnaire included questions on postal service usage patterns and on consumer satisfaction with the quality of the services used. The quality assessment also referred to the aforementioned criteria (delivery frequency, transit times and the accessibility of postal branches and postboxes). Respondents were asked how important they deemed these criteria to be and about their willingness to pay more. The aim of the methodology applied was to distinguish between wishful thinking and a realistic need underpinned by the willingness to pay.

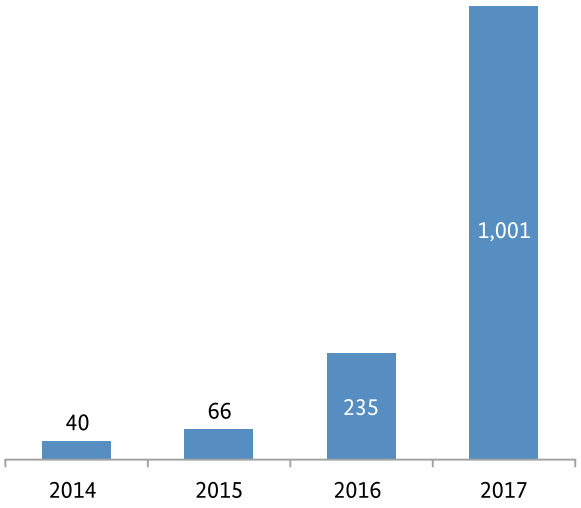
Evaluation of the survey had not been completed at the time when this report went to press.

Postal dispute resolution panel

Statutory mandate
Since the Postal Services Ordinance came into force on 25 August 2001, the Bundesnetzagentur's postal dispute resolution panel has been carrying out alternative dispute resolution procedures to resolve disputes between postal operators and their customers. The Consumer Alternative Dispute Resolution Act, which came into force on 1 April 2016, strengthens extrajudicial settlements. The postal dispute resolution panel is a State dispute resolution entity in terms of the Consumer Alternative Dispute Resolution Act located within the European Economic Area and is recognised by the European Commission as such.

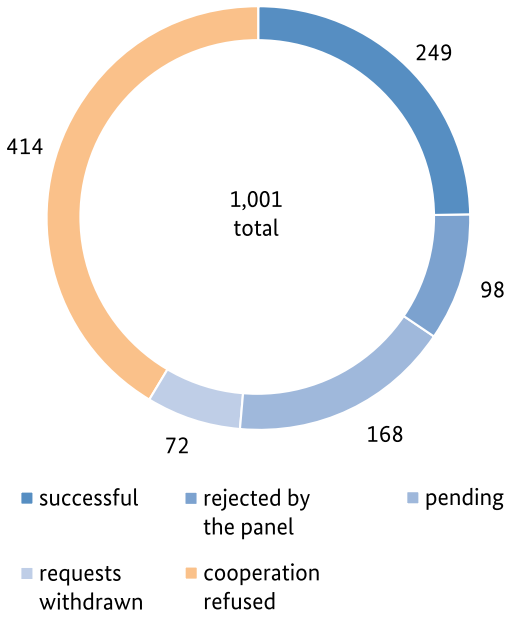
Dispute resolution requests and procedures
In 2017, the number of requests for dispute resolution rose even more steeply than the number of postal complaints. The dispute resolution panel received about 1,001 dispute resolution requests, a fourfold increase on the number received the previous year (2016: 235 requests). By the end of the year, 833 cases had been closed.

Dispute resolution requests 2014 to 2017



In the period under review, postal operators refused to cooperate in 414 cases. 249 cases met with success, the disputes having been resolved by means of a dispute settlement or by an agreement without a formal conciliation procedure. The dispute resolution panel rejected 98 requests as none of the rights set out in the Postal Services Ordinance had been violated. 72 requests were withdrawn.

Disputes 2017

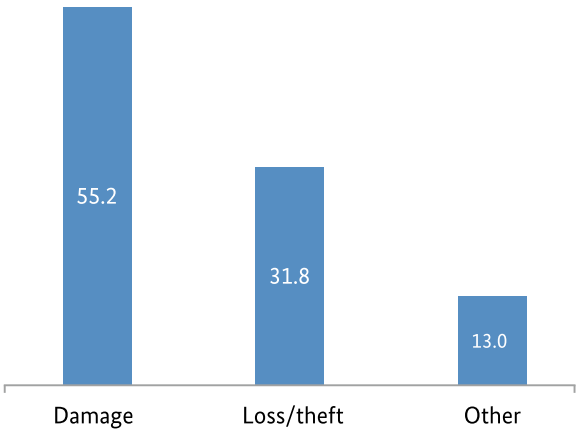


Grievances

The majority of closed cases (55.2%) concerned damaged postal items. Dispute resolution requests due to loss or theft came second (31.8%). The remaining requests pertained to long transit times or delivery irregularities.

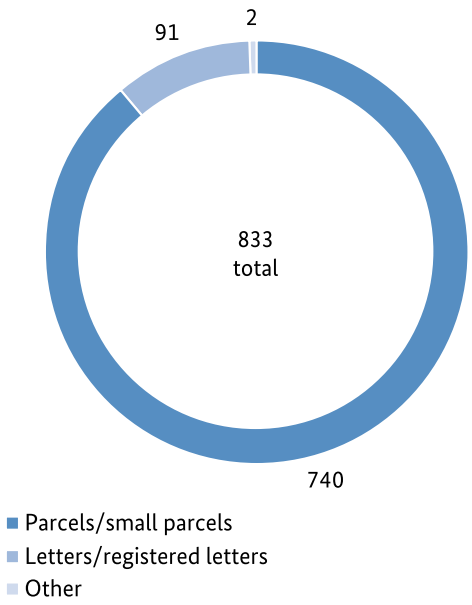
Reasons for dispute resolution requests 2017

%



In the period under review, most applicants complained about parcel conveyance problems: 89%. To a much lesser extent (about 11%), requests concerned letter conveyance.

Dispute resolution requests, postal items 2017



Rulings, activities and proceedings

The Ruling Chamber ruled that withholding access mail discounts was anti-competitive. The Chamber approved prices for the special *Prio* service and for *E-Postbrief mit klassischer Zustellung* letters.

Ruling Chamber decisions

Two approvals for rates for *E-Postbrief mit klassischer Zustellung*

On 14 December 2016, the Ruling Chamber approved the follow-up application submitted by Deutsche Post E-POST Solutions GmbH (DP EPS), a Deutsche Post AG subsidiary, for its *E-Postbrief mit klassischer Zustellung* service, with effect from 1 January 2017 (Decision BK5-16/029).

E-Postbrief letters are posted electronically by the senders and delivered either electronically (to registered addressees) or physically. The letters delivered physically are sent as electronic messages by the sender and are then printed, folded and inserted into envelopes by DP EPS or a subcontractor. They are also franked with the postage payable for conveyance by Deutsche Post AG, for example 70 cents for a standard letter. The letters are then passed on to Deutsche Post InHaus Services GmbH (DP IHS) – a mail consolidator that hands them over to Deutsche Post AG under the terms of a partial service contract – for delivery to the addressee.

The prices put forward for approval by DP EPS are the charges for physically transporting the letters, which is just part of the service provided by the company, and are therefore not the full rates payable by the customers. Senders also have to pay the costs for electronically posting and producing the letters, as well as the applicable VAT. The current price payable by private customers for a standard *E-Postbrief* letter, for example, is therefore not the approved rate of 44.5 cents, but 70 cents. The approval expired on 31 December 2017.

The prices approved by the Ruling Chamber for the special services were those put forward by DP EPS, while those approved for the basic products were slightly higher than those proposed. These prices were raised because of adjustments to the reimbursements paid by DP IHS on the basis of the actual volumes of mail handed over, and adjustments to the scope of the allocable common costs. These changes were, in turn, necessary to ensure compliance with the efficient operator benchmark. The changes did not affect the total price payable by the customers.

On 31 November 2017, the Chamber ruled on an application for approval of the *E-Postbrief* prices for the next period from 1 January to 31 December 2018 (BK5-17/048). The prices for the special services and for the standard, compact and large *E-Postbrief* letters remained unchanged. The price for maxi letters rose by 11 cents to €2.15.

The prices approved by the Ruling Chamber for compact, large and maxi *E-Postbrief* letters were each 1 cent lower than the prices proposed.

A key change was that for the first time Deutsche Post AG's infrastructure discount was taken into account as a cost component for *E-Postbrief* letters. The infrastructure discount was due to be introduced on 1 January 2018. As it was unclear at the time of the Chamber's decision whether or not DP EPS and DP IHS would qualify for the discount, the Chamber made it a requirement for the two companies to report back on this. The Chamber also extended its right of revocation to cover the eventuality that introduction of the infrastructure discount was postponed or the discount was ruled to be in contravention of postal legislation and therefore prohibited.

Since Deutsche Post AG decided to introduce a transitional period with simplified posting requirements for the infrastructure discount, the Ruling Chamber withdrew its concerns about the discount being introduced.

Two price approvals for *Prio* service

On 1 February 2017, Deutsche Post AG launched a market test for a new special service for letter mail. The new *Prio* service essentially offers proof of posting and priority handling, in parts of the postal process, for single piece letters (standard, compact, large and maxi letter formats, and postcards). The price for the test service, which is payable in addition to the applicable postage for the item and which was approved on 2 January 2017, is 90 cents.

The service was initially offered at branches with electronic payment systems across the country from 1 February until 31 December 2017. The service was first tested with postcards, standard letters and compact letters, and in a second stage with large and maxi letters as well.

Customers wishing to use the *Prio* service must post their items at a Deutsche Post AG branch. Priority handling aims to increase the probability of items being delivered the next working day, but does not guarantee next day delivery. Customers (senders) can also track the progress of their items online. The service does not provide confirmation of delivery, however; customers can only see when their items were scanned at the inward mail centre prior to delivery, and if an item could not be delivered.

Deutsche Post AG plans to offer the special *Prio* service as a permanent part of its product portfolio after the test period. On 29 September 2017, Deutsche Post AG therefore applied for approval of the price for the subsequent period from 1 January to 31 December 2018, and the Ruling Chamber granted approval on 7 December 2017. The price remains unchanged at 90 cents. The special *Prio* service will – as in the market test – provide proof of posting, partial priority handling, and (restricted) item tracking.

Cash on delivery and cash handling charges

New VAT regulations led Deutsche Post AG to combine its previously separate charges for its cash on delivery and cash handling services. The charges approved under the price cap regime were €2.02 for cash on delivery and €2.00 for cash handling. Previously, VAT was only payable for the cash on delivery service, resulting in a combined gross charge of €4.40.

On 8 November 2017, the Ruling Chamber approved Deutsche Post AG's proposed net charge of €3.70 for cash on delivery, including cash handling. The charge including the applicable VAT therefore remains unchanged at €4.40. Unlike before, the full charge is payable even if the recipient refuses to take delivery (and pay). The approval runs from 1 March to 31 December 2018.

As the charges had previously been approved under the price cap regime, the provision in the benchmarking process for removing individual services from the price cap basket came into effect for the first time. No changes were needed to the prices of the remaining products in the basket to compensate for the two services being removed, because the price cap conditions were still met.

Anti-competitive refusal to pay access mail discounts
Deutsche Post AG refused to pay Postcon Konsolidierung GmbH (Postcon) the access mail discounts due for April 2017 on the grounds of outstanding civil counterclaims. The Chamber ruled that Deutsche Post AG's refusal to pay constituted anti-competitive conduct and required the company in its decision of 15 August 2017 to cease the conduct.

