UKE | Office of Electronic Communications

Report on the state of the telecommunications market in Poland in 2019

CONTENTS

INTRODUCTION

We present to you the report on the state of the telecommunications market in Poland in 2019. As was the case in previous years, the publication covers two issues. The first concerns the market itself, the second the telecommunications infrastructure and broadband coverage.

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

• according to Article 7(1) of the Telecommunications Law Act – 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 coverage".

The analyses and conclusions drawn from them in the report were based on data as at 31 December 2019.

The telecommunications sector remains an important part of Poland's economy. The value of the Polish telecommunications market amounted to PLN 39.6 billion. The value of investments in the telecommunications sector in 2019 equalled PLN 7.8 billion.

The most vital telecommunications service was providing universal access to the internet. Currently, more than 54.8% of households in Poland use fixed-line internet. For several years now, the number of lines with the highest capacity has been growing in Poland.

At the end of 2019, over 50.4% of households were using the internet delivered through lines with the capacity of 100 Mb/s or more. Fixed access to the internet is becoming a universal service, as barriers to network access due to a high price were overcome. Poland is among 5 countries with the lowest internet access prices in the European Union.

The penetration[1] of mobile internet services per 100 inhabitants was 183.2%, taking into account all possible uses. Dedicated access using modems, cards, 2G/3G/4G keys was used by 21.1% of the population. The value of the market of internet access services increased by approx. 4.9% (PLN 6.1 billion) compared to 2018.

The mobile communications segment generated over 27.7% of revenues across the entire market. At the end of 2019, the total number of active SIM cards was 52.2 million, meaning 1.2% more than in 2018. The penetration of mobile telephony services equalled nearly 136%.

In the area of bundled services, repleteness of the telecommunications market with such services can be observed. The number of users decreased only by 0.5% compared to 2018. At the same time, the value of the market of bundled services reached PLN 9.5 billion, which is about 12% more than last year. Users became more open towards the idea of a market for such services and started to make fuller use of available bundles.

The value of the market and the number of fixed-line telephony users is decreasing year by year. In 2019, operators' revenues amounted to approximately PLN 1.6 billion and the number of subscribers to 3.5 million. The costs of using fixed-line telephony services, which are among the lowest across the European Union countries, are decreasing.

The number of VoIP telephony users last year was 2.5 million, a change of 1.1% compared to 2018. At the same time, it should be mentioned that the volume of traffic for this service has decreased by 7.2%. Among the users of VoIP telephony services, 28.6% used pre-paid scratch cards.

The results of the analysis of data collected as part of this year's inventory of telecommunications infrastructure and services described in Part II of the report indicated another increase in both the number of telecommunications undertakings who submitted data and the charts in submitted data concerning the facilities subject to the inventory.

A very positive trend that can be observed is that the length of fibre-optic lines in our country is increasing with each passing year. Last year, there was a 1.5% increase in the network length compared to 2018. At the end of 2019, the length of the optic network in Poland was 379,000 km.

With the increase in the length of the fibre-optic network, the number of fibre-optic nodes increased, of which there were 240,000 km in Poland. Compared to 2018, there was an increase by 22,000 km nodes, which means almost 10 percentage points.

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[1] Percentage of the population or target group using the service.

This year's report comes at an important time – just prior to the new challenges of entering the next financial perspective, but it also illustrates the state as at 31.12.2019 – meaning a year ahead of the deadline set by the European Commission for Member States to implement the indicators of the Digital Agenda for Europe (DAE).

The report shows that 75% of households in Poland have access to fixed-line internet with a speed of at least 30 Mb/s. Compared to 2018, the share of such households increased by 3.4 percentage points, and over the last 5 years this indicator increased by 12 percentage points.

The implementation of investments related to Measure 1.1 of the Operational Programme Digital Poland should increase this indicator to 84.5%.

The Digital Agenda for Europe also sets a target for the EU countries to build demand for high-speed services and to ensure that by the end of 2020, 50% of households use fixed-line internet access services with a speed of at least 100 Mb/s. As at the end of 2019, the usage level of such services in all households in Poland amounted to 23.3% and increased by 4 percentage points compared to 2018.

It is worth adding that in 2019, 63% of households had the possibility to use services with a speed of 100 Mb/s, which means that if all households with a fixed-line internet connection with a speed of at least 100 Mb/s made use of this potential, Poland would meet this DAE target.

It is therefore important to stimulate demand for high-speed internet access services. The Covid-19 outbreak likely changed the way Poles think about internet access on account of the need to work remotely or attend school online. Therefore, in the following year we can expect a radical increase in the usage rate of internet access services with a speed of at least 100 Mb/s.

We would also like to remind that in connection with the amendment to the Act on supporting the development of telecommunications services and networks, implemented in 2016, setting out a catalogue of information which is not subject to confidentiality due to a business secret (Article 29(6b)), most of the data provided as part of the inventory is public, therefore, as in previous years, detailed data does not constitute an annex to the report, but is available in API form on the Open Data portal: https://dane.gov. pl/dataset/588,system-informacyjny-o-infrastrukturze-szerokopasmowej-api and in the form of a search engine on the UKE website https://wyszukiwarka.uke.gov.pl/.

1

INTERNET
ACCESS

PART I
TELECOMMUNICATIONS MARKET

1.1. GENERAL INFORMATION

Information on broadband internet penetration was developed in a different way compared to how it was presented in previous years. Previously, the total penetration of fixed-line and mobile internet was presented in aggregate. In the present report, penetration is presented separately for fixed-line and mobile internet. In the case of fixed-line internet, the indicator was calculated per household, while mobile internet was referenced against population. This approach seems to better reflect the actual availability of internet services.

After a periodic decline, penetration of fixed-line broadband internet services started to increase. At the end of 2019, fixed-line internet access was available to 54.8% households in Poland.

Penetration of mobile internet services was presented in two ways. Access through all possible categories of mobile access[2] was analysed separately from dedicated offers provided only with modems, cards and keys.

Taking into account all the possibilities of mobile internet access, it is worth noting the dynamic growth of service

penetration. On average, it increased by 20% each year. In 2019, it reached 183.2%, an increase by 14 percentage points compared to 2018.

In the case of dedicated 2G/3G/4G mobile access using modems, cards, keys, we observe a systematic, albeit small increase of the penetration rate. At the end of 2019, 21.1% of the population used dedicated mobile internet access. Compared to 2018, service penetration increased by 0.2%.

54.8%
fixed-line internet penetration

183.2%
mobile internet services penetration

[2] The mobile access category includes: actually used active SIM cards in mobile networks; dedicated data transmission offers for additional voice service bundles requiring an additional fee and dedicated data transmission offers for services sold separately and provided only with cards/modems/keys (e.g. USB modems, PCMCIA cards and ExpressCard).

CHART 1. **BROADBAND INTERNET SERVICES PENETRATION RATE**

	2015	2016	2017	2018	2019
mobile access (all categories)	101.4%	121.8%	153.1%	169.4%	183.2%
fixed-line access	53.0%	52.1%	50.1%	50.8%	54.8%
dedicated mobile access (modems, cards, keys)	17.1%	19.0%	19.2%	19.9%	21.1%
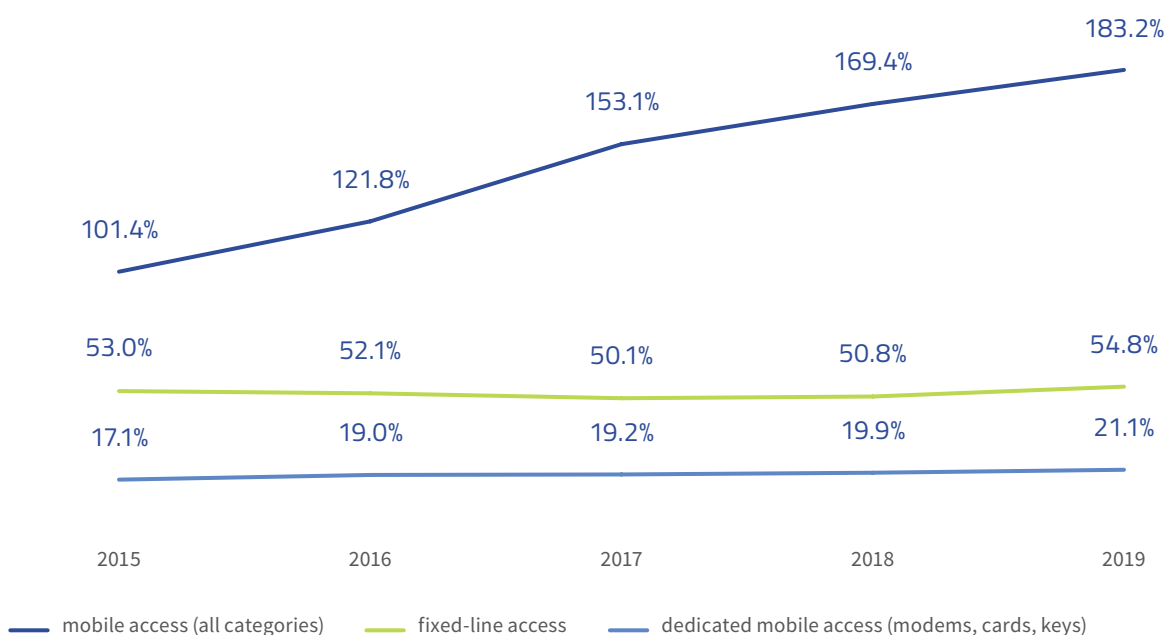
Source: UKE

1.2. REVENUES

In 2019, the value of the internet access market amounted to PLN 6.1 billion, an increase of 15.2% over the last 5 years. The average monthly revenue per user amounted to PLN 31.5 and was slightly higher than a year before, and almost 16% higher than in 2015.

PLN 6.1 billion
value of the internet access market

CHART 2. **VALUE OF THE INTERNET ACCESS MARKET (PLN BILLION) AND AVERAGE MONTHLY REVENUE PER USER (ARPU IN PLN)**

	2015	2016	2017	2018	2019
Value of the market	5.1	4.9	4.7	5.8	6.1
ARPU	27.2	28.2	27.2	31.4	31.5

■ Value of the market ── ARPU
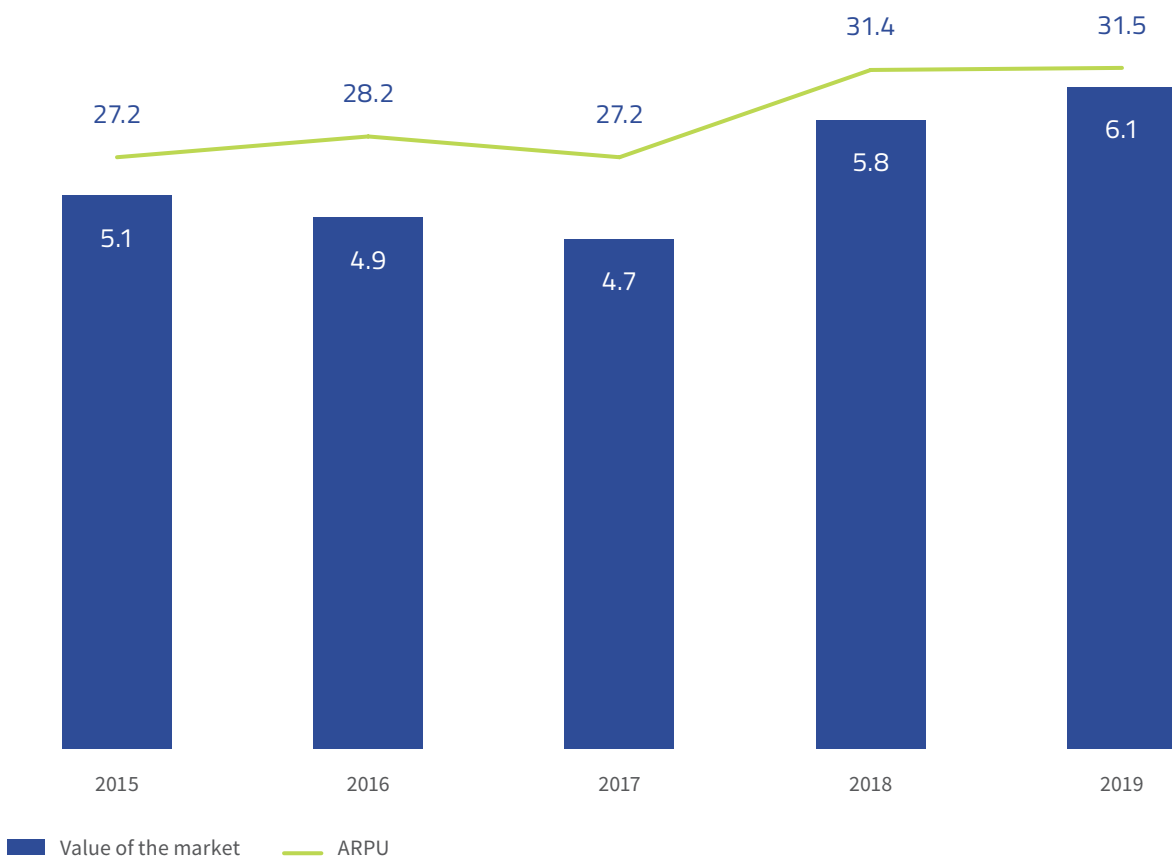
Source: UKE

Similarly to the previous year, the biggest revenue came from internet access services provided by means of mobile devices. The share of such services increased by 2.4 percentage points to 30.7%. The cable TV modem technology came to occupy a very similar position in the percentages structure to that from 2018 (16.2%). The third place is occupied by xDSL services, with their share dropping by 3 percentage points to 19.7%. The share of FTTH increased by 2.9 percentage points and amounted to 14.6%.

CHART 3. **REVENUE STRUCTURE IN TERMS OF TECHNOLOGIES USED**

2018	2019
8.2%	7.3%
5.7%	5.2%
7.3%	6.4%
11.7%	14.6%
22.7%	19.7%
16.1%	16.2%
28.3%	30.7%

Legend: 2G/3G/4G modem, Cable TV modem, xDSL, FTTH, WLAN, LAN-Ethernet, other
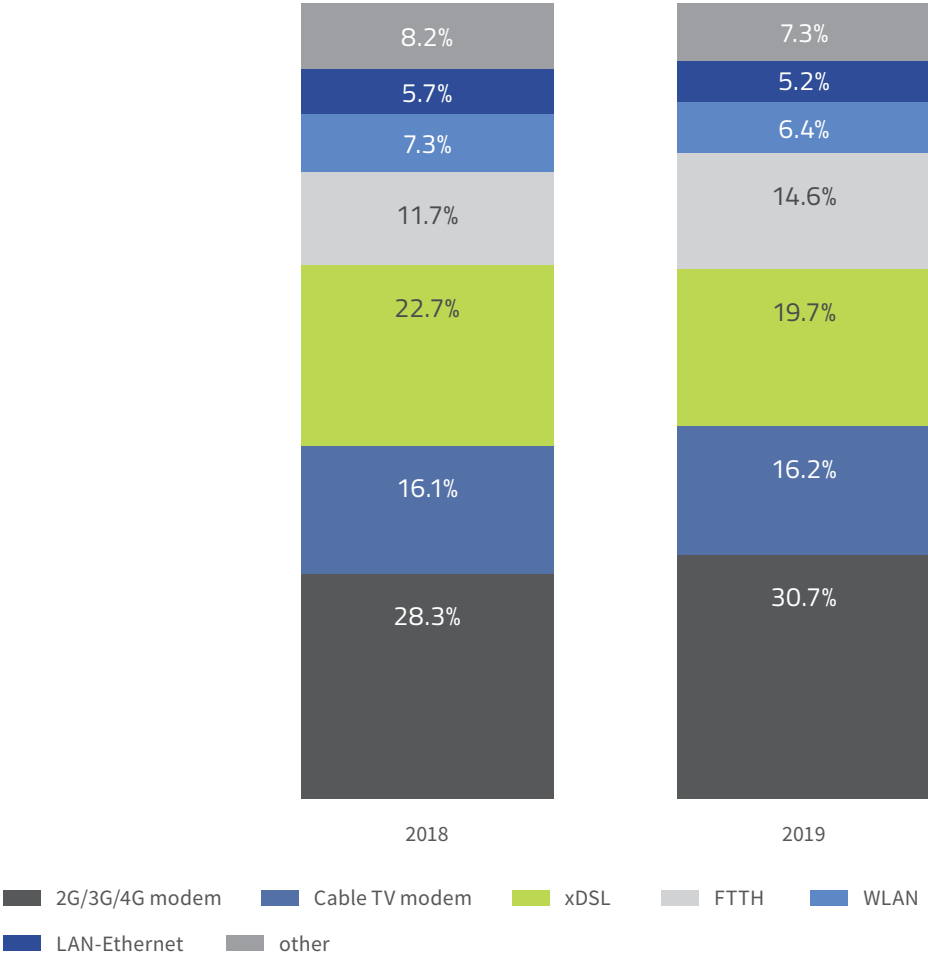
Source: UKE

1.3. USERS

The number of internet users in Poland is growing systematically. In 2019, services were provided to 16.2 million users[3], i.e. 4.7% more than the year before. In the case of fixed-line internet, the number of users remained at the level from year ago, while the number of mobile internet customers increased by almost 10%.

More than half of users (52%) used mobile access[4]. The percentage of people using the second most popular type of access, i.e. cable TV modem, slightly decreased (to 17.5%). The third place in the percentages structure (11.2%) was taken by xDSL technology, the share of which dropped by 2.1 percentage points. Meanwhile, the share of fibre-optic lines increased by 1.6% and amounted to 9.8%.

16.2 million
Internet access users

[3] Fixed-line (wired and wireless) and mobile (2G/3G/4G access via modems, cards, keys) internet users.
[4] 2G/3G/4G access via modems, cards, keys.

CHART 5. **STRUCTURE OF SUBSCRIBERS IN TERMS OF ACCESS TECHNOLOGY USED**

2.5% LAN-Ethernet
4.7% WLAN
9.8% FTTH
11.2% xDSL
17.5% Cable TV modem
2.4% other
52.0% 2G/3G/4G modem
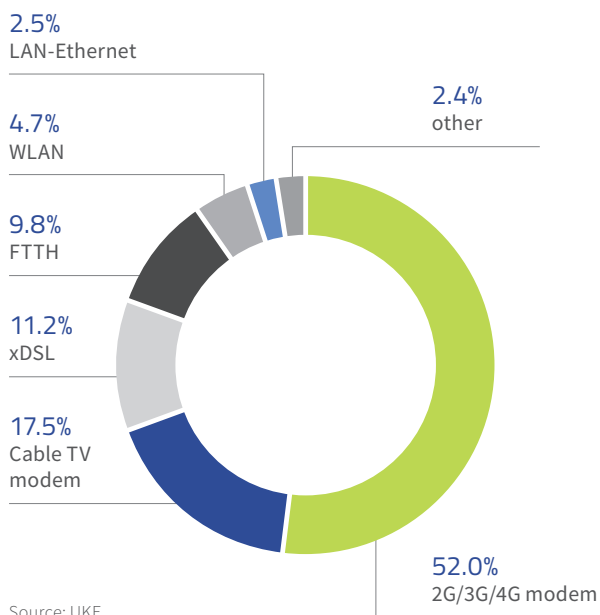
Source: UKE

CHART 4. **NUMBER OF FIXED-LINE AND MOBILE SUBSCRIBERS (MILLION)**

	2015	2016	2017	2018	2019
Fixed-line internet	7.1	7.1	7.1	7.8	7.8
Mobile internet	6.7	7.4	7.4	7.7	8.4

■ Fixed-line internet   ■ Mobile internet
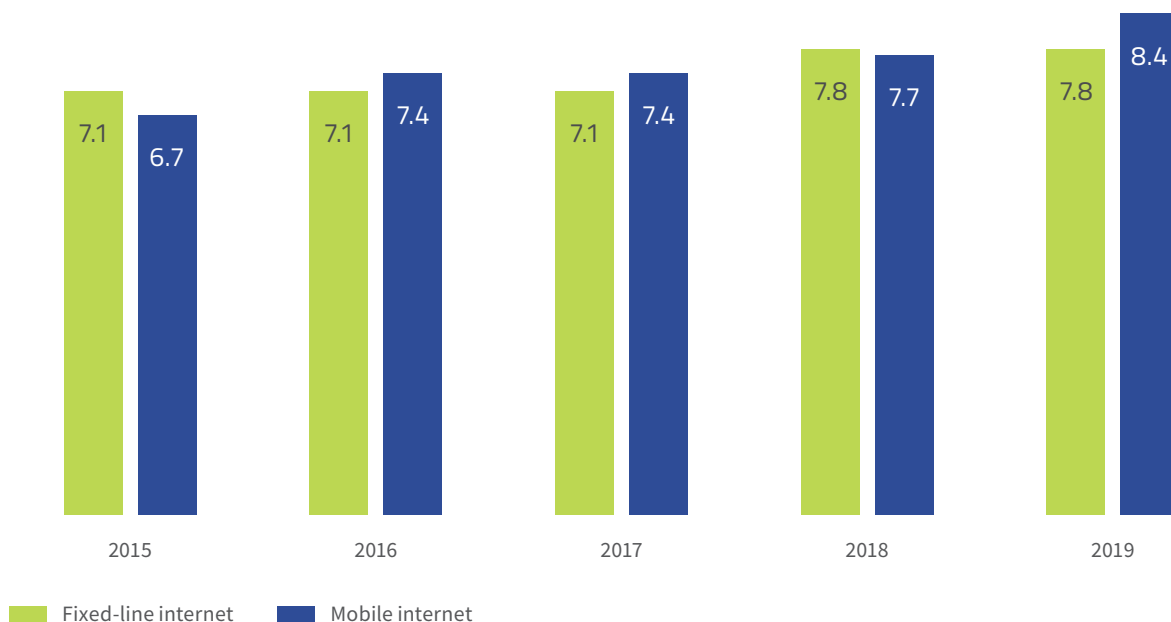
Source: UKE

1.4. MARKET STRUCTURE

Orange Polska remained the absolute leader in terms of the number of internet access users, with the share in 2019 being the same as in the previous year, amounting to 30.1%. The second place belongs to T-Mobile with a share of 8.8%, 0.8 percentage points less than the year before. The next place in the ranking was taken by P4 with a share of 8.4%. In the case of this operator, an increase of over 2 percentage points was noted.

CHART 6. **OPERATORS' SHARES IN TERMS OF THE NUMBER OF INTERNET ACCESS USERS**

Operator	2018	2019
Orange	30.1%	30.1%
T-Mobile	8.0%	8.8%
P4	6.3%	8.4%
Polkomtel	8.2%	7.8%
UPC	7.6%	7.6%
Aero 2	4.6%	4.5%
Vectra	4.0%	3.9%
Cyfrowy Polsat	4.2%	3.8%
Netia	4.3%	3.4%
Mutimedia Polska	3.2%	3.0%
Inea	1.4%	1.5%
Others	18.1%	17.4%
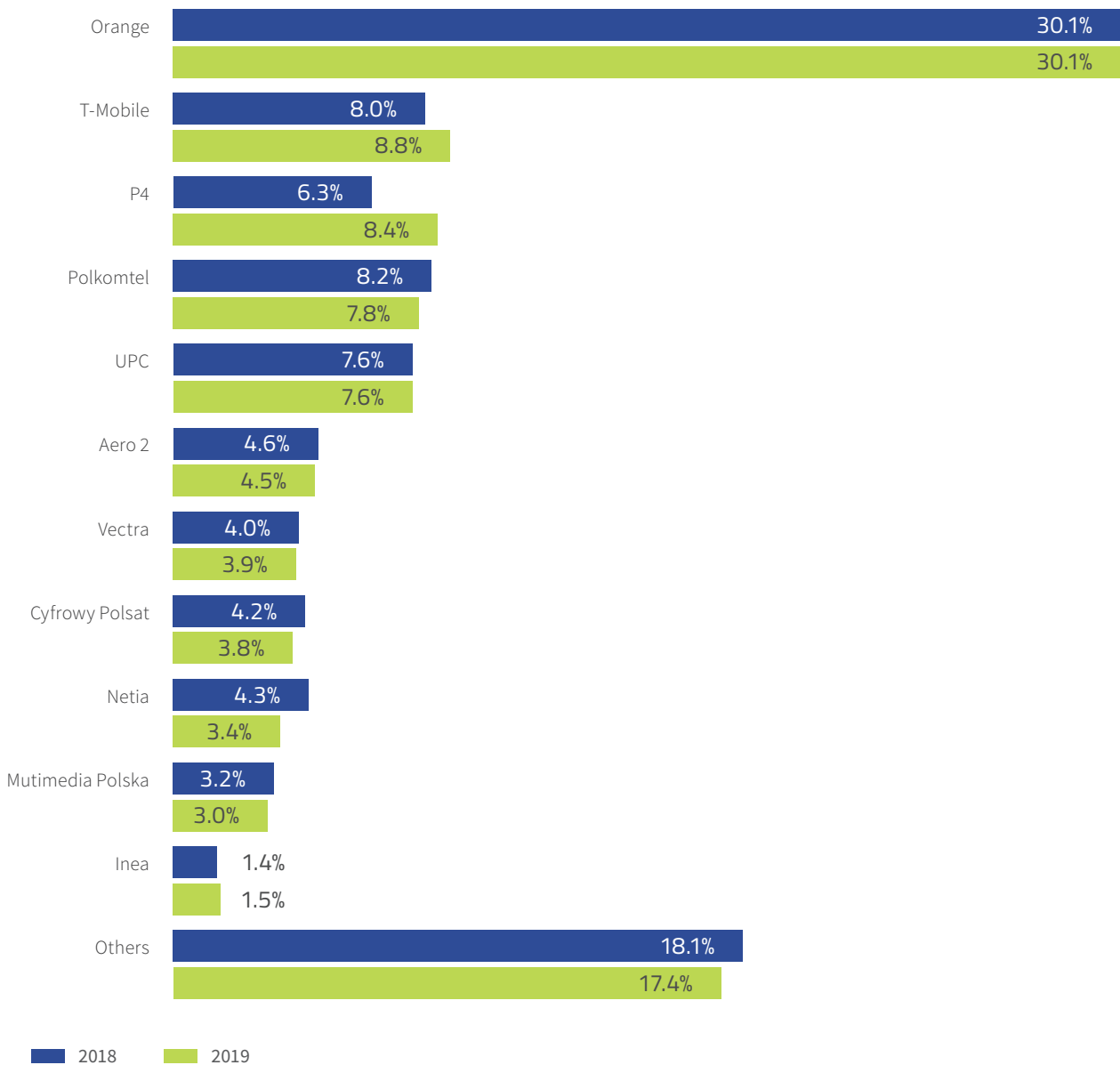
Source: UKE

1.5. INTERNET ACCESS TECHNOLOGIES

Mobile devices (modems, cards, keys)

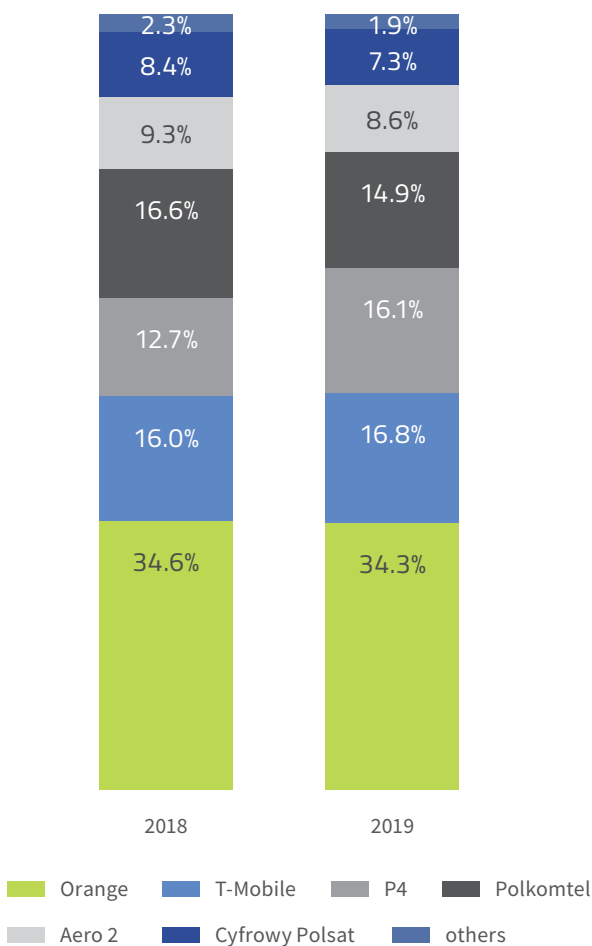When it comes to the provision of services via mobile devices, Orange Polska remained in the lead with a share of 34.3%, slightly lower than the year before. The second place was taken by T-Mobile, with the share increased to 16.8%. The next place belongs to P4, which recorded a significant increase in their share up to 16.1%. Polkomtel dropped to the fourth place.

In 2019, the value of the market for internet access services via mobile devices amounted to approx. PLN 1.9 billion, i.e. around PLN 200 million more than the year before.
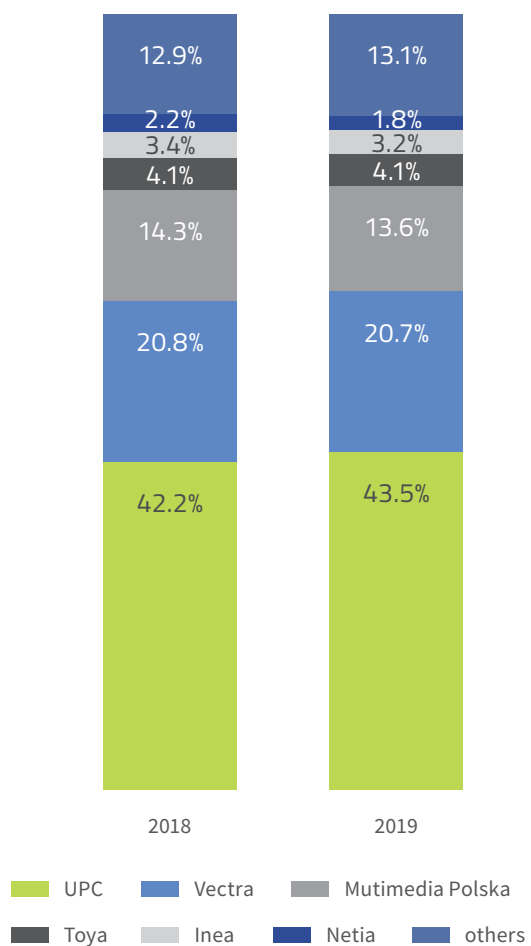
Cable TV modem

There were no major changes in the distribution of shares on the market for cable TV modem access. UPC clearly remains the leader in the provision of internet access via a cable TV modem. Its market share in terms of access to this technology increased to 43.5%. Vectra's share was half of that (20.7%). The third place was taken by Multimedia Polska, which provided internet to 13.6% of users.

The value of the market for internet access services using cable TV modems amounted to almost PLN 1 billion.

CHART 7. **OPERATORS' SHARES IN THE TOTAL NUMBER OF MODEM USERS**

CHART 8. **OPERATORS' SHARES IN THE TOTAL NUMBER OF USERS ACCESSING THE INTERNET VIA CABLE TV MODEMS**

CHART 7 data:

	2018	2019
Orange	34.6%	34.3%
T-Mobile	16.0%	16.8%
P4	12.7%	16.1%
Polkomtel	16.6%	14.9%
Aero 2	9.3%	8.6%
Cyfrowy Polsat	8.4%	7.3%
others	2.3%	1.9%

CHART 8 data:

|	2018	2019
UPC	42.2%	43.5%
Vectra	20.8%	20.7%
Mutimedia Polska	14.3%	13.6%
Toya	4.1%	4.1%
Inea	3.4%	3.2%
Netia	2.2%	1.8%
others	12.9%	13.1%

Source: UKE

Source: UKE

xDSL lines

The value of the market for internet access services using xDSL technology decreased by 9.2% compared to the previous year and amounted to PLN 1.2 billion. Orange Polska continues to be the main service provider in this technology, with a share of over 82.7%. Second comes Netia with 14.7%. Other businesses, none of which had a share of more than 1%, jointly provided this type of service to 2.6% of users. The number of xDSL technology users decreased by almost 12% compared to 2018.

