UKE | Office of Electronic Communications

Report on the state of the telecommunications market in Poland in 2020

Warsaw, October 2021

CONTENTS

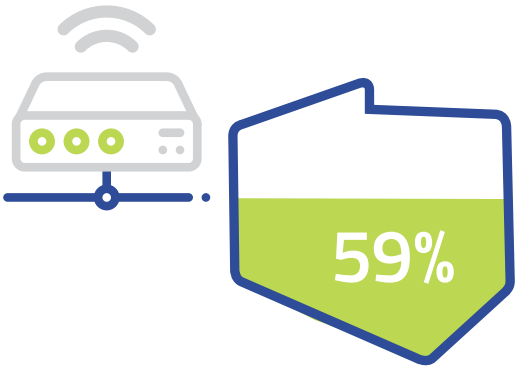
INTRODUCTION

We present to you the report on the state of the telecommunications market in Poland in 2020. As was the case in previous years, the publication consists of two parts. The first part deals with the type and scope of services provided by telecommunications enterprises, the second with the telecommunications infrastructure and broadband coverages.

This report has been drawn up pursuant to:
Article 192(3) of the Act of 16 July 2004 – Telecommunications Law, based on data obtained from obliged enterprises:

- according to Article 7(1) of the Telecommunications Law – part I "Telecommunications Market,"
- according to Article 29(2) of the Act on supporting the development of telecommunications services and networks – part II "Telecommunications infrastructure and network coverages."

In 2020, the total revenues from the telecommunications market were equal to PLN 40.8 billion. This means a slight increase compared to 2019 (by 2.7%). Expenditures for telecommunication investments were equal to PLN 7.5 billion.



In 2020, as many as close to 59% of fixed-line internet users were able to enjoy access with 100 Mb/s and greater capacity.

The penetration of fixed-line internet access services per household amounted to 56.7%, an increase of 1.9 percentage points compared to the previous year. Revenues from these services grew by 5%, reaching PLN 4.5 billion. The structure of revenues consisted mostly of revenues from services provided using fibre-optic connections (26.7%). The number of fixed-line access users grew by 5.3% year on year, reaching 8.2 million. Because of the recent upsurge in online activity prompted by the COVID-19 pandemic, the growth of the fast internet was greatly accelerated. In 2020, according to COCOM, as much as 59% of fixed-line internet users were able to enjoy access with 100 Mb/s and greater capacity. **Poland was among the three countries with the lowest prices of fixed-access internet services.**

COVID-19 has also driven the demand for fast mobile connections. Dedicated access, using modems, cards, and keys was used by 23.5% of the population, 2.4 percentage points more than in 2019. Taking into account all possible forms of mobile access, the penetration of mobile internet services per 100 inhabitants of Poland grew by 12.1 percentage points, reaching 195.3%. Revenues from services provided using mobile devices such as modems, cards, and keys were slightly over PLN 2 billion in 2020, 7.4% more than in the previous year. This form of access was used by 9 million users, 6.6% more than in 2019.

Traditional fixed-line telephony is one of the few telecommunication services in Poland that keeps losing popularity among users. Nevertheless, fixed-line telephony services are still used by about 3.1 million subscribers, and the total revenues in this market reached almost PLN 1.4 billion. With every year, this segment of the telecommunication market sees an increasing share of alternative operators. Despite the observed general downturn in these services, the duration of calls was unchanged compared to 2019, which was undoubtedly the effect of the SARS-CoV-2 pandemic.

Traditional telephony services are increasingly being replaced by VoIP. In 2020, the number of VoIP users was 2.5 million. The share of this technology in the number of all fixed-line telephony services was 44.9%, an increase of 3.3 percentage points compared to the previous year. A vast majority of customers (73.9%) used subscription-based services. Revenues from the VoIP telephony market rose by about 10% and reached PLN 0.3 billion. The traffic volume in VoIP connections climbed by 18% to 2.6 billion minutes. This was probably affected by the continuing COVID-19 pandemic that resulted in the need for work and education at home and precluded face-to-face business meetings.

In 2020, an increase of revenues from mobile telephony services was noted.

Compared to such Western European countries as France, Germany and Italy, Poland's level of market saturation for this service is very low. VoIP penetration in Poland is estimated to increase to 11.5% in 2024, while in the above EU countries its share will be around 48-54%.

In 2020, an increase in revenues from mobile telephony services was noted. The total revenues of operators amounted to PLN 12.5 billion, 13.8% more than in the previous year. The increase in revenues from the mobile telephony market shows it to be a very important area of telecommunications activities since it accounted for 30.6% of revenues achieved by the entire telecommunications market in Poland.

At the end of 2020, a novel trend, compared to the few previous years, was noted – an increase in the number of mobile telephony users. The total number of active SIM cards in 2020 was 54.1 million. Mobile telephony service penetration also increased, reaching 141.5%. An upward trend in the number of M2M cards was maintained, with 4.8 million such cards used in the previous year, an increase of 25.5% compared to 2019.

The bundled services market has been relatively stable for a few years in terms of the number of users. Following a slight decrease in 2019, in 2020 the market returned to the 2018 figure and attracted 13.7 million subscribers. Consumer decisions were undoubtedly affected by the COVID-19 pandemic.

Long-lasting limitations that followed the pandemic outbreak, and especially restrictions on movement and switching to work and education at home gave a positive stimulus to the telecommunications market, boosting demand for TV and internet services.

Purchasing services as a bundle has price advantages, a key factor due to the growing uncertainty of society and reined-in consumption by households. As companies switch to remote/hybrid work mode, it can be concluded that the demand for bundled services, especially those including internet access and mobile services, will be on the rise. Revenues from the bundled services market have been growing each year, reaching the level of PLN 10.3 billion in 2020.

The number of TV service subscribers was PLN 10.8 million, with revenues from these services at PLN 6.7 billion. The main player in the TV market was Cyfrowy Polsat, which attracted 30.1% of subscribers.

TV services are currently undergoing a change. IPTV is becoming increasingly popular, accounting for 12.2% of the TV services market in 2020. Interest in satellite TV dropped in 2020. Nevertheless, its share of subscribers was 51.5%.

The COVID-19 pandemic greatly impacted the TV services market. On the one hand, demand for TV services was observed, with consumers increasingly turning to TV content for national and international news, or to wind down. On the other hand, cancelling and postponing many international sport events, such as Euro 2020, negatively influenced the viewer ratings of sports channels, which was certainly reflected in operators' financial results.

In 2020, the most popular service bundles were still "mobile telephony + mobile internet" (49.9%) and "fixed-line internet + TV" (10.8%).

We enter the new era facing new challenges, especially those arising from the pandemic situation. The prevailing COVID-19 pandemic demonstrated that access to a broadband, stable internet connection is often decisive in the ability to do work or have children attend classes remotely. The network density and coverage ratios show that we are still lacking modern NGA networks. The ability to access the internet using a 30 Mb/s or faster connection is available to 75.9% of households. This ratio is also a measure of achieving the Digital Agenda for Europe (DAE) objective planned to be achieved by 2020. Poland did not achieve the DAE objective of ensuring such access to all households; however, only two European Union countries managed to do so.

DAE also required EU members to drive demand for high-capacity services and ensure that internet access services with a capacity of 100 Mb/s and greater are used by one-half of households. In 2020, such services were used by 28.3% of households in Poland. Therefore, this goal remained unachieved as well, however, the usage of these services increases each year, with Poland being now above the European average. The EU goals related to building a gigabit society noted a strategic objective for 2025, according to which all European households are to have internet access via a connection with a downstream speed of at least 100 Mb/s, with the option to upgrade to gigabit speeds. In Poland, such access is currently possible for 65.9% of households.

It should however be stressed that the state-of-the-art infrastructure is springing up very rapidly. The number of optic fibre nodes at the end of 2020 increased by 7% compared to the amount declared in the previous inventory. A very positive trend is the simultaneous increase in the length of fibre-optic lines. In the previous year, a 6 per cent increase in network length compared to 2019 was noted. In comparison with 2019 data, the number of inhabited localities with no LTE internet access dropped to 9.

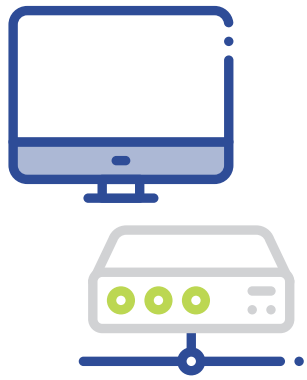
We would also like to remind that in connection with an amendment to the Act on supporting the development of telecommunications services and networks, which was passed in 2016, setting out a repertoire of information that cannot be made proprietary as business secret (Article 29(6b)), most of the data provided as part of the inventory is public, and thus, as in previous years, detailed data do not constitute an annexe to the report, but are available in API form on the Open Data portal: https://dane.gov.pl/dataset/588 and via a search engine on the UKE website https://wyszukiwarka.uke.gov.pl/.

1 INTERNET ACCESS

PART I
THE TELECOMMUNICATIONS MARKET

The internet access market in Poland is a highly competitive one, with a wide range of entrepreneurs and provided services. The penetration of internet services in Poland has been increasing steadily, but not very rapidly, during the last few years.

According to the research conducted on behalf of UKE by the ARC Rynek i Opinia polling company, 67% of individual users prefer to use fixed-line access due to better connection quality and stability. However, both mobile access and fixed access users do not rule out switching to the other form of access, if faced with a better offer, worse coverage of their current service or better coverage of alternative access methods, or, finally, an increase in the costs borne.



1.1. FIXED-LINE INTERNET

1.1.1. GENERAL INFORMATION

56.7% fixed-line internet penetration

In recent years, the penetration of fixed-line access services has been growing slowly but steadily. In 2020, 56.7% of households used fixed-line internet, i.e. 1.9 percentage points more than in the previous year.

Chart 1. **Fixed-line internet services saturation rate**

Source: UKE

1.1.2. REVENUES

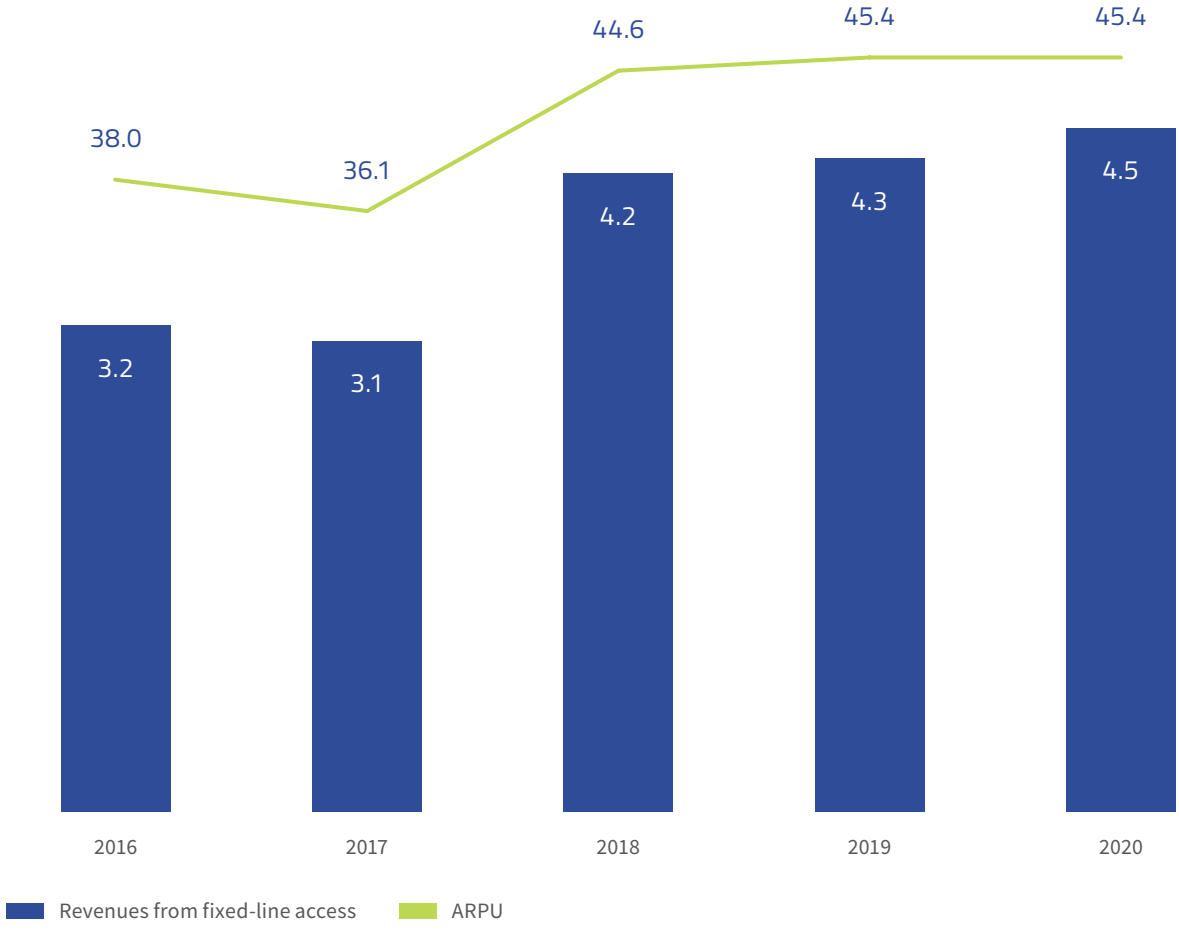
In 2020, revenues from fixed-line internet services grew by slightly more than 5% compared to the previous year, reaching PLN 4.5 billion.

Despite greater demand for internet access and a rise in revenues, the average monthly revenue per user (ARPU) remained on the same level as in the previous year, i.e., PLN 45.4.

PLN 4.5 billion

revenue from the fixed-line internet access market

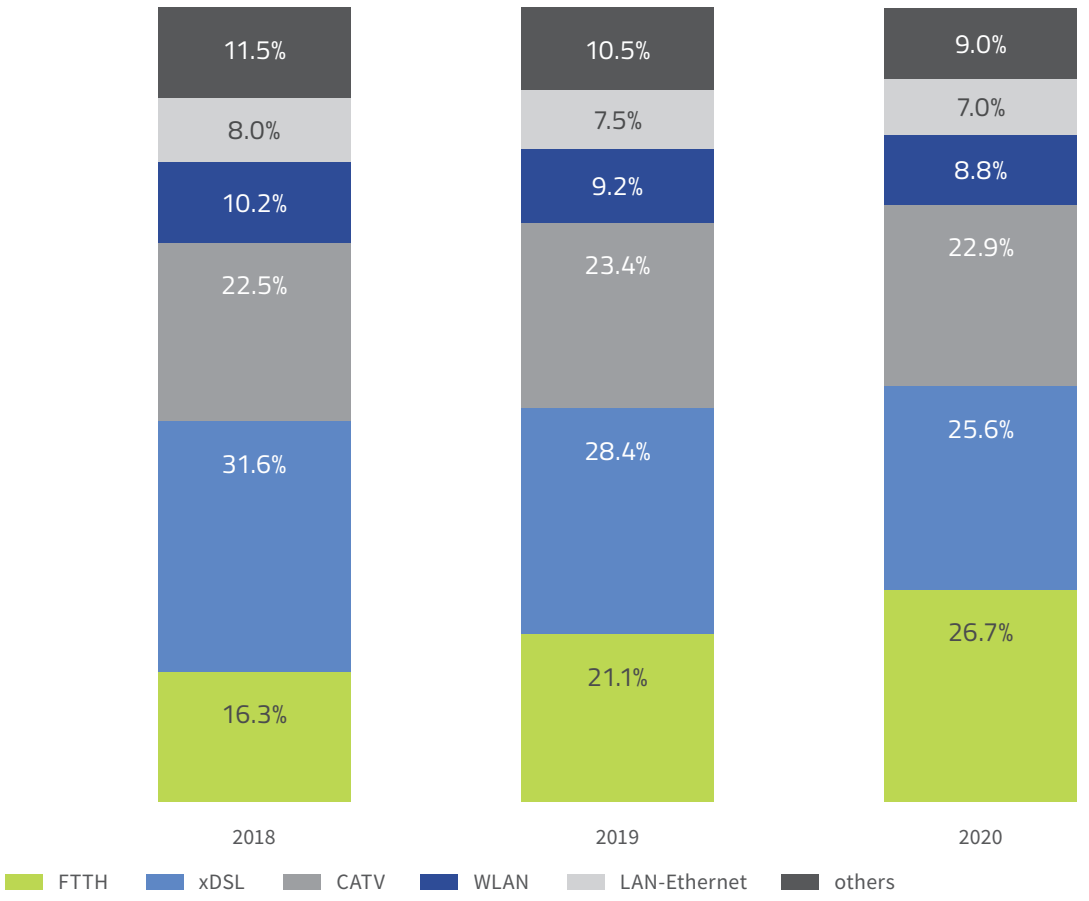
Chart 2. **Revenues from the fixed-line internet access market (PLN billion) and average revenue per user (ARPU, in PLN)**



Source: UKE

In the revenue structure from fixed-line internet access, the largest share (26.7%) was contributed by revenue from services provided via fibre-optic connections (PLN 1.2 billion). A significant increase in the share of revenues from connections of this kind in total revenues is observed every year. In 2020, revenues from FTTH rose by 33.6%. Revenues from xDSL (PLN 1.1 billion) still accounted for more than one fourth of revenues, however, their share decreases each year. Almost 23% of enterprise revenues (more than PLN 1 billion) were derived from services provided through cable TV modem connections. Their value increased compared to 2019, but the share in total revenues from fixed-line access declined slightly. In parallel, revenues from services provided through WLAN (PLN 0.4 billion), LAN-Ethernet (PLN 0.3 billion) and other connections decreased steadily.

Chart 3. **Structure of revenues from fixed-line internet access in terms of the technology used**



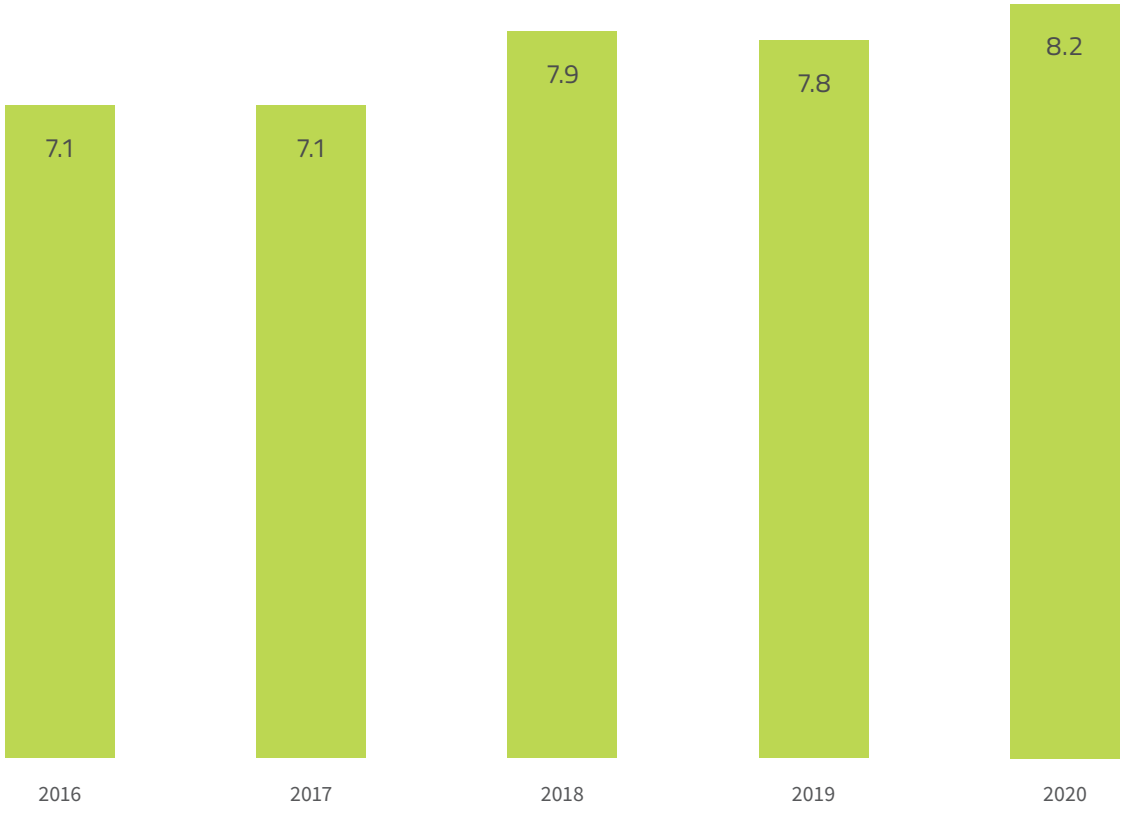
Source: UKE

1.1.3. USERS

The number of fixed-line internet users increases every year. In 2020, the total number of users with this type of access was 8.2 million, 5.3% more than in 2019.

8,2 million
fixed-line internet access users

Chart 4. **Number of fixed-line internet users (in millions)**



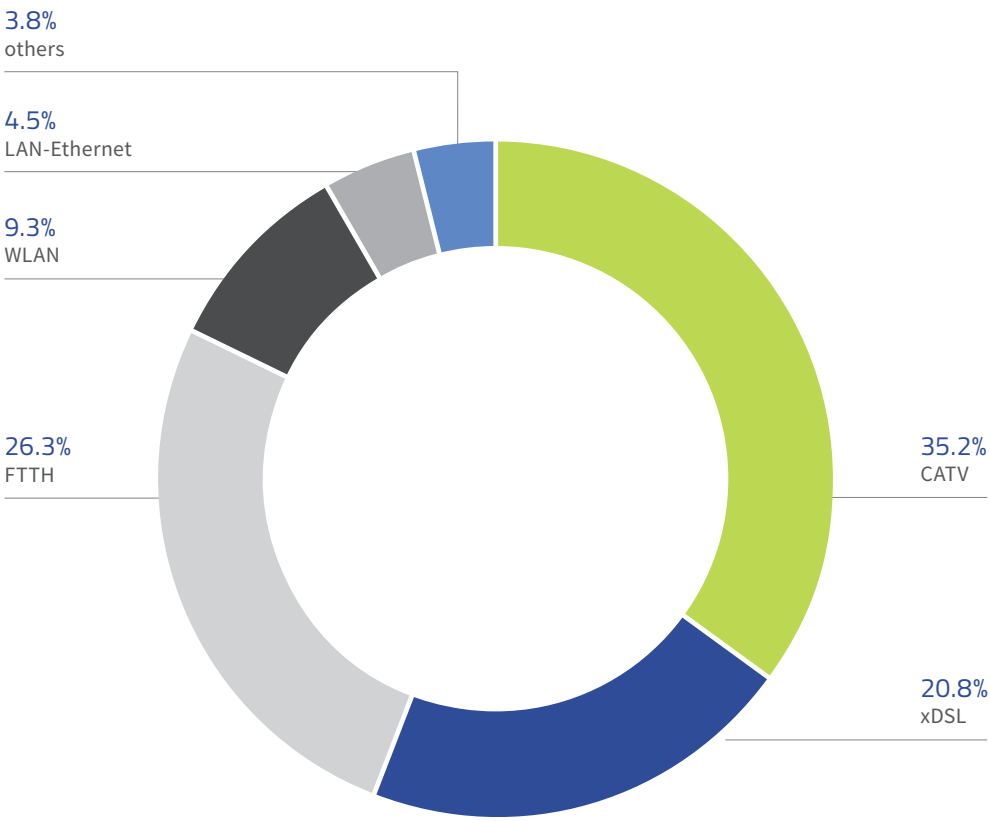
Source: UKE

The largest share of users accessed the internet via a cable TV modem (35.2%). FTTH was another technology with a large share (26.3%). Fibre-optics are one of the most rapidly developing access technologies. Just in the previous year, the number of users accessing the internet through FTTH rose by 36%, and during the two previous years – by 71%.

2020 was another year, in which the number of users accessing the internet via xDSL decreased. In 2020, xDSL users accounted for 20.8% of all users. The share of other connections, such as WLAN and LAN, also dropped by 3.1% and 9.5%, respectively.

Fibre-optics growths in successive years are predicted by many analytics, inter alia Analysys Mason.[1] According to their estimations, the number of FTTP/B access points in Poland will be growing, on average, by 13% per year.

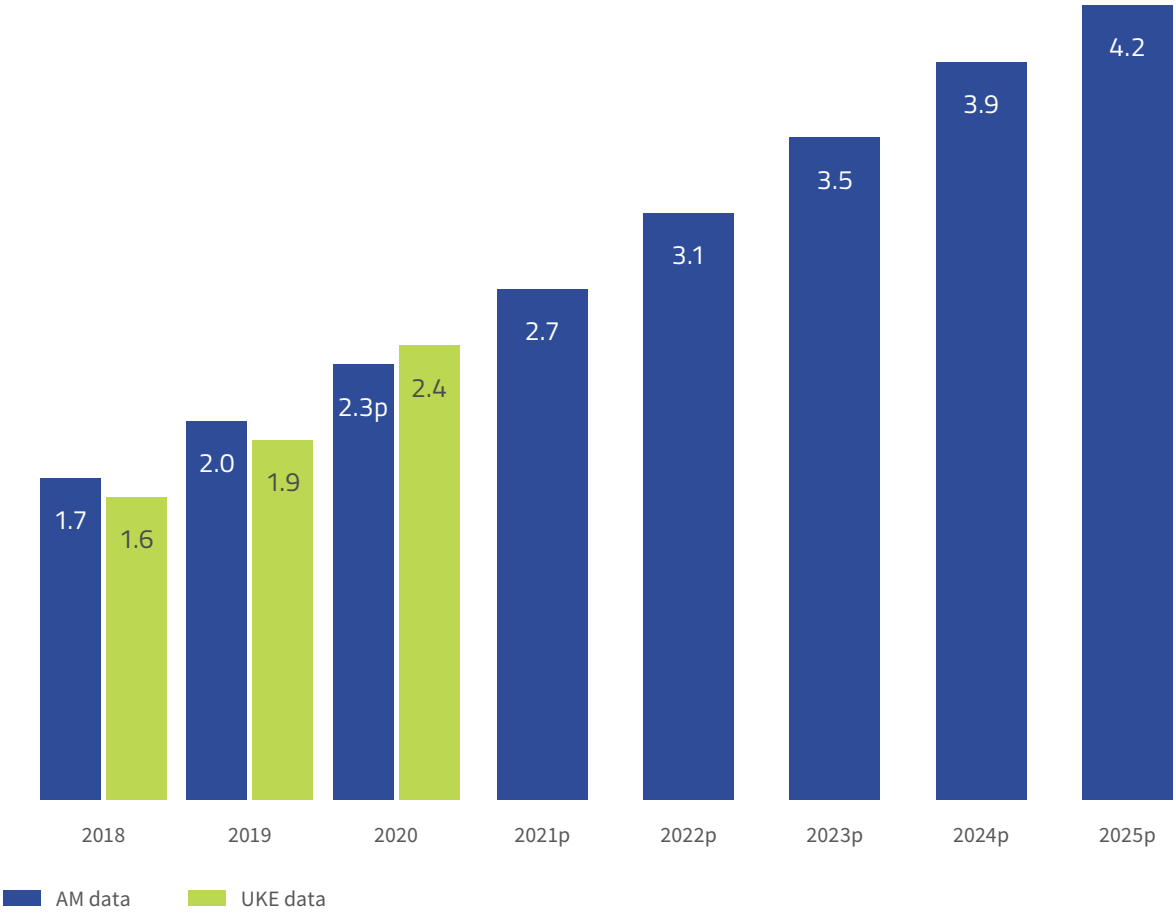
Chart 5. **Structure of fixed-line internet users in terms of the access technology used**



Source: UKE

[1] An analytics company specialising in researching telecommunications market.

Chart 6. **Number of FTTP/B connections in Poland**

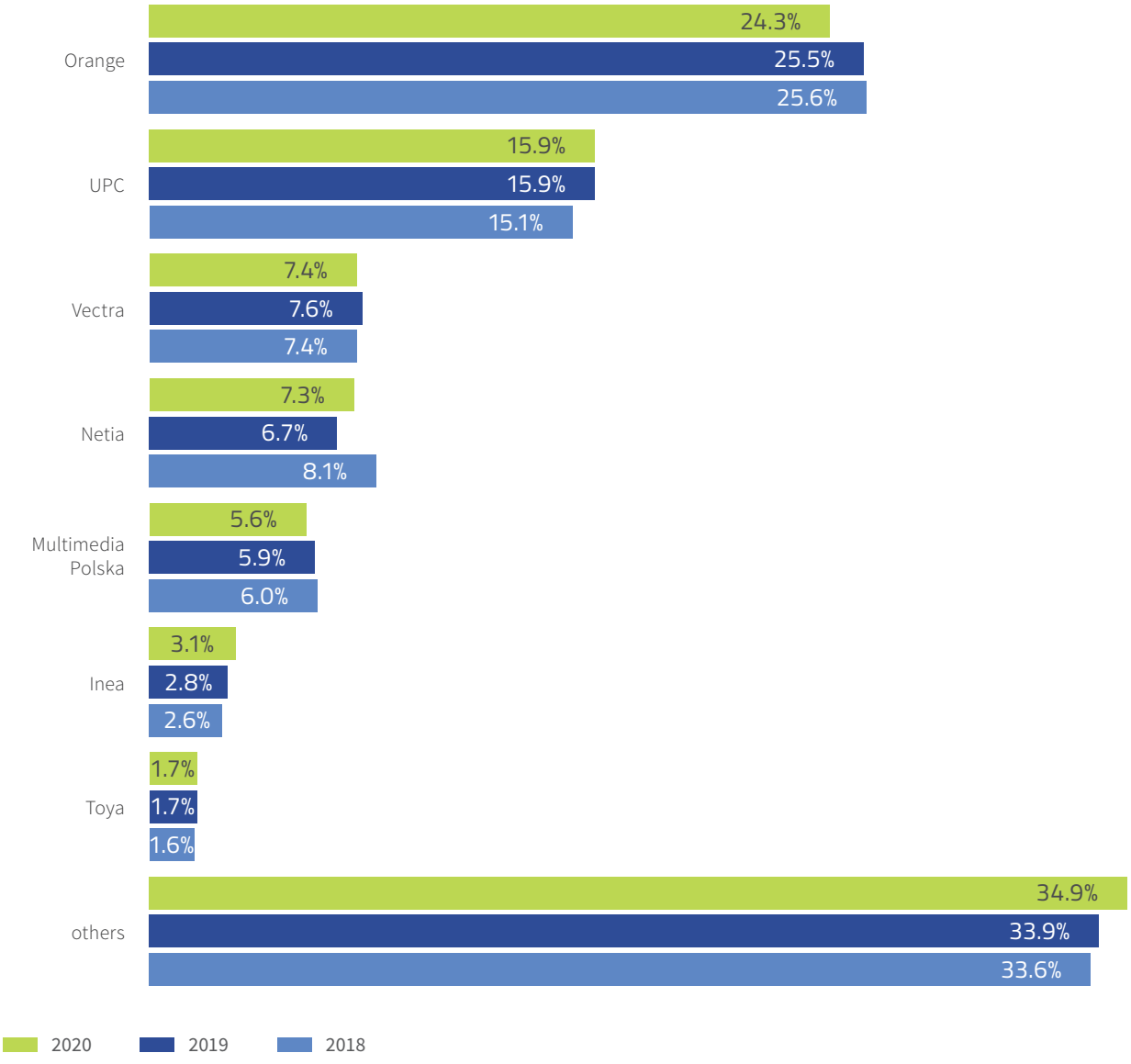


Source: UKE; Analysys Mason, DataHub p – forecast

Orange Polska maintained the leading position in terms of the number of fixed-line internet access users. However, its share dropped[2] by 1.2 percentage points to 24.3%. The second place was taken by UPC with a share of 15.9%. The share of Vectra decreased slightly (to 7.4%), while Netia serviced marginally more users (an increase from 6.7% to 7.3%).

[2] Shares shown for telecommunications enterprises with more than 1% share of the market.

Chart 7. **Shares of operators in terms of number of fixed-line internet users**



Source: UKE

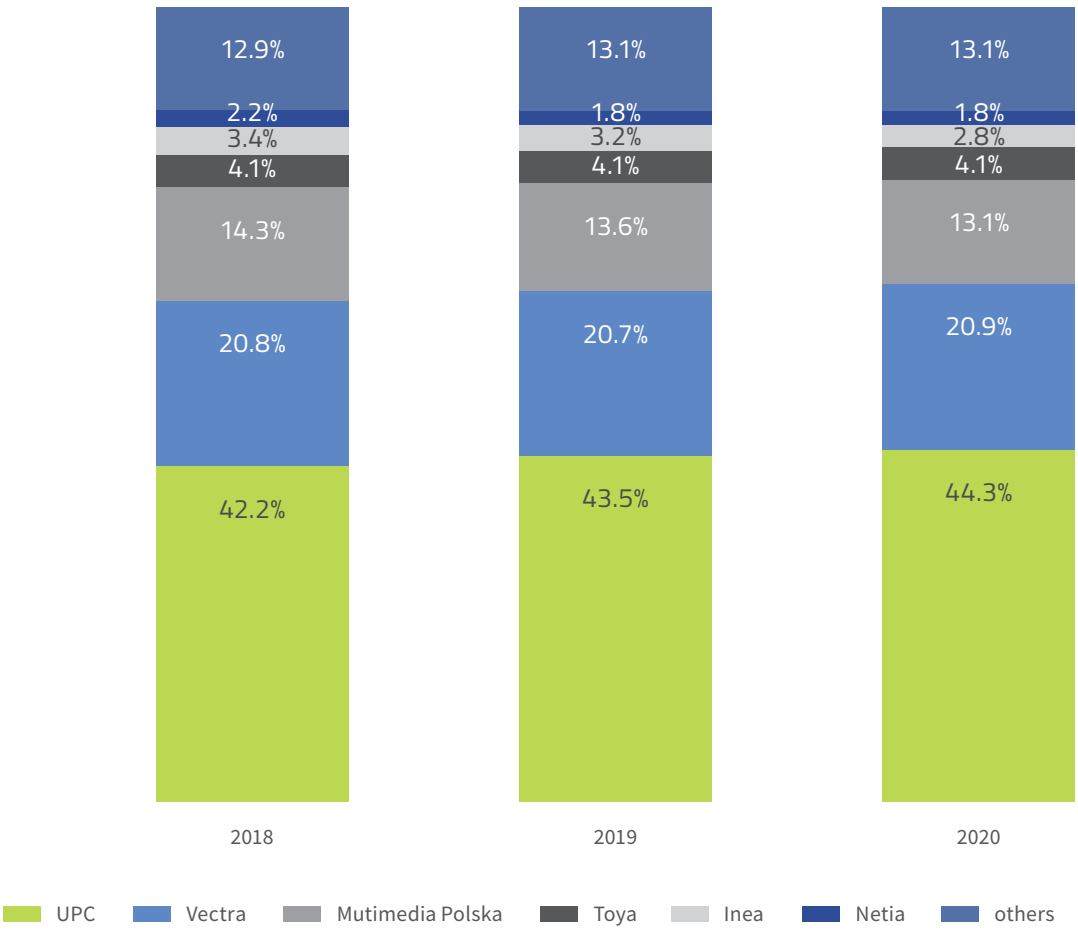
others – enterprises with individual share not exceeding 1%

1.1.3.1. CABLE TV MODEM

Considering individual technologies, the share of enterprises in the number of users was slightly different.

In the cable TV modem access segment, UPC came first in terms of customers serviced in 2020. Its share grew by 1.8 percentage points compared to 2019, up to 44.3%. Vectra, servicing almost 21% of users, ranked second.

Chart 8. **Shares of operators in the total number of users using the cable TV modem internet access service**



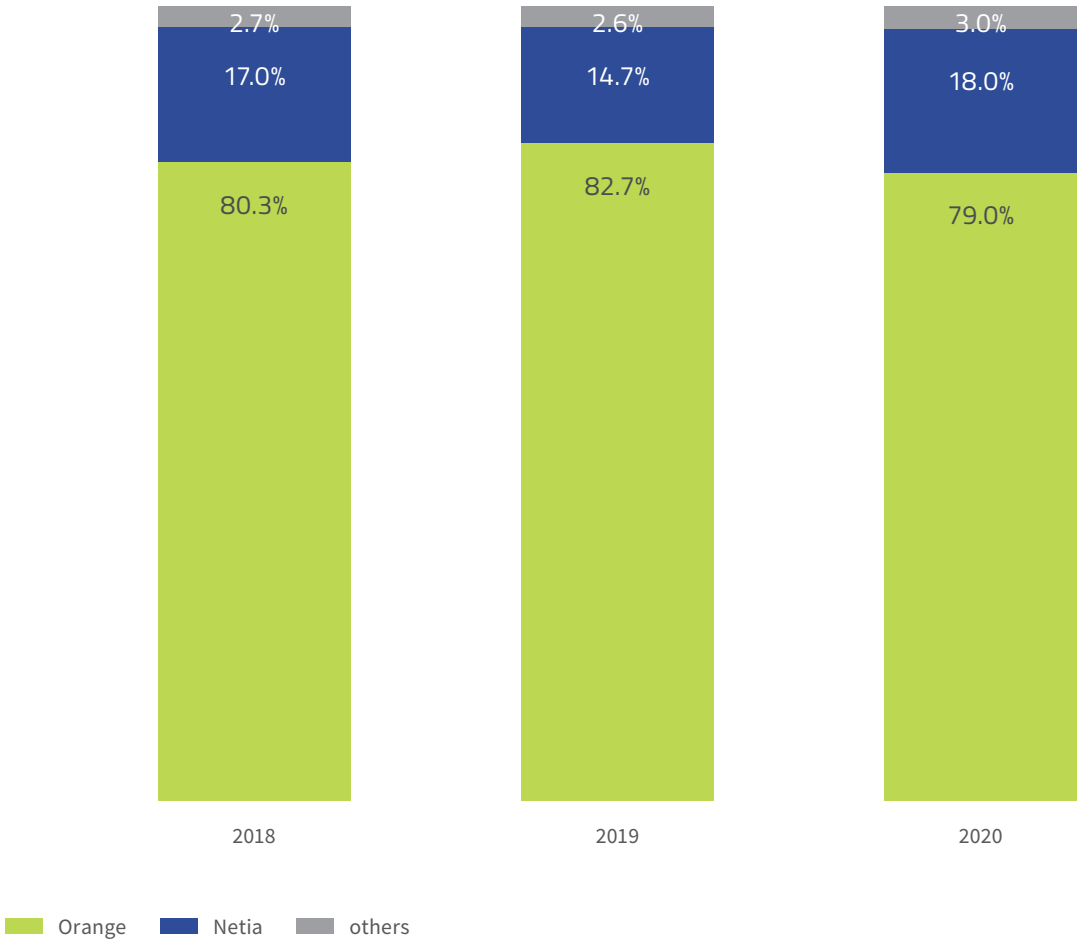
Source: UKE

others – enterprises with individual share not exceeding 1%

1.1.3.2. xDSL

In the xDSL access segment, just like in previous years, the leading players were Orange Polska and Netia, together providing access to 97% of xDSL users. 79% of the segment belonged to Orange Polska. The company's share decreased by 3.7 percentage points, mainly for the benefit of Netia, which, as in the previous year, serviced 18% of customers.

Chart 9. **Shares of operators in the total number of users using the xDSL internet access service**



Source: UKE

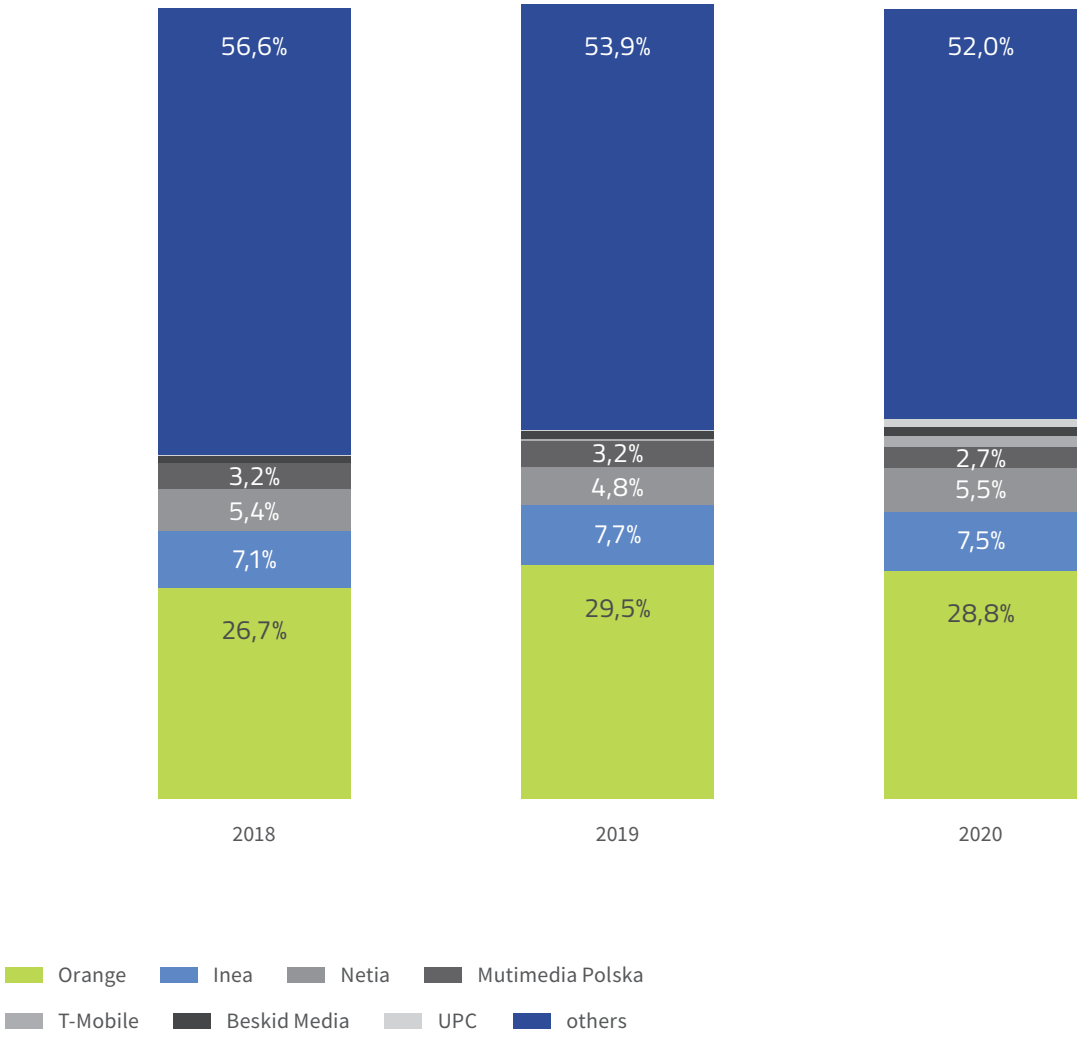
others – enterprises with individual share not exceeding 1%

1.1.3.3. FIBRE-OPTIC CONNECTIONS

Orange Polska achieved yet another year as the leader in FTTH technology. Its share dropped by 0.7 percentage points, to 28.8%. The importance of Inea, which came second in the ranking with a share of 7.5%, decreased slightly. Netia serviced 5.5% of users, 0.7 percentage points more than in the previous year. The share of Multimedia Polska dropped from 3.3% to 2.7%.

Except for seven companies that achieved a greater than 1% share in the FTTH access segment, a considerable fragmentation of services provided through fibre-optic connections is worthy of note. Even though the number of companies, whose share in the segment is below 1%, decreases every year. In 2020, they still constituted more than half of all players.

Chart 10. **Shares of operators in the total number of users using the FTTH internet access service**



Source: UKE

others – enterprises with individual share not exceeding 1%

1.1.3.4. WLAN AND LAN ETHERNET

The WLAN and LAN Ethernet internet access segments were, like in previous years, characterised by very considerable fragmentation. The vast majority of enterprises did not achieve even a 1% share in services provided to customers. In the case of WLAN technology, this threshold was reached or slightly exceeded by only four companies. In the LAN-Ethernet segment, the shares of the largest 17 companies ranged from 1% to 8%.

In 2020, services provided using these two technologies were used by about 1.1 million users, 3% less than in the previous year.

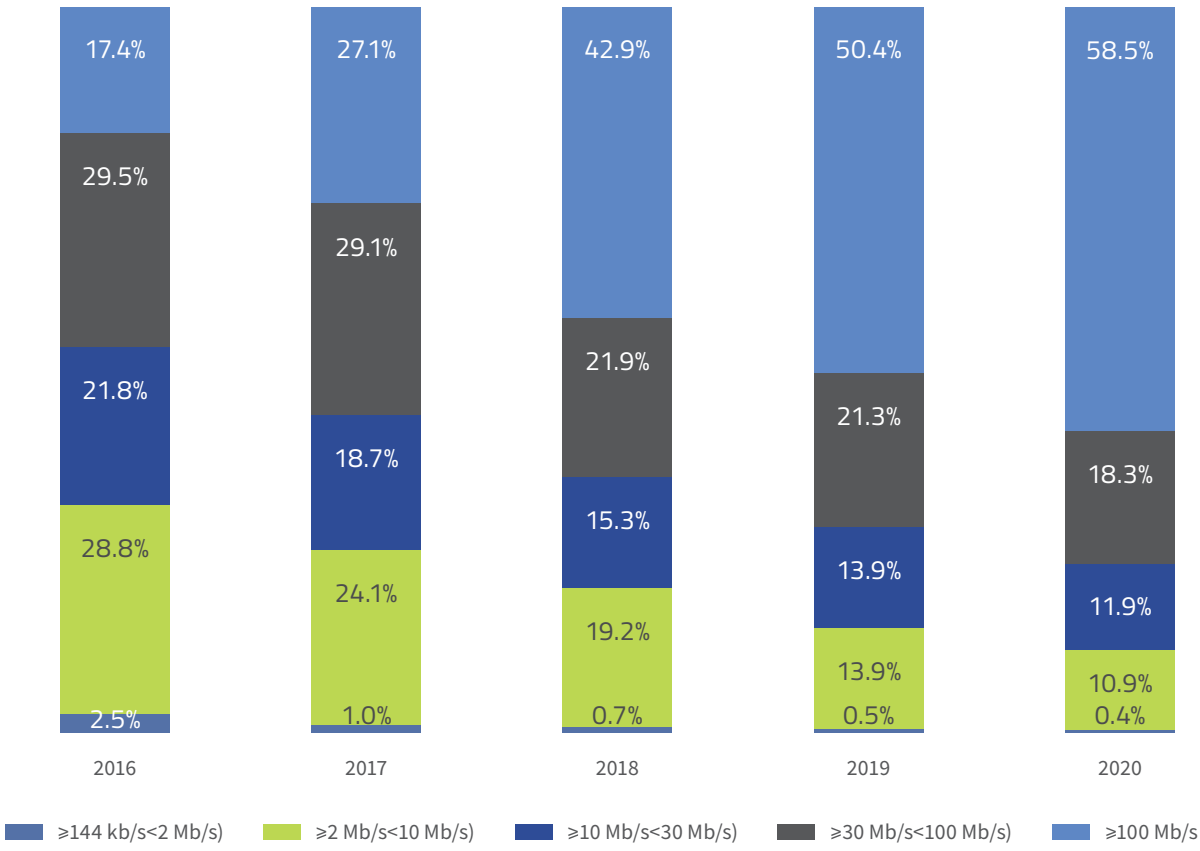
1.1.4. CONNECTION CAPACITY

The connections used to provide fixed-line internet access are increasingly faster. In particular, this trend is visible in recent years. In 2016, 100 Mb/s connections accounted for only 17.4% of all fixed-line connections. In 2020, according to COCOM, almost 59% of internet users were able to enjoy internet speeds this fast. As the internet accelerates, the number of connections with lower capacities is steadily decreasing. The lowest speeds occur only with 0.4% of customers.

Very fast connections with the capacity of at least 1 Gb/s were used in 2020 by 2.5% of users, which means an increase of 1.1 percentage points compared to 2019.

58.5% share of connections of at least 100 Mb/s capacity

Chart 11. **Shares of connections broken down by capacity**



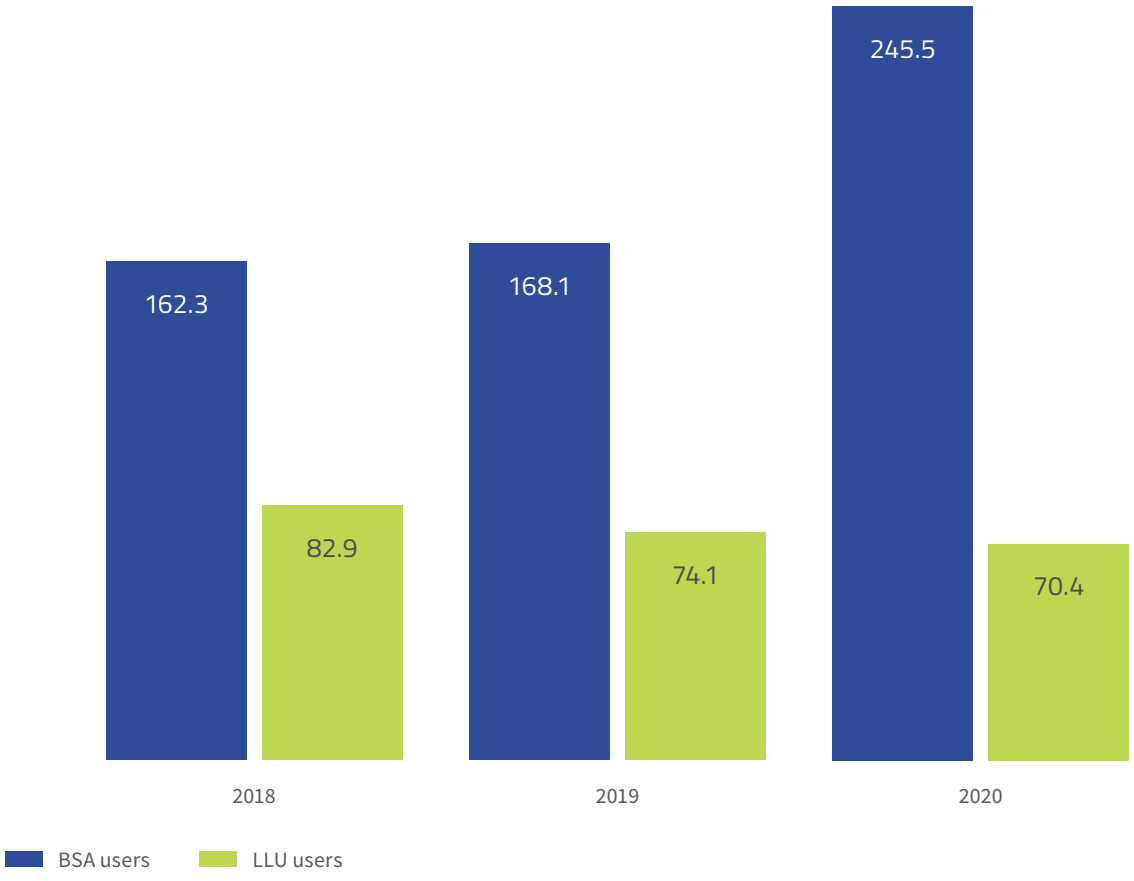
Source: COCOM, January 2021

1.1.5. RETAIL SERVICES BASED ON BSA AND LLU

Among many enterprises active in the fixed-line broadband internet access market, merely 3.8% took advantage of the possibility of providing retail broadband internet access services based on wholesale line rental from another operator providing bit-stream access, or access to the local subscriber loop of the incumbent operator. In 2020, the total number of customers serviced based on BSA and LLU was 0.3 million, a 30.4% increase in comparison with 2019.

The number of BSA users rose by 46% in 2020 and reached 245.5 thousand. At the same time, the number of LLU users decreased by 5% to 70.4 thousand.

Chart 12. **The number of users provided with internet services based on BSA and LLU**

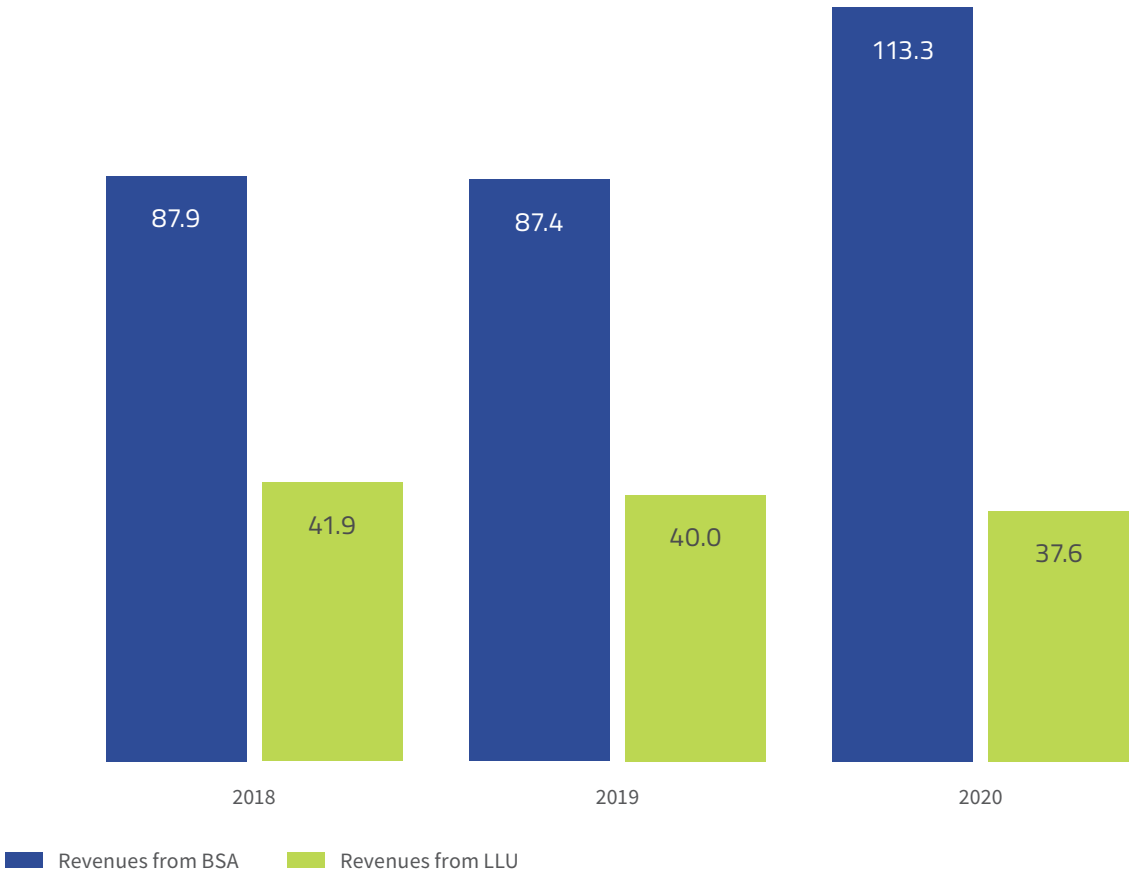


Source: UKE

In 2020, the total revenues from users based on BSA and LLU amounted to PLN 150.9 million. BSA revenues accounted for 2.5% of all fixed-line internet revenues, and LLU revenues for 0.8%.