The Chamber believes that a dominant company is generally not precluded from pursuing civil claims against its competitors. In this case, however, the particular circumstances led the Chamber to assess the conduct – settling the counterclaims by offsetting the amounts and withholding payments, whereby further clarification was needed on the amounts, allocation and liability – as contrary to good faith and thus unfair within the meaning of the control of anti-competitive practices and therefore to prohibit the conduct.

Deutsche Post AG's action, which was surprising and unforeseeable to Postcon, meant that Deutsche Post AG retained customers' advance payments for postage. It is clear when these customers (senders) pay their postage that Deutsche Post AG will have to reimburse them with a considerable part of their payments as the access mail discount. Deutsche Post AG's billing model ultimately means that the letters are always franked with the postage payable by private customers, which is higher than the postage actually due. Retaining payments puts the consolidator concerned (Postcon) in a difficult financial situation, which the billing model is actually supposed to prevent in the case of access services.

Deutsche Post AG's refusal to pay without informing Postcon or explaining the situation was unacceptable, especially in light of the long-standing business relations. Deutsche Post AG passed on all the risks to the consolidator alone and, in this specific case, the consolidator saw itself as damaged. The conduct was also unfair because Deutsche Post AG was unable to set out its claim in concrete terms, and a lengthy civil dispute with Postcon about the amount of the actual counterclaim was to be expected.

On 25 September 2017, following Deutsche Post AG's failure to cease the conduct within the time given, the Chamber issued Deutsche Post AG with an anti-competitive practices order on the second step of the escalation ladder in anti-competitive proceedings under section 32 of the Postal Act. The Chamber ordered Deutsche Post AG to initiate payment of the amount withheld within one week. Deutsche Post AG filed appeals against the two decisions and applied for interim relief. The Chamber refrained from requesting the administrative court to enforce the anti-competitive practices order until a decision was reached in the expedited proceedings.

Approval of charges for the service of documents
Charges for the service of documents are different in that all companies offering formal delivery services, and not just the dominant company, must have their charges approved by the Bundesnetzagentur. This is because Deutsche Post AG and its competitors are granted special sovereign powers to issue certificates of service.

In 2017, 33 applications were made for the approval of charges for the service of documents, significantly more than in the previous years (17 in 2016 and 13 in 2015). The increase is mainly due to a large number of follow-up applications. In 2017, there were only four first-time applications for the approval of service of document charges. Applications were made for both sliding scale and individual charges, with the majority applicable to regional, but some also to nationwide delivery. The highest charge approved in 2017 was €3.45 and the lowest €2.10.

International cooperation

EU Regulation on cross-border parcel delivery services aims to increase price transparency and regulatory oversight of the market. The Bundesnetzagentur advocates open standards for postal services.

ERGP

The Bundesnetzagentur is a member of the European Regulators Group for Postal Services (ERGP). The ERGP, which was established in 2010, serves as a forum to facilitate the dialogue between regulatory authorities and to coordinate the development of common positions ("best practices") in joint reports and position papers. One of its main tasks is to advise and assist the European Commission in consolidating the internal market for postal services. In this context, the ERGP is particularly concerned with the systematic and consistent application of the regulatory framework for postal services across all Member States, in order to promote the development of the internal market for postal services. The ERGP is composed of the regulatory authorities of the Member States of the EU and EEA and the EU candidate countries.

In 2017, Italy's regulatory authority chaired the ERGP. The ERGP's plenary meetings, during which reports and position papers are adopted, took place in Budapest, Hungary, at the end of June and in Bonn, Germany, at the end of November. An open workshop on "Empowering postal consumers" was held the day before the plenary meeting in Bonn.

In 2017, the ERGP's work programme was managed by five expert sub-groups dealing with the following issues: (1) accounting and price regulation, (2) evolution of the universal service, (3) consumer issues and market monitoring, (4) e-commerce cross-border parcel delivery services, and (5) end-to-end competition and access regulation. The Bundesnetzagentur participated in the work of all the sub-groups in 2017. The Bundesnetzagentur and the French regulatory authority ARCEP jointly chair the sub-group for cross-border parcel delivery services.

An ad hoc task force was set up alongside these sub-groups in 2017 to look at efficiency aspects of the ERGP's organisation. The Bundesnetzagentur was also involved in the work of the task force.

The reports and common position papers produced by the sub-groups in 2017 included the annual reports on quality of service, complaint handling and consumer protection, and core indicators for monitoring the market. Further reports dealt with possible changes in the universal service obligation scope in the light of market development, and the impact of these changes on universal service sustainability, and best practices in access regulation. The ERGP also produced reports on the boundaries between postal services and the transport sector and on the costs incurred by universal service providers in granting access to their infrastructure. The proposal for an EU Regulation on cross-border parcel delivery services was again a central issue for the ERGP in 2017. The aim of the Regulation is to increase price transparency and regulatory oversight of the market. The ERGP has been accompanying the legislative process from a regulatory perspective, and will continue to do so in 2018, when the final Regulation will be implemented.

ERGP Plenary in Bonn – impetus for cross-border parcel delivery

The Bundesnetzagentur hosted the ERGP's second plenary meeting for 2017. The regulators addressed, in particular, the on-going legislative initiative for an EU Regulation on cross-border parcel delivery services.

Twice a year, the ERGP holds a one-day plenary meeting that is attended by all the regulatory authorities of the Member States of the EU and EEA and the EU candidate countries, as well as the European Commission and the ERGP Secretariat. At its 13th meeting held in Bonn on 30 November 2017, the Plenary approved not only numerous reports, but also the ERGP Work Programme 2018.

The ERGP's reports investigate developments in the European postal markets. The ERGP looks not only at the regulated companies, the companies' business models that have changed as a result of the spread of digital technology, and the companies' potential for innovation, but also, in detail, at the postal service users. The meeting in Bonn gave major impetus to the final approval stage for the EU Regulation on cross-border parcel delivery services.

The workshop that was held on the day before the plenary meeting provided a forum for more than 120 experts to discuss current consumer developments in the postal sector. The first part of the workshop focused on ways to strengthen consumer rights for users of letter and parcel delivery services. A further element of the workshop looked closely at technical developments, such as open systems for parcel boxes, and at a study on key developments in the postal markets in the period from 2013 to 2016.

European and international standardisation

The European Committee for Standardization (CEN[2]) develops European standards for the postal sector. The standards and technical specifications are developed by a dedicated CEN Technical Committee for postal services (CEN/TC 331). The aims are to harmonise, across the EU, the technical methods for measuring the quality of service, and to improve interoperability between all postal industry stakeholders.

The development of market-based standards within CEN is, in particular, frequently driven by initiatives from interested parties such as industry and the European Commission. The standards serve to promote cross-border trade, rationalisation, and quality management and assurance. As a forum for industry, research and society, CEN makes a significant contribution in developing innovations through to market uptake and unlocking the potential of forward-looking projects.

CEN/TC 331 currently comprises four working groups, which are mirrored within the German Institute for Standardization (DIN) and its "Postal services" committee. The working groups consist of representatives of postal and logistic operators, courier, express and parcel operators, online merchants and industry, as well as regulatory authorities, trade associations and consumer organisations. The Bundesnetzagentur was elected to chair the European Technical Committee CEN/TC 331 at the end of 2016, and also chaired the relevant DIN committee again in 2017. The Bundesnetzagentur advocates open standards as a way to prevent, at an early stage, barriers to market entry for competitors and the transfer of imbalances from the physical to the electronic postal service market. It places emphasis on ensuring the necessary transparency in standardisation and on open communication with all market players.

In the field of quality of service, CEN dealt with a method for measuring the transit time of international letter mail. An existing standard is being revised to specify the method for measurements using real mail instead of test letters. CEN also revised existing standards on complaint handling processes for items that have been damaged, delayed or lost.

One key standardisation project deals with parcel boxes with free access for users. The aim of the project is to develop a standard for digital parcel boxes, as a next step from physical parcel boxes, with free access for the consumers and the transport providers involved in the collection and delivery process. CEN also continued its work on standardising the design and printing requirements for reverse envelopes.

Existing standards for secured electronic postal services were also revised in light of the new EU Regulation on electronic identification and trust services for electronic transactions in the internal market. CEN also began work on the requirements for electronic advanced data (EAD) in postal operations, in particular to facilitate faster and smoother delivery of international goods items. The project supports the customs clearance processes and takes account of the increased security requirements for European and international air transport.

In the field of physical process data, a standard for the exchange of data between e merchants and logistic operators for cross-border parcels was successfully completed in 2017. The aim of this project was to eliminate barriers to cross-border parcel delivery by developing common interfaces between postal and logistic operators and retailers. The standard has now been published as "CEN/TS 17073 – Postal services – Interfaces for cross border parcels".

[2] CEN = Comité Européen de Normalisation = European Committee for Standardization. CEN's 34 national members are the national standardisation bodies of the 28 EU countries, the former Yugoslav Republic of Macedonia, Serbia and Turkey, plus three EFTA countries. CEN provides a platform that brings together various players within a specific field to enable a consensus to be developed at European level. CEN aims to ensure that the standardisation system respects the principles of consensus, openness, transparency and coherence.

Universal Postal Union

In 2017, the Bundesnetzagentur contributed its expertise under the leadership of the Federal Ministry for Economic Affairs and Energy to the work of the Universal Postal Union (UPU). The UPU today has 192 member countries. Its meetings are attended by governments, regulatory authorities and postal operators. Every four years, a Universal Postal Congress sets the UPU's strategic and financial course. The Council of Administration (CA) and the Postal Operations Council (POC) define the specific activities. The International Bureau, under the authority of a Director General, takes care of preparatory work for the two Councils and of day-to-day business between Universal Postal Congresses.

In light of the spread of digital technology and the growth in electronic commerce, the POC elaborated the UPU's Integrated Product Plan (IPP). One of the issues addressed by the first-ever IPP forum, held in 2017 with the participation of large and successful companies, was the needs of the postal service users, which were identified as item tracking, faster delivery, simpler return options and guaranteed costs.