CHART 9. **OPERATORS' SHARES IN THE TOTAL NUMBER OF USERS ACCESSING THE INTERNET VIA xDSL LINES**
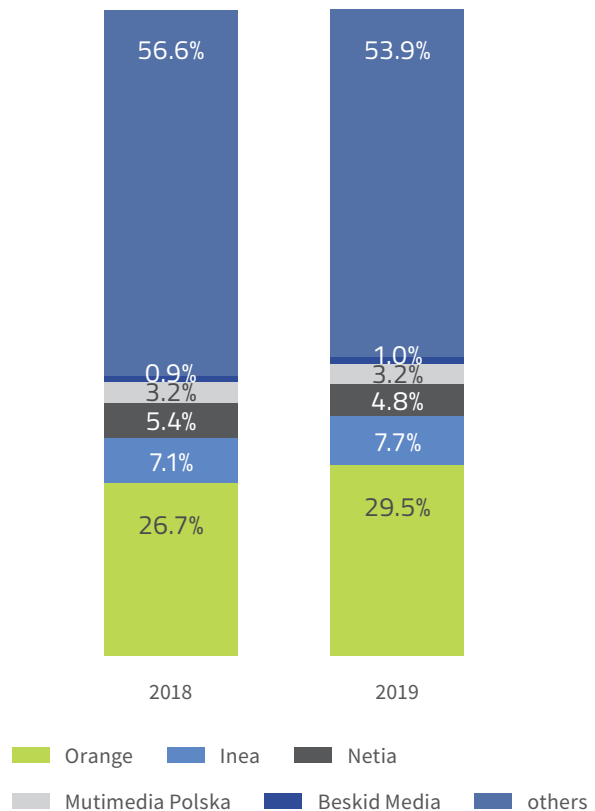

	2018	2019
others	2.7%	2.6%
Netia	17.0%	14.7%
Orange	80.3%	82.7%

Legend: Orange, Netia, others
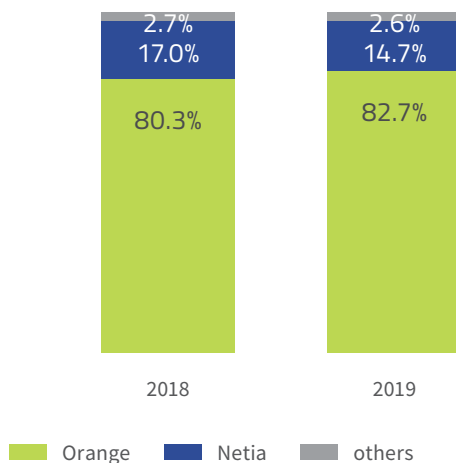
FTTH

Orange Polska remained the leading company in this sector, proving services to almost 30% of users. Its share increased by approx. 3 percentage points. Inea and Netia were ranked second and third with 7.7% and 4.8%, respectively. Apart from a number of larger entities, services were provided by a significant number of smaller entrepreneurs. In 2019, the total market share of the entities with a share not exceeding 1% on the market for access via FTTH amounted to 53.9%.

In 2019, the value of the market for internet access by means of FTTH technology equalled PLN 0.9 billion, which meant an increase by 31% compared to 2018.

	2018	2019
others	56.6%	53.9%
Beskid Media	0.9%	1.0%
Mutimedia Polska	3.2%	3.2%
Netia	5.4%	4.8%
Inea	7.1%	7.7%
Orange	26.7%	29.5%

Legend: Orange, Inea, Netia, Mutimedia Polska, Beskid Media, others

WLAN and LAN-Ethernet

The highly fragmented markets for WLAN and LAN-Ethernet internet access technologies are occupied by companies with a market share usually not exceeding 1%. Of the companies that provided services via WLAN in 2019, only three had a share between 1% and 2%. The shares of other companies were lower than 1%. In the case of LAN-Ethernet, the shares of the top 16 largest companies ranged from 1% to 4%.

The services provided by means of these two technologies were used by a total of approx. 1.2 million users in 2019, 10% less than the year before.

In 2019, the value of the market for internet access by means of WLAN technology equalled PLN 0.4 billion, while for Ethernet technology – PLN 0.3 billion.
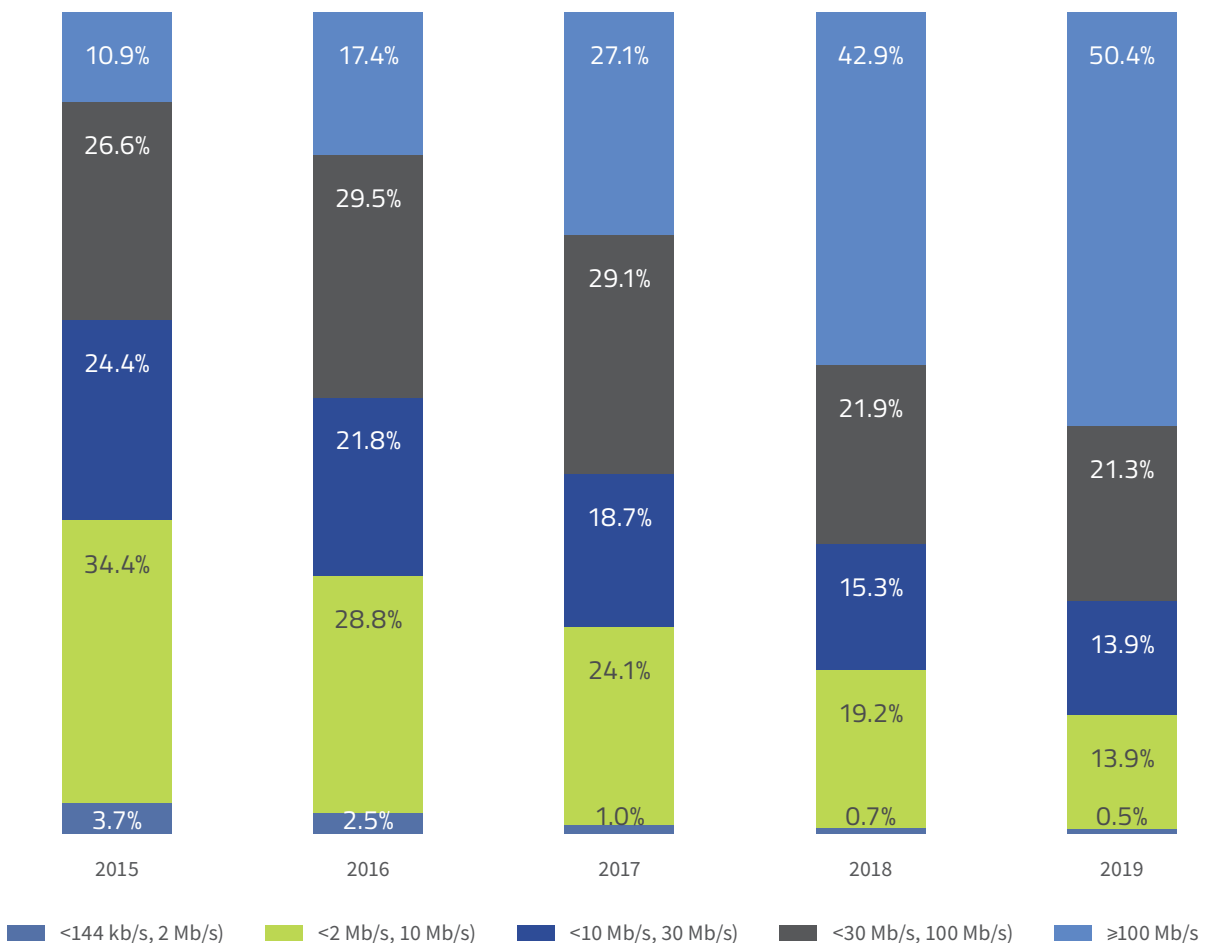
1.6. CAPACITY

Over the last 5 years, there has been a significant increase in the number of lines with a bit rate of at least 100 Mb/s. In 2019, the share of these lines in the total number of lines increased to 50.4%, i.e. by almost 8 percentage points compared to 2018. The shares of other lines with a speed below 100 Mb/s are decreasing in favour of the highest speed lines. In 2019, 1.4% of users were able to use the fastest lines currently on the market, with a minimum bit rate of 1 Gb/s.

50.4%
lines of minimum capacity of 100 Mb/s

CHART 11. **SHARES OF LINES BY SPEED**

	2015	2016	2017	2018	2019
≥100 Mb/s	10.9%	17.4%	27.1%	42.9%	50.4%
<30 Mb/s, 100 Mb/s	26.6%	29.5%	29.1%	21.9%	21.3%
<10 Mb/s, 30 Mb/s	24.4%	21.8%	18.7%	15.3%	13.9%
<2 Mb/s, 10 Mb/s	34.4%	28.8%	24.1%	19.2%	13.9%
<144 kb/s, 2 Mb/s	3.7%	2.5%	1.0%	0.7%	0.5%

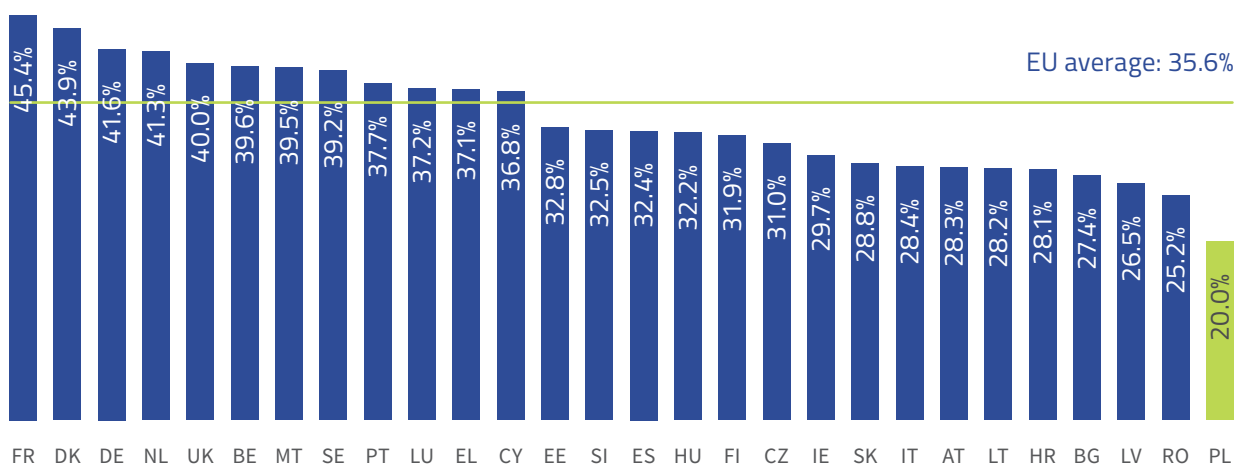Legend: ■ <144 kb/s, 2 Mb/s ■ <2 Mb/s, 10 Mb/s ■ <10 Mb/s, 30 Mb/s ■ <30 Mb/s, 100 Mb/s ■ ≥100 Mb/s

Source: UKE

1.7. COMPARISON WITH EUROPEAN UNION COUNTRIES

In 2019, the highest services penetration for fixed-line internet access was recorded in France, where it amounted to 45.4% and was higher than the EU average by almost 10 percentage points. Penetration in Poland was at the lowest level among EU states and amounted to 20%. It was a score over 15 percentage points lower than the EU average.

On the other hand, our country could boast the best score in terms of mobile internet access services. In 2019, Poland occupied the highest position among EU states, with penetration reaching almost 176%, a score better than the EU average by more than 75 percentage points.

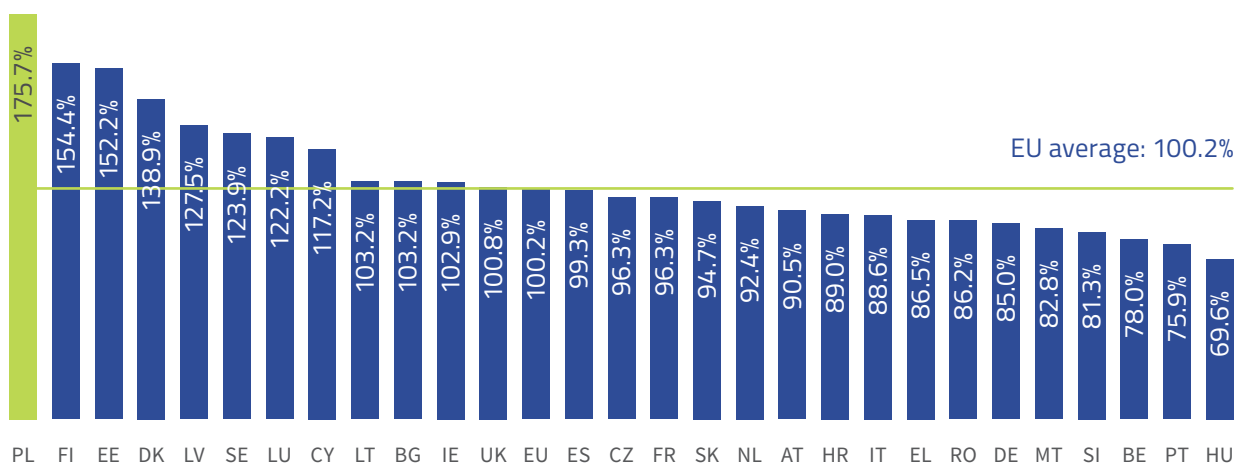CHART 12. **PENETRATION OF FIXED-LINE INTERNET SERVICES IN THE EU (PER 100 INHABITANTS)**

EU average: 35.6%

FR	DK	DE	NL	UK	BE	MT	SE	PT	LU	EL	CY	EE	SI	ES	HU	FI	CZ	IE	SK	IT	AT	LT	HR	BG	LV	RO	PL
45.4%	43.9%	41.6%	41.3%	40.0%	39.6%	39.5%	39.2%	37.7%	37.2%	37.1%	36.8%	32.8%	32.5%	32.4%	32.2%	31.9%	31.0%	29.7%	28.8%	28.4%	28.3%	28.2%	28.1%	27.4%	26.5%	25.2%	20.0%

Source: Digital Agenda Scoreboard, July 2019.

CHART 13. **PENETRATION OF MOBILE INTERNET SERVICES IN THE EU (PER 100 INHABITANTS)**

175.7%
penetration of mobile internet access

EU average: 100.2%

PL	FI	EE	DK	LV	SE	LU	CY	LT	BG	IE	UK	EU	ES	CZ	FR	SK	NL	AT	HR	IT	EL	RO	DE	MT	SI	BE	PT	HU
175.7%	154.4%	152.2%	138.9%	127.5%	123.9%	122.2%	117.2%	103.2%	103.2%	102.9%	100.8%	100.2%	99.3%	96.3%	96.3%	94.7%	92.4%	90.5%	89.0%	88.6%	86.5%	86.2%	85.0%	82.8%	81.3%	78.0%	75.9%	69.6%

Source: Digital Agenda Scoreboard, July 2019.

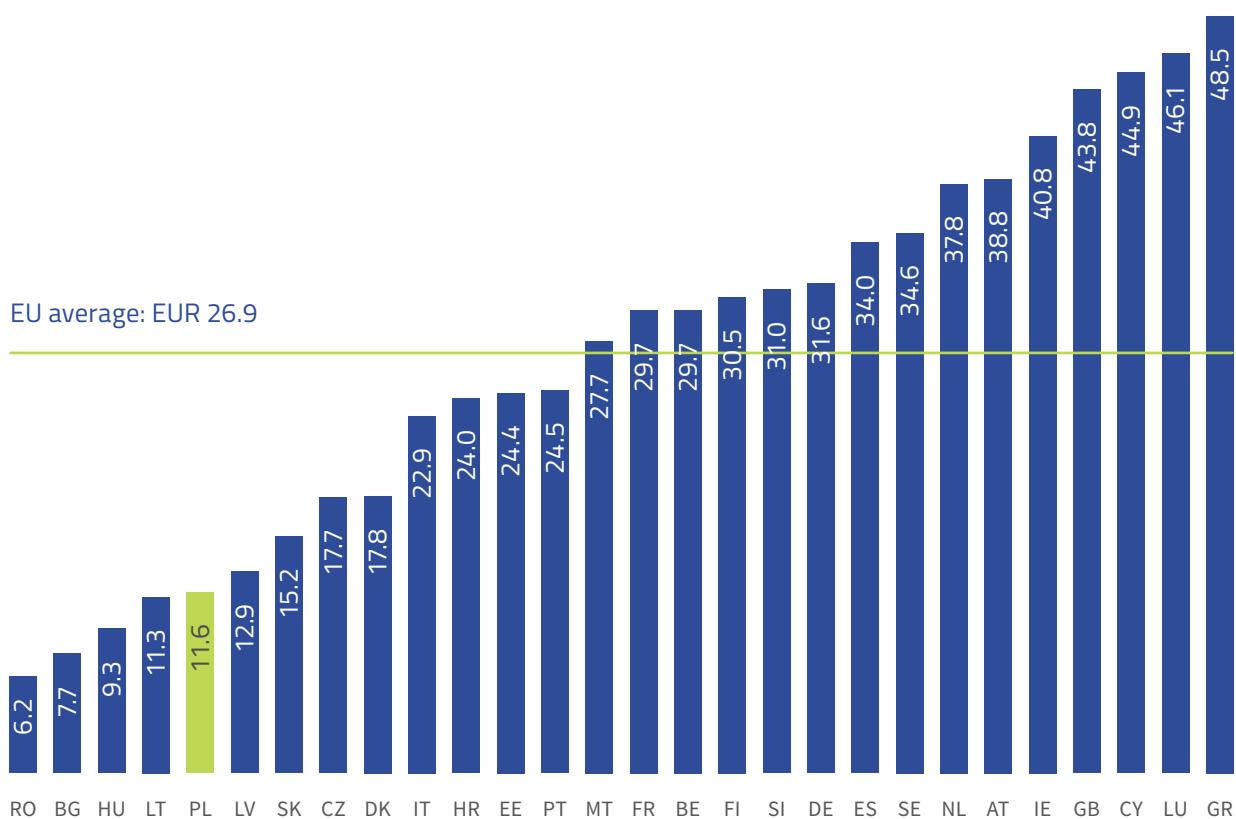# 1.8. PRICES OF FIXED-LINE INTERNET ACCESS SERVICES

Prices for fixed-line internet access in EU states were compared using the *Fixed Price Broadband database*[5], up-to-date as at December 2019. The cheapest offers of operators within the most frequently used speed range were taken into account.

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

Our country was among ones with the lowest prices in the EU. The cost of fixed-line internet access in Poland was lower by as much as EUR 15.3 than the average in other EU states. The most expensive services were offered in Greece, Luxembourg and Cyprus, where prices were well above the EU average.

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

CHART 14. **AVERAGE MONTHLY SERVICE COST IN THE EU FOR THE OECD MEDIUM BASKET: 120 GB/>100 MB/s**

EU average: EUR 26.9

RO	BG	HU	LT	PL	LV	SK	CZ	DK	IT	HR	EE	PT	MT	FR	BE	FI	SI	DE	ES	SE	NL	AT	IE	GB	CY	LU	GR
6.2	7.7	9.3	11.3	11.6	12.9	15.2	17.7	17.8	22.9	24.0	24.4	24.5	27.7	29.7	29.7	30.5	31.0	31.6	34.0	34.6	37.8	38.8	40.8	43.8	44.9	46.1	48.5

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

Note: tariffs for private and business customers purchasing only the internet access service are included (bundles are excluded from the analysis). For Poland, the selected offer belonged to UPC – internet 150Mb/s (24M). Cost of the service as at December 2019, not including the purchasing power parity.

2

MOBILE TELEPHONY

PART I
TELECOMMUNICATIONS MARKET

2.1. MARKET CHARACTERISTICS

At the end of 2019, there were 91 telecommunications undertakings operating on the Polish mobile telephony market; 7% more than last year, when 85 entities declared such activity.

Of all mobile operators, five had their own infrastructure (MNOs) and 86 used the network of a selected technological partner (MVNOs). As in the last year, the following operators functioned as MNOs: 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.

In the last few years, there has been a systematic decrease in the number of mobile phone users. At the end of 2019, a different trend was recorded, with the total number of active SIM cards reaching 52.2 million, an increase by 1.2% compared to 2018. At the same time, the penetration

of mobile services was higher and amounted to almost 136% (an increase by 1.6 percentage points compared to 2018).

The number of M2M cards increased by 16% and reached 3.8 million. These cards represented 7.3% of all SIM cards.

52.2 million SIM cards

135.9%
penetration of mobile telephony services

CHART 15. **NUMBER OF USERS (SIM CARDS IN MILLIONS) AND PENETRATION OF THE MOBILE TELEPHONY MARKET IN POLAND**

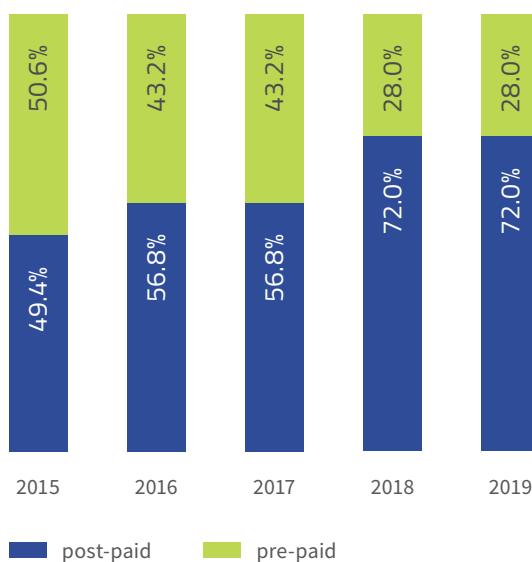|	2015	2016	2017	2018	2019
penetration	147.2%	144.2%	138.6%	134.3%	135.9%
SIM cards	56.6	55.5	53.3	51.6	52.2

■ SIM cards ── penetration

Source: UKE

In connection with the obligation introduced in 2016 to register pre-paid cards, a decrease in the number of users of pre-paid services in favour of post-paid customers has been recorded every year. At the end of 2019, the number of pre-paid SIM cards decreased by 1.3% compared to 2018, to 13.4 million. Pre-paid users constituted only 28% of all mobile users.

According to Analysys Mason[6] data, the average penetration of mobile services in EU countries was 131.5%. This indicator for Poland was above the EU average and amounted to 142.7%[7]. Among EU countries, the highest penetration rates were in Finland (176.6%), Portugal (167.7%) and Lithuania (156.2%).
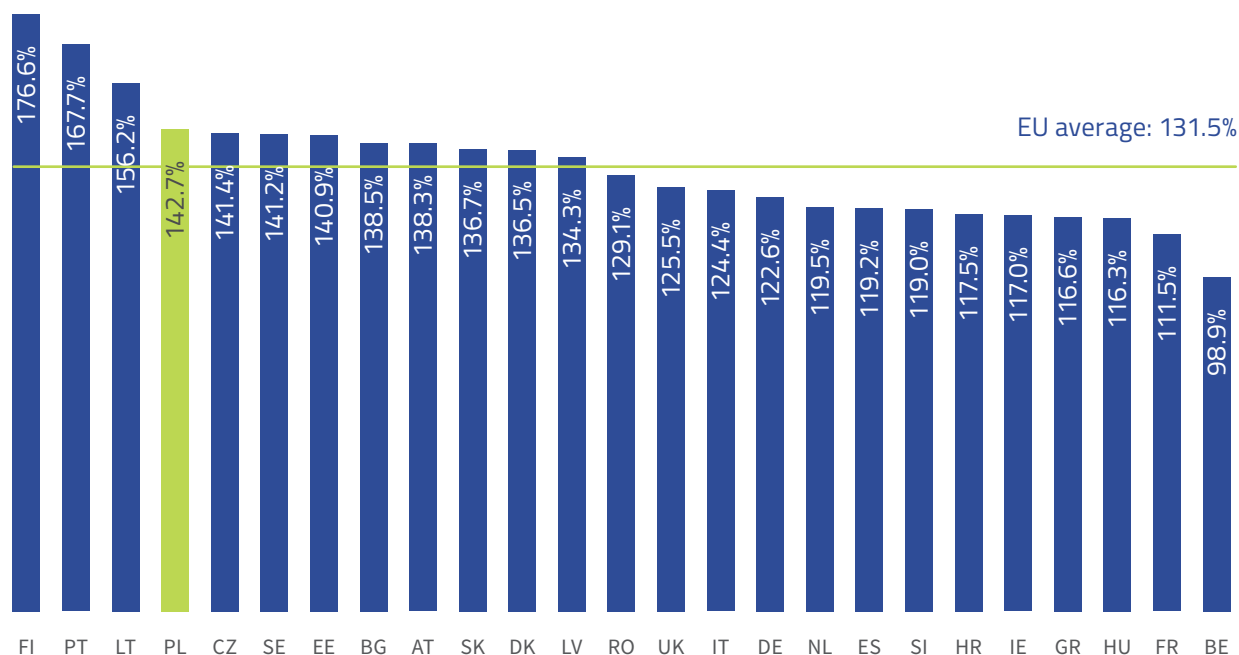
[6] Analytical company specializing in telecommunications market research.

[7] The methodology adopted by Analysys Mason differs from UKE, hence the differences between the calculations.

CHART 16. **SHARE OF PRE-PAID AND POST-PAID CUSTOMERS**

	2015	2016	2017	2018	2019
pre-paid	50.6%	43.2%	43.2%	28.0%	28.0%
post-paid	49.4%	56.8%	56.8%	72.0%	72.0%

post-paid   pre-paid

Source: UKE

CHART 17. **MOBILE TELEPHONY MARKET PENETRATION IN SELECTED EUROPEAN COUNTRIES**

EU average: 131.5%

FI	PT	LT	PL	CZ	SE	EE	BG	AT	SK	DK	LV	RO	UK	IT	DE	NL	ES	SI	HR	IE	GR	HU	FR	BE
176.6%	167.7%	156.2%	142.7%	141.4%	141.2%	140.9%	138.5%	138.3%	136.7%	136.5%	134.3%	129.1%	125.5%	124.4%	122.6%	119.5%	119.2%	119.0%	117.5%	117.0%	116.6%	116.3%	111.5%	98.9%

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

2.2. REVENUES

In 2019, the trend in revenues from mobile services continued to decline. Total revenues of operators amounted to PLN 11 billion and were 20.4% lower than the year before.
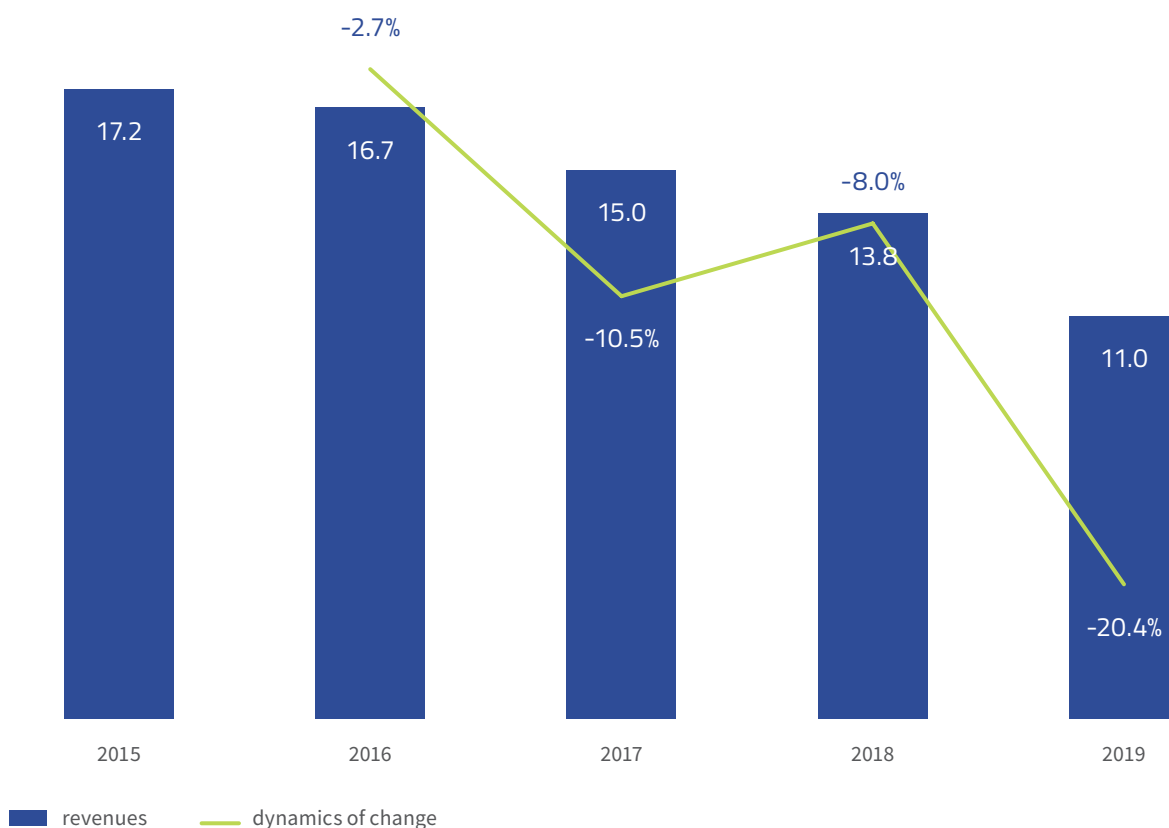
A decrease in revenues was noted in almost all types of mobile services. Proceeds from subscription fees went down by 22.2%, and from voice calls by 11%. The decrease in revenues from voice calls is slightly smaller than in the previous reporting period (by 13.1%). In the case of SMS messages, revenues were lower by 16.3% and MMS services generated a decline of 26.8%. The only increases in revenues were recorded for data transmission (by 4.4%), outbound roaming (by 4.4%) and inbound roaming (by 9.1%).

Despite the decline in the value of the mobile telephony market, it was still a very important area of telecommunications activity. It generated over 27.7% of revenues in the entire telecommunications market in Poland.

27.7%

share of mobile telephony in revenues of the telecommunications market

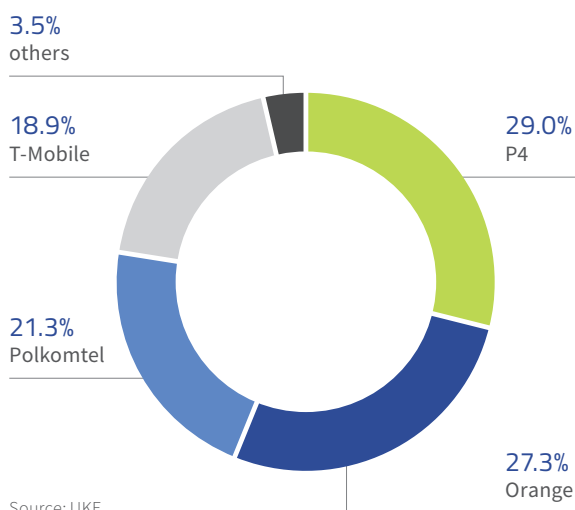CHART 18. **REVENUES FROM MOBILE TELEPHONY SERVICES (PLN BILLION) AND THE DYNAMICS OF CHANGE**

	2015	2016	2017	2018	2019
revenues	17.2	16.7	15.0	13.8	11.0
dynamics of change		-2.7%	-10.5%	-8.0%	-20.4%

■ revenues —— dynamics of change

Source: UKE

2.3. SHARES OF OPERATORS

For several years, P4 has been the leader in terms of the number of mobile phone users. Its share in the number of users in 2019 was 29%. The second place was taken by Orange Polska (27.3%). The third position was held by Polkomtel (21.3%). T-Mobile was ranked fourth with a share of 18.9%.
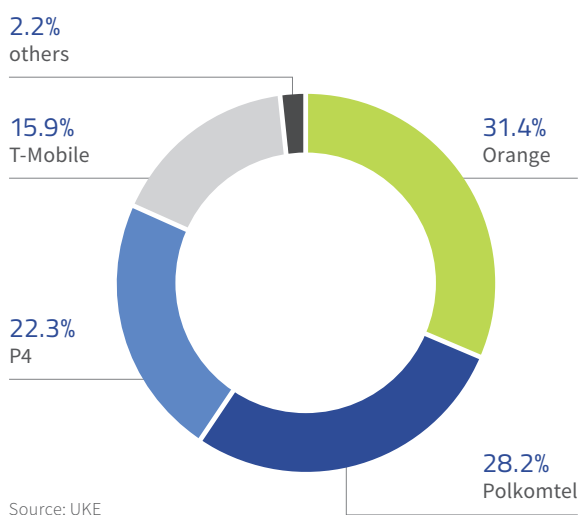
Orange was ranked first in terms of revenue generated in 2019, with a 31.4% share, a promotion from third position in 2018. The second position was taken by Polkomtel (28.2%). Last year's leader in this summary – P4, obtained 22.3% of total revenues from mobile telephony, and T-Mobile took fourth place with a 15.9% market share.