As with the number of users, a notable increase (29.6%) was observed in BSA revenues, which reached PLN 113.3 million in 2020. LLU revenues dropped by 6.1% to PLN 37.5 million.

Chart 13. **Revenues from users provided with internet services based on BSA and LLU**



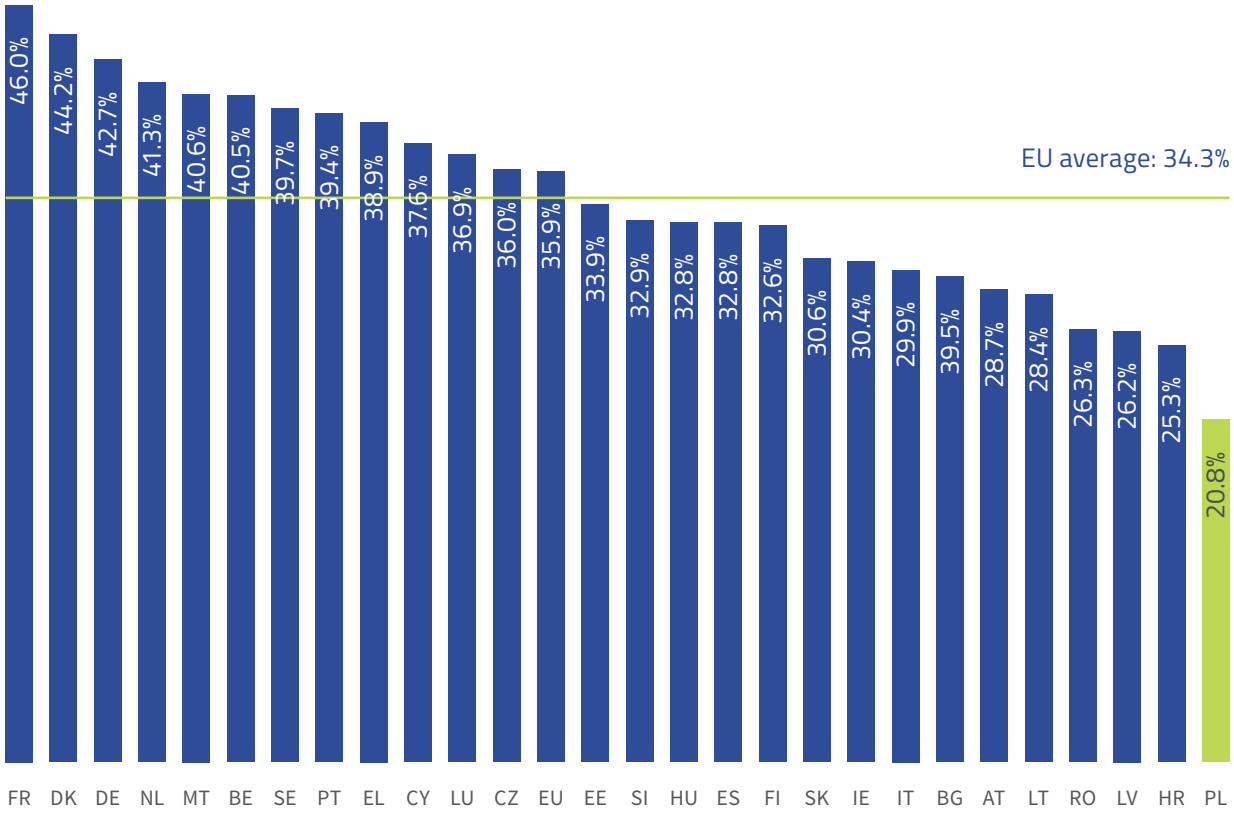
Source: UKE

1.1.6. COMPARISON WITH EUROPEAN COUNTRIES

The penetration of fixed-line internet services in Poland improved slightly, but was still at the lowest level among all EU countries, standing at 20.8%. This result was lower than the EU average by 13.5 percentage points.

As in the previous year, the country with the highest penetration of service was France, where 46% of the population has access to fixed-line internet services, and it was higher than the EU average by 11.7 percentage points.

Chart 14. **Penetration of fixed-line internet services in the EU (per 100 inhabitants)**



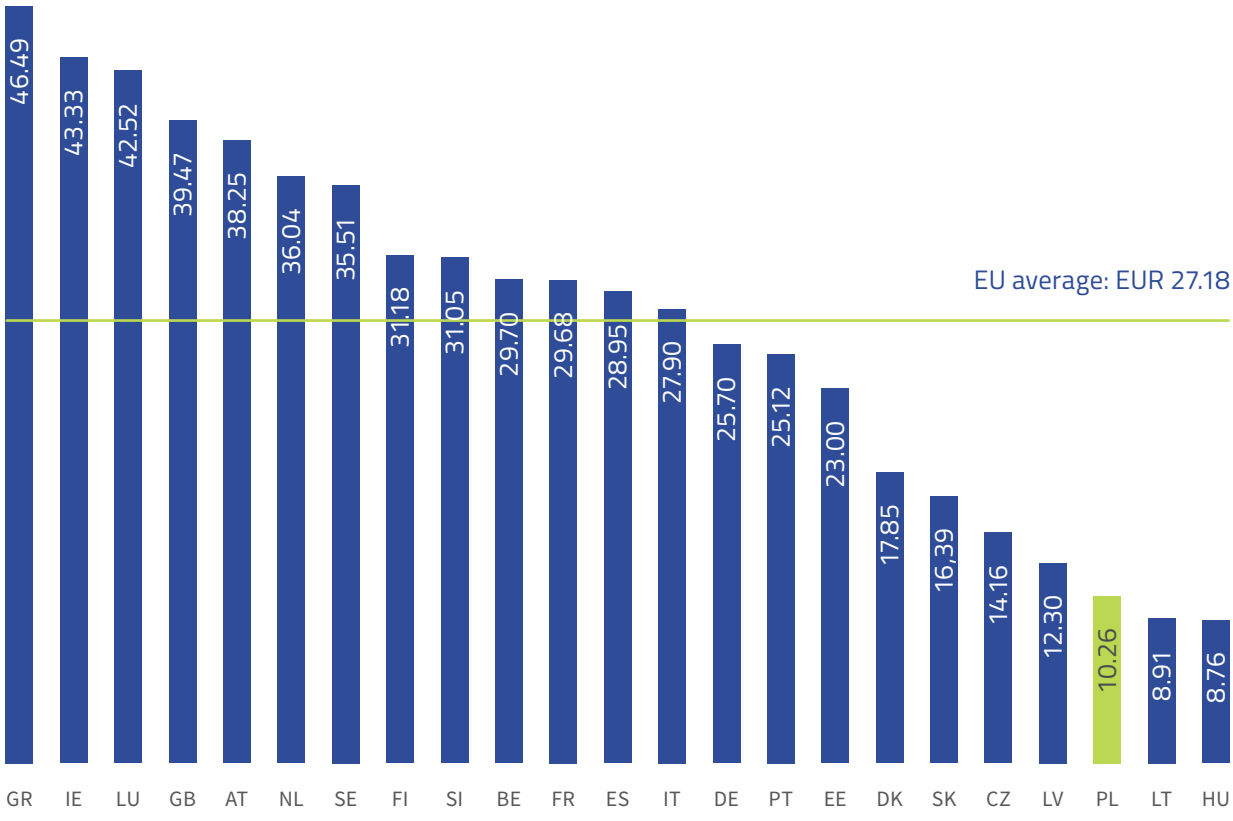
Source: Digital Agenda Scoreboard, July 2020

The prices of fixed-line internet access in EU countries were compared using the *Fixed Price Broadband*[3] database current as of September 2020. The cheapest operator offers in the most frequently used speed range were considered.

The service prices were compared based on the OECD Medium price basket: 120 GB/>100 Mb/s (120 GB data cap, internet speed over 100 Mb/s).

Poland is one of the three EU countries, where prices of fixed-line internet access were the lowest in 2020, as was the case in 2019. The service price, calculated according to the OECD methodology, was at the level of EUR 10.26 and was lower by as much as EUR 16.91 than the average price in other EU countries. Lower prices were offered only in Hungary and Lithuania. The countries in which internet access was the most expensive were Greece, Ireland and Luxembourg.

Chart 15. **Average monthly cost of service in EU countries, calculated for the OECD Medium basket: 120 GB/>100 Mb/s**



Source: UKE based on Fixed Broadband Price Benchmarking, Strategy Analytics

Note: tariffs for individual and business customers who purchased an internet access service only (bundles were not analysed) were taken into account. For Poland, the offering of UPC, internet 150 Mb/s (24 months) was chosen. Service cost as of September 2020, without taking purchasing power parity into account.

[3] Database developed by the *Strategy Analytics* analytics company.

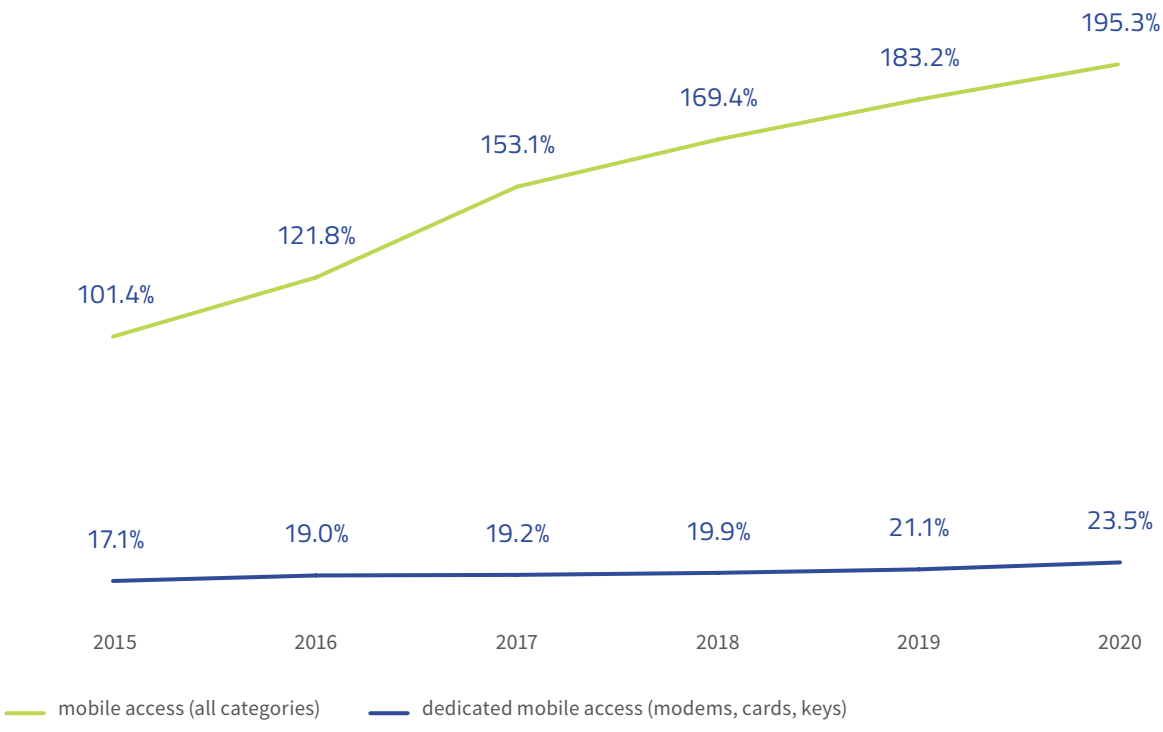
1.2. MOBILE INTERNET

1.2.1. GENERAL INFORMATION

Penetration of mobile internet services has been presented in two ways. Access was analysed separately for all possible categories of mobile access[4] and dedicated offerings provided solely by modems, cards, or keys.

195.3% penetration of mobile internet

Chart 16. **Penetration of mobile internet access**



Source: UKE

When all possibilities of mobile internet access (including access in phones) are considered, a dynamic increase in the service penetration ratio can be observed. In 2020, the ratio was 195.3%[5], 12.1 percentage points higher than in the previous year. Dedicated mobile access through modems, cards and keys was used in 2020 by 23.5% of the population. This means an increase of 2.4 percentage points compared to 2019, with the penetration ratio showing a constant upwards trend for this ratio as well.

[4] Mobile access categories include: actually used active SIM cards in mobile networks, dedicated data transmission offers for additional voice service bundles that require an extra fee, and dedicated data transmission offerings for services sold separately and provided solely via cards/modems/keys (e.g., USB modems, PCMCIA cards, ExpressCard).

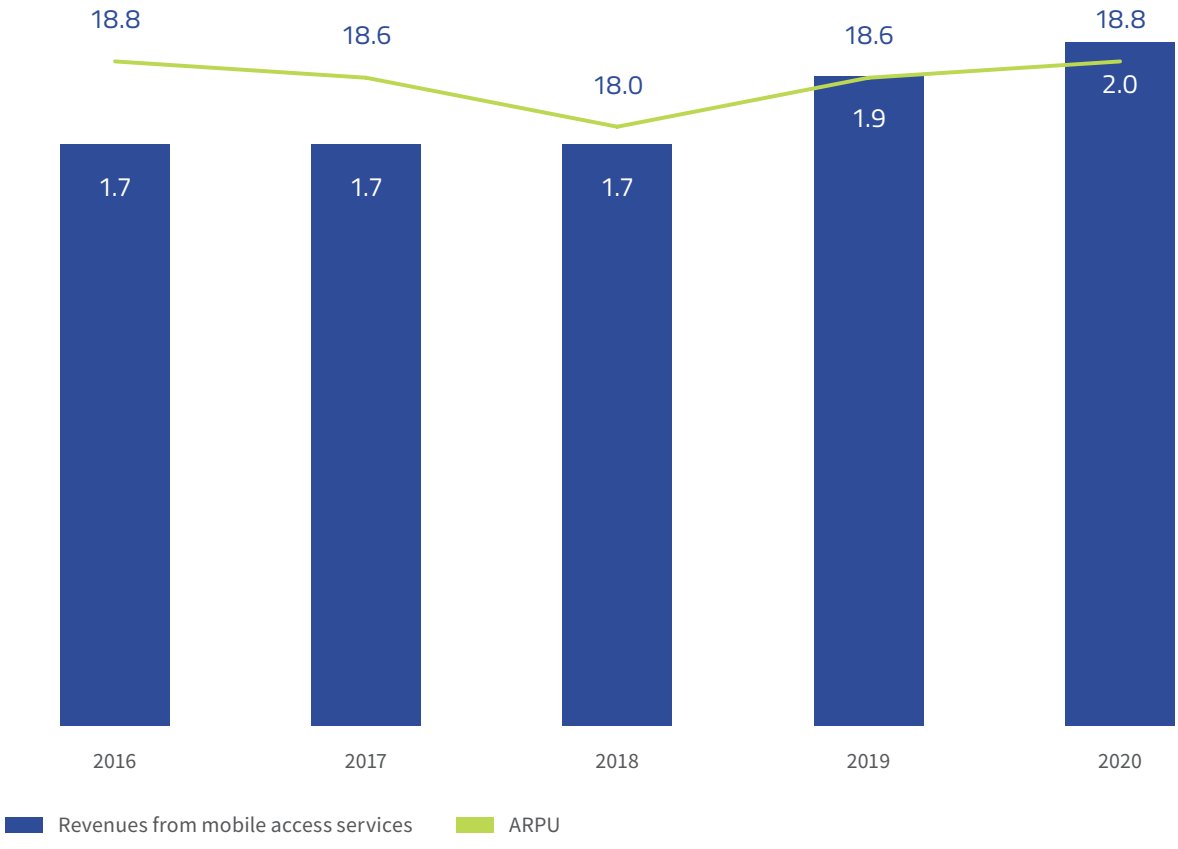
[5] In this case, penetration above 100% means that a user can access mobile internet using more than one kind of device.

1.2.2. REVENUES

Similar to fixed-line access, revenues from internet access through modems, cards and keys showed a rising trend in recent years. In 2020, they were slightly above PLN 2 billion, which means a 7.4% increase. PMR forecasts[6] show that the increase will not be as high in the coming years. Mobile modems will be chosen primarily by users unable to secure a fixed-line service with suitable quality.

The average revenue per user rose slightly (PLN 18.8). At the same time, the ARPU for mobile internet access services was lower by as much as PLN 26.60 in comparison with fixed-line access.

Chart 17. **Revenues from the fixed-line internet access market (PLN billion) and average revenue per user (ARPU, in PLN)**



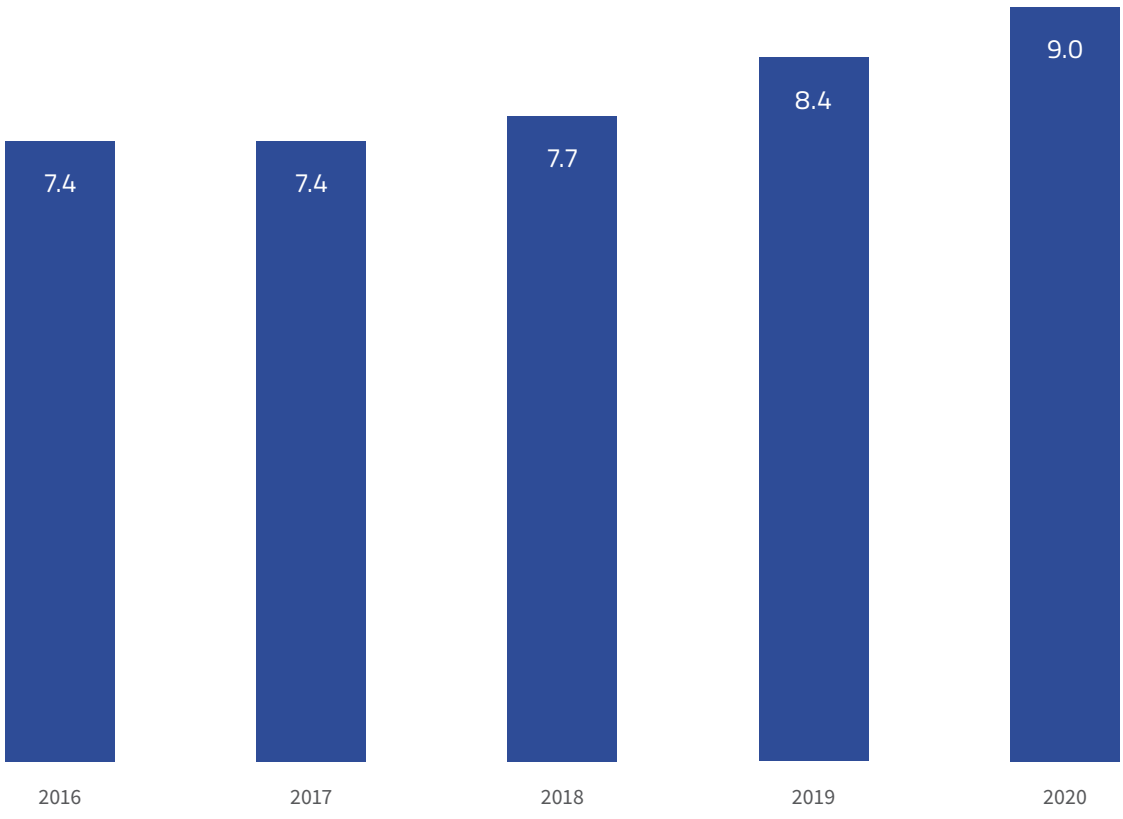
Source: UKE

[6] PMR, Telecommunications market in Poland 2020. Market analysis and growth forecasts for the years 2020-2025. December 2020.

1.2.3. USERS

Internet users serviced through dedicated mobile access devices such as modems, cards or keys accounted for 52% of all internet users in 2020. These numbers show a steady rising trend. In the previous year, 9 million users used dedicated mobile internet access , 6.6% more than in 2019.

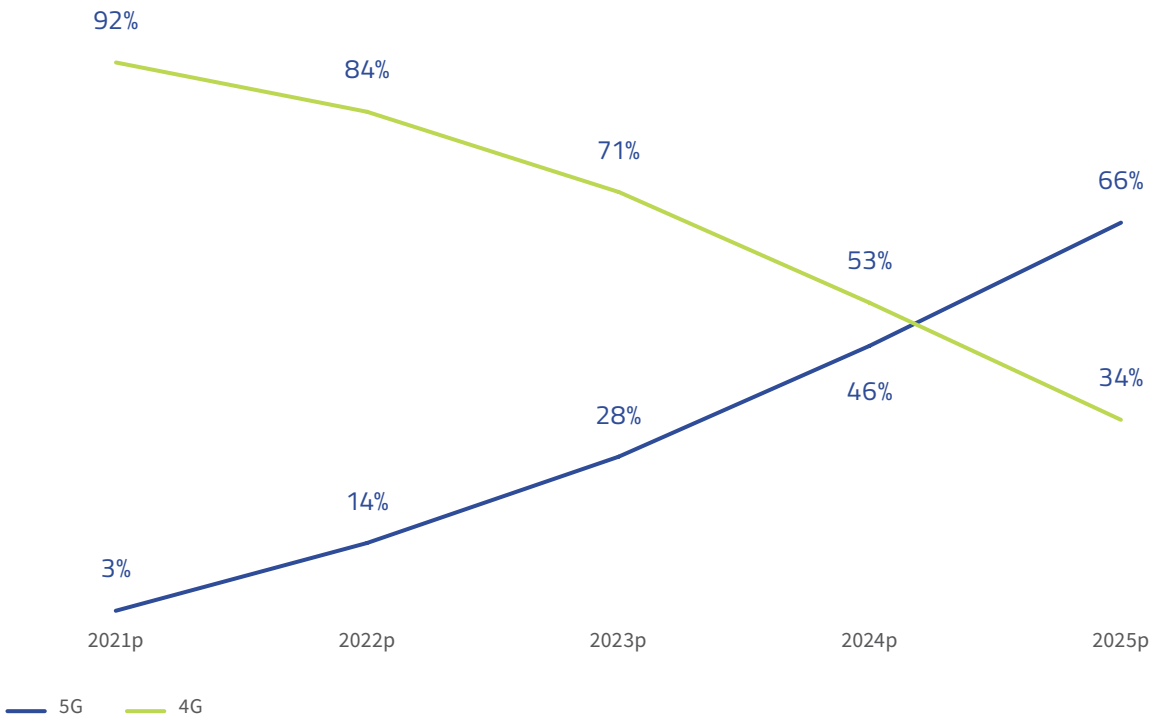
Chart 18. **Number of mobile internet access users (in millions)**



Source: UKE

Among users of dedicated internet access devices, the number of those using mobile 4G devices is growing more and more. Analysys Mason predicts their share to reach 92% in 2021 and to decline in subsequent years in favour of 5G access, reaching 66% of users in 2025.

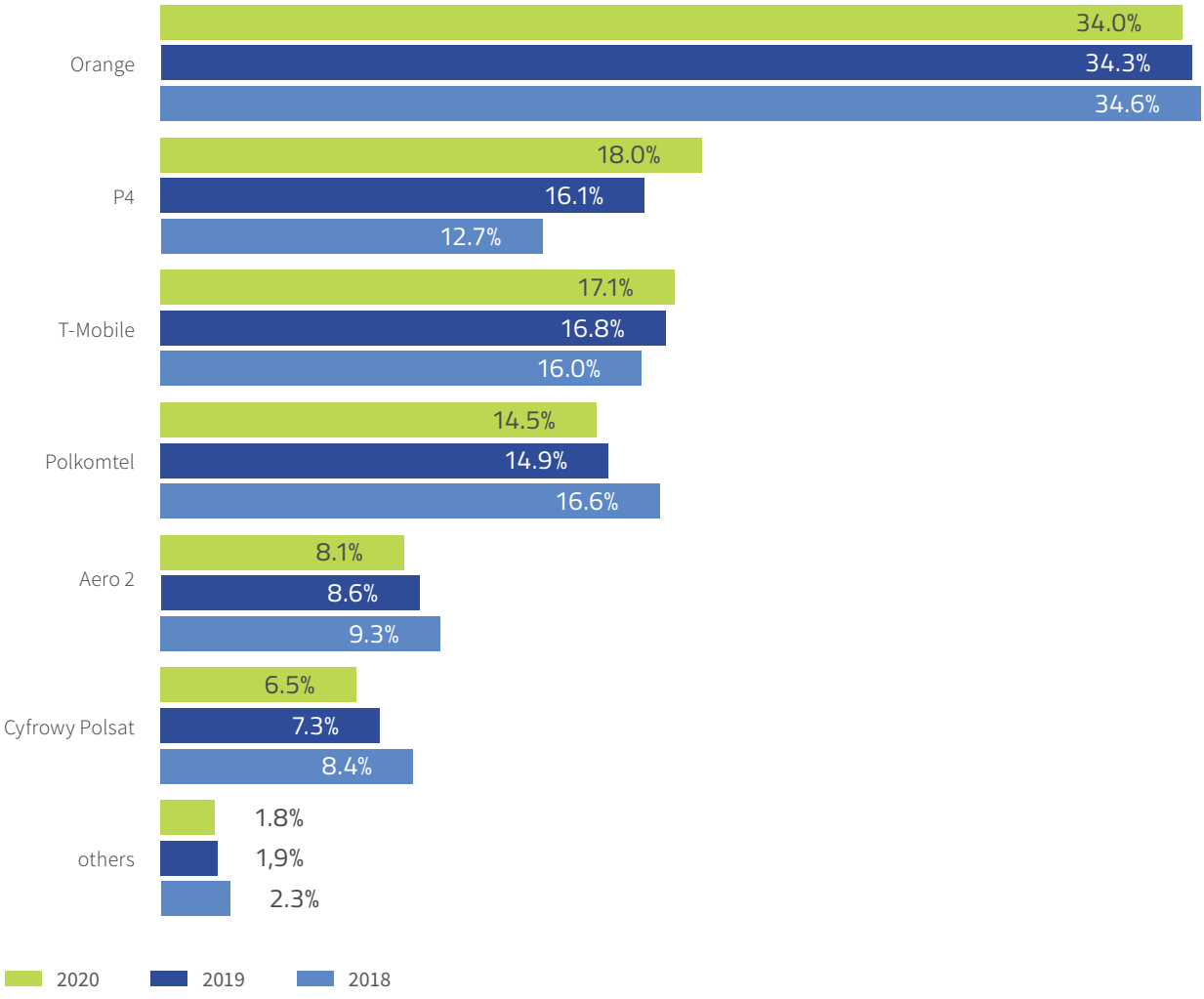
Chart 19. **The share of 4G and 5G technologies in the total number of mobile access devices**



Source: Analysys Mason, DataHub p – forecast

Orange Polska, serving 34% of users, was at the forefront of the mobile access market in 2020 as well. Its share in the market decreased slightly. The share of P4, the new runner-up in the ranking, rose by 1.9 percentage points, to 18%. Third place was taken by T-Mobile that serves 17.1% of mobile access customers.

Chart 20. **Shares of operators in terms of mobile internet users**



Source: UKE

others – enterprises with individual share not exceeding 1%

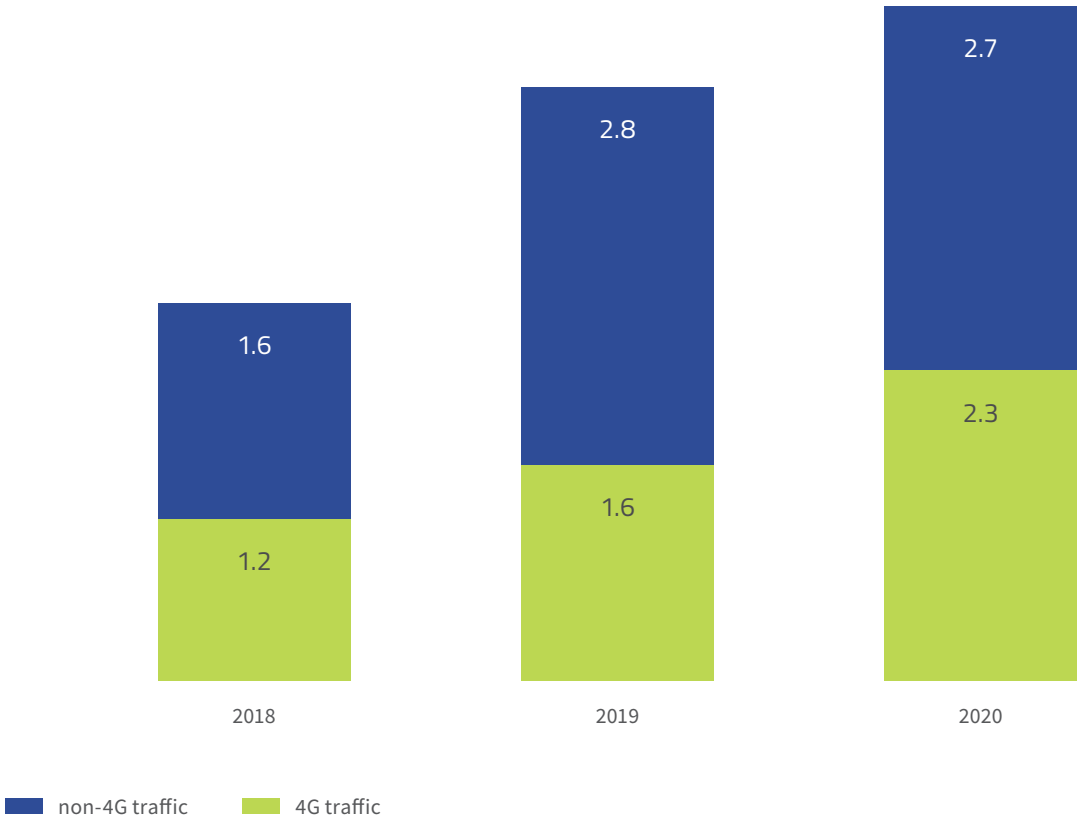
1.2.4. TRAFFIC VOLUME

In 2020, all forms of mobile access[7] were used to send 5 million TB of data. This meant an increase of 17% compared to 2019. 46% of all traffic in mobile networks, i.e., 2.3 million TB, was traffic to and from 4G devices. Traffic in 4G technology increased by 46% year on year.

46%

amount of data sent via 4G mobile networks

Chart 21. **Amount of data sent in mobile networks**



Source: UKE

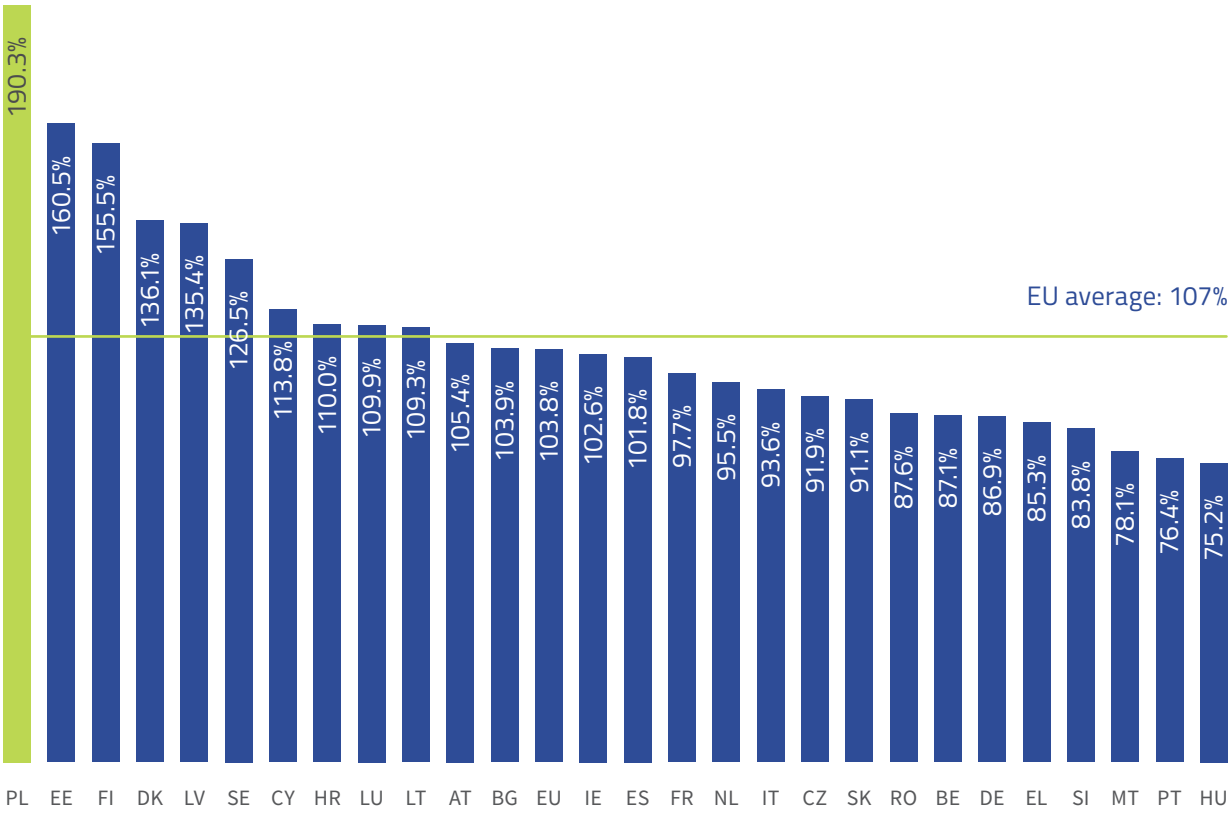
[7] All forms of mobile service mean: actually used active SIM cards in mobile networks, dedicated data transmission offers for additional voice service bundles that require an extra fee, and dedicated data transmission offers for services sold separately and provided solely via cards/modems/keys (e.g. USB modems, PCMCIA cards, ExpressCard).

1.2.5. COMPARISON WITH EUROPEAN COUNTRIES

In terms of internet mobile access, Poland ranked first. In July 2020, the service penetration ratio was equal to 190.3%, higher than the EU average by as much as 83.3 percentage points.

Apart from Poland, 9 other countries had ratios higher than the average. The second highest penetration was shown by Estonia (160.5%), followed by Finland (155.5%). The lowest result was recorded in Hungary (75.2%), Portugal (76.4%) and Malta (78.1%).

Chart 22. **Mobile internet service penetration in EU (per 100 inhabitants)**

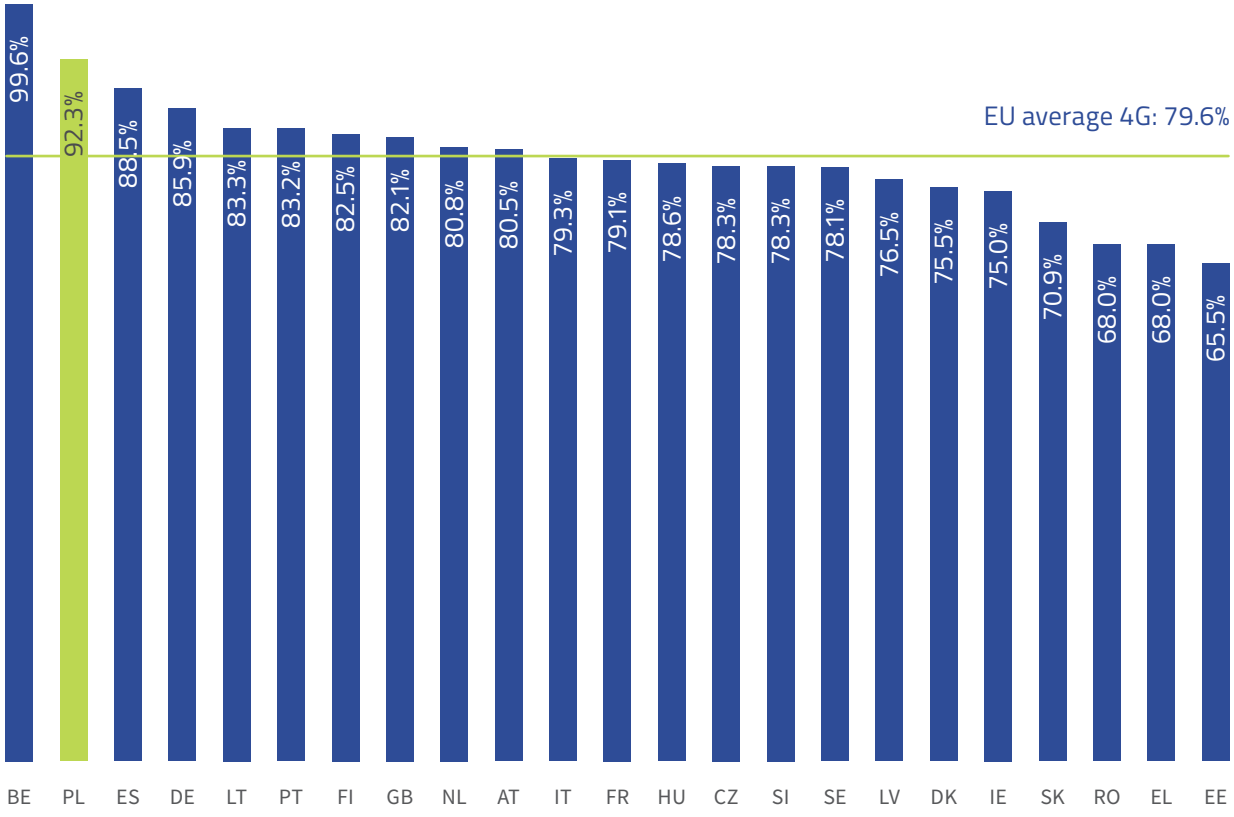


Source: Digital Agenda Scoreboard, July 2020

Highest mobile internet access penetration in the EU

In addition to high penetration, Poland can also boast good quality of mobile internet compared to other EU countries. In 2020, 92.3% of mobile access used 4G technology. In these terms, Poland came second in the ranking of EU Member States. Its result was higher than the EU average by 12.7 percentage points.

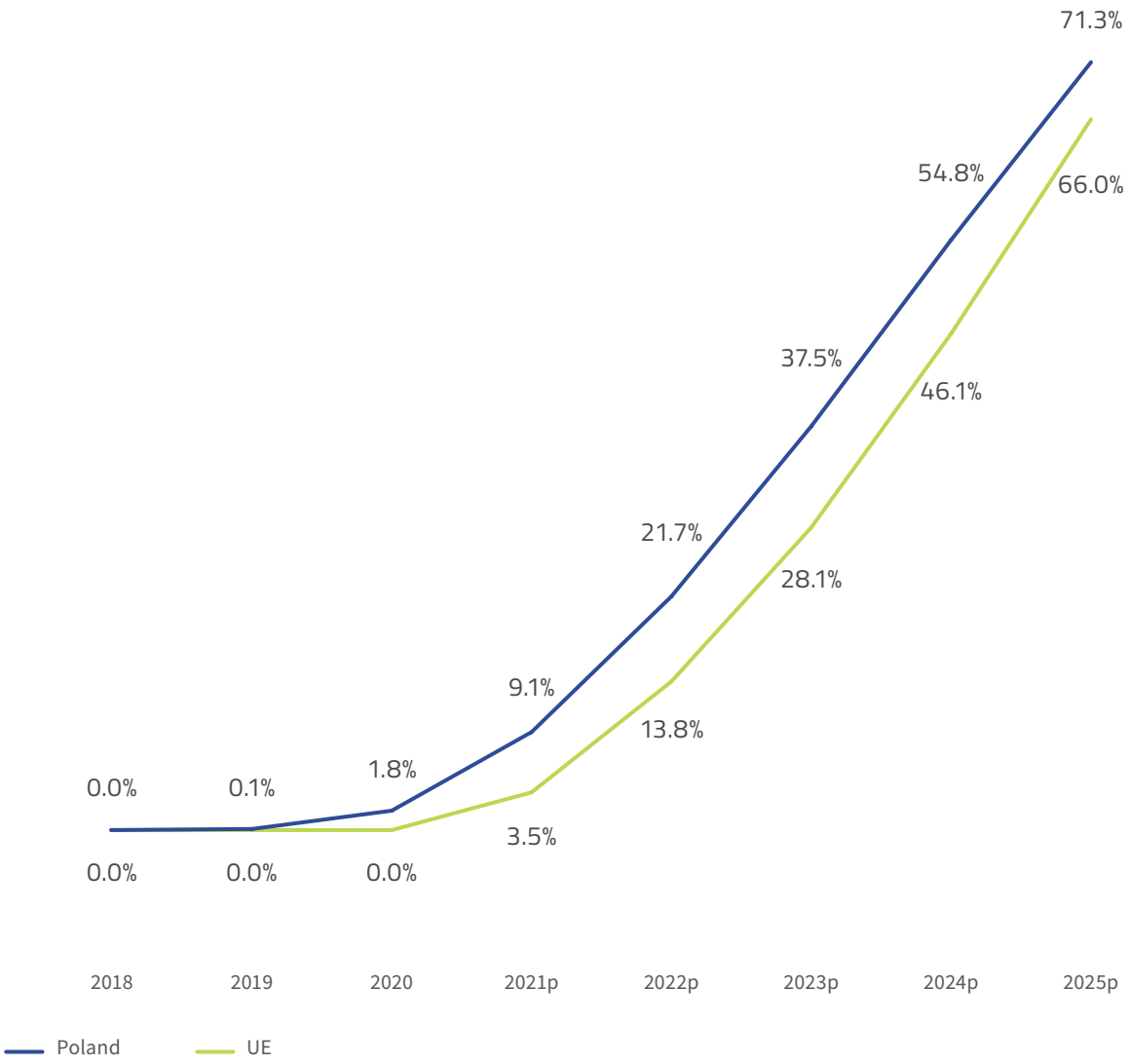
Chart 23. **Share of 4G in mobile access in EU countries in 2021 (forecast)**



Source: Analysys Mason, DataHub

Analysys Mason predicts that the share of this technology in mobile access in EU countries will grow significantly. In 2025, 5G connections will account for 71.3% of all connections used for mobile access. The forecast for Poland is equally optimistic. The company estimates that in 2025, 66% of the Polish population will be using 5G mobile access.

Chart 24. **Comparison of the share of 5G technology in the number of mobile connections in Poland and the EU average**



Source: Analysys Mason, DataHub p – forecast

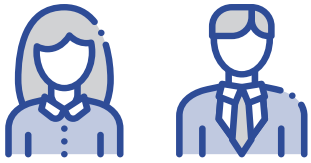
2 TELEPHONY SERVICES

PART I
THE TELECOMMUNICATIONS MARKET

2.1. FIXED-LINE TELEPHONY

2.1.1. GENERAL INFORMATION

Fixed-line telephony services are becoming less popular among users of telecommunication services in Poland year on year. In 2020, more than 3.1 million subscribers used fixed-line telephony services, 12% less than in the previous year. Revenues from providing telephone services reached almost PLN 1.4 billion, 11% less in comparison with 2019.

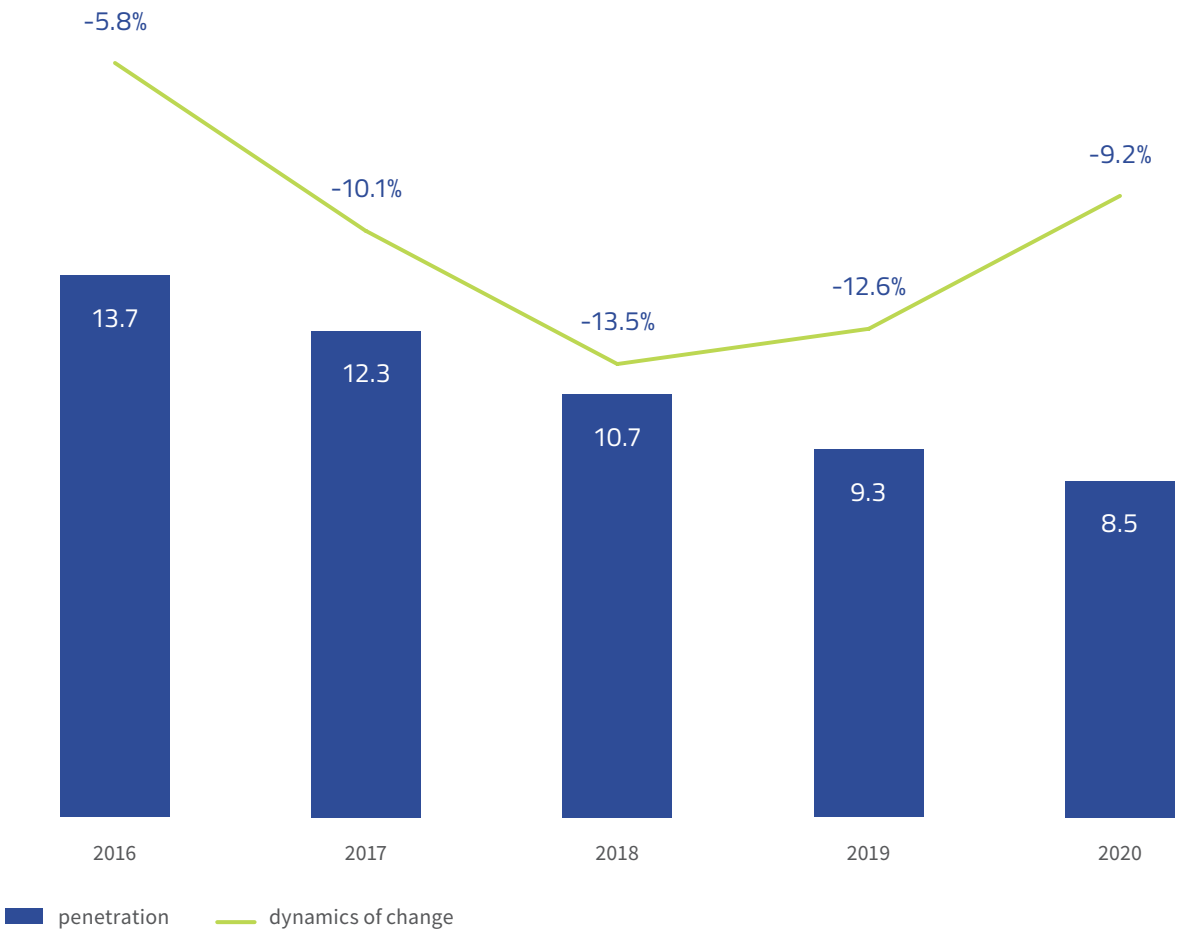


3.1 million number
of fixed-line telephony subscribers

PLN 1.4 billion
revenues from the fixed-line telephony market

Penetration of fixed-line telephony services declines with each year, but the downward trend slowed down slightly during the COVID-19 pandemic. In 2020, the penetration rate for the country was 8.5% (9.2% less than in 2019).

Chart 25. **Fixed-line telephony services penetration (%) (number of subscriber connections per number of inhabitants) and the dynamics of change**

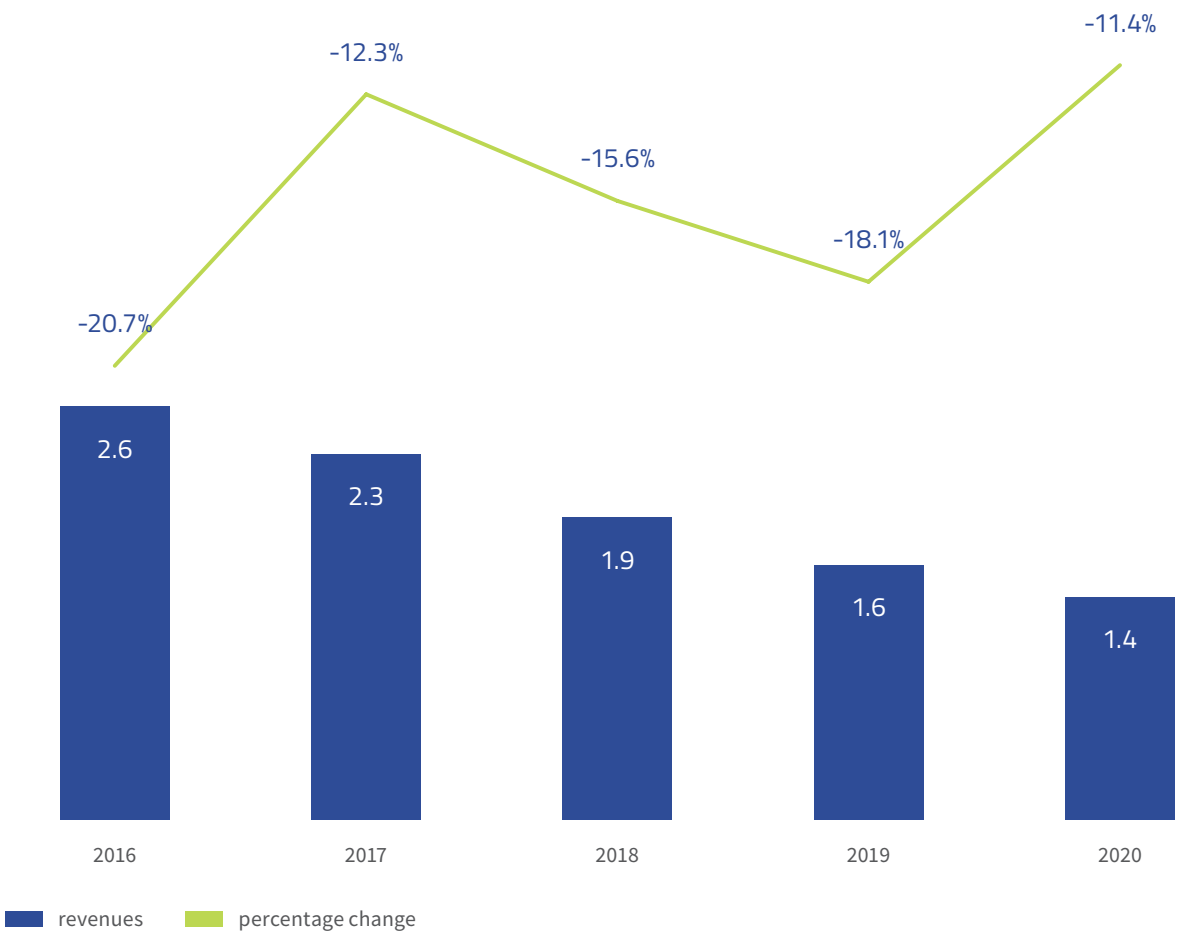


Source: UKE

2.1.2. REVENUES

In 2020, revenues from the fixed-line telephony market reached almost PLN 1.4 billion, 11% less in comparison with the previous year.

Chart 26. **Revenues from the fixed-line telephony market (PLN billion) and the dynamics of change**

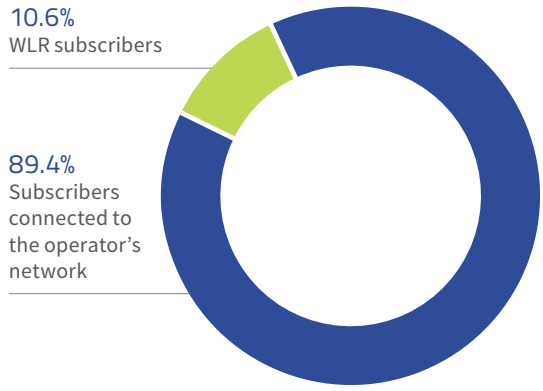


Source: UKE

The majority of telecommunications entrepreneurs' revenues from the provision of fixed-line telephone services was generated by subscribers connected to the operator's network (89.3%). Only slightly more than one-tenth of all revenues (10.7%) from the whole market came from subscribers providing services via wholesale line rental (WLR).

A slight, almost 1%, increase in monthly average revenue per fixed-line telephony subscriber was noted. Considering the further decrease in the number of subscribers and revenues from fixed-line telephony services, this was mostly the result of the billing model adopted by operators (revenues from fixed monthly subscriber fees) and a slightly (by 0.15%) longer call duration.

Chart 27. **Structure of revenues by the type of subscriber connections used**



Source: UKE

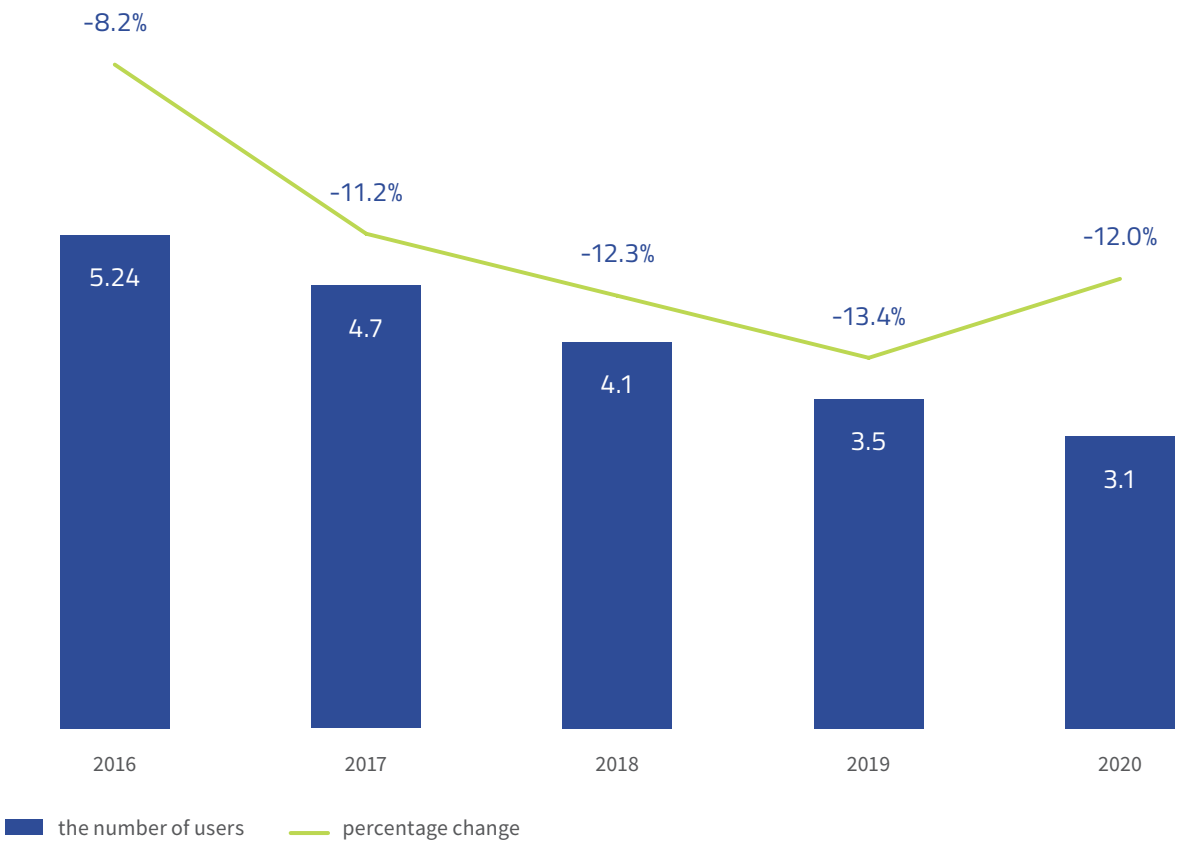
Chart 28. **Average monthly revenue per subscriber (PLN) and the dynamics of change**

Source: UKE

2.1.3. USERS

The number of fixed-line telephony users decreases each year, but the pace of this decline slowed down slightly. In 2020, the number of subscribers was a little over 3.1 million, 12% less in comparison with the previous year. A slower rate of subscriber decrease may have resulted from the consequences of restrictions imposed in connection with an outbreak of the COVID-19 pandemic. During the Polish national quarantine, a large share of users was still using fixed-line telephony.