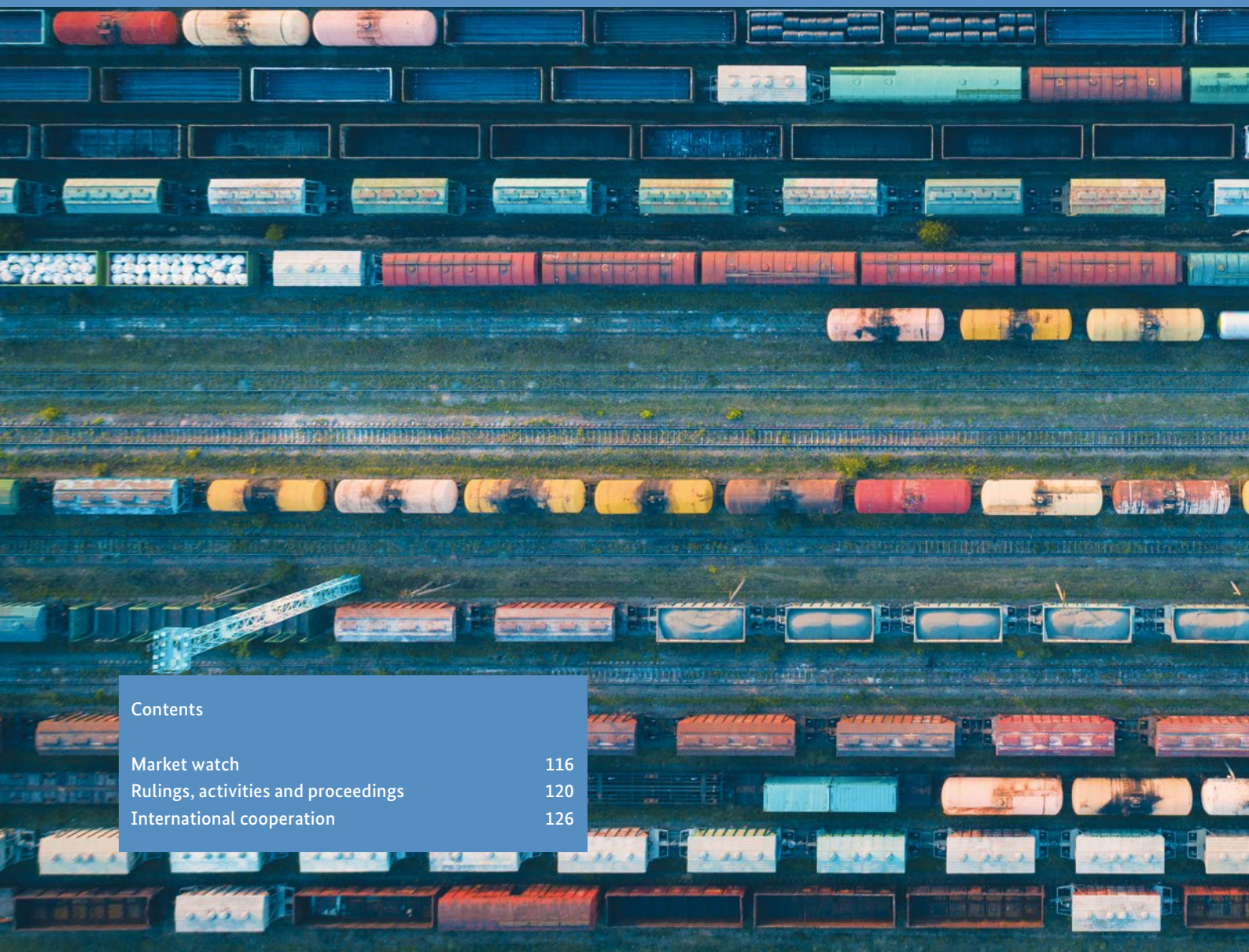
The growth in international e-commerce is also leading to an increase in interest in establishing extraterritorial offices of exchange (ETOEs). An ETOE is a facility operated for commercial purposes by a designated operator of one member country on the territory of another country. This enables operators to draw and accelerate business in markets outside their own national territory. A number of UPU member countries do not allow the establishment of ETOEs on their territory, while others conditionally or unconditionally allow ETOEs to be established. Germany is one of the countries that allow the establishment of ETOEs subject to certain conditions. Since 2017, Germany has allowed ETOEs to be established by operators of other member countries, provided that the other countries also allow German ETOEs to be established on their territory. This has led to member countries considering lifting their bans on ETOEs, so as to enable their operators to establish ETOEs in Germany.

An increased focus of the CA's work in 2017 was on proposals to reform the UPU. One of the proposals is to raise the number of POC members from 40 to 48, which would enable better representation of the developing countries. Another is to reform the contribution system to ensure improved and sustainable funding for the UPU. The UPU's activities are currently financed on the basis of voluntary contribution classes. In future, contributions could, for instance, be based on a country's gross domestic product as a recognised indicator of the country's economic performance.

RAIL

Competition on the rails

The Rail Regulation Act that entered into force in 2016 has been implemented in numerous ruling chamber proceedings over the past year. In addition to this, the Bundesnetzagentur has continued working on additional activities to improve competition on the rails.



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In 2012, federal transport companies were accountable for approximately 70% of rail freight moved. This figure fell to around 54% in 2016.

With respect to regional passenger rail services, around 82% of the services in 2012 were provided by Deutsche Bahn AG companies, and this figure likewise fell in 2016 to approximately 74%.

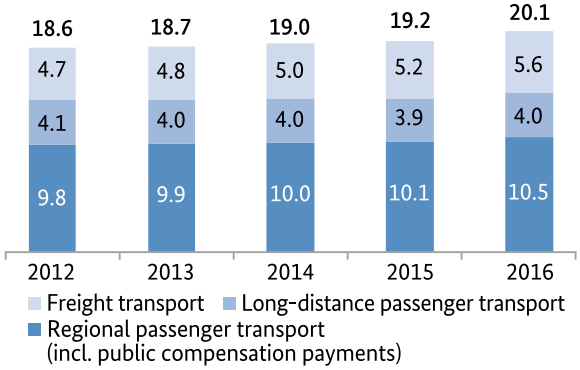
The number of passenger kilometres recorded in long-distance passenger rail services grew from 37 billion to 40 billion for the 2015-2016 period, which represents a considerably stronger performance than in previous years. Deutsche Bahn AG companies were responsible for almost all of the services provided in this segment, with a market share of over 99%.

Market watch

The total share of Deutsche Bahn AG's competitors in the rail freight transport market once again rose in 2016 and now stands at 46%, a significant increase on the share recorded in 2012 (30%). The number of passenger kilometres recorded in 2016 as regards long-distance passenger rail services is up on the previous year, rising from 37 billion to 40 billion. Deutsche Bahn AG companies were responsible for almost all of these services, with a market share of over 99%.

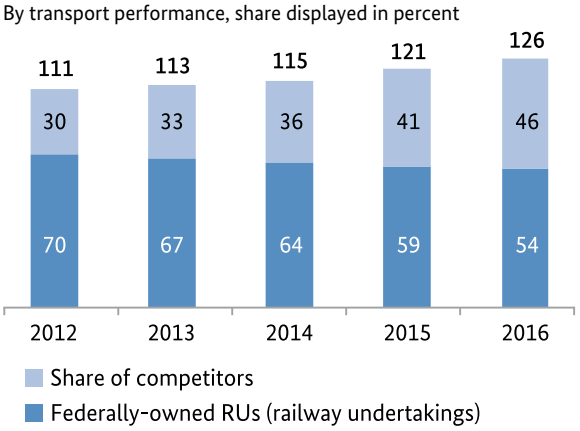
Key trends

Revenue development in the rail market by type of transport
in €bn[1]



The trend of revenue growth in the rail market looks set to continue, as revenue increased by more than 5% from 2015 to 2016. In total, railway undertakings recorded revenues of €20.1bn in 2016. The revenue generated in the rail freight transport segment grew from €5.2bn to €5.6bn, while revenue in the regional passenger rail services segment rose from €10.1bn to €10.5bn. There was also a slight increase in the revenue recorded in long-distance passenger rail services, with the figure increasing from €3.9bn to €4bn.

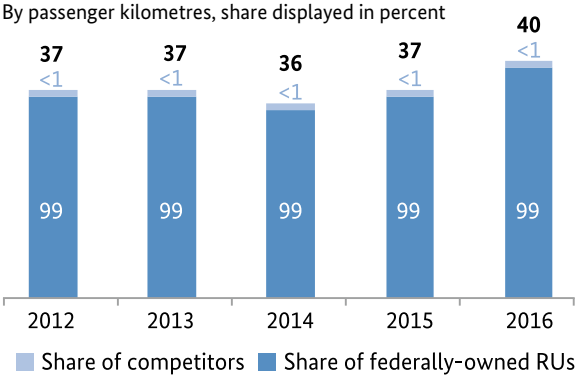
Competition in rail freight transport[1]
By transport performance, share displayed in percent



The volume of rail freight moved in 2016 was 126bn tonne kilometres. The 4% increase on the previous year stems from the fact that new companies provided transport data as part of the market survey conducted by the Bundesnetzagentur. While federally-owned railway undertakings were accountable for approximately 70% of the freight moved by rail in 2012, this figure dropped to around 54% in 2016.

Rail transport rose by more than 13% in the period from 2012 to 2016. The share of rail freight in the modal split[2] likewise grew slightly in this same period.

Competition in long-distance passenger rail transport[1]
By passenger kilometres, share displayed in percent



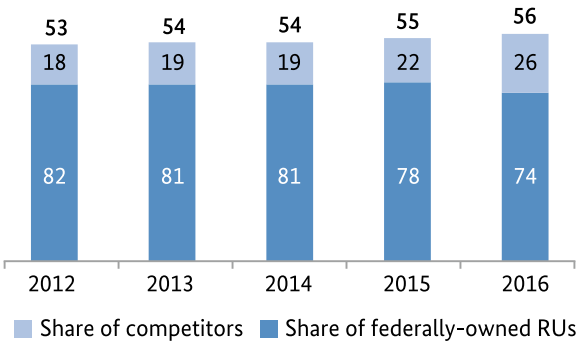
[1] There is no data available yet for 2017.

[2] Transport volume allocated to the different modes of transport.

The long-distance passenger rail segment recorded 40bn passenger kilometres in 2016, which was up on the previous year's figure of 37bn. This represents growth of more than 8%. Deutsche Bahn AG companies were responsible for almost all of the services provided in this segment, with a market share of over 99%.

The reasons behind the increase in the number of passenger kilometres are responses as regards prices, particularly the budget prices offered by DB Fernverkehr AG owing to the competition among long-distance coach travel operators as well as the bankruptcy of the Air Berlin airline. There are signs to suggest that transport in the long-distance passenger rail segment will continue to rise.

Competition in regional passenger rail transport[1]
By passenger kilometres, share displayed in percent



The number of passenger kilometres recorded in the regional passenger transport segment grew slightly from 55bn to 56bn passenger kilometres. The positive trend recorded from previous years thus continued into 2016. Whereas Deutsche Bahn AG companies accounted for around 82% of regional passenger kilometres in 2012, they only accounted for around 74% in 2016.

In the period from 2012 to 2016, the share of regional passenger transport in the modal split remained at a constant 8.2%.

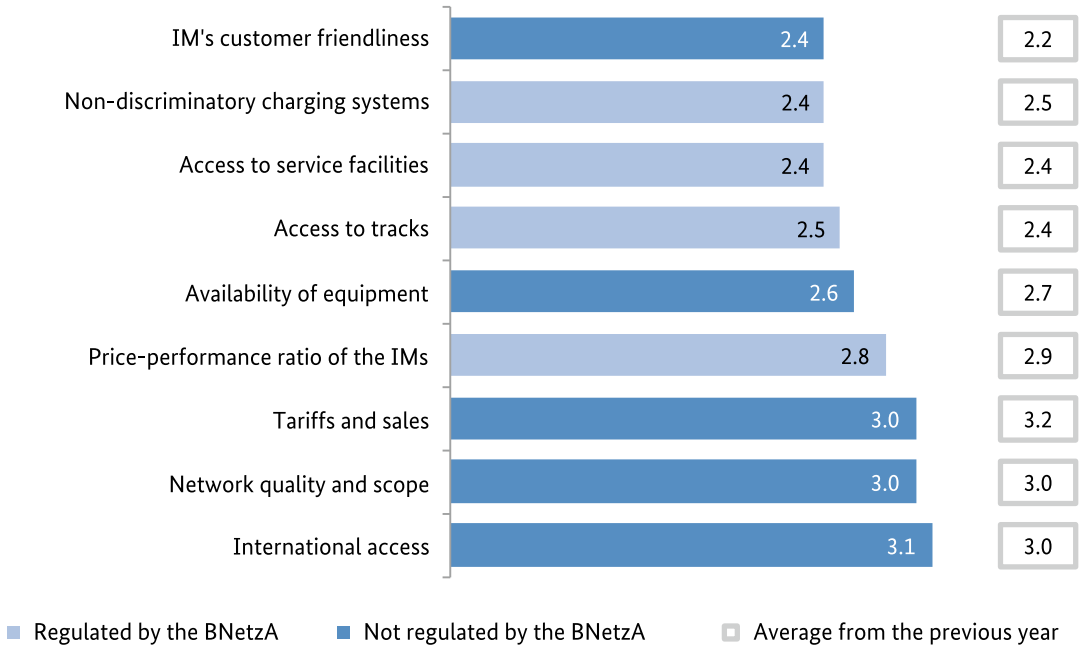
Market assessment

Factors influencing the rail market

In the annual survey on the factors influencing the rail market, railway undertakings were asked to assess the categories listed in the chart by giving a rating of between 1, which stands for "very good", and 5, meaning "very poor".