Compared to 2018, both Polkomtel and Orange saw their revenues increase, by 3.1% and 6.9%, respectively. In turn, T-Mobile (by 5.2%) and P4 (by 3.8%) recorded a decrease in revenue. The remaining entrepreneurs, apart from the four largest ones mentioned above, generated revenues of 2.2%.
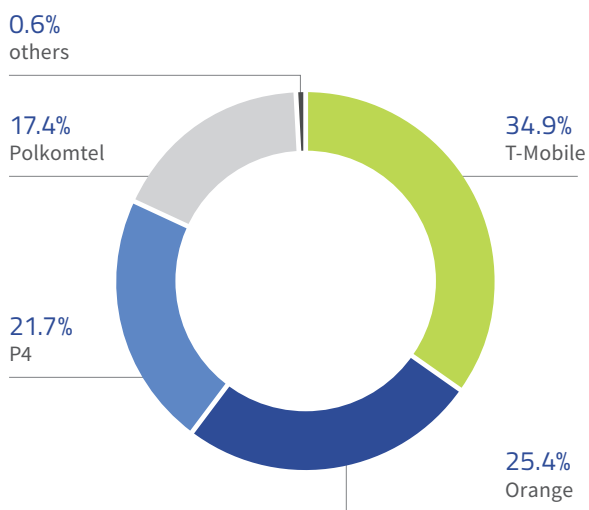
CHART 19. **SHARES OF OPERATORS IN TERMS OF THE NUMBER OF USERS**

3.5% others
18.9% T-Mobile
21.3% Polkomtel
29.0% P4
27.3% Orange

Source: UKE

CHART 20. **SHARES OF OPERATORS IN TERMS OF REVENUES GENERATED**

2.2% others
15.9% T-Mobile
22.3% P4
31.4% Orange
28.2% Polkomtel

Source: UKE

In 2019, T-Mobile recorded the largest percentage of revenues from SMS messages sent on mobile networks. This share represented 34.9% of this market, 6.4 percentage points more than in 2018.

The second position was taken by Orange Polska with a share of 25.4% (an increase by 2.7 pp), followed by P4 (21.7%) and Polkomtel (17.4%). Other operators had a 0.6% share in revenues from this category of services.

0.6%
others

17.4%
Polkomtel

21.7%
P4

34.9%
T-Mobile

25.4%
Orange

Source: UKE

2.4. VOLUME OF SERVICES PROVIDED

The duration of outgoing calls increased by 1.1%. Mobile users made calls with a total duration of 104.9 billion minutes. Statistically, there were 2,732 minutes per capita in Poland during the year, 30 minutes more than in 2018.

2,732 minutes
average length of calls during the year

CHART 22. **TOTAL DURATION OF OUTGOING VOICE CALLS AND THE DYNAMICS OF CHANGE**
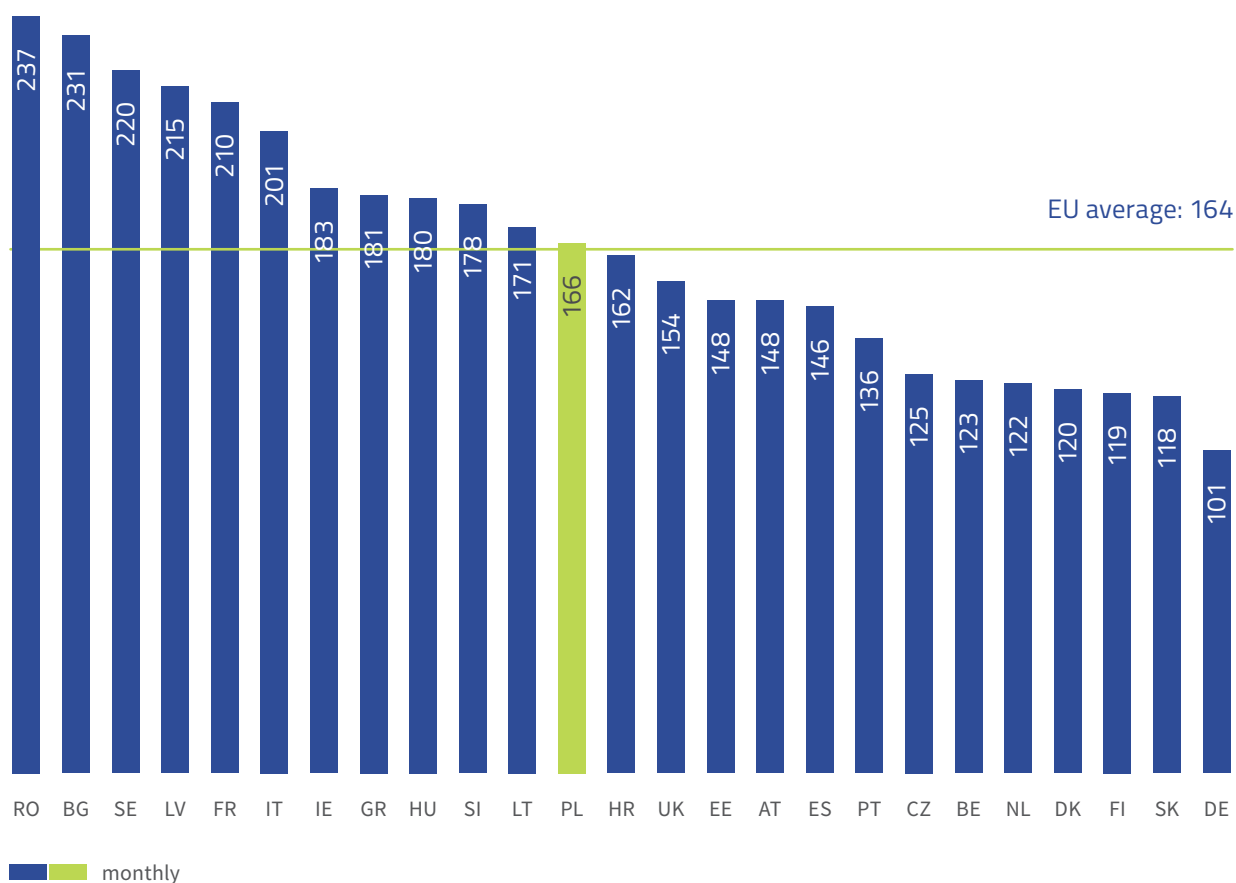

	2015	2016	2017	2018	2019
duration of voice calls	91.8	97.3	101.9	103.8	104.9
dynamics of change		6.0%	4.7%	1.8%	1.1%

■ duration of voice calls　　━ dynamics of change
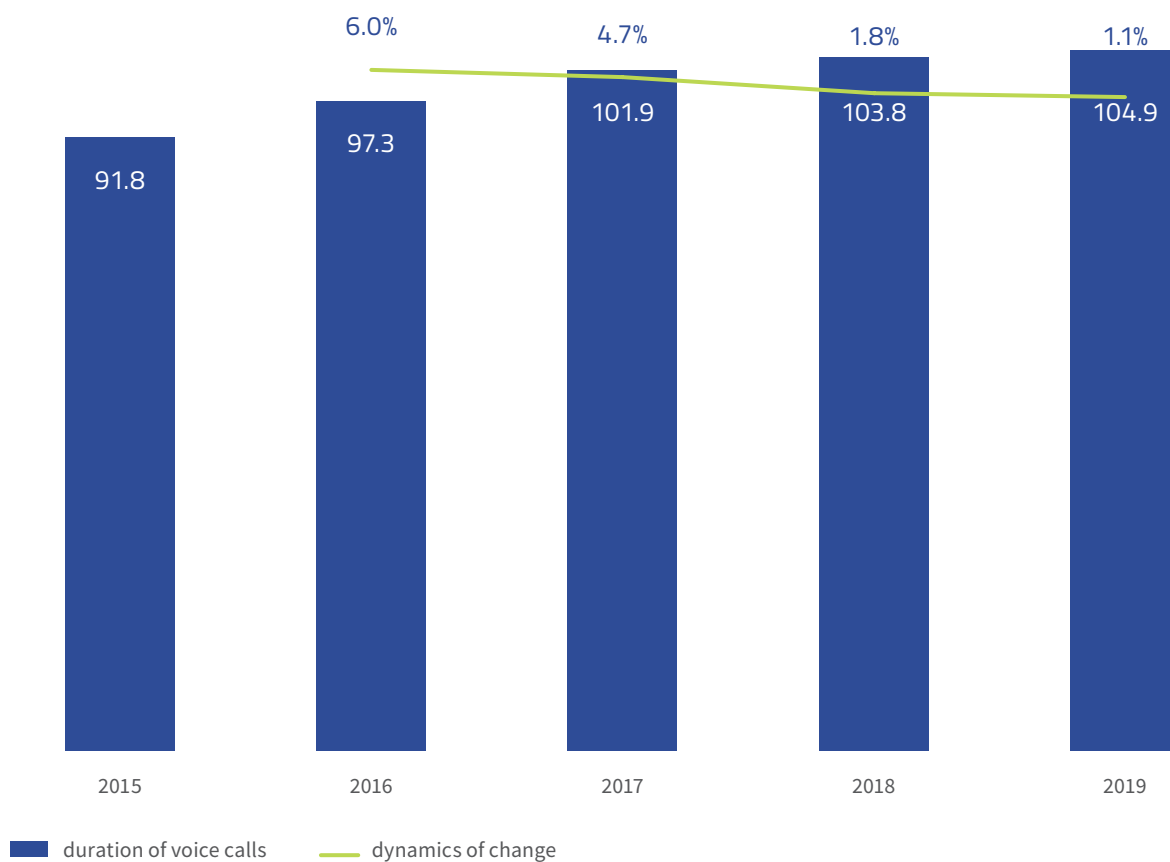
Source: UKE

Taking into account the average duration of voice calls per active user during the month in 2019, Poland was slightly above the European Union average. The Polish subscriber talked for about 166 minutes a month[8], which is 2 minutes longer than the EU average.

[8] The methodology adopted by Analysys Mason differs from UKE, hence the differences between the calculations.

CHART 23. **AVERAGE DURATION OF VOICE CALLS PER ACTIVE USER PER MONTH IN SELECTED EU COUNTRIES (MINUTES)**

EU average: 164

RO	BG	SE	LV	FR	IT	IE	GR	HU	SI	LT	PL	HR	UK	EE	AT	ES	PT	CZ	BE	NL	DK	FI	SK	DE
237	231	220	215	210	201	183	181	180	178	171	166	162	154	148	148	146	136	125	123	122	120	119	118	101

■ ■ monthly

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

In 2019, a total of 45 billion SMS messages were sent, more than 1.5 billion less than the year before. This means that statistically, in 2019, each Pole sent over 97 SMS messages per month. The data obtained indicate that traditional SMS messages are replaced by messages sent via instant messaging or internet services.

CHART 24. **TOTAL NUMBER OF SMS MESSAGES SENT (BILLION) AND THE DYNAMICS OF CHANGE**

	2015	2016	2017	2018	2019
number of SMS messages sent	52	50	49	47	45
dynamics of change		-3.3%	-2.0%	-5.5%	-3.2%

■ number of SMS messages sent ── dynamics of change
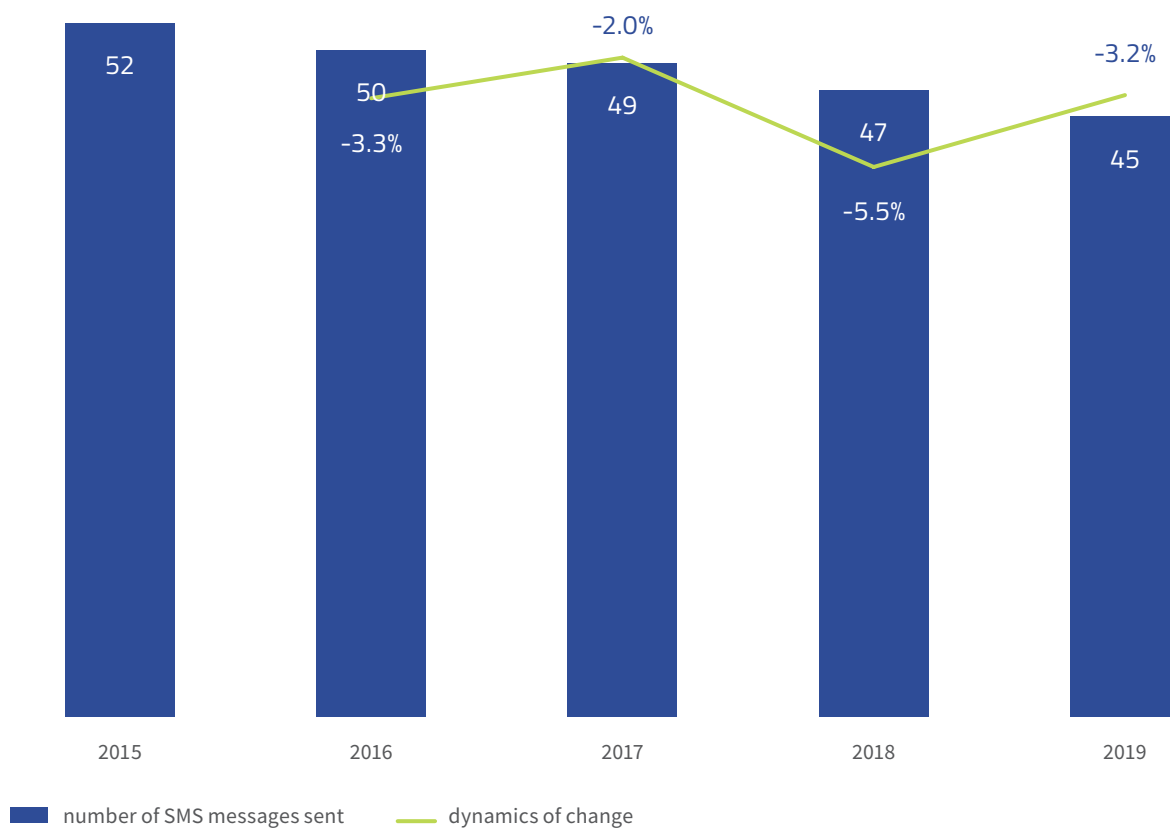
Source: UKE

The popularity of MMS messages has increased. Almost 2 billion such messages were sent in 2019. It was over 13.2% more than a year ago. Statistically, there were 4 MMS per capita per month.

CHART 25. **NUMBER OF MMS SENT (MILLION) AND THE DYNAMICS OF CHANGE**

- number of MMS sent
- dynamics of change
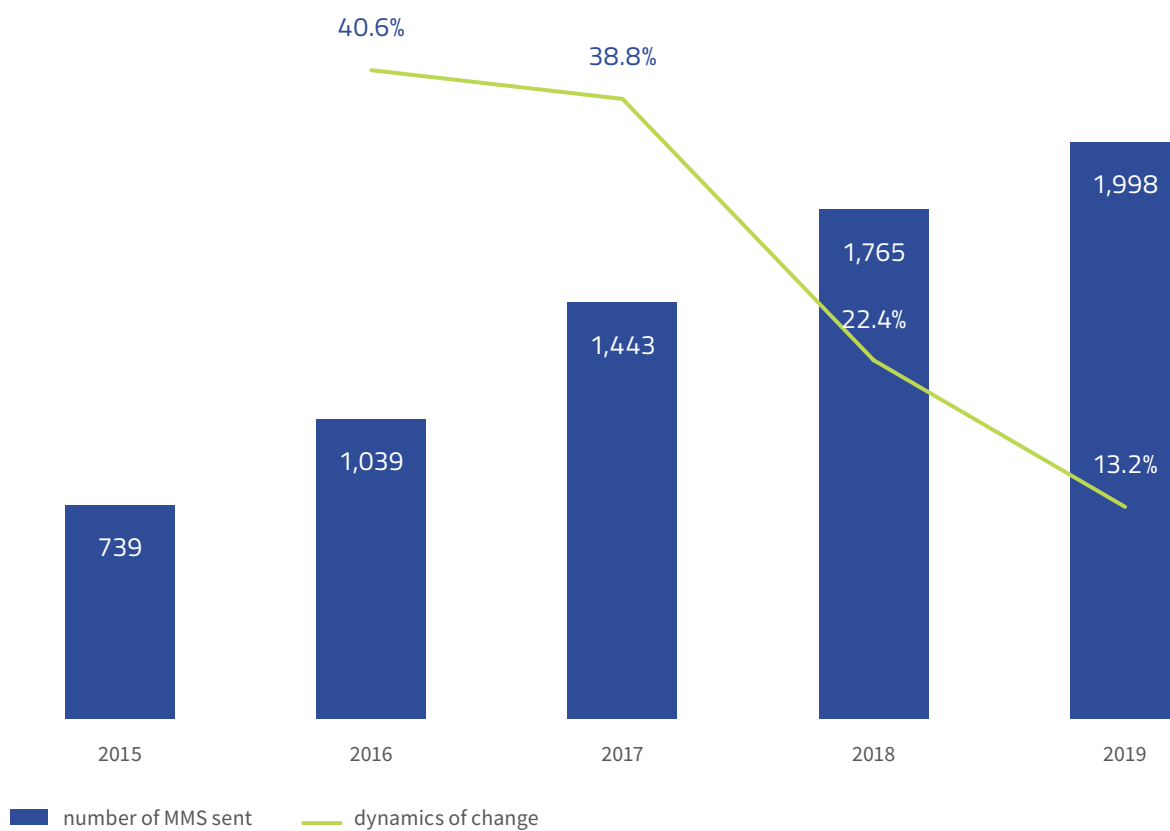
Source: UKE

Data transmission in mobile networks has been the most dynamically developing service for several years, with a total of 3,611 PB of data sent in 2019. This is a result by almost 16.6% better than the year before. In statistical terms, there was an average of 94.1 GB per one Pole.

CHART 26. **VOLUME OF DATA TRANSMISSION (PB) AND THE DYNAMICS OF CHANGE**

- data transmission
- dynamics of change
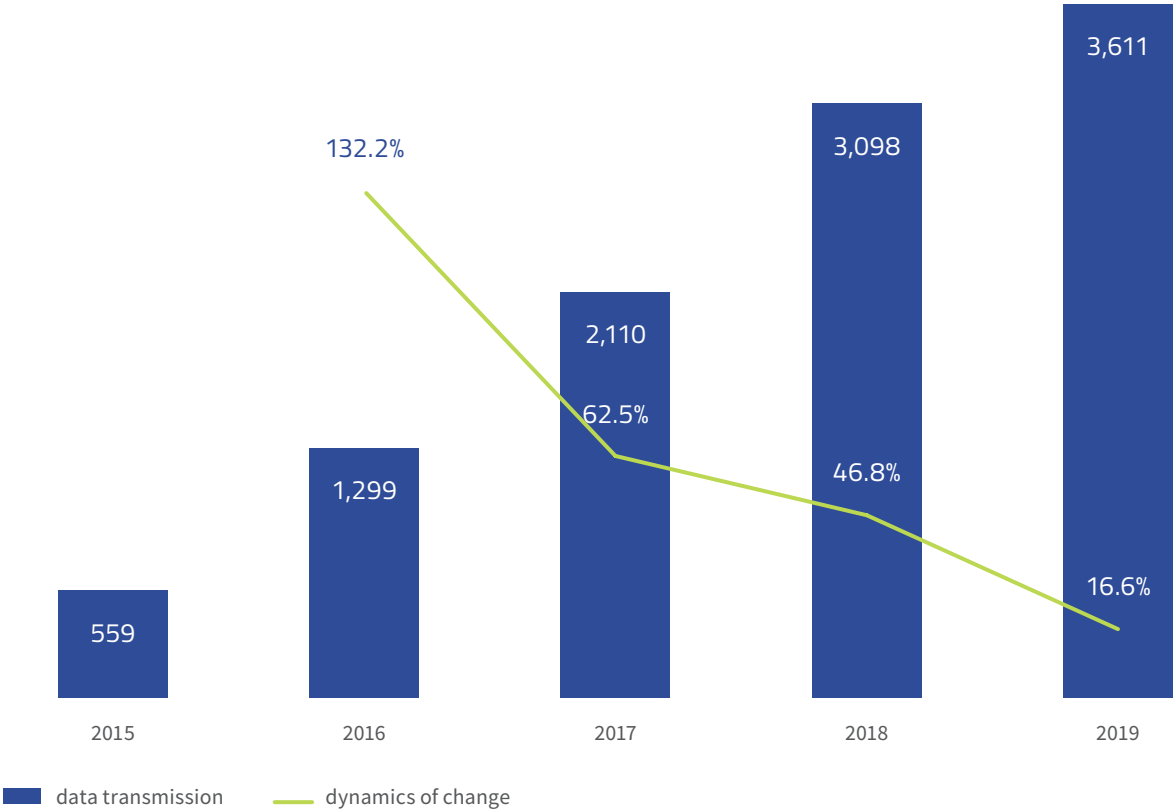
Source: UKE

2.5. ROAMING

In 2019, as in the previous year, we witness the impact of the "Roam Like At Home" principle on the use of mobile services by Poles. The application in other EU countries of the same rates for voice, text and data transmission as those for customers in Poland has resulted in Poles abroad continuing to use these services willingly. However, voice calls were less popular than last year (down by 6.3%). The total duration of voice calls made (initiated) by Poles abroad as part of roaming in 2019 amounted to almost 4 billion minutes.

6.3% decrease in the duration
of roaming voice calls

CHART 27. **TOTAL DURATION OF OUTGOING VOICE CALLS IN OUTBOUND ROAMING (MILLION MINUTES)**

■ duration of outbound roaming calls   —— dynamics of change
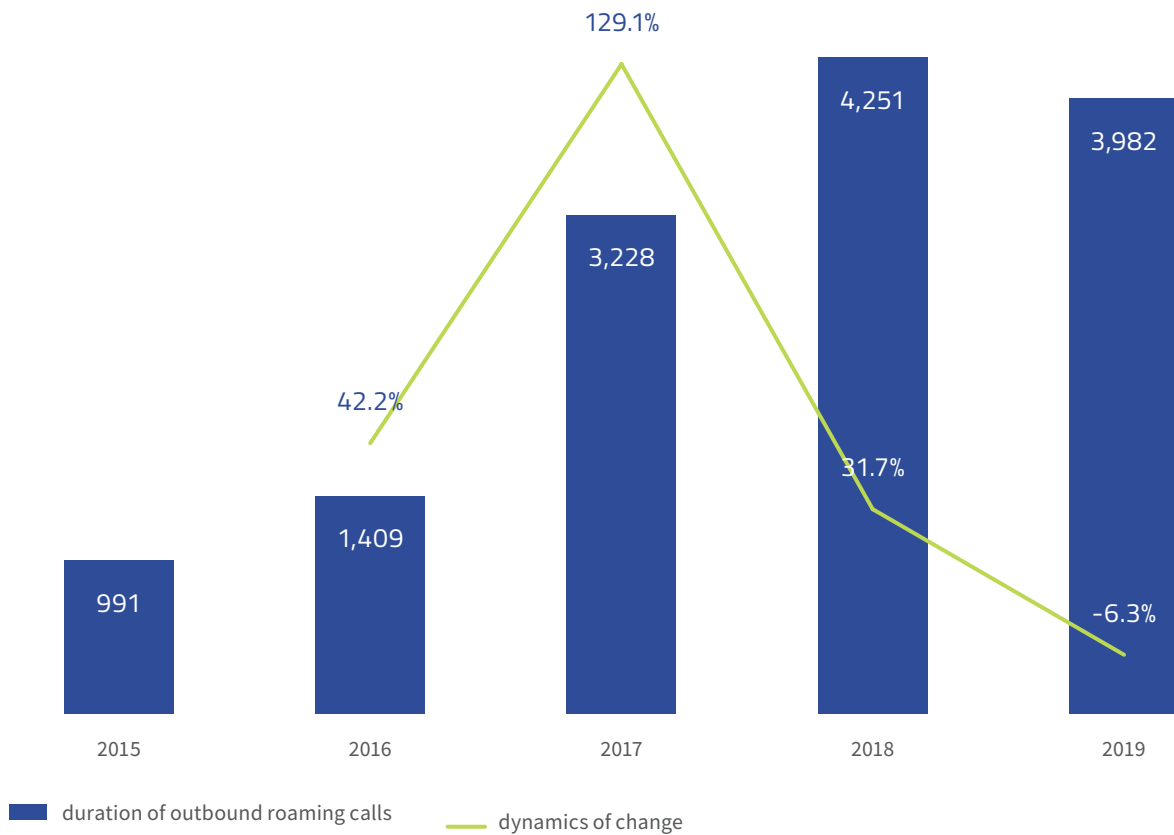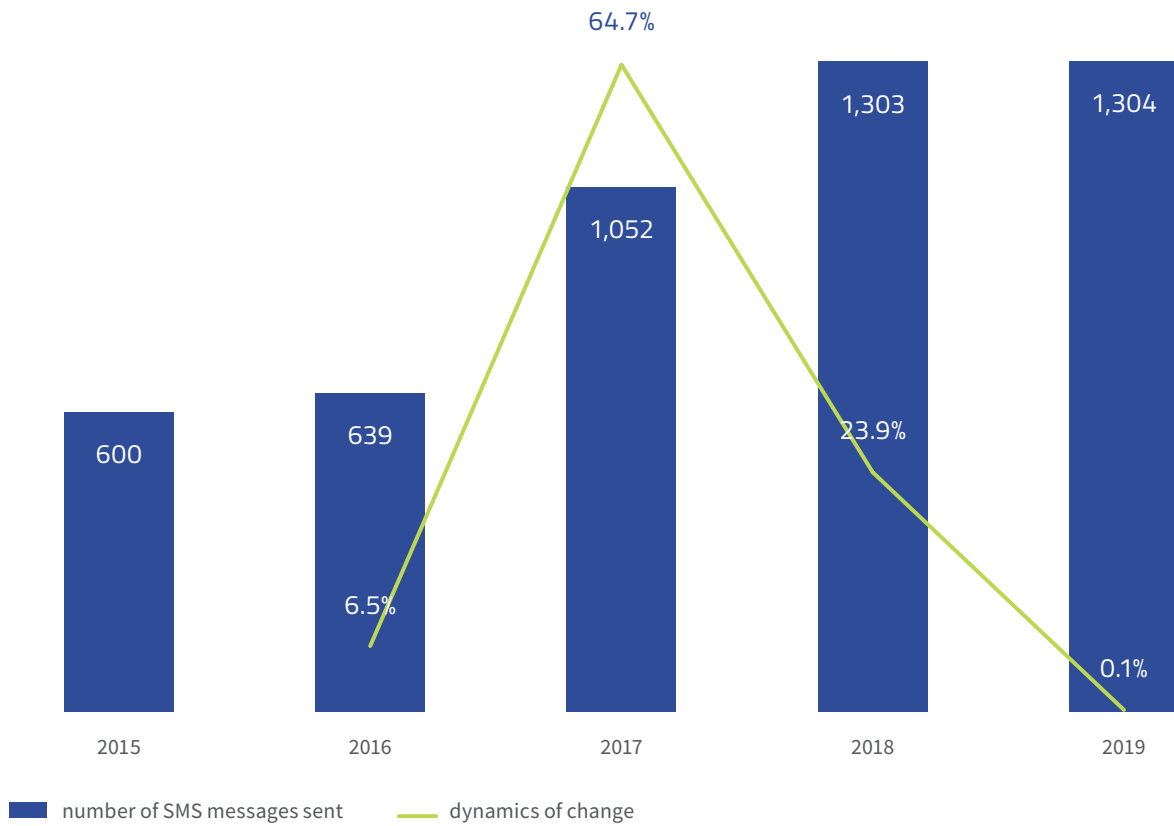
Source: UKE

Source: UKE

The subscribers of Polish mobile networks using roaming sent over 1.3 billion SMS messages.

1.3 billion
SMS messages sent while roaming

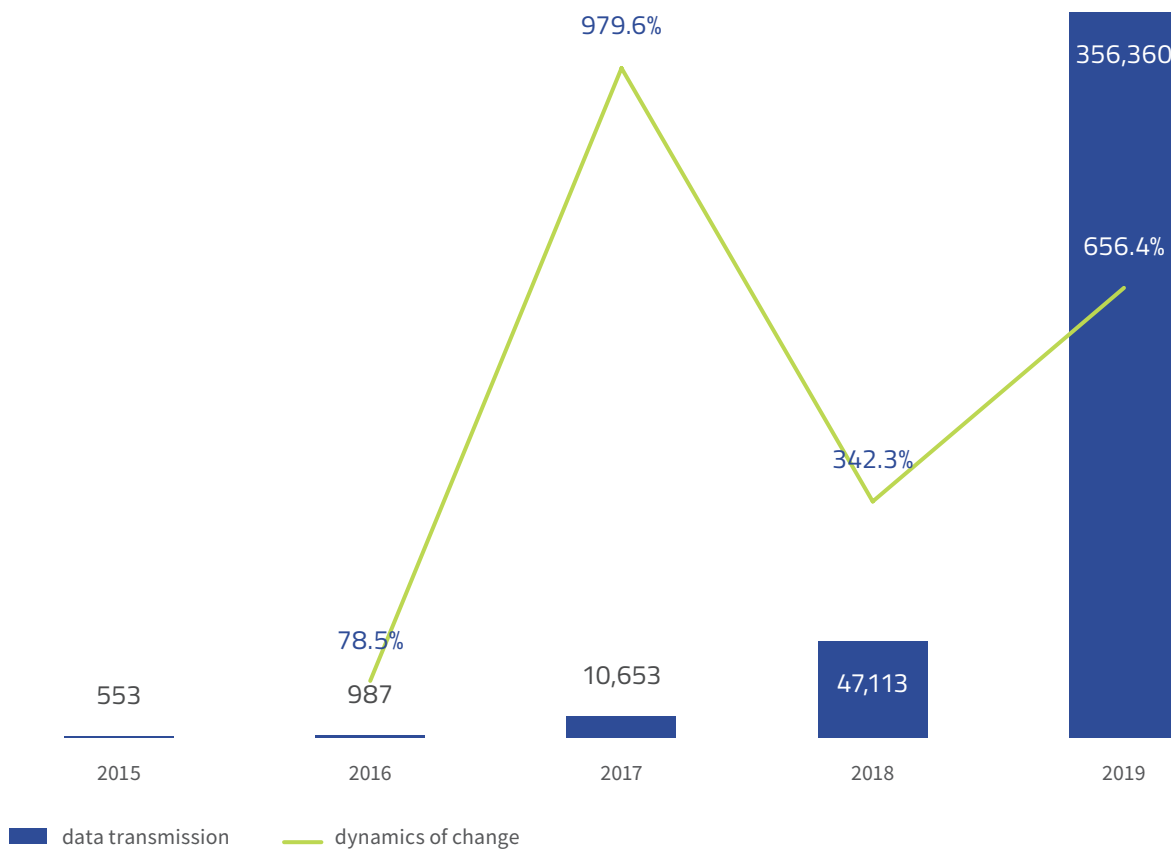CHART 28. **TOTAL NUMBER OF SMS SENT IN OUTBOUND ROAMING (MILLION)**

	2015	2016	2017	2018	2019
number of SMS messages sent	600	639	1,052	1,303	1,304
dynamics of change		6.5%	64.7%	23.9%	0.1%

■ number of SMS messages sent   ▬ dynamics of change

Source: UKE

The greatest dynamics of changes among outbound roaming services was observed in data transmission. It was over 7.6 times bigger than the year before.

7.6 fold
growth of data transmission in roaming

CHART 29. **TOTAL DATA TRANSMISSION VOLUME IN OUTBOUND ROAMING (TB)**

	2015	2016	2017	2018	2019
data transmission	553	987	10,653	47,113	356,360
dynamics of change		78.5%	979.6%	342.3%	656.4%

■ data transmission ── dynamics of change

Source: UKE

3

BUNDLED
SERVICES

3.1. GENERAL INFORMATION

Bundled services are invariably popular with users. However, this market appears more saturated and stable than in previous years. Compared to 2018, the number of subscribers slightly decreased (by 0.5%) and amounted to less than 13.7 million.