Chart 29. **Number of fixed-line telephony users (in millions) and the dynamics of change**

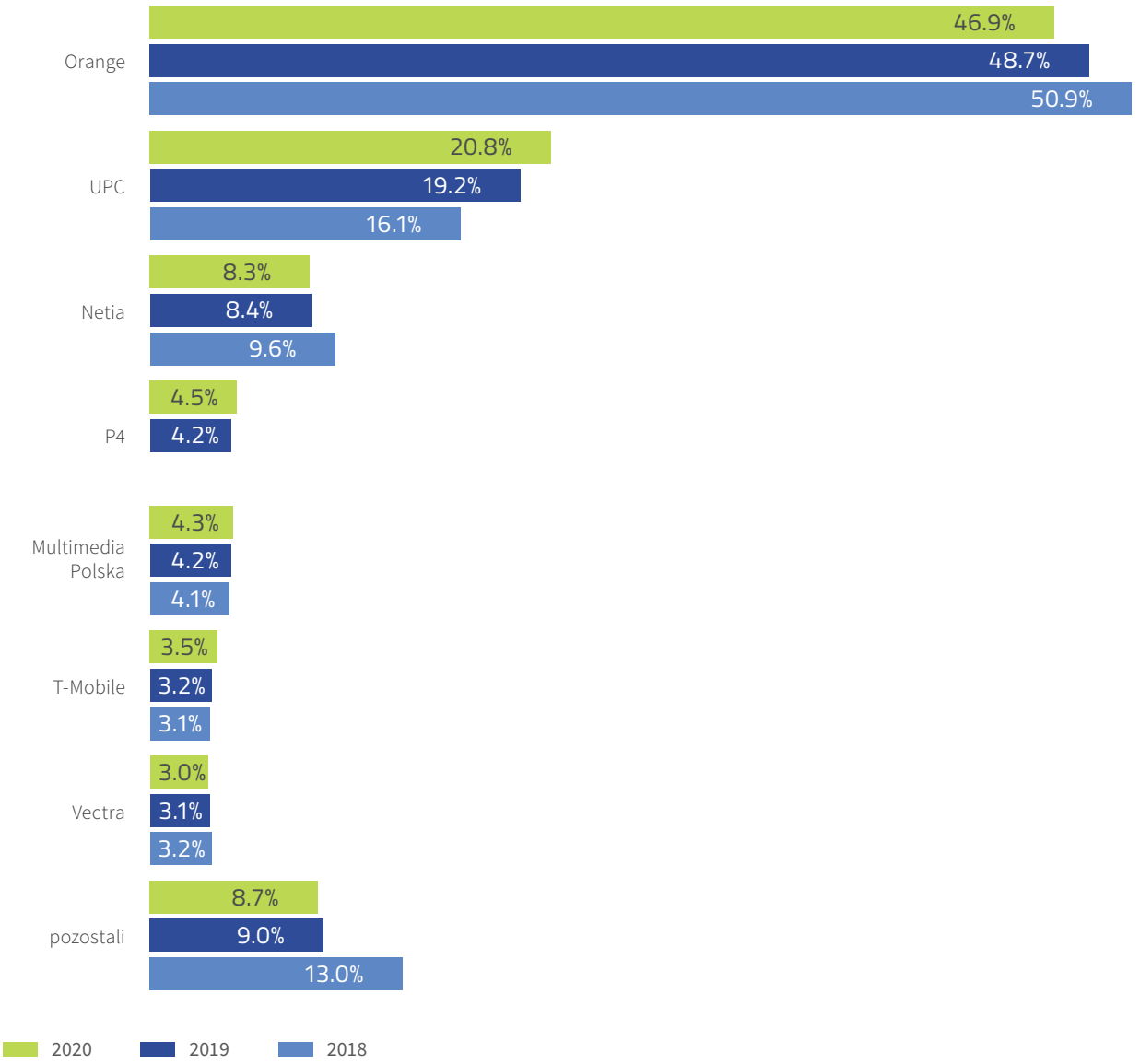


Source: UKE

In 2020, almost half (46.9%) of the fixed-line telephony market, in terms of numbers of users, was still in the hands of Orange Polska. However, in comparison with the previous year, the share of this operator in the market decreased by 1.8 percentage points. The share of alternative operators providing fixed-line telephony services grows year on year.

The second place was taken by UPC (20.8% – increase by 1.6 percentage points). It was followed, respectively, by Netia (8.3%), P4 (4.5%), Multimedia (4.3%), T-Mobile (3.5%) and Vectra (3%). The share of the remaining entrepreneurs was 8.7%.

Chart 30. **Shares of operators in terms of numbers of users**



Source: UKE

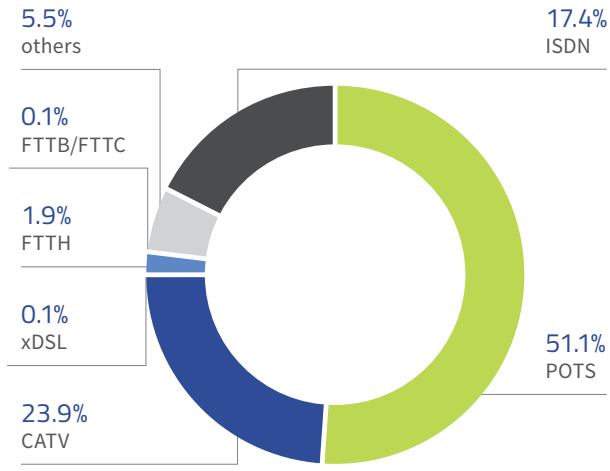
others – enterprises with individual share not exceeding 3%

2.1.4. SUBSCRIBER CONNECTIONS

The largest group, more than half of all own subscriber connections were POTS connections (51.1%). Compared to the previous year, cable TV connections once again noted an increase (by 0.8 percentage points), becoming the second most popular technology, in terms of the number of connections (23.9%), used by fixed-line telephony operators to provide services. ISDN connections came third (17.4%), their share also increased compared by the previous year, by 1.4 percentage points.

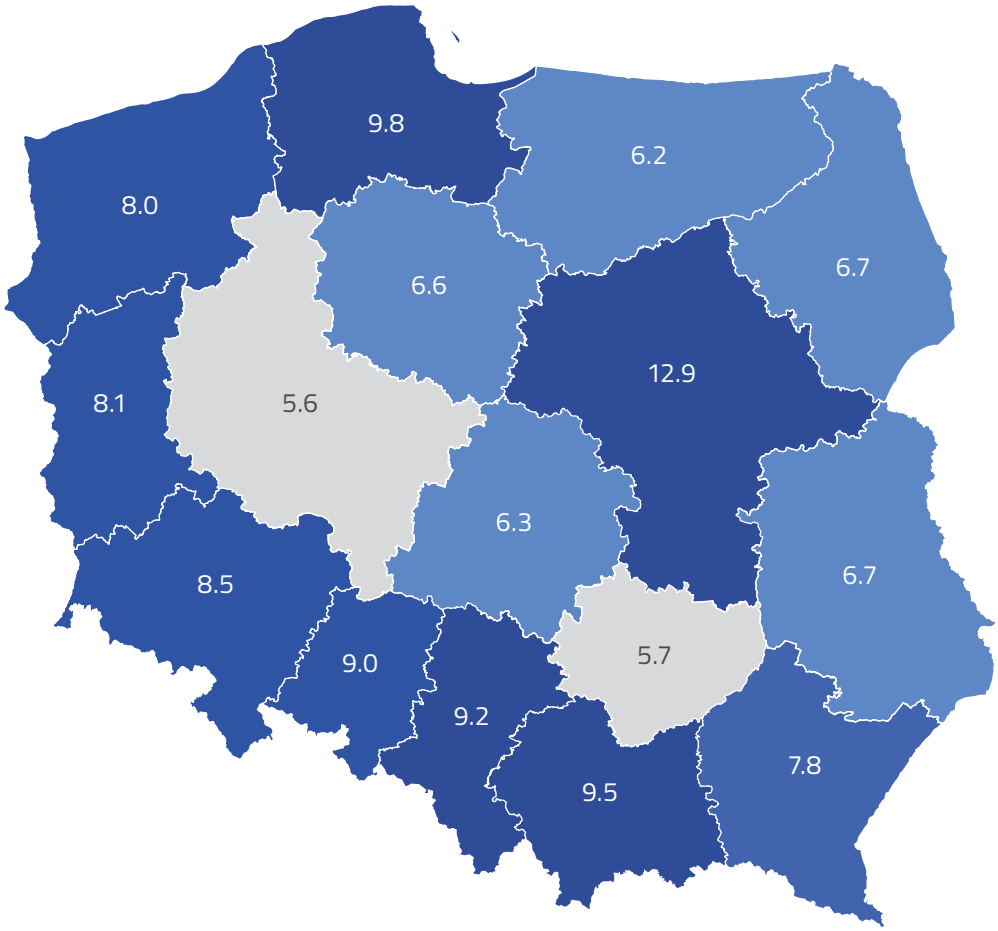
In 2020, the largest number of subscriber connections per inhabitant was found in the Masovia voivodeship (12.9%) and the lowest number in the Greater Poland (5.6%).

Chart 31. **Percentage share of connection types in the entire share of subscriber connections by technology**



Source: UKE

Map 1. **Penetration of fixed-line telephony connections broken down by voivodeship**



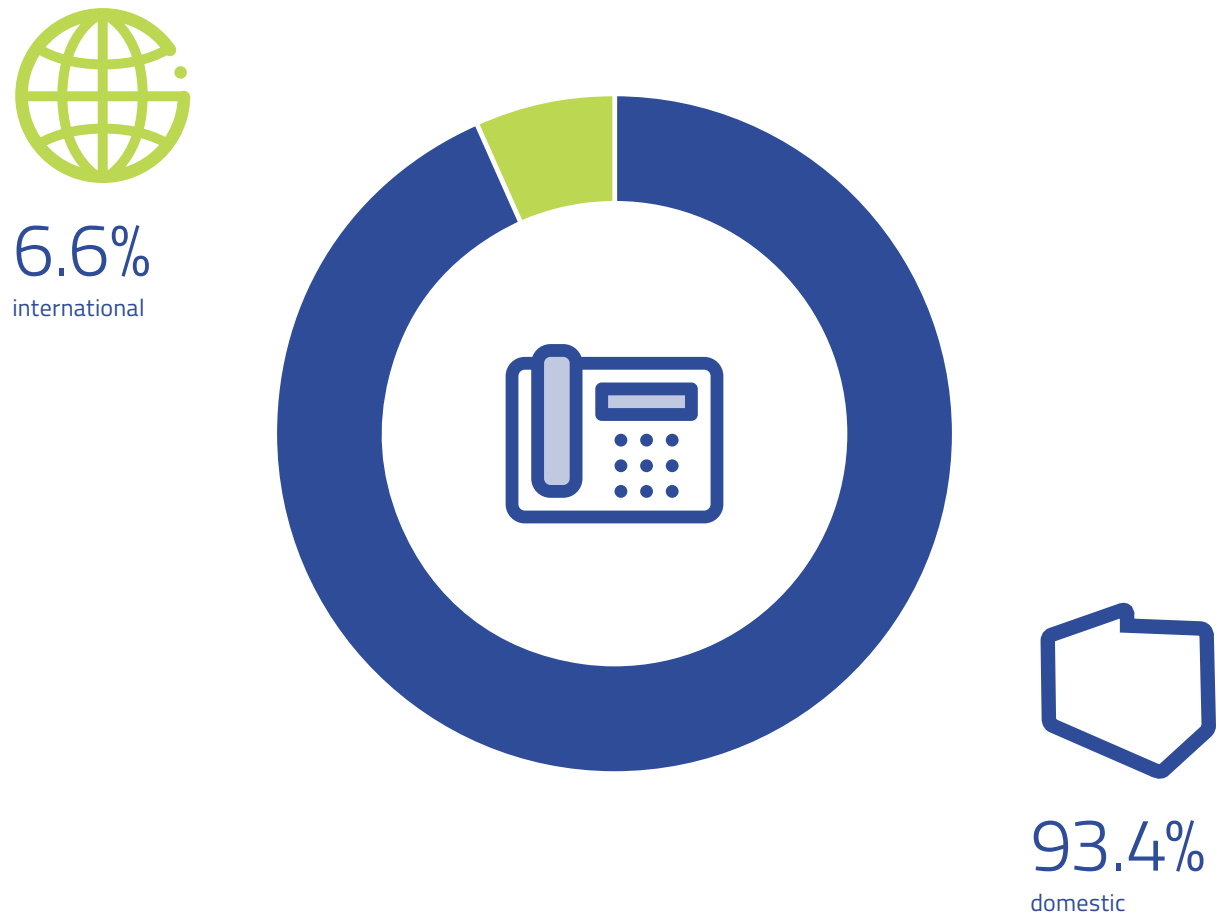
Source: UKE

2.1.5. TRAFFIC VOLUME

In 2020, the total duration of calls rose slightly compared to previous years, reaching the figure of around 4.5 billion minutes. The reversal of the previously observed downward trend of call duration was caused by the COVID-19 pandemic and the imposed movement restrictions.

Domestic calls had the largest share in the total number of calls (93.4%). The decrease of the number of international calls in the entire call duration proves the trend that international traffic in telecommunication networks is being superseded by instant messaging services.

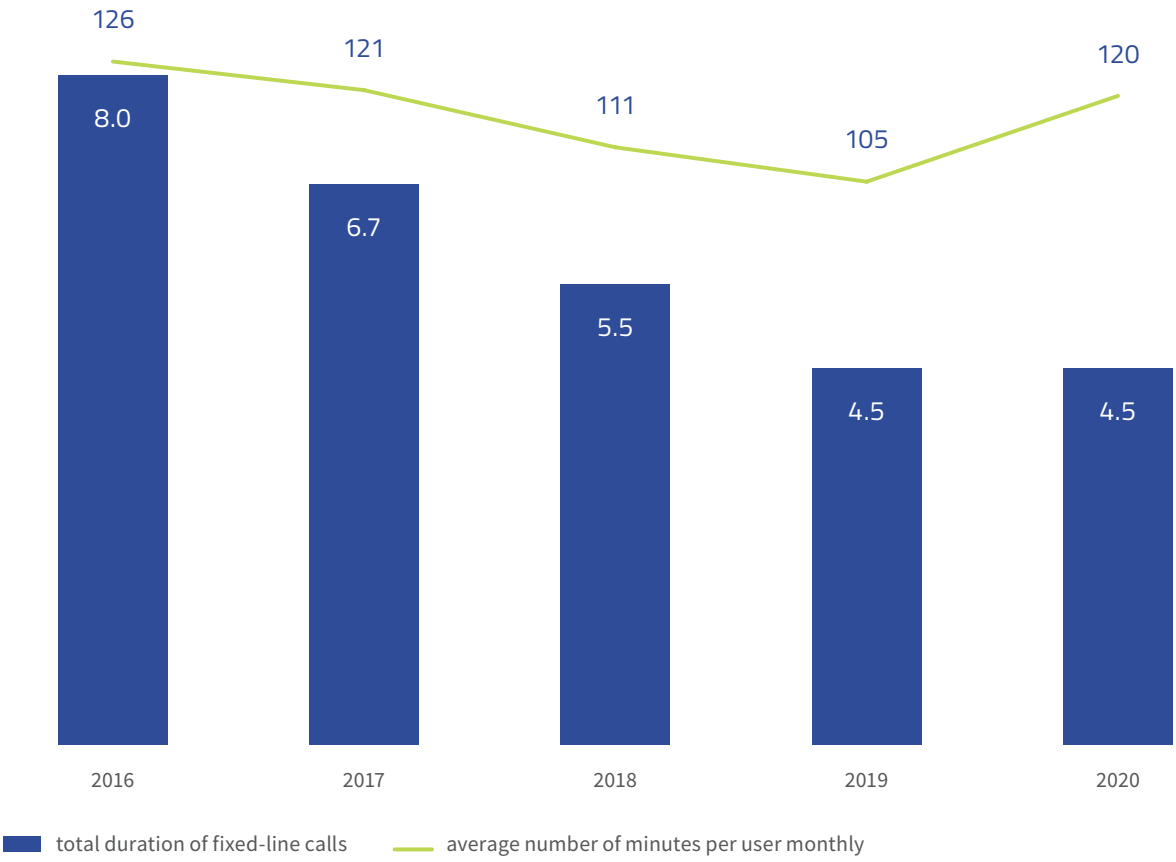
Chart 32. **Traffic volume by direction of voice calls**



Source: UKE

Due to the smaller subscriber base and a slightly longer total call duration, the average number of minutes per subscriber rose sharply. Compared to 2019, the rate increased by around 17 minutes, up to 120 minutes per subscriber monthly.

Chart 33. **Traffic volume (in billions of minutes) and the average number of minutes per user monthly**



Source: UKE

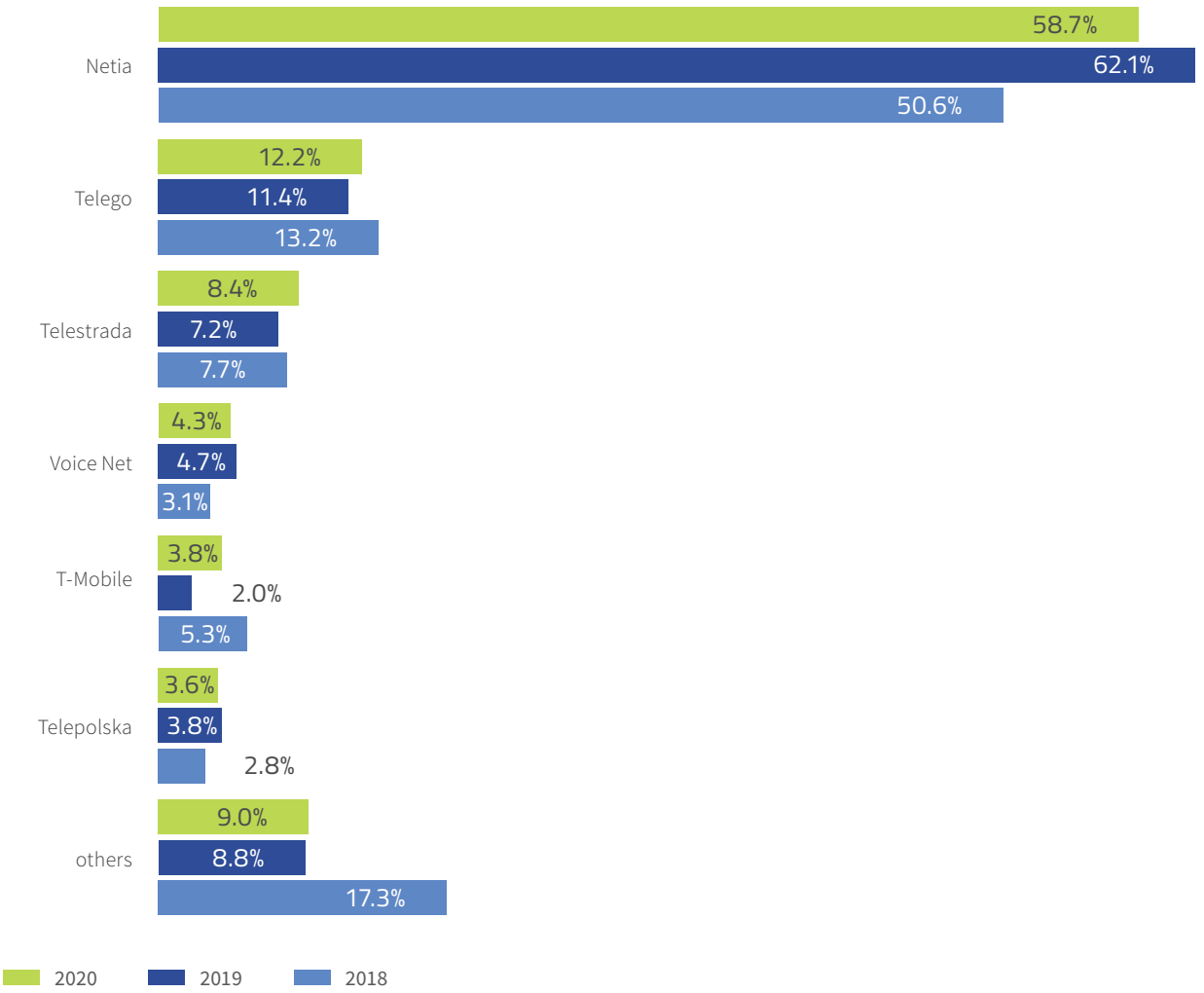
2.1.6. RETAIL SERVICES BASED ON WLR

Revenues from retail services based on wholesale line rental (WLR) in 2020 amounted to PLN 146.7 million. Compared to the previous year, their value decreased by about 19%.

Among operators active on the WLR market, the largest share in revenues was held by Netia, although it fell by 3.4 percentage points compared to 2019 (to 58.7%). The leading player's revenues strongly outranked those of Telego (12.2%), Telestrada (8.4%), Voice Net (4.3%), T-Mobile (3.8%) and Telepolska (3.6%). The remaining operators covered 9% of the market, 0.2 percentage points more than in 2019.

In 2020, the sum of WLR subscriber connections was 0.36 million, which means a decrease by around 13% compared to the previous year. The number of subscribers using WLR services was 0.27 million, over 53 thousand less, which means an annual decrease by 17%.

Chart 34. **Shares of operators in revenues provided through WLR**



Source: UKE

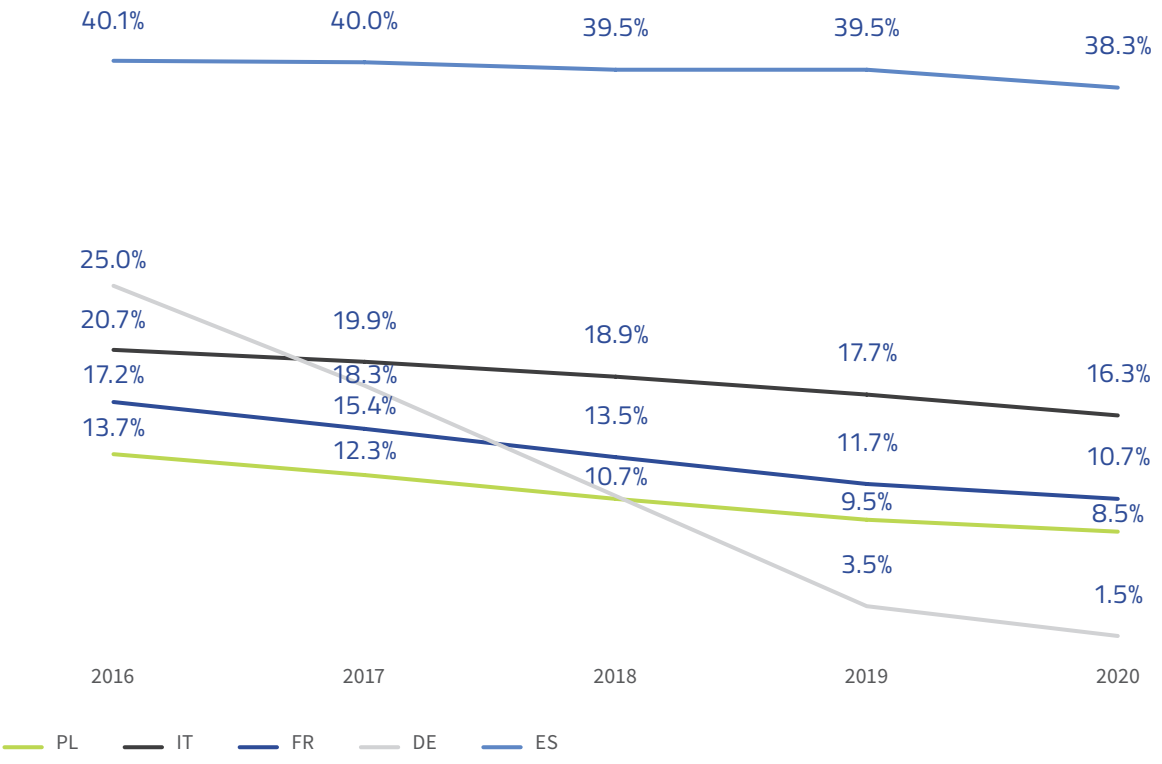
others – enterprises with individual share not exceeding 2%

2.1.7. COMPARISON WITH EUROPEAN COUNTRIES

In terms of penetration of fixed-line telephony connections, Poland was ranked fourth (8.5%) among the five most populous EU countries.[8] The country with the largest penetration of fixed-line telephony connections (excluding VoIP) in 2020 was Spain (38.3%).

On the other hand, Italy had a much lower penetration ratio at 16.3%. With each year, the popularity of PSTN connections declines, a trend manifesting most strongly in Germany.

Chart 35. **Penetration of fixed-line telephony connections in selected European Union countries in 2016-2020**

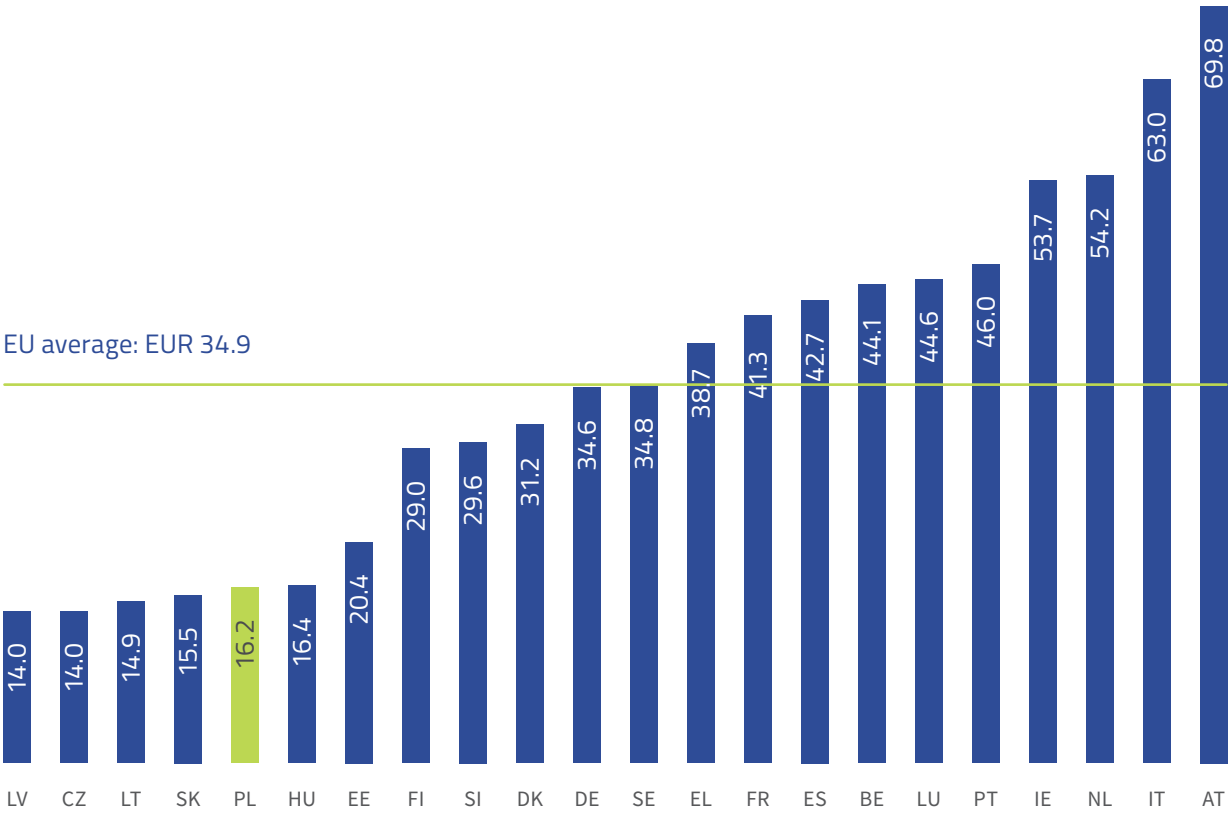


Source: UKE

[8] This comparison includes, in addition to Poland, the four European Union countries with the largest population: Germany, France, Italy and Spain.

At the end of 2020, the average price[9] of fixed-line telephony services in selected EU countries was EUR 34.9, EUR 0.2 more than in the previous year. Users from Latvia (EUR 14) paid the lowest subscription costs, the highest were paid by users from Austria (EUR 69.8). In Poland, a fixed-line telephony subscriber had to pay EUR 16.2, EUR 18.7 less than the average price in EU countries. Compared to last year's price ranking of selected EU countries, the prices of fixed-line telephony in Poland increased by EUR 1.9.

Chart 36. **Monthly values of baskets for a moderately active subscriber in selected EU countries**



Source: Analysys Mason, DataHub

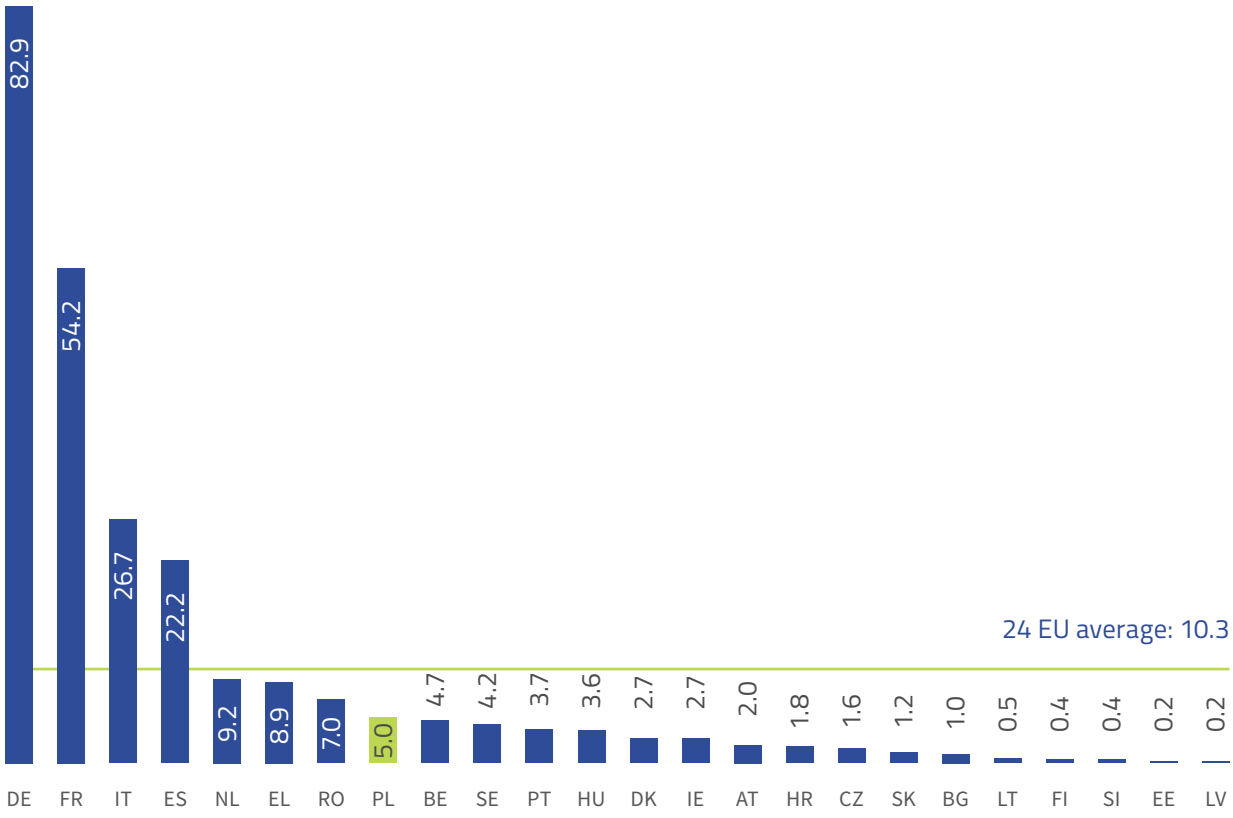
*The prices do not take into account the purchasing power parity (PPP).

[9] The price analysis was conducted based on the OECD Fixed Voice Price Benchmarking database. The ranking employed the medium usage basket.

In 2020, the traffic volume of fixed-line telephony in 24 EU countries was 10.3 billion minutes on average. Poland's figure was below that average (5 billion minutes). In the ranking, Germany was at the top place with the duration of calls at the level of 82.9 billion minutes.

Another country above the European average was France (54.2 billion minutes), followed by Italy with 26.7 billion minutes of fixed-line telephone calls.

Chart 37. **Size of traffic volume (in billions of minutes) in European countries**



Source: Analysys Mason

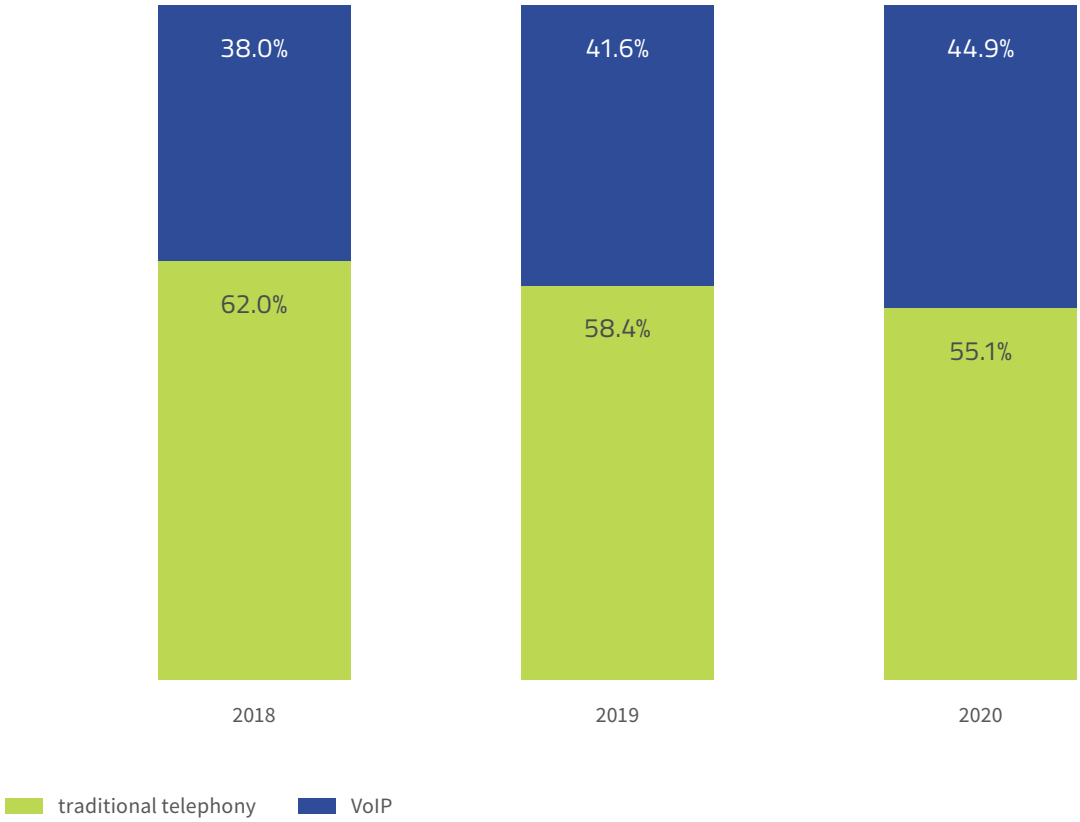
*Duration in minutes of calls initiated in fixed-line networks: includes traffic generated by PSTN and voice over broadband (VoBB) services. Does not include dial-up internet connections

2.2. VoIP TELEPHONY

2.2.1. GENERAL INFORMATION

VoIP services, formerly used mostly for international calls as a cheaper alternative, have become increasingly prevalent in the fixed-line telephony structure, mainly because the importance of traditional telephony services has declined.

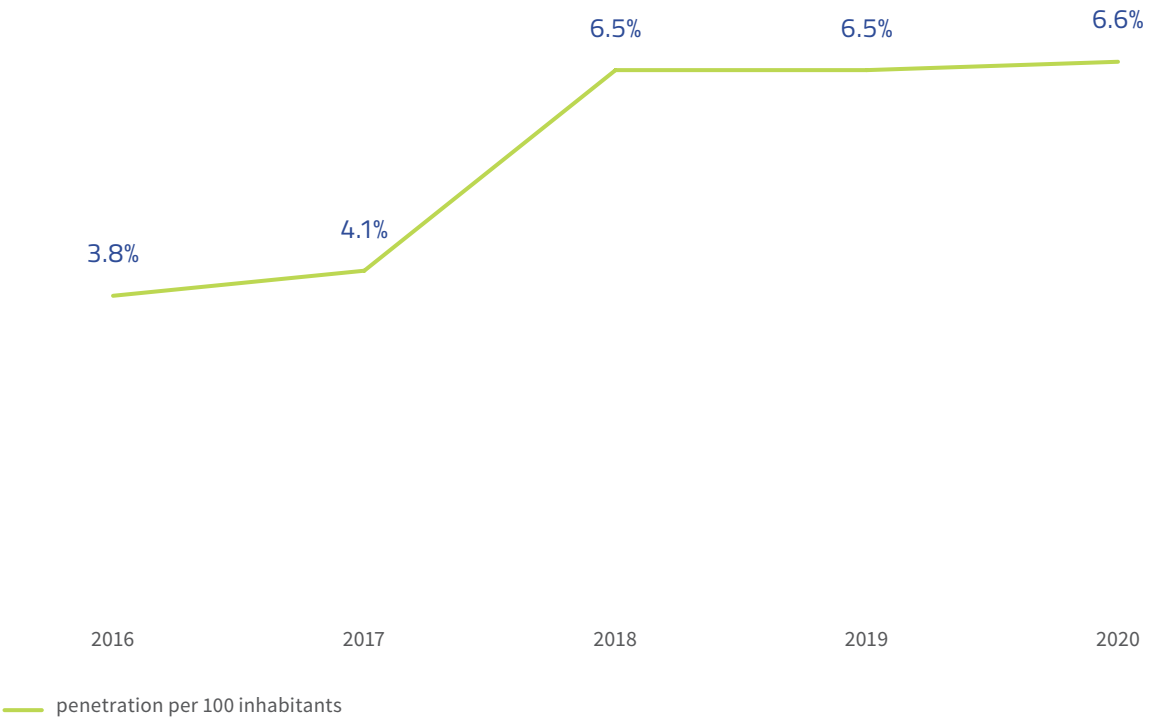
Chart 38. **Share of VoIP and traditional telephony in the total number of fixed-line telephony users**



Source: UKE

The market penetration of VoIP services remained almost constant for the past couple of years, standing at 6.6% in 2020.

Chart 39. **VoIP services penetration**



Source: UKE

2.2.2. REVENUES

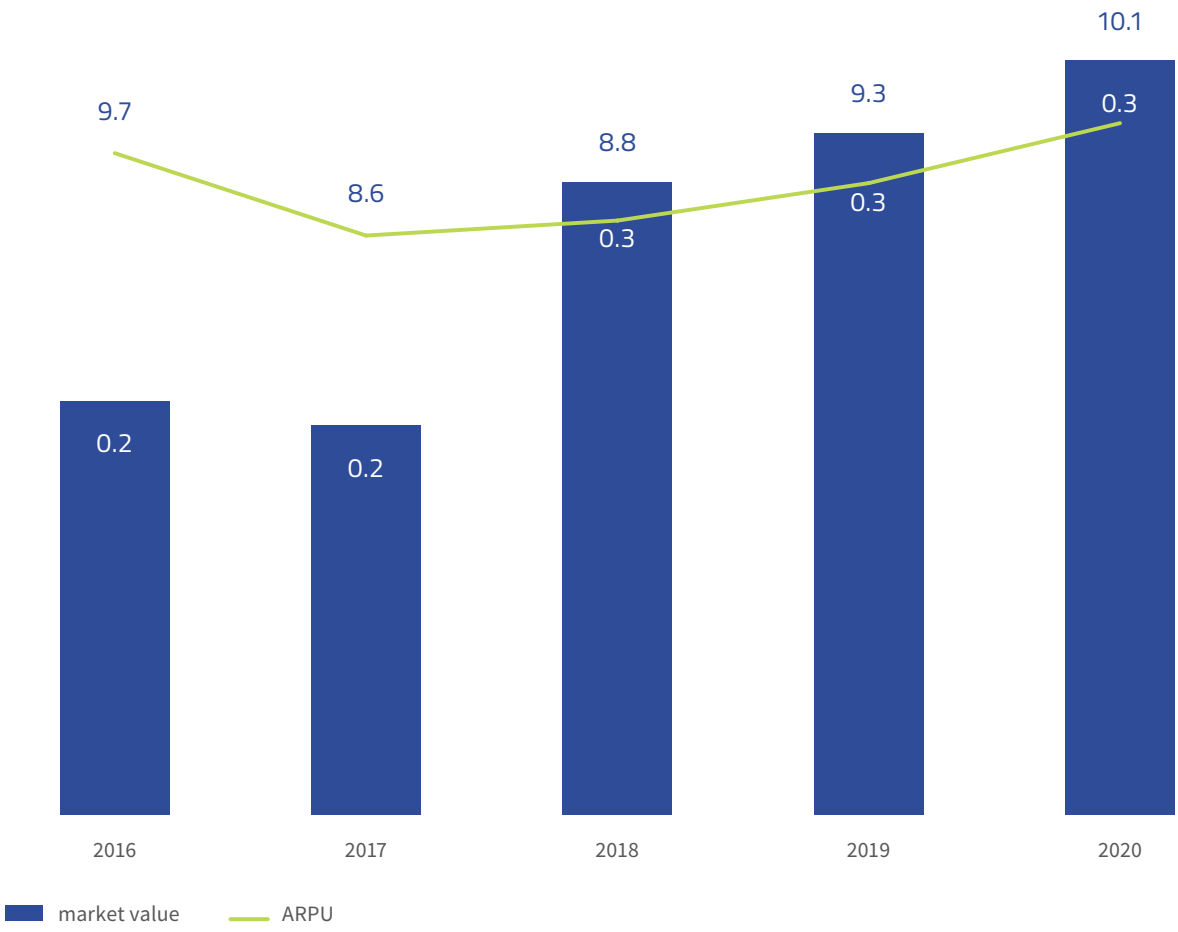
Revenues from VoIP telephony are growing steadily. In the last year, they amounted to PLN 0.3 billion and were higher by about 10% than in the previous year and by 18% than two years ago.

PLN 0.3 billion

revenues from the VoIP telephony market

The monthly revenue per user has also been increasing. In 2016-2020, it was PLN 9.3 on average. In 2020, ARPU stood at PLN 10.1 and was PLN 0.8 higher than in the previous year.

Chart 40. **Revenues from the VoIP telephony market (PLN billion) and average monthly revenue per user (ARPU, PLN)**

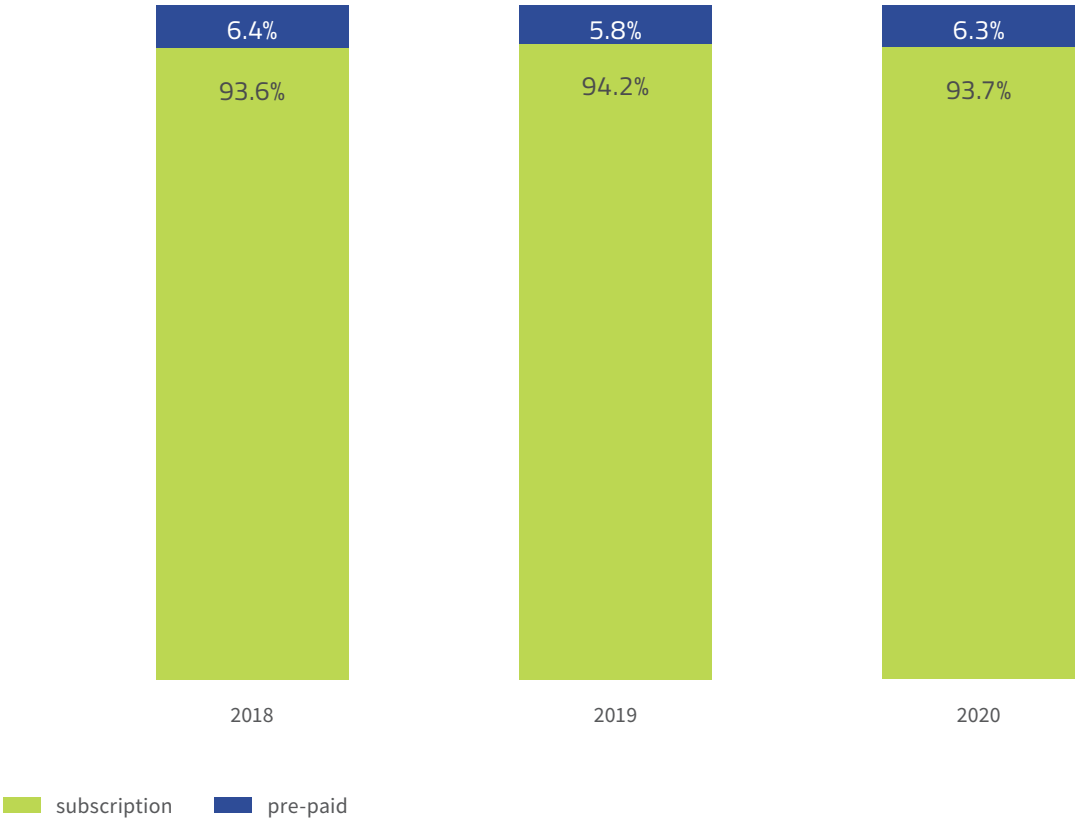


Source: UKE

VoIP telephony revenues were derived mainly from subscription offers that in 2020 accounted for 93.7% of all VoIP services. Pre-paid service revenues accounted for just 6.3%, even though these users amounted to 26.1% of all VoIP users.

93.7% revenues from subscription services

Chart 41. **Share of subscription and pre-paid services in revenues from VoIP telephony services**



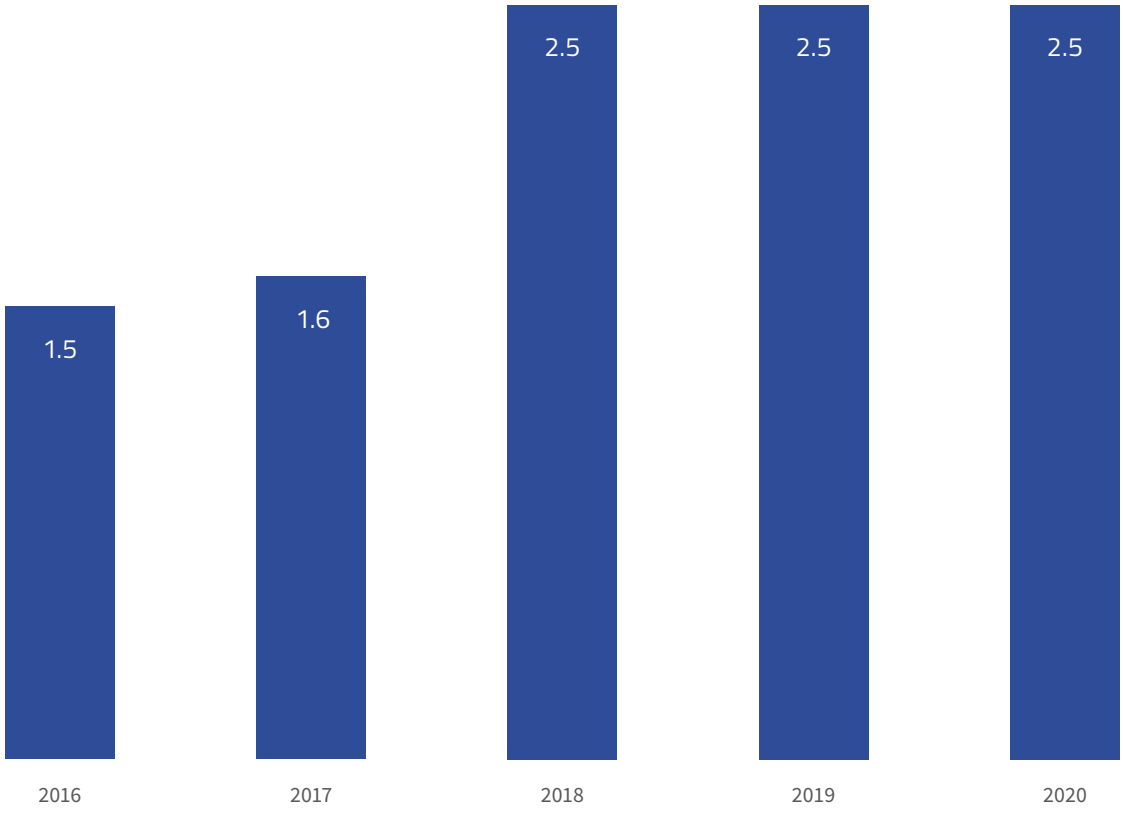
Source: UKE

2.2.3. USERS

VoIP has gained importance in recent years, especially in the business segment. however the market appears to be saturated with the service and the pace of change slowed down.

In the last three years, there was no significant change in the number of VoIP users, which stayed at a similar level of about 2.5 million. In 2020, an increase of merely 0.8% was noted compared to 2019.

Chart 42. **Number of VoIP service users (in millions)**



Source: UKE

In the individual customers' segment, there was a slight downward trend. On the other hand, the number of business clients increased, and their share in the total number of VoIP users has been growing. In 2020, the increase of business users was 10.4%. They accounted for 18.8% of all VoIP users, which is 1.6 percentage points more than the year before.

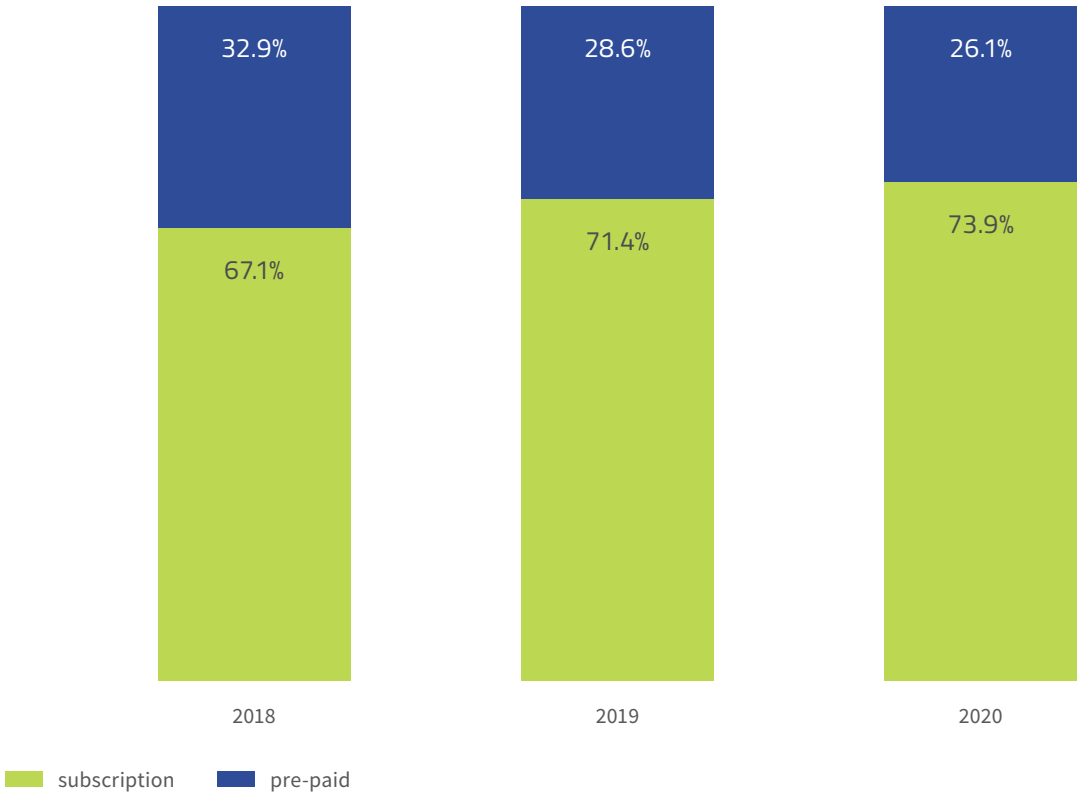
The forecasts for the business market are not particularly optimistic either. PMR[10] estimates that over the next four years, the dynamic of VoIP services will gradually decline as the market becomes saturated and business users no longer see the need to use them.

2.5 million VoIP user

The majority of VoIP users (73.9%) used services provided as a subscription. The share of pre-paid users is declining with each year. In 2020, it was 26.1%.

73,9% users using VoIP subscription services

Chart 43. **Share of subscription and pre-paid services in the total number of VoIP users**



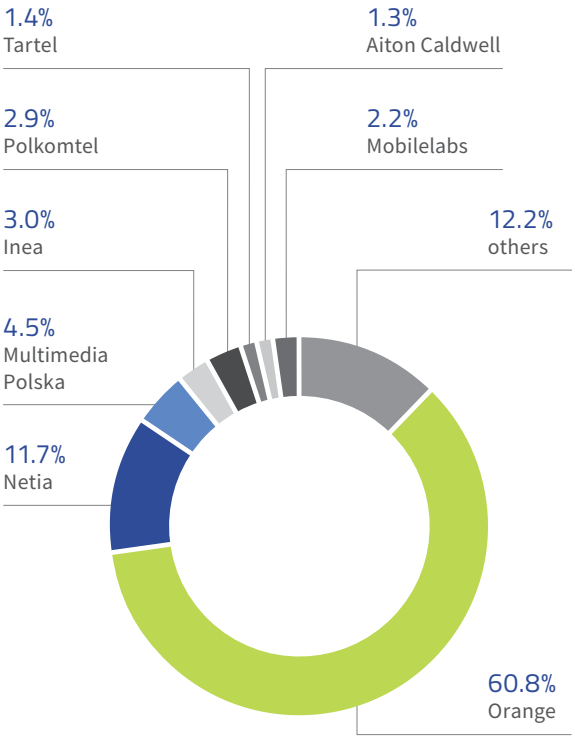
Source: UKE

[10] PMR, The impact of the COVID-19 pandemic on the telecommunications market in Poland in 2020.