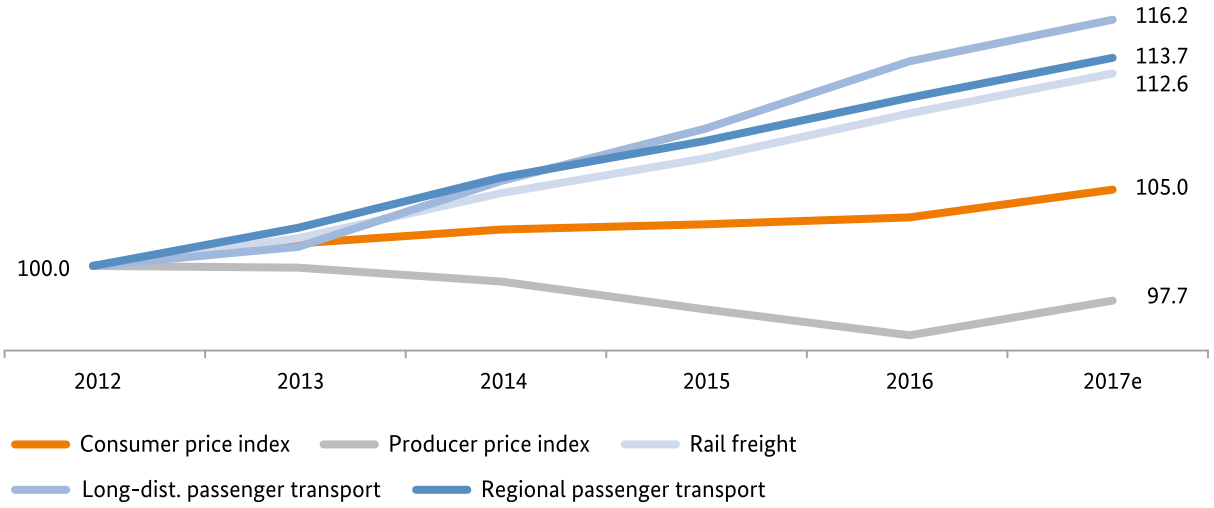
According to railway undertakings, the situation on the rail market has improved marginally in the "Non-discriminatory charging systems" and "Price-performance ratio of the IMs" categories, which are regulated by the Bundesnetzagentur. There have also been improvements in the assessments of other categories, including in "Tariffs and sales" and "Availability of equipment".

Factors influencing the rail market
based on an average rating of 1 (very good) to 5 (very poor)



Infrastructure usage charges

Average track access charge of IMs
indexed; 2012 = 100



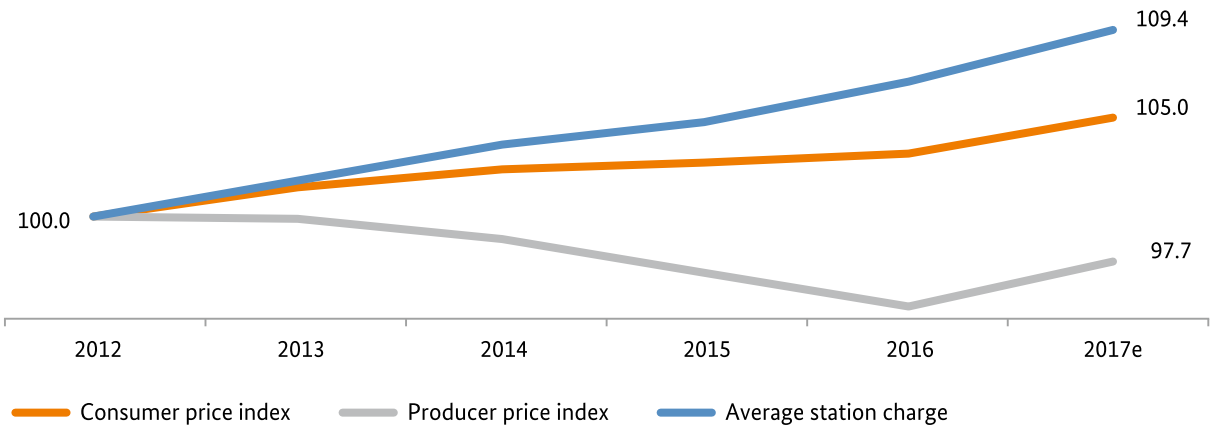
Average track access charge per train path kilometre (indexed)

Whereas the consumer price index rose by around 5% between 2012 and 2017, track access charges rose by more than 12% in the rail freight segment, by more than 13% in the regional passenger segment and by more than 16% in the long-distance passenger segment. By contrast, the producer price index for industrial products dropped by approximately 2% during the same period.

Average revenue per station stop (indexed)

The average charge for use of passenger stations has risen by just over 9% since the base year 2012. This rate of increase is much greater than the increase in the consumer price index (5%) and the producer price index for industrial products (which fell by just over 2%).

Average station charge of IMs
indexed; 2012 = 100



Annual figures labelled with an "e" in the following charts are estimated values.

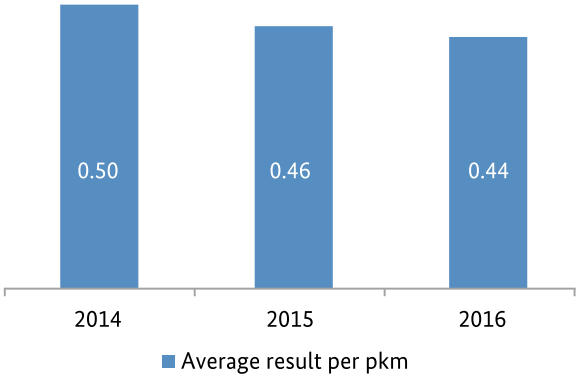
Operating results of the railway undertakings

In comparison to 2015, the railway undertakings (RUs) saw their revenue fall in all transport segments in 2016[3].

Measured in terms of passenger kilometres, the long-distance passenger segment reported an average operating result of 0.44 cents per passenger kilometre in 2016, which represents a slightly lower operating result than in 2015.

Specific results of RUs in long-distance passenger rail transport[3]

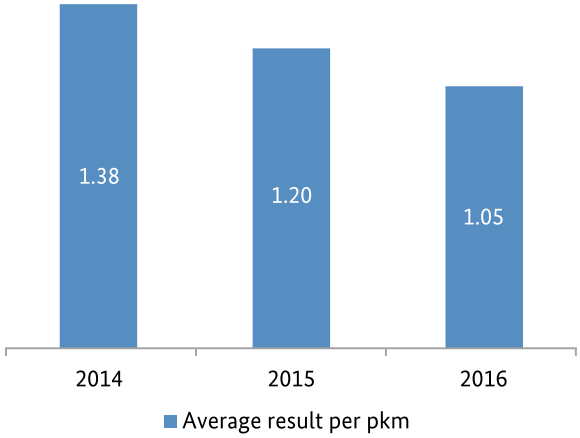
in euro cents per passenger kilometre



In the regional passenger segment, the average operating result was 1.05 cents per passenger kilometre travelled in 2016, which is likewise lower than the figure record in 2015 when the operating result was 1.20 cents.

Specific results of RUs in regional passenger rail transport[3]

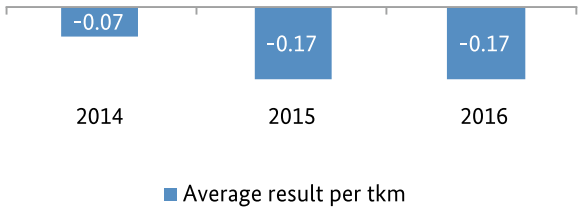
in euro cents per passenger kilometre



The railway undertakings reported an average loss of 0.17 cents per tonne-km in the rail freight segment in 2016, which was on par with the previous year.

Specific results of RUs in rail freight transport[3]

in euro cents per tonne kilometre



[3] There is no data available yet for 2017.

Rulings, activities and proceedings

The Bundesnetzagentur improved access to railway infrastructure in 2017 in a number of individual proceedings. It opened 65 proceedings with the aim of revising or amending network statements for service facilities. In addition to this, the usage charges for the railway infrastructure of DB Netz AG were approved for the 2018/2019 timetable period.

The Rail Regulation Act (Eisenbahnregulierungsgesetz – ERegG) entered into force on 2 September 2016. In many areas, the requirements pertaining to access remained the same. The Bundesnetzagentur continued to review the network statements before their entry into force. A market consultation, however, no longer needs to be conducted for every network statement. The ruling chamber proceedings will ensure that all stakeholders are involved in the proceedings. More extensive changes can be discussed with the Bundesnetzagentur in the run-up to the formal proceedings.

Track access

Information on and the planning of construction sites with DB Netz AG

The regulations concerning the provisions of information to and the coordination of construction work with railway undertakings are included in the network statements and have been agreed with the Bundesnetzagentur. Nevertheless, numerous railway undertakings once again contacted the Bundesnetzagentur with complaints in 2017. As in previous years, the complaints referred in detail to deadlines for information not being met as per regulations as well as to changes being made to timetables at short notice during the construction work. The timetables that were sent to the railway undertakings were sometimes incorrect and did not contain all of the requisite information. In addition, the railway undertakings believe that their arguments were not taken into consideration to a sufficient degree or even at all when coordinating the construction work. This applied in particular to the complete closure of routes with insufficient rerouting possibilities for freight transport. The Bundesnetzagentur intervened in the complaints and in some instances carried out on-site inspections with the railway undertakings and infrastructure managers to clear up any problems. These proceedings helped in many cases to correct the planning and to make improvements that benefitted the railway undertakings.

The railway undertakings also frequently experienced major quality problems when organising rail traffic during the construction work, which lead to complaints being made. Unstable operating situations combined with additional minor construction work had adverse effects on the trains operated by the railway undertakings in every traffic division.

The Bundesnetzagentur has in previous years carried out projects together with all of the stakeholders in order to improve process workflows in the planning of construction work and has, for example, made agreements to further develop IT services. The RU associations do not believe that all of these measures have resulted in significant improvements being made. As a result, a "construction site round table" was convened in early 2017 and was attended by representatives from the German Federal Ministry of Transport, regional public transport authorities, railway undertakings and DB Netz AG. The final report of the "Fahren und Bauen" ("Train running and engineering work") working group of the Bundesnetzagentur from 2016 provided an important basis for this round table. In three working groups, data was collected and discussions were held to improve incentive systems, construction site planning and communication. The Bundesnetzagentur was involved in the consultations and contributed to the discussions surrounding construction site planning/communication within the working group. The first results have already been achieved and work has started on their implementation.