13.7 million
subscribers to bundled services

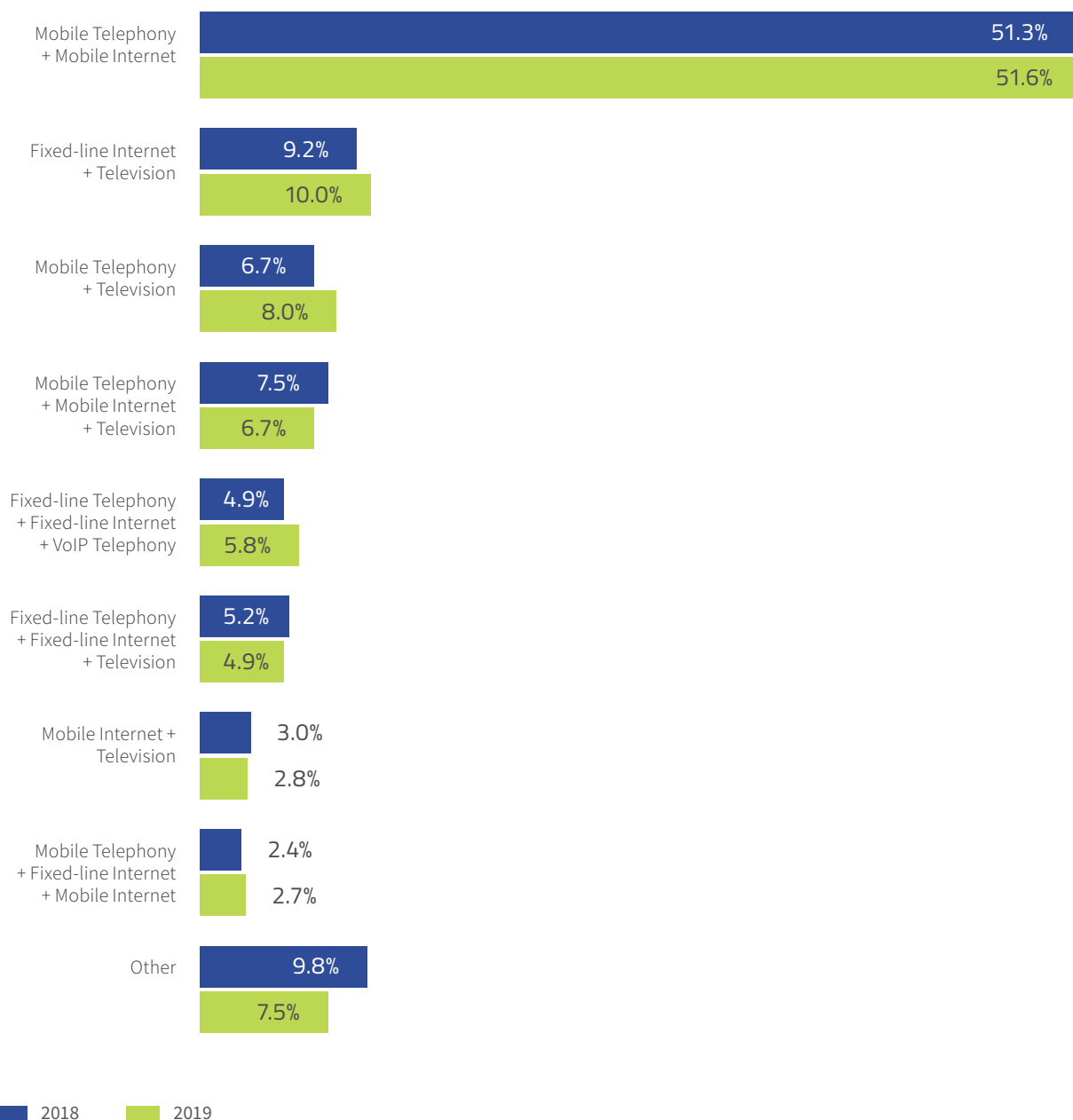CHART 30. **NUMBER OF USERS OF BUNDLED SERVICES (MILLION) AND THE DYNAMICS OF CHANGE**

- number of subscribers
- percentage change
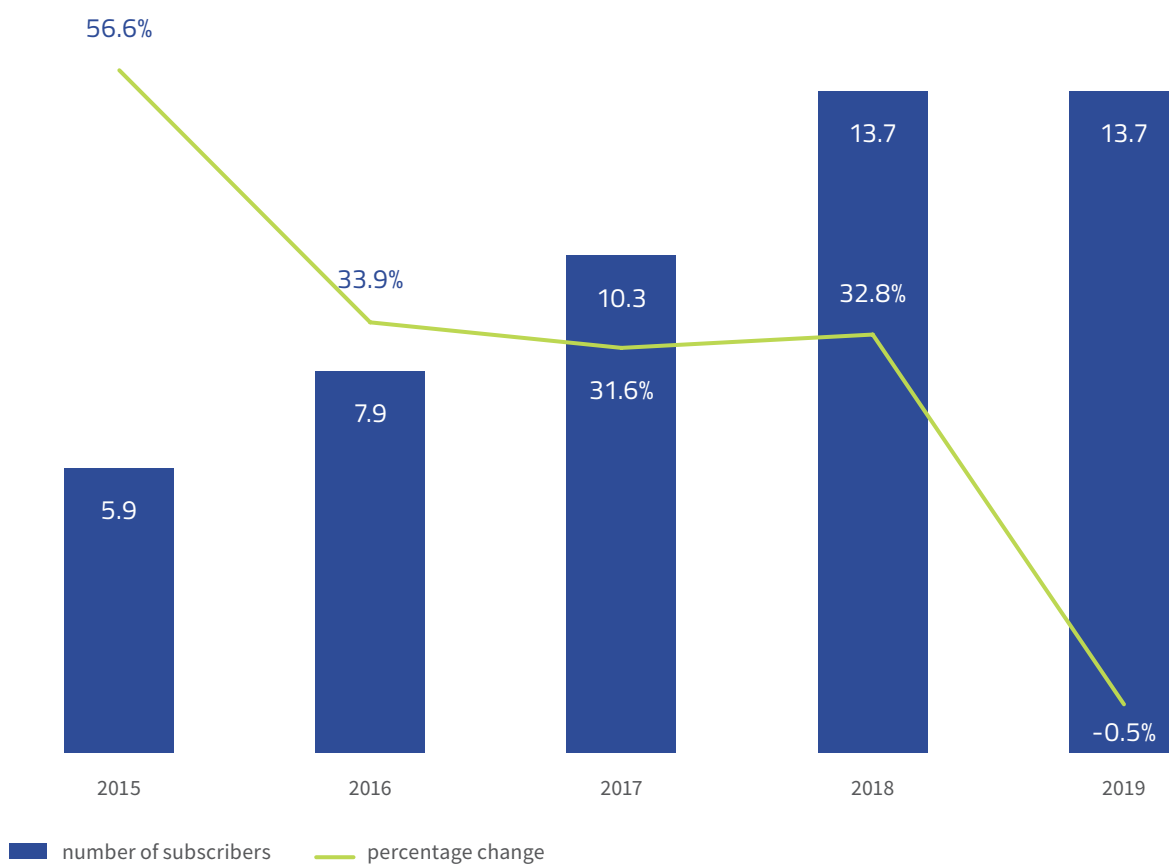
Source: UKE

In 2019, the most popular service bundles were "Mobile Telephony + Mobile Internet" (51.6%) and "Fixed-line Internet + Television" (10%). In both cases, there was an increase in market shares compared to 2018, by 0.3 pp. and 0.8 pp., respectively. Customers' interest in the "Mobile Telephony + Television" (8%) and "Fixed-line Telephony +

Fixed-line Internet + VoIP Telephony" (5.8%) bundles also increased by 1.3 pp. and 0.9 pp. respectively, compared to 2018. Interest in the "Mobile Telephony + Mobile Internet + Television" bundle fell by 0.8 pp (6.7%). The remaining bundles gathered 7.5% of subscribers of all bundled services, 2.1 pp less than in 2018.

CHART 31. **SHARES OF BUNDLES IN TERMS OF THE NUMBER OF USERS**

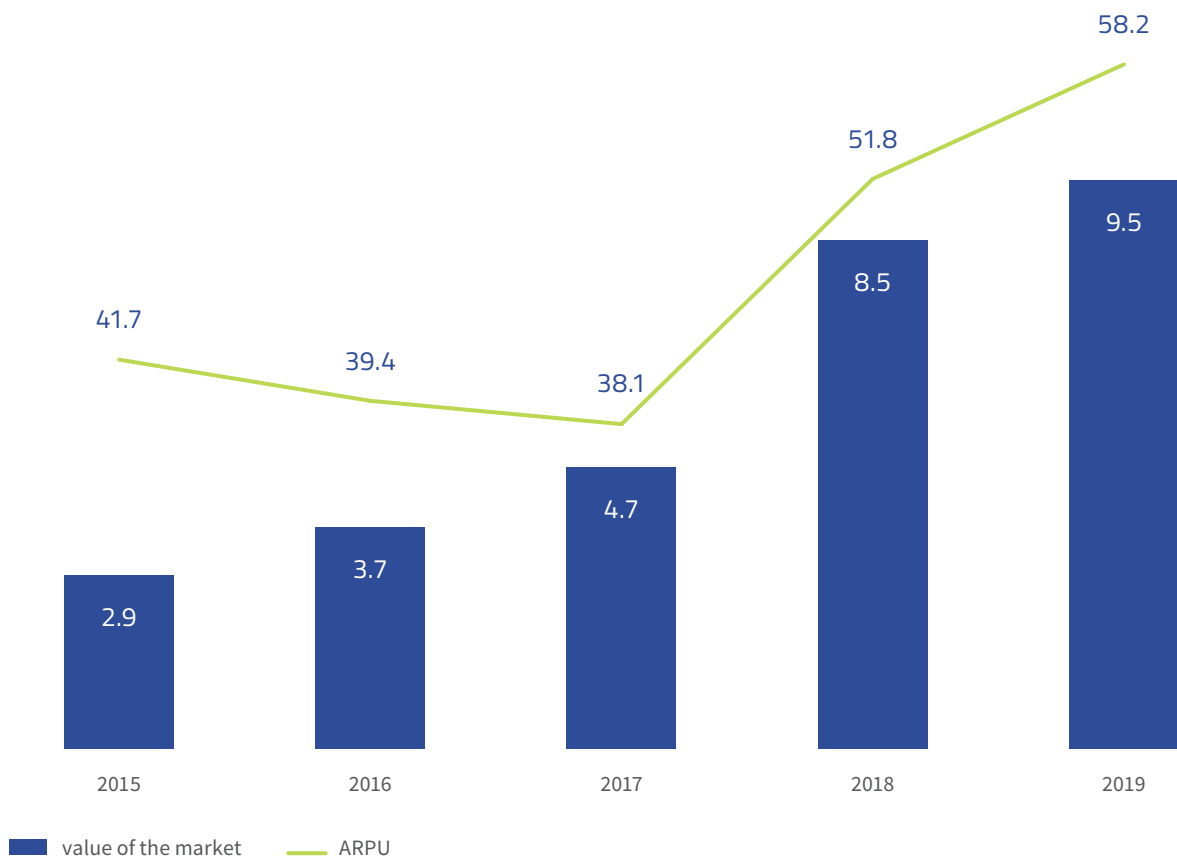| Bundle	2018	2019
Mobile Telephony + Mobile Internet	51.3%	51.6%
Fixed-line Internet + Television	9.2%	10.0%
Mobile Telephony + Television	6.7%	8.0%
Mobile Telephony + Mobile Internet + Television	7.5%	6.7%
Fixed-line Telephony + Fixed-line Internet + VoIP Telephony	4.9%	5.8%
Fixed-line Telephony + Fixed-line Internet + Television	5.2%	4.9%
Mobile Internet + Television	3.0%	2.8%
Mobile Telephony + Fixed-line Internet + Mobile Internet	2.4%	2.7%
Other	9.8%	7.5%

Source: UKE

UKE

3.2. REVENUES

The value of the bundled services market in comparison with 2018 increased by about 12% and amounted to PLN 9.5 billion. The average monthly revenue per user (ARPU) in 2019 was about PLN 58.2 – by slightly more than PLN 6 when compared to 2018.

PLN 9.5 bilion
value of the bundled services market

CHART 32. **VALUE OF THE MARKET (PLN BILLION) AND AVERAGE MONTHLY REVENUE PER USER (ARPU IN PLN)**

	2015	2016	2017	2018	2019
value of the market	2.9	3.7	4.7	8.5	9.5
ARPU	41.7	39.4	38.1	51.8	58.2

■ value of the market — ARPU

Source: UKE

3.3. SUBSCRIBERS

More than 77% of subscribers to the bundled services market chose a bundle of two services (double play). Next places are taken by *triple play*[9] (16.5%) and *quadruple play*[10] (6%) bundles. The remaining bundles, *quintuple*[11] and *sextuple play*[12] were hardly popular and used by about 0.1% of the subscribers of bundled services.

Among offers consisting of two services, the vast majority of customers chose the "Mobile Telephony + Mobile Internet" bundle (66.6%). The second most popular bundle was "Fixed-line Internet + Television" (13%), whose popularity increased by 1 pp compared to 2018. The third position among double play services was taken by the "Mobile Telephony + Television" bundle (10.3%), which also gained popularity among subscribers (1.7 percentage points) compared to last year.
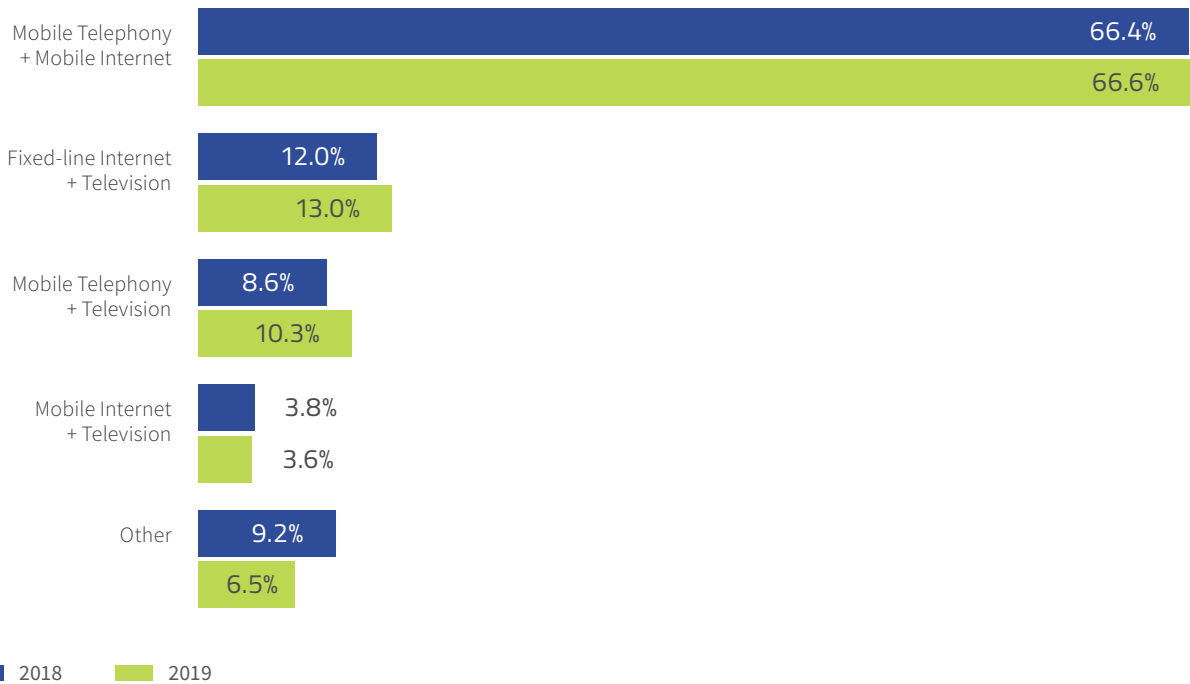
77.4%
of subscribers choose *double play* bundles

[9] a bundle of three services
[10] a bundle of four services
[11] a bundle of five services
[12] a bundle of six services

CHART 33. **SHARES OF BUNDLES IN TERMS OF THE NUMBER OF SUBSCRIBERS**

6.0% quadruple play

0.1% other

16.5% triple play
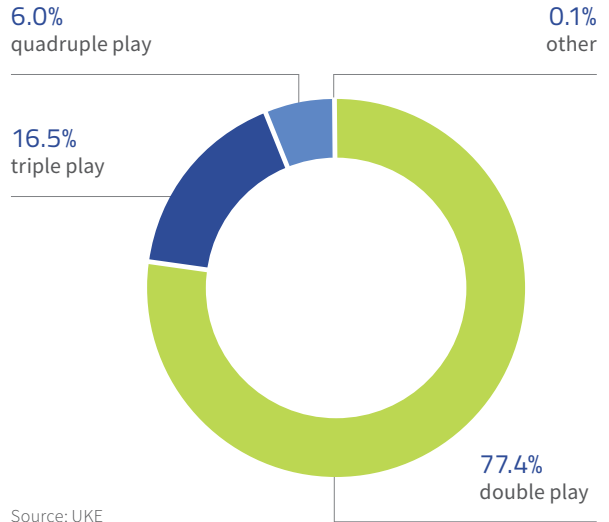
77.4% double play

Source: UKE

CHART 34. **SHARES OF INDIVIDUAL *DOUBLE PLAY* BUNDLES IN TERMS OF THE NUMBER OF SUBSCRIBERS**

	2018	2019
Mobile Telephony + Mobile Internet	66.4%	66.6%
Fixed-line Internet + Television	12.0%	13.0%
Mobile Telephony + Television	8.6%	10.3%
Mobile Internet + Television	3.8%	3.6%
Other	9.2%	6.5%

■ 2018 ■ 2019

Source: UKE

Among the bundles of three services, the so-called *triple play*, the shares of individual bundles are distributed more evenly than in the case of the other bundled services. The bundle "Mobile Telephony + Mobile Internet + Television" came first with a share of 40.6%. The second place with a 29.5% share was taken by the bundle "Fixed-line Telephony + Fixed-line Internet + Television". Further places are taken by "Mobile Telephony + Fixed-line Internet + Mobile Internet" (16%) and "Fixed-line Internet + Television + VOIP Telephony" (9.9%)

CHART 35. **SHARES OF INDIVIDUAL *TRIPLE PLAY* BUNDLES IN TERMS OF THE NUMBER OF SUBSCRIBERS**

■ 2018	■ 2019
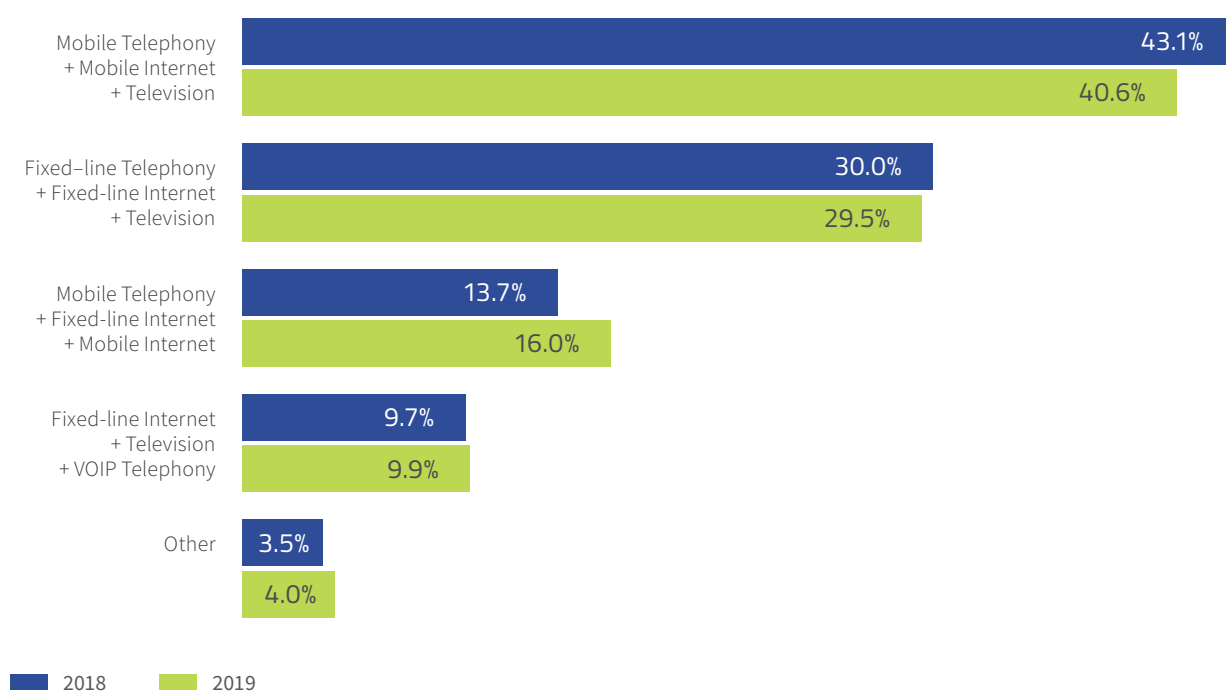
Source: UKE

In the case of the number of subscribers of bundles consisting of four services, the so-called *quadruple play*, the bundle "Mobile Telephony + Fixed-line Internet + Television + VoIP Telephony" definitely dominates. Nearly 96% of the users decided to use these bundles. The second place was taken by the bundle "Fixed-line Telephony + Mobile Telephony + Fixed-line Internet + Television" (1.5%), and the third place by "Fixed-line Internet + Mobile Internet + Television + VoIP Telephony" (1.2%).

Mobile Telephony
+ Fixed-line Internet
+ Television
+ VOIP Telephony
- 94.6%
- 95.9%

Fixed-line Telephony
+ Mobile Telephony
+ Fixed-line Internet
+ Television
- 1.3%
- 1.5%

Fixed-line Internet
+ Mobile Internet
+ Television
+ VOIP Telephony
- 0.5%
- 1.2%

Other
- 3.6%
- 1.4%

■ 2018 ■ 2019
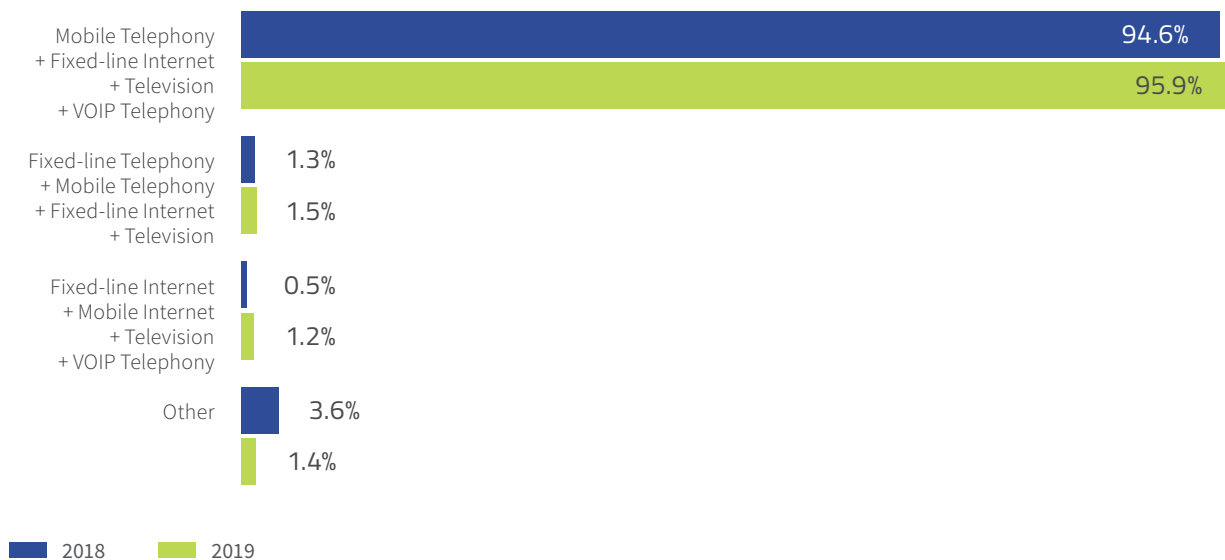
Source: UKE

Approximately 70% of the market for bundled services consisting of five elements was constituted by the service "Mobile Telephony + Fixed-line Internet + Mobile Internet + Television + VoIP Telephony", whose share increased by more than 20 percentage points. The next position was occupied by the bundle "Fixed-line Telephony + Mobile Internet + Fixed-line Internet + Mobile Internet + Television" (27.5%), which still in 2018 had almost 50% of the market share in the so-called *quintuple play*.

CHART 37. **SHARES OF INDIVIDUAL *QUINTUPLE PLAY* BUNDLES IN TERMS OF THE NUMBER OF SUBSCRIBERS**

Mobile Telephony
+ Fixed-line Internet
+ Mobile Internet
+ Television
+ VOIP Telephony
- 50.0%
- 70.2%

Fixed-line Telephony
+ Mobile Telephony
+ Fixed-line Internet
+ Mobile Internet
+ Television
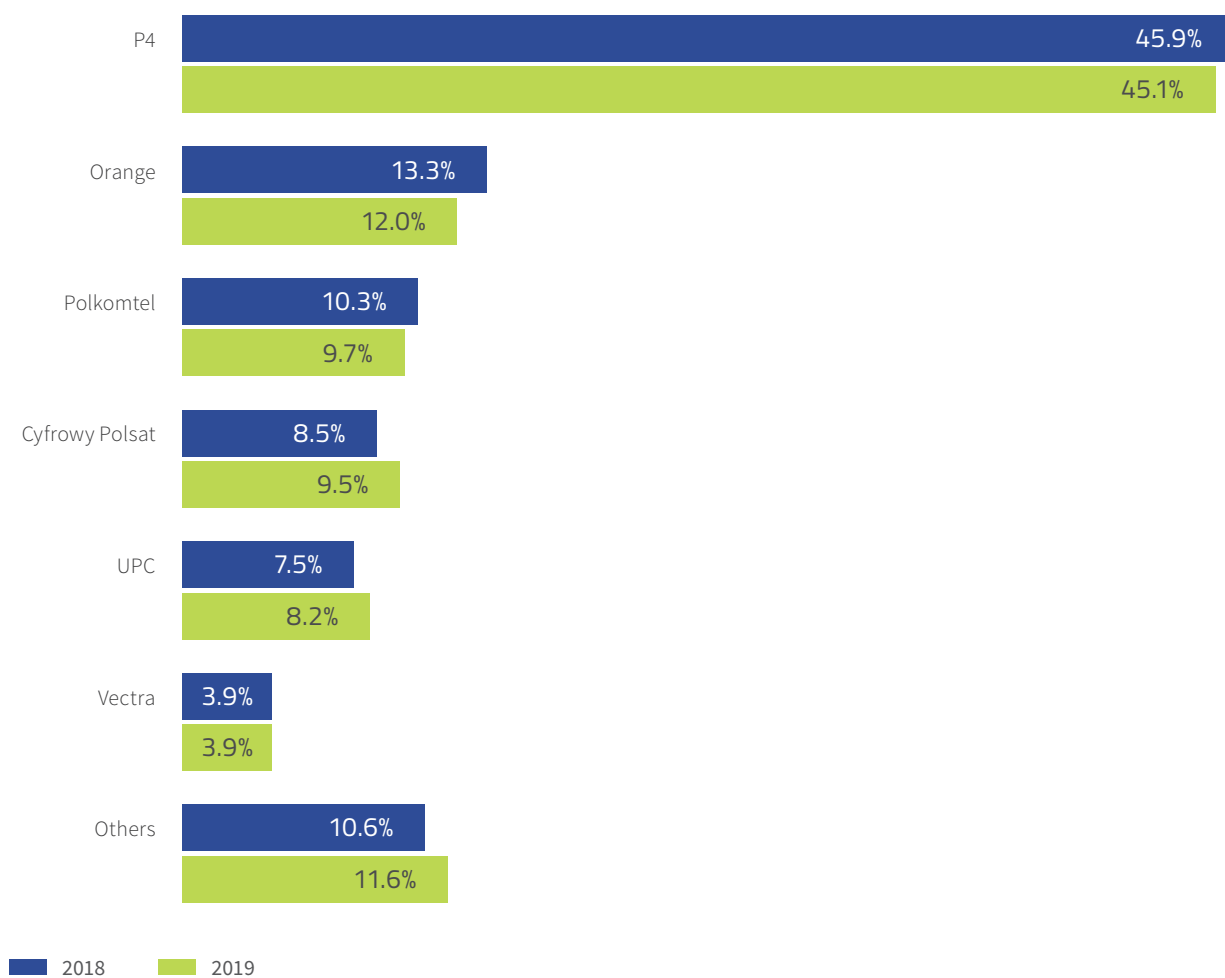- 49.1%
- 27.5%

Other
- 0.9%
- 2.3%

■ 2018 ■ 2019
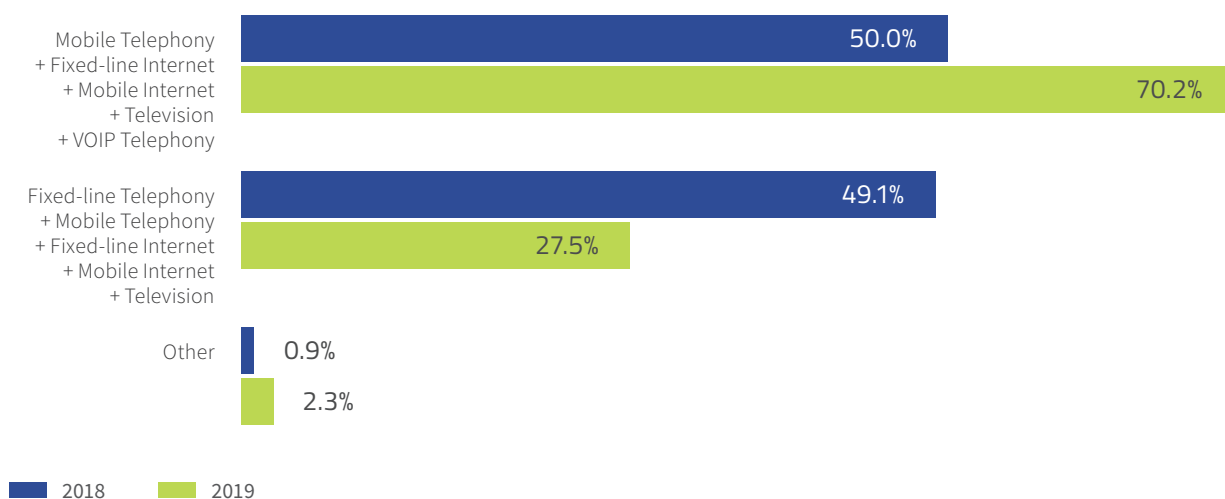
Source: UKE

3.4. MARKET STRUCTURE

Invariably for several years now, P4 has been the operator attracting the largest number of customers for bundled services (about 45%). Orange managed to gather 12% of subscribers of bundled services in its customer base,

over 1 pp less than last year. Polkomtel had less than 10%, and Cyfrowy Polsat about 9.5%. Further places were taken by UPC (8.2%) and Vectra (3.9%). The remaining operators had an 11.6% share in the market for bundled services.
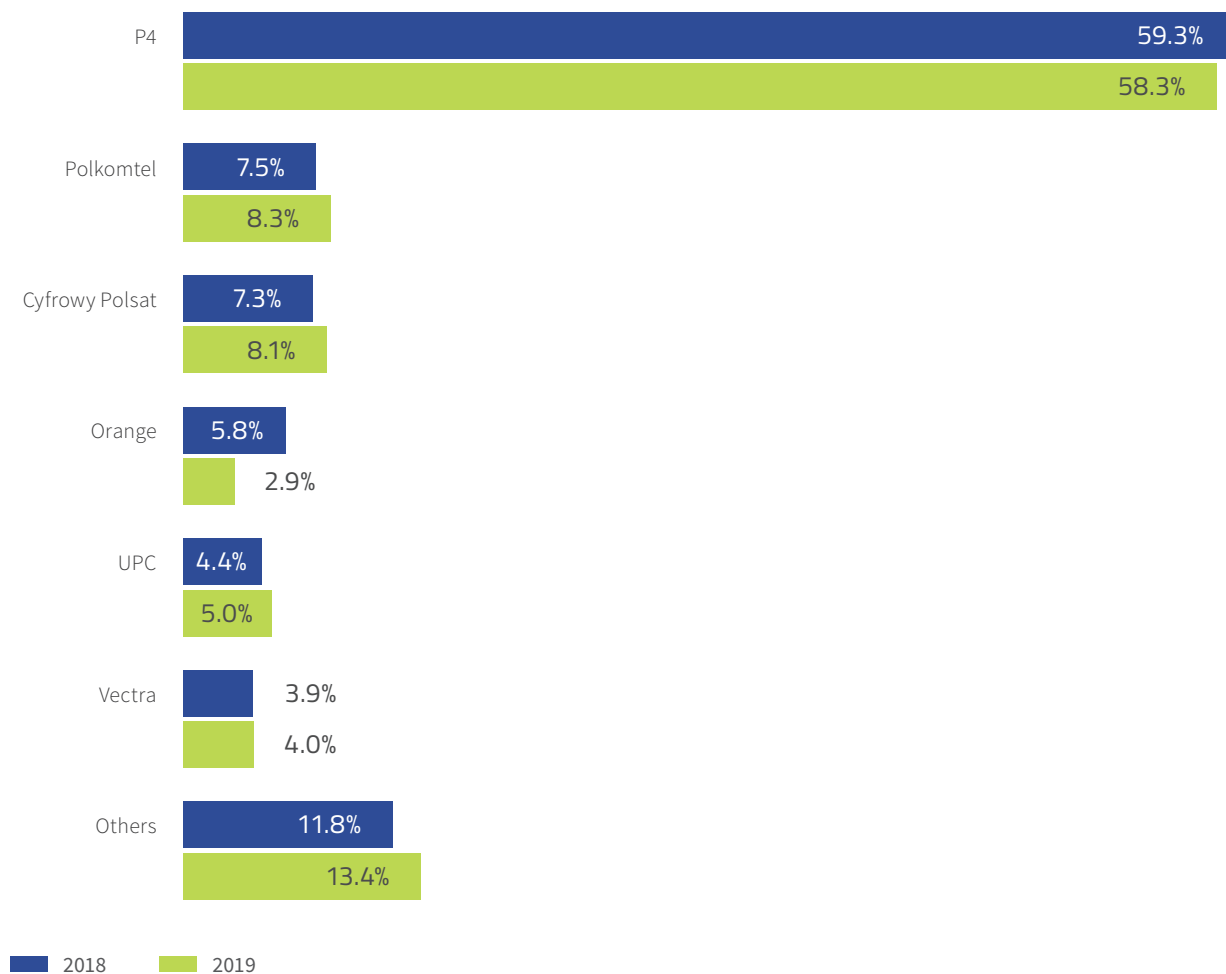
CHART 38. **SHARES OF OPERATORS IN TERMS OF THE NUMBER OF SUBSCRIBERS TO BUNDLED SERVICES**