The VoIP subscription services market was still dominated by Orange Polska, whose share increased by 1.6 percentage points to 60.8%. The runner-up, Netia, provided services to 11.7% of users. Its share has declined by 0.6 percentage points. The share of Multimedia in that market segment similarly decreased, with 4.5% of customers being provided services by that operator.

On the pre-paid VoIP telephony services market, the leader in 2020 was once again Voxnet that serviced 49.6% of customers. Its share decreased by 3.1 percentage points. A slightly smaller number of users favoured Galena, its market share increasing from 44.7% to 46.2%. 11 other entrepreneurs provided this type of service, and only Ahmes, Easy Call and Pika Polska had more than a 1% market share. The total share of the remaining eight operators was just 0.5%.

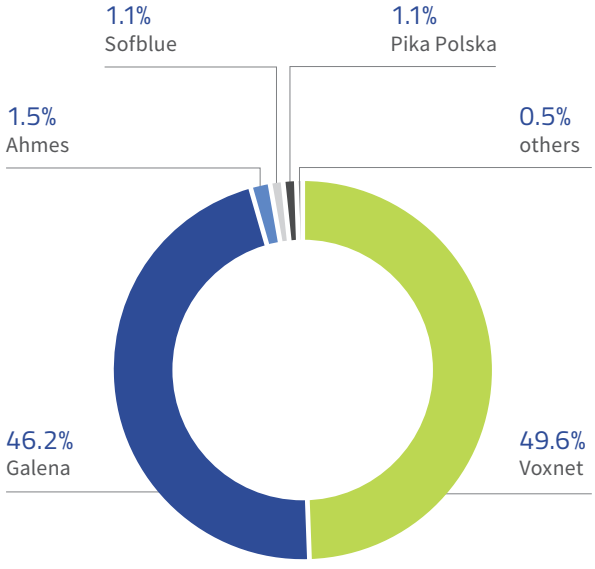
Chart 44. **Shares of operators in the number of VoIP telephony users (subscription)**



Source: UKE

others – enterprises with individual share not exceeding 1%

Chart 45. **Shares of operators in the number of VoIP telephony users (pre-paid scratch cards)**



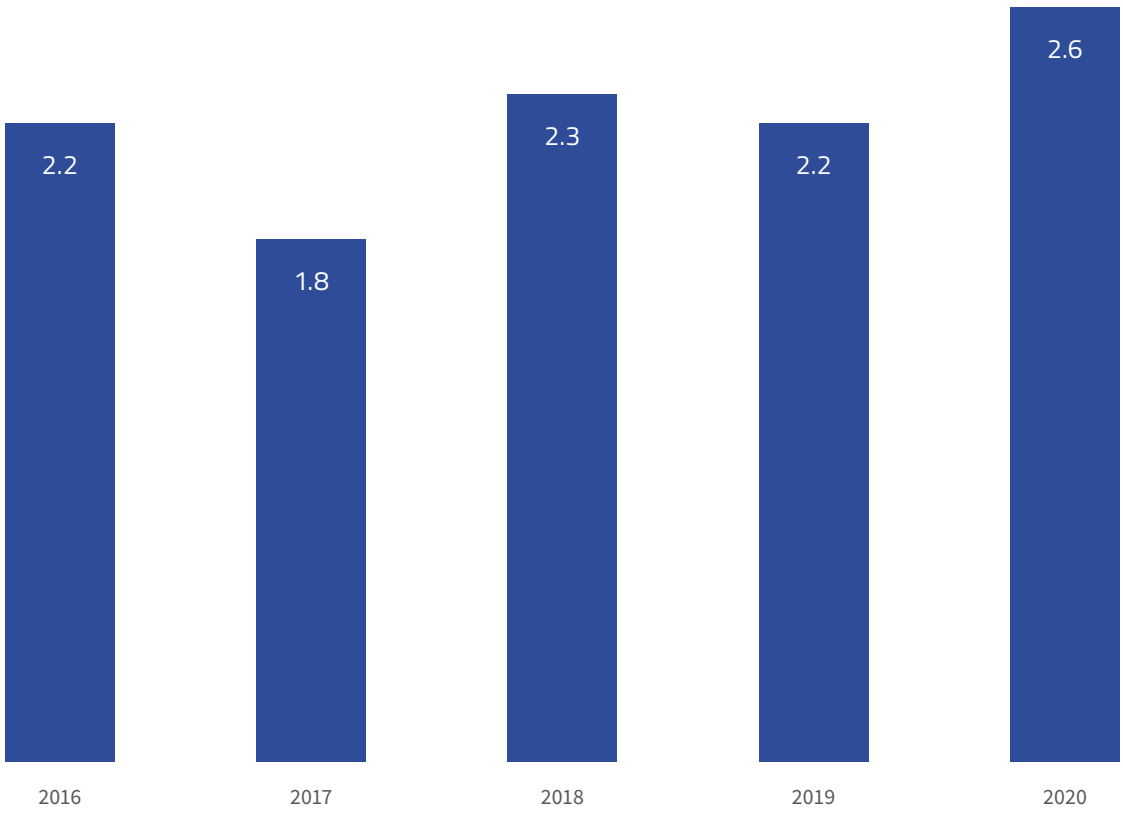
Source: UKE

others – enterprises with individual share not exceeding 1%

2.2.4. TRAFFIC VOLUME

In 2020, the VoIP traffic volume grew by 18% to 2.6 billion minutes. This could have been the result of the COVID-19 crisis that prompted users to turn to telephone calls as work and education was confined to homes and no face-to-face meetings took place.

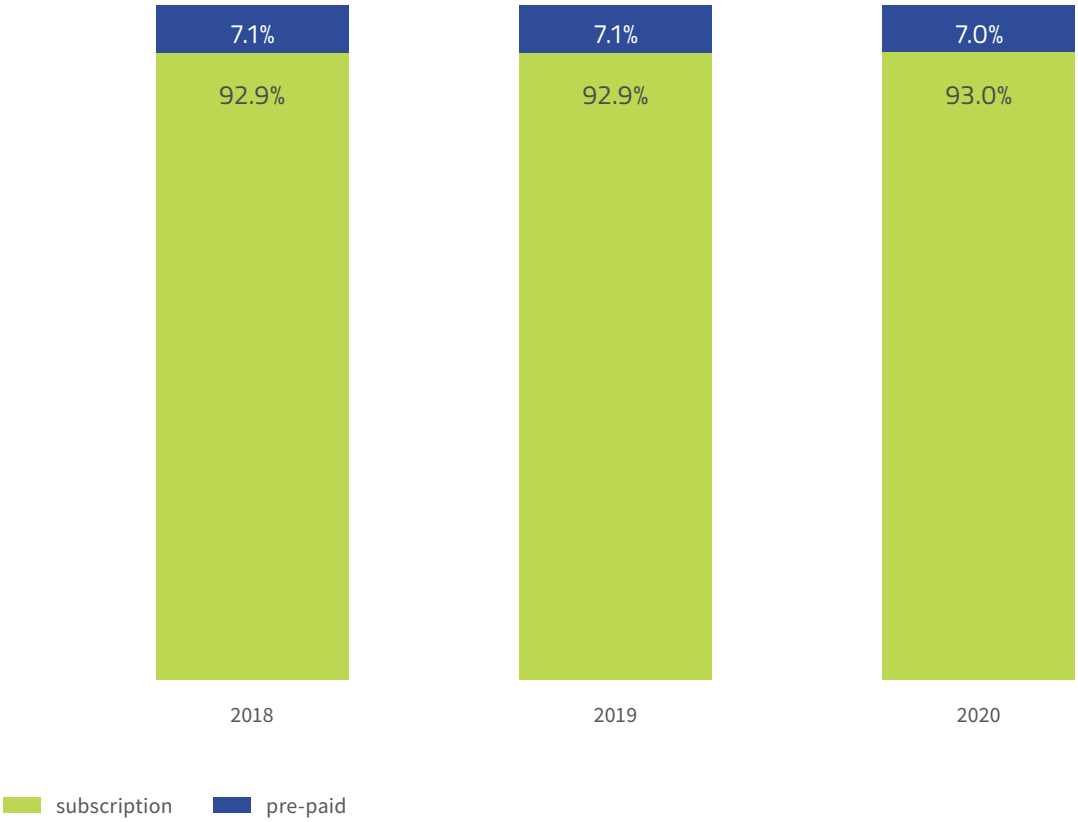
Chart 46. **VoIP traffic volume (in billions of minutes)**



Source: UKE

The traffic structure was virtually unchanged. Almost 93% of VoIP calls, 2.4 billion of minutes, were made as part of subscription services.

Chart 47. **VoIP traffic structure**

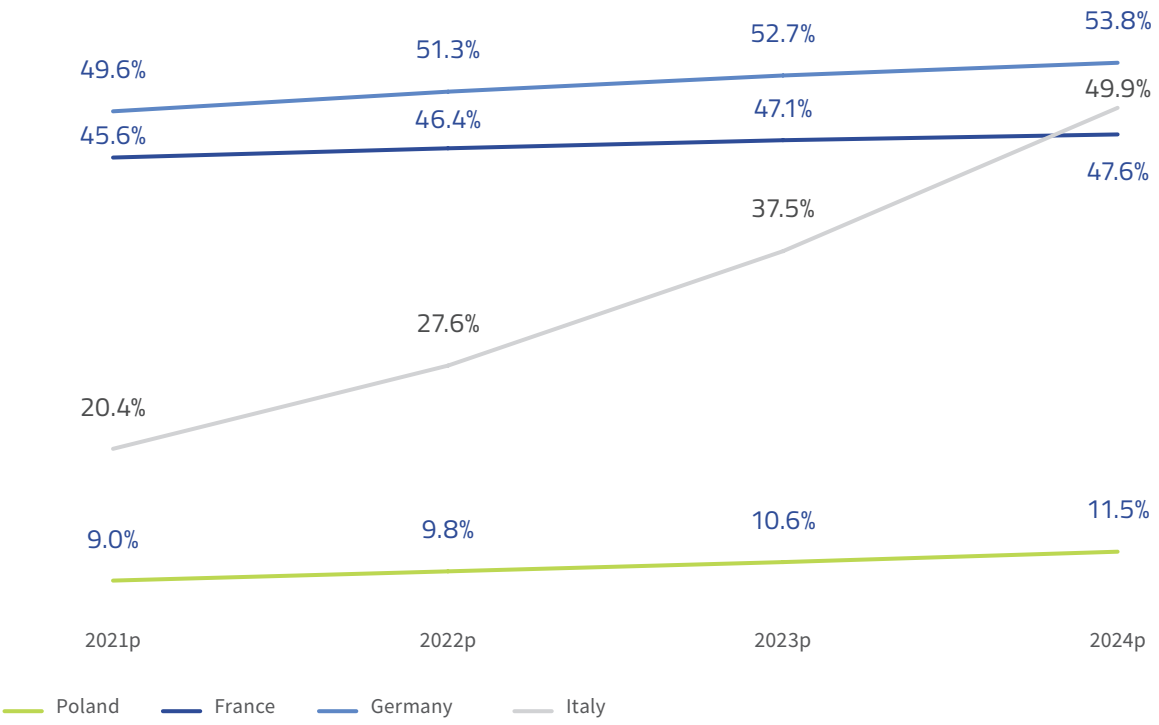


Source: UKE

2.2.5. COMPARISON WITH EUROPEAN COUNTRIES

Compared to other European Union countries, Poland cannot boast too large a penetration of VoIP telephony services. Poland's data contrasted with France, Germany or Italy show that VoIP is not overly popular in Poland. According to IDATE estimates, in 2021 in Poland, VoIP services will be used by 9% of the population. But, in 2024, the percentage of those who use this type of connection should increase to 11.5%. In contrast, for the three above countries the VoIP service penetration in 2024 is predicted to be at the level of 48%-54%.

Chart 48. **Penetration of VoIP telephony service in Poland compared to certain European countries**



Source: UKE

2.3. MOBILE TELEPHONY

2.3.1. GENERAL INFORMATION

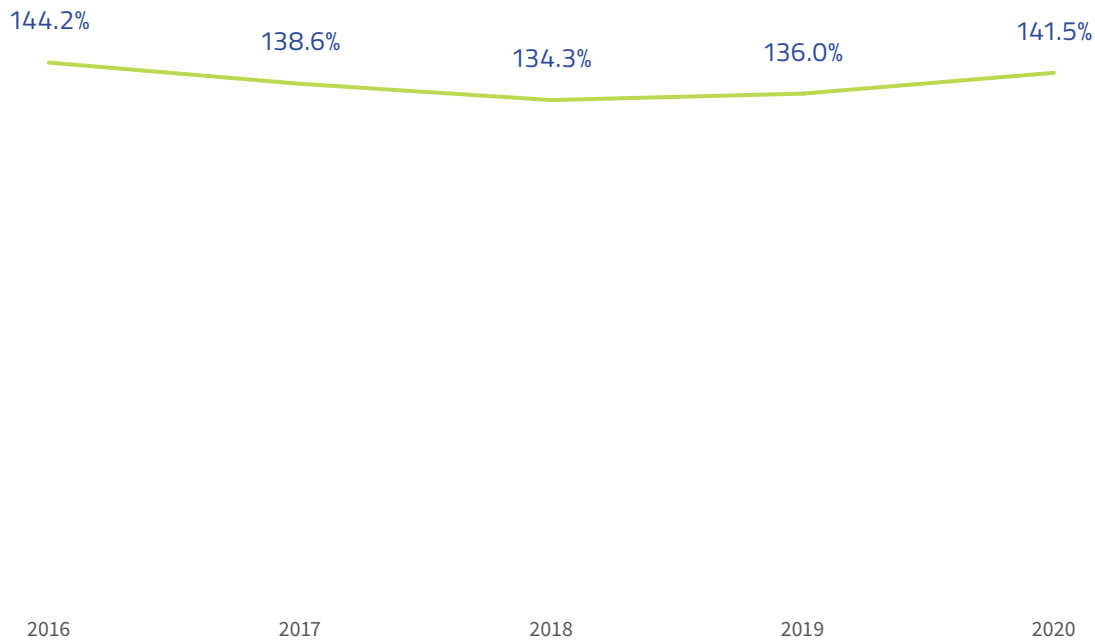
At the end of 2020, 103 telecommunication enterprises were active in the Polish mobile telephony market.

Among companies operating in this market, five had their own infrastructure (MNOs), while 98 used the network of a selected technological partner. As in the previous year, the MNOs were: Orange Polska S.A., Polkomtel Sp. z o.o., P4 Sp. z o.o., T-Mobile Polska S.A. and Aero 2 Sp. z o.o.

At the same time, the penetration of mobile telephony services recorded an increase to 141.5%[11] (by 5.5 percentage points compared to 2019).

141.5% penetration
of mobile telephony services

Chart 49. **Penetration of mobile telephony services in Poland**



Source: UKE

[11] Penetration over 100% is the result of some users possessing more than one SIM card.

2.3.2. REVENUES

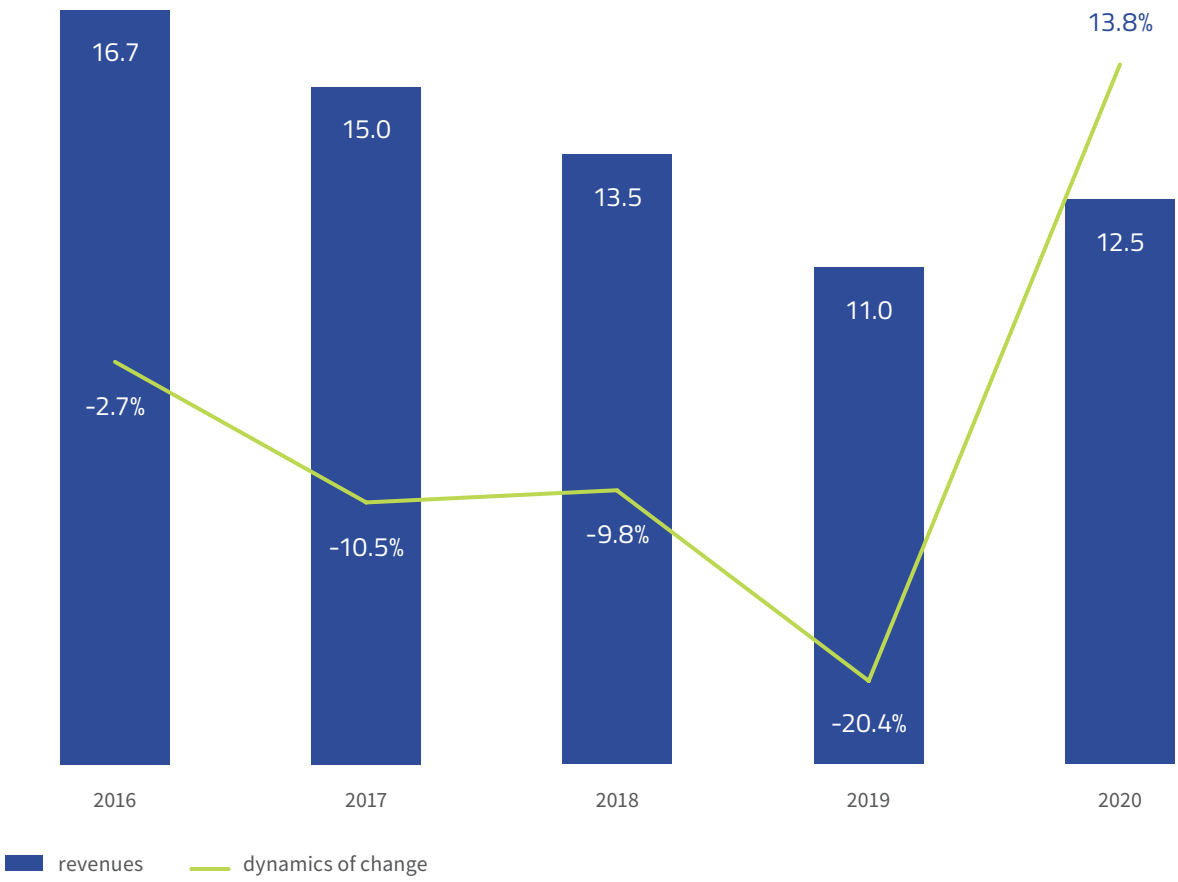
2020 halted the downturn in revenues from mobile telephony services, which was apparent for some years. The total revenues of operators in 2020 amounted to PLN 12.5 billion and were 13.8% higher in comparison with the previous year.

An increase was noted in revenues from subscription fees (by 19.6%). Revenues from individual types of services were, however, further decreasing. A decline of revenues from voice calls by 30.5% was observed. For text messages, revenues were lower by 21.2%, while multimedia messages generated 3% less revenues.

The increase in revenues from the mobile telephony market showed that this market was a very important area of telecommunication activities since it accounted for 30.6% of revenues achieved by the entire telecommunications market in Poland.

30.6% share of mobile telephony in revenues of the telecommunications market

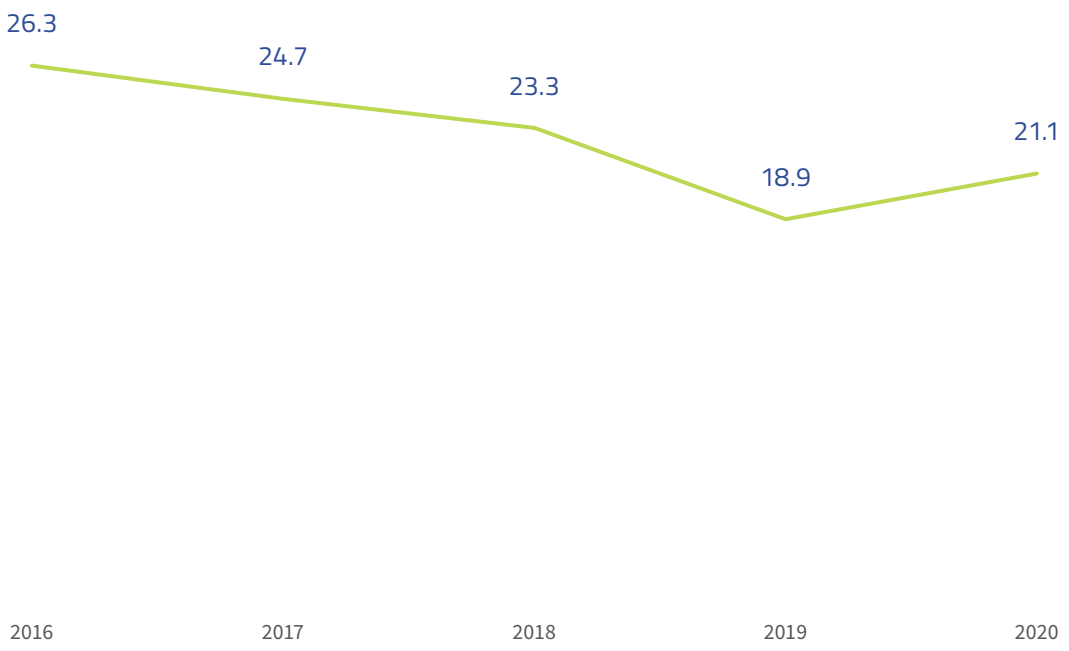
Chart 50. **Revenues from mobile telephony service (PLN million) and the dynamics of change**



Source: UKE

Following a rather drastic decline in 2019, the monthly average revenue per user rose to PLN 21.1.

Chart 51. **Average monthly revenue per subscriber (ARPU, PLN)**



Source: UKE

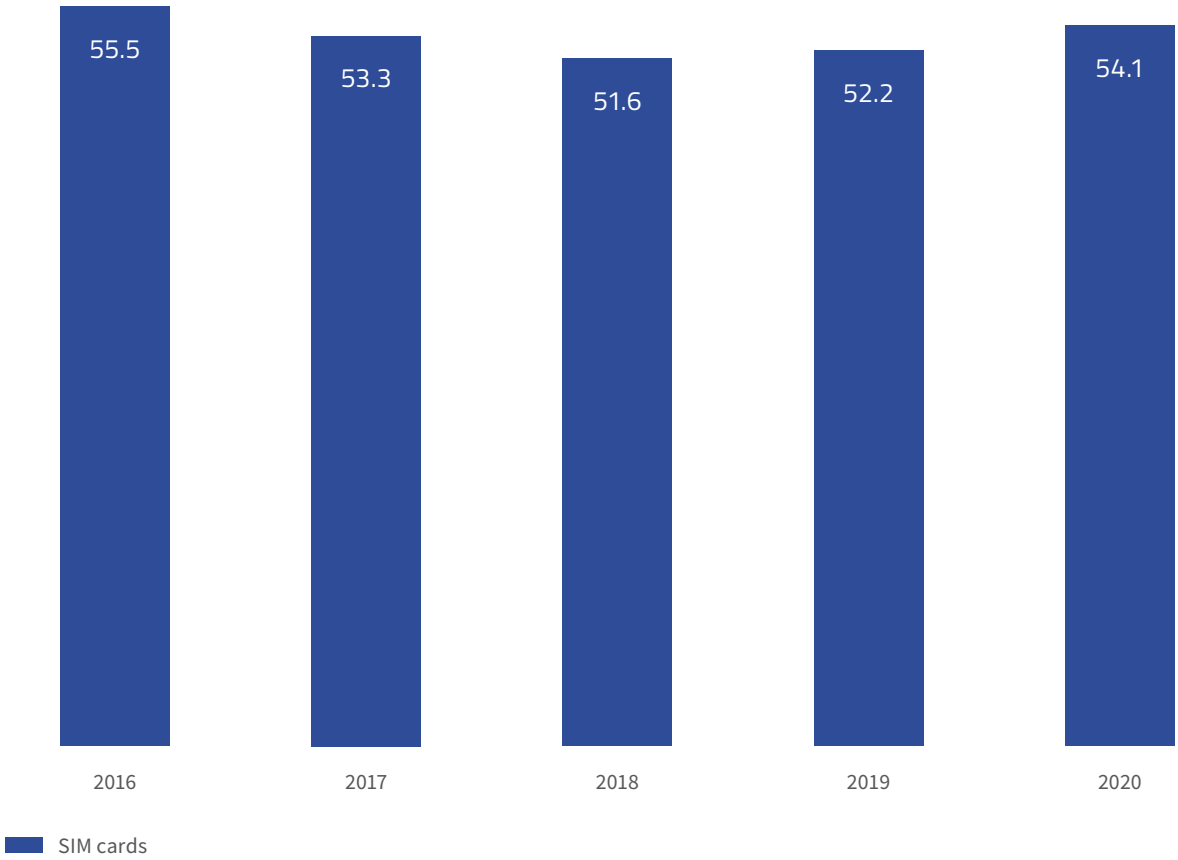
2.3.3. USERS

At the end of 2020, unlike in the few previous years, growth in the number of mobile telephony users was observed. The total number of active SIM cards in 2020 was 54.1 million, which means an increase of o 3.7% compared to 2019.

The number of M2M cards rose by 25.5% and reached the level of 4.8 million. Such cards accounted for 8.9% of all SIM cards.

54.1 mln SIM cards

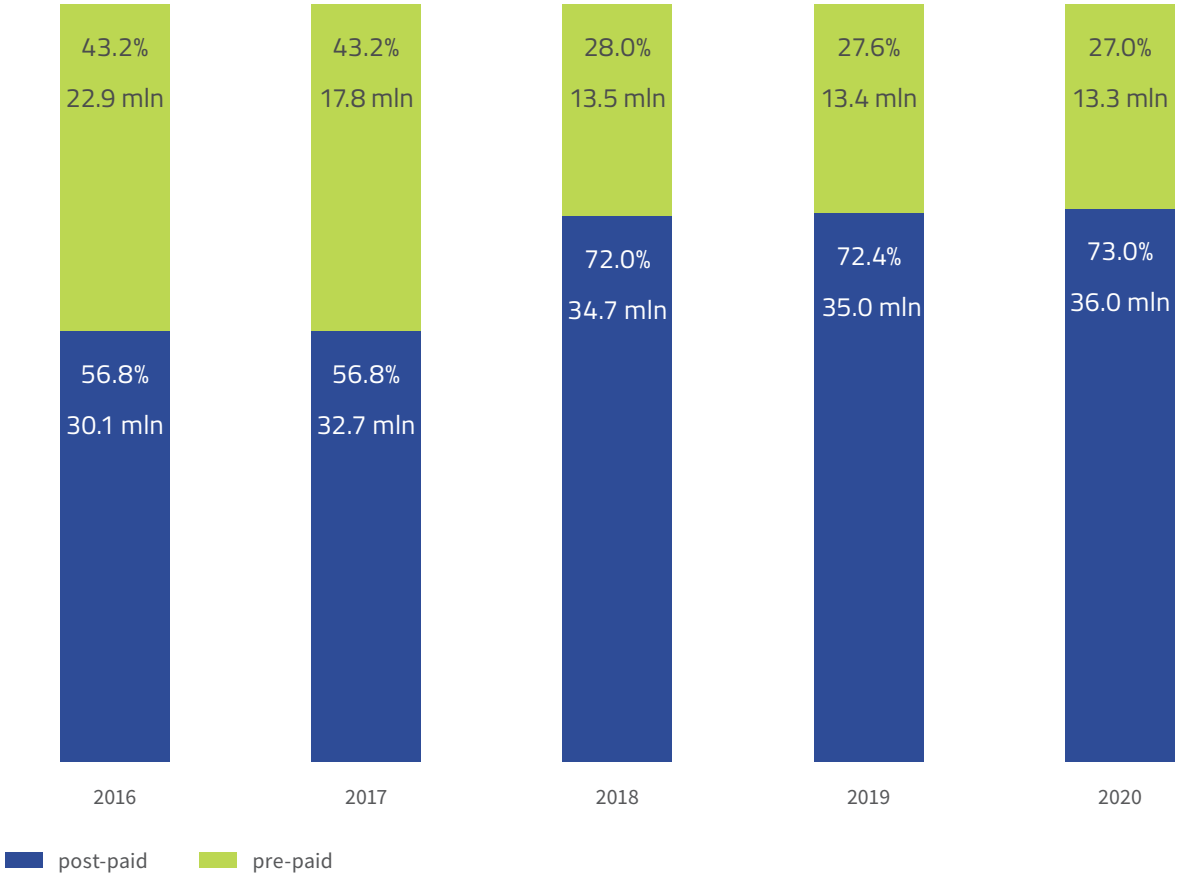
Chart 52. **The number of users (SIM cards in millions) of the mobile telephony market in Poland**



Source: UKE

Since compulsory registration of SIM cards was introduced in 2016, the number of pre-paid users declines each year as they switch to subscription services. At the end of 2020, the number of pre-paid SIM cards decreased by 0.4% compared to 2019, reaching 13.3 million, a mere 27% of all cards.

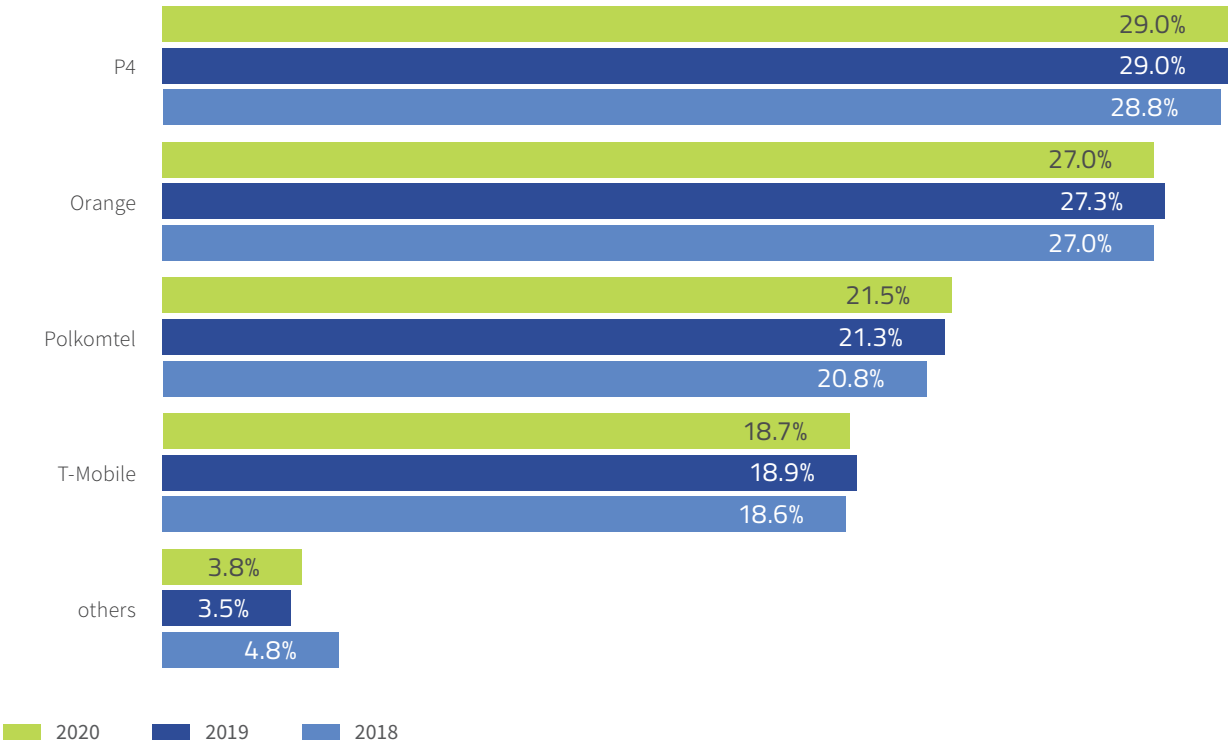
Chart 53. **Share and number of customers (in millions) of pre-paid and post-paid services**



Source: UKE

For a few years, the leader in terms of numbers of mobile telephony users has been P4, and this trend was maintained last year. In 2020, the share of P4 was 29%. Second place was, like in the previous year, occupied by Orange Polska (27.0%), Polkomtel came third (21.5%), while T-Mobile ranked fourth with a share of 18.7%.

Chart 54. **Shares of operators in terms of numbers of users**



Source: UKE

others – enterprises with individual share not exceeding 1%

In 2020, the first place in terms of revenues was taken by Orange Polska with a share of 28.3%. It was followed by Polkomtel (24.9%). T-Mobile achieved 24.3% of all revenues from mobile telephony, while P4 came fourth with a market share of 20.2%.

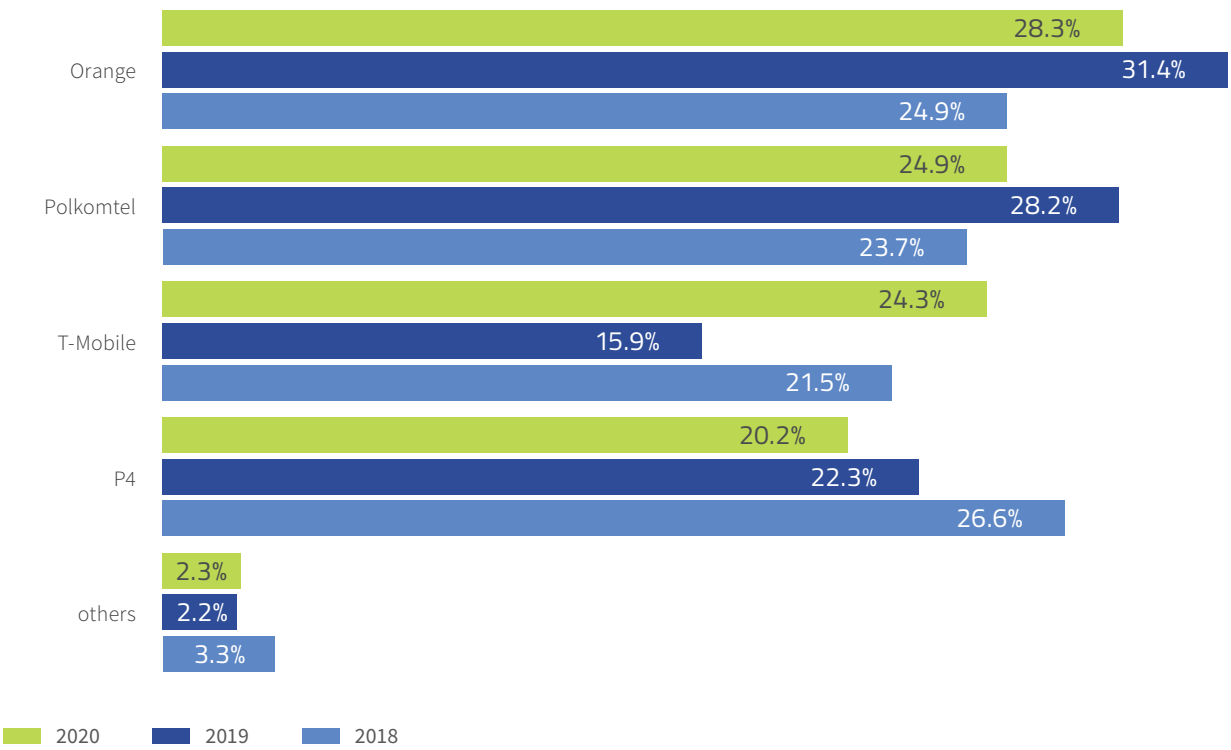
Compared to 2019, all operators noted an increase in their revenues: Orange Polska by 2.4%, Polkomtel by 0.5%, P4 by 3.3%, and T-Mobile by 74.4%. The revenues of other enterprises were on a level similar to the previous year, i.e., 2.3%.

In 2020, the largest share of revenues from text messages sent in mobile networks fell to Orange Polska. That operator's share was 32.4%, 7 percentage points more than in 2019.

Second-ranked P4 had a 25.7% share (increase by 3.9 percentage points), followed by Polkomtel (22.2%). T-Mobile, last year's leader, recorded a 19.1% share.

In 2020, in terms of revenues from sent multimedia messages, Orange Polska again came on top (41.5%). The lower ranks were occupied by P4 (21.6%), Polkomtel (19.8%) and T-Mobile Polska (15.2%). Other enterprises obtained 1.9% of revenues from sent multimedia messages.

Chart 55. **Shares of operators in terms of revenues obtained**



Source: UKE

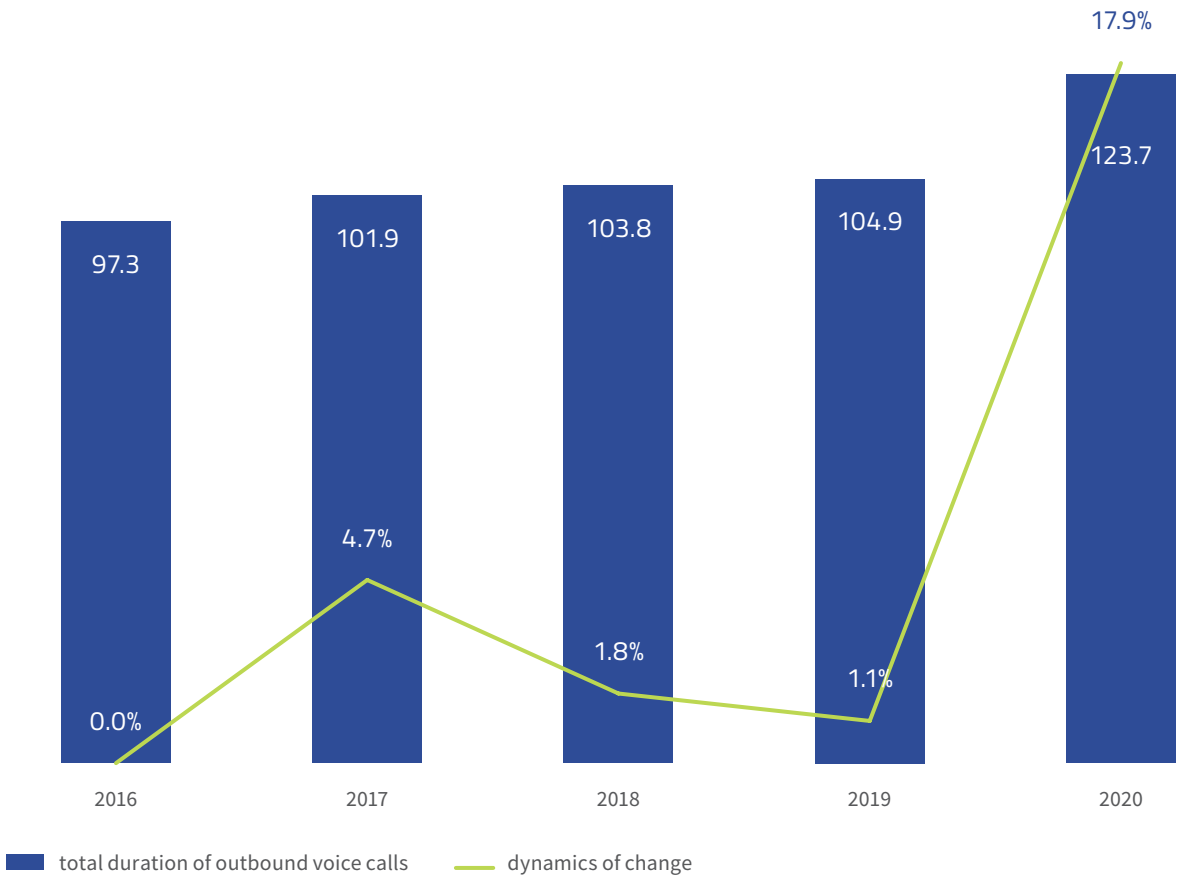
others – enterprises with individual share not exceeding 1%

2.3.4. SERVICE VOLUME

In 2020, the duration of outbound calls increased by 17.9%. Users of mobile telephony made calls, whose total duration was 123.7 billion minutes. The average for each inhabitant of Poland was 3,232 minutes per year, 500 minutes more than in 2019.

3,232 minutes
average duration of calls throughout the year

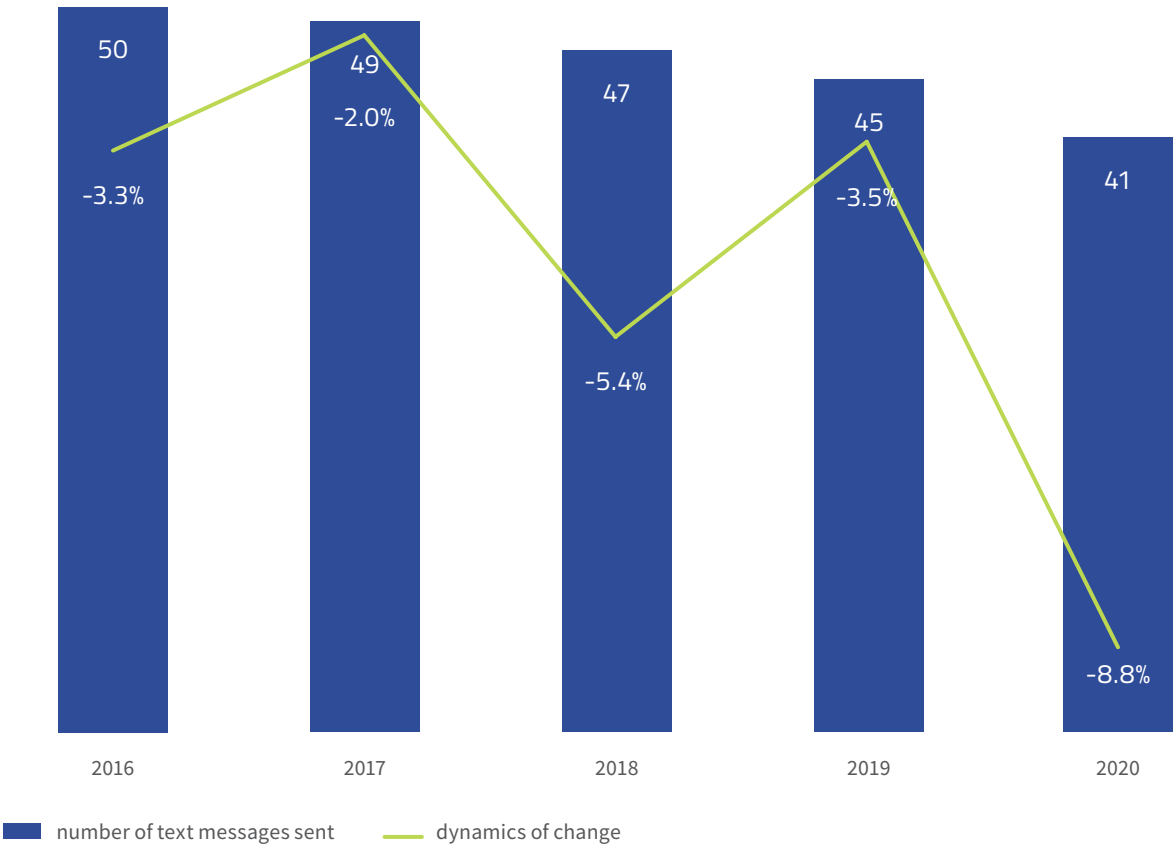
Chart 56. **Total duration of outbound voice calls and the dynamics of change**



Source: UKE

In 2020, 41 billion text messages were sent, a decrease of 8.8% compared to the previous year. This means that each inhabitant of Poland sent more than 89 text messages per month on average. The resulting data show that traditional text messages are increasingly superseded by instant messaging or websites.

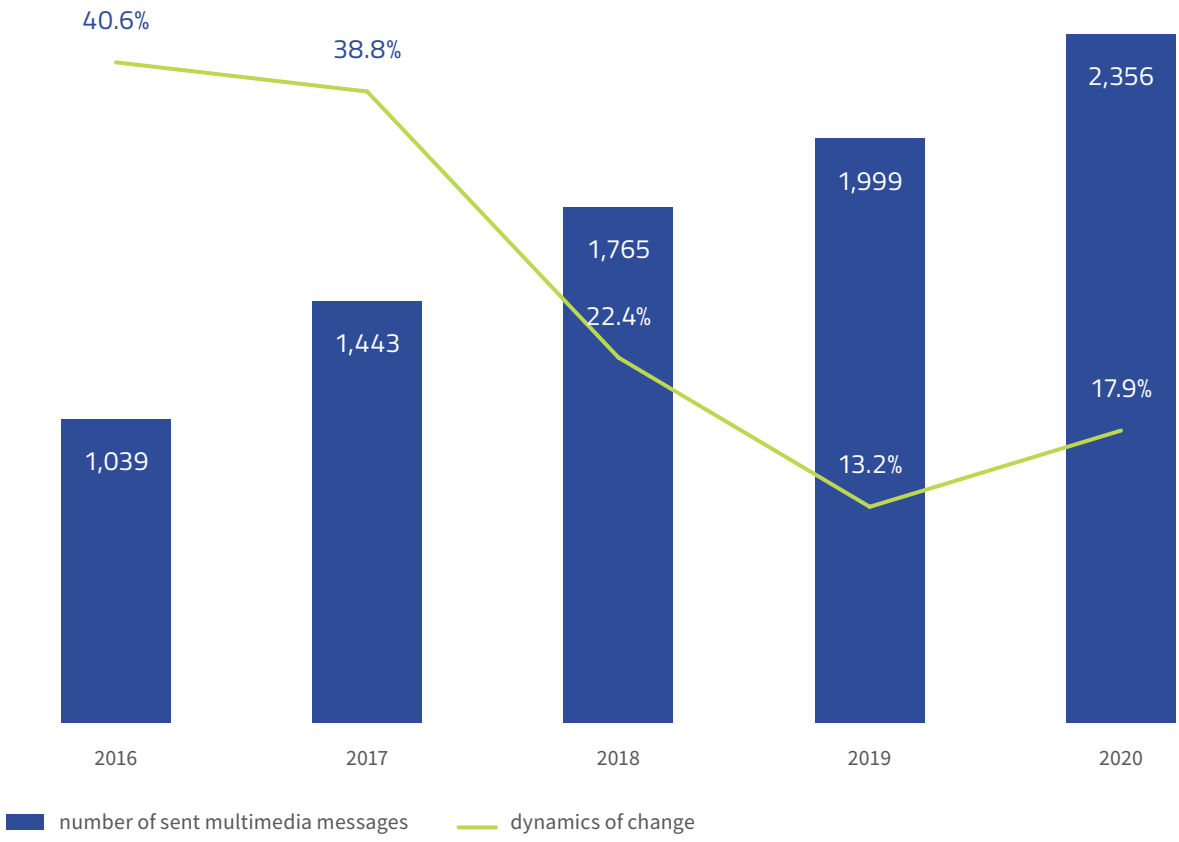
Chart 57. **Total number of text messages sent (in billions) and the dynamics of change**



Source: UKE

The popularity of multimedia messages kept on growing. In 2020, users sent almost 2.4 billion of them, 17.9% more than in the previous year. This meant 5 multimedia messages per month per inhabitant of Poland on average.

Chart 58. **Number of multimedia messages sent (in millions) and the dynamics of change**

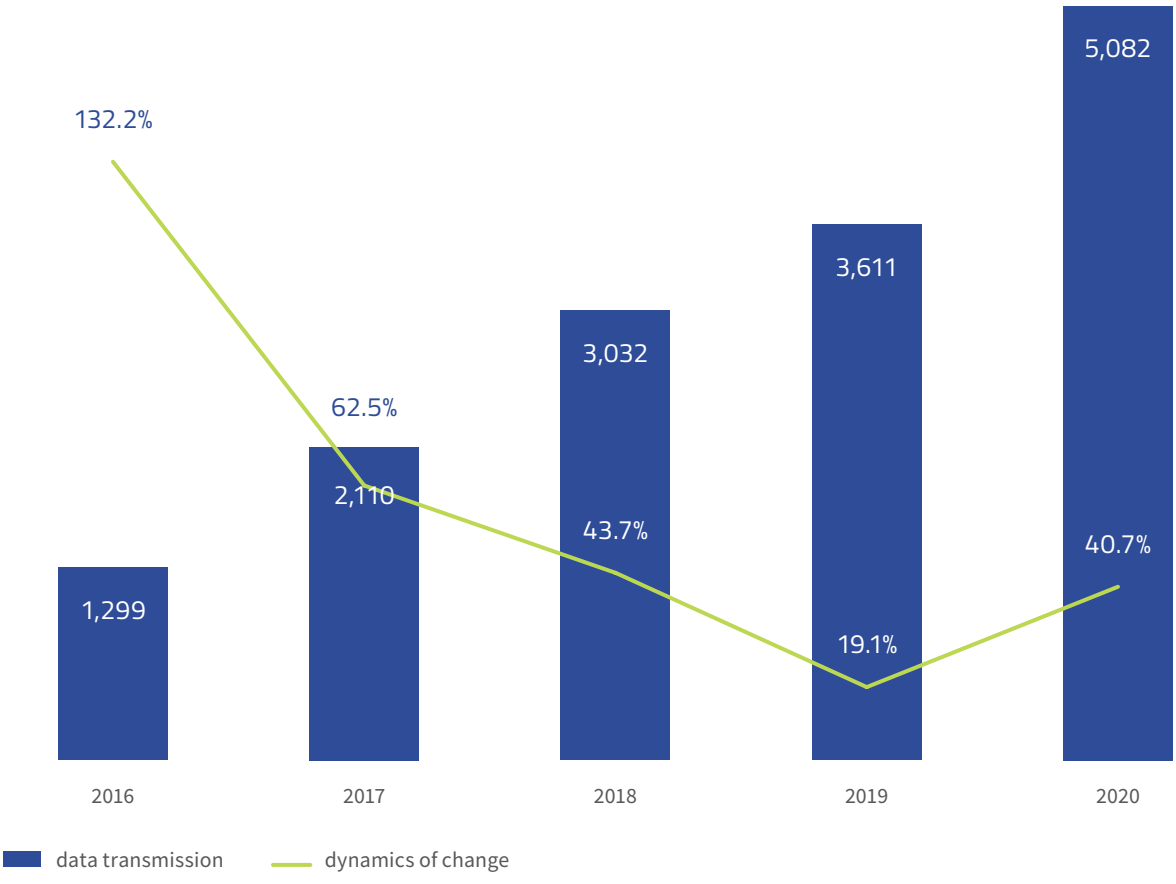


Source: UKE

The transmission of data in mobile networks has for a few years been the most dynamically growing service.

In the last year, a total of 5,082 PB of data was sent, a result almost 40.7% better than in 2019. The average for one inhabitant of Poland was 133 GB.

Chart 59. **Data transmission volume (PB)* and the dynamics of change**



Source: UKE

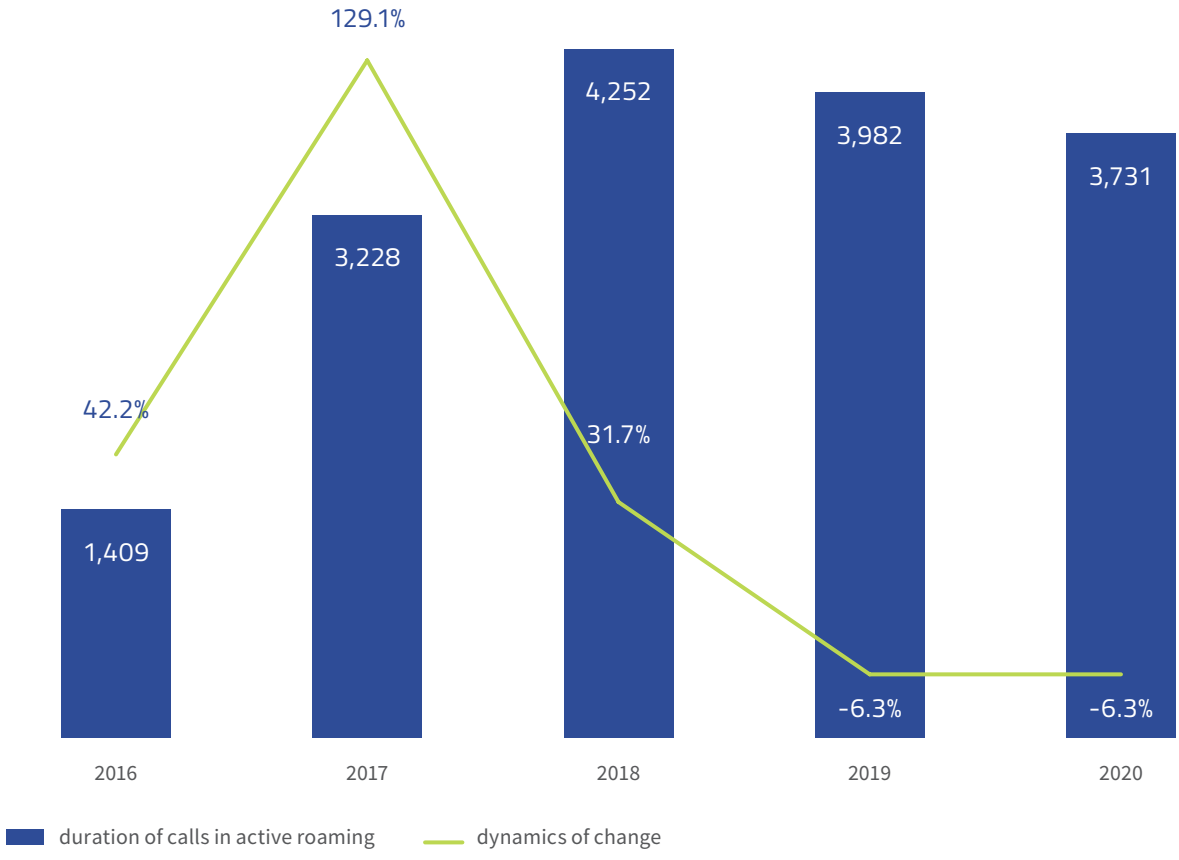
* Data transmission details provided as part of form F04 *Retail services provided to end users in the mobile public telecommunication network*

2.3.5. ROAMING

In 2020, roaming services were far from popular. Due to the pandemic and resulting travel restrictions, a decrease in roaming voice calls was noted. The total duration of voice calls made (initiated) by Poles abroad via the roaming service was 3.7 billion minutes, 6.3% less compared to 2019.