The complete closure of the Rhine Valley route near Rastatt for seven weeks due to an accident in a tunnel site

The Rhine Valley route which is extremely important for international rail services was completely closed between 12 August and 2 October 2017, with the cause being a structural collapse of the tunnel site underneath the Rhine Valley route near Rastatt. Although a replacement bus service was provided for rail passenger traffic, only around 20% of rail freight traffic was able to operate via diversionary routes. The diversionary routes required, such as the "Gäubahn", were not always available due to construction and repair works. In addition, DB Netz AG did not have any suitable diversionary and contingency plans in place following the tunnel accident. For example, rerouting freight trains to travel via France was not possible.

A large share of the rail freight traffic on the Rhine Valley route was cancelled without a replacement service being organised. This resulted in a huge backlog of freight being held at port and freight terminals. Furthermore, freight traffic was moved from the rails to the roads in lorries or to the waters in river boats.

Following the complete closure of the route after the tunnel accident, the Bundesnetzagentur initiated preliminary proceedings and continuously gathered information from DB Netz AG as regards the granting of access. One key area here was the provision of the train paths on the remaining diversionary routes and their allocation to the individual railway undertakings.

The Bundesnetzagentur will continue with the preliminary proceedings for Rastatt in 2018 and will in future see to it that suitable contingency plans are put in place. When planning and carrying out construction work in the future, measures should be put in place to ensure that rail services can continue to operate to the greatest extent possible in the event of disruptions and/or accidents.

Overloading proceedings on the West Rhine Railway in the Bonn region

At the end of 2016, the route that runs on the western bank of the Rhine from Hürth-Kalscheuren to Remagen via Bonn main train station was adjudged to be overloaded, with the result being that a capacity analysis had to be carried out and a plan to increase the railway infrastructure capacity (PEK) was drawn up in 2017. As a result of the new Rail Regulation Act, the draft PEK was first published in September so that the access beneficiaries had one month to comment on the plan.

Trains being used in long-distance and regional passenger services, as well as those in freight transport services, share the capacity of the double-track railway line. According to the information provided by DB Netz AG in the PEK, this usually equates to nine trains travelling on the line per hour, i.e. "more trains are travelling over the overloaded section than is acceptable with respect to operational quality". Although smaller infrastructure measures are possible in the short- to medium-term, they will only create limited additional capacity. Mainly, they will improve operational quality. One of the proposals put forward by DB Netz AG in the public PEK draft was therefore to "freeze" the current regional passenger rail service offering to increase the capacity for freight transport and to have the Ahr Valley Railway trains (RB 30) terminate in Remagen outside of peak times. This proposal was met with huge protests from the local communities.

DB Netz AG axed its plans to cancel some services at the end of the year after the Federal Railway Authority and the Bundesnetzagentur made it clear that the capacity requirements for additional freight transport had in the meantime not been sufficiently documented. In light of the significance of the two railway lines along the Rhine (the western and eastern Rhine railways) as a key European freight transport corridor (Zeebrugge, Amsterdam, Rotterdam, Antwerp (ZARA ports) – Cologne – Basel – Switzerland – Genoa), the overloading problem remains an ongoing concern.

Access to service facilities

Network statement for service facilities
In 2017, 65 proceedings were instituted to formulate or amend network statements for service facilities. In one case, the amendments were rejected in a decision handed down by Ruling Chamber 10. In addition to these proceedings, focus was placed in 2017 on reviewing the service specifications of the infrastructure companies belonging to the DB Group.

The Bundesnetzagentur has been monitoring the drafting of sample network statements by the Association of German Transport Companies (Verband Deutscher Verkehrsunternehmen (VDV)) since 2006. It became necessary to review them after the Rail Regulation Act (ERegG) entered into force in September 2016. The aim is to furnish infrastructure managers and the operators of service facilities with network statements and statements for service facilities which can be used as a recommended guideline. The sample network statements and statements for service facilities drawn up by the VDV are intended to help the companies to meet the statutory requirement to issue network statements.

The Bundesnetzagentur has the right to check the network statements in the concrete application case, as samples always need to be adapted to the individual infrastructure.

Conflict resolution in service facilities
In 2017, the Bundesnetzagentur conducted several proceedings involving conflicts relating to service facilities following notification issued in accordance with Section 72 of the Rail Regulation Act. None of the decisions taken by infrastructure managers were rejected. In two proceedings, mediation by the Bundesnetzagentur led to a mutually agreeable solution being found. Another formal lawsuit involving conflict over the use of service facilities was avoided after comprehensive talks were held with all the stakeholders. Further usage restrictions were resolved or mitigated thanks to mediation by the Bundesnetzagentur.

Improvements in the quality of service specifications
For quite some time, the Bundesnetzagentur has been receiving complaints from access beneficiaries about the inadequate specifications of service and facilities in the network statement for passenger stations of DB Station&Service AG. The Bundesnetzagentur therefore insisted that improvements be made to the service specifications. As part of the intended amendment to the statement, the Bundesnetzagentur reviewed the infrastructure and service specifications DB Station&Service AG was planning to use. DB Station&Service AG will now draw up specifications for each individual passenger station. Since extensive adjustments will need to be discussed, particularly with regard to the level of detail of the specifications for service and facilities at each station, Ruling Chamber 10 will institute further proceedings to this end.

The situation is similar regarding the infrastructure specifications relating to DB Netz AG's sidings. Access beneficiaries have complained both about the conditions of the facilities and the lack of transparency in DB Netz AG's network statement. Ruling Chamber 10 has conducted a review of the statement for service facilities that will be brought to a conclusion in the near future.

Impact the closure of the Rhine Valley route had on handling at Deutsche Umschlaggesellschaft Schiene-Straße mbH's terminal in Weil am Rhein
The closure of the Rhine Valley route in the late summer of 2017 severely impacted the handling situation at the terminal of Deutsche Umschlaggesellschaft Schiene-Straße mbH (DUSS) Weil am Rhein along the border with Switzerland. This resulted in parking capacities for loading units becoming overloaded at the terminal, causing delays with the clearance of trucks delivering and collecting shipments which in turn caused traffic congestion on the roads around Rastatt. DUSS responded promptly and coordinated temporary measures with the Bundesnetzagentur. The regular opening hours of the terminal have since been extended. In addition, every truck delivering a loading unit has been required to take a loading unit with it in return. Priority has also been given to trucks collecting shipments.

Handling problems at Bremerhaven
As a result of construction measures, Bremische Hafeneisenbahn (BHE) experienced capacity-related

Determining the base level of DB Netz AG's costs

The Bundesnetzagentur has set the base level of DB Netz AG's costs for the first regulatory period. The cost determination will create stable framework conditions for the sector and will secure investments. This will create the conditions for fair competition in the railway sector.

Setting the base level is the first step in determining DB Netz AG's charges for the years 2019 to 2023. In order to determine the base level, the Bundesnetzagentur reviewed DB Netz AG's costs and traffic volume for the years 2014 to 2016. A cost framework is created for each year on this basis. The process creates incentives for DB Netz AG to reduce its infrastructure costs, thereby enhancing the attractiveness of rail transport in competition with road transport.

DB Netz AG claimed vis-à-vis the Bundesnetzagentur that it incurred costs of around €6bn which the Bundesnetzagentur reduced to €5.3bn. The reductions refer in particular to capital costs and cost projections.

The pricing proceedings conducted by a ruling chamber for the first time were characterised by a significantly higher level of participation than previous proceedings in the railway sector.

problems in mid-September which continued until November 2017. BHE provides for scheduled feed control to deal with any such scenarios. Trains that do not have access to entry sidings upon arrival temporarily use sidings of DB Netz AG's adjacent infrastructure. When infrastructure capacity becomes available again, these trains are to be dispatched immediately.

However, the situation worsened so much as a result of extraordinary weather conditions that it became necessary to implement further measures. Among other things, construction measures were postponed and new tracks were put into operation ahead of schedule. The temporary rejection of additional requests for non-scheduled transport services also helped to ease the situation. The scheduled feed control was suspended on 24 November 2017. There is consensus among all the stakeholders regarding the outcome: The problems need to be examined in detail retroactively. The Bundesnetzagentur will monitor this process and pay particular attention to the coordinated planning and use of capacities at the port railway and at the interface to the adjacent infrastructures (DB Netz AG and freight terminals).

Car trains need suitable service facilities

Now that DB Fernverkehr AG has pulled out of the business with car trains and overnight trains, a number of new service providers have entered this market. Passengers are benefitting from a wider range of services thanks to competition in the rail sector. However, the fact that the existing loading facilities are being used by several operators means there is now a greater need for coordination among the stakeholders. The Bundesnetzagentur monitored the implementation of the transport services. Problem areas have emerged, such as delays in the loading of cars during times of peak traffic and in the level of detail of network statements. In the network statement submitted on 26 October 2017, DB Station&Service AG provides a detailed description of the car loading facilities and has set rules for the use of these facilities which include "Registration". The majority of complaints and conflicts were resolved.

Infrastructure charges

Price approval application by DB Station&Service AG and pertinent proceedings

The Bundesnetzagentur has approved the charges for use of DB Station&Service AG's passenger stations for 2018. The company operates approximately 5,400 stations throughout Germany. As a result, the price approval applications were approved, with moderate reductions being made to accommodate individual circumstances. Extreme price hikes for individual station stops by long-distance passenger rail transport, which were becoming apparent in the meantime, were prevented by price adjustments.

For the first time, the charges for regional rail passenger transport had to be adjusted for the so-called station price brake in accordance with section 37 of the Railway Regulation Act. As such, station prices are linked to the development of state funding for regional passenger rail services. Deviations in price are only legally possible subject to an agreement between the station operator and local authorities. Furthermore, the charges for long-distance rail passenger transport are based on price developments in regional rail passenger transport.

The proceedings instituted in parallel on price approval applications in relation to the changes in charging principles in the network statement envisaged by DB Station&Service AG were brought to a conclusion without requiring an authority to take any action.

Procedure for determining the base level and upper limit of the total costs

Since the Rail Regulation Act entered into force, the charges levied by all operators of regular gauge railways have been subject to approval. If no exemptions or legal exceptions apply, incentive pricing must be implemented. This applies to DB Netz AG and seven other railway undertakings.

Before the first regulatory period begins, which extends from 2019 to 2023, a ruling was issued for the one-off determination of the base level of total costs for each company concerned. The average costs incurred and traffic volume generated in the years 2014 to 2016 were used as a basis for determining the base level of total costs. In addition, findings on future cost developments were taken into account in an appropriate update.

Based on the base level of total costs, an upper limit of total costs was set for each railway undertaking for the 2018/2019 timetable period. The upper limit of total costs is calculated from the base level of total costs to which a rate of price increase is added and from which a rate of productivity growth is deducted. The progress rates are derived based on time series defined by the Federal Statistical Office and of the German Council of Economic Experts. The upper limit of total costs caps the level of charges that can be subsequently applied for and approved for the respective timetable periods of the first regulatory period.