Operator	2018	2019
P4	45.9%	45.1%
Orange	13.3%	12.0%
Polkomtel	10.3%	9.7%
Cyfrowy Polsat	8.5%	9.5%
UPC	7.5%	8.2%
Vectra	3.9%	3.9%
Others	10.6%	11.6%

■ 2018   ■ 2019

Source: UKE

Among entrepreneurs offering a bundle of two services, the largest shares were held by P4 (58.3%), a result by 1 pp lower than in 2018, followed by Polkomtel (8.3%) and Cyfrowy Polsat (8.1%).
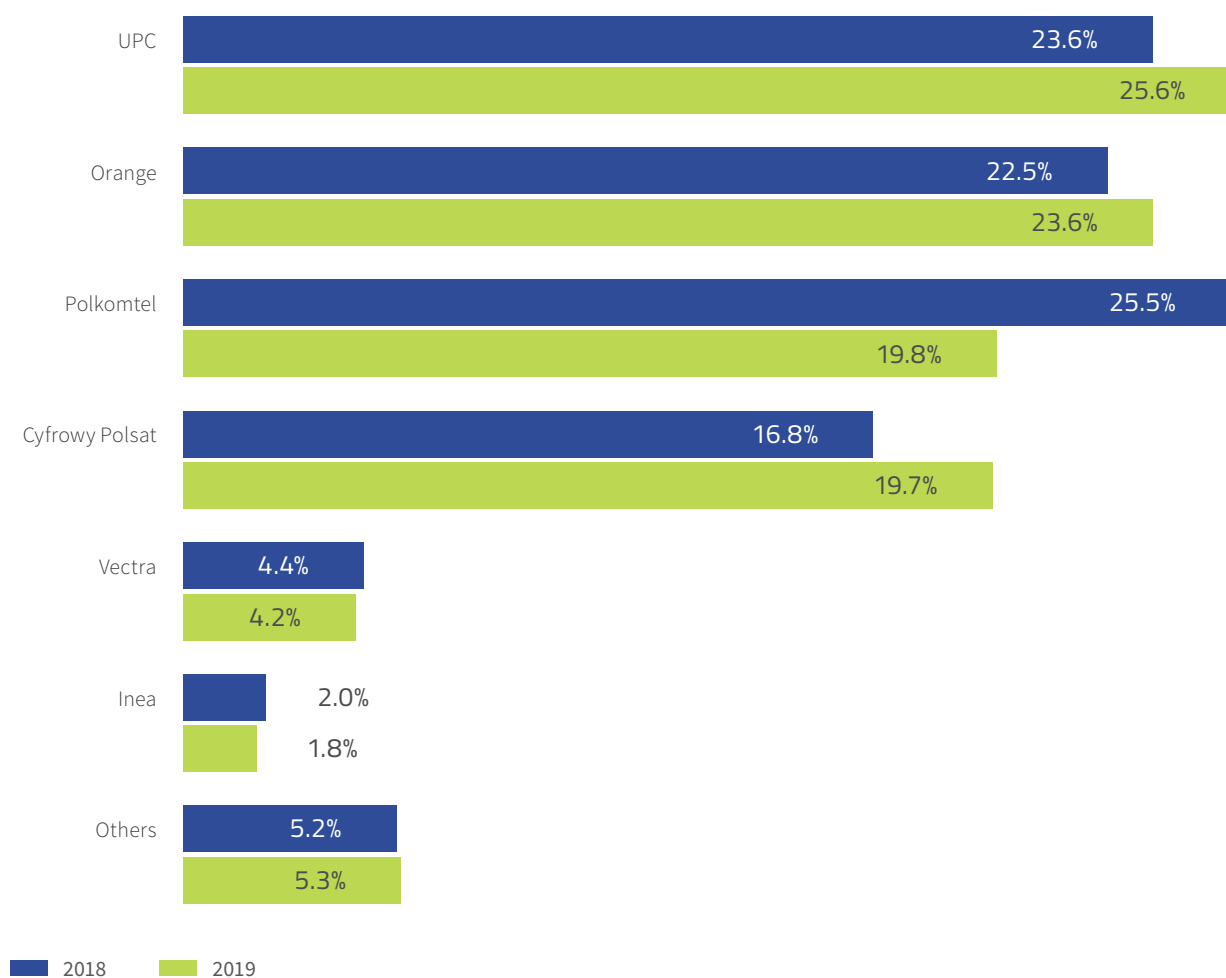
CHART 39. **SHARES OF OPERATORS IN TERMS OF THE NUMBER OF SUBSCRIBERS TO BUNDLED SERVICES –** *DOUBLE PLAY*

Operator	2018	2019
P4	59.3%	58.3%
Polkomtel	7.5%	8.3%
Cyfrowy Polsat	7.3%	8.1%
Orange	5.8%	2.9%
UPC	4.4%	5.0%
Vectra	3.9%	4.0%
Others	11.8%	13.4%

■ 2018   ■ 2019

Source: UKE

Among operators offering bundles of three services, 25.6% of subscribers were UPC's. Next were Orange (23.6%), Polkomtel (19.8%) and Cyfrowy Polsat (19.7%). The above mentioned companies have concentrated almost 90% of the *triple play* market share in terms of the number of subscribers.

CHART 40. **SHARES OF OPERATORS IN TERMS OF THE NUMBER OF SUBSCRIBERS TO BUNDLED SERVICES –** *TRIPLE PLAY*

Operator	2018	2019
UPC	23.6%	25.6%
Orange	22.5%	23.6%
Polkomtel	25.5%	19.8%
Cyfrowy Polsat	16.8%	19.7%
Vectra	4.4%	4.2%
Inea	2.0%	1.8%
Others	5.2%	5.3%

■ 2018   ■ 2019

Source: UKE

Of the operators offering *quadruple play* bundles in 2019,
the overwhelming majority of market shares in terms
of the number of subscribers were held by Orange (95.6%).

CHART 41. **SHARES OF OPERATORS IN TERMS OF THE NUMBER OF SUBSCRIBERS TO BUNDLED SERVICES –**
QUADRUPLE PLAY

Operator	2018	2019
Orange	94.6%	95.6%
Inea	2.4%	1.4%
Vectra	1.4%	1.3%
Others	1.6%	1.7%

■ 2018   ■ 2019
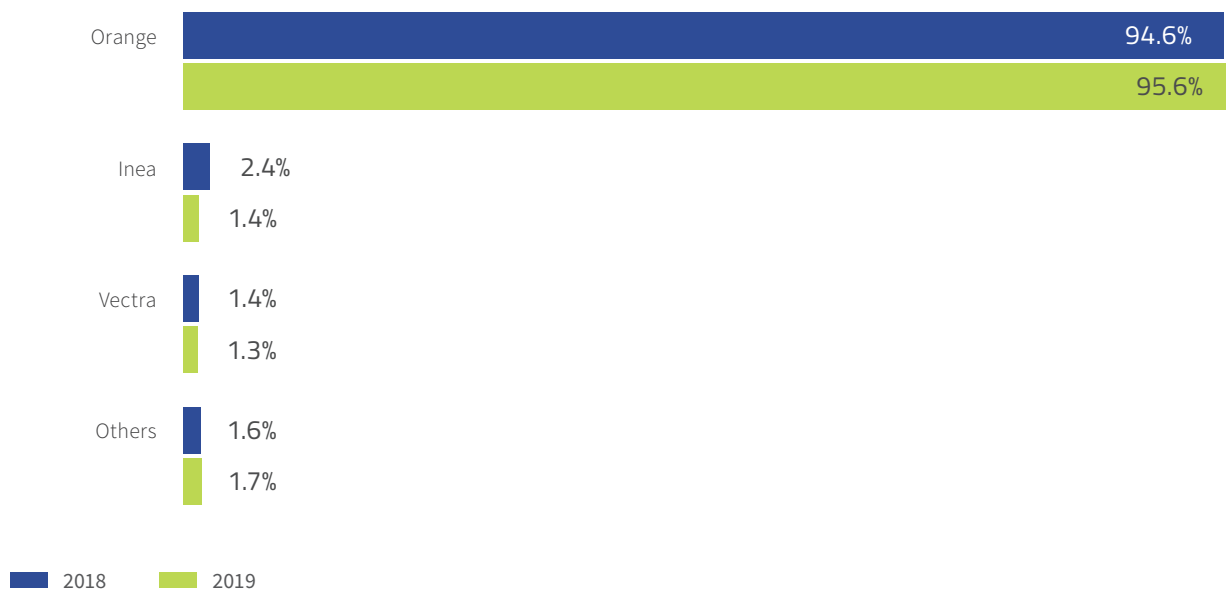
Source: UKE

4

FIXED-LINE
TELEPHONY

PART I
TELECOMMUNICATIONS MARKET

4.1. GENERAL INFORMATION

In 2019, the fixed-line telephony service was used by more than 3.5 million subscribers, about 13% less than in 2018. Revenues from fixed-line telephony services amounted to almost PLN 1.6 billion. Compared to the last year, this value decreased by just over 18%.

3.5 million

fixed-line telephony subscribers

PLN 1.6 bilion

value of the fixed-line telephony market

The largest number of own subscriber lines, more than half (53.8%) of all fixed-line telephony lines, were POTS lines. The share of CATV (Cable TV modem) lines, which is the second largest technology used by fixed-line telephony operators in Poland in terms of the number of lines (23.1%), is systematically growing. The third place was taken by ISDN lines (16%).

CHART 43. **PERCENTAGE SHARE OF LINE TYPES IN THE TOTAL SHARE OF SUBSCRIBER LINES IN TERMS OF TECHNOLOGY**

1.3% FTTH
0.8% FTTB/FTTC
4.9% other
0.1% xDSL
16.0% ISDN
23.1% CATV
53.8% POTS
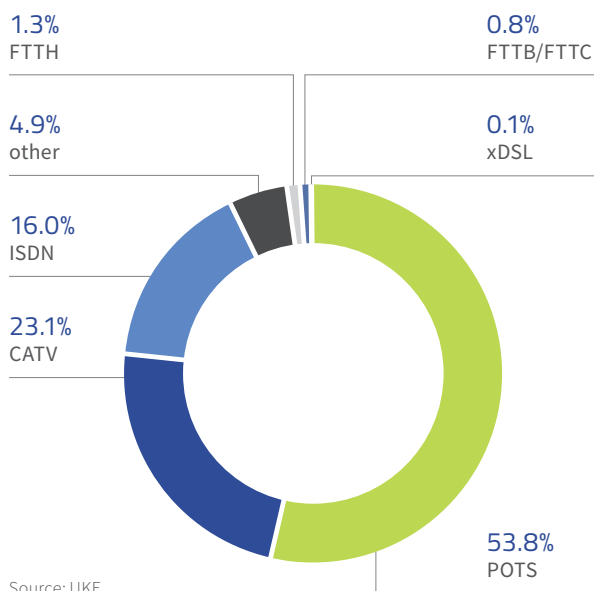
Source: UKE

CHART 42. **VALUE OF THE FIXED-LINE TELEPHONY MARKET (PLN BILLION) AND THE DYNAMICS OF CHANGE**

Year	Value	Percentage decrease
2015	3.3	-13.0%
2016	2.6	-20.5%
2017	2.3	-12.6%
2018	1.9	-15.7%
2019	1.6	-18.1%

■ value of the market   — percentage decrease
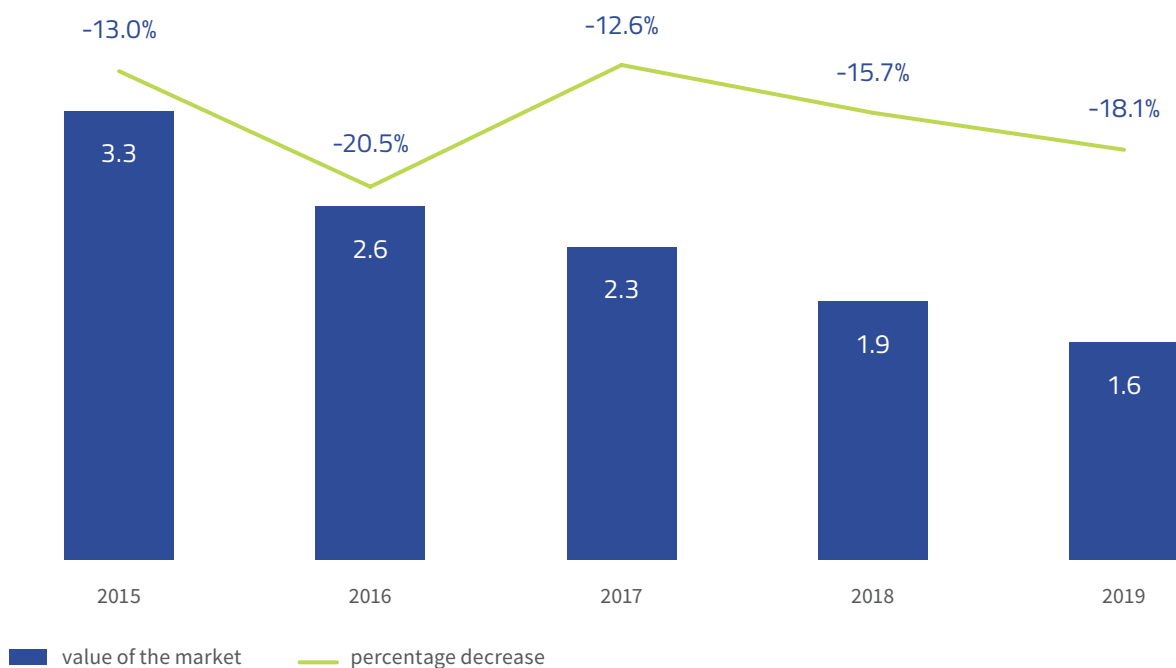
Source: UKE

The penetration of fixed-line telephony services is decreasing year by year. In 2019, this indicator for the whole country was 9.3% (12.6% less than in 2018).

In 2019, the highest number of own subscriber lines per capita was in the Mazowieckie Voivideship (13.5%), while the lowest in the Świętokrzyskie and Wielkopolskie Voivideships, 6.5% and 6.4%, respectively.

CHART 44. **FIXED-LINE TELEPHONY PENETRATION (NUMBER OF SUBSCRIBER LINES/NUMBER OF INHABITANTS) AND THE DYNAMICS OF CHANGE**

- penetration
- percentage change
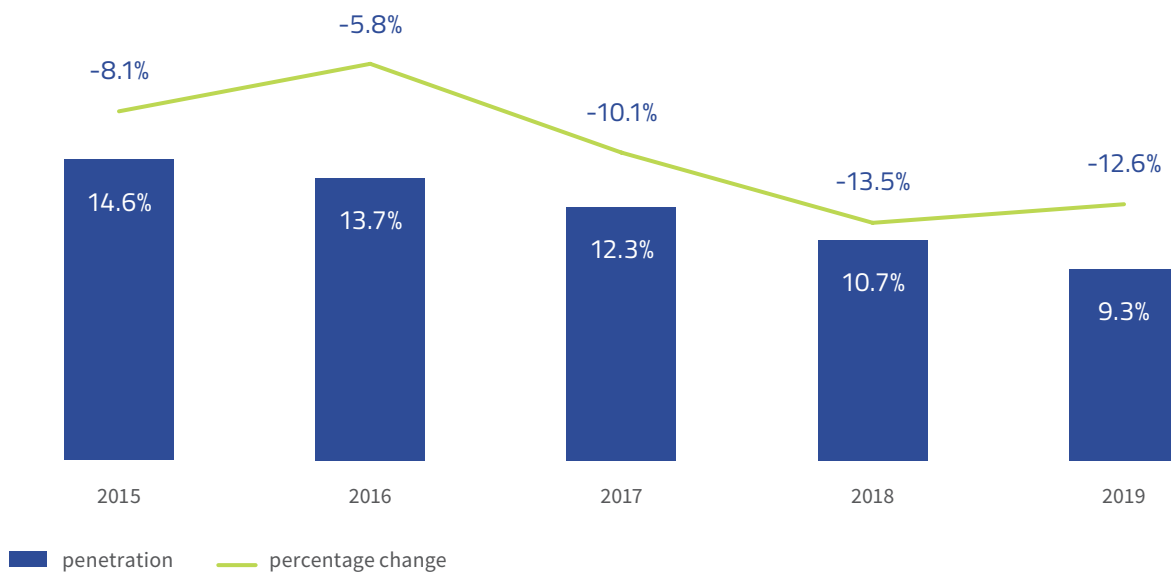
Source: UKE

MAP 1. **FIXED-TELEPHONY LINES PENETRATION BY VOIVODESHIP (REGION)**
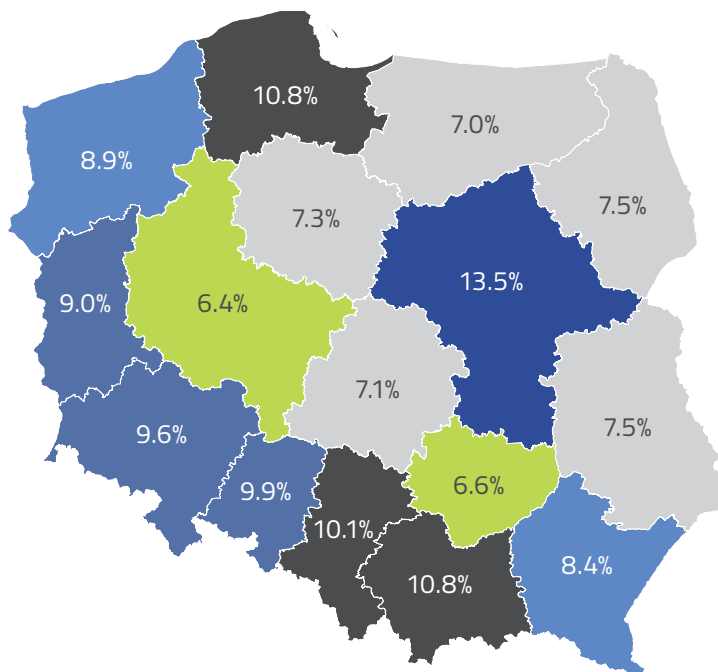
Source: UKE

4.2. REVENUES

Invariably, the value of the fixed-line telephony market in Poland has been steadily decreasing for several years. In 2019, operators' revenues from the provision of these services amounted to approximately PLN 1.6 billion. Compared to the previous year, this amount decreased by about 18%.

18.1%

decrease in revenues from fixed-line telephony

The main source of revenues (about 88%) of fixed-line telephony operators were revenues from subscribers connected to the operator's own network. Only less than 12% were revenues from subscribers of WLR services.

The general downward trend in the fixed-line telephony market has also translated into a decrease in monthly average revenues per user (ARPU). The indicator amounted to PLN 37 and was lower by over PLN 2 compared to 2018. Within 5 years, the ARPU of fixed-line telephony operators has decreased by about 30%.

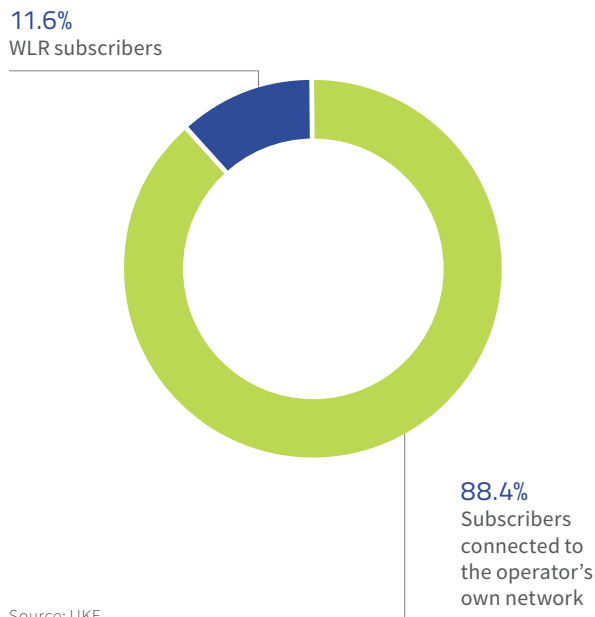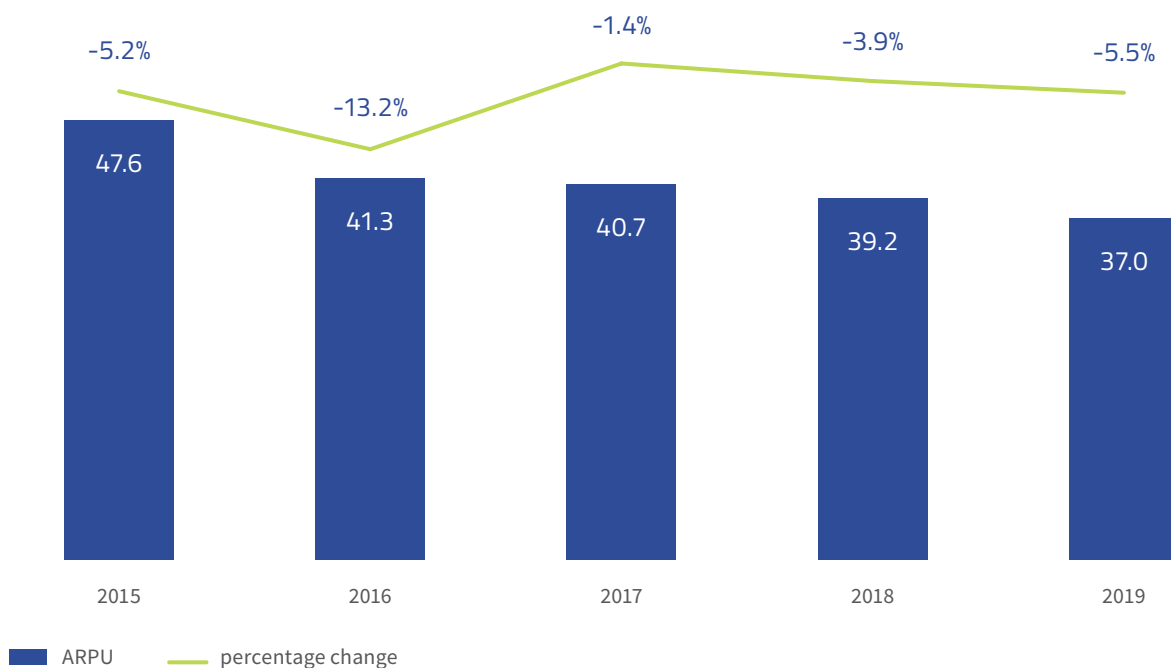CHART 45. **STRUCTURE OF REVENUES IN TERMS OF THE TYPE OF SUBSCRIBER LINES USED**

11.6%
WLR subscribers

88.4%
Subscribers connected to the operator's own network

Source: UKE

CHART 46. **AVERAGE MONTHLY REVENUE PER SUBSCRIBER (ARPU IN PLN) AND THE DYNAMICS OF CHANGE**

|	2015	2016	2017	2018	2019
ARPU	47.6	41.3	40.7	39.2	37.0
percentage change	−5.2%	−13.2%	−1.4%	−3.9%	−5.5%

■ ARPU ▬ percentage change

Source: UKE

4.3. SUBSCRIBERS

From 2015, the number of fixed-line telephony subscribers is clearly falling. Compared to 2018, the number of subscribers in 2019 decreased by more than 13.4% and amounted to 3.5 million.

13.4%

decrease in the number of fixed-line telephony subscribers

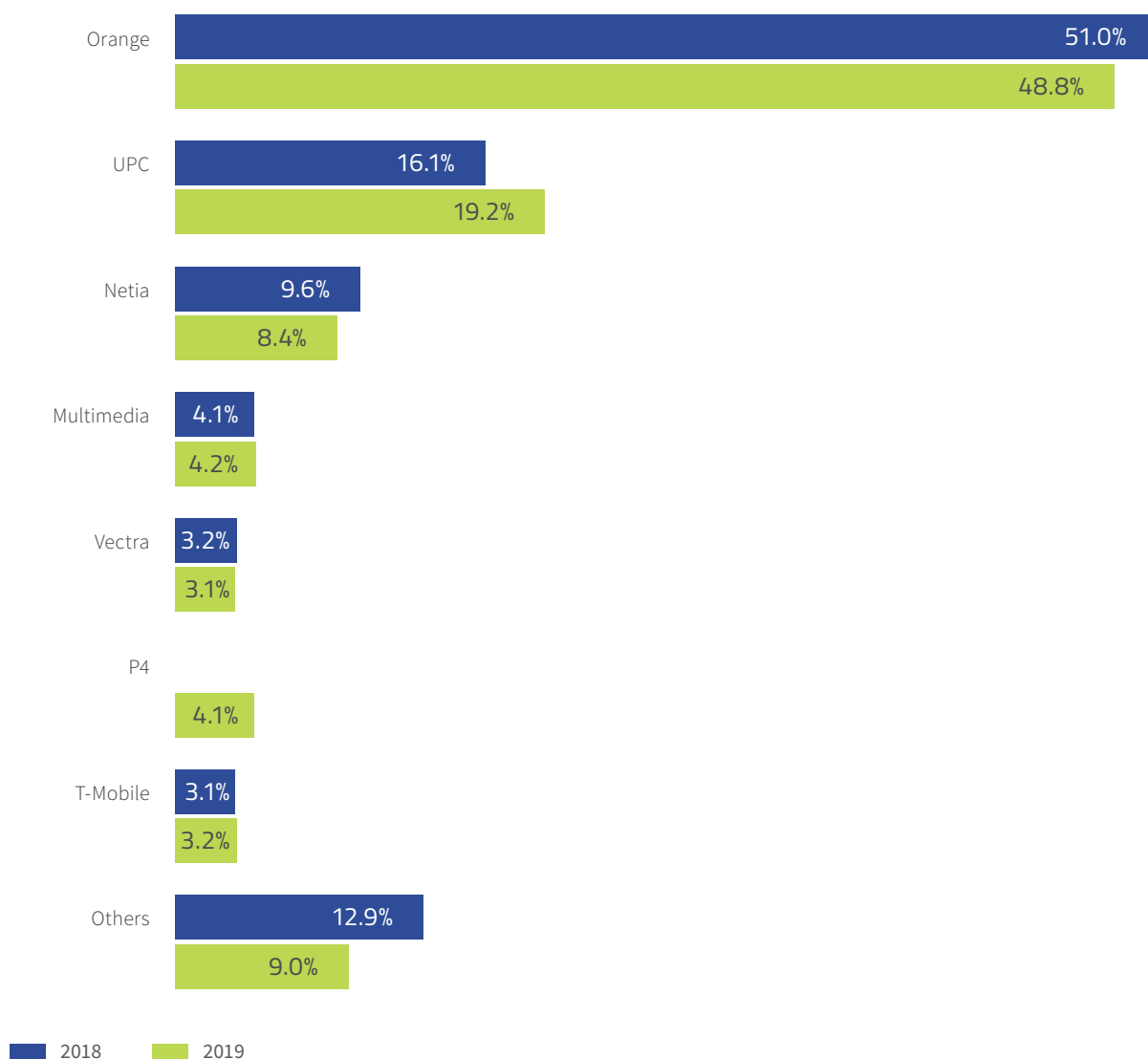CHART 47. **NUMBER OF SUBSCRIBERS (MILLION) AND THE DYNAMICS OF CHANGE**
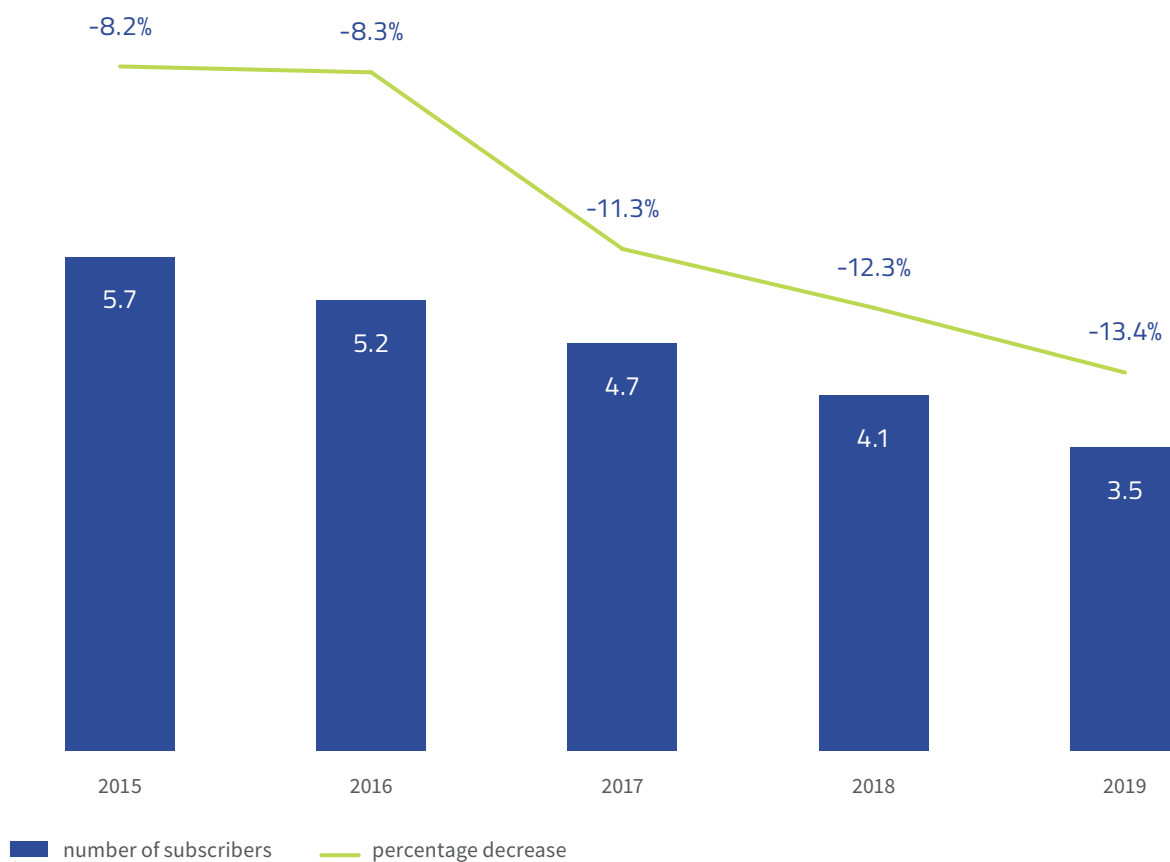
Source: UKE

4.4. MARKET STRUCTURE

In 2019, Orange still held almost half of the fixed-line telephony market share in terms of the number of users (48.8%). UPC came second (19.2%), followed by Netia (8.4%), Multimedia (4.2%), P4 (4.1%) and T-Mobile (3.2%). The share of other operators in the market decreased by almost 4 percentage points compared to the previous year and amounted to 9%.