6.3% lower duration of roaming calls

Chart 60. **Total duration of outbound voice calls in the roaming service (in billions of minutes)**



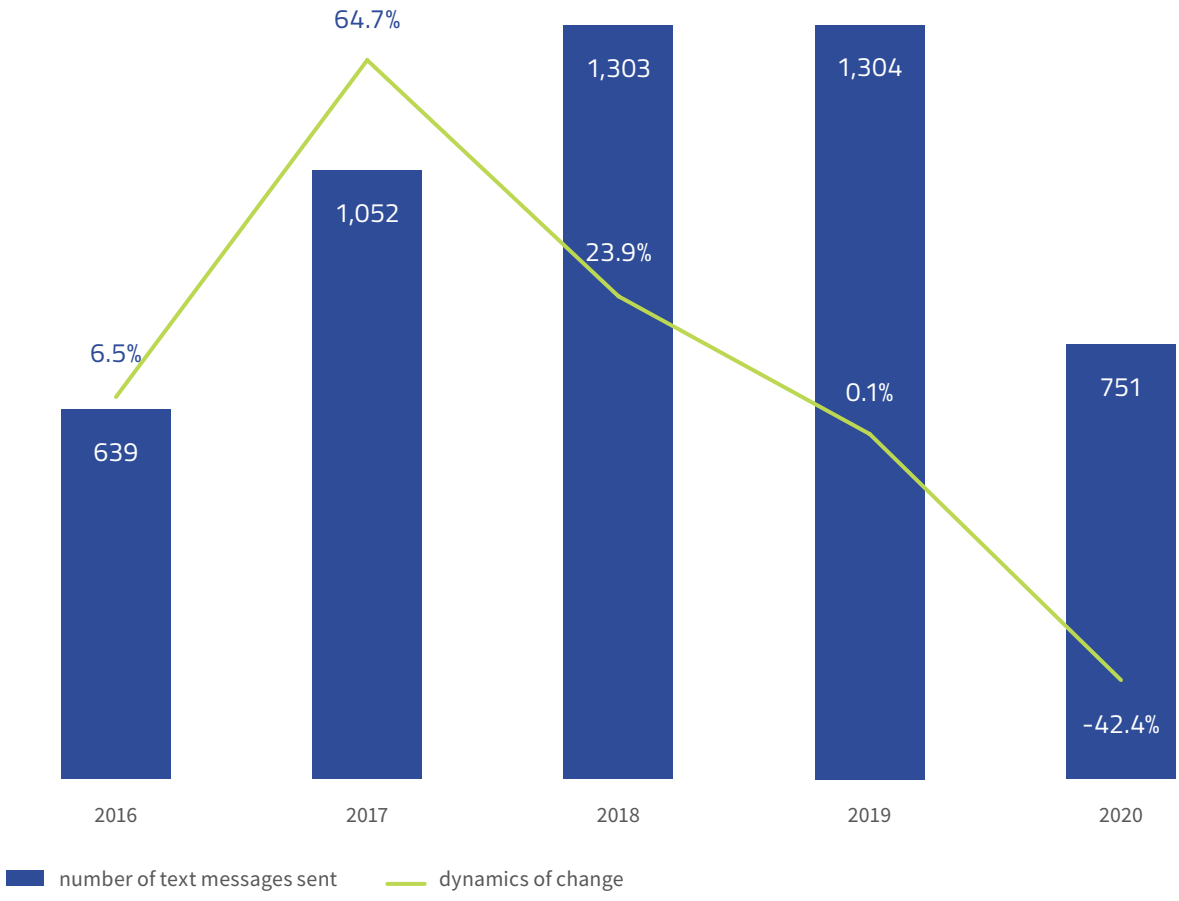
Source: UKE

Subscribers of Polish cell networks using the roaming service sent 0.8 billion text messages, 42.4% less than in the previous year.

0.75 billion

text messages sent using the roaming service

Chart 61. **Total number of sent text messages in active roaming (in millions)**

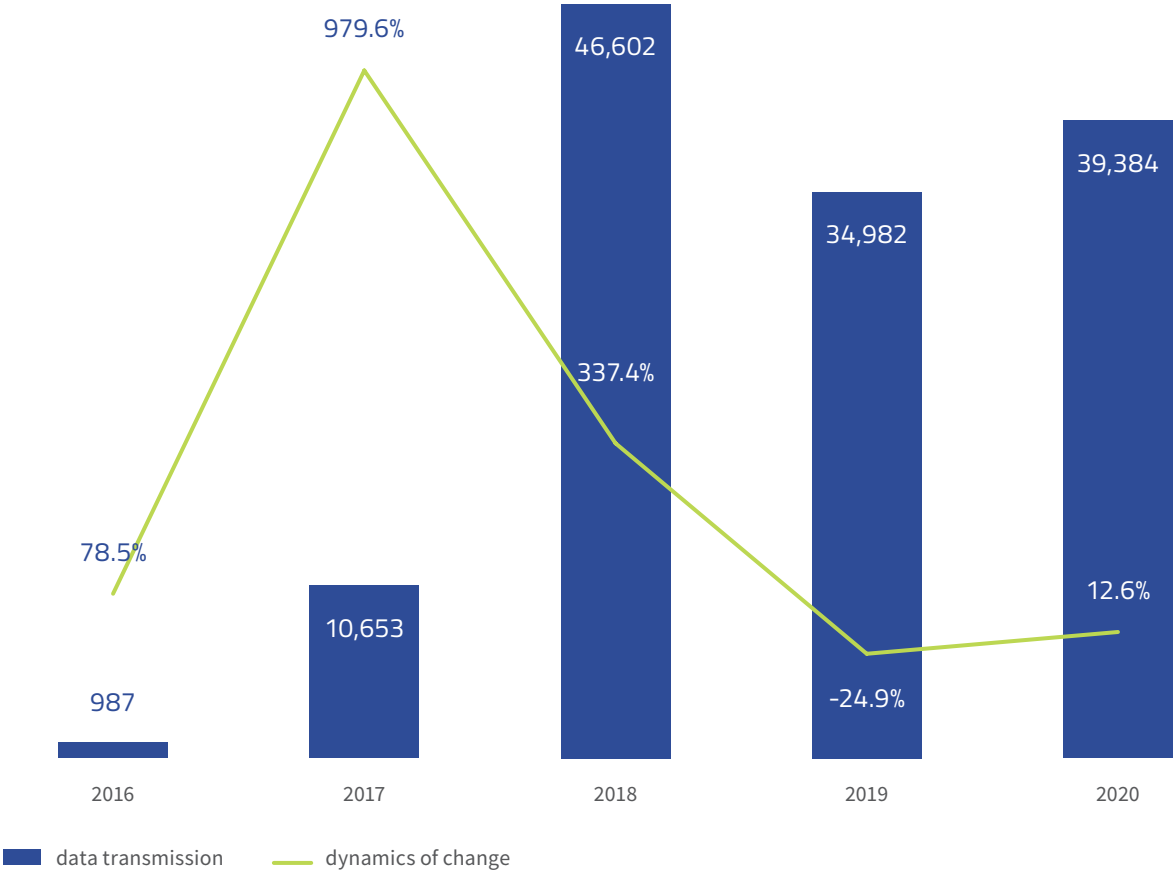


Source: UKE

The only roaming service whose volume increased in 2020 was data transmission (by more than 12.6% compared to the previous year).

12.6% more data transmitted using the roaming service

Chart 62. **Total data transmission volume using active roaming services (TB)**



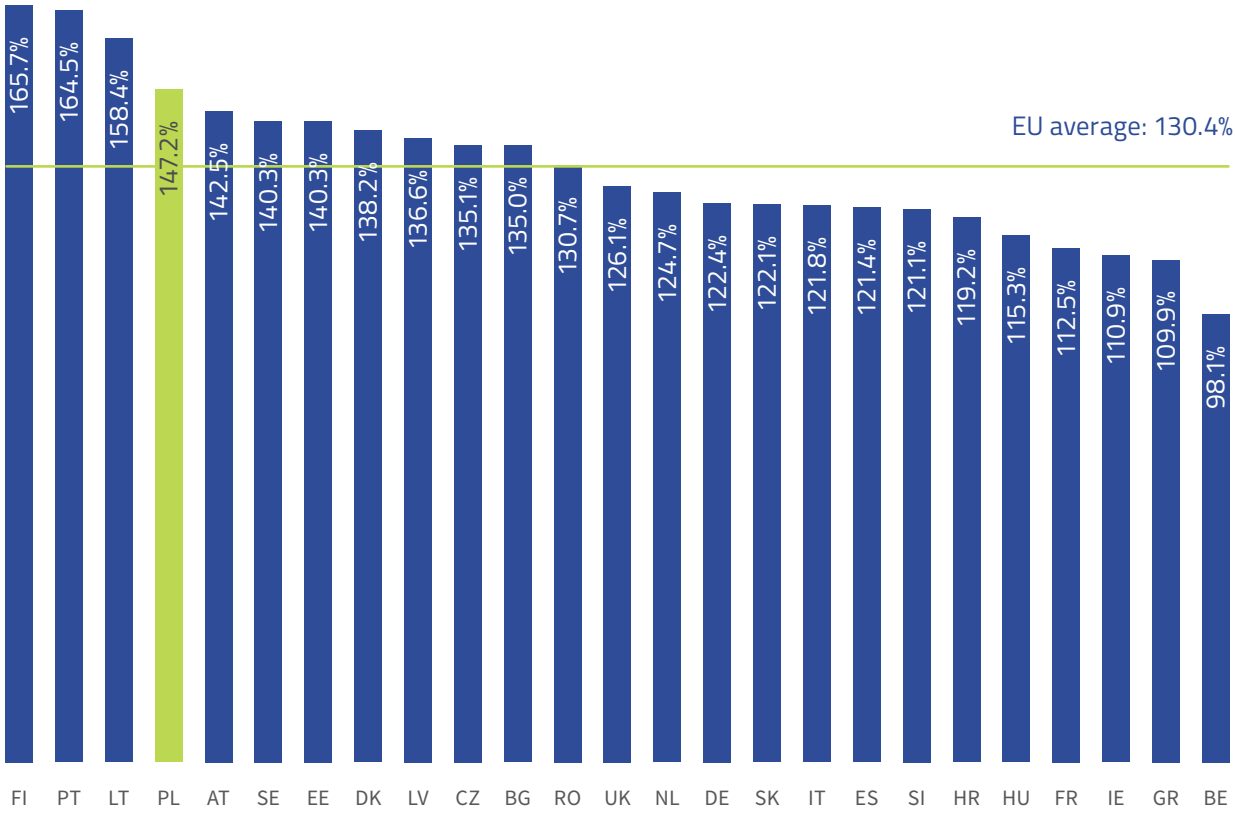
Source: UKE

2.3.6. COMPARISON WITH EUROPEAN COUNTRIES

According to Analysys Mason data, the average penetration of mobile telephony services in European Union countries in 2020 was 130.4%. Poland's ratio was above the European average, at 147.2%.

Among EU countries, the highest penetration ratios were invariably found in Finland (165.7%), Portugal (164.5%) and Lithuania (158.4%).

Chart 63. **. Penetration of mobile telephony services in selected European countries**



Source: UKE based on the Telecom Market Matrix database, Analysys Mason*

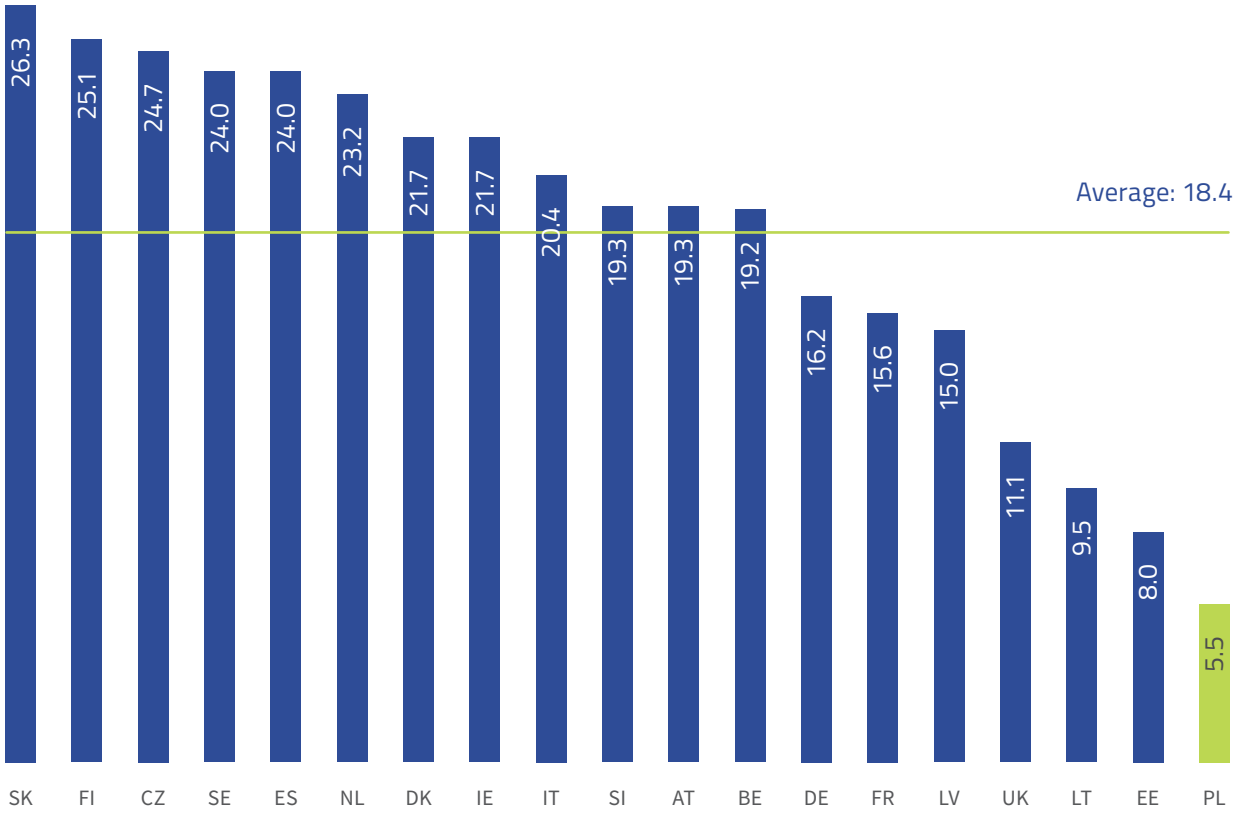
*The methodology adopted by Analysys Mason differs from the UKE methodology, hence the numerical variations.

The list of mobile telephony prices[12] takes into account the monthly cost[13] of services provided to individual users characterised by moderate usage of services.
The benchmark service consisted of unlimited calls and a 5 GB data transmission cap. For each national basket, an average offer from November 2020 was chosen.

Analysis results show that in Poland, the value of the mobile telephony services basket is among the lowest in Europe.

In the case of standard mobile telephony usage, costs borne by customers of a Polish network amounted to EUR 5.5 per month. This means that the offer was lower than the EU average of EUR 18.4.

Chart 64. **Average monthly cost of using mobile network services with moderate services usage (EUR incl. VAT)**



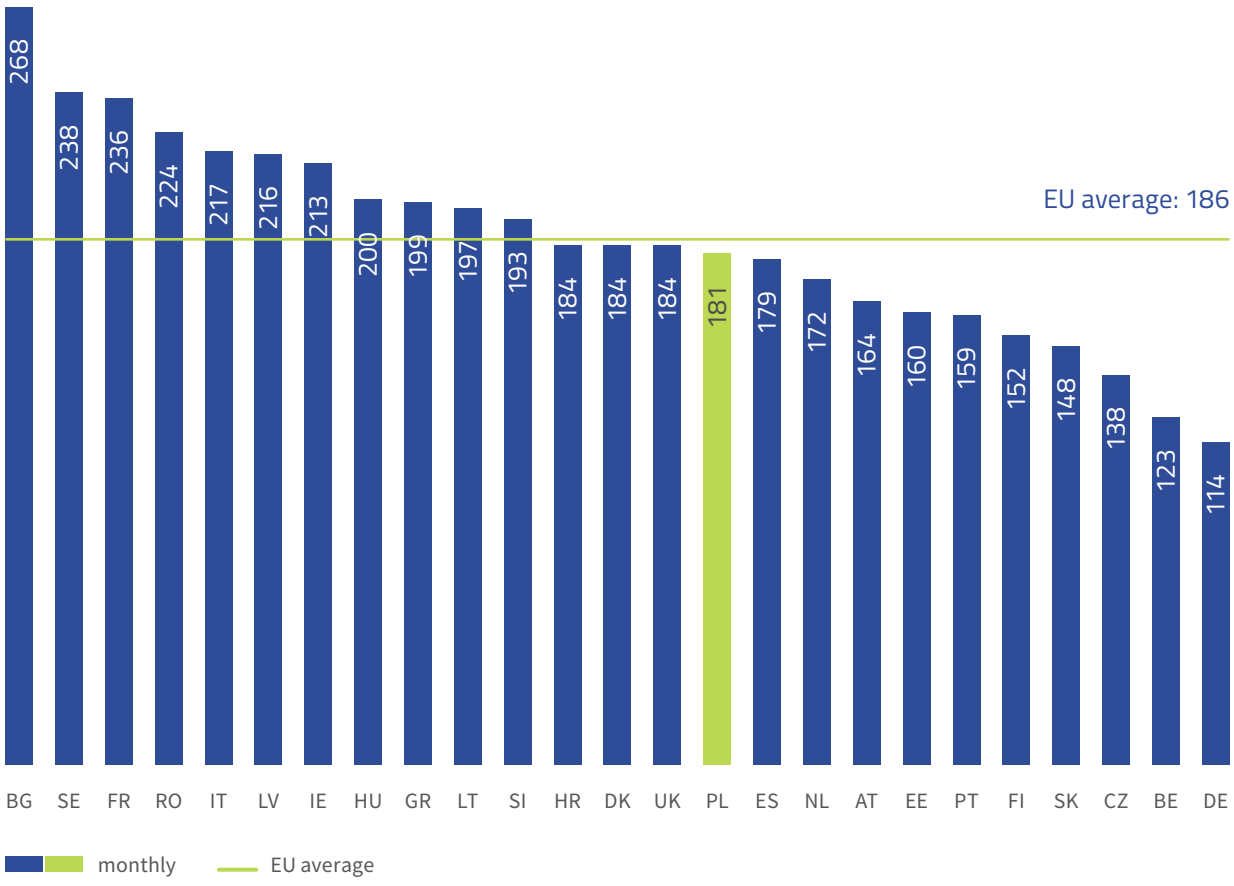
Source: UKE based on the Telecom Market Matrix database, Analysys Mason

[12] The comparison of mobile telephony service usage costs in Poland and other European Union countries was based on data from the OECD Mobile Voice Price Benchmarking price database by Strategy Analytics.

[13] The offers of operators with the lowest prices are taken into account.

In 2020, in terms of the average monthly duration of voice calls per active user, Poland ranked below the average European Union value. According to data presented by Analysys Mason, the calls of Polish subscribers lasted around 181 minutes per month, 5 minutes less than the EU average.

Chart 65. **Average duration of voice calls per one active user per month in selected EU countries (in minutes)**



Source: UKE based on the Telecom Market Matrix database, Analysys Mason*

* The methodology adopted by Analysys Mason differs from the UKE methodology, hence the numerical variations.

3 BUNDLED SERVICES

PART I
THE TELECOMMUNICATIONS MARKET

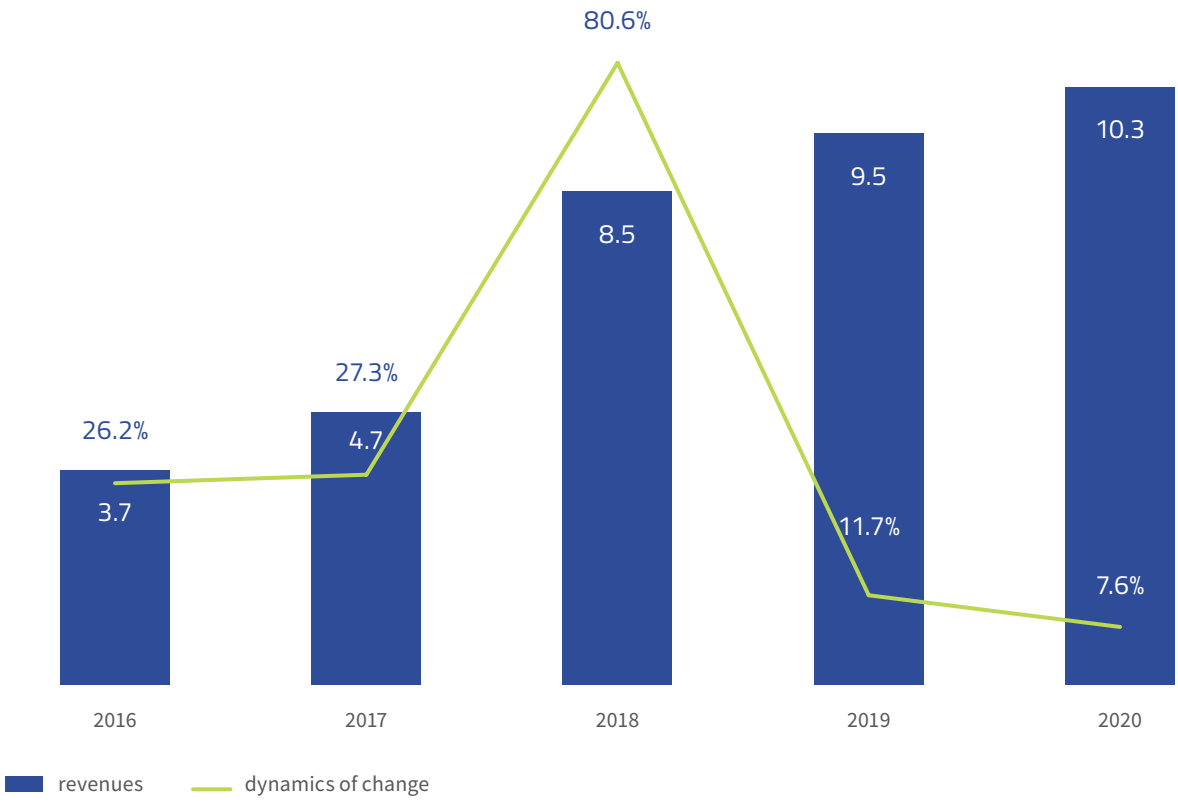
3.1. GENERAL INFORMATION

In 2020, revenues from the bundled services market reached PLN 10.3 billion, an increase of 176% over the last 5 years. The number of users in 2018-2020 remained constant, around PLN 13.7 million. Slightly more than 77% of all users of bundled services chose a double play bundle. The popularity of each bundle did not change appreciably in 2018-2020. Quintuple play bundles were an exception, with users migrating from the "Mobile telephony + fixed-line internet + mobile internet + TV + VoIP telephony" to the "Fixed-line telephony + mobile telephony + fixed-line internet + mobile internet + TV" bundle. The operator with the largest pool of bundled services users was P4 (42.8% of the bundled services market).

3.2. REVENUES

Revenues from the bundled market increased by about 8% compared to 2019, reaching PLN 10.3 billion. This 8% increase value was the smallest over the last 5 years.

Chart 66. **Revenues from the bundled services market (PLN billion) and the dynamics of change**

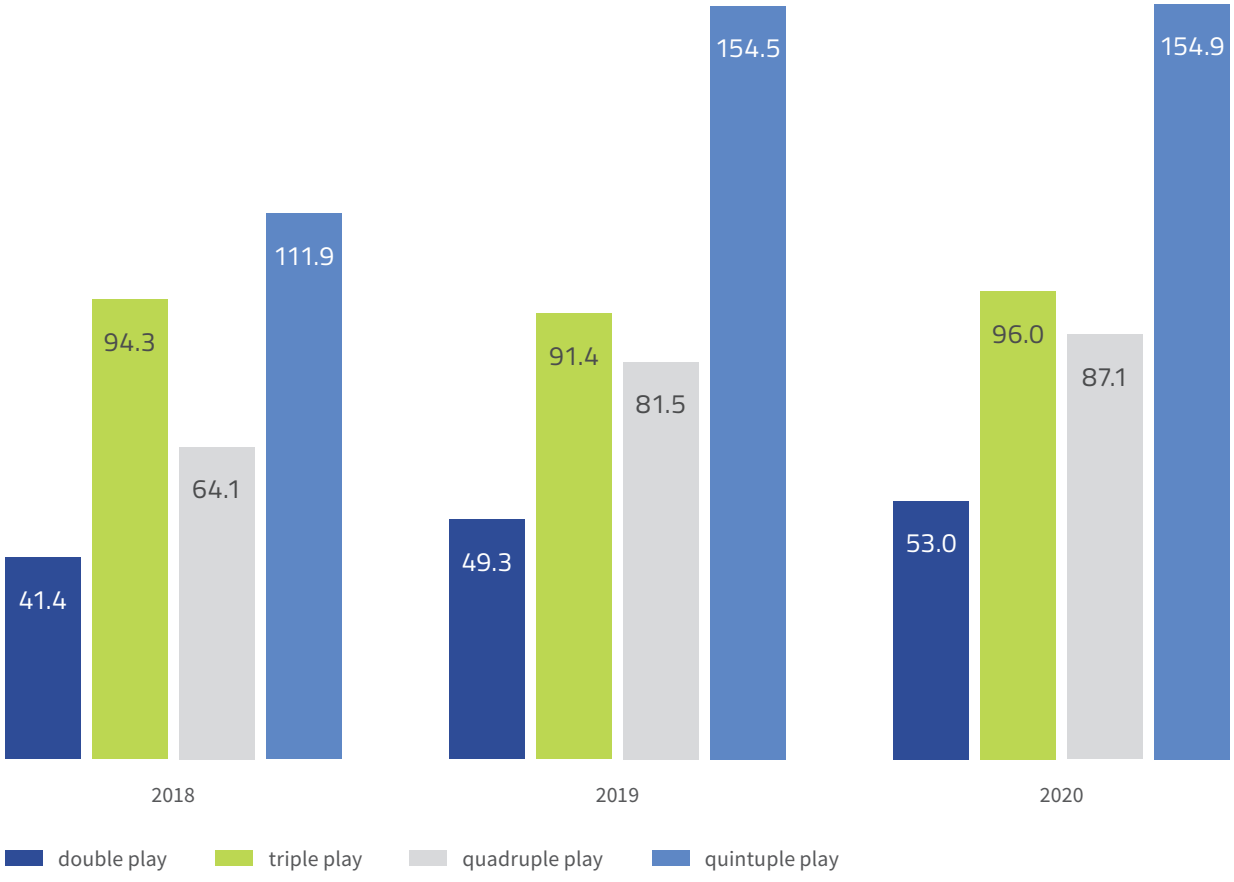


Source: UKE

PLN 10.3 billion revenues from the bundled services market

With each year, the average monthly revenue per subscriber of bundled services increases. For double, triple and quadruple play bundles, a growth of revenue from PLN 3.7 to PLN 5.6 can be observed, when comparing 2019 and 2020 figures. For the quintuple play bundle, revenue per subscriber increased from 2019 to 2020 by a mere PLN 0.4.

Chart 67. **Average monthly revenue per subscriber of bundled services (PLN)**



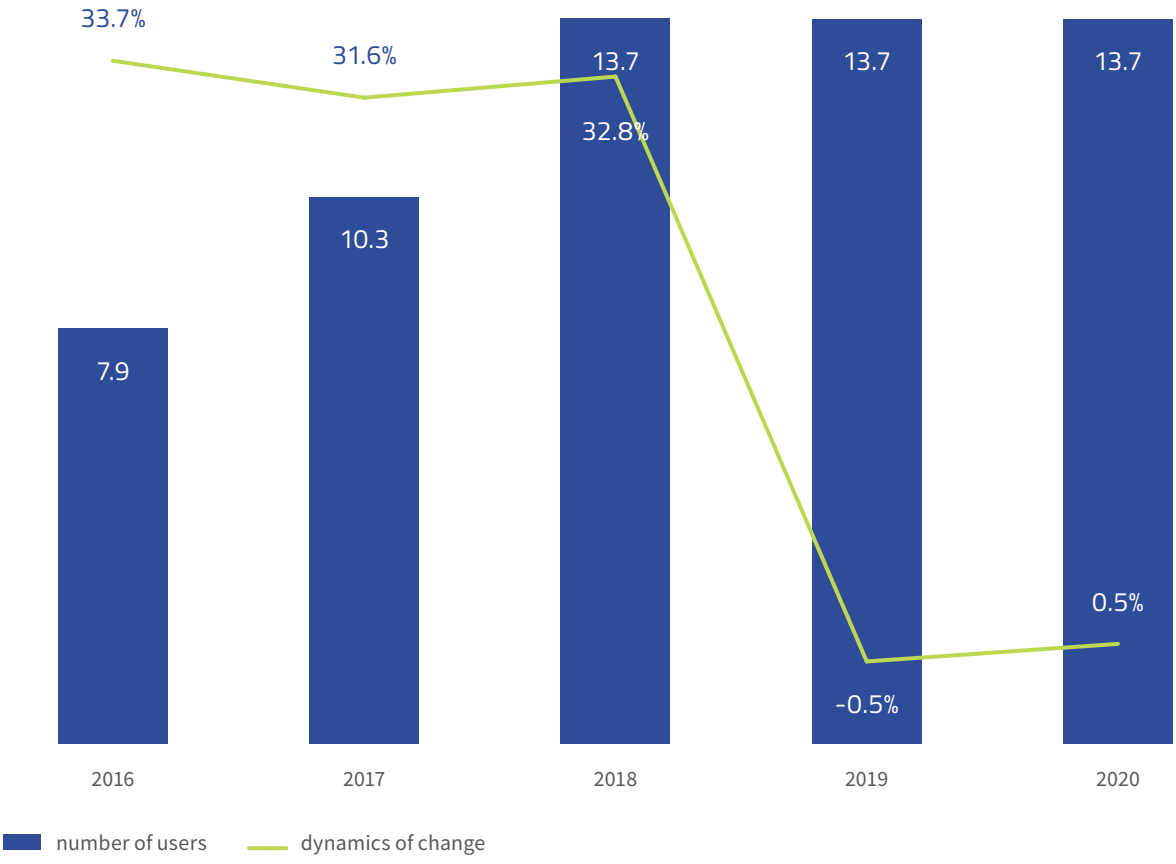
Source: UKE

3.3. USERS

In the last 3 years, the bundled services market changed slightly in terms of the number of users. The difference between the number of subscribers in 2018 and 2020 was just 0.04 percentage points. In 2020, the bundled services market attracted 13.7 million customers.

13.7 mln
users of bundled services

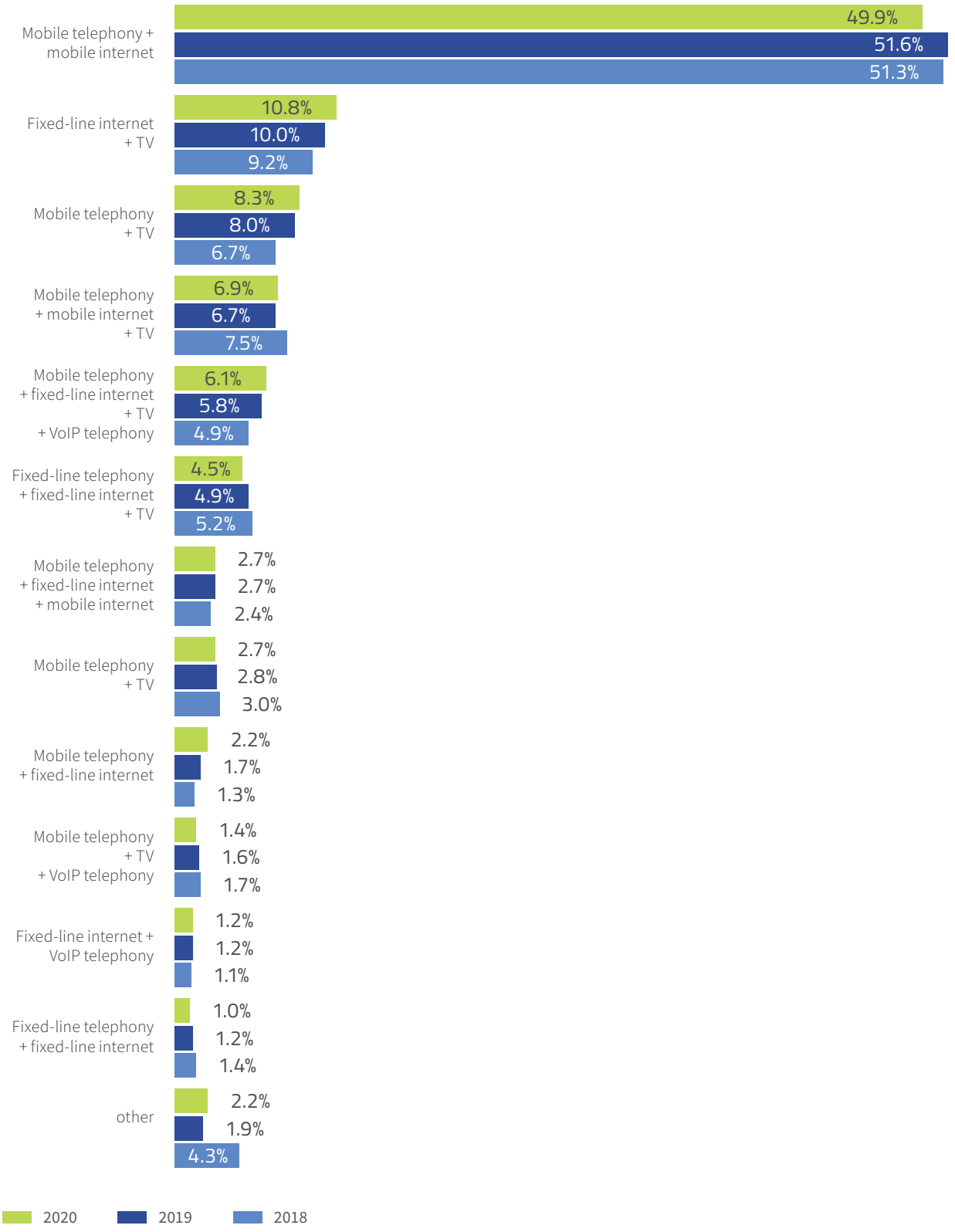
Chart 68. **The number of users of bundled services (in millions) and the dynamics of change**



Source: UKE

In 2020, the most popular service bundles were invariably "Mobile telephony + mobile internet" (49.9%) and "Fixed-line internet + TV" (10.8%). For the first bundle, its share fell by 1.7 percentage points compared to 2019, while customers showed a rising interest in the "Mobile telephony + TV" (8.3%), "Mobile telephony + mobile internet + TV" (6.9%) and "Mobile telephony + fixed-line internet + TV + VoIP telephony" (6.1%), bundles, whose shares grew by 0.3, 0.2 and 0.3 percentage points respectively. Interest in the "Fixed-line telephony + fixed-line internet + TV" is steadily declining (by 0.4 percentage points). For a few years, a slight upwards trend has been observed for the "Mobile telephony + fixed-line internet + mobile internet" bundle (increase by 0.1 percentage point), while the reverse is true for the "Mobile internet + TV" bundle (decrease by 0.1 percentage point). The remaining bundles accounted for 2.2% of all subscribers of bundled services, 0.3 percentage points more than in 2019.

Chart 69. **Share of bundles in terms of numbers of users**



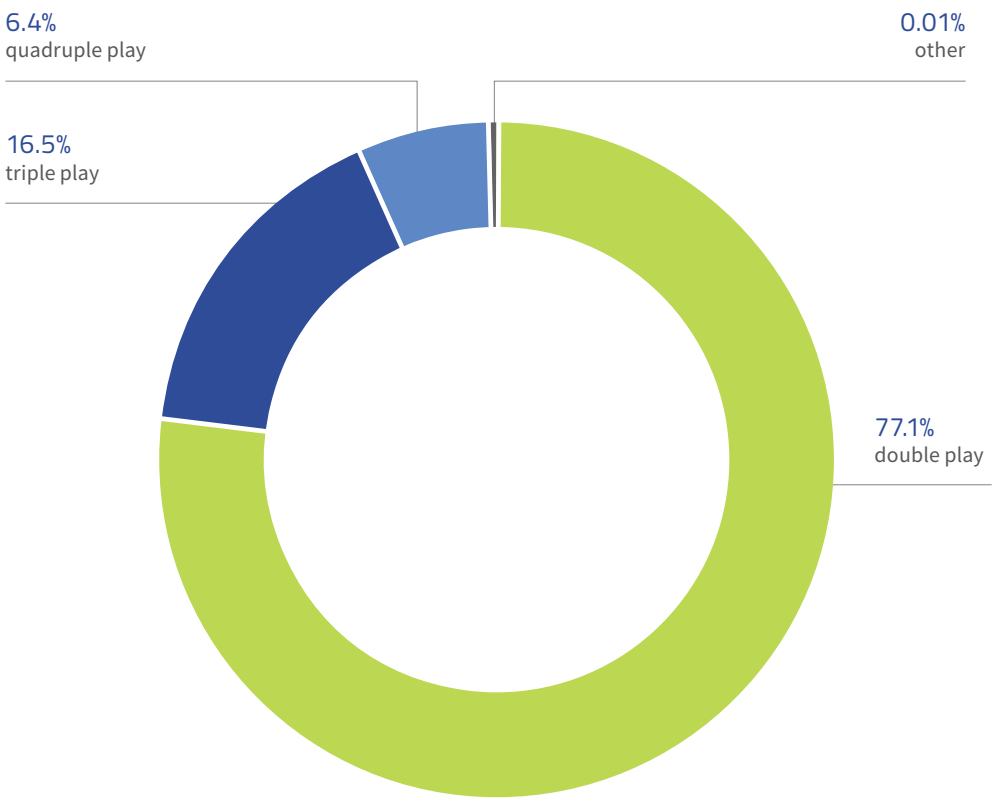
Source: UKE

others – bundles with individual share not exceeding 1%

The subscriber structure of bundled services remained largely unchanged. More than 77% of the bundled services market users chose a double play bundle. Triple play (16.5%) and quadruple play (6.4%) bundles came next. Interest in the other bundles, quintuple and sextuple play, was minuscule, attracting about 0.01% of subscribers of all bundled services.

77.1% of users
choose double play bundles

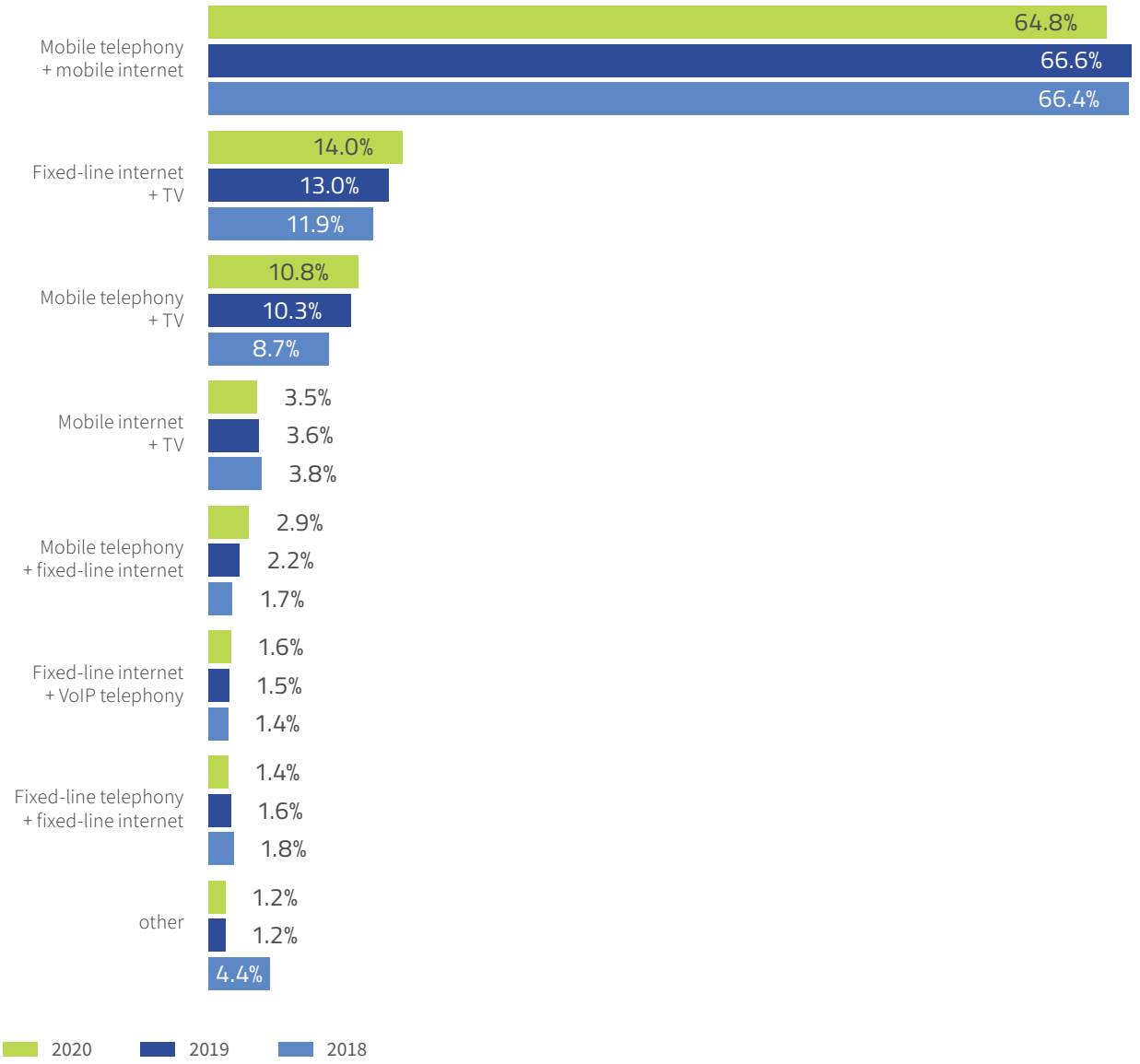
Chart 70. **Share of bundles in terms of the number of users**



Source: UKE

Among double play bundle offerings, a vast majority of users chose the "Mobile telephony + mobile internet" bundle. This bundle, however, was chosen less frequently compared to 2019 (decrease by 1.9 percentage points). The other frequently chosen bundle was "Fixed-line internet + TV" (14%), whose popularity rose by 1 percentage point compared to 2019. The "Mobile telephony + TV" (10.8%) came third among double play bundles, also becoming more popular among users (by 0.5 percentage points) in comparison with 2019.

Chart 71. **Shares of individual double play packages in terms of the number of users**

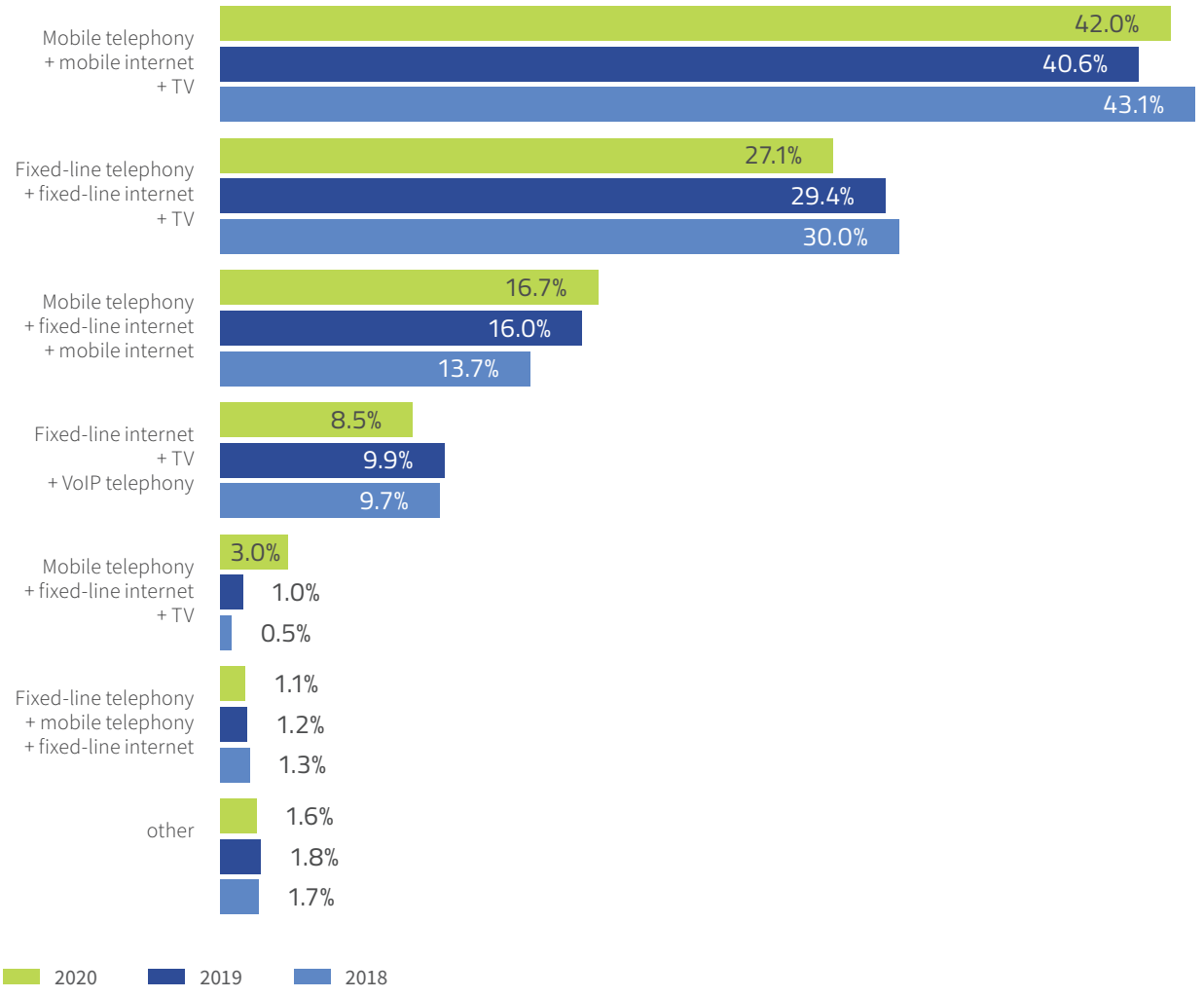


Source: UKE

others – bundles with individual share not exceeding 1%

Among triple play bundles, each package retained the position it had held in 2019. The "Mobile telephony + mobile internet + TV" bundle came first with a share of 42%, followed by "Fixed-line telephony + fixed-line internet + TV" with 27.1% share. The remaining places were taken by "Mobile telephony + fixed-line internet + mobile internet" (16.7%) and "Fixed-line internet + TV + VoIP telephony" (8.5%). The "Mobile telephony + fixed-line internet + TV" bundle noted a considerable increase compared to 2019 (by 2 percentage points).

Chart 72. **Shares of individual triple play packages in terms of the number of users**

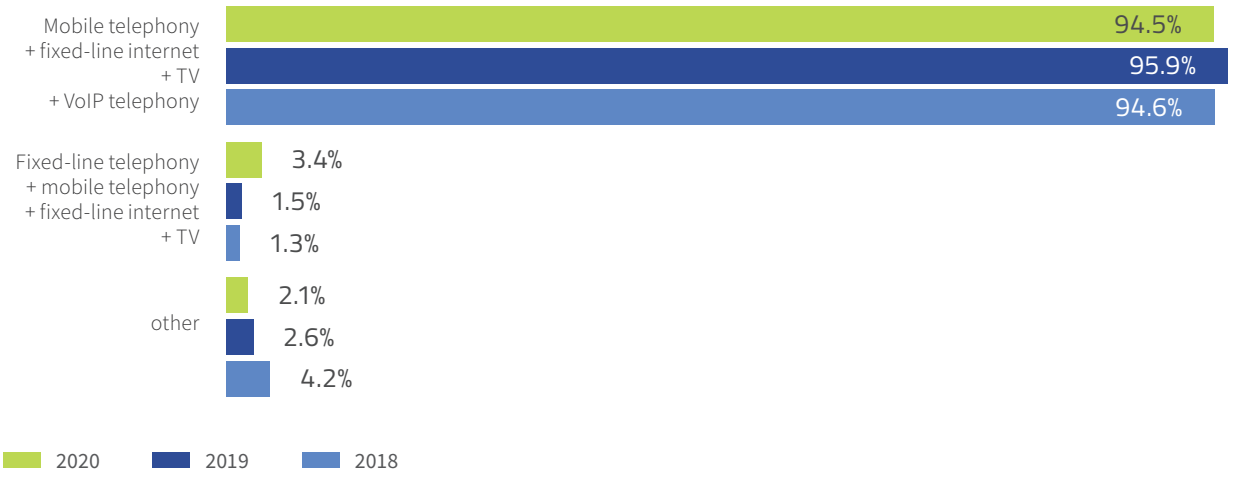


Source: UKE

others – bundles with individual share not exceeding 1%

In the case of quadruple play bundle users, the “Mobile telephony + fixed-line internet + TV + VoIP telephony” bundle massively predominates. It was chosen by 94.5% of users (a result that nevertheless means a decrease of 1.4 percentage points compared to 2019). The “Fixed-line telephony + mobile telephony + fixed-line internet + TV” bundle came second (3.4%), attracting double the number of subscribers in 2020.

Chart 73. **Shares of individual quadruple play packages in terms of the number of users**

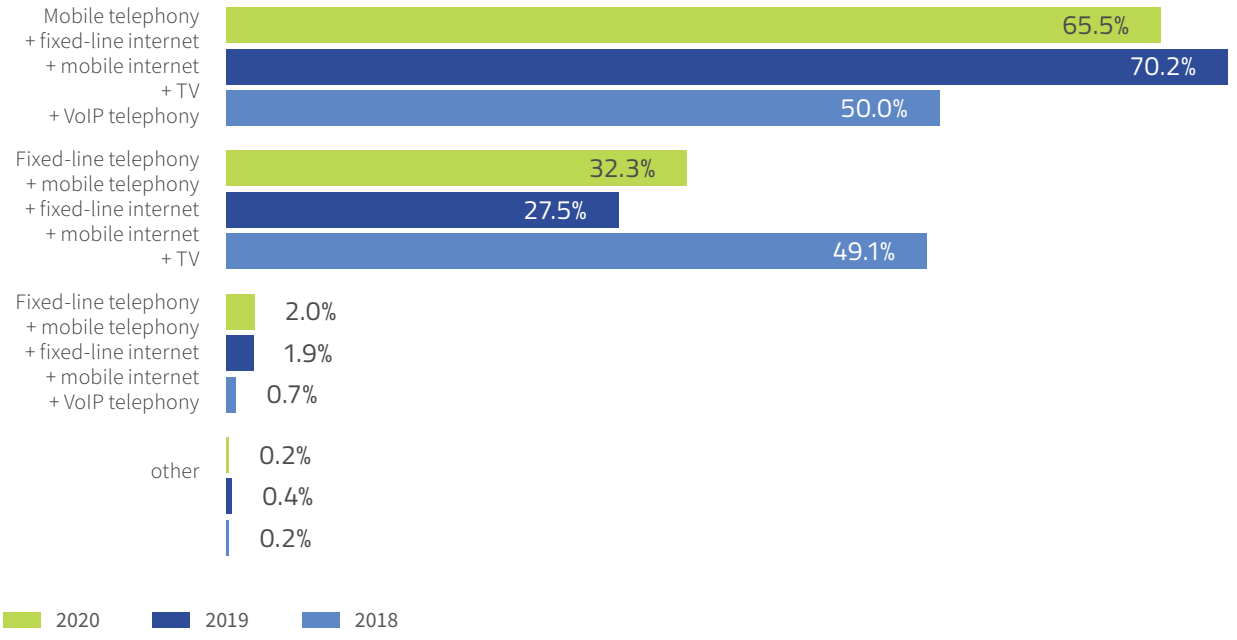


Source: UKE

others – bundles with individual share not exceeding 1%

Changes can be observed in the shares of quintuple play bundles. A migration of users took place from the "Mobile telephony + fixed-line internet + mobile internet + TV + VoIP telephony" bundle, whose share lost 4.7 percentage points in favour of the "Fixed-line telephony + mobile telephony + fixed-line internet + mobile internet + TV" bundle (increase by 4.8 percentage points).

Chart 74. **Shares of individual quintuple play packages in terms of the number of users**

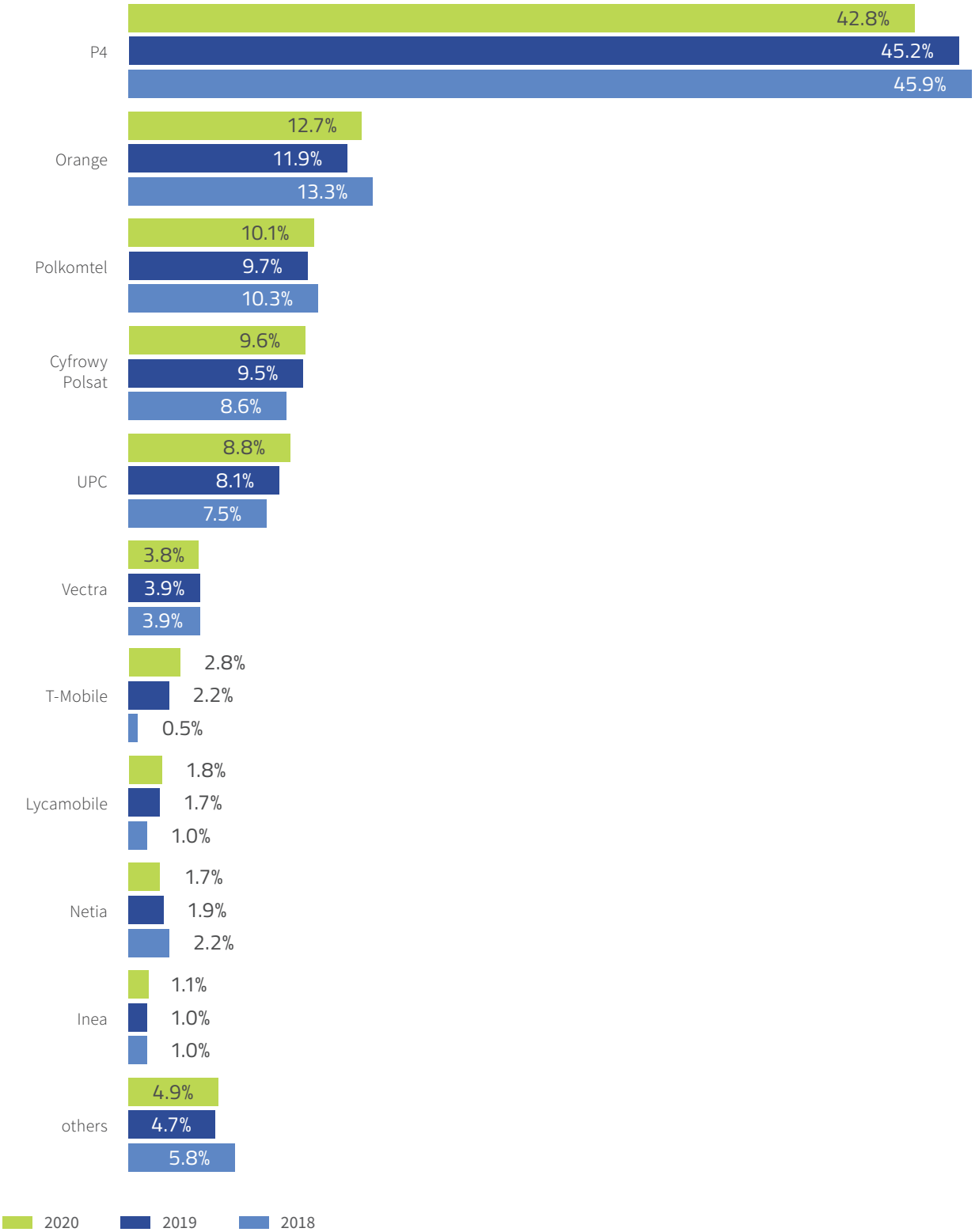


Source: UKE

others – bundles with individual share not exceeding 1%

P4 captured about 43% of the bundled services market (a decrease by 2.4 percentage points compared to 2019). Orange managed to collect almost 13% of users in its database. Polkomtel increased its customer pool to slightly more than 10%, and Cyfrowy Polsat to 9.6%. UPC (8.8%), Vectra (3.8%), T-Mobile (2.8%), Lycamobile (1.8%), Netia (1.7%) and Inea (1.1%), respectively, followed in the ranking. The other operators had a 4.9% share in the bundled services market.