In relation to the base level of total costs, DB Netz AG informed the Bundesnetzagentur that its total costs amounted to around €6bn. The Bundesnetzagentur reviewed the costs and lowered them to €5.3bn. The Bundesnetzagentur did not recognise cost items that had not been sufficiently documented or that were based on a forecast which did not take all concerns into account. The Bundesnetzagentur reduced the interest rate of 7.7% (pre-tax interest rate) applied by DB Netz AG on capital employed to 5.9%.

The upper limit of total costs for the 2018/2019 timetable period was set at just under €5.3bn, based on an inflation rate of 0.77% and a productivity rate of 0.93%, after the base level of total costs had been determined.

DB Netz AG's 2019 track access charging system

The Bundesnetzagentur approved DB Netz AG's track access charges for the 2018/2019 timetable period (2019 track access charging system).

In principle, charges can be approved if the imputed reference revenue of the prices submitted for approval corresponds to the upper limit of total costs for the respective year and the charging structures take the other legal requirements into account.

In October 2017, DB Netz AG submitted its application for approval of charges it intended to levy for the year 2018/2019. The Bundesnetzagentur approved the track access charges for regional passenger transport services submitted for approval in accordance with the application. In accordance with the provisions set forth in section 37 of the Rail Regulation Act, regional passenger transport charges are based on the average charges levied in each federal state in 2017 and are then increased annually by 1.8% (similar to the development of the state funding for regional passenger rail services).

With regard to track access charges for long-distance rail passenger transport, the Bundesnetzagentur lowered charges in the "Charter/Nostalgia" and "point-to-point" segments used in particular by rival railway undertakings. The competitor share in long-distance rail passenger transport remains below 1%; the few existing providers in these areas are also having difficulties developing sustainably profitable business models.

In the case of track access charges for rail freight transport, the Bundesnetzagentur lowered the charges in the "standard" segment from the charges indicated in DB Netz AG's application. The reason why it considered it necessary to lower the charges was the relative viability of this segment, which the Bundesnetzagentur considered to be overestimated in DB Netz AG's application.

Price approval procedures for other infrastructure managers

In addition to DB Netz AG, incentive pricing was required for seven other undertakings. The majority of these undertakings had filed a price approval application in October and November 2017. The Bundesnetzagentur assumes that all proceedings will be brought to a successful conclusion by the beginning of 2018 once it has received the complete and correct documentation.

A simplified approval procedure is sufficient if the criteria for exemptions or legal exceptions have been fulfilled. The charges levied by these infrastructure managers are be approved provided they do not exceed the cost of service provision and generate a reasonable return, are reasonable, non-discriminatory and transparent.

To this end, the Bundesnetzagentur wrote to around 100 infrastructure managers in July 2017 to inform them about the legal basis and about what the process involves. The Bundesnetzagentur has standardised the entire process to the necessary extent considering the large number of infrastructure managers who are affected. To this end, it designed an electronic data collection form which it sent to the relevant undertakings.

All of the undertakings had submitted a price approval application for the timetable period 2018/2019 by the end of the year. A large number of the approval proceedings passed the two-month review period without any further measures, after the expiry of which the charges are deemed to have been approved. The Bundesnetzagentur assumes that all proceedings will have been brought to a conclusion by the spring of 2018.

Exemptions and legal exceptions provided for in Section 2 of the Rail Regulation Act

Section 2 of the Rail Regulation Act specifies exemptions and legal exceptions from the scope of application of certain regulations governing the allocation of capacity, the levying of charges for infrastructure managers and unbundling.

Ruling Chamber 10 examines the applications for exemption for each type of railway infrastructure based on defined criteria. These criteria represent the outcome of the market consultation conducted by the Bundesnetzagentur in the autumn of 2017.

The response of the railway market to the exemption possibilities and to the guidelines provided by the Bundesnetzagentur has been high. By December 2017, almost 150 railways had applied for an exemption. About one-third of all proceedings have meanwhile been brought to a conclusion.

Market survey on maintenance facilities

As part of its market survey on maintenance facilities, the Bundesnetzagentur published its report on market definition in November 2017. Fifteen markets were defined. The report differentiates between on-site maintenance and heavy maintenance for most types of vehicles. It also makes a distinction between regional and long-distance passenger transport as well as freight transport and the various types of vehicle. Out of the 15 markets, 14 are surveyed nationwide. A regional analysis is only being carried out for the market for on-site maintenance of regional transport vehicles.

The competition assessment is currently being carried out for the 15 markets. The law requires the overall market survey to be completed by December 2018.

International cooperation

International cooperation has been further intensified in the area of rail regulation with the focus being placed on the exchange of regulatory practices and monitoring the drafting of directly applicable implementing acts.

Working groups at IRG-Rail and ENRRB

The Bundesnetzagentur was actively involved in the relevant bodies, most notably the Independent Regulators' Group IRGRail[4], which grew to 30 members in 2017, as well as the European Network of Rail Regulatory Bodies (ENRRB), which is headed by the EU Commission. International cooperation was rounded off by regular working meetings with the EU Commission, the Platform for Railway Infrastructure Managers in Europe (PRIME) and various stakeholder groups in the railway sector.

The work of IRGRail in 2017 focused on engaging in an intensive exchange of regulatory practices now that Directive 2012/34/EU has been transposed in all Member States. The work of IRGRail also focused on drawing up position papers as a contribution towards the legislative processes at EU level. As such, the Bundesnetzagentur was actively involved in all IRGRail working groups, representing the interests of the Bundesnetzagentur. It also chaired three out of the six working groups and subworking groups.

In the area of access, European railway regulators have discussed creating incentives for minimising disruptions and the respective approaches to regulating charges for the minimum access package and for the use of service facilities.[5]

In October 2017, IRG-Rail organised an expert workshop on the performance-based direct award of public service contracts in rail passenger transport at which high-ranking representatives from the rail sector exchanged views on the risks and challenges of so-called "PSO (public service obligations) services".

The Bundesnetzagentur also attended the ENRRB meetings, participated in the various sub-group meetings of the Single European Railway Area Committee (SERAC) on rail freight corridors and attended the meetings of the European Commission on market monitoring at European level (Rail Market Monitoring Survey, RMMS).

Implementing acts of the European Commission pursuant to Directive 2012/34/EU

Directive 2012/34/EU ("Recast") makes provision for the EU Commission to issue so-called implementing acts in a number of areas. This legal act is directly applicable and binding for all Member States.

In 2017, the EU Commission worked intensively on an implementing act governing access to service facilities and railway-related services. In several rounds, the Commission drafted the legal text with the participation of the ministries and regulatory authorities of the Member States, but also of associations and market participants. From the very beginning, the Bundesnetzagentur has been involved in the ongoing communication and consultation process, both via IRG-Rail and directly in bilateral discussions with the EU Commission, representing the regulatory perspective. The implementing act is based on the regulation that applies in Germany, which is comparatively strict by European standards.

Key statements relate to the obligation to allocate existing capacities at service facilities, the obligation to draw up a network statement and the possibility of obtaining exemptions from obligations for strategically unimportant service facilities.

IRG-Rail provided input from a regulatory perspective in the current legislative process. It will draw up a common position paper for the regulatory authorities for the application of the exemptions and will contribute to a uniform interpretation and application of the act.

The EU Commission has discussed its first draft of an implementing regulation with the Member States involving economic equilibrium in respect of public service contracts (the so-called "economic equilibrium test"). The IRG-Rail working group responsible for legal developments, which is chaired by the Bundesnetzagentur, has monitored the process which is to be continued in 2018. IRG-Rail will develop and publish a common position paper on the methods and criteria used to assess the economic equilibrium.

Access-related issues and rail freight corridors

Focus was placed, inter alia, on a performance scheme. In this respect, the European regulations stipulate that charging schemes for use of the infrastructure must provide incentives for both railway undertakings and infrastructure managers to minimise disruptions and increase the performance of the rail network. To this end, IRG-Rail, under the chair of the Bundesnetzagentur, organised an internal workshop in March 2017. In addition, the working group has published a document providing a detailed overview of the current situation in the European Member States.[6]

The trans-European freight corridors were another focal point in 2017. The IRG-Rail "Access" working group organised an international forum for the first time in September 2017 to monitor rail freight corridors. This facilitated both the exchange between the regulatory authorities and with market participants.

The IRG-Rail working group has jointly compiled a list of key performance indicators and has published them on its website.[7] The data collected relates to capacity management, operations, market development and charges levied. Meetings were held with corridor operators at regular intervals to facilitate the exchange of information.

Market monitoring at European level

Market monitoring at European level was characterised by the drafting of IRG-Rail's Annual Monitoring Report.[8] In addition to publishing key data on the European rail networks, the 2017 report focused on the issue of opening up the freight and passenger transport market. The high informative value of the report requires data collection on common indicators to be harmonised in the Member States. Regular exchanges with the other regulatory authorities formed the basis for effective and transparent cooperation.

[4] https://www.irg-rail.eu
[5] IRG-Rail (17)4 – IRG-Rail Overview on Performance schemes, IRG-Rail (17)5 – IRG-Rail Overview of Charging practices for the minimum access package in Europe und IRG-Rail (17)6 – IRG-Rail Overview on charging practices for access to service facilities and rail related services, available at https://www.irg-rail.eu/irg/documents/position-papers/166,2017.html
[6] IRG-Rail (17)4 – IRG-Rail Overview on Performance schemes, available at https://www.irg-rail.eu/irg/documents/position-papers/166,2017.html
[7] IRG-Rail (17)3 – IRG-Rail List of key performance indicators, available at https://www.irg-rail.eu/irg/documents/position-papers/166,2017.html
[8] Fifth IRG-Rail Monitoring Report 2015, available at https://www.irg-rail.eu/irg/documents/market-monitoring/135,2017.html

The Bundesnetzagentur's core tasks and organisation

An adaptable and highly efficient organisational structure is essential for the Bundesnetzagentur to meet its many responsibilities, including its commitment to increased competition, modern infrastructure and easy network access for the good of consumers.

Tasks and structure

The Bundesnetzagentur, originally known as the Regulatory Authority for Telecommunications and Post, was set up on 1 January 1998 as a separate higher federal authority under the then Federal Ministry of Economics and Technology. It took over the responsibilities of the former Federal Ministry of Post and Telecommunications and the Federal Office for Post and Telecommunications. In 2005, on being assigned responsibilities under the Energy Act and the General Railway Act, the Regulatory Authority for Telecommunications and Post was renamed the Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen.

First and foremost, the Bundesnetzagentur's remit is to promote competition through regulation in the energy, telecommunications, postal and rail sectors and to guarantee non-discriminatory network access. Alongside regulatory measures in the energy sector, as the national planning authority the Bundesnetzagentur is also responsible for electricity transmission lines crossing national or federal state borders in the context of the energy transition. In the telecommunications and postal sectors it ensures appropriate, adequate and nationwide services and, on the basis of various pertinent laws and ordinances, provides regulations for the use of frequencies and numbers.

Furthermore, the Bundesnetzagentur is the competent authority under the Electronic Signatures Act.

The Bundesnetzagentur's tasks are complex and highly diversified. They range from cases addressed in quasi-judicial proceedings in regulation areas, to reporting requirements and planning authority responsibilities, consumer protection and information activities in the regulated sectors, right down to the nationwide presence for investigating and processing frequency interference complaints.