CHART 48. **SHARES OF OPERATORS IN TERMS OF THE NUMBER OF SUBSCRIBERS**

Operator	2018	2019
Orange	51.0%	48.8%
UPC	16.1%	19.2%
Netia	9.6%	8.4%
Multimedia	4.1%	4.2%
Vectra	3.2%	3.1%
P4		4.1%
T-Mobile	3.1%	3.2%
Others	12.9%	9.0%

■ 2018   ■ 2019

Source: UKE

4.5. TRAFFIC VOLUME

For several years now, the fixed-line telephony market in Poland has been experiencing a systematic decrease in the volume of traffic. The total duration of fixed-line calls in 2019 amounted to approx. 4.5 billion minutes and was approx. 18% shorter than in 2018. With the reduction of call duration, the number of minutes spent on phone calls per subscriber has decreased. In 2019, it was about 105 minutes.

The volume of calls was overwhelmingly generated by domestic calls (around 93%). International calls accounted to just over 7% of the voice call time.

CHART 50. **TRAFFIC VOLUME IN TERMS OF DIRECTION OF VOICE CALLS**

7.1%
international

92.9%
domestic
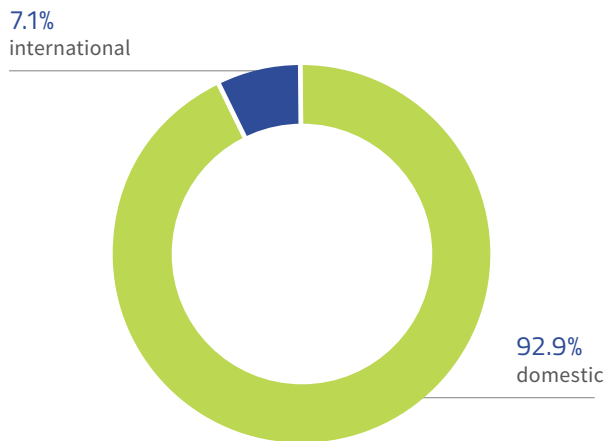
Source: UKE

CHART 49. **TRAFFIC VOLUME (BILLION MINUTES) AND AVERAGE MONTHLY NUMBER OF MINUTES PER SUBSCRIBER**

134
127
121
111
105

9.2
8.0
6.7
5.5
4.5

2015   2016   2017   2018   2019

- total duration of fixed-line calls
- average monthly number of minutes per subscriber
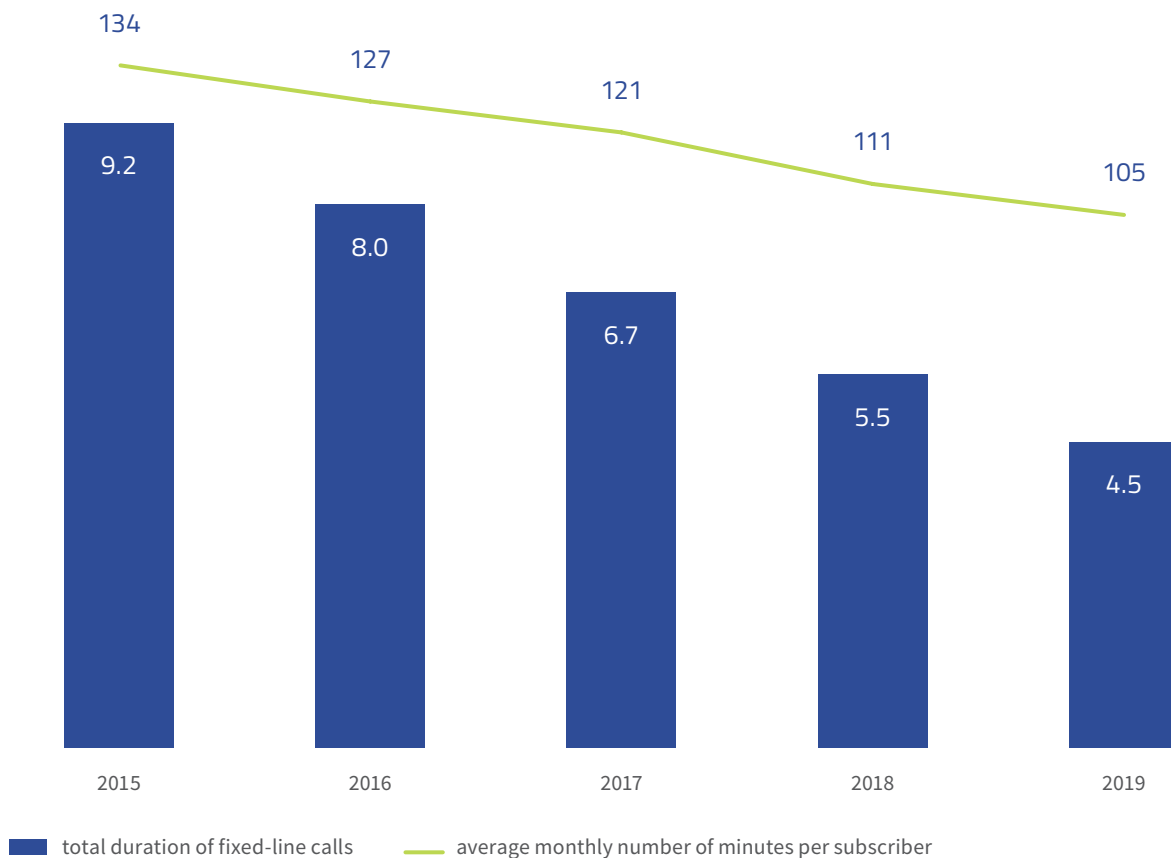
Source: UKE
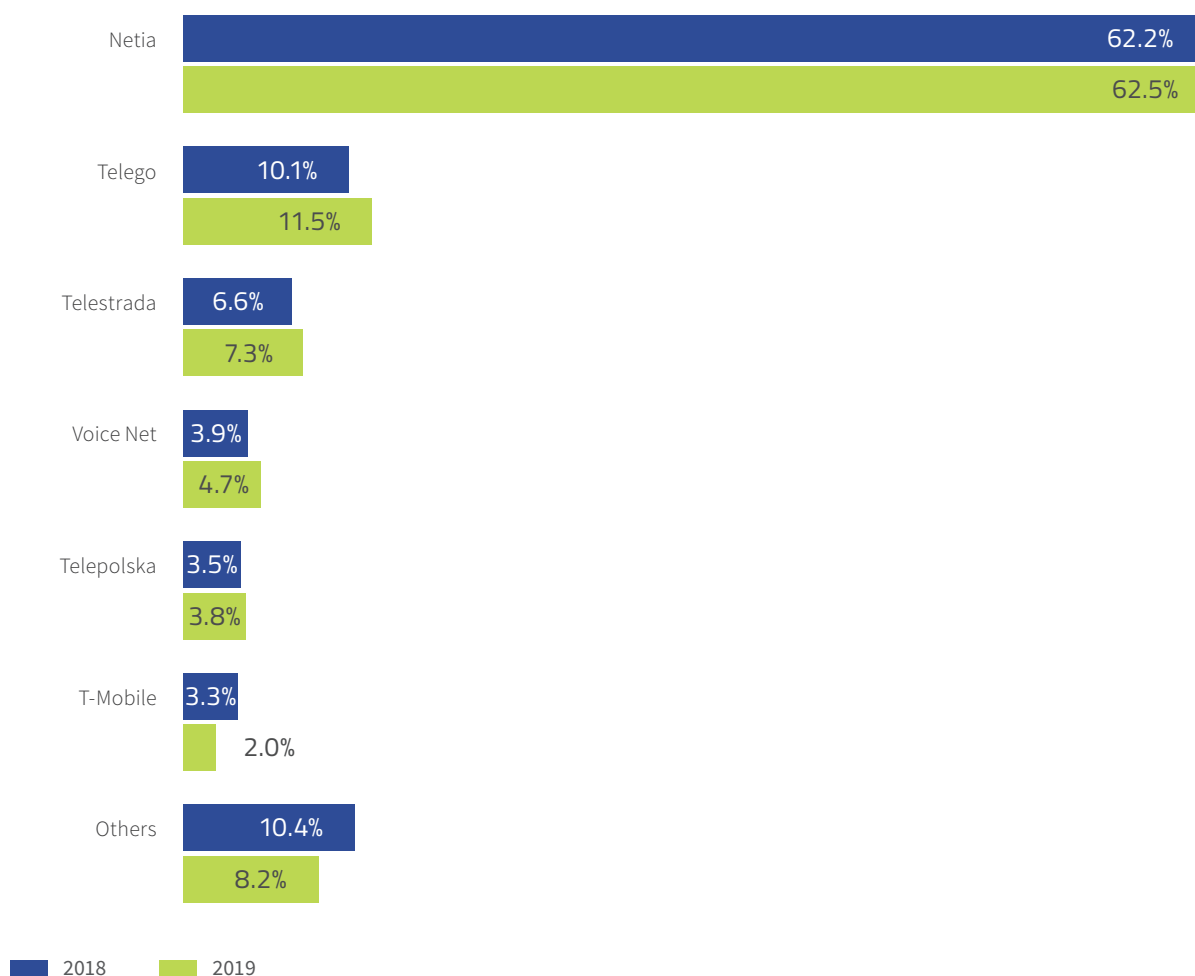
4.6. WHOLESALE LINE RENTAL (WLR)

In 2019, revenues from wholesale line rental amounted to PLN 179.9 million. Compared to the last year, their value dropped by approx. 26%.

Among the operators on the WLR market, for several years Netia has invariably had the largest share in revenues (62.5%). Significantly lower revenues were recorded by Telego (formerly Novum) (11.5%), Telestrada (7.3%), Voice

Net (4.7%), Telepolska (3.8%) and T-Mobile (2%). The other operators accounted for 8.2% of the market, which is by 2.2 percentage points less than in 2018.

In 2019, the total volume of WLR subscriber lines amounted to 0.4 million. In comparison to the previous year, this number decreased by 29%.

CHART 51. **OPERATORS' SHARES IN REVENUES FROM THE PROVISION OF WLR SERVICES**

Operator	2018	2019
Netia	62.2%	62.5%
Telego	10.1%	11.5%
Telestrada	6.6%	7.3%
Voice Net	3.9%	4.7%
Telepolska	3.5%	3.8%
T-Mobile	3.3%	2.0%
Others	10.4%	8.2%

■ 2018   ■ 2019

Source: UKE
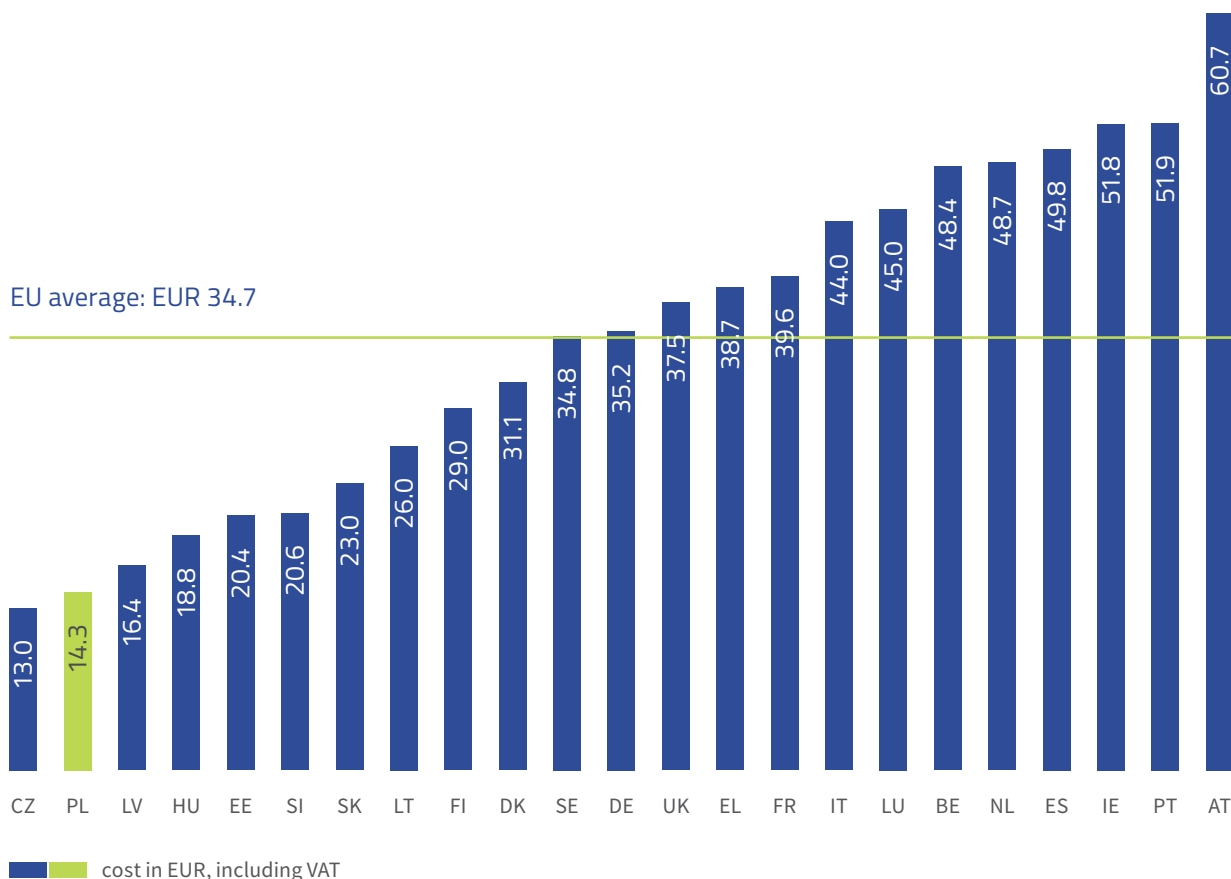
4.7. PRICES OF FIXED-LINE TELEPHONY SERVICES

The price analysis was based on the OECD *Fixed Voice Price Benchmarking* database. A medium usage basket was applied for the purposes of the analysis.

At the end of 2019, the average price of fixed-line telephony services in selected EU states amounted to EUR 34.7. The lowest costs were incurred by Czech users (EUR 13) and the highest by Austrian residents (EUR 60.7). The costs borne by a fixed-line telephony user in Poland amounted to EUR 14.3 and were almost EUR 20.5 lower than the average price in selected EU states. Just like last year, among the countries included in the list, prices in Poland were the second lowest in Europe, just after the Czech Republic.

Fixed-line telephony prices in Poland are among the lowest in the EU.

CHART 52. **MONTHLY BASKET VALUES FOR A MODERATELY ACTIVE USER IN SELECTED EU COUNTRIES (EUR WITH VAT)**

EU average: EUR 34.7

CZ	PL	LV	HU	EE	SI	SK	LT	FI	DK	SE	DE	UK	EL	FR	IT	LU	BE	NL	ES	IE	PT	AT
13.0	14.3	16.4	18.8	20.4	20.6	23.0	26.0	29.0	31.1	34.8	35.2	37.5	38.7	39.6	44.0	45.0	48.4	48.7	49.8	51.8	51.9	60.7

■ ▬ cost in EUR, including VAT

Source: UKE based on OECD Fixed Voice Price Benchmarking, Strategy Analytics.

Note: prices do not include purchasing power parity (PPP).

5

VOIP TELEPHONY

5.1. NUMBER OF USERS AND TRAFFIC VOLUME

After a slight decline in 2016, the number of users of VoIP telephony services has been steadily increasing. In 2019, there were 2.5 million users of VoIP services.

2.5 million VoIP users

The increase in the number of users did not always affect the volume of traffic. In 2019, along a slight increase in service usage, there was a decrease in VoIP traffic by 7.2%.

The vast majority of users (71.4%) used services provided through a subscription. The remaining 28.6% used pre-paid scratch cards.

71.4%
users of VoIP subscription services

CHART 54. **SHARE OF SUBSCRIPTIONS AND SCRATCH CARDS IN THE TOTAL NUMBER OF VOIP USERS**
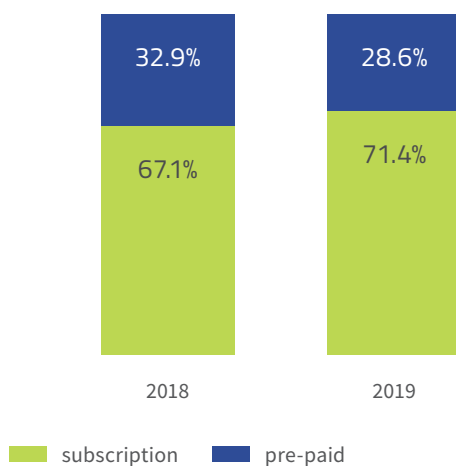
Source: UKE

CHART 53. **NUMBER OF USERS AND TRAFFIC VOLUMES FOR VOIP SERVICES**
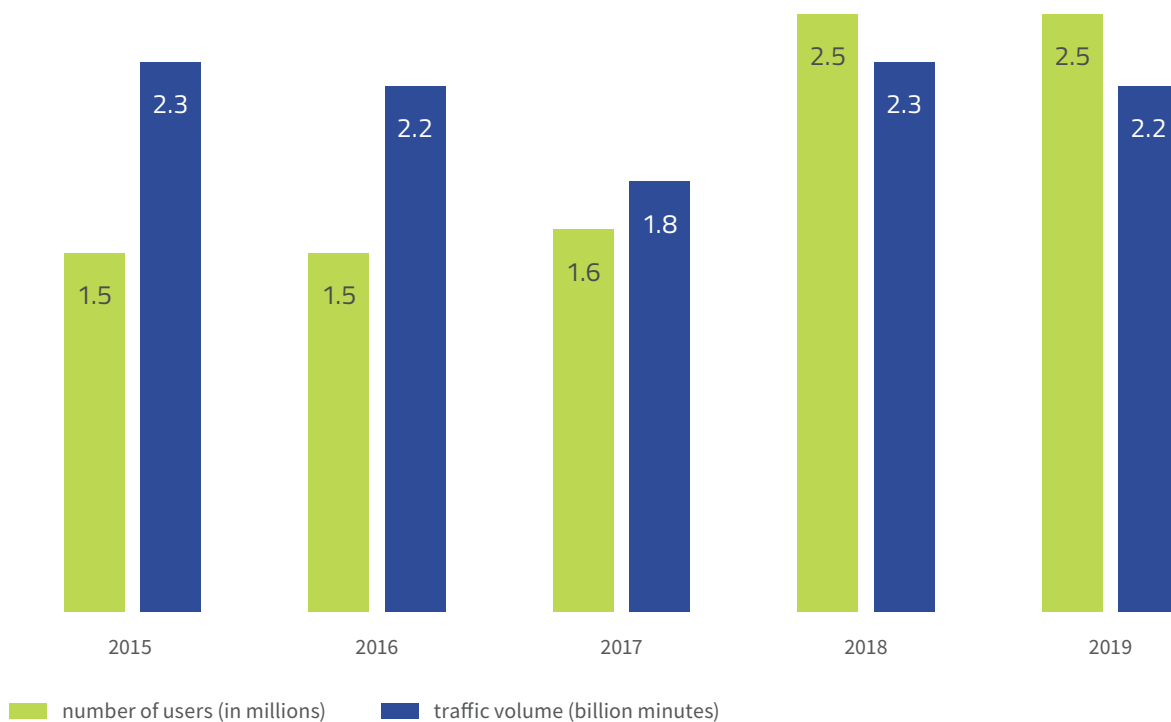
Source: UKE

5.2. VALUE OF THE MARKET

The market for VoIP services is a growing one. Total revenues from VoIP services in 2019 amounted to PLN 0.3 billion, an increase by 7% compared to 2018 and by 132% compared to 2015.

The monthly revenue per user in the years 2015–2019 averaged PLN 8.6. Over the last year, ARPU increased to PLN 9.3 per user.

PLN 0.3 billion
value of the VoIP telephony market

The main revenues from VoIP are linked to subscription services (94.2%). Although scratch card users account for approx. 30% of the VoIP market, revenues from services provided with such cards account for less than 6% of the total value of the VoIP market.
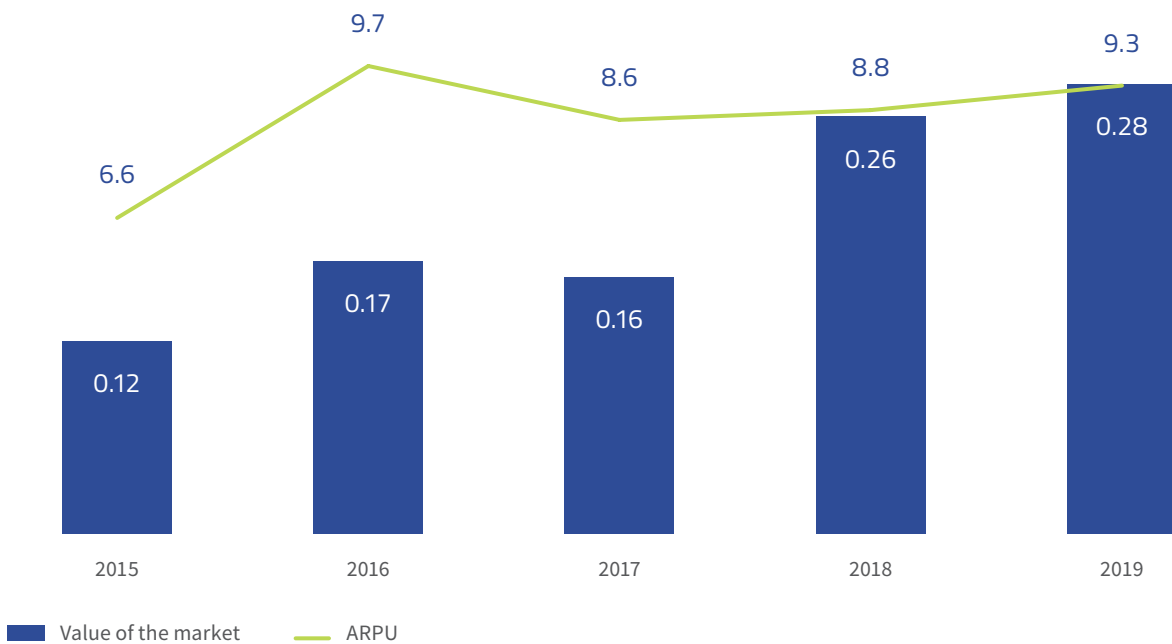
94.2% of revenues
from subscription services

CHART 56. **SHARE OF SUBSCRIPTIONS AND SCRATCH CARDS IN REVENUES FROM VOIP TELEPHONY SERVICES**

	2018	2019
pre-paid	6.4%	5.8%
subscription	93.6%	94.2%

■ subscription ■ pre-paid
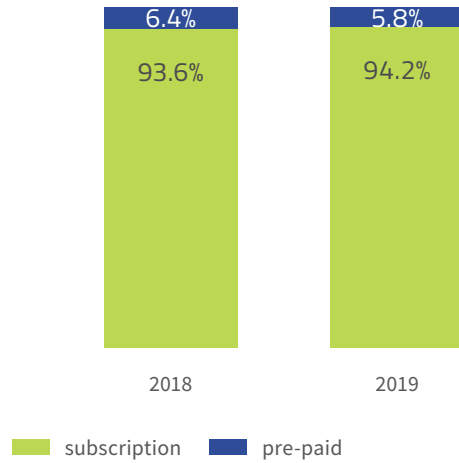
Source: UKE

CHART 55. **VALUE OF THE VOIP TELEPHONY MARKET (PLN BILLION) AND AVERAGE MONTHLY REVENUE PER USER (ARPU IN PLN)**

Year	2015	2016	2017	2018	2019
Value of the market	0.12	0.17	0.16	0.26	0.28
ARPU	6.6	9.7	8.6	8.8	9.3

■ Value of the market — ARPU

Source: UKE

5.3. MARKET STRUCTURE

Once again Orange is the leading provider on the market of VoIP subscription services. In 2019, the company provided services to more than 59% of users. Netia's market share fell from 15% to 12.3%. The market share of Multimedia Polska also declined (5.2% compared to 6.5% in 2018).

In the structure of entities providing services on the VoIP telephony market with the use of pre-paid scratch cards, the market leader was Voxnet, with a share of 52.7% (increase of 6.2 percentage points). Second was Galena, the operator of the "Telegrosik" service. Its market share fell from 52.8% to 44.7%. This type of services was also provided by 11 other entrepreneurs, of which only Ahmes and Easy Call had a market share of over 1%. The total share of the other entities was only 0.2%.

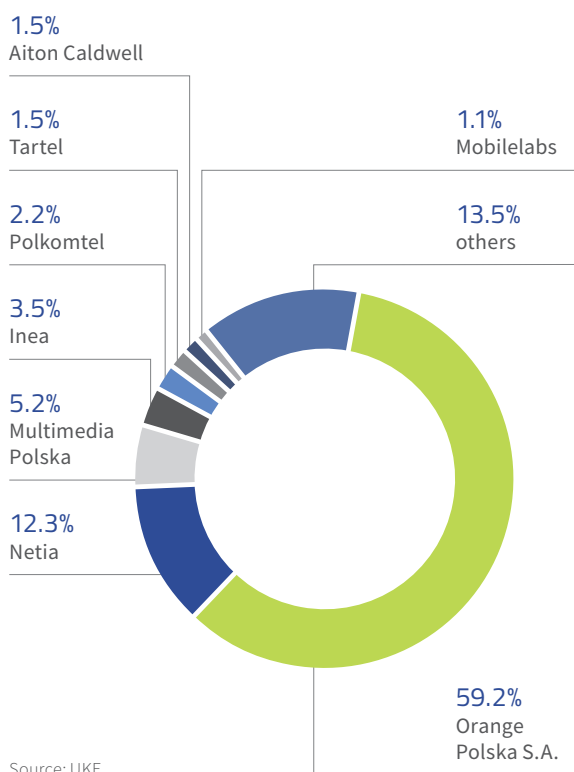CHART 57. **SHARES OF OPERATORS IN THE NUMBER OF VOIP TELEPHONY USERS (SUBSCRIPTION)**

1.5% Aiton Caldwell
1.5% Tartel
2.2% Polkomtel
3.5% Inea
5.2% Multimedia Polska
12.3% Netia
1.1% Mobilelabs
13.5% others
59.2% Orange Polska S.A.

Source: UKE

CHART 58. **SHARES OF OPERATORS IN THE NUMBER OF VOIP TELEPHONY USERS (PRE-PAID SCRATCH CARDS)**

1.0% EasyCall
1.4% Ahmes
0.2% others
44.7% Galena
52.7% Voxnet

Source: UKE
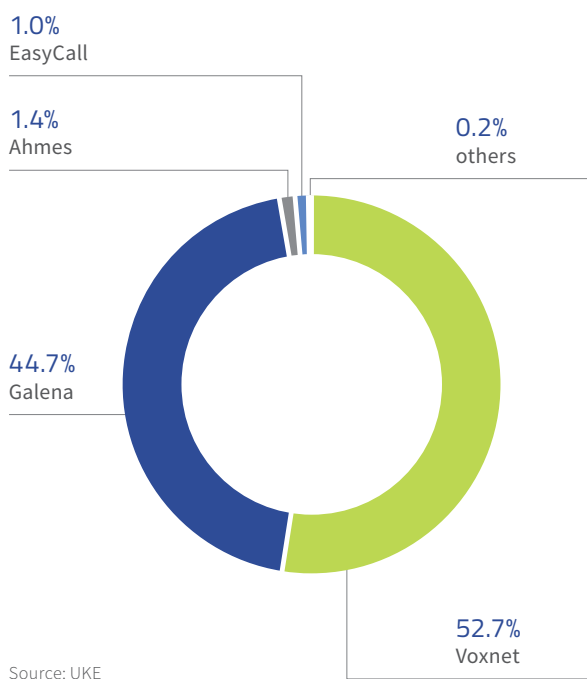
1

# STATISTICS OF DATA COLLECTED DURING THE INVENTORY

PART II TELECOMMUNICATIONS INFRASTRUCTURE AND NETWORK COVERAGE

The Information System on Broadband Infrastructure (SIIS), used to transmit data as part of the annual inventory of telecommunications infrastructure and services, includes a total of 8,797 entities, i.e. 159 fewer than in the previous year. The difference in the number of entities that were included in the SIIS as part of the previous inventory results from:
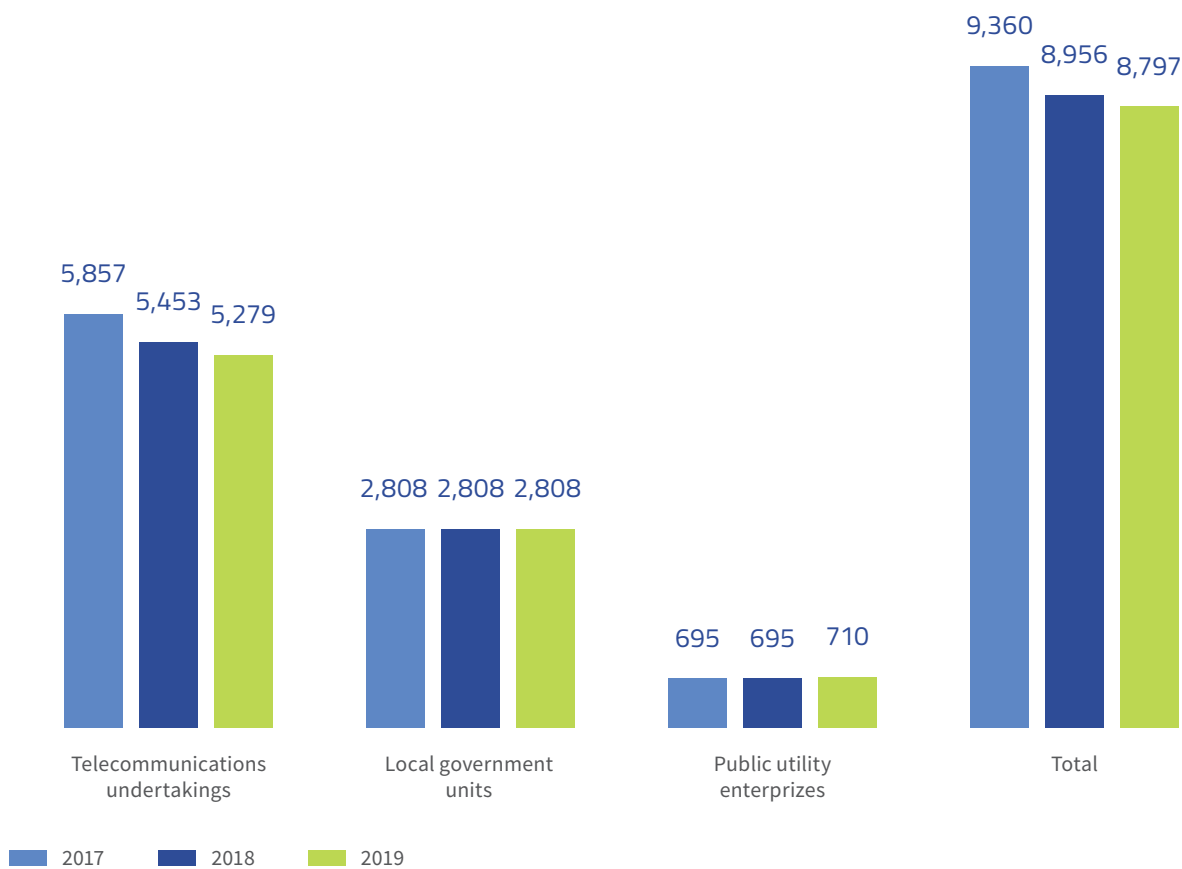
- making entries in and deletions from the Register of Telecommunications Undertakings (RPT) at the request of undertakings;
- *ex officio* deletion from the RPT of 19 entities removed from the CEIDG and 21 entities removed from the National Court Register (KRS).