Chart 75. **Shares of operators in terms of bundled services users**

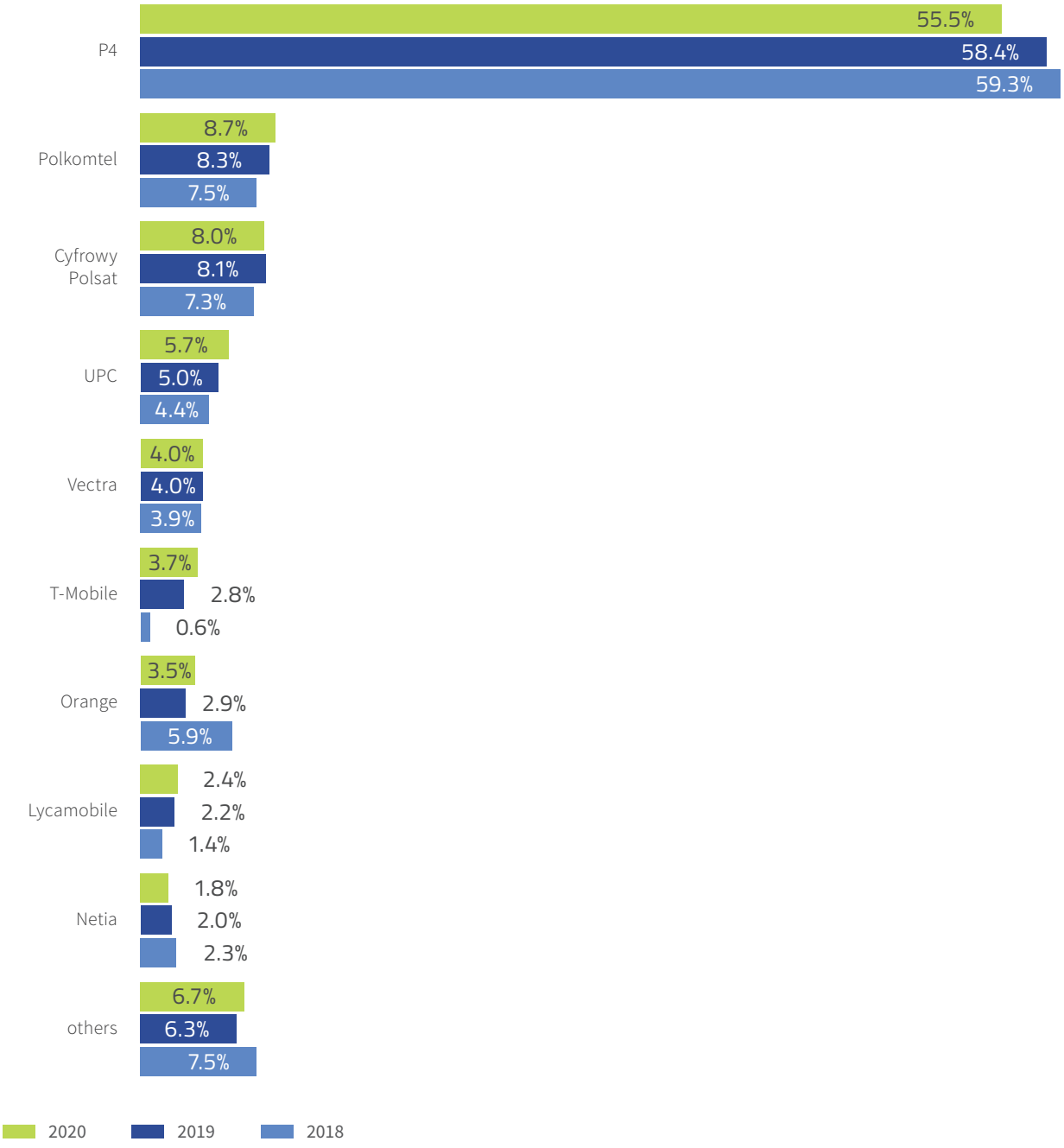


Source: UKE

others – enterprises with individual share not exceeding 1%

Among enterprises offering double play bundles, P4 had the largest share (55.5%). However, this meant a decrease by 2.9 percentage points compared to 2019 data. Polkomtel came second with 9% of subscribers, followed by Cyfrowy Polsat with 8%. UPC retained its client base at the level of 5.7%. A large increase over the last 3 years was noted by T-Mobile that managed to convince 3.7% of users (an increase of 3.1 percentage points compared to 2018).

Chart 76. **Operator shares in terms of bundled services users – *double play***

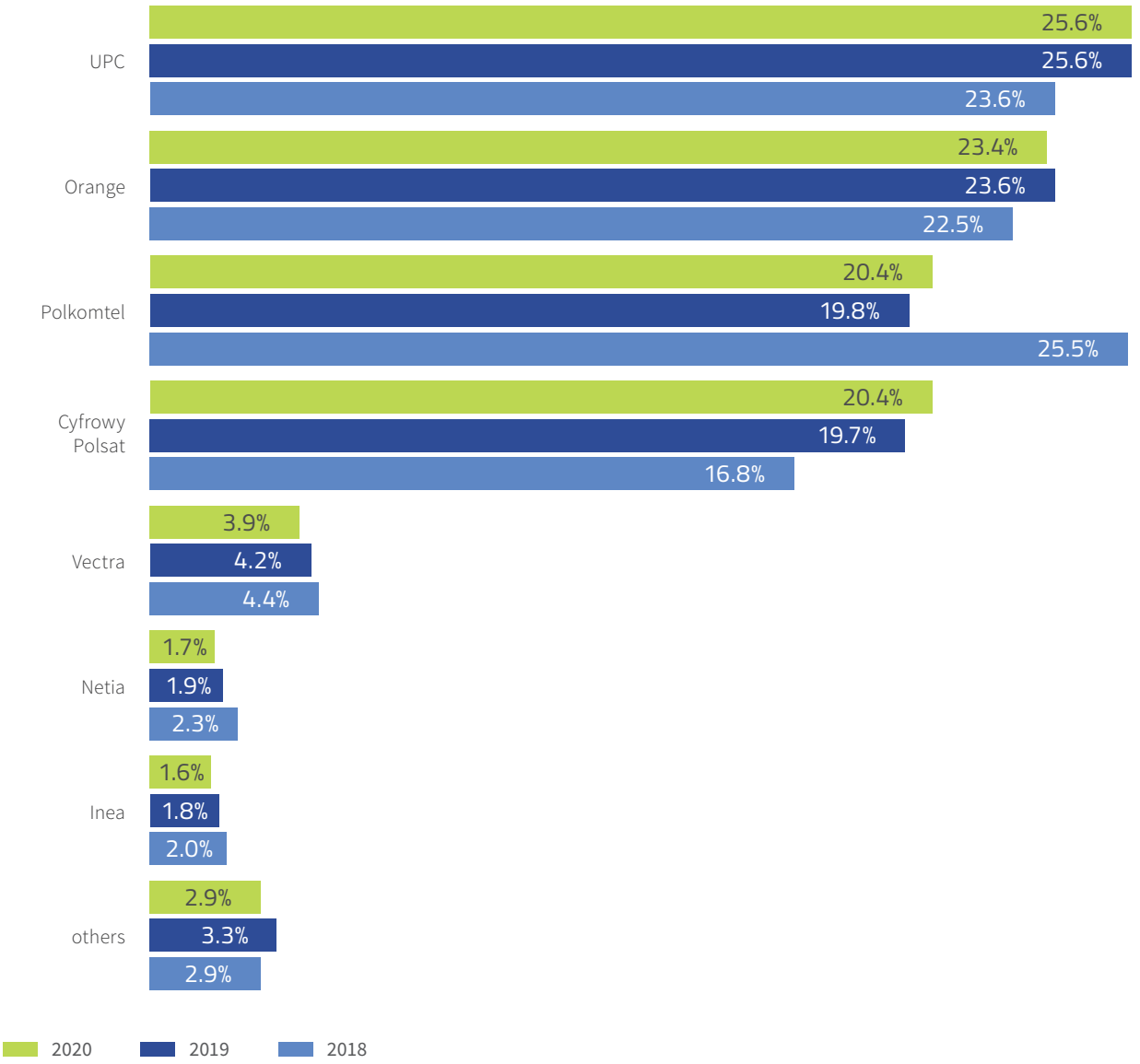


Source: UKE

others – enterprises with individual share not exceeding 1%

Among operators offering triple play bundles, UPC maintained a 25.6% share of subscribers. The next places were taken by Orange (23.4%) and, equally, Polkomtel and Cyfrowy Polsat (20.4% each). Slight decreases in the number of users of triple play bundles were noted by Vectra (3.9%), Netia (1.7%) and Inea (1.6%).

Chart 77. **Operator shares in terms of bundled services users – *triple play***

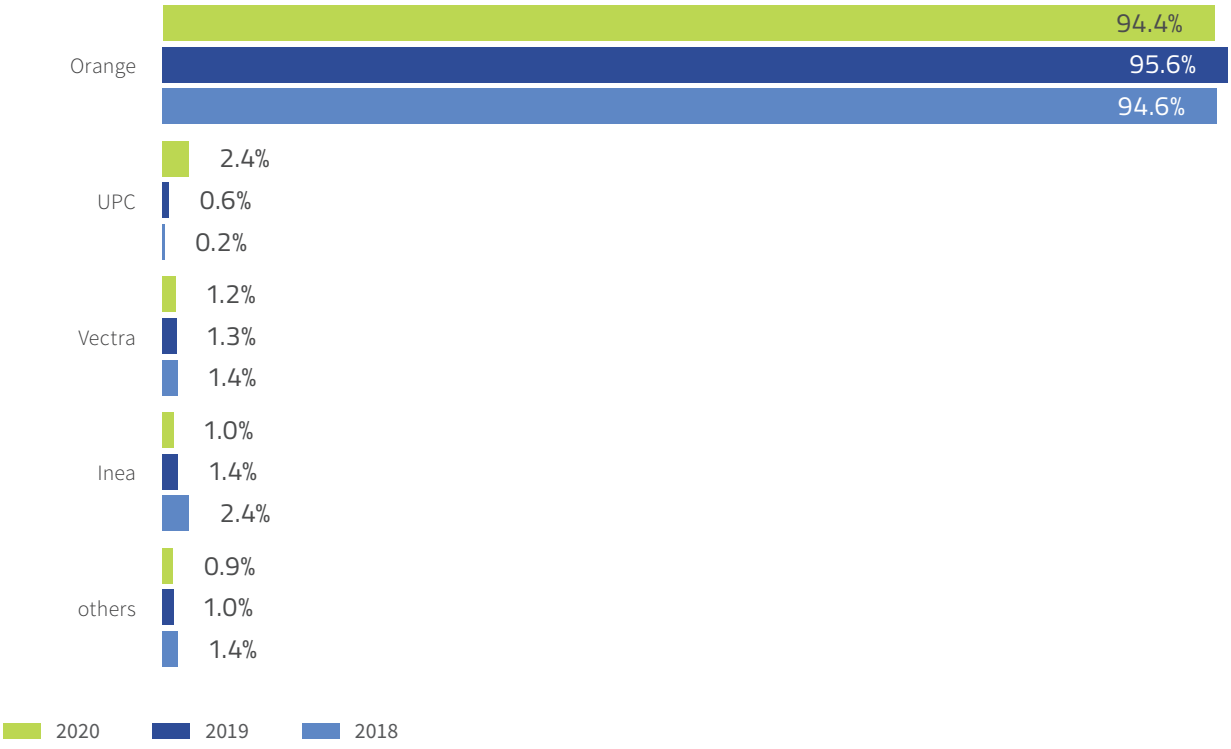


Source: UKE

others – enterprises with individual share not exceeding 1%

Among operators offering quadruple play bundles, a vast majority of the market in terms of the number of users remained invariably in the hands of Orange (94.4%). UPC noted a considerable increase, expanding its pool of customers by 1.8 percentage points, while the number of Inea customers decreased (by 0.4 percentage points compared to 2019 data).

Chart 78. **Shares of operators in terms of bundled services users – *quadruple play***

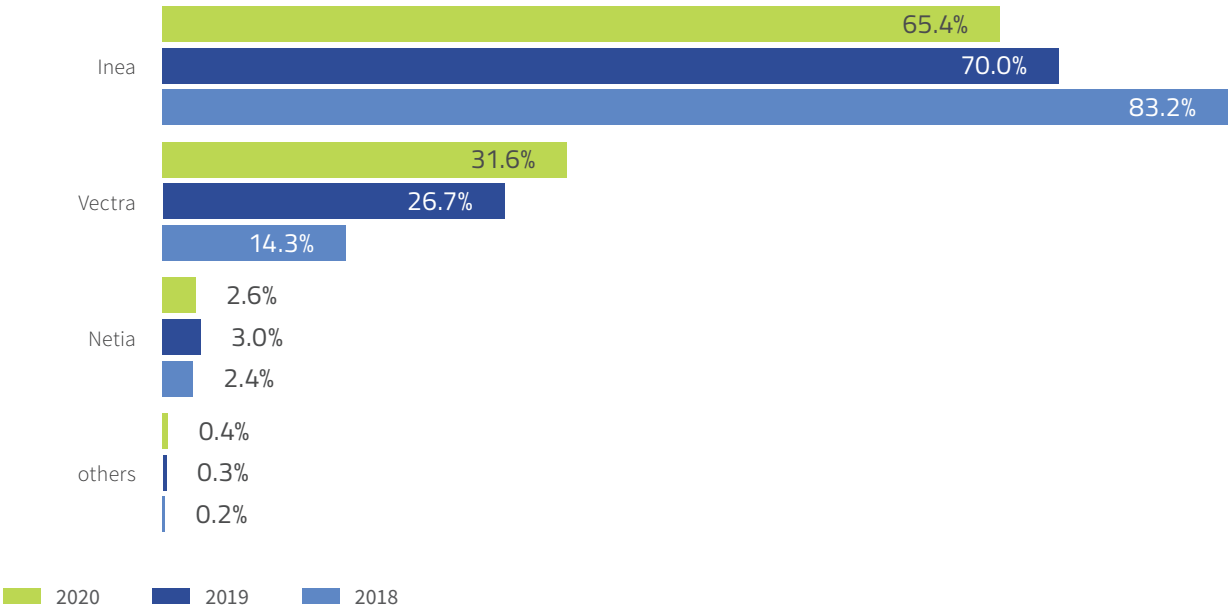


Source: UKE

others – enterprises with individual share not exceeding 1%

Among operators offering quadruple play bundles, the largest share invariably belonged to Inea (65.4%). This number has, however, shrunk by 4.6 percentage points compared to 2019. Vectra, on the other hand, recorded around 5% more users compared to 2019 (31.6%).

Chart 79. **Shares of operators in terms of bundled services users – *quintuple play***



Source: UKE

others – enterprises with individual share not exceeding 1%

4 TV SERVICES

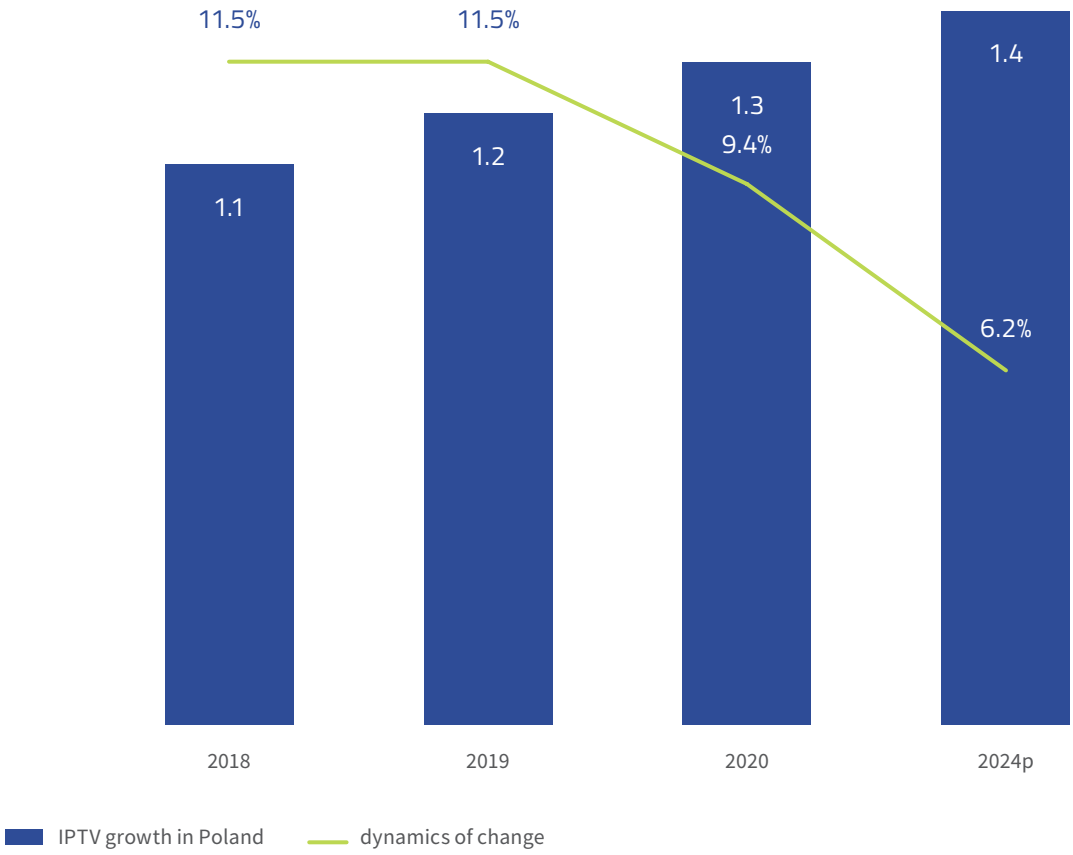
PART I
THE TELECOMMUNICATIONS MARKET

4.1. GENERAL INFORMATION

TV services are an interesting segment of the telecommunications market. Year on year, the number of users declines (10.8 million in 2020), while revenues from the market keep on growing (PLN 6.7 billion). In 2020, slightly more than 30% of the TV services market was captured by Cyfrowy Polsat. Around 19% of the market was in the hands of Canal+. The most popular method of connecting to TV services was SATTV. Over the last few years, more than half of the users have chosen to use this type of connection. The IPTV service, which in 2020 attracted more than 12% users, is a rising star.

Considering the potential of the IPTV market, it can be expected to reach 1.4 million subscribers in 2024. This will be an increase by over 6 percentage points compared to 2020.

Chart 80. **Penetration with the IPTV service in Poland (in millions) and the dynamics of change**



Source: UKE

Legend: p – forecast, the forecast for Poland was calculated in proportion to forecasts for the European market based on IDATE data.

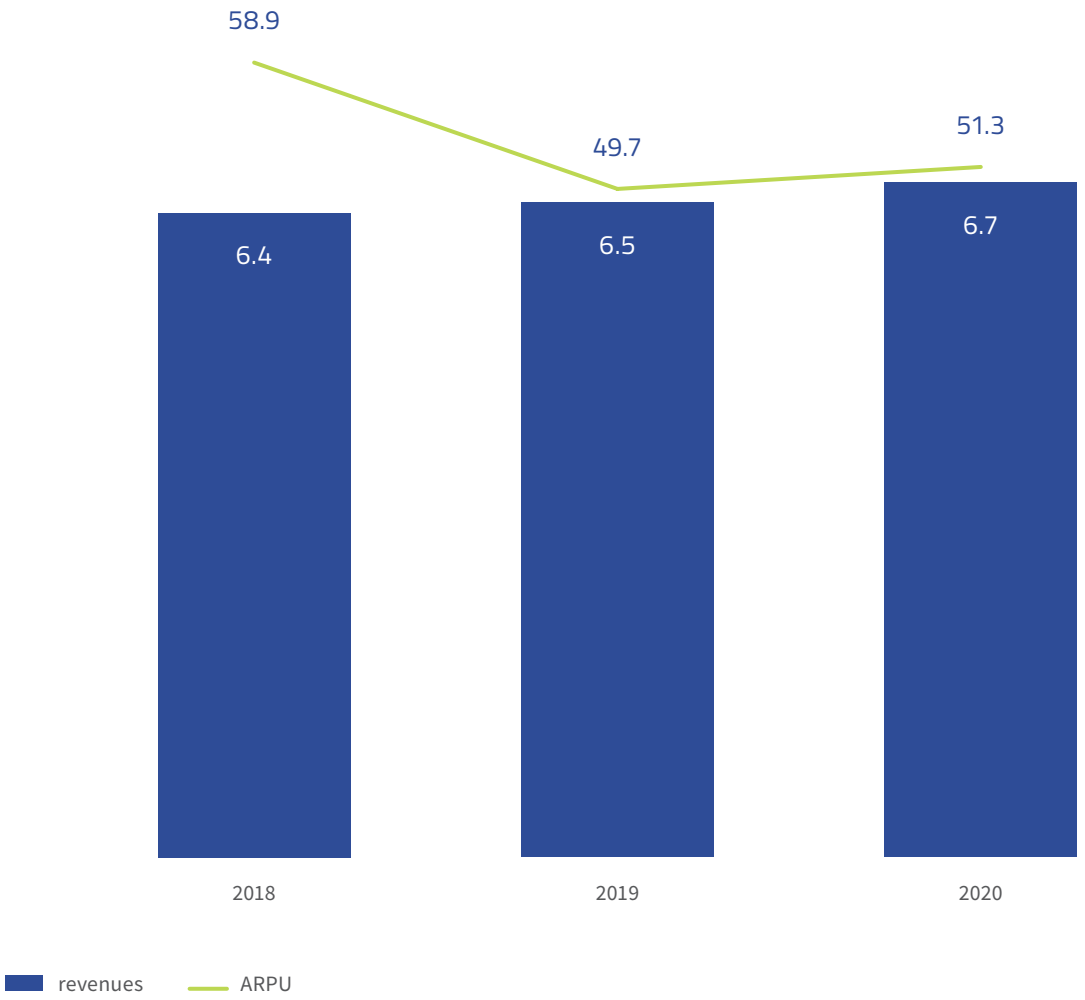
4.2. REVENUES

In contrast with the number of subscribers, revenues from the TV services market grow steadily year on year. In 2020, they amounted to PLN 6.7 billion. The average monthly revenue per user (ARPU) was PLN 53.1, about PLN 2 more than in the previous year.

PLN 6.7 billion

revenues from the TV services market

Chart 81. **Revenues from the market (PLN billion) and average monthly revenue per user (ARPU, PLN)**



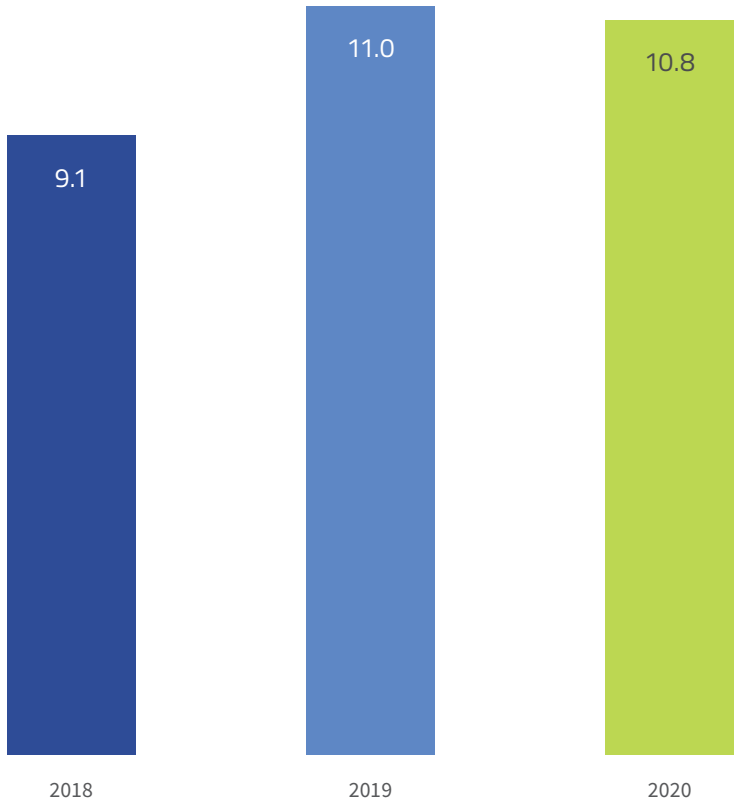
Source: UKE

4.3. USERS

The number of users of TV services is steadily decreasing. The difference between 2019 and 2020 is 0.2 percentage points.

10.8 million
users of TV services

Chart 82. **The number of users of TV services (in millions)**

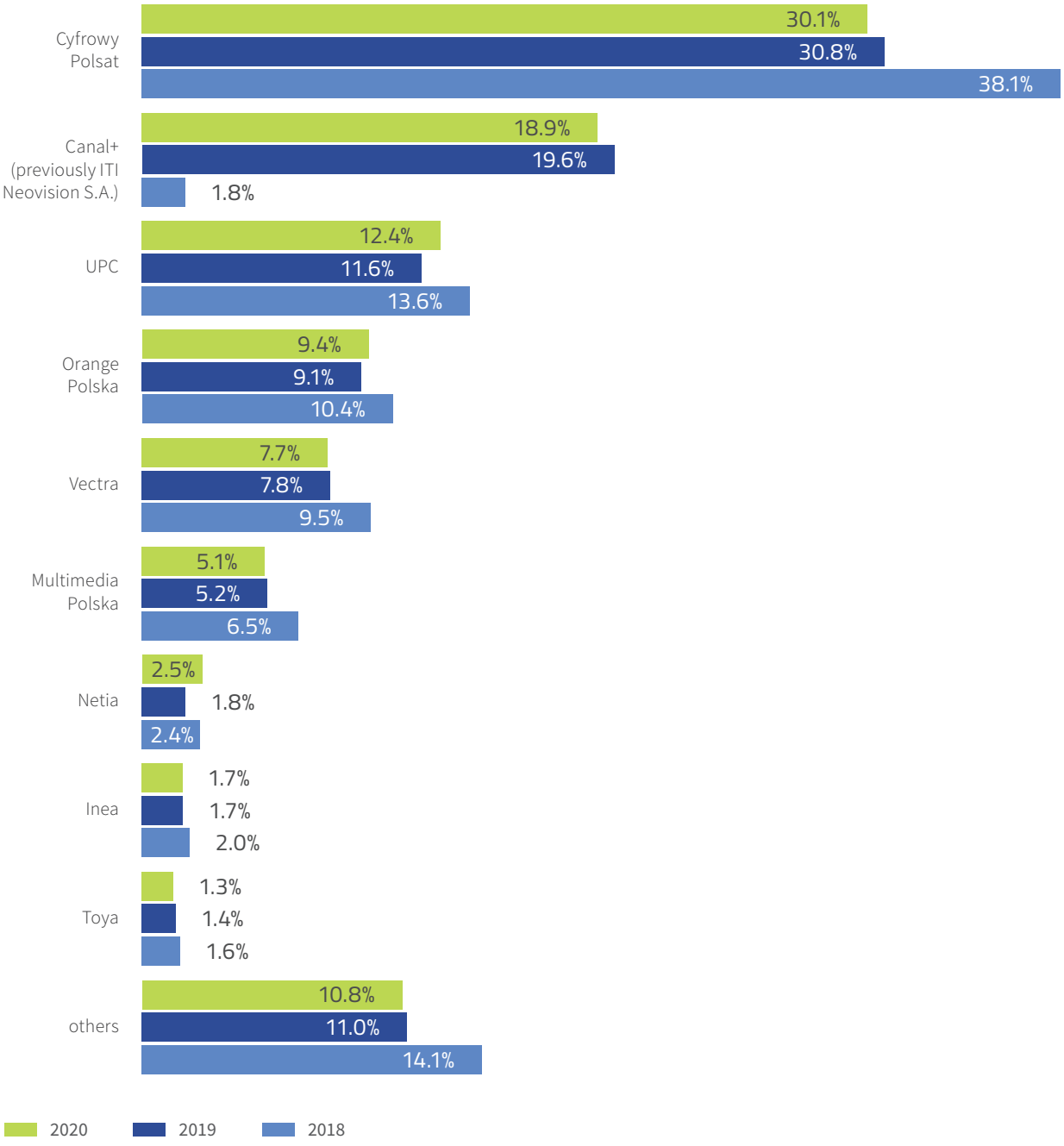


Source: UKE

The largest share of the TV services market, 30.1%, belonged to Cyfrowy Polsat. Canal+ captured 18.9% of the market, which meant a decrease of 0.7 percentage points compared to 2019. The offer of UPC and Orange managed to attract 0.8 and 0.3 percentage points more customers, respectively.

In terms of the number of users, Vectra had a stable year – its share slightly reduced to 7.7%. A large slice of the TV services market (10.8%) belonged to other telecommunications enterprises.

Chart 83. **Shares of operators in terms of the number of users of TV services**

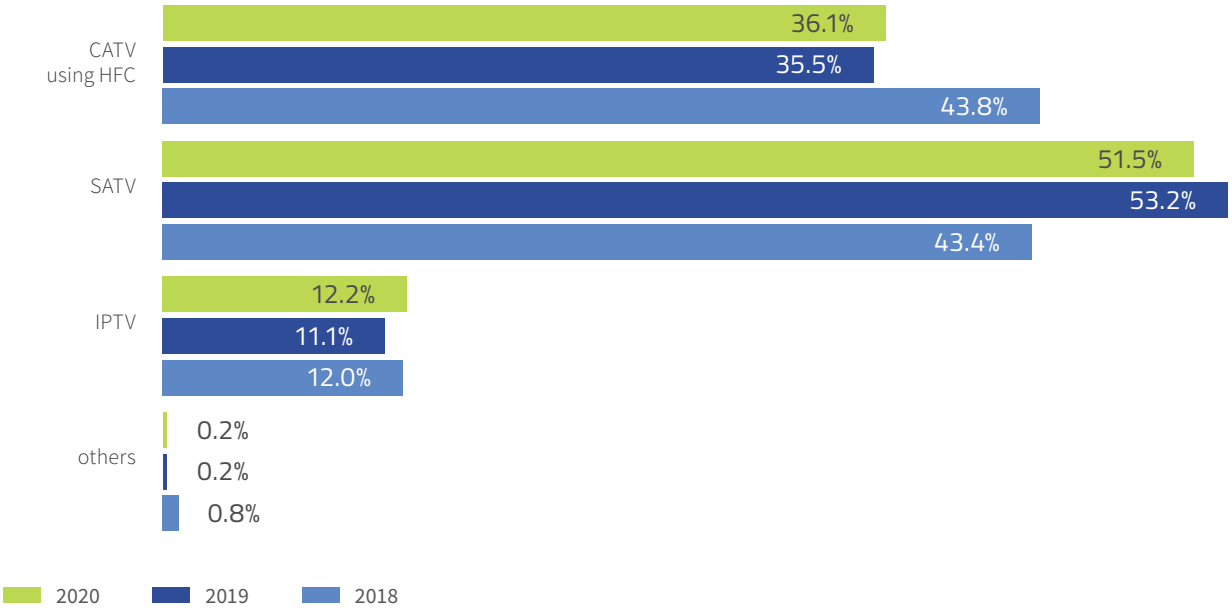


Source: UKE

others – enterprises with individual share not exceeding 1%

The most popular method of connecting to TV services was invariably a satellite dish. In 2020 this was chosen by more than half of the subscribers. However, this service is being increasingly supplanted by cable TV using HFC (36.1%) and IPTV (12.2%) technologies every year. The latter's share increased by 1.1 percentage points compared to 2019.

Chart 84. **Access to TV services in terms of users**

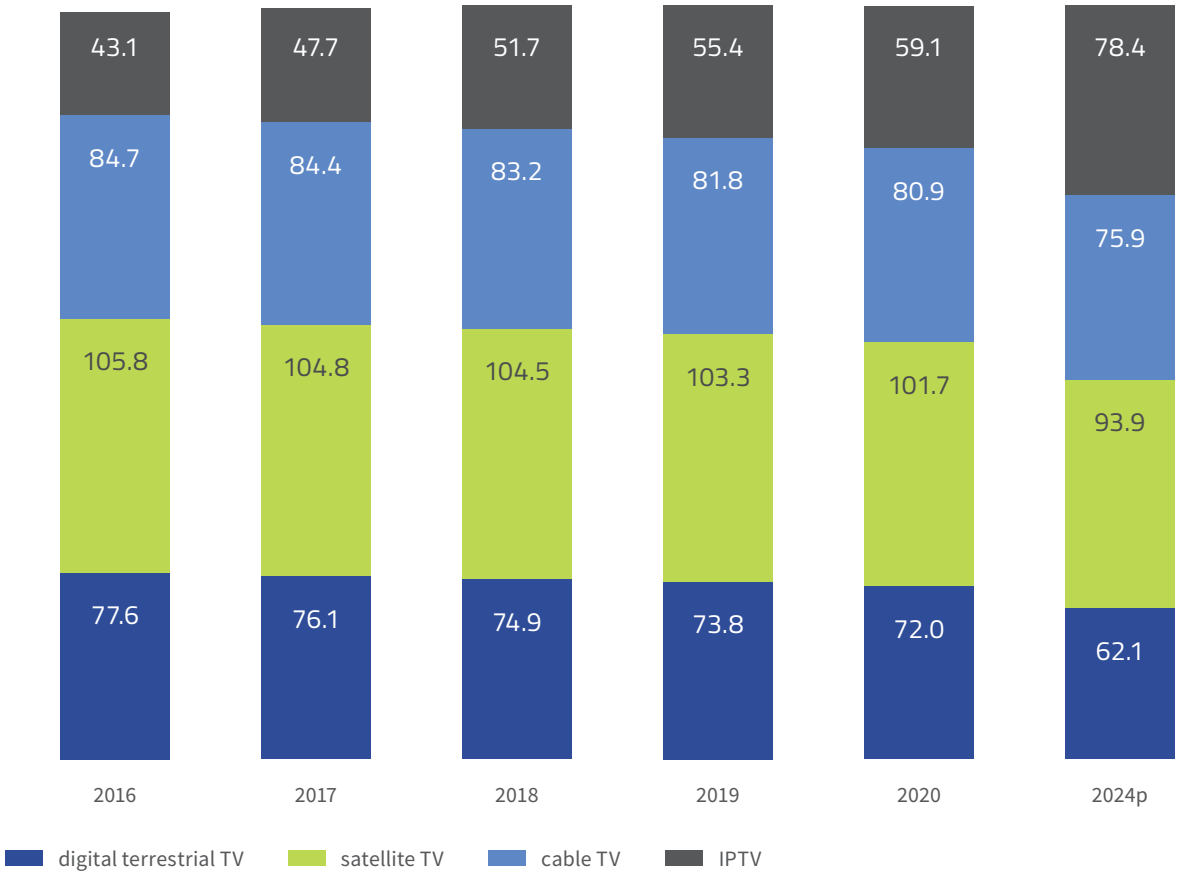


Source: UKE

4.4. COMPARISON WITH EUROPEAN COUNTRIES

According to forecasts, IPTV will gradually supplant the remaining TV services. In 2024, it will be used by 78.4 million households in Europe. Satellite TV, which has been relatively well established for years, will lose about 12 million users by 2024 (compared to 2016). A similar fate awaits cable TV HFC network, with a drop by 8.8 percentage points compared to 2016.

Chart 85. **Changes concerning access to TV services in Europe (households in millions)**



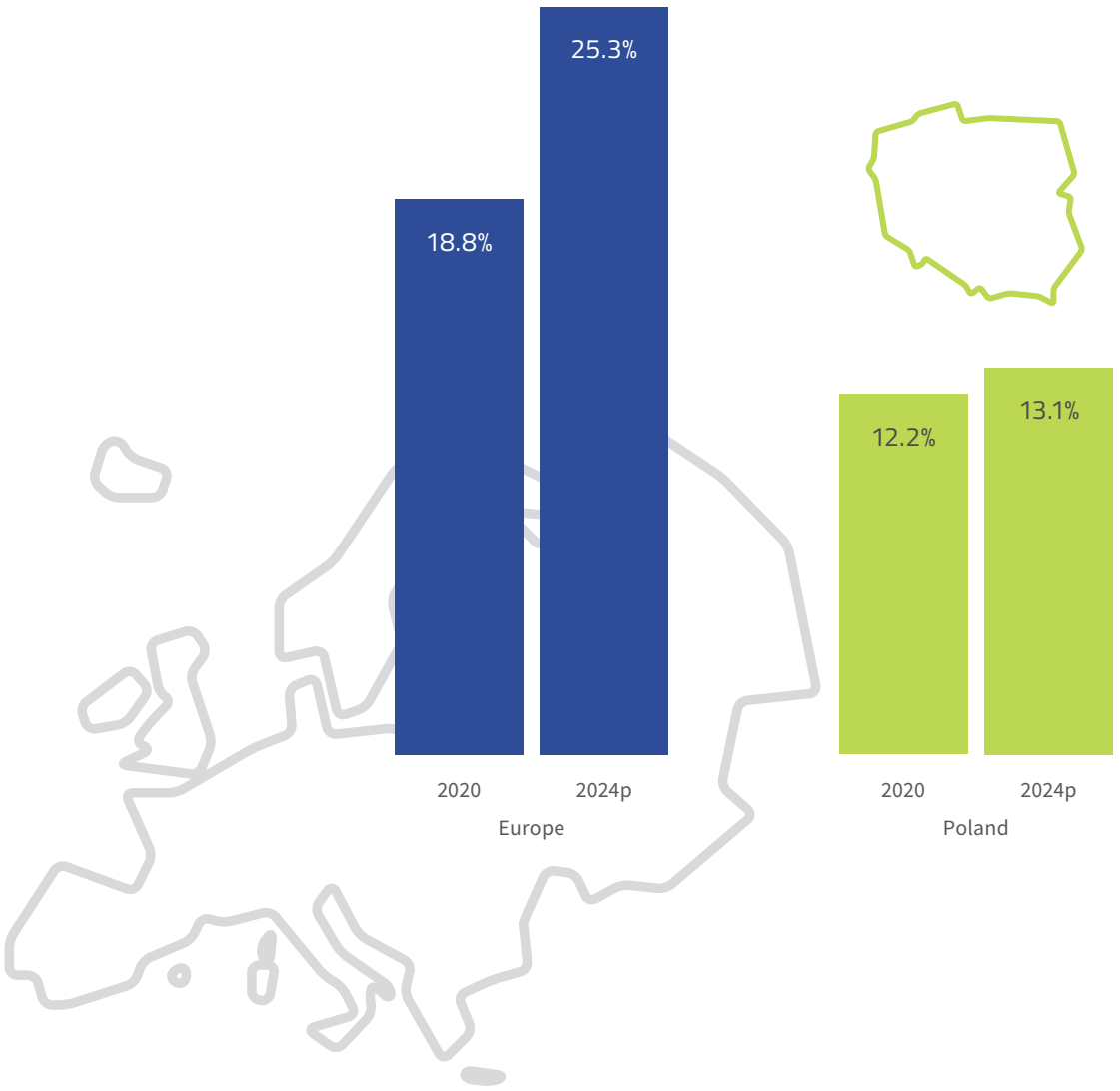
Source: IDATE 2021

p – forecast

Legend: the chart includes data obtained from Russia and Turkey.

Comparing the domestic market with European statistics, the following years will be marked by a considerable growth of IPTV. According to the forecasts, by 2024 saturation of the market with IPTV will reach slightly over 25% in Europe and slightly over 13% in Poland.

Chart 86. **Penetration with the IPTV service in Poland and Europe (in millions) – 2024 forecast**



Source: IDATE. UKE

Legend: p – forecast, the forecast for Poland was calculated proportionally to forecasts for the European market based on IDATE data.

5 THE IMPACT OF THE COVID-19 PANDEMIC ON THE TELECOMMUNICATIONS MARKET

PART I
THE TELECOMMUNICATIONS MARKET

In the previous year, a considerable impact on the growth of telecommunication services was undoubtedly exerted by the COVID-19 pandemic that led to increased demand for these services.

The need to stay at home, remote work and education, and lack of social contact resulted in greater usage of voice, internet and TV services.

The crisis led to increased demand for both fixed-line connections with higher capacities and high-quality mobile access. In 2020, the number of people using fixed-line access with high capacities (of at least 100 Mb/s) grew by almost 13%, and with the highest capacities (of at least 1 Gb/s) by almost 58%. In the case of mobile access, 75% of equipment dedicated to such access were 4G equipment, and traffic in the 4G network rose by 16%[14]. Remote work and education, growth of online sales, and online entertainment had a considerable impact on the increased demand of consumers, while businesses in many cases had to rapidly shift from traditional to remote operations.

The pandemic also affected the development of fibre-optic connections. In the structure of available technologies, the share of FTTH increased greatly and the number of its users rose by 36.4%. In 2020, already 12.6% of all users could enjoy the service.

Considering revenues from internet access services, they were not significantly affected by the crisis. In 2020, internet revenues rose by just 6% compared to the previous year.

The pandemic halted the downward trend on the fixed-line telephony services market which has been ongoing for many years. Even though a decrease in subscribers, connections and revenues was recorded, the duration of calls increased slightly (0.15%) compared to the pre-pandemic time.

The COVID-19 crisis contributed to a greater flow of data through mobile networks. As remote work and education became a must, strong demand for good quality mobile connections emerged. According to PMR estimates[15], that trend is here to stay.

The pandemic undoubtedly affected the usage of mobile telephony services in Poland and abroad. Domestic users used voice services more than in the previous year. The total duration of calls increased by 17.9%. The services most strongly impacted by the onset of the pandemic were, however, those related to data transmission. Prolonged remote work and remote access to network resources or clouds increased data consumption in domestic mobile networks by 40.7% compared to 2019. The same trend could have been observed with respect to roaming. As the SARS-CoV-2 pandemic continued through 2020, a considerably (12.6%) increased interest in data transmission services was recorded.

The pandemic era strongly affected the time spent by users in front of TV sets. 35% of those surveyed admitted to watching TV more frequently. According to PMR15 data, almost 40% of interviewees reported increased watching of news channels because of the pandemic. At the same time, slightly more than 27% of households stated that the pandemic did not affect the amount of TV/VOD content they consumed. It must be considered that the survey was conducted in April 2020, and in May 2020 many operators launched a special offer related to the “stay at home” campaign, during which premium content was offered for free for one month (or in some cases longer).

[14] According to COCOM, January 2020.

[15] PMR, The impact of the COVID-19 pandemic on the telecommunications market in Poland in 2020.

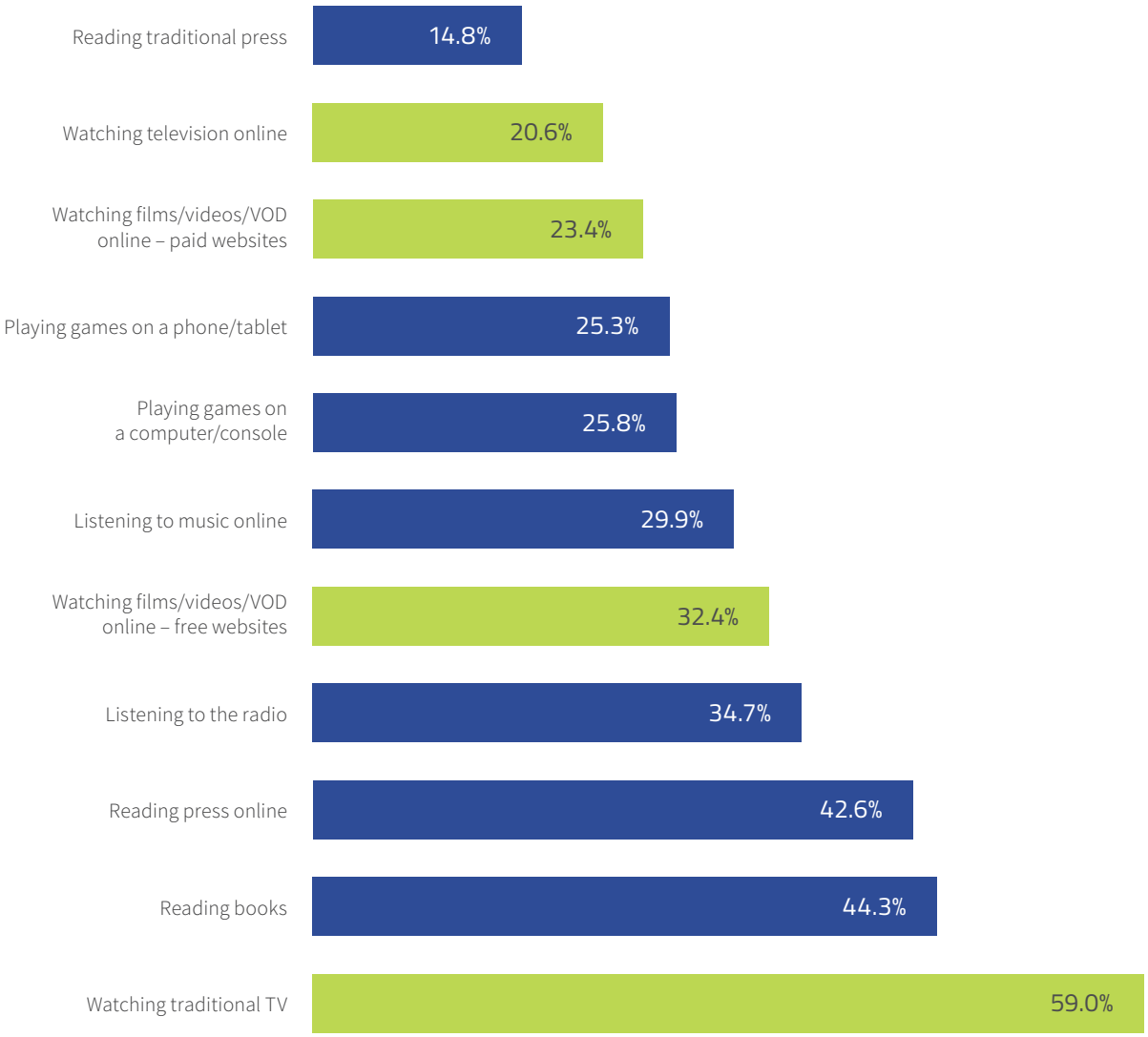
Chart 87. **Impact of the COVID-19 pandemic on watching TV/VOD content in Polish households**

Source: PMR. 2020

Legend: the survey was conducted in April 2020 using the CAWI method on a general group of 800 adult Poles.
The values do not sum up to 100%, because respondents could indicate more than one answer.

Observing the impact of COVID-19 on the potential increase in the frequency of using media and entertainment services, the huge role of traditional TV (59%) can be discerned. About 21% of those surveyed claimed to watch online television more often due to the pandemic. A large percentage of interviewees used the pandemic time to watch films/videos/VOD – in this case, 32.4% visited free websites, and 23.4% – paid ones.

Chart 88. **Increase in frequency of using media and entertainment services among Poles due to the COVID-19 pandemic (%), 2020**



Source: PMR. 2020

Legend: the survey was conducted in April 2020 using the CAWI method on a general group of 840 adult Poles.
The values do not sum up to 100%, because respondents could indicate more than one answer.

1 STATISTICS OF DATA COLLECTED DURING INVENTORY

PART II TELECOMMUNICATIONS INFRASTRUCTURE AND NETWORK COVERAGES

This year's inventory, carried out in the Information System on Broadband Infrastructure (SBI) used to collect data about the inventory of infrastructure and telecommunications services, covered 1180 fewer enterprises than in the previous year. In contrast to almost 8800 enterprises found in SBI one year ago, this year the total number of accounts was 7617.

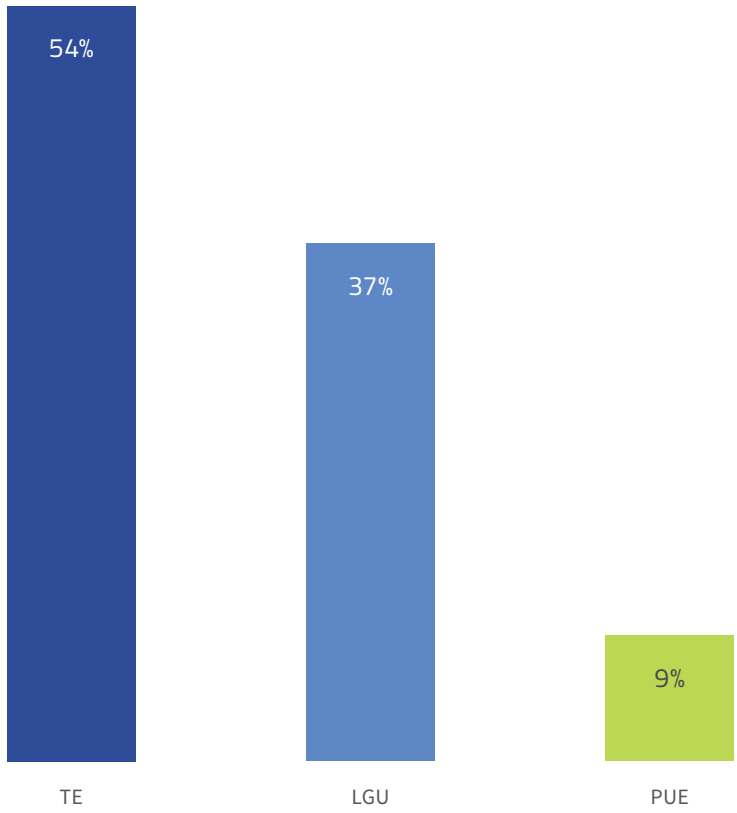
Such a clear decrease in the number of enterprises affected mostly telecommunications enterprises (TE) and was in particular due to deleting almost 1200 such enterprises from the register of telecommunications enterprises (RTE) because of their failure to fulfil the information duties referred to in Article 7(1) and 7(2) of the Telecommunications Law (Journal of Laws 2021, item 576, hereinafter the "TL"). The legal basis for those deletions is Article 12a point 5 of the TL.

In addition, differences in the number of telecommunications enterprises in the SBI resulted from the following:

- adding and deleting entries in RTE on request of entrepreneurs,
- deletions from the RTE done ex officio: 33 enterprises deleted from Central Register and Information on Economic Activity (CRIEA) and 27 enterprises deleted from National Court Registry (NCR).

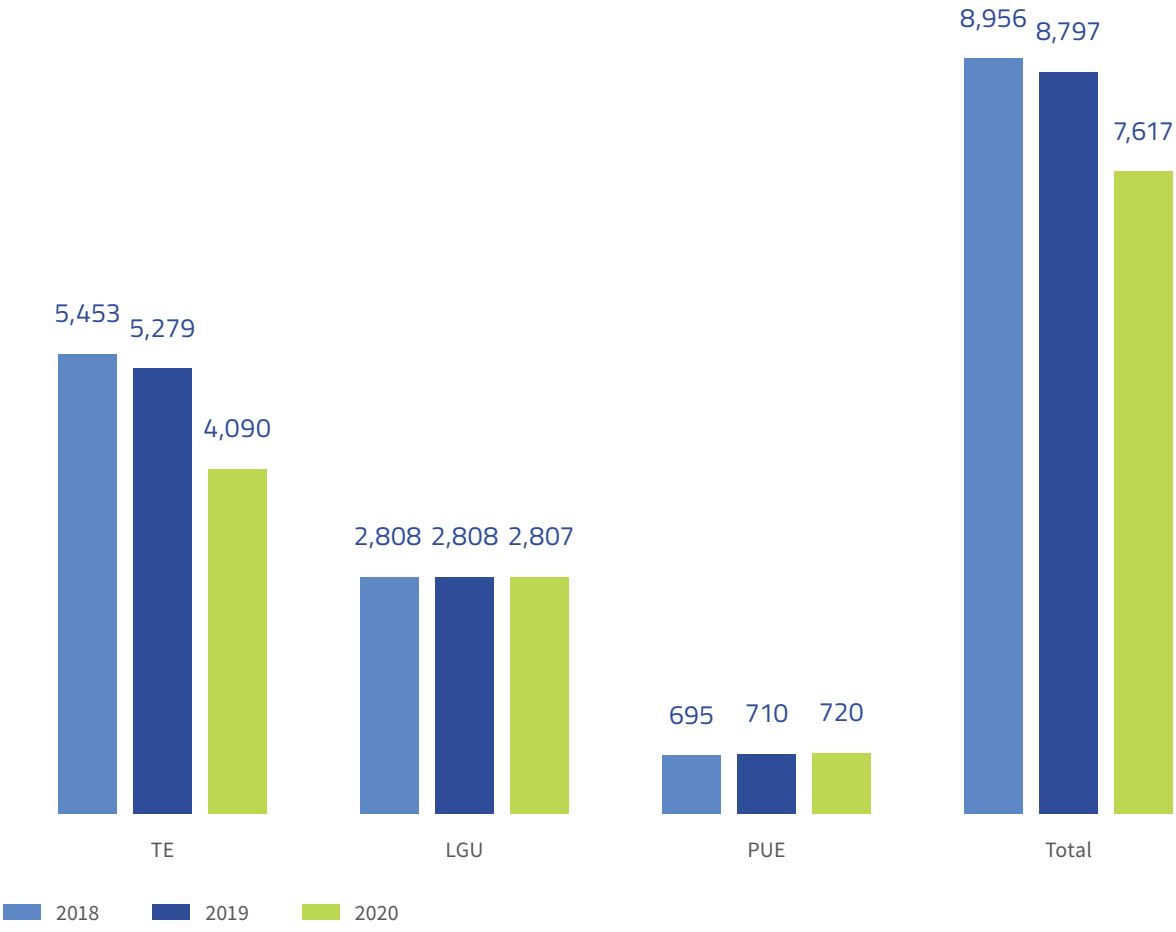
The number of enterprises conducting public utility tasks (PUE) increased slightly (by 10) because these enterprises requested a SBI account in order to notify the relevant information. The remainder of the notifying enterprises consisted of local government units (LGU).