Below the management level the Bundesnetzagentur comprises ruling chambers and departments. The President's Chamber takes decisions in specific cases, in particular on award proceedings for scarce radio spectrum resources and the imposition of universal service obligations. In the telecommunications sector it determines which markets require regulation and which companies have significant market power in these markets. On the basis of these determinations, the ruling chambers then decide on the regulatory measures to be imposed on companies with significant market power. This is how decisions on specific details of obligations are reached, for example in the field of network access conditions or ex-ante or ex-post price reviews. In the postal sector the ruling chamber focuses on (ex ante and ex post) rates approval and the control of anti-competitive practices, including the regulation of access to the postal network. In the

energy sector the ruling chambers have decision-making powers on general and individual issues regarding access to electricity and gas networks and network charges.

The departments perform specialised and central administrative functions. These include economic and legal policy issues in the various areas of regulation and the relevant international coordination, as well as technical aspects of frequencies, standardisation, numbering and public safety. The Bundesnetzagentur is involved in international standardisation bodies, cooperating in the development of next-generation networks and new radio systems.

In the energy sector the Bundesnetzagentur has been assigned key market supervisory tasks from gas and electricity network development planning, from the Market Transparency Unit for Wholesale Electricity and Gas Markets set up in 2013, and from its responsibility for safeguarding security of supply. A major departmental function is to give ruling chambers specialist assistance in their decision-making.

All of the Bundesnetzagentur's responsibilities have a strong international element. Coordination at European level, in particular, has always been an important aspect of its regulatory activity. This is reflected by the fact that the international activities are mostly concentrated and dealt with in one department.

In the telecommunications sector the Bundesnetzagentur is mainly responsible for the key decisions and objectives that promote investment, innovation and competition for the benefit of all citizens. In the context of Industry 4.0, ideas are being developed to promote the spread of digital technology and internetworking in key future-oriented fields and economic opportunities offered by the digital revolution and internetworking are being assessed with respect to growth, employment and competitiveness in the national economy.

Consumer protection remains another key focus area in the telecommunications sector. A particular emphasis is placed on investigating problems that hinder a smooth change of supplier. In addition, the Bundesnetzagentur continues to vigorously combat misuse as regards unlawful use of telephone numbers, anti-competitive behaviour and cold calling. In protecting the consumer, particular attention is given to preventing the illegal billing of call queues. Another primary function is to ensure transparency of consumer contracts, in particular with respect to the bandwidth guaranteed in the contract. The Bundesnetzagentur also maintains a database of sites of fixed transmitters operating above a specified power level. Also of particular importance for consumers are the resolution of radio interference, the dispute resolution procedure and general consumer services. Additionally the Bundesnetzagentur makes an important contribution to public safety. Its tasks include checking the technical protection measures for critical telecommunications infrastructure, protecting personal data and telecommunications privacy, the technical implementation of interception measures, and implementing and safeguarding information procedures.

In the energy sector it is the Bundesnetzagentur's duty to create and secure the basis for efficient competition in the electricity and gas markets. This is done in particular through unbundling and regulating non-discriminatory access to the energy networks, including rates regulation. In addition, the statutory decision in 2011 to phase out nuclear power as part of the *Energiewende* and the continued expansion of renewable energy require state measures with respect to the various market players, including monitoring the electricity and gas wholesale markets and intervening where necessary to safeguard security of supply. The Bundesnetzagentur also monitors the development of upstream generation and import markets along with consumer markets.

One of the major tasks for the Bundesnetzagentur in the context of the energy transition is the fast, large-scale expansion of the electricity transmission networks. To achieve this, the Bundesnetzagentur has been given wide-ranging authority in network development planning and in approving network expansion measures. This includes implementing the federal sectoral planning for extra-high voltage lines crossing federal state and national borders and, as of 2013, their planning approval. As part of the statutory planning process, the network development plan is constantly being updated to take account of the latest developments. This also involves network planning and connection in the offshore sector.

In rail regulation the Bundesnetzagentur monitors compliance with the legislation on rail infrastructure access. A core task here is to ensure non-discriminatory use of the rail infrastructure by railway undertakings and other access beneficiaries. The term rail infrastructure includes the infrastructure and services connected with both tracks and service facilities (eg stations, freight terminals). Rates regulation includes the examination of the level and structure of infrastructure charges and of other charges levied by the infrastructure managers.

A nationwide presence is vital for the Bundesnetzagentur to perform its duties well. To ensure consistency the Bundesnetzagentur's regional offices, the contact point with consumers and the industry, are managed and coordinated centrally by a single department.

The regional offices are mainly responsible for technical matters. They provide information, for instance, on compliance with the Telecommunications Act and electromagnetic environmental compatibility provisions. They are also in charge of frequency assignment, for instance for private mobile radio systems, for granting site certificates and for sampling equipment under their market surveillance duties. Another important area is the investigation and processing of radio interference using state-of-the-art measuring equipment, monitoring compliance with regulations generally and carrying out radio monitoring and inspection orders under the Telecommunications Act and the Electromagnetic Compatibility of Equipment Act.

Additional executive tasks are carried out by specific regional offices. In particular, this involves activities in number administration, number misuse and cold calls, consumer protection and information, the registration of photovoltaic systems and the registration of railway infrastructure. Moreover, they also carry out some human resources management functions for other government bodies and institutions, primarily those falling under the Federal Ministry for Economic Affairs and Energy.

Human resources management

Human resources management is a top priority at the Bundesnetzagentur. It is important both to assign staff optimally and to recruit new qualified staff. This is only possible when human resources management takes account of work requirements and staff skills and preferences in equal measure. Only a combination of pro-active and appropriate staff deployment and motivated employees will allow the Bundesnetzagentur to fulfil its responsibilities in an efficient and cost-effective way even in times of tight budgets. Aspiring to modern human resources management, the Bundesnetzagentur offers not only corporate health schemes but also models for balancing work and family life.

In recruiting new staff the Bundesnetzagentur requires not only excellent specialist knowledge, but also the ability to structure and address complex new tasks in an interdisciplinary team and with a focus on solutions.

Given its diverse areas of activity, the Bundesnetzagentur attaches particular importance to an interdisciplinary work approach. The Bundesnetzagentur employs specialists from various fields, including legal experts, economists, engineers and scientists, to ensure the efficient, proper performance of tasks in all areas.

Retirements and posts created as a result of new tasks have opened up numerous opportunities for new recruits in the fields mentioned above. The new arrivals have interesting career prospects ahead of them.

The Bundesnetzagentur has been offering apprenticeships since 1999. In view of the recruitment of future staff and the challenges of demographic change, the training qualifications offered by the Bundesnetzagentur have become ever more diverse. Vocational training is available for office management trainees, electronic equipment and systems trainees, and for IT trainees in applications development and system integration. Since 2011 the Bundesnetzagentur has also offered a practice-oriented study programme, now available at five locations, to qualify students (Bachelor of Engineering/Electrical Engineering and Bachelor of Science) to work as technicians for electronic equipment and systems at the Bundesnetzagentur. In 2016, the Bundesnetzagentur introduced a similar programme with further places for computer science students (Bachelor of Science) in combination with posts as IT trainees. Moreover, each year since 2012 civil servants preparing for the rank of *Regierungsinspektor* have been selected to take a university degree in IT in public administration. Vocational training courses are offered at eight Bundesnetzagentur locations, in particular at the regional offices.

In 2017, 186 trainees and students were trained at the Bundesnetzagentur in various occupations. Of the 29 trainees who successfully completed their training in 2017, 27 decided to stay with the Bundesnetzagentur and took posts at the Bundesnetzagentur at intermediate level. Two students in IT in public administration completed their work-study programmes in 2017 and took posts at the Bundesnetzagentur at higher intermediate level.

Budget

The Bundesnetzagentur's income and expenditure is budgeted for in the federal budget, in the departmental budget of the Federal Ministry for Economic Affairs and Energy.

The table below shows the income for 2017 (target and performance) and 2018 (target).

Type of income	Target 2017 €'000	Performance 2017 €'000	Target 2018 €'000
Fees, contributions and other charges in the telecoms sector	61,069	31,231	41,801
Fees and other charges in the postal sector	40	38	40
Fees and other charges in the rail sector	62	–20	62
Fees and other charges in the energy sector (electricity and gas)	2,405	10,147	9,139
Fees and other charges under the Grid Expansion Acceleration Act	26,760	14,134	30,402
Other administrative income, eg fines and rental and sale income	1,218	3,324	2,877
Administrative income	**91,554**	**58,854**	**84,321**

Lower than expected income in the telecommunications sector is partly due to an adjustment to fees imposed under the new Ordinance concerning the Controls for the Limitation of Electromagnetic Fields. In addition, the collection of interference protection contributions was postponed until next year as a precaution because of an expected ruling by the Higher Administrative Court of North Rhine-Westphalia.

The negative income in the rail sector is due to refunds. It was not possible to charge fees in 2017 because the entry into force of the Rail Regulation Act replaced the previous legal basis but no new ordinance concerning fees has been put in place yet.

The energy sector has seen another significant increase in income, mainly due to fees being collected from previous years. Fees collected in relation to the conduct of auctions under the Renewable Energy Sources Act are included in these for the first time.

Since the collection of fees related to the grid expansion depends on progress in planning and procedures, the delays in submitting applications for power line projects in recent years continue to result in lower income in the Bundesnetzagentur's budget.

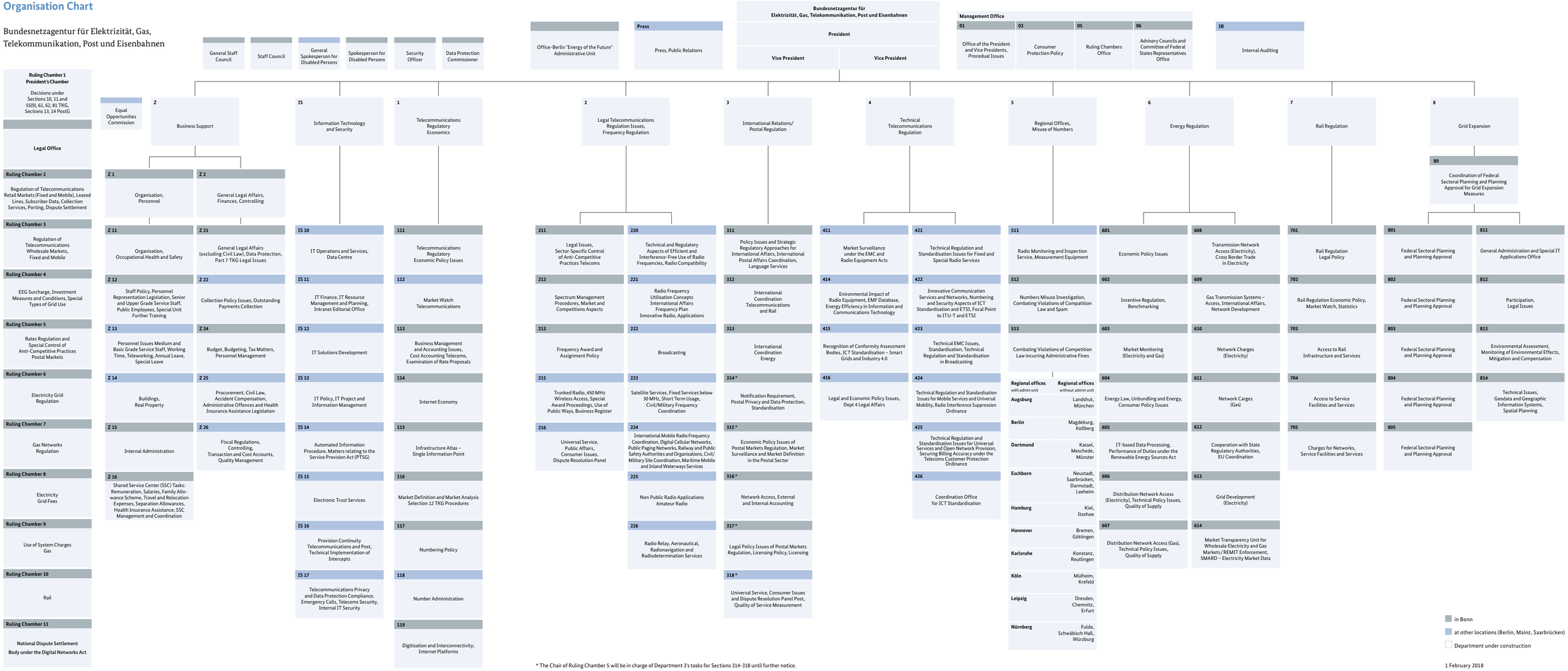
The table below shows the expenditure for 2017 (target and performance) and 2018 (target).