CHART 1. **PERCENTAGE DISTRIBUTION OF ENTITIES IN SIIS IN 2019**

8%
Public utility enterprizes

32%
Local government units

60%
Telecommunications undertakings
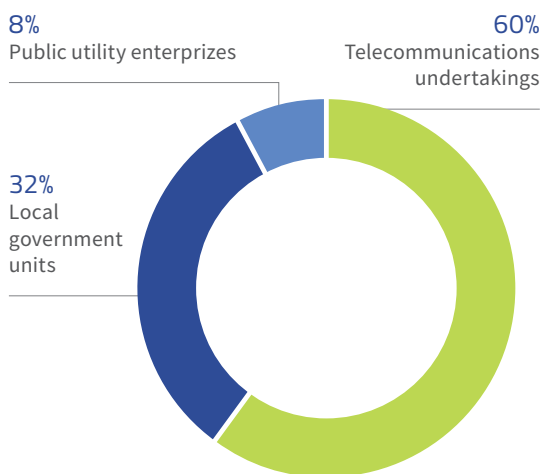
Source: UKE

CHART 2. **NUMBER OF ENTITIES IN SIIS DURING THE INVENTORY FOR 2017–2019**

	Telecommunications undertakings	Local government units	Public utility enterprizes	Total
2017	5,857	2,808	695	9,360
2018	5,453	2,808	695	8,956
2019	5,279	2,808	710	8,797

■ 2017   ■ 2018   ■ 2019

Source: UKE

Data for 2019 was submitted to the SIIS system by 3,433 entities. Compared to previous years, there was an increase in the number of telecommunications undertakings that provided data to the SIIS. This is likely related to administrative proceedings conducted by UKE in 2018 and 2019 to impose a penalty on entities which failed to comply with the obligation to provide information as part of the annual infrastructure inventory for previous years.

CHART 3. **NUMBER OF ENTITIES THAT PROVIDED DATA AS PART OF THE INVENTORY FOR 2017–2019**
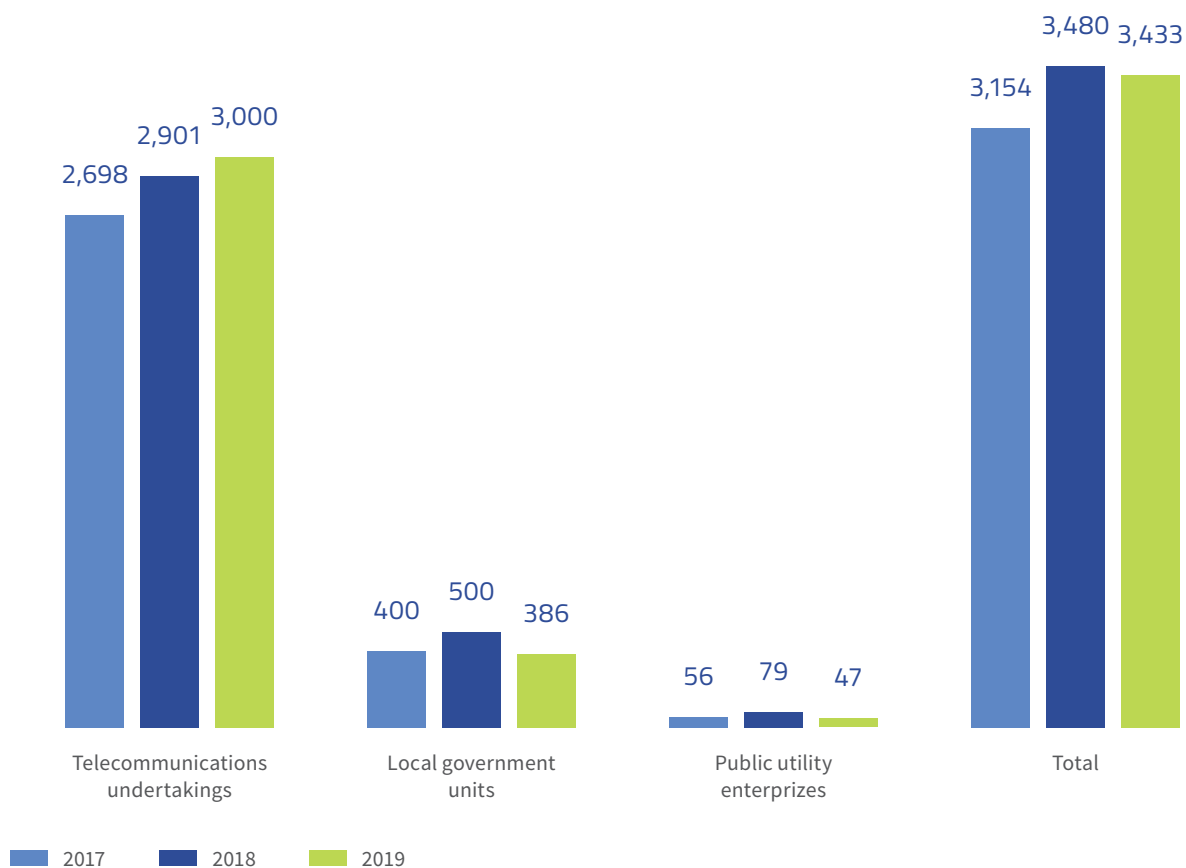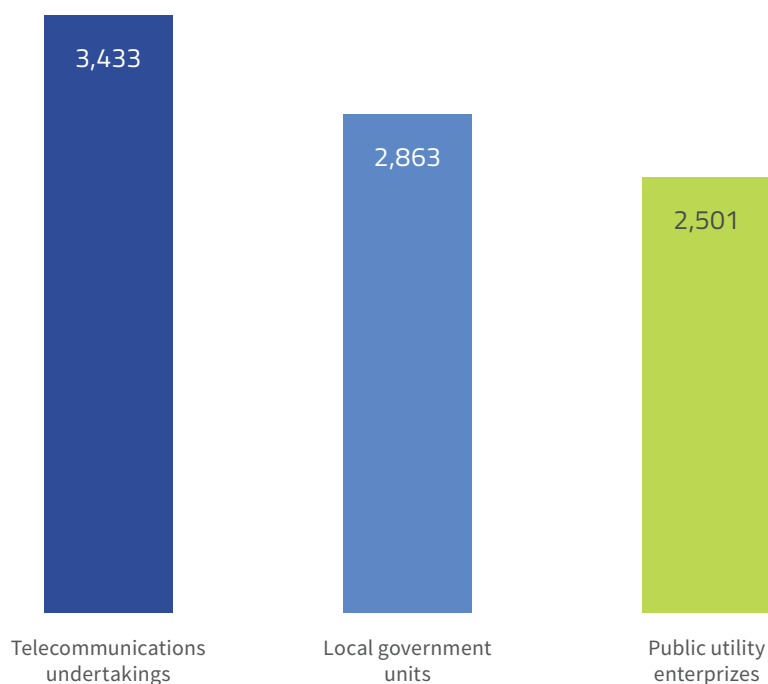

Source: UKE

In connection with the amendment of the Act of 7 May 2010 on supporting the development of telecommunications services and networks, which entered into force on 25 October 2019, entities which do not have telecommunications infrastructure, public telecommunications networks, co-location buildings and do not provide telephone services, data transmission services ensuring broadband access to the internet and radio and television broadcasting services, are obliged to submit a statement that they do not have telecommunications infrastructure or do not provide telephone services, data transmission services ensuring broadband access to the internet and radio and television broadcasting services. 2,863 entities submitted statements for 2019. A total of 71.6% of entities submitted statements as part of the inventory for 2019.

CHART 4. **NUMBER OF ENTITIES THAT PROVIDED DATA AND SUBMITTED STATEMENTS AS PART OF THE INVENTORY IN 2019**
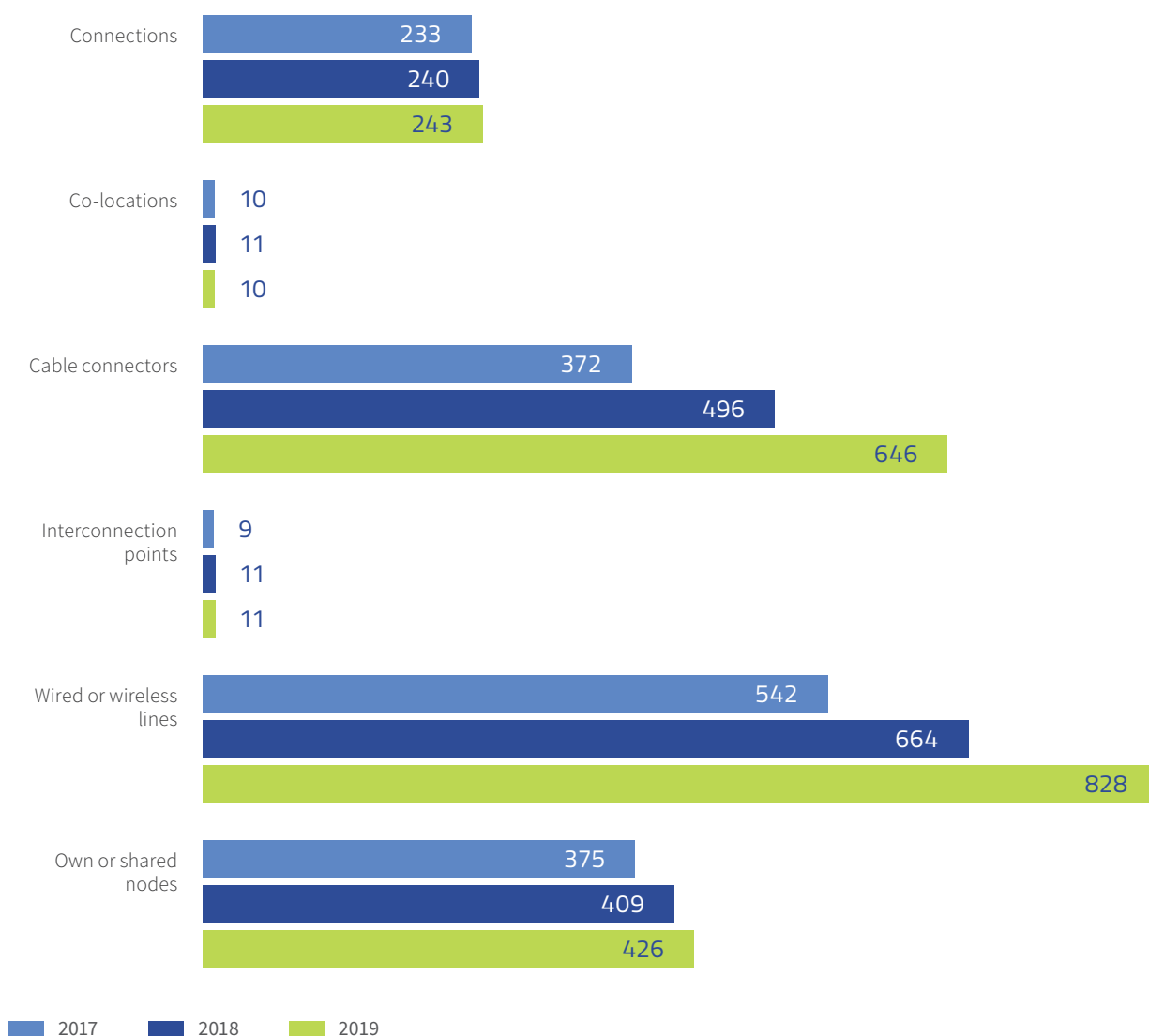

Source: UKE

Along with the increase in the number of telecommunications undertakings providing data, there was a general increase in the amount of data uploaded to the SIIS, from a few percent up to 20% of the number of lines and 25% of the number of cable connectors.

During this year's inventory, the number of network terminations submitted amounted to 41.8 million, most of which were mobile network terminations. The number of buildings covered by networks, which is several times higher than the number of buildings in Poland – results from the fact that each of the mobile operators declared that a vast majority of buildings is covered by their mobile network.

CHART 5. **NUMBER OF INFRASTRUCTURE ELEMENTS (IN THOUSANDS) ENTERED INTO SIIS IN 2017–2019**
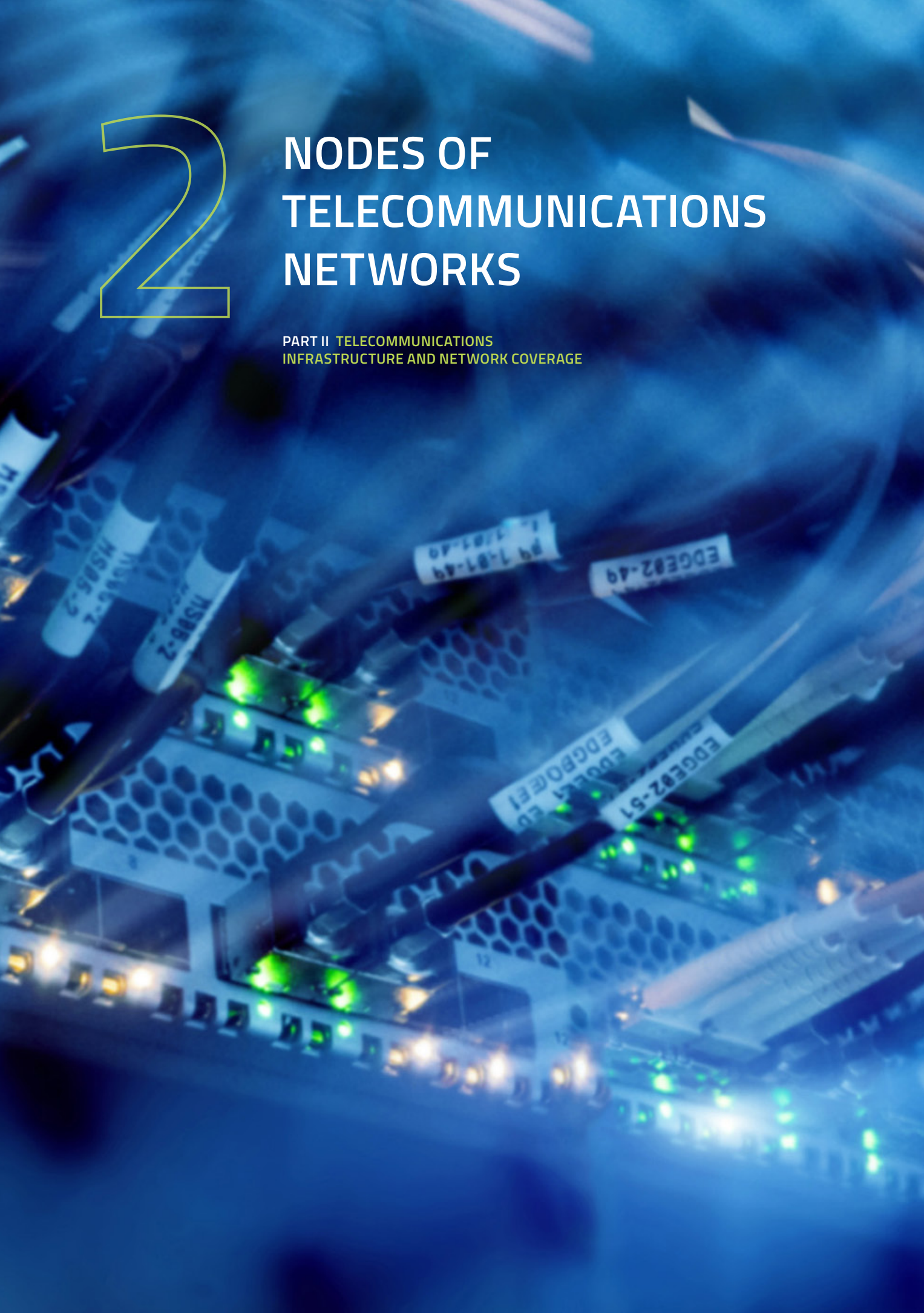
	2017	2018	2019
Connections	233	240	243
Co-locations	10	11	10
Cable connectors	372	496	646
Interconnection points	9	11	11
Wired or wireless lines	542	664	828
Own or shared nodes	375	409	426

Source: UKE

2

# NODES OF TELECOMMUNICATIONS NETWORKS

2.1. OWN NODES

As part of this year's inventory, entities reported 414,566 own nodes (excluding virtual nodes), which is an increase by over 20,000 compared to the 2018 data.

Map 1 shows the density and number of own nodes in individual regions. As always, the Śląskie Region stands out, where the largest number of nodes are located within a relatively small area – this situation is the result of a high level of urbanisation of this area. Also Małopolskie Region is characterised by high density of the nodes (more than

3 nodes per km^2). Almost 30% of all the nodes in the country are located in the area of the two regions. The following regions have an average density of nodes: Dolnośląskie, Kujawsko-Pomorskie, Opolskie, Mazowieckie, Podkarpackie, Pomorskie and Wielkopolskie. At the other end of the list is the Warmińsko-Mazurskie Region, with one telecommunications node per 3 km^2.

MAP 1. **OWN NODES IN REGIONS**
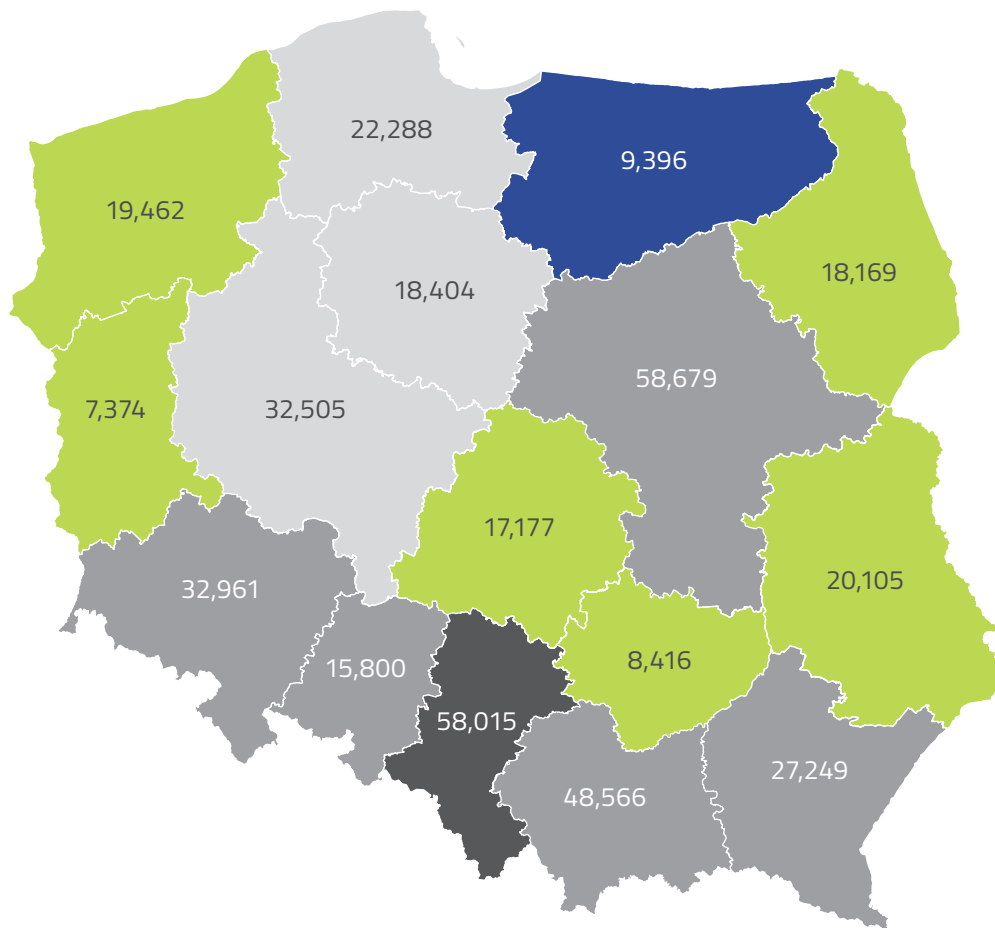
Density of own nodes (number/km^2)

- 0.38 – 0.50
- 0.51 – 1.00
- 1.01 – 1.50
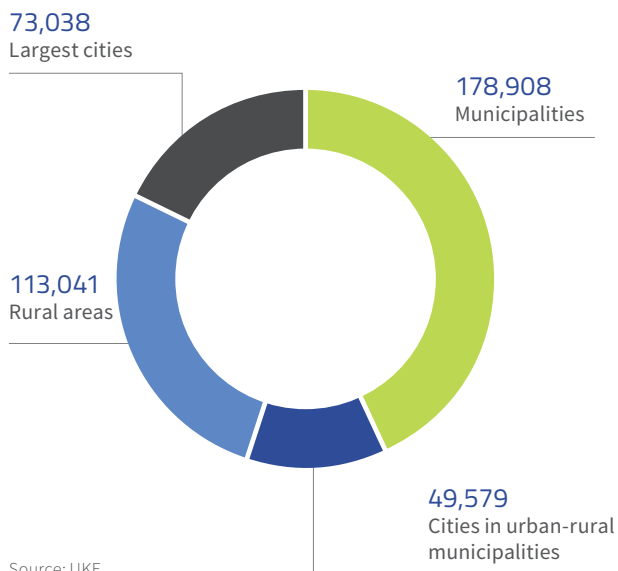- 1.51 – 3.50
- 3.51 – 4.70

Source: UKE

TABLE 1. **NUMBER OF NODES IN LOCALITIES OF DIFFERENT SIZE CATEGORIES**

Size of locality	Number of nodes	Percentage of the number of nodes in the total number of nodes
more than 100,000	169,430	40.87
50,001 – 100,000	36,073	8.70
20,001 – 50,000	45,727	11.03
5,001 – 20,000	44,841	10.82
1,001 – 5,000	48,250	11.64
501 – 1,000	27,102	6.54
101 – 500	36,183	8.73
up to 100 residents	6,960	1.68

Source: UKE

As shown in Table 1, nearly half of the nodes are located in cities with a population of over 50,000. In turn, 27% of nodes are located in rural areas (CHART 6).
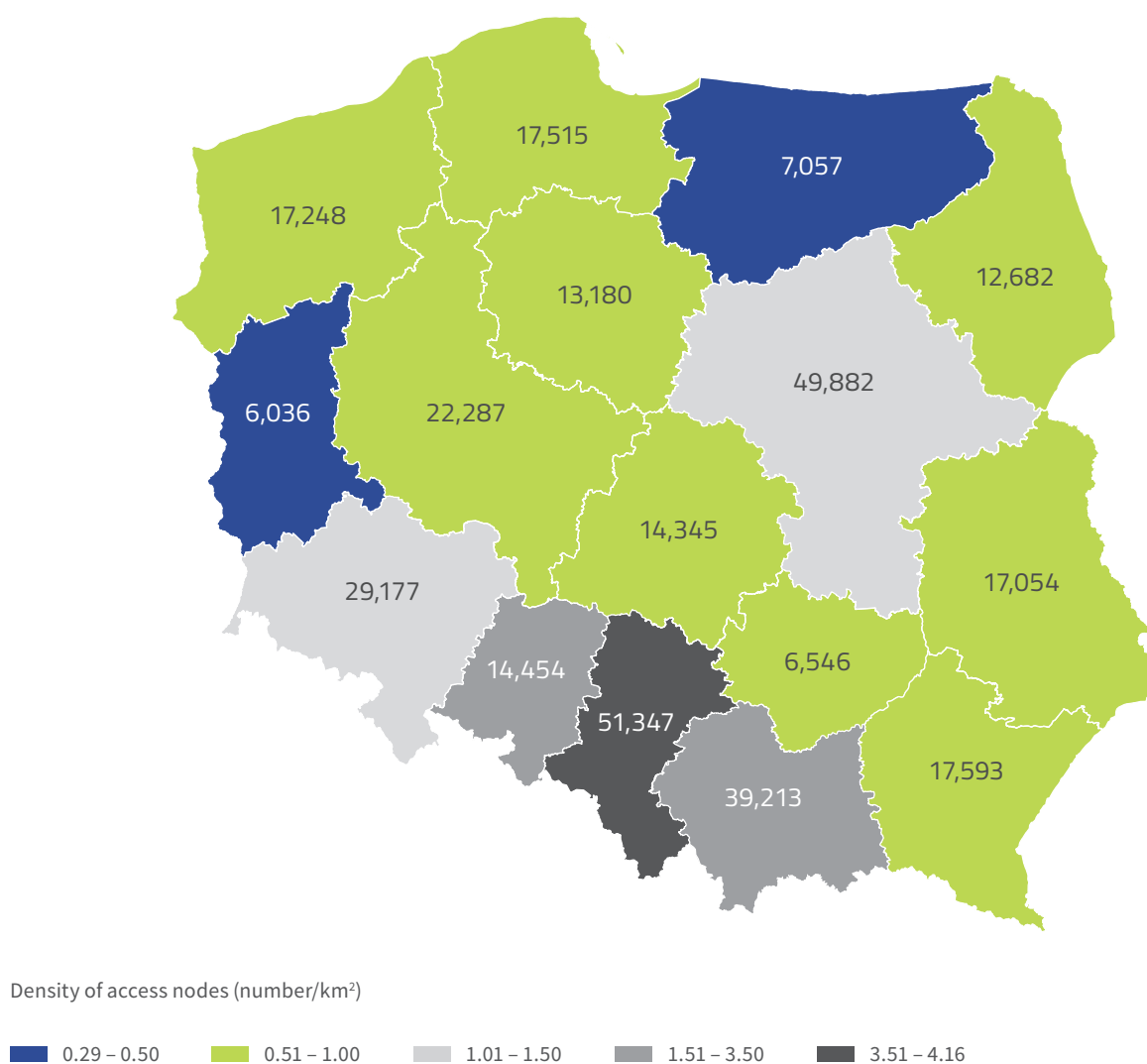
CHART 6. **NUMBER OF OWN NODES**

73,038
Largest cities

178,908
Municipalities

113,041
Rural areas

49,579
Cities in urban-rural municipalities

Source: UKE

2.2. ACCESS NODES

335,219 access nodes were reported in the last inventory. The density and number of such nodes are shown on Map 2. As in the case of own nodes, the highest density of access nodes is characteristic of the Śląskie Region, followed by the Małopolskie Region.

The similarity with respect to analogous data for operators' own nodes is also noticeable when comparing the percentage of access nodes in localities of different size categories – more than half of the nodes are located in cities with population of more than 50,000 (Table 2).

MAP 2. **ACCESS NODES IN REGIONS**

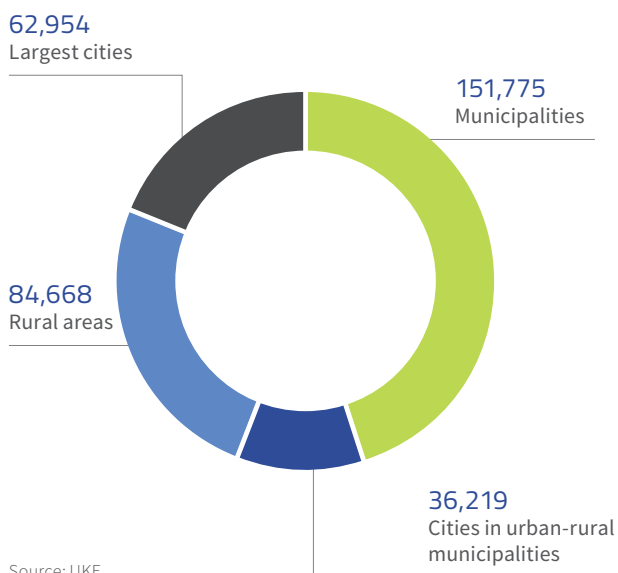Density of access nodes (number/km²)

■ 0.29 – 0.50   ■ 0.51 – 1.00   ■ 1.01 – 1.50   ■ 1.51 – 3.50   ■ 3.51 – 4.16

Source: UKE

Size of locality	Number of nodes	Percentage of the number of nodes in the total number of nodes
more than 100,000	147,032	43.81
50,001 – 100,000	29,526	8.80
20,001 – 50,000	37,176	11.08
5,001 – 20,000	32,880	9.80
1,001 – 5,000	36,048	10.74
501 – 1,000	19,922	5.94
101 – 500	27,753	8.27
up to 100 residents	5,279	1.57

Source: UKE

CHART 7 presents the distribution pattern of access nodes in relation to the degree of urbanisation in different areas. A comparison with the values in CHART 6 leads to the conclusion that 86% of own nodes located in the biggest cities are access nodes.

CHART 7. **NUMBER OF ACCESS NODES**

62,954
Largest cities

151,775
Municipalities

84,668
Rural areas

36,219
Cities in urban-rural municipalities

Source: UKE

Table 3 and CHART 8 which illustrates it show the number of localities (regardless of their type or size) in which entities declared having their own access nodes (all technologies). Relatively few localities without access nodes are located in the Małopolskie and Podkarpackie Voivodships (less than 25%). These regions, as well as the Śląskie Region, are also characterised by the largest number of localities with three or more operators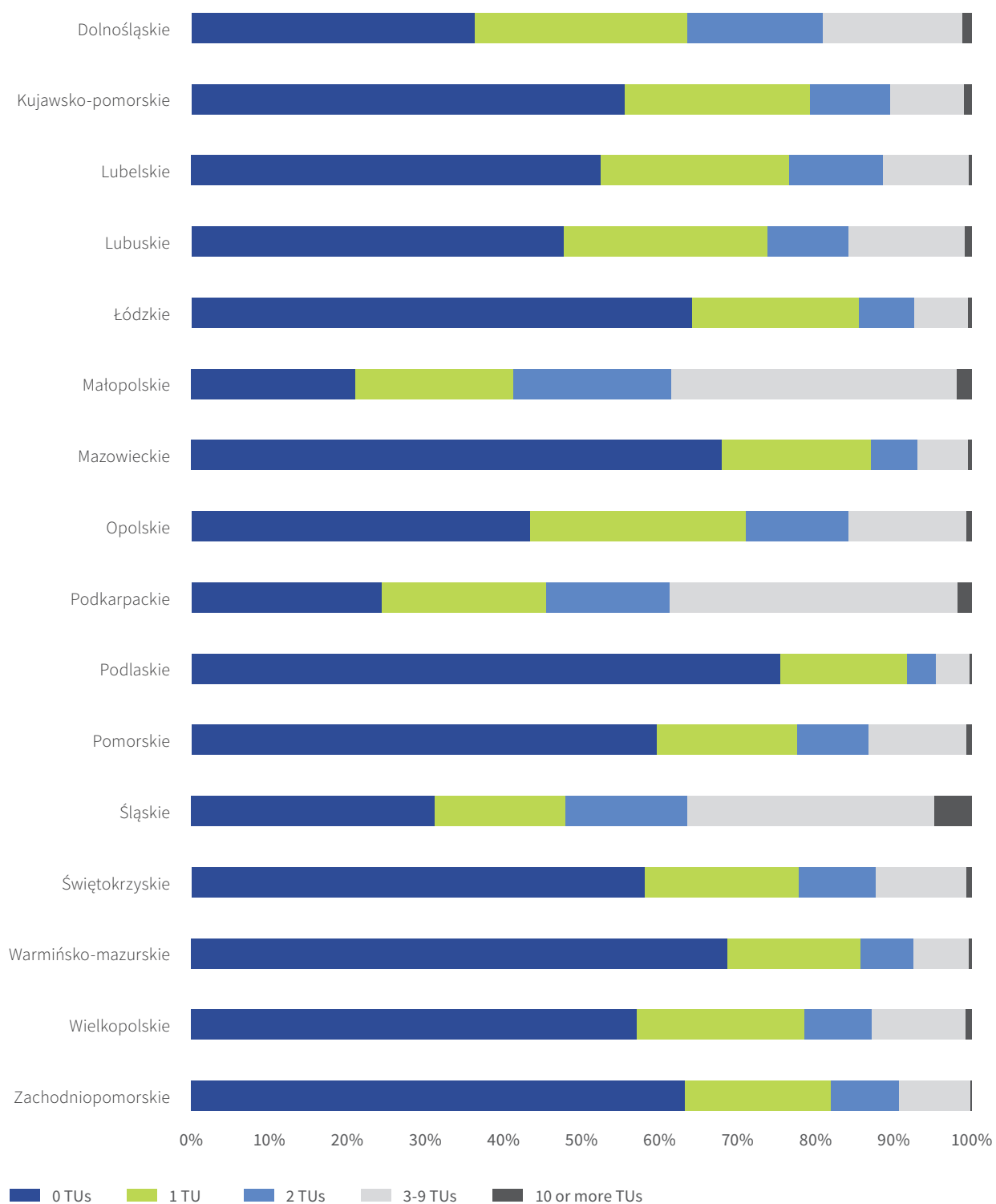 (over 30%). Most of the localities without access nodes are located in the Podlaskie Region (75%) and the Warmińsko-Mazurskie Region (69%). When comparing the data for 2018 and 2019, it should be noted that as a result of the development of the telecommunications market and the effectiveness of investments supported with public funds, the number of localities without their own access nodes has decreased in almost all regions.