Chart 89. **Percentage distribution of enterprises in the SBI in 2020**



Source: UKE

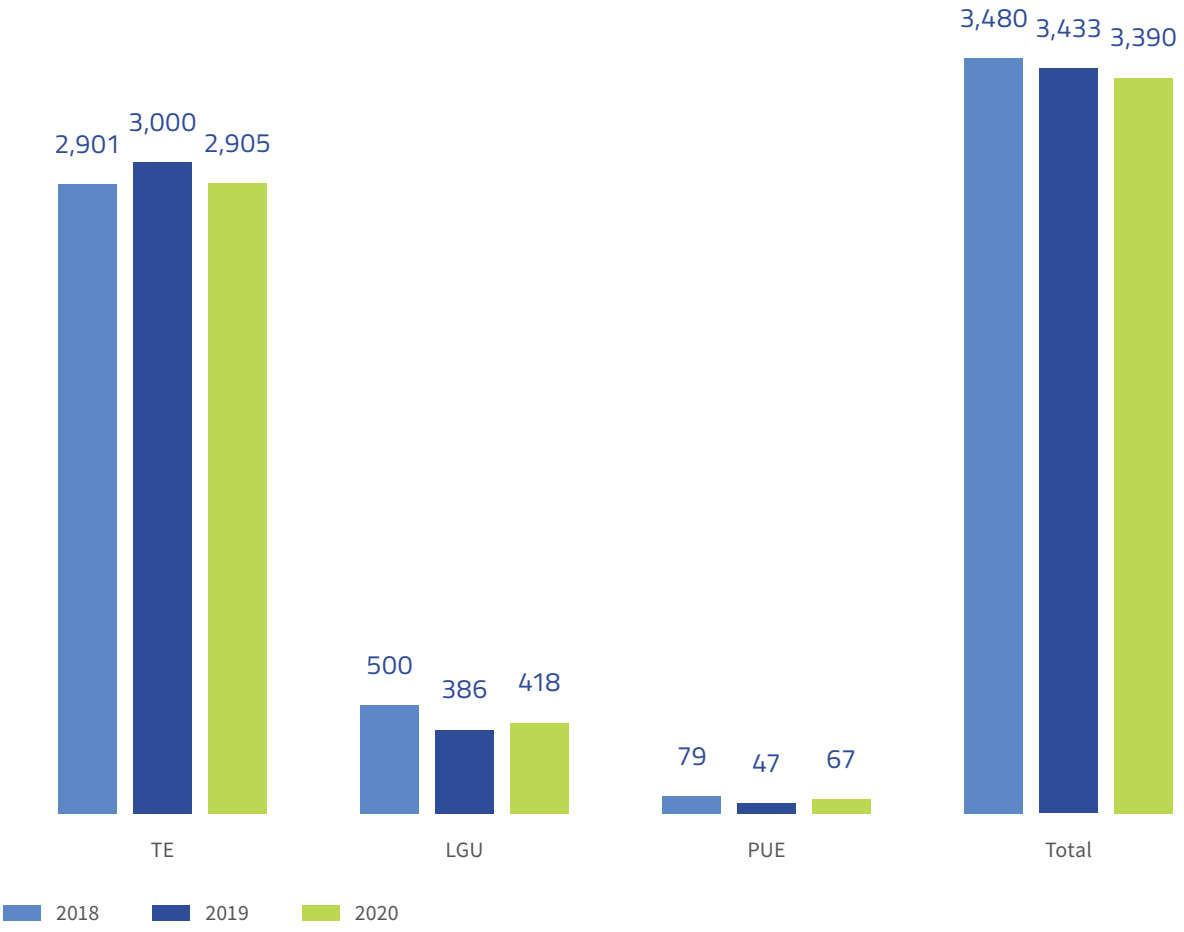
Chart 90. **Number of enterprises in SBI at time of inventory in 2018-2020**



Source: UKE

In 2021, the number of enterprises submitting data to SBI (for 2020) decreased. Following last year's increase in the number of data-submitting telecommunications enterprises, this year their number returned to the level from 2018 and was slightly over 2900. It should be noted, however, that 83 telecommunications enterprises submitted additional details after the statutory deadline, while 20 enterprises that failed to submit data were deleted from the register in early 2021. This year, data were contributed to SBI by a larger number of local government units and enterprises carrying out public utility tasks (52 enterprises more in total).

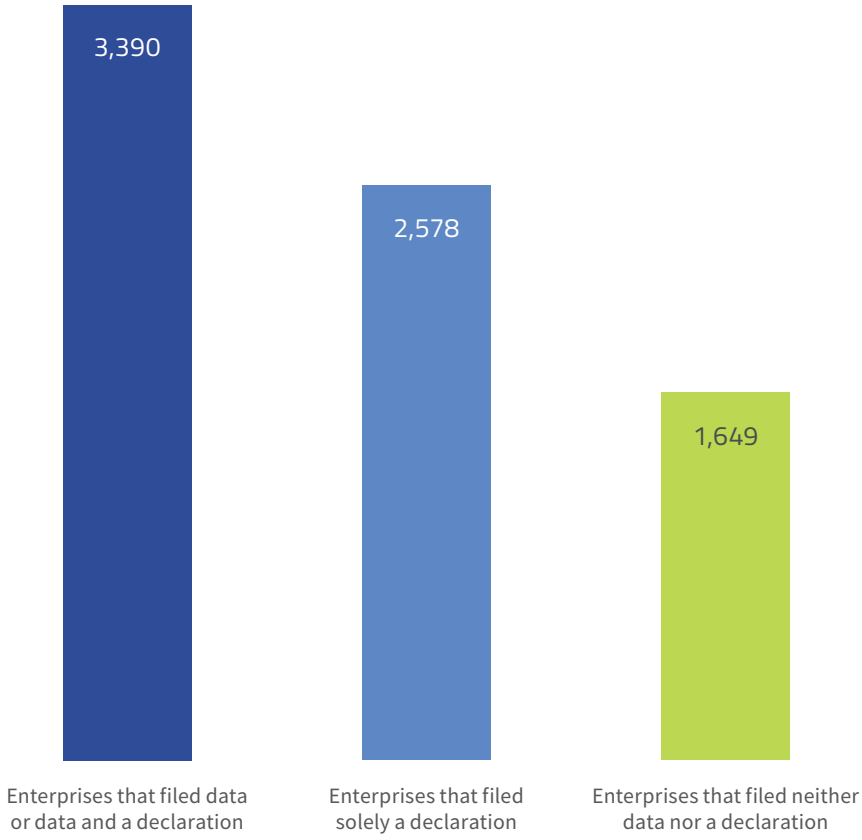
Chart 91. **Number of enterprises that submitted data during inventory in 2018-2020**



Source: UKE

Beginning with last year's inventory, enterprises that do not possess the telecommunications infrastructure, public telecommunications networks and buildings allowing collocation, and that do not provide telephony services, data transmission services allowing broadband internet access and radio and TV distribution services are required to file suitable declarations in the SBI system pursuant to Article 29(2b) of the Act on supporting the development of telecommunications services and network. During the 2020 inventory, declarations filed by a total of 5926 enterprises were recorded, with 2578 enterprises filing declaration exemptions. In total, during this year's inventory, data and declarations were filed by 78.4% of enterprises having a SBI account.

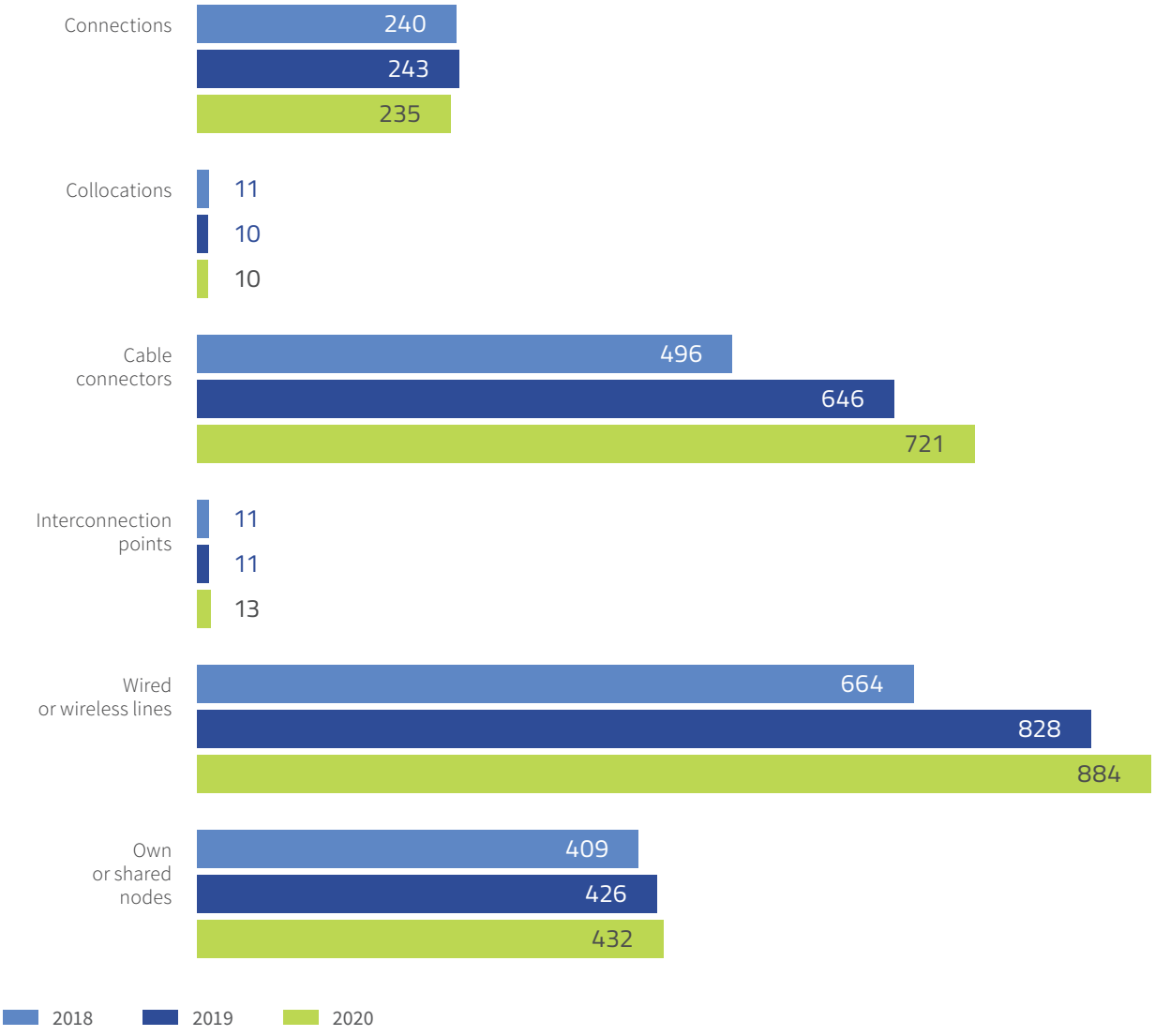
Chart 92. **Activity of enterprises during the 2020 inventory**



Source: UKE

The amount of data submitted to SBI for 2020 did not deviate greatly in comparison with the previous year. Increases in the number of cable connectors, interconnection points and nodes ranged from 1.5% to 11.5%. Data concerning network connections and collocation buildings decreased by about 3-4%.

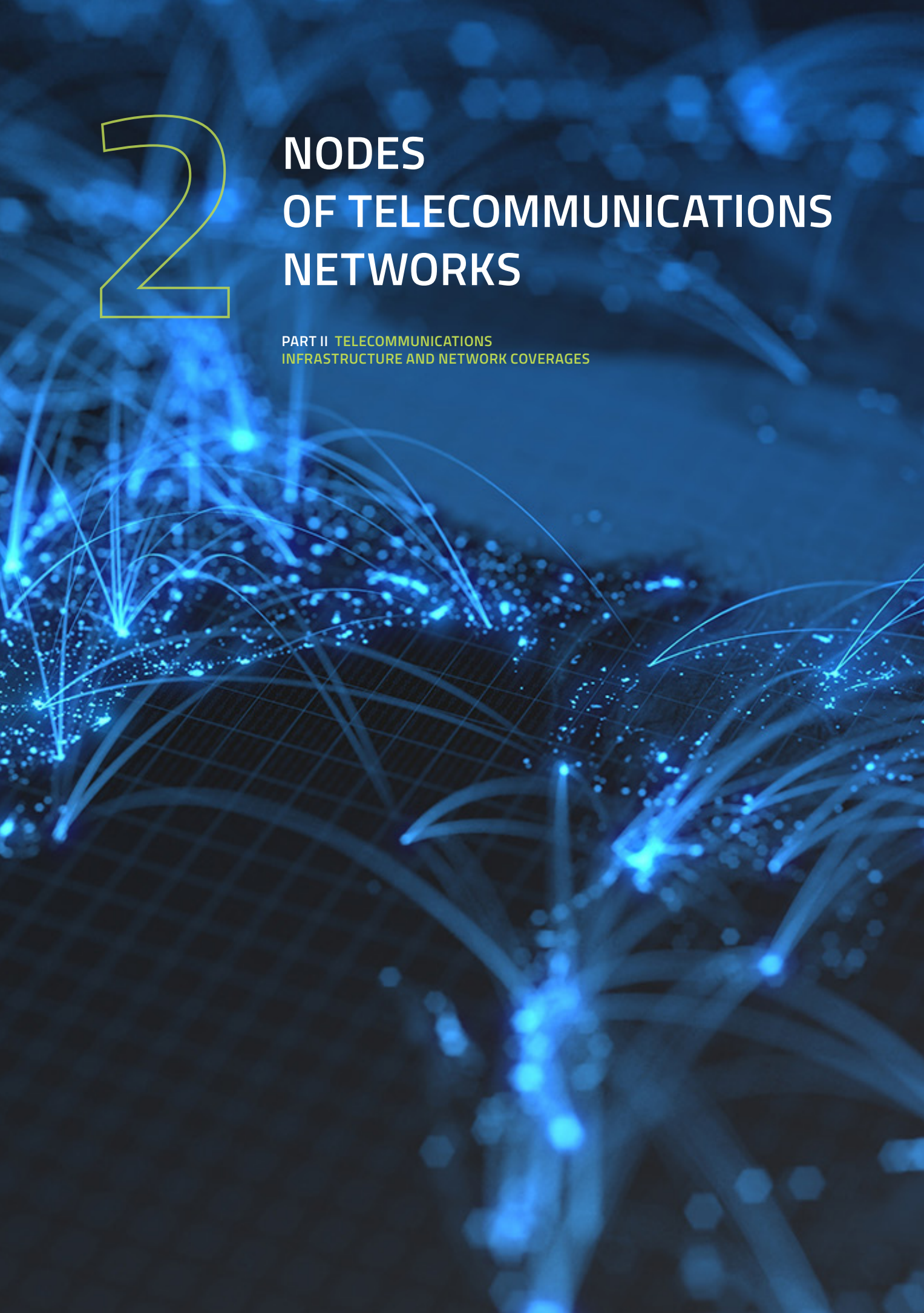
Chart 93. **Number of infrastructure elements (in thousands) entered into SBI in 2018-2020**



Source: UKE

The number of network terminations declared as of 31 December 2020 was 45.5 million (increase by 3.7 million). The majority of them are mobile network terminations. The number of declared network terminations, which greatly exceeds the number of buildings in Poland, results from the fact that all mobile network operators submit data about the vast majority of buildings covered by their network.

Following the statutory deadline to file data (31 March), the inventory was completed by 195 additional enterprises. Almost half of them declared to complete their data submission on 1 April 2021. Slightly less than half of delayed reports (96 enterprises) consisted of data, the remainder being declarations that no data eligible for submission exist.



2 NODES OF TELECOMMUNICATIONS NETWORKS

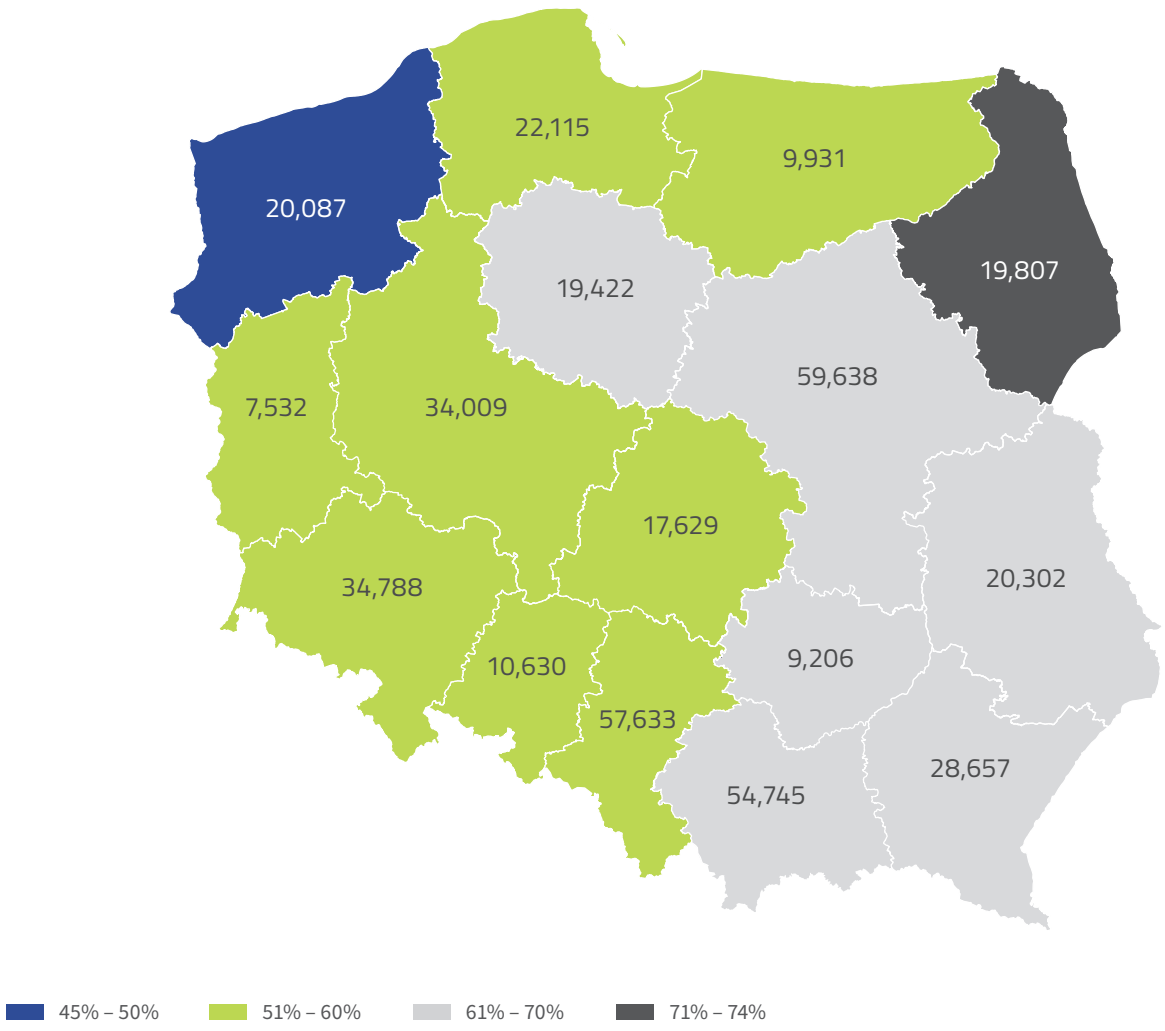
PART II TELECOMMUNICATIONS INFRASTRUCTURE AND NETWORK COVERAGES

During the 2020 inventory, the enterprises reported a total of 426,131 own nodes (excluding virtual nodes), an increase by more than 11,000 compared to 2019 data. An increase in the number of access nodes in data for 2020, from more than 7 thousand to 342,779, was also observed.

The inventory for 2020 contains data about 258,670 fibre-optic nodes. The number of such nodes increased by 19 thousand compared to 2019 (Chart 94).

As in the previous year, the largest share of nodes with fibre-optic interconnections is found in the Podlaskie voivodeship, with 74% of nodes in the region equipped with them. The least number of such nodes is found in the West Pomeranian voivodeship (46%), although a considerable increase is observed regardless.

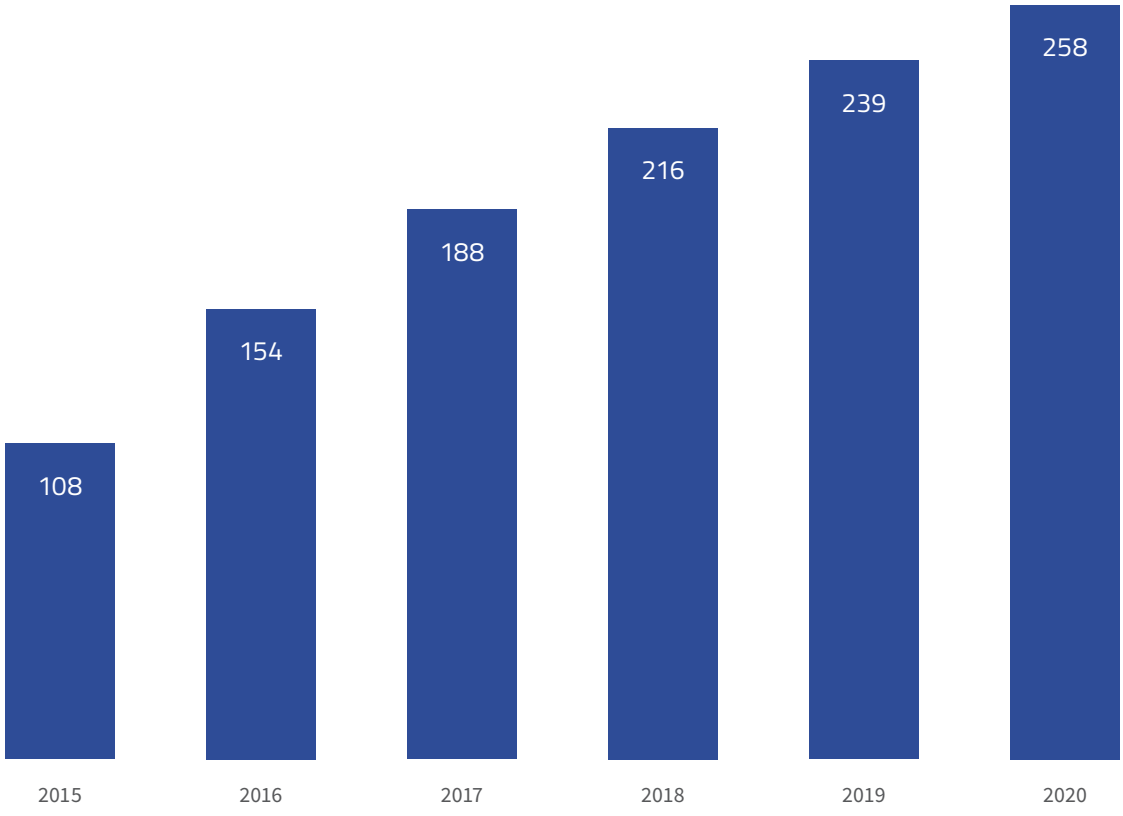
Map 2. **Number of nodes with fibre-optic interfaces and their share in the total number of own nodes**



Source: UKE

The share of nodes equipped with fibre-optic interfaces is steadily increasing – such interfaces are already found in more than half of all nodes. The largest share of fibre-optic nodes is typical for localities with 20,000 to 100,000 inhabitants. On average, the least number of such nodes is found in very small localities with up to 100 inhabitants (Table 1).

Chart 94. **Number of fibre-optic nodes in each year (in thousands)**



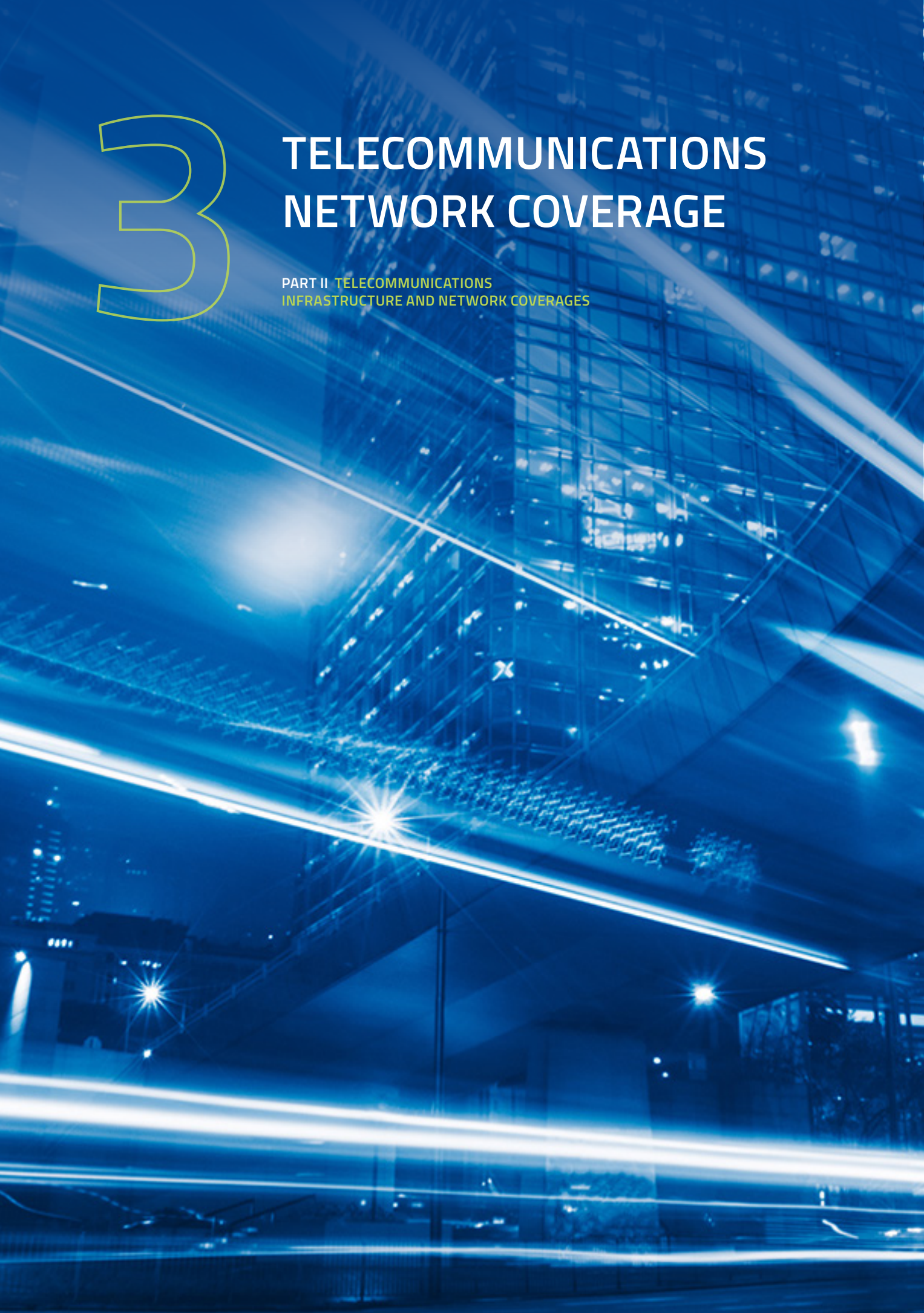
Source: UKE

Table 1. **Number of nodes of each type in localities of various size categories**[16]

Locality size	Number of nodes	Number of fibre-optic nodes	Number of cable nodes	Number of radio nodes
more than 100,000	168,110	101,573	128,116	19,347
50,001 – 100,000	36,992	24,064	23,288	4,579
20,001 – 50,000	44,567	28,751	25,480	8,059
5,001 – 20,000	46,005	28,989	22,646	10,829
1,001 – 5,000	57,621	36,271	19,613	18,956
501 – 1,000	30,063	18,974	9,148	11,111
101 – 500	38,214	18,291	14,690	20,118
up to 100 inhabitants	4,559	1,757	1,045	2,929

Source: UKE

[16] The sum of nodes of each type is greater than the total number of nodes. This is because obliged enterprises report some nodes as having different types of interfaces.



3 TELECOMMUNICATIONS NETWORK COVERAGE

PART II TELECOMMUNICATIONS INFRASTRUCTURE AND NETWORK COVERAGES

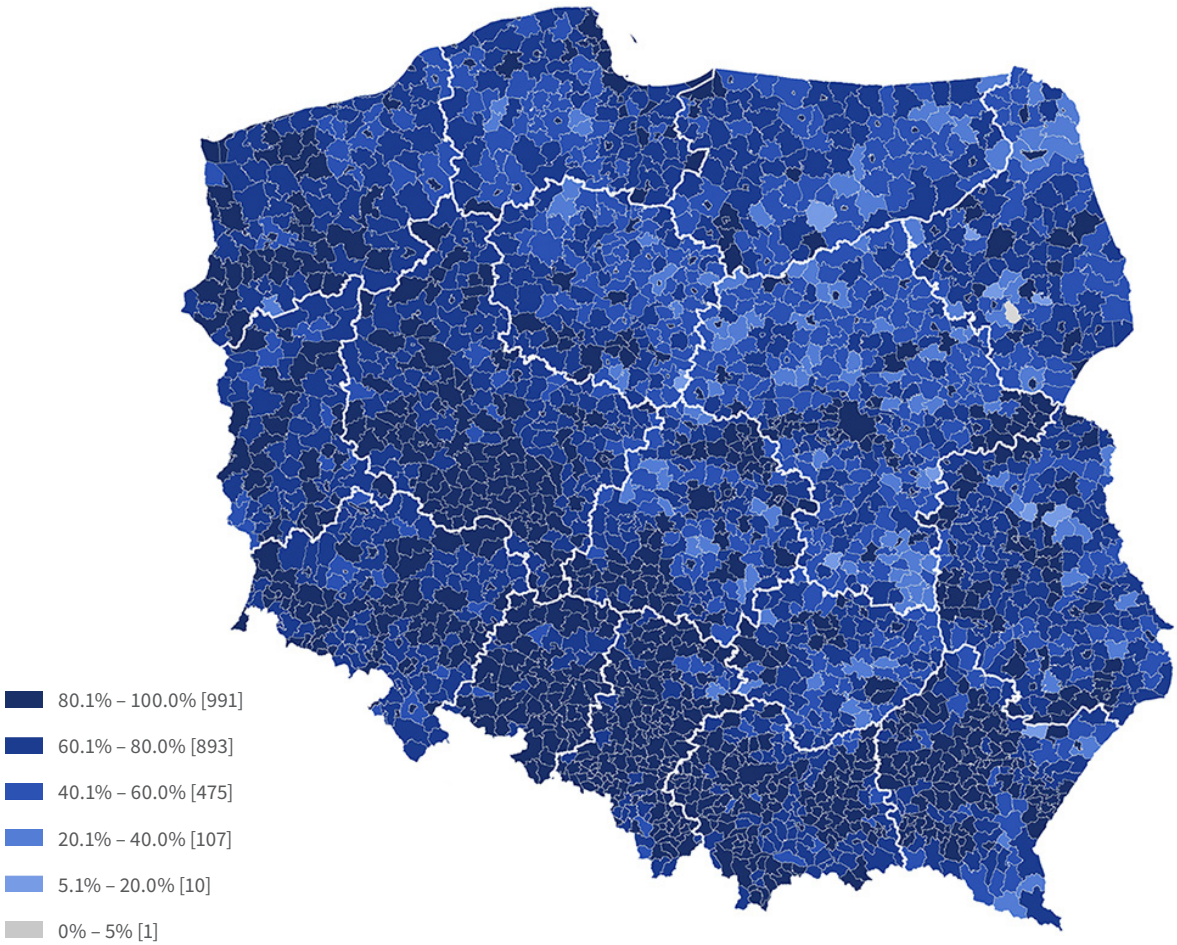
In order to prepare this report, in the part concerning the coverage of telecommunications networks, an address database compiled on the basis of NOBC (system of address identification of streets, real estate, buildings and flats maintained by the President of the Central Statistical Office) and PRG (state register of borders and areas of the country's territorial division units kept by the President of the Head Office of Geodesy and Cartography) was used.

In total, the list contains around 8 million unique addresses, which for the purposes of this report were equated with buildings. In addition, on account of the data model used to collect information in the SBI system, the address database was extended by 64 thousand addresses not featured in the above-mentioned reference databases, which were reported as network terminations by enterprises obliged to submit a report.

3.1. BUILDING PENETRATION

The results of this year's inventory of coverages match projections made based on linear trends from the previous years. The availability of services with the capacity of 30 Mb/s and 100 Mb/s is increasing steadily. Changes in the higher of these two capacity categories are particularly visible, with nationwide penetration increasing from 32.78% to 40.85% compared with the previous year.
In turn, a smaller increase or decrease in the total number of capacities of 30 Mb/s is the result of a changed approach to reporting coverages of VDSL technology by one of the larger operators.

Map 3. **Total building penetration with fixed-line internet coverages**

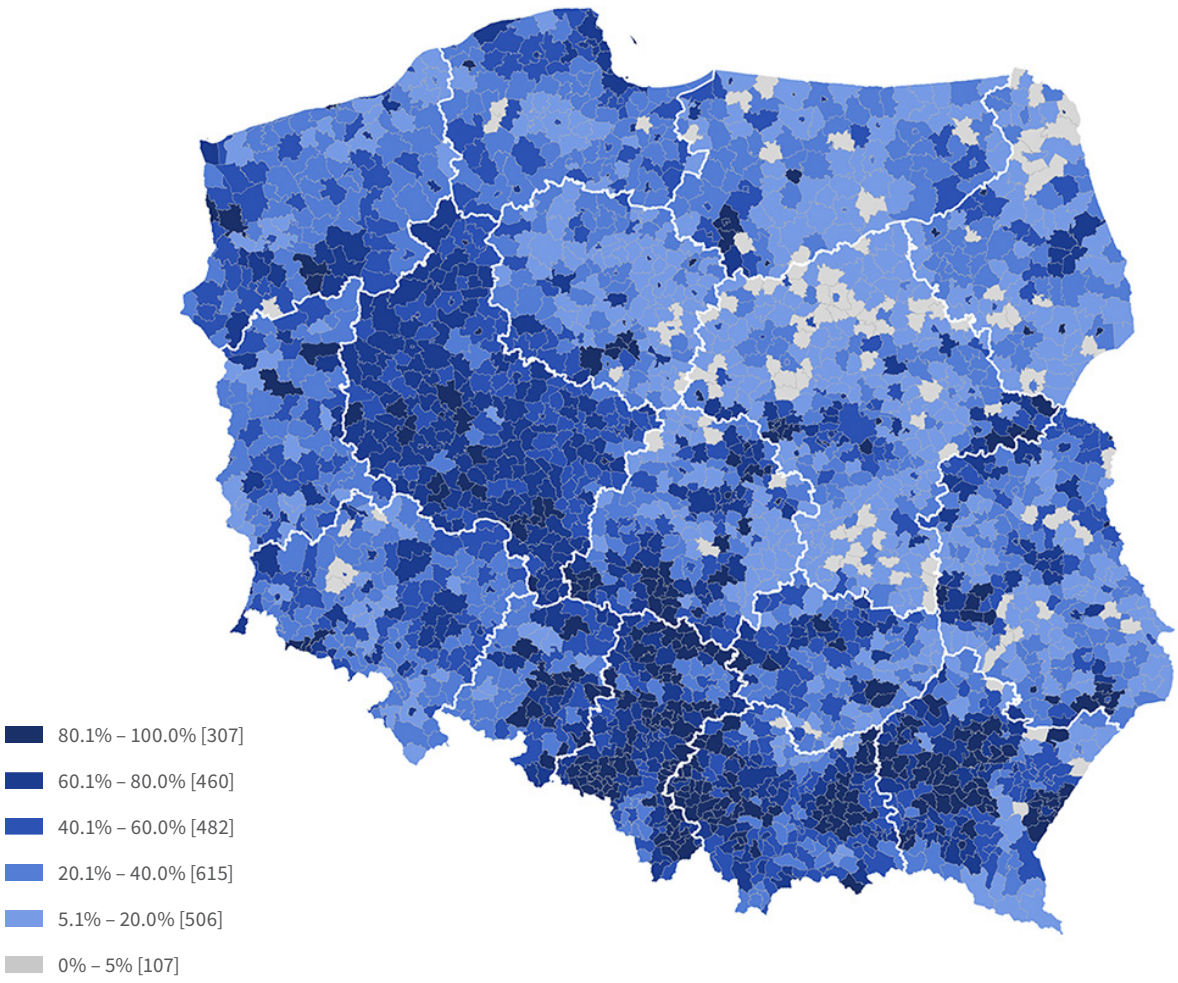


Source: UKE

The assessment of the availability of public telecommunications networks was carried out using the building penetration rate, understood as the ratio of the number of buildings with specific parameters within the network's coverage (i.e., buildings where operators declare the possibility of providing services) to the number of all buildings in the analysed area.

The availability of fixed-line internet services remains on a similar level compared to last year's data; areas located in the west and south of Poland, as well as areas surrounding large cities, are still notable for having penetration values close to 100%. It is worth noting that in 192 Polish communes, fixed-line internet is already available in at least 95% of buildings.

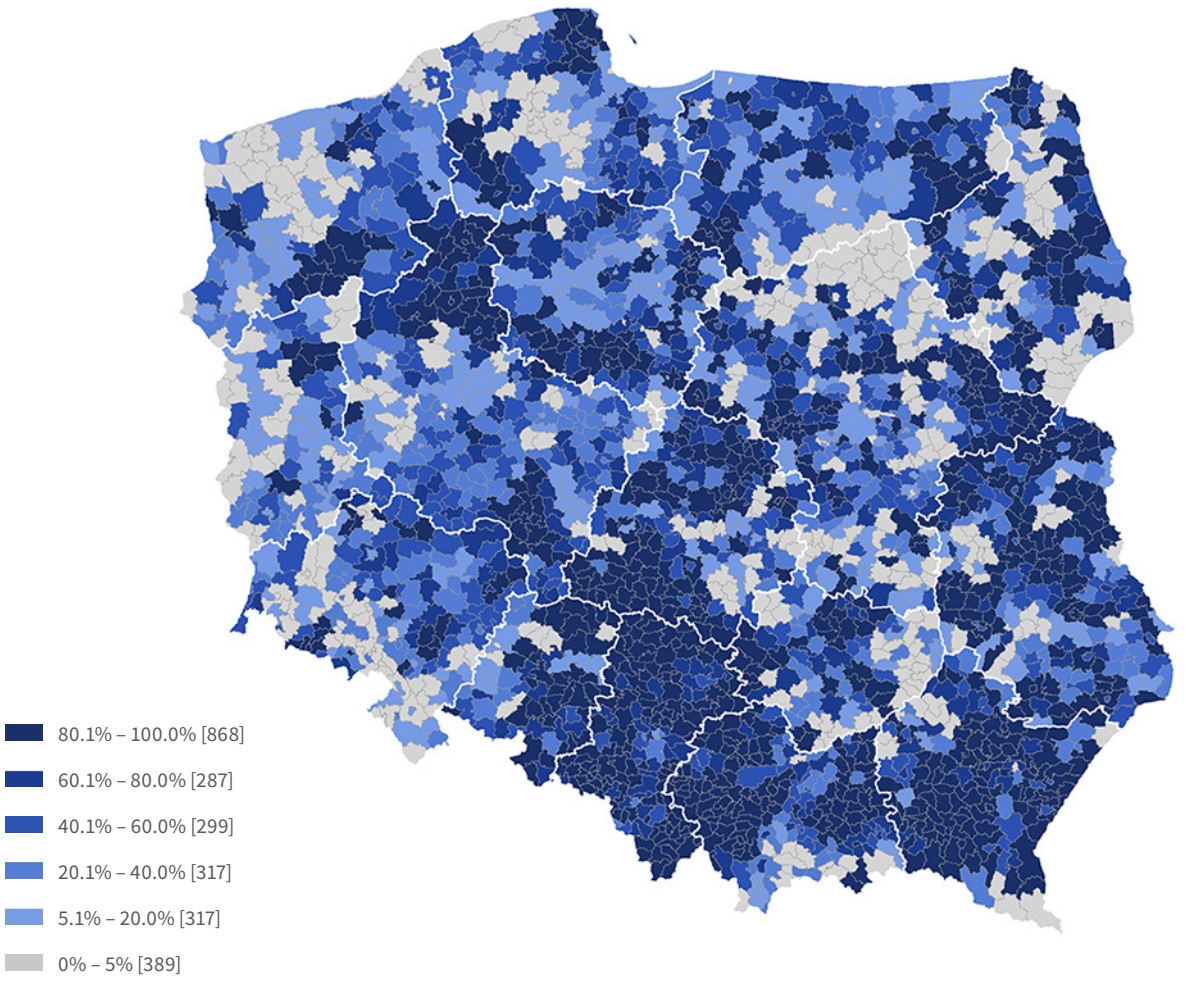
Map 4. **Building penetration with fixed-line internet coverages with at least 30 Mb/s capacity**



Source: UKE

The 30 Mb/s capacity coverage map now looks considerably different compared to last year's data which results from a changed approach of one of the operators to reporting data about VDSL technology. The consequence of this altered model is that building penetration in many communes fell below the 2019 level, while other communes were classified as belonging to a lower data presentation class. Following the changes, notable facts include the low availability of 30 Mb/s capacity services in Mazovia, especially in communes close to the voivodeship's borders, where penetration does not exceed 20% of buildings.

Map 5. **The share of small and medium telecommunications enterprises in the total number of coverages with at least 30 Mb/s capacity**

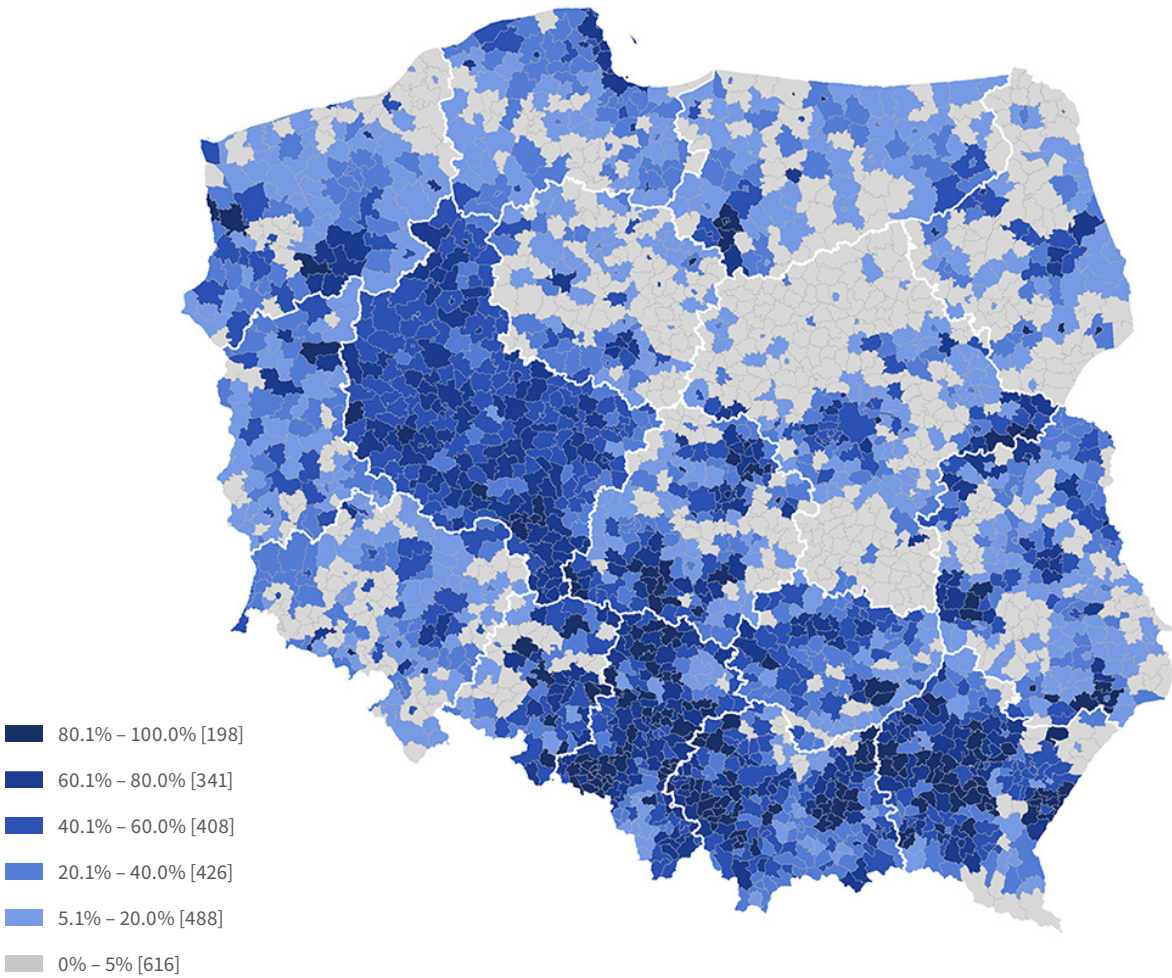


Source: UKE

Analysing coverages with 30 Mb/s capacity, it should be noted that services with such capacity can be provided by small and medium telecommunications enterprises (SME). Map 5 shows that the share of SMEs in the total number of coverages with at least 30 Mb/s capacity is especially large in the so-called “eastern belt” and in southern Poland.

This means that SMEs are more effective in reaching end users in areas with problematic geography, for example due to terrain configuration. On the other hand, they have a relatively low share in services in voivodeships in which Poland’s largest urban centres are located.

Map 6. **Building penetration with fixed-line internet coverages with at least 100 Mb/s capacity**



Source: UKE

The map showing building penetration with coverages with at least 100 Mb/s capacity (Map 6) even more clearly underscores the differences, which can already be seen in the 30 Mb/s capacity map. Internet access with at least 100 Mb/s capacity is available mostly in voivodeships which grow fast in this respect: Silesian (65.39%) and Greater Poland (59.61%). The voivodeship, in which the largest percentage change compared to the previous year was observed is Lesser Poland (14 percentage points) and West Pomeranian (13 percentage points).

The lowest penetration of buildings with fixed-line internet coverages with more than 100 Mb/s capacity can be observed in the north-eastern voivodeships: Kuyavian-Pomeranian (21.67%), Warmian-Masurian (23.77%) and Masovian (24.42%), with Masovian coming last in the building penetration ranking if Warsaw and surrounding communes are excluded.

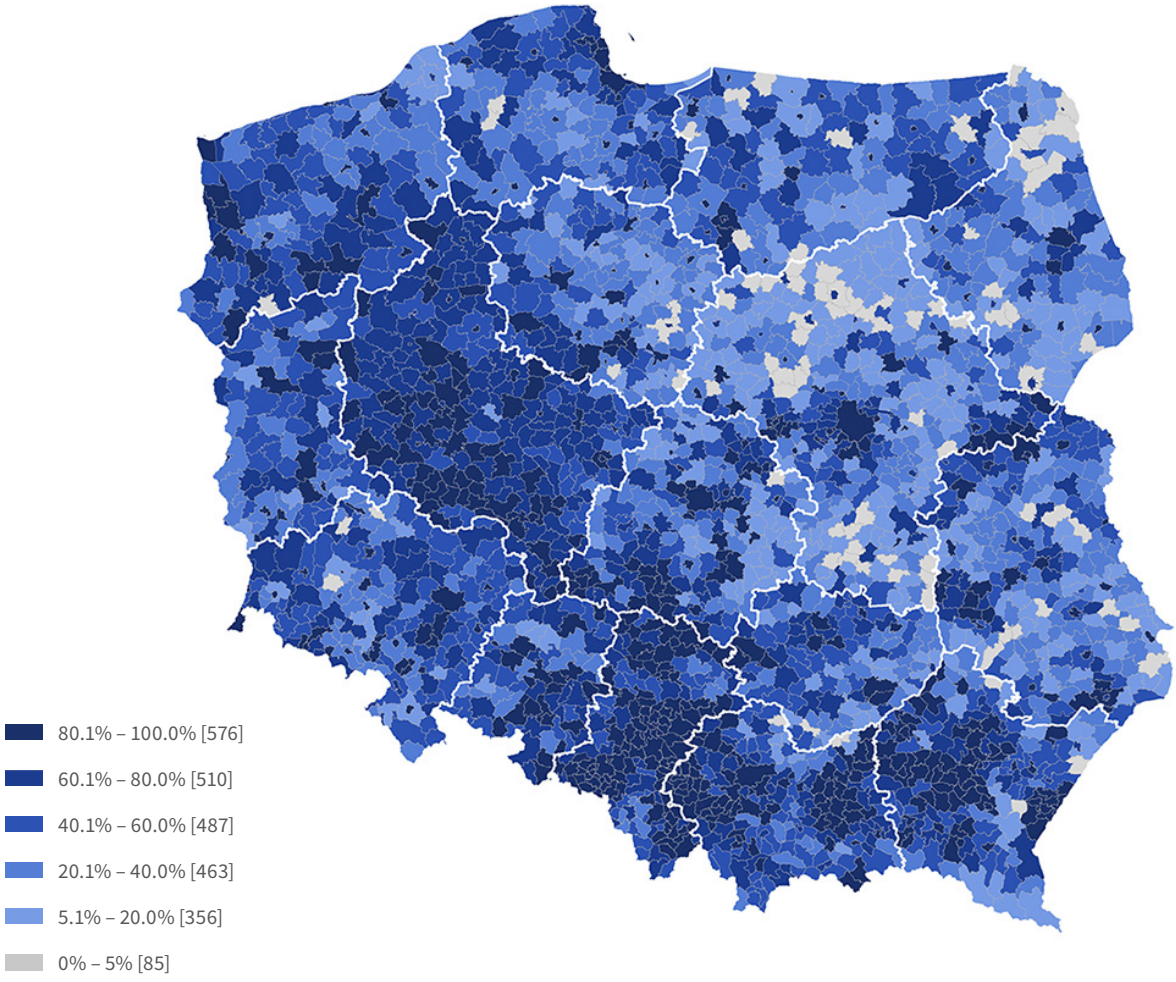
3.2. DWELLING PENETRATION

The Digital Agenda for Europe (DAE) that continued the Lisbon Strategy was one of seven leading initiatives adopted by the European Commission as part of the Europe 2020 strategy. Published in May 2010, DAE set before EU countries two[17] main objectives related to internet services access and usage, planned to be completed in 2020. The first was ensuring that all households in the European Union have access to internet with at least 30 Mb/s capacity by the end of 2020. With reference to the rules of monitoring the progress of DAE objectives, set out in detail in the National Broadband Plan (NBP), for the purposes of the DAE indicators, a household is equated with a residential dwelling. Hence, in order to assess the progress of the aforesaid assumptions, a dwelling penetration indicator was used, understood as the ratio between all residential dwellings covered by networks with at least 30 Mb/s capacity (a building in which operators declare themselves capable of providing specific services) and the total number of residential dwellings in the analysed area. According to the situation at the end of 2020, fixed-line internet access with capacity of at least 30 Mb/s was available to 75.9% of all households.

Comparing these data with 2019, the share of such households increased by 0.9 percentage points. The highest penetration is invariably found in the Silesian voivodeship (89.1%), and the lowest in the Lubusz voivodeship (61.9%). The share of households to which fixed-line internet access service with capacity of at least 30 Mb/s can be provided, broken down by commune, has been shown in Map 7.

[17] The third DAE objective related to internet service access was ensuring broadband internet access to all Europeans in 2013. Because this objective was achieved in 2013, it is not discussed further here.