Type of expenditure	Target 2017 €'000	Performance 2017 €'000	Target 2018 €'000
Staff costs	137,910	139,698	139,016
General administrative expenditure, appropriations and special financing expenditure	68,424	53,719	62,707
Investment	15,201	15,012	16,814
Total expenditure	**213,535**	**208,429**	**218,537**

The lower than expected expenditure is largely due to the fact that no compensation had to be paid to telecommunication service providers required to store traffic data in cases of undue hardship because the Bundesnetzagentur temporarily suspended the enforcement of this requirement. Moreover, there is not yet any expenditure related to the execution of preliminary studies pursuant to the Offshore Wind Energy Act by the Federal Maritime and Hydrographic Agency. Finally, the delays in the expansion of the electricity grid are still leading to lower expenditure as the rather low number of applications received from network operators means that not all posts earmarked for the grid expansion have been filled. Consequently, both staffing costs and infrastructure costs are lower than planned.

Organisation Chart

Bundesnetzagentur für Elektrizität, Gas, Telekommunikation, Post und Eisenbahnen



* The Chair of Ruling Chamber 5 will be in charge of Department 3's tasks for Sections 314-318 until further notice.

1 February 2018

List of abbreviations

€/a euro per year

5G 5th generation of mobile networks

A

ACER Agency for the Cooperation of Energy Regulators

ADSL asymmetric digital subscriber line

AEG General Railway Act

AG stock company

ARCEP Autorité de régulation des communications électroniques et des postes

ARegV Incentive Regulation Ordinance

B

B2B Business-to-Business

B2C Business-to-Consumer

BBPlG Federal Requirements Plan Act

BDEW German Association of Energy and Water Industries

BdS Railway Line Infrastructure Operators

BEREC Body of European Regulators for Electronic Communications

BfDI Federal Commissioner for Data Protection and Freedom of Information

BGBl. Federal Law Gazette

BITKOM German Association for Information Technology, Telecommunications and New Media

BK ruling chamber of the Bundesnetzagentur

BMWi Federal Ministry for Economic Affairs and Energy

bn billion

BNetzA Bundesnetzagentur

BOS public protection and disaster relief agencies

BSH Federal Maritime and Hydrographic Agency

BSH Bosch and Siemens Home

BSI Federal Office for Information Security

BVerwG Federal Administrative Court

BWA Broadband Wireless Access

C

CA UPU Council of Administration

CACM capacity allocation and congestion management

CEER Council of European Energy Regulators

CEN European Committee for Standardization

CENELEC European Committee for Electrotechnical Standardization

CEP Courier, Express, Parcel

CEP Clean Energy for all Europeans Package

CEPT European Conference of Postal and Telecommunications Administrations

CEREMP ACER portal for registration (Centralised European Register for Market Participants)

CHP combined heat and power

CLL carrier leased line

CO2 carbon dioxide

CP consumer perspective

CPI consumer price index

CRC Bulgarian regulatory authority

ct/kWh cent per kilowatt hour

ct/kWh cent per kilowatt hour

CWE Central Western Europe

D

DAkkS Germany's national accreditation body

DB AG Deutsche Bahn AG

DC direct current

DCC Demand Connection Code

DE Germany

DESTATIS Federal Statistical Office

DigiNetzG Act to facilitate the deployment of high-speed digital networks

DIN German Institute for Standardization

DIT Duisburg Intermodal Terminal GmbH

DIY Do It Yourself

DOCSIS Data Over Cable Service Interface Specification

DPAG Deutsche Post AG

DP-Gruppe Deutsche-Post group

DPIHS Deutsche Post InHaus Services GmbH

Dr Doctor

DSL Digital Subscriber Line

DSO distribution system operator

DK Denmark

DTAG Deutsche Telekom AG

DVGW German association for gas and water supply (Deutscher Verein des Gas- und Wasserfaches e. V.)

E

e estimate

e. V. registered association

EAD electronic advanced data

EaPRegNet Eastern Partnership Regulators Network

EB electricity balancing

ECC Electronic Communications Committee

ECJ European Court of Justice

e-commerce electronic commerce

EEA European Economic Area

EEG Renewable Energy Sources Act

EFTA European Free Trade Association

eg for example

EMERG European Mediterranean Regulators Group

EMF electromagnetic fields

EMVG Electromagnetic Compatibility of Equipment Act

EN European standard

EnLAG Power Grid Expansion Act

ENRRB European Network of Rail Regulatory Bodies

ENTSO E European Network of Transmission System Operators for Electricity

ENTSOG European Network of Transmission System Operators for Gas

EnWG Energy Industry Act

ERegG Rail Regulation Act

ERGP European Regulators Group for Postal Services

eSIM Embedded subscriber identity module

ETOE extraterritorial office of exchange

ETSI European Telecommunications Standards Institute

EU European Union

Eurostat Statistical office of the European Union

F

FAQ frequently asked question

FCA forward capacity allocation

FIMM feed-in management measure

FSV NSA voluntary "Use, don't curtail" commitment

FTTB Fibre to the building

FTTH Fibre to the home

FU Free University

G

GasGKErstV Gas Appliances Reimbursement Ordinance

GasNEV Gas Network Charges Ordinance

GasNZV Gas Network Access Ordinance

GASPOOL Gas market area cooperation of the companies GASCADE GmbH, Gastransport Nord GmbH, Gasunie Deutschland Transport Services GmbH, Nowega GmbH, ONTRAS Gastransport GmbH

GB gigabyte

GHz gigahertz

GIS Geographic Information System

GL guideline

GmbH limited liability company

GSM Global System for Mobile Communications

GW gigawatt

GWh gigawatt hour

H

HaftPflG Liability Act

HAR Harmonised Allocation Rules

HEN Harmonised European Standard

HFC Hybrid-Fibre-Coax

H-gas high-calorific gas

HVDC high voltage direct current

I

IC interconnection

ICA interconnection access

ICT Information and communication technology

IM infrastructure manager

IMSI international mobile subscriber identity

IMT-2020 international mobile telecommunications for 2020 and beyond

Ing. engineer

incl. including

int. international

IP internet protocol

IPP integrated product plan

IRG Independent Regulators Group

IRG-Rail Independent Regulators' Group – Rail

ISDN integrated services digital network

ISG ECI Industry Specification Group for exchangeable Embedded Common Interface

IT information technology

IT security requirements catalogue Catalogue of security requirements drawn up by the Bundesnetzagentur and the BSI to protect the telecommunications and electronic data processing systems required to ensure safe network operations

ITU International Telecommunication Union

ITU-R International Telecommunication Union, Radiocommunication Sector

ITU-T International Telecommunication Union, Telecommunication Sector

K

KG limited partnership

km kilometre

kW kilowatt

kWh kilowatt hour

KWK co-generation

KWKAusV CHP Auction Ordinance

L

LAN local area network

L-gas low-calorific gas

LLP Limited Liability Partnership

LNG liquefied natural gas

LRIC long run incremental costs

LSV Charging Station Ordinance

LTE Long Term Evolution

M

M2M machine-to-machine

MaStR Market master data register

Mbps megabits per second

MHz megahertz

m million

MRU Manner-Romberg Unternehmensberatung GmbH

MSAN multi-service access node

MsbG Metering Act

MVNO mobile virtual network operator

MW megawatt

N

NABEG Grid Expansion Acceleration Act

NC CAM Network code on capacity allocation mechanisms in gas transmission systems

NC TAR Network code on harmonised transmission tariff structures for gas

NCG NetConnect Germany – Gas market area cooperation of the TSOs bayernets GmbH, Fluxys TENP GmbH, GRTgaz Deutschland GmbH, Open Grid Europe GmbH, terranets bw GmbH and Thyssengas GmbH

NDP network development plan

NEMO nominated electricity market operator

NeMoG Network Charges Modernisation Act

NetzResV Grid Reserve Ordinance

NGA next generation access

NGN next generation network

O

O-NDP offshore network development plan

OTT over-the-top

P

p forecast

PCI project of common interest

PDLV Postal Services Ordinance

PEK plan to increase the railway infrastructure capacity

pkm passenger kilometer

PMx primary rate multiplex

POC UPU Postal Operations Council

PostG Postal Act

POTS Plain old telephone service

PRIME Platform for Railway Infrastructure Managers in Europe

Prof. Professor

PR public relations

PSO public service obligation

PSTN public switched telephone network

PUDLV Postal Universal Service Ordinance

PwC PriceWaterhouseCooper

R

RDCD Railroad Development Coorporation Deutschland GmbH

REMIT Regulation on wholesale energy market integrity and transparency

RfG requirements for grid connection of generators

RMMS Rail Market Monitoring Survey

RNI DB Regio Netz Infrastruktur GmbH

RRT Communications Regulatory Authority of the Republic of Lithuania

RSPG Radio Spectrum Policy Group

RU railway undertaking

S

SAP single allocation platform

SD standard definition

SDH synchronous digital hierarchy

SERAC Single European Railway Area Committee

SigG Electronic Signatures Act

SIM subscriber identity module

SMARD Bundesnetzagentur website for electricity market data

SMS short message service

SO system operation

SoS-VO EU Regulation no 994/2010 concerning measures to safeguard security of gas supply

SRD Short Range Devices

StromNEV Electricity Network Charges Ordinance

T

TAL subscriber line

TC Technical Committee (CEN)

TK telecommunications

TKG Telecommunications Act

tkm tonne-kilometre

TKTransparenzV Telecommunications Transparency Ordinance

TPS train path pricing system

TSO transmission system operator

TTF Title Transfer Facility (virtual Netherlands gas trading hub)

TV television

TWh terawatt hour

TYNDP Ten Year Network Development Plan

U

UMTS Universal Mobile Telecommunications System

Univ. University

UPU Universal Postal Union

V

VAT value added tax

VDSL very high data rate digital subscriber line

VDV Association of German Transport Companies

VG Administrative court

VHF very high frequency

VoIP Voice over IP

VSBG Alternative Consumer Dispute Resolution Act

VULA virtual unbundled local access

VZBV Federation of German Consumer Organisations

W

WiMAX Worldwide Interoperability for Microwave Access

WIK Wissenschaftliches Institut für Infrastruktur und Kommunikationsdienste GmbH

Wi-Fi Wireless Fidelity

WindSeeG Offshore Wind Energy Act

WLAN Wireless Local Area Network

WRC-19 World Radio Conference 2019

X

Xgen general sectoral productivity factor

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