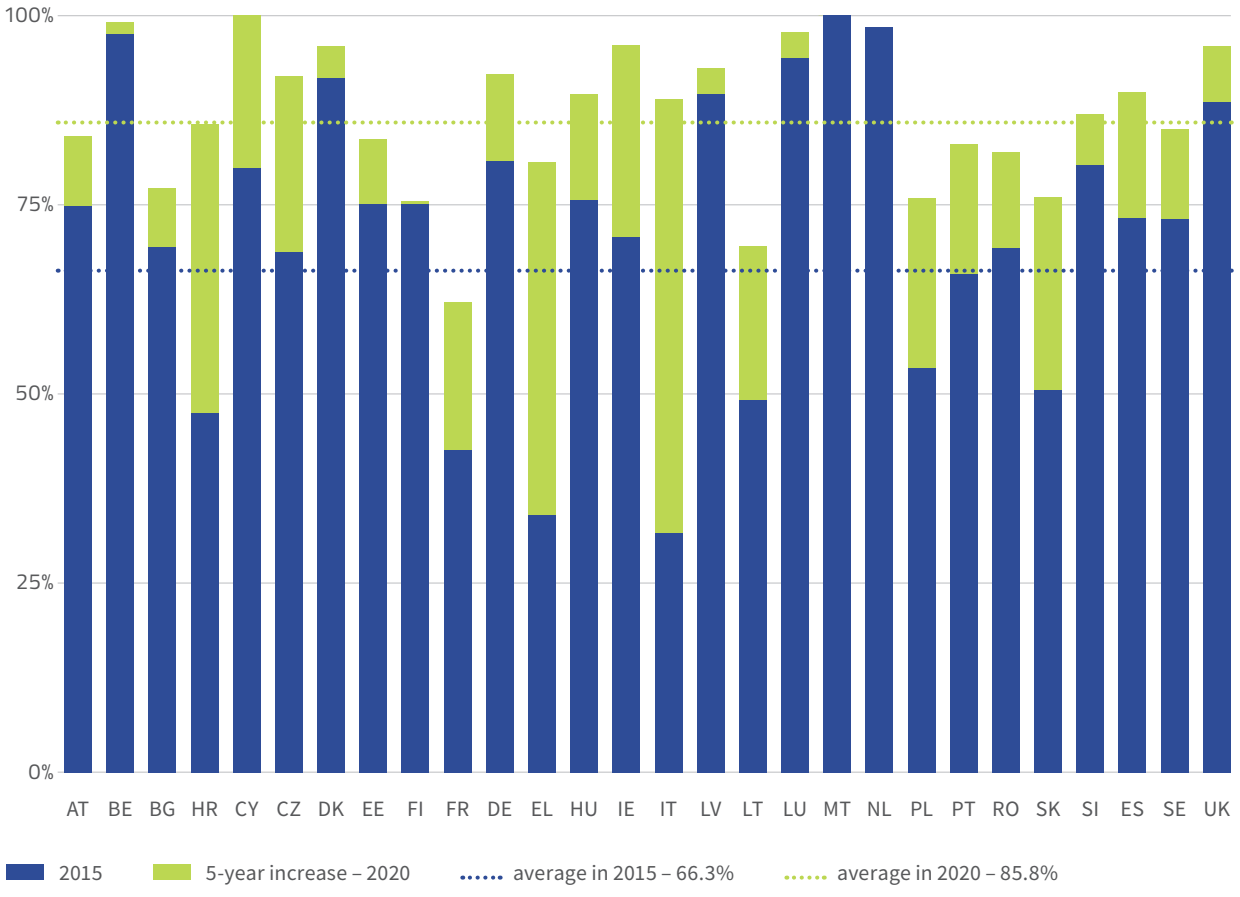
Map 7. **Dwelling penetration with fixed-line internet coverages with at least 30 Mb/s capacity**



Source: UKE

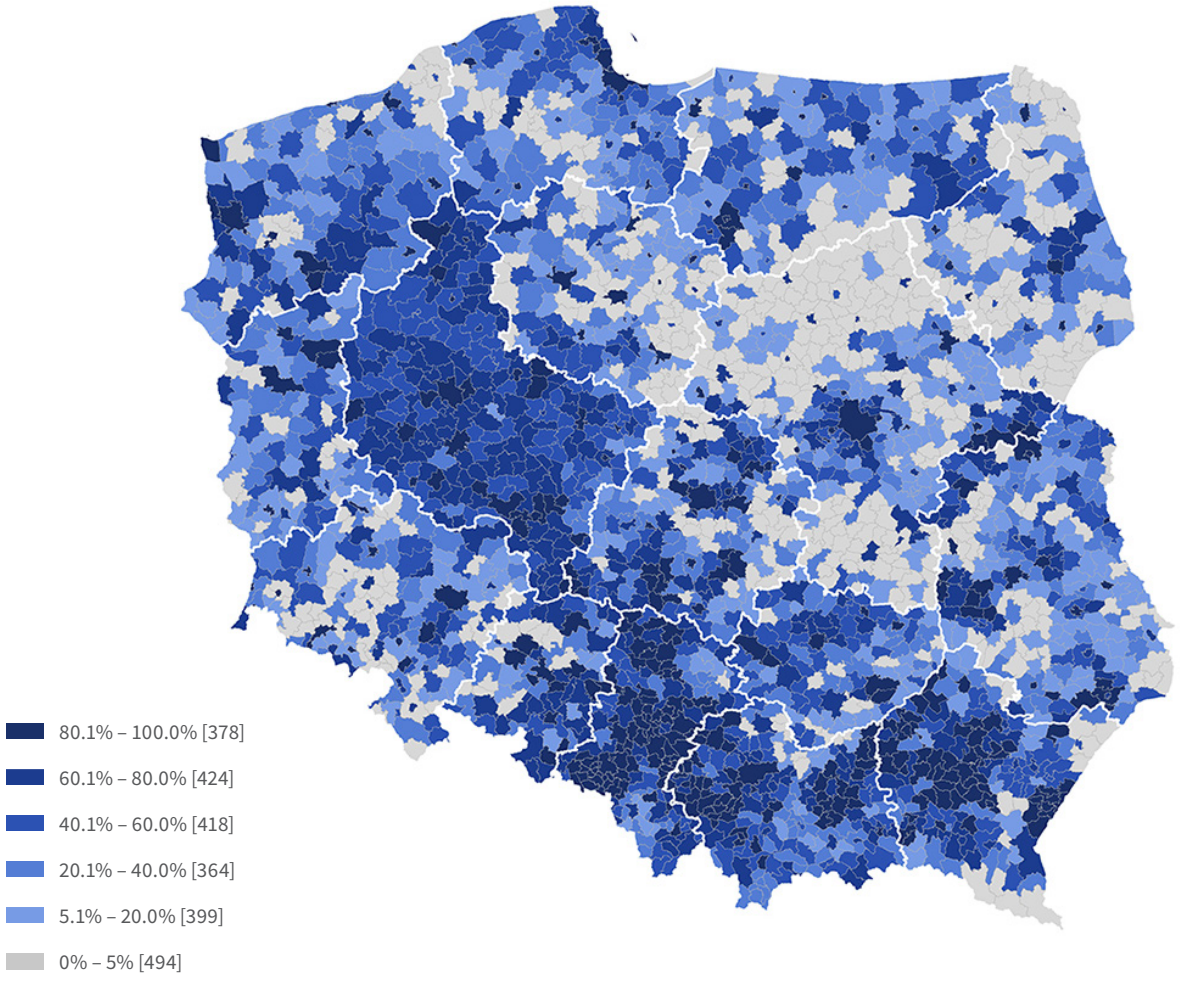
The above-cited data on the share of households, to which a fixed-line internet access service with capacity of at least 30 Mb/s can be provided, show that Poland has not achieved the DAE objective that assumes that such access will be ensured for all households. Among EU countries only two, Malta and Cyprus, managed to achieve this objective (Chart 95). Poland, despite a rapid growth, failed to match the result obtained by these countries, although compared to 2015 it can be noted that the DAE objective achievement percentage increased by more than 22 percentage points. Poland belongs to a group of countries which had a low percentage of households fulfilling the DAE objective in 2015 but made considerable progress towards achieving these objectives during the last five years.

Chart 95. **Percentage of households to which an internet access service with capacity of least 30 Mb/s can be provided in each European country**



Source: data for Poland are derived from the inventory of infrastructure and telecommunications services carried out by the President of the UKE as of 31 December 2020; data for other countries are derived from reports of the Digital Economy and Society Index (DESI): https://digital-agenda-data.eu/charts/desi-see-the-evolution-of-two-indicators-and-compare-countries

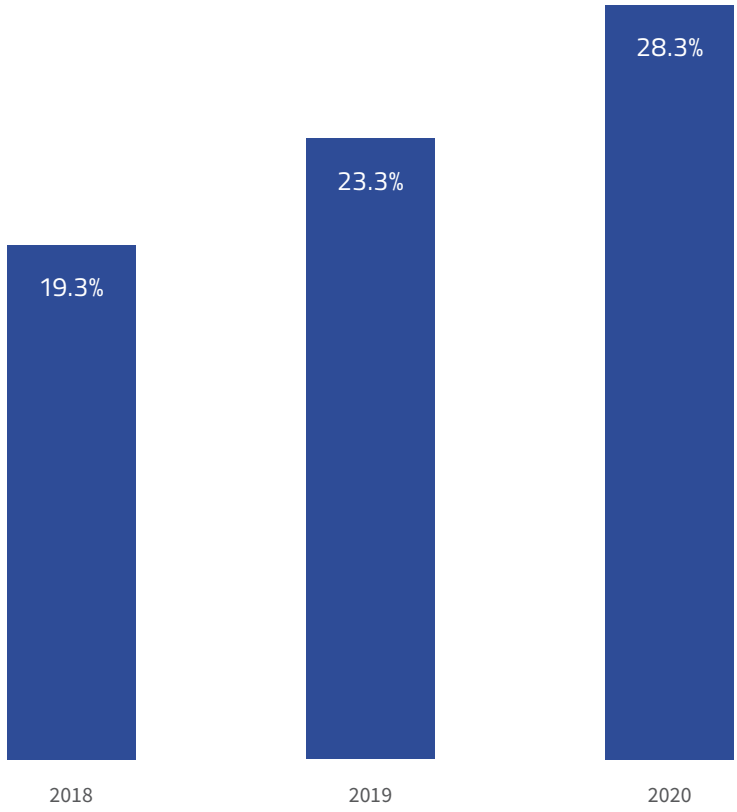
Map 8. **Dwelling penetration with fixed-line internet coverages with at least 100 Mb/s capacity**



Source: UKE

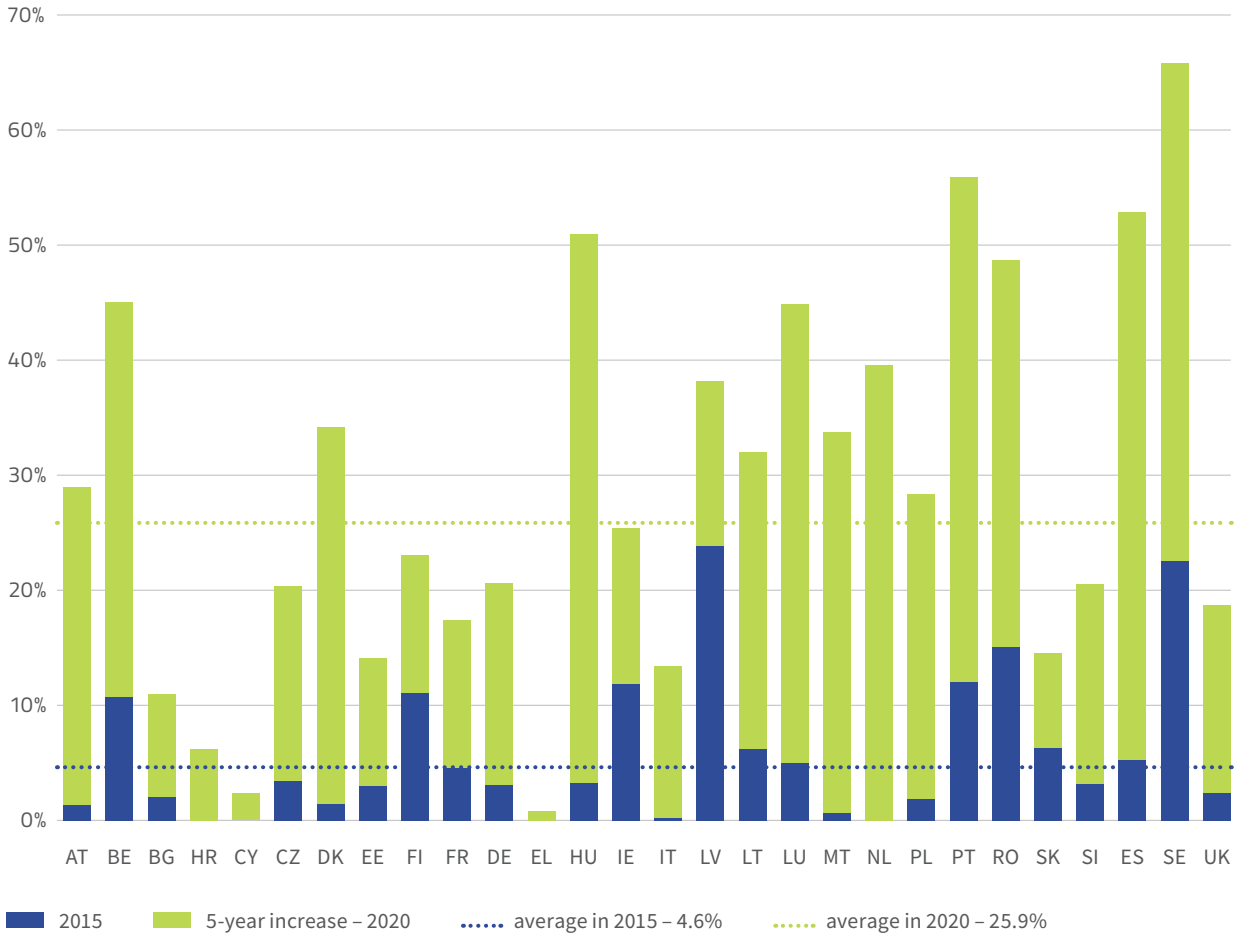
The other objective of the Digital Agenda for Europe planned for 2020 was building demand for high-capacity services and ensuring that the usage of internet access with at least 100 Mb/s capacity is increased to 50% of households. As of the end of 2020, the usage level of such services in all households in Poland was 28.3%, having increased by 5 percentage points compared to 2019 (Chart 96). Poland did not manage to achieve the set DAE objective, although usage of the services under consideration increases year on year, and Poland is currently ranked above the European average (Chart 97). Among EU countries, this objective was completed by four: Hungary, Portugal, Spain and Sweden.

Chart 96. **Share of households using internet access services with at least 100 Mb/s capacity in the total number of households in Poland in 2017-2020**



Source: UKE

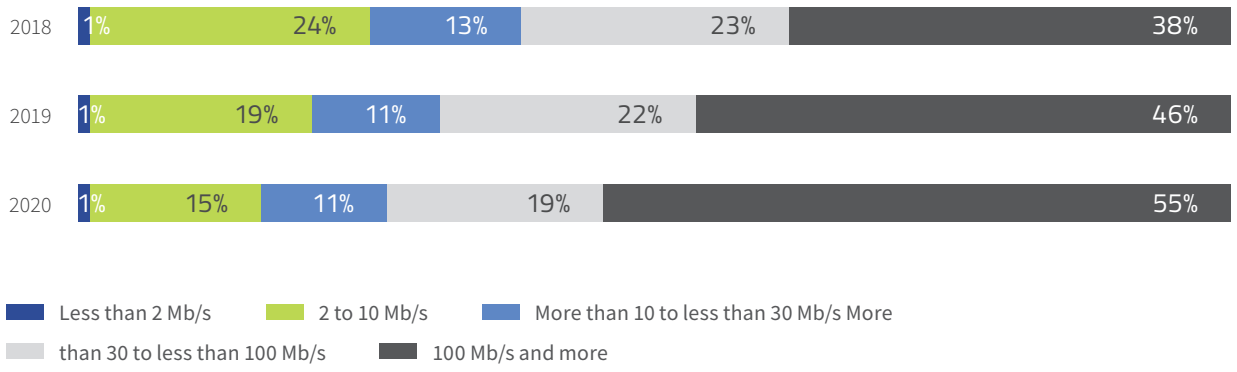
Chart 97. **Share of households using internet access services with at least 100 Mb/s capacity in the total number of households in European countries**



Source: data for Poland are derived from the inventory of infrastructure and telecommunications services carried out by the President of the UKE as of 31 December 2020; data for other countries are derived from reports of the Digital Economy and Society Index (DESI): https://digital-agenda-data.eu/charts/desi-see-the-evolution-of-two-indicators-and-compare-countries

Each year, an increase of the share of services with the highest capacities in the total volume of provided fixed-line internet access services can be noted. In 2020, services with at least 100 Mb/s capacity were used already by 55% of households with fixed-line internet access (Chart 98). Compared to 2018, the share of such services increased by 9 percentage points at the expense of the percentage of lowest capacity services.

Chart 98. **Share of individual capacity categories of provided fixed-line internet access services in the total number of such services**

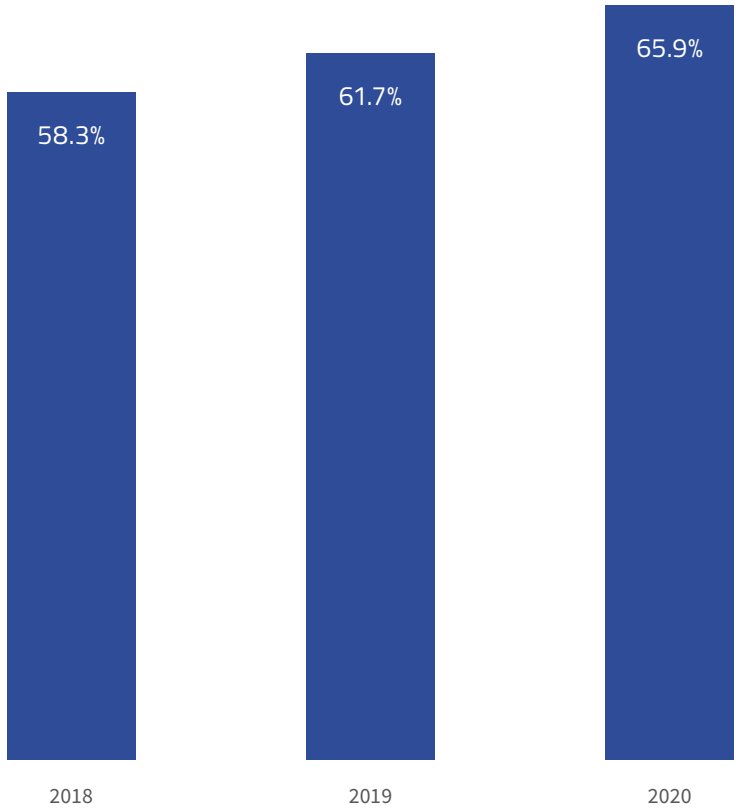


Source: UKE

The Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the *Regions Connectivity for a Competitive Digital Single Market – towards a European Gigabit Society* (COM(2016)587 final) lists the European Union objectives related to development of broadband networks planned to be achieved in 2025. The strategic goal for 2025 is to ensure that all households in Europe have internet access with downstream connection speed of at least 100 Mb/s, with the option to upgrade to gigabit speeds. In order to assess the achievement of this objective, households are equated with residential dwellings, similar to assessing the achievement of DEA objectives. Households having internet access with downstream connection speed at least 100 Mb/s, with the option to upgrade to gigabit speeds, are understood as residential dwellings in buildings covered by fibre-optic and coaxial copper cable networks (limited to *(EURO)DOCSIS 3.x* technology) and twisted pair copper cables (limited to *1 Gigabit Ethernet, 10 Gigabit Ethernet, 100 Mb/s Fast Ethernet* technology), and dwellings to which services with a speed above 100 Mb/s using a radio medium are already provided. Taking the above assumptions into account, the percentage of households covered by internet access of at least 100 Mb/s capacity, with the option to upgrade to gigabit speeds, amounted at the end of 2020 to 65.9% and increased by 4.2 percentage points in relation to 2019-2018 (Chart 99).

[18] Until 2019, when determining the degree of achieving this objective, the 100 Mb/s Fast Ethernet technology for twisted pair cooper cable medium was treated as allowing the objective's assumptions to be achieved. Since 2020, this technology is not taken into account when calculating the value of the indicator.

Chart 99. **Share of households covered with networks allowing internet access with downstream connection speed of at least 100 Mb/s, with the option to upgrade to gigabit speeds in the total number of all households in Poland in 2018-2020**



Source: UKE

Monitoring the achievement of the remaining objectives stated in the above-cited communication:

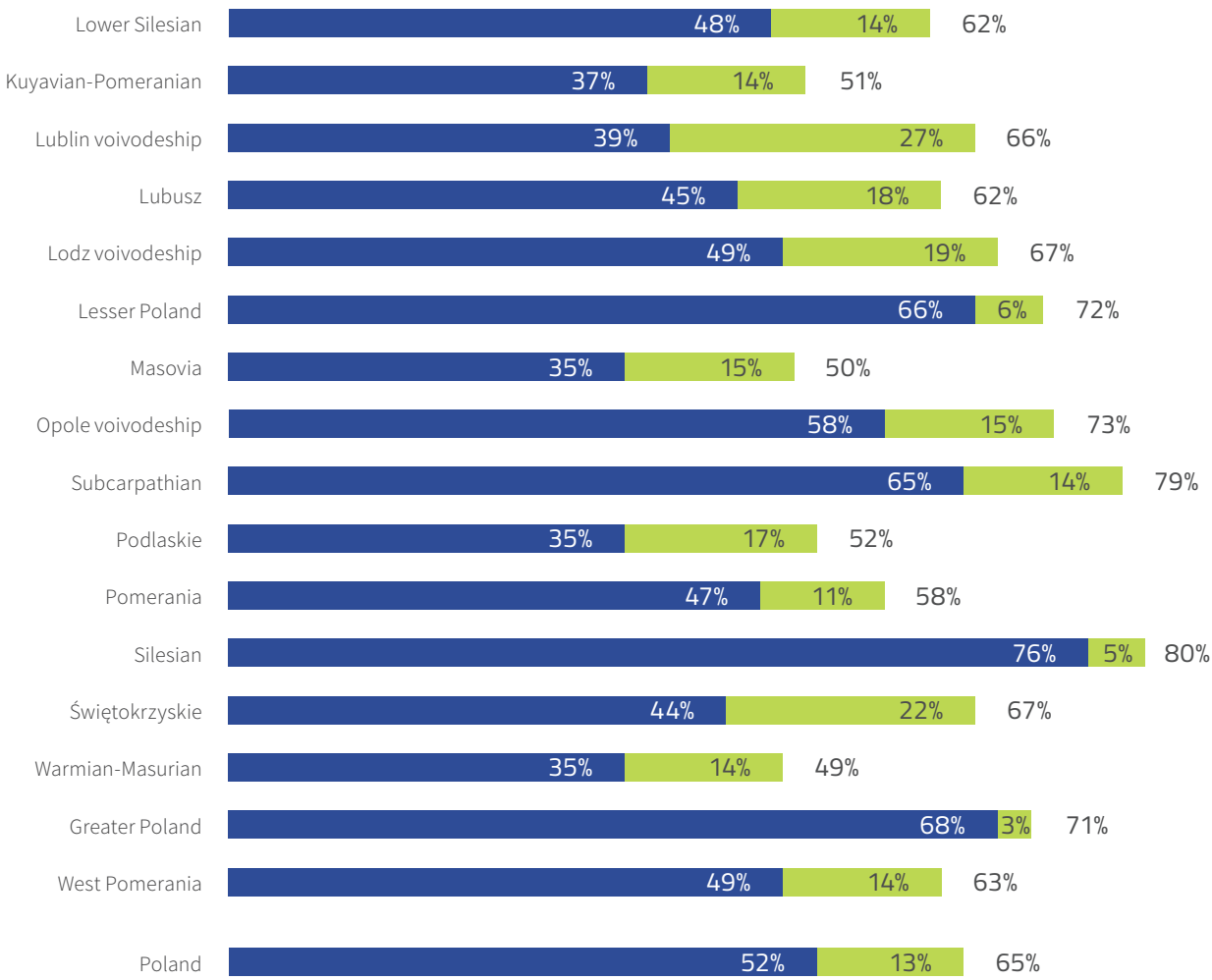
- strategic objective for 2025: uninterrupted access to the 5G network for all urban areas and all major roads and railways;
- strategic objective for 2025: gigabit-speed Internet access for all locations driving social and economic development, such as schools, transport hubs and main providers of public services, as well as digitally intensive enterprises;
- intermediate objective for 2020: ensuring 5G communications as a fully developed commercial service in at least one main city in each member state due to the introduction of the 5G network in 2018

– this will be possible only when the provision of Article 29(2) of the Act on supporting the development of telecommunications services and networks as well as executive regulations defining the detailed scope and manner of providing data enter into force. At the current stage, a national methodology for monitoring these objectives is being developed.

3.3. POST-OPDP NETWORK COVERAGE

The Operational Programme Digital Poland for the years 2014-2020 (OPDP) is intended to ensure access to fast internet of at least 30 Mb/s capacity over the entire country. As part of action 1.1 of OPDP, 4 competitions were announced which, once completed, will connect 11,000 schools and more than 2 million households. According to plan, by the end of 2023 all address points declared for connection by beneficiaries should be covered by an NGA network.

Chart 100. **Building penetration of fixed-line internet coverage with at least 30 Mb/s capacity once OPDP investments are completed**



Source: UKE

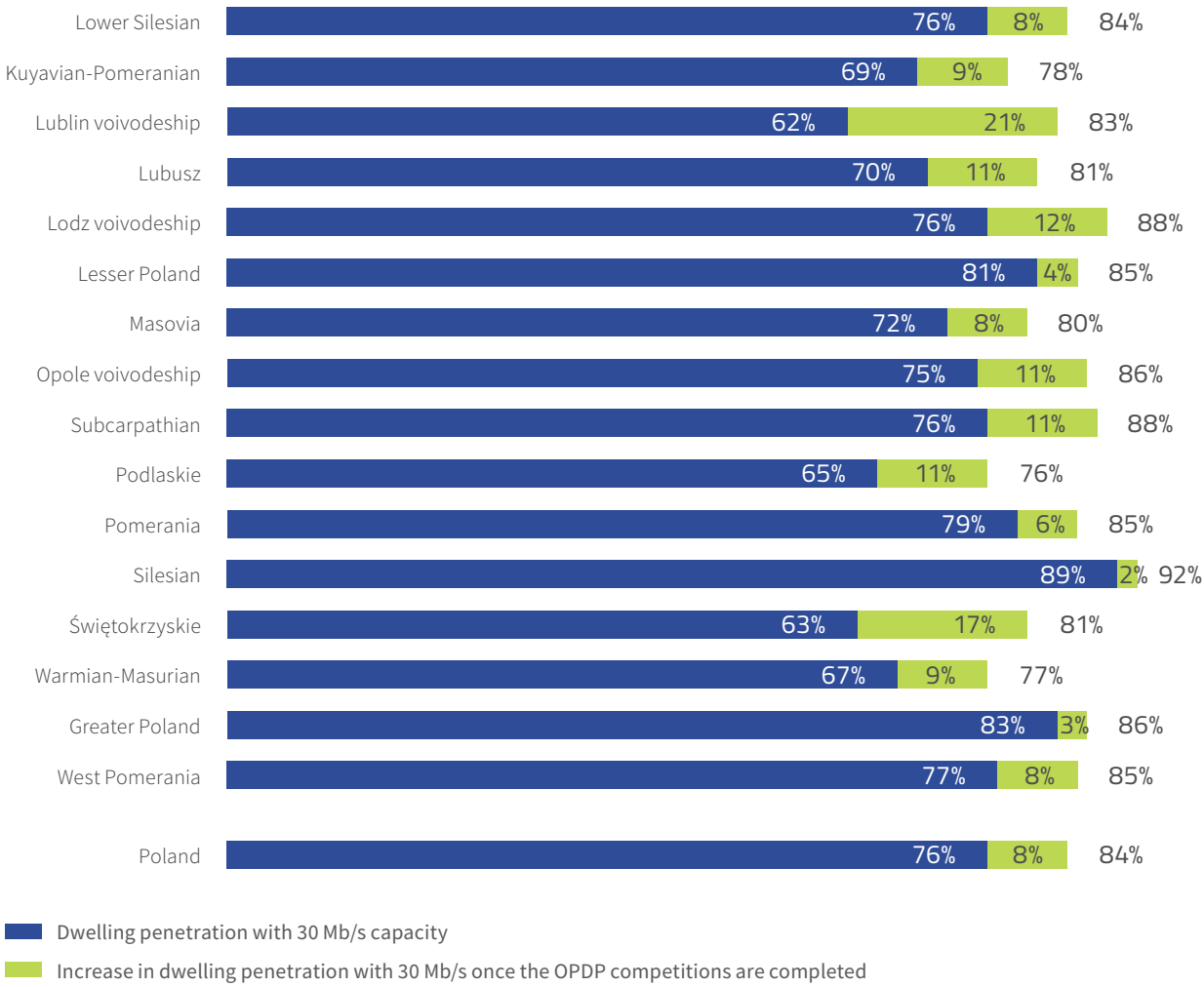
Completing investments from the 2nd, 3rd (round 1 and 2) and 4th calls for proposals as part of action 1.1 of Operational Programme Digital Poland will allow to increase building penetration with fixed-line internet coverage with at least 30 Mb/s capacity by 13 percentage points on average and achieve the average level of 65% (Chart 100).

As part of the 2nd and 3rd OPDP competitions, NGA network coverage was extended to more than 600,000 households (as of the end of May 2021), 29% of the number of households declared for connection by beneficiaries.

A large decrease compared to 2019, up to 10% of the expected value of building penetration with fixed-line internet services with capacity of at least 30 Mb/s, that followed the completion of the OPDP investment for the Podlaskie voivodeship, is the result of terminating three agreements from competition areas in that voivodeship.

Completion of investments related to action 1.1 of the OPDP should cause an increase in dwelling penetration with coverages with capacity of at least 30 Mb/s to 84%. The most pronounced effects of these investments can be expected in the Lublin voivodeship and Świętokrzyskie voivodeships, by 21 and 17 percentage points respectively (Chart 101). The completed investments will allow the Silesian voivodeship to improve dwelling penetration to a level above 90%.

Chart 101. **Dwelling penetration with fixed-line internet coverages with at least 30 Mb/s capacity once OPDP investments are completed**

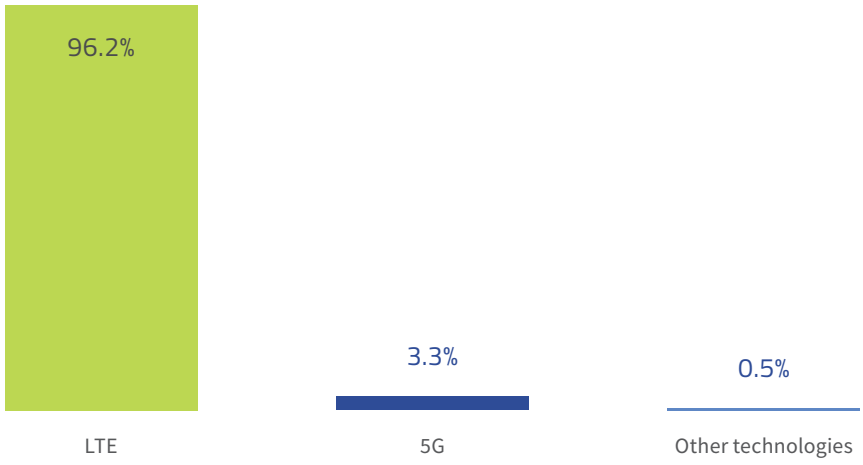


Source: UKE

3.4. MOBILE NETWORK COVERAGE

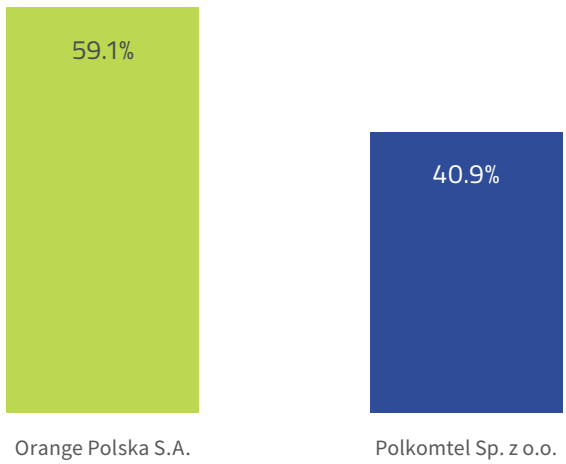
Mobile network coverages are determined by address points located within the technological coverage of base stations, reported through spatial indication. Information about mobile coverages submitted by operators for 2020 show that mobile technologies are still dominated by LTE, whose share in 2020 was 96.2% (Chart 102). Since this year, operators began to show 5G technology coverages which had been reported by two of them (Chart 103). The share of 5G in total mobile internet coverages was 3.3%.

Chart 102. **Share of individual technologies in mobile internet coverages**



Source: UKE

Chart 103. **Percentage of 5G network coverages reported by telecommunications operators**



Source: UKE

Other enterprises providing mobile services took the position that 5G services are being provided based on radio technology and frequencies allocated for 4G. According to their interpretation, this technology does not meet the 5G standard yet, which will occur only when dedicated frequencies are allocated to 5G.

According to the approach formulated in last year's report, the analysis of localities with no internet access was limited to inhabited localities. The very existence of uninhabited localities in the *List of official names of localities and their parts* was the object of UKE's informational campaign, discussed in more detail in Appendix 2 to the Report on the state of the telecommunications market in Poland in 2019. Inhabited localities were understood as localities containing at least one building with at least one residential dwelling as per the NOBC system[19], forming part of the TERYT register maintained by the President of the Central Statistical Office.

Taking into account inhabited localities having the status of an independent locality, as of the end of 2020, in Poland there are 15 localities that have no form of internet access via LTE. In total, these localities comprise 63 addresses of residential buildings. Among these, 9 localities are outside the coverage of any network, whether fixed-line or mobile. These localities comprise 15 addresses of residential buildings. Compared to 2019, the number of inhabited localities with no internet access via LTE technology decreased by 9. The list of localities with no internet access via LTE is found in Table 2. In addition, the table lists localities with no internet access whatsoever.

Table 2. **List of inhabited localities having no internet access via LTE, with designation of localities having no internet access whatsoever**

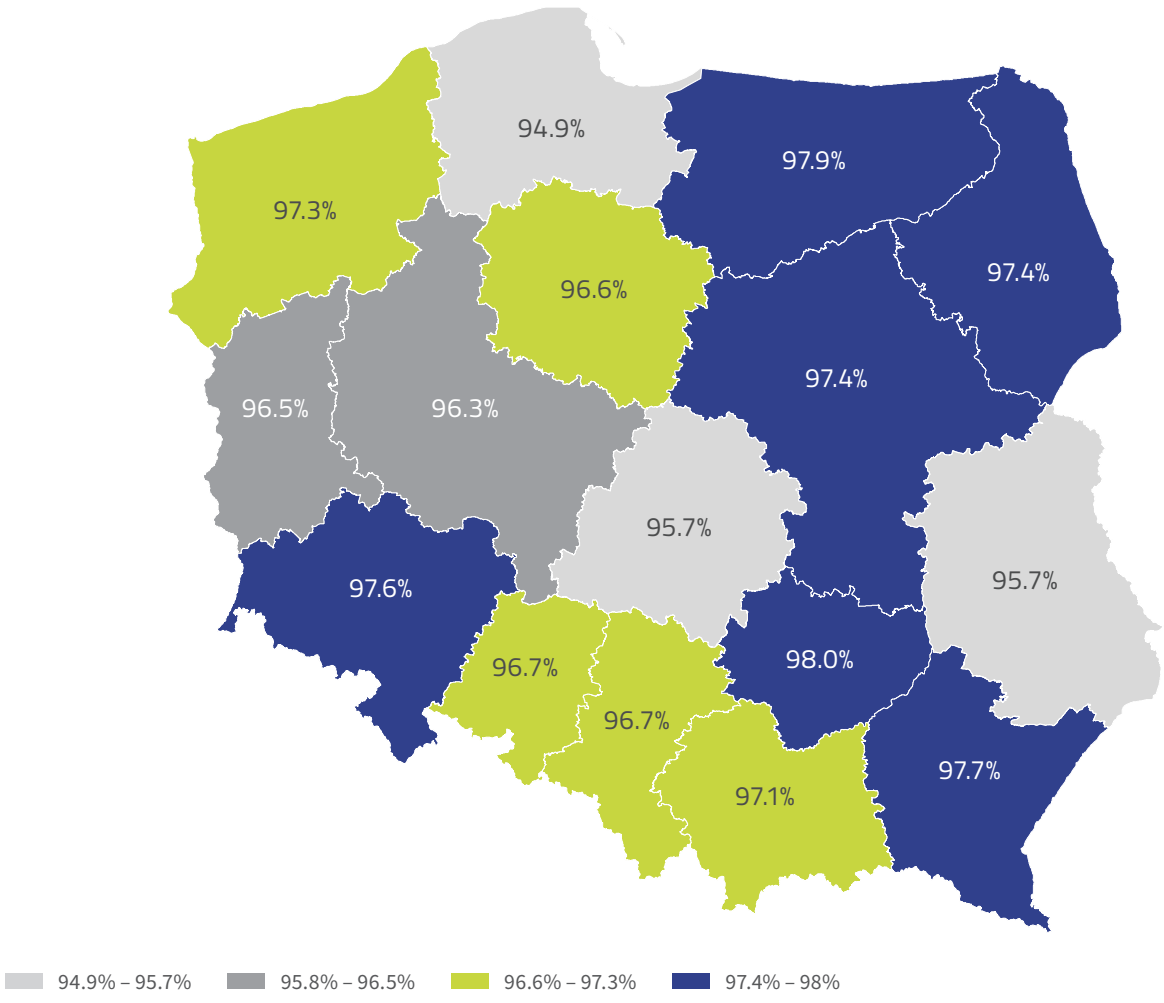
	Name of independent locality	SIMC code	Type of locality	Internet access Total
1	Bielice	0855546	village	
2	Brzegi Górne	0356122	village	
3	Dubne	0454787	village	
4	Gozdowiec	0594531	settlement	none
5	Huta Polańska	0355520	village	
6	Kadłub	0269742	forest settlement	none
7	Kronowo	0767612	settlement	none
8	Nakielno	1010472	forest settlement	none
9	Niwki	0603017	settlement	
10	Noskowo	1010130	settlement	none
11	Orzeszków	1003012	settlement	none
12	Piaskowice	0851459	village	none
13	Roztoka	0418455	tourist refuge	
14	Tarnawa Niżna	0356317	village	none
15	Trępnowy	0153672	settlement	none

Source: UKE

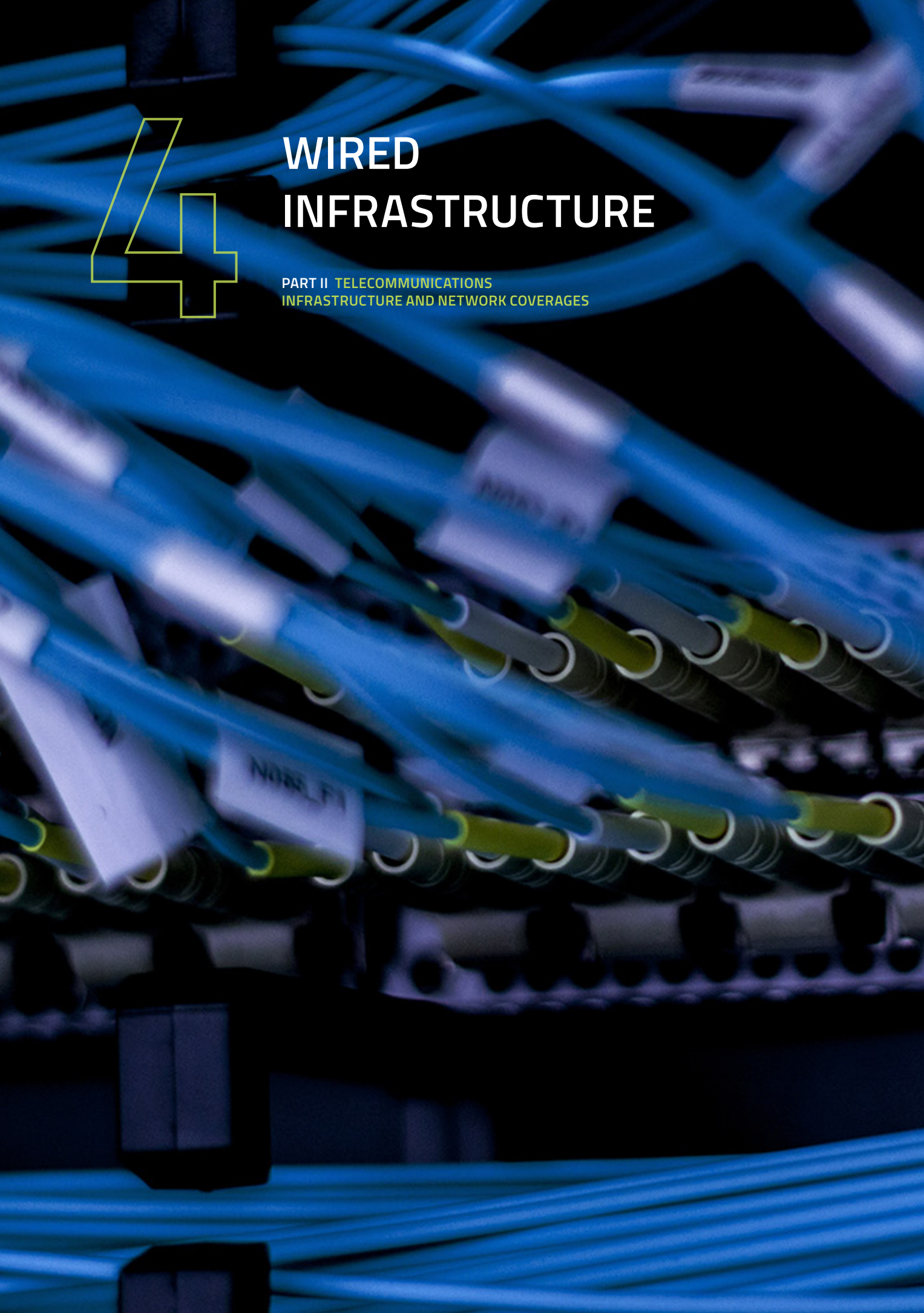
[19] A system of address identification of streets, real estate, buildings and flats

The growing coverage of LTE means that it can be used to access the internet in about 97% of buildings in Poland. The largest percentage of buildings covered by LTE is found in the Świętokrzyskie (98%) and Warmian-Masurian voivodeships (97.9%). The lowest percentage, even though the difference is slight, occurs in the Pomerania voivodeship (94.9%).

Map 9. **Percentage buildings covered by LTE**



Source: UKE



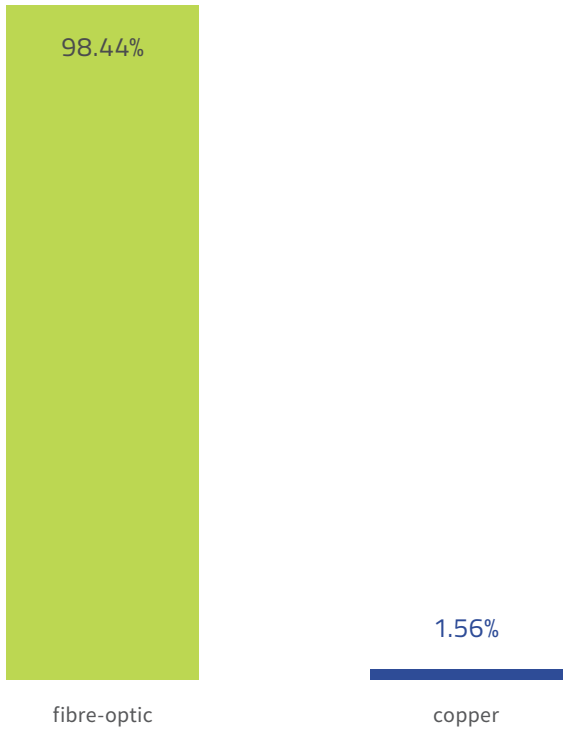
4 WIRED INFRASTRUCTURE

PART II TELECOMMUNICATIONS
INFRASTRUCTURE AND NETWORK COVERAGES

As part of an inventory of the telecommunications infrastructure and services, data about line infrastructure (beginning and end of line) are provided, although they do not reflect the actual course of the telecommunication networks. The length of courses of own wired lines, estimated on the basis of information submitted to SBI, was, as of 31 December 2020, equal to almost 411 thousand km. In addition, data on 45 thousand km of line infrastructure made available to enterprises that submitted their reports were provided.

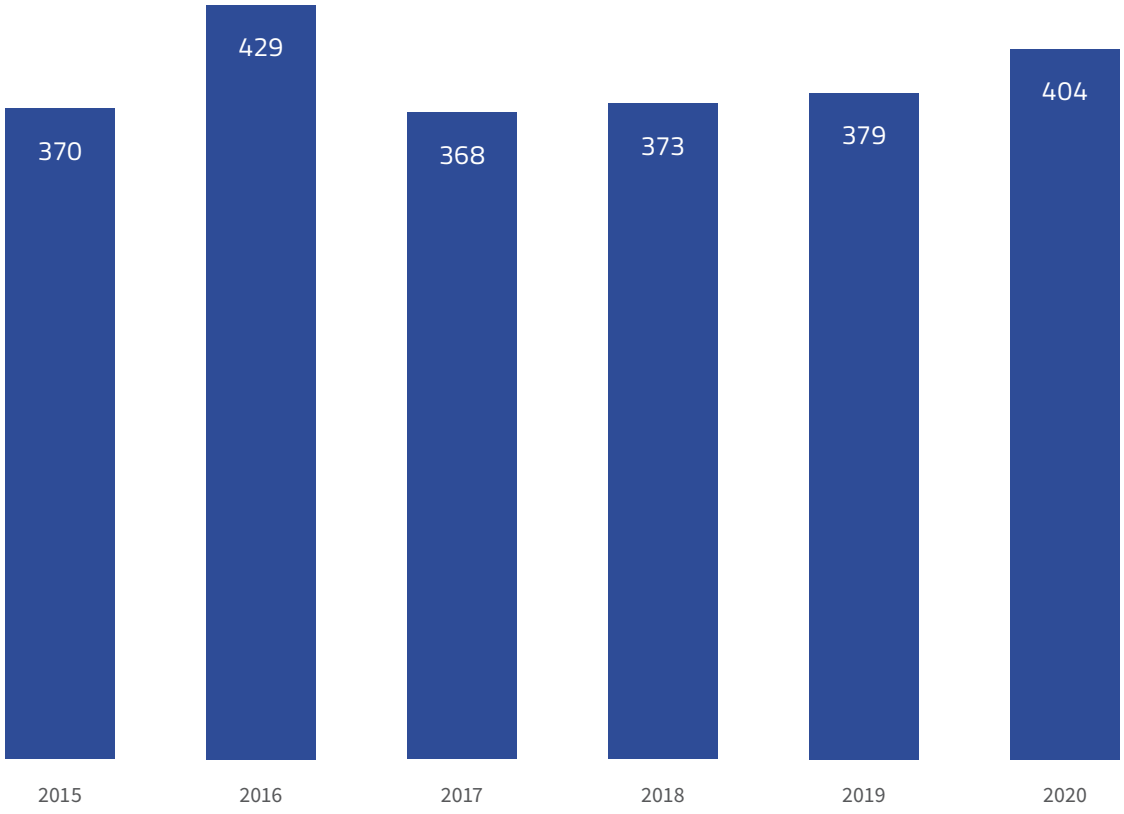
Chart 104 shows the share of individual media in line infrastructure for own infrastructure. Line infrastructure is dominated mostly by fibre-optic infrastructure (almost 98.5% of all lines), whose estimated length at the end of 2020 was 404 thousand km. Chart 105 shows the change of the total length of fibre-optic networks submitted to SBI each year.

Chart 104. **Share of different media in own line infrastructure**



Source: UKE

Chart 105. **Length of own infrastructure lines in thousands of km in 2015-2020**[20]



Source: UKE

Map 10 shows verified routes between fibre-optic lines in Poland (straight-line connections between network nodes). A notable density of lines is obviously associated with the most urbanised areas (Upper Silesia, Tricity, Warsaw, Poznań, Wrocław) as well as main communication routes that link the largest agglomerations in the country.

[20] An increase in the length of fibre-optic network in 2016, followed by a decrease in 2017, is the result of an erroneous submission of data by certain enterprises, as also explained in the report on the state of the telecommunications market in 2017. For example, in 2017, just one entity noted a drop by over 72,000 km, from 76,724 km to 4,513 km. The subsequent decrease in the length of the fibre-optic network and continued steady level of this value is the result of more detailed data submitted to SBI by stakeholders.

Map 10. **Relations of own fibre-optic networks in Poland**

Source: UKE

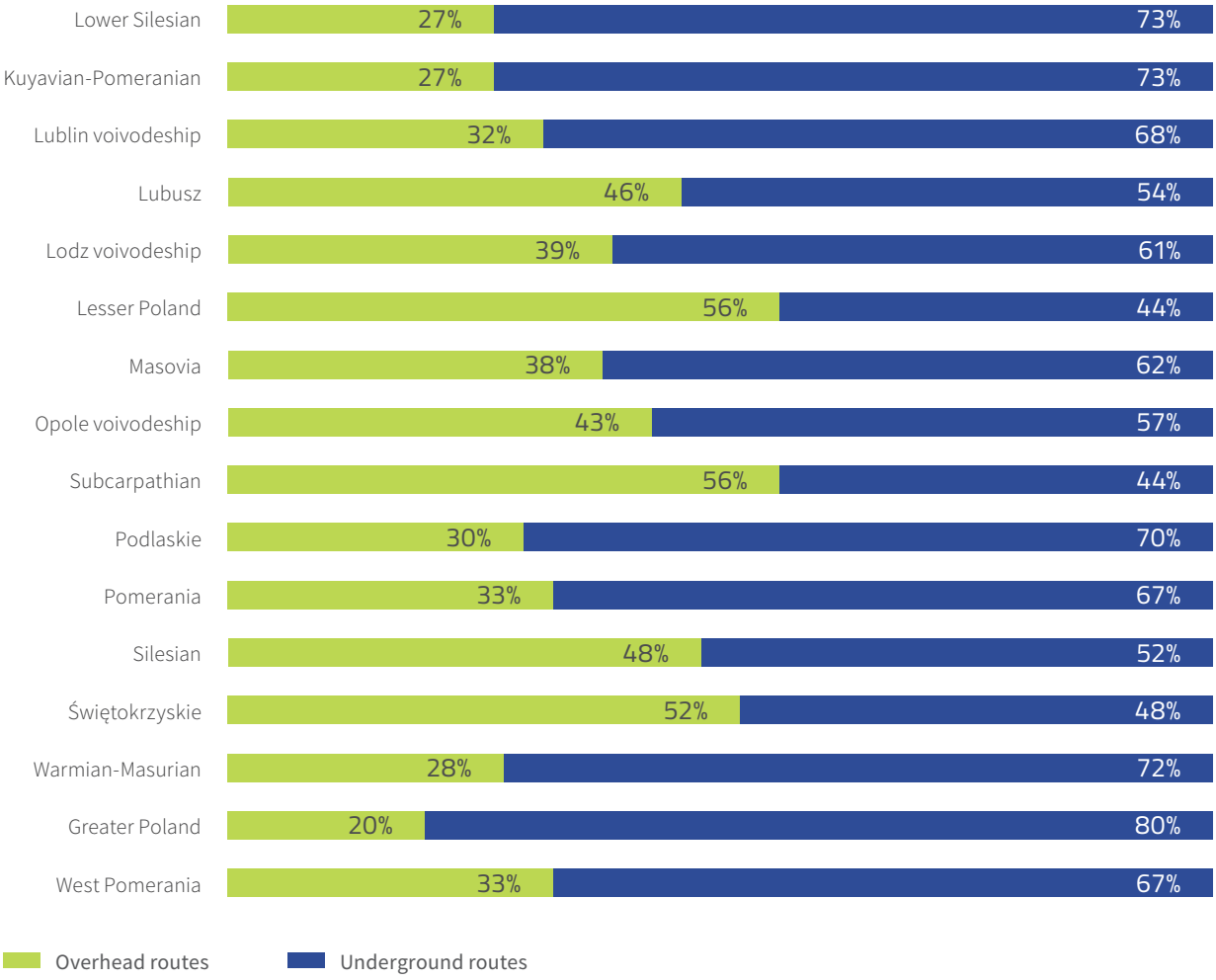
Chart 106 shows the share of own wired networks in underground and overhead routes. It should be noted here that because of the model of data used to collect information about line infrastructure (line relations instead of actual courses), information about the share of each route type are approximations only.

The share of individual types of routes in own wired lines differs from voivodeship to voivodeship. The share of overhead routes ranges from about 20% in the Greater Poland voivodeship to about 56% in the Subcarpathian and Lesser Poland voivodeships.

The difference in individual types of routes result from terrain configuration in a particular region, the possibility of hanging cables, and the availability of technology channels. Regions located in southern Poland are characterised by a higher share of overhead lines, while in lowland areas (Greater Poland and Kuyavian-Pomeranian voivodeships) underground infrastructure predominates.

The average density of wired networks in Poland in 2020 was 1.3 km/km^2.

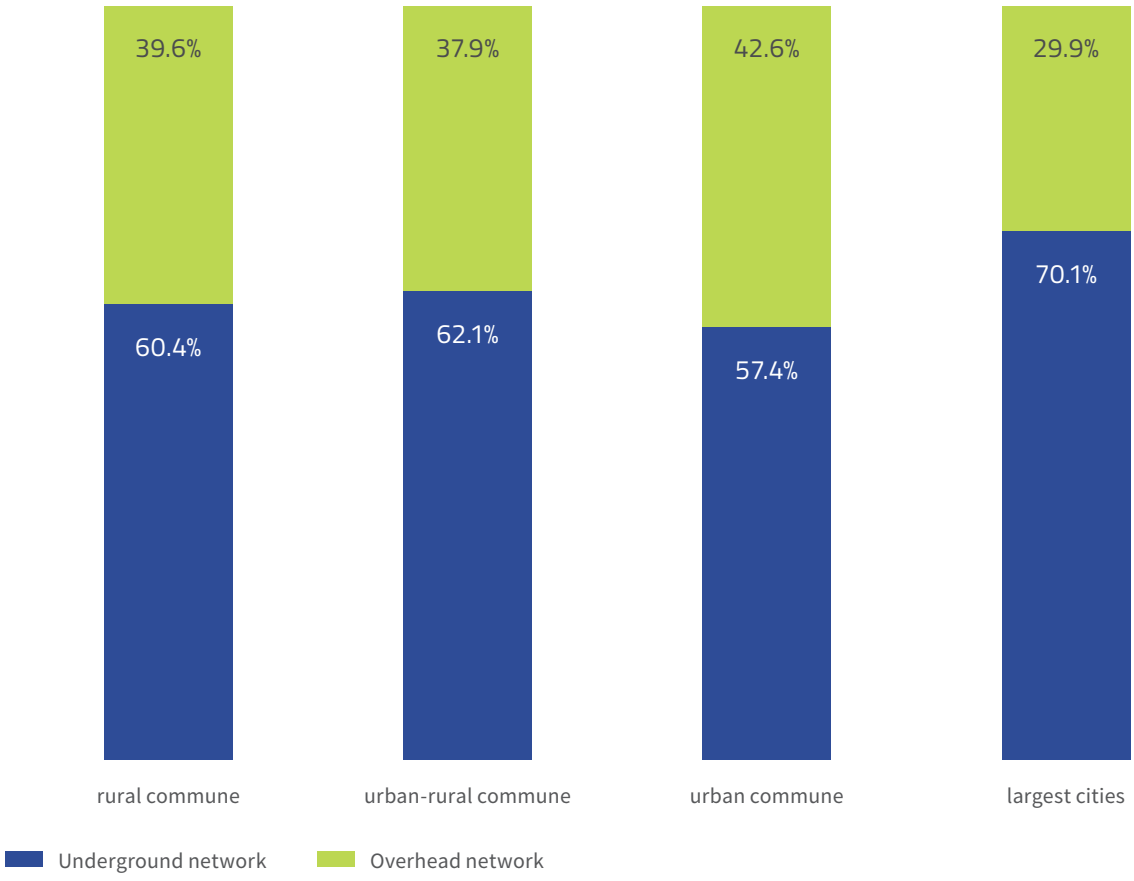
Chart 106. **Share of underground and overhead routes for wired own networks by voivodeship**



Source: UKE

The share of individual types of routes for own lines is slightly different due to the type of commune through which the approximate course of the line passes. Data shown in Chart 107 demonstrate that the share of overhead lines is similar (about 40%) in rural, urban-rural and urban communes, except for the largest cities. In the twenty largest cities, the share of overhead route networks is lower, with about 30% of the total length of own networks running overhead.

Chart 107. **Network routes for own wired networks in different types of areas**



Source: UKE

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Office of Electronic Communications
Department of Strategy and Analysis
+48 22 534 9335
fax: +48 22 534 9322
e-mail: sekretariat.dsa@uke.gov.pl