TABLE 3. **NUMBER OF LOCALITIES BY REGIONS IN WHICH ENTITIES DECLARED THE EXISTENCE OF THEIR OWN TELECOMMUNICATIONS NETWORK ACCESS NODES**

Region	Total number of localities	0 TUs	1 TU	2 TUs	3-9 TUs	10 or more TUs
Dolnośląskie	2,619	952	715	450	469	33
Kujawsko-pomorskie	3,631	2,018	864	371	343	35
Lubelskie	4,082	2,145	983	490	449	15
Lubuskie	1,337	639	349	139	199	11
Łódzkie	5,048	3,239	1,079	357	347	26
Małopolskie	2,013	424	406	410	735	38
Mazowieckie	8,609	5,859	1,638	515	555	42
Opolskie	1,192	518	330	156	179	9
Podkarpackie	1,715	420	362	270	632	31
Podlaskie	3,798	2,864	621	138	167	8
Pomorskie	2,919	1,743	523	269	361	23
Śląskie	1,364	428	226	213	433	64
Świętokrzyskie	2,517	1,462	499	246	293	17
Warmińsko-mazurskie	3,924	2,699	668	263	279	15
Wielkopolskie	5,569	3,188	1,189	484	665	43
Zachodniopomorskie	3,081	1,949	573	272	279	8

Source: UKE

Source: UKE

The analysis of data concerning the number of localities by size categories, in which entities declared the existence of their own access nodes (Table 4, CHART 9) allows us to conclude that in all localities with population of at least 5,000 there are nodes of at least 3 entities.

In all large cities (with at least 100,000 inhabitants), there are nodes of at least 10 entities. The largest number of localities without access nodes are small and very small localities with up to 500 residents.

TABLE 4. **NUMBER OF LOCALITIES BY SIZE CATEGORY IN WHICH ENTITIES DECLARED THE EXISTENCE OF THEIR OWN TELECOMMUNICATIONS NETWORK ACCESS NODES**

Size of locality	Total number of localities	0 TUs	1 TU	2 TUs	3-9 TUs	10 or more TUs
more than 100,000	39	0	0	0	0	39
50,001 – 100,000	48	0	0	0	1	47
20,001 – 50,000	135	0	0	0	32	103
5,001 – 20,000	423	0	0	0	255	168
1,001 – 5,000	2,829	25	147	343	2,259	55
501 – 1,000	4,319	409	1,008	1,120	1,780	2
101 – 500	24,915	12,094	7,787	3,188	1,844	2
up to 100 residents	20,710	18,019	2,083	392	214	2

Source: UKE

CHART 9. **SHARE OF LOCALITIES BY SIZE IN WHICH ENTITIES DECLARED THE EXISTENCE OF THEIR OWN TELECOMMUNICATIONS NETWORK ACCESS NODES**
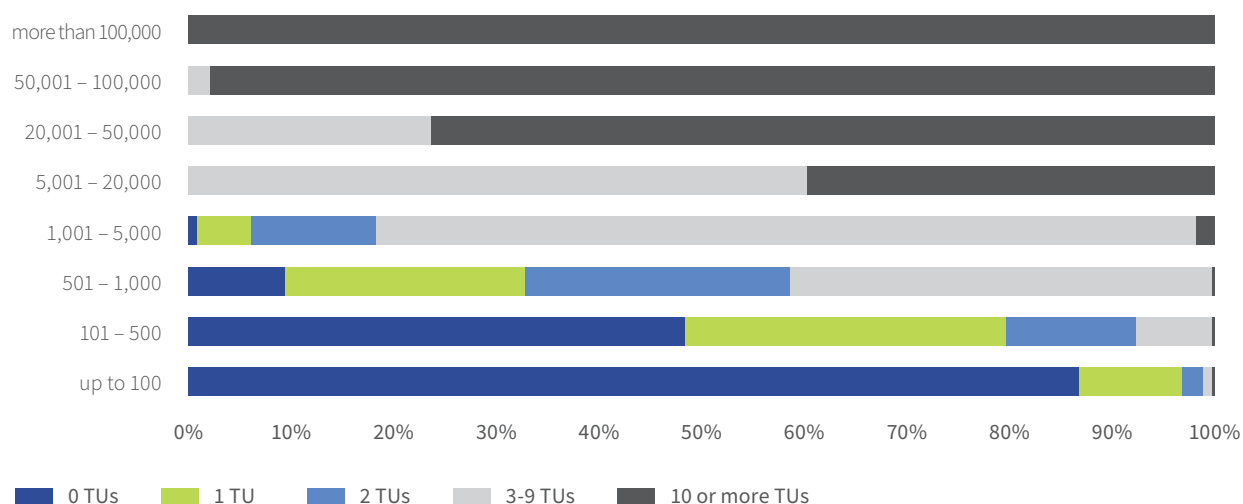
Source: UKE

2.3. FIBRE-OPTIC NODES

In the inventory of data for 2019, 239,187 fibre-optic nodes were reported. The number of such nodes increased by 22,000 in relation to 2018 and four times in relation to 2013 (CHART 10). The largest share of nodes with fibre-optic interfaces is characteristic of the Podlaskie Region – 74% of the nodes in this region have this type of interfaces. On the other hand, only 32% of the nodes in the Opolskie Region feature fibre-optic interfaces, with a 2% increase compared to 2018. In Poland every other node, on average, is equipped with fibre-optic interfaces (Table 5). The largest share of fibre-optic nodes is typical of localities with 50,000 to 100,000 inhabitants. On average, the smallest number of such nodes can be found in very small localities – up to 100 inhabitants (Table 6).

TABLE 5. **NUMBER OF NODES IN INDIVIDUAL REGIONS, BY MEDIUM**

Region	Number of nodes	Number of fibre-optic nodes	Number of cable nodes	Number of radio nodes
Dolnośląskie	32,961	17,727	21,894	7,804
Kujawsko-pomorskie	18,404	10,507	10,496	4,768
Lubelskie	20,105	12,762	7,747	6,242
Lubuskie	7,374	3,592	4,525	2,362
Łódzkie	17,177	9,551	9,105	5,459
Małopolskie	48,566	28,796	22,115	10,834
Mazowieckie	58,679	40,566	31,626	9,422
Opolskie	15,800	5,052	12,660	2,283
Podkarpackie	27,249	17,217	7,999	8,171
Podlaskie	18,169	13,398	8,930	2,746
Pomorskie	22,288	12,762	13,216	5,828
Śląskie	58,015	32,069	34,989	10,021
Świętokrzyskie	8,416	4,920	3,617	2,881
Warmińsko-mazurskie	9,396	4,645	5,715	3,357
Wielkopolskie	32,505	17,084	17,193	8,582
Zachodniopomorskie	19,462	8,539	13,603	4,617

Source: UKE

CHART 10. **NUMBER OF FIBRE-OPTIC NODES IN INDIVIDUAL YEARS**

	2013	2014	2015	2016	2017	2018	2019
	59,516	89,894	108,533	154,665	188,390	216,599	239,187
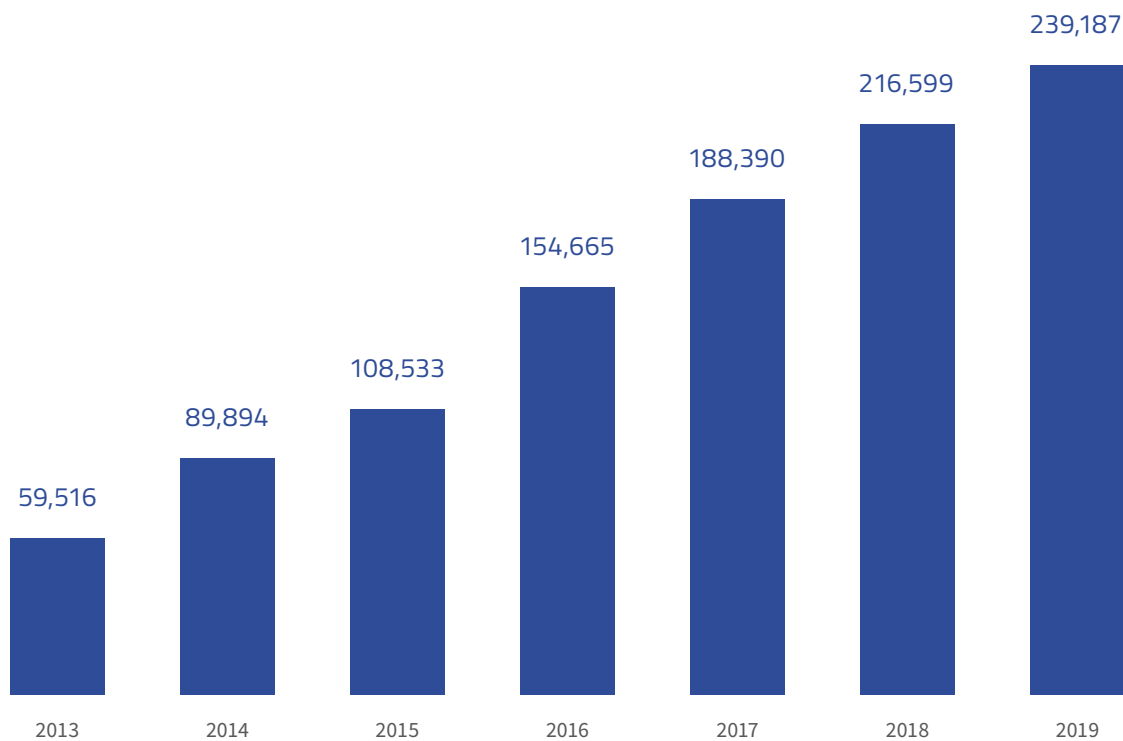
Source: UKE

TABLE 6. **NUMBER OF NODES IN LOCALITIES OF DIFFERENT SIZE CATEGORIES**

Size of locality	Number of nodes	Number of fibre-optic nodes	Number of cable nodes	Number of radio nodes
more than 100,000	169,430	97,945	114,435	19,371
50,001 – 100,000	36,073	22,724	20,584	4,431
20,001 – 50,000	45,727	28,531	24,118	7,997
5,001 – 20,000	44,841	27,136	22,484	10,858
1,001 – 5,000	48,250	28,213	17,866	17,626
501 – 1,000	27,102	16,420	8,535	10,392
101 – 500	36,183	15,487	14,712	20,421
up to 100 residents	6,960	2,731	2,696	4,281

Source: UKE

3

TELECOMMUNICATIONS NETWORK COVERAGE

PART II TELECOMMUNICATIONS INFRASTRUCTURE AND NETWORK COVERAGE

In order to prepare the report, in the part concerning the coverage of telecommunications networks, the address database prepared on the basis of NOBC state registers (system of address identification of streets, real estate, buildings and flats kept by the President of Statistics Poland) 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 approx. 8 million unique addresses, identified as buildings for the purposes of the report. Moreover, on account of the data model for collecting information in the SIIS system, the address database was extended by 448,000 addresses not featured in the above-mentioned reference databases, which were reported as network terminations by entities obliged to submit such a report. The issue of verifying addresses not featured in the reference databases is discussed in Annex 1 to this report.

3.1. BUILDING PENETRATION OF WIRED CONNECTIONS OR WIRELESS TERMINALS

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 within the network's coverage with specific parameters (i.e. buildings where operators declare the possibility of providing services) to the number of all buildings in the analysed area.

At the end of 2019, the average building penetration of fixed-line internet access amounted to 77.6% and increased by 0.3 percentage points compared to 2018. The highest penetration (over 80%) occurs in Silesia, in the following regions: Śląskie (89.5%), Opolskie (87.4%), Dolnośląskie (81.7%), Małopolskie (81.5%) and Wielkopolskie (81.0%). The lowest (less than 70%) – in Warmińsko-Mazurskie (69.2%) and Świętokrzyskie (66.0%). Map 3 presents the distribution of access to fixed-line internet services in buildings by municipality. The share of buildings with fixed-line internet access in different municipalities is still spatially diverse – it is higher in the southern and western part of the country and within urbanised areas, and lower in the central and eastern part.

MAP 3. **TOTAL BUILDING PENETRATION WITH FIXED-LINE INTERNET COVERAGE**

- 80.1% – 100.0% [986]
- 60.1% – 80.0% [931]
- 40.1% – 60.0% [456]
- 20.1% – 40.0% [97]
- 5.1% – 20.0% [7]
- 0% – 5% [0]
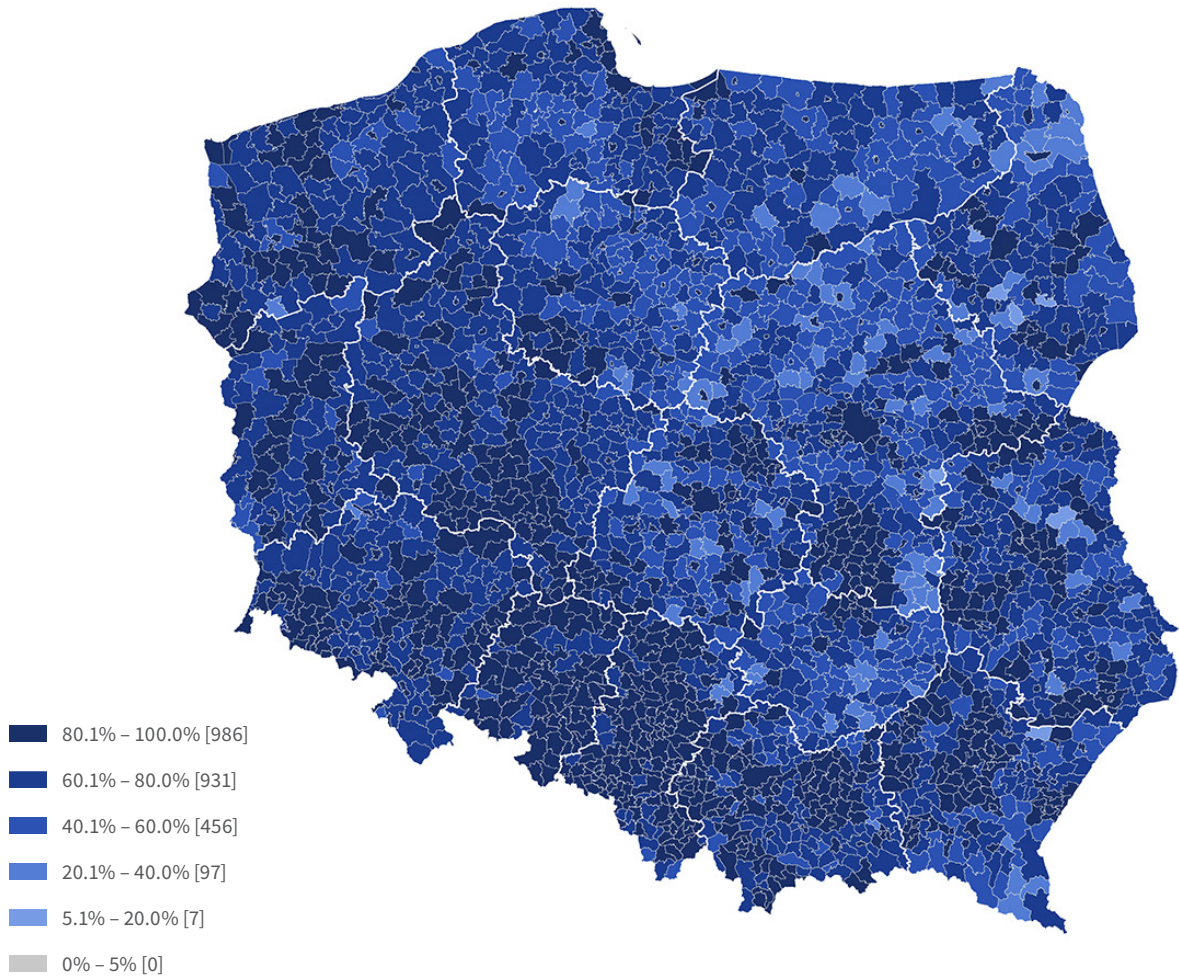
Source: UKE

In 2019, the average building penetration of fixed-line internet access with a capacity of at least 30 Mb/s reached 49.0%, increasing by 6.0 percentage points compared to 2018. The highest value of the indicator was recorded in Śląskie (72.3%), Wielkopolskie (59.8%), Podkarpackie (57.4%) and Małopolskie (57.1%) Regions, while the lowest – in the Warmińsko-Mazurskie Region (34.7%). In terms of municipalities, the highest penetration of such coverage occurs in the municipality of Hyżne in the Podkarpackie Region – 98.9%. An area with extremely low penetration of the aforementioned coverage – similarly to 2018 – was the rural municipality of Przasnysz in the Mazowieckie Region, where only 0.5% of buildings have access to lines with a capacity of at least 30 Mb/s.

MAP 4. **BUILDING PENETRATION WITH FIXED-LINE INTERNET COVERAGE OF AT LEAST 30 MB/s**

- 80.1% – 100.0% [230]
- 60.1% – 80.0% [395]
- 40.1% – 60.0% [559]
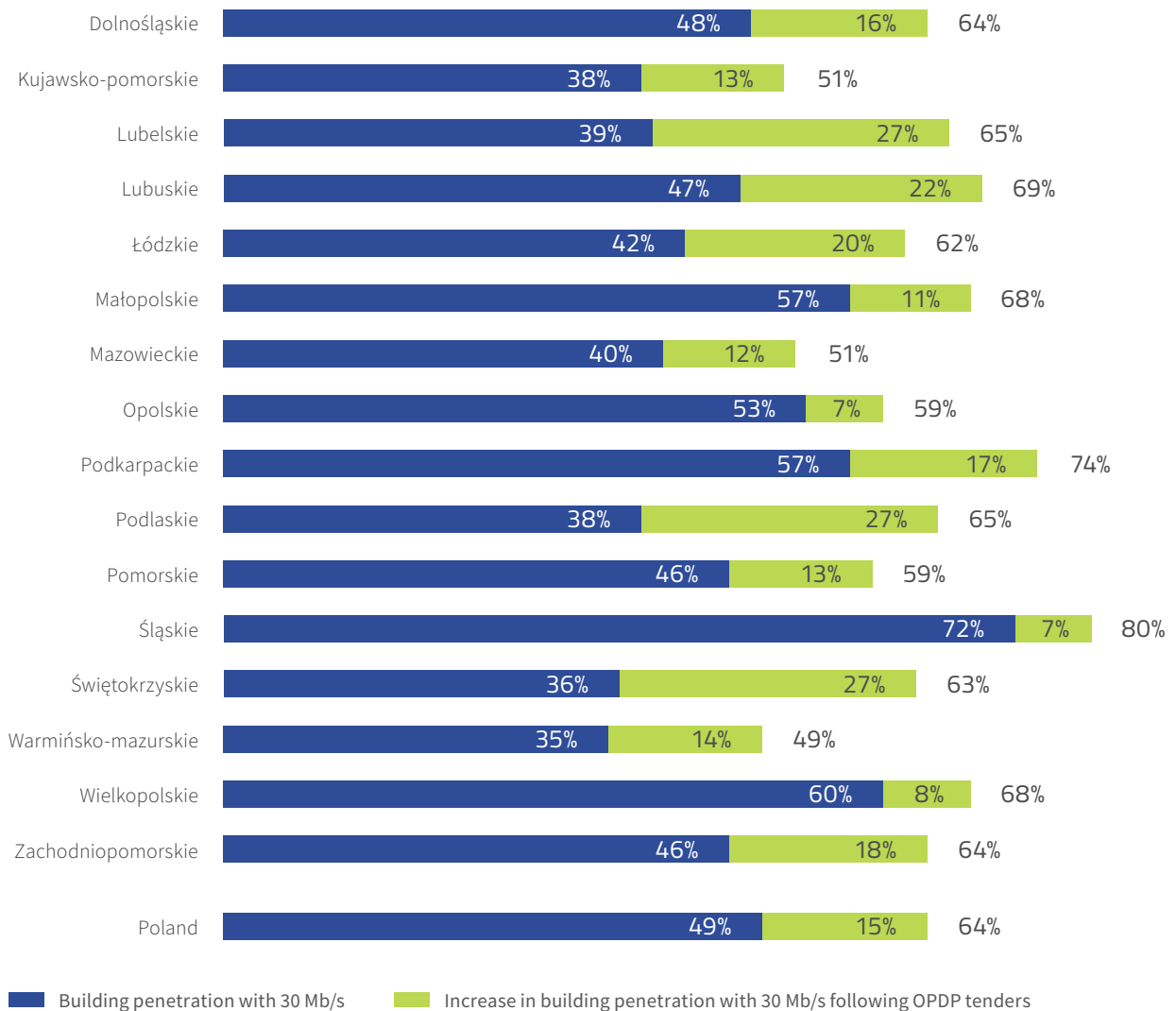- 20.1% – 40.0% [771]
- 5.1% – 20.0% [492]
- 0% – 5% [30]
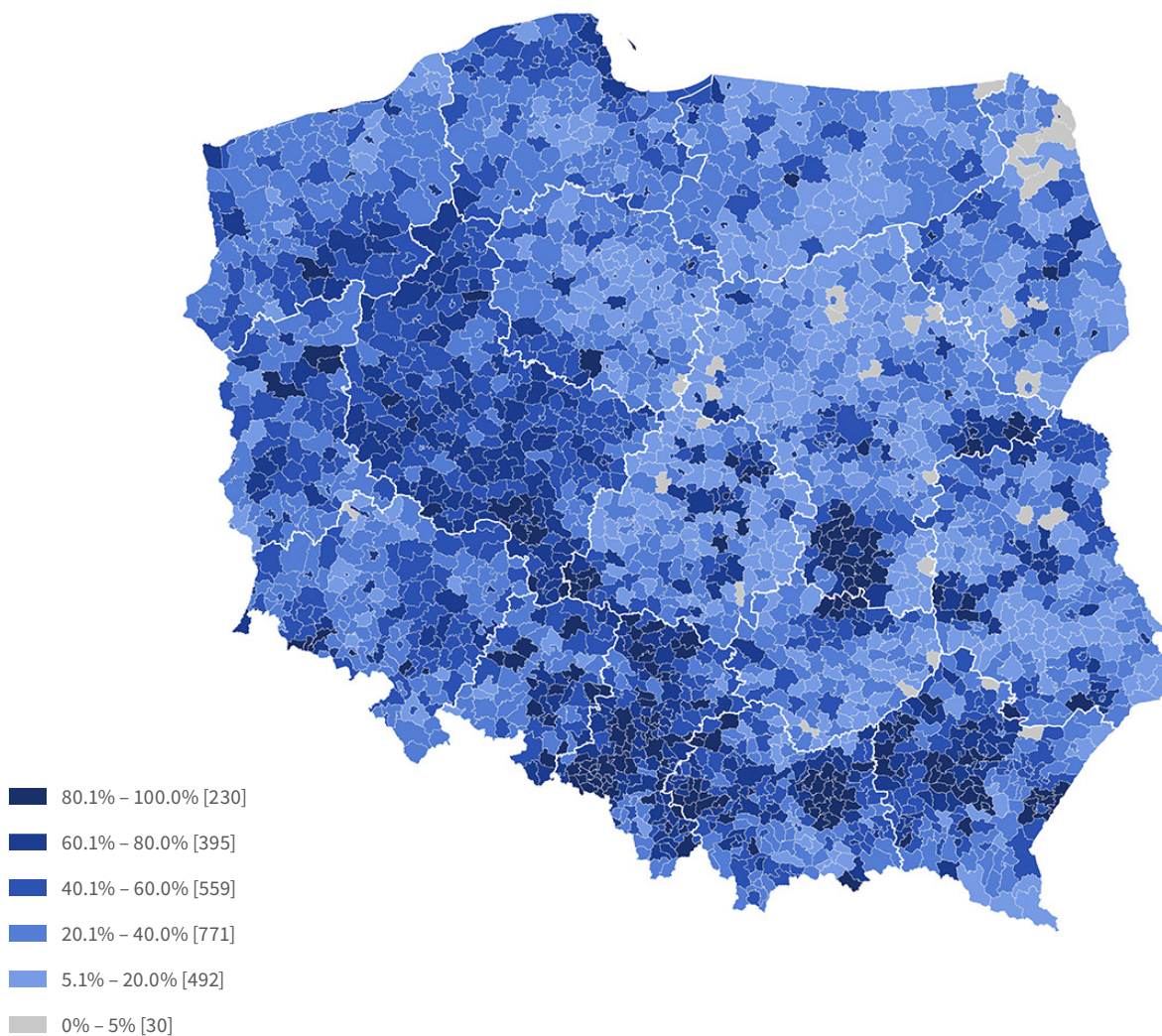
Source: UKE

The implementation of investments from the 2nd, 3rd (rounds 1 and 2) and 4th call for proposals under Measure 1.1 of the Operational Programme Digital Poland will allow to increase the average building penetration with fixed-line internet coverage with the capacity of at least 30 Mb/s to 64%. The most noticeable results of investments in access networks should be expected in Lubelskie, Podlaskie and Świętokrzyskie Regions (penetration increase by 27 percentage points), while the smallest in Śląskie

and Opolskie Regions, where penetration will increase by 7 percentage points. However, in the Śląskie Region it is already relatively high and amounts to approx. 72%. On average, the implementation of investments under Measure 1.1 will allow to increase the building penetration with fixed-line internet coverage with the capacity of at least 30 Mb/s by 15 percentage points from the current level of 49% (CHART 11).

CHART 11. **BUILDING PENETRATION WITH FIXED-LINE INTERNET COVERAGE OF AT LEAST 30 MB/s AFTER THE IMPLEMENTATION OF INVESTMENT PROJECTS WITHIN OPDP**

Region	Building penetration with 30 Mb/s	Increase	Total
Dolnośląskie	48%	16%	64%
Kujawsko-pomorskie	38%	13%	51%
Lubelskie	39%	27%	65%
Lubuskie	47%	22%	69%
Łódzkie	42%	20%	62%
Małopolskie	57%	11%	68%
Mazowieckie	40%	12%	51%
Opolskie	53%	7%	59%
Podkarpackie	57%	17%	74%
Podlaskie	38%	27%	65%
Pomorskie	46%	13%	59%
Śląskie	72%	7%	80%
Świętokrzyskie	36%	27%	63%
Warmińsko-mazurskie	35%	14%	49%
Wielkopolskie	60%	8%	68%
Zachodniopomorskie	46%	18%	64%
Poland	49%	15%	64%

■ Building penetration with 30 Mb/s   ■ Increase in building penetration with 30 Mb/s following OPDP tenders

Source: UKE

Access to services with the highest speeds, equal to at least 100 Mb/s, is currently available to residents of one out of three residential buildings in Poland (32.8%) – in 2018, 25% of buildings had such access. The highest percentage of buildings with internet coverage with the speed of at least 100 Mb/s can be found in the Śląskie Region (53.9%). This percentage is also high in the Wielkopolskie and Podkarpackie Regions – 48.4% and 47.7%, respectively. The situation is the least favourable in the Kujawsko-Pomorskie and Dolnośląskie Regions, where the percentage of buildings within the coverage of lines with a capacity of at least 100 Mb/s is lower than 20% and equals 17.0% and 19.0%, respectively.

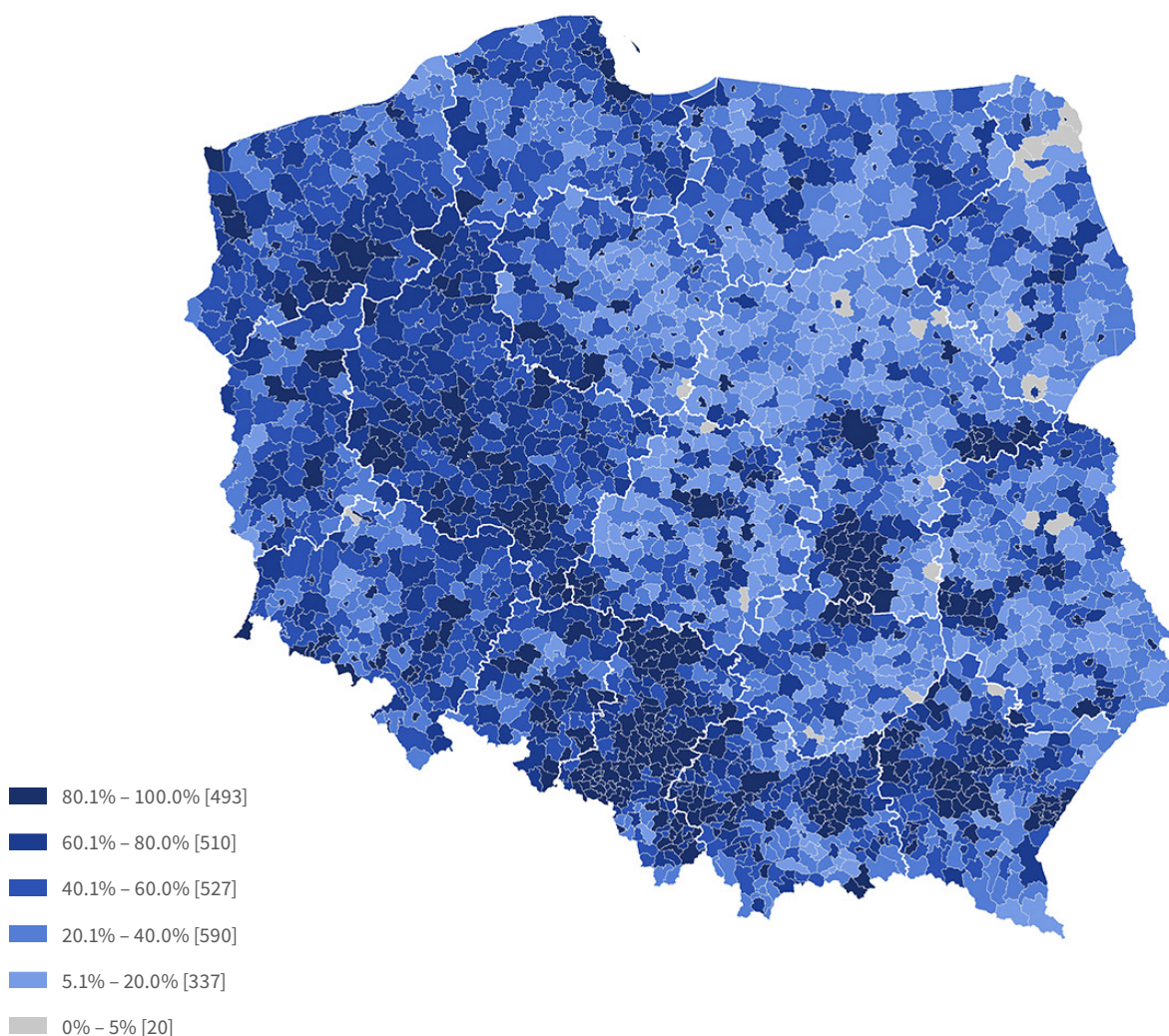MAP 5. **BUILDING PENETRATION WITH FIXED-LINE INTERNET COVERAGE OF AT LEAST 100 MB/s**

- 80.1% – 100.0% [135]
- 60.1% – 80.0% [226]
- 40.1% – 60.0% [326]
- 20.1% – 40.0% [447]
- 5.1% – 20.0% [511]
- 0% – 5% [832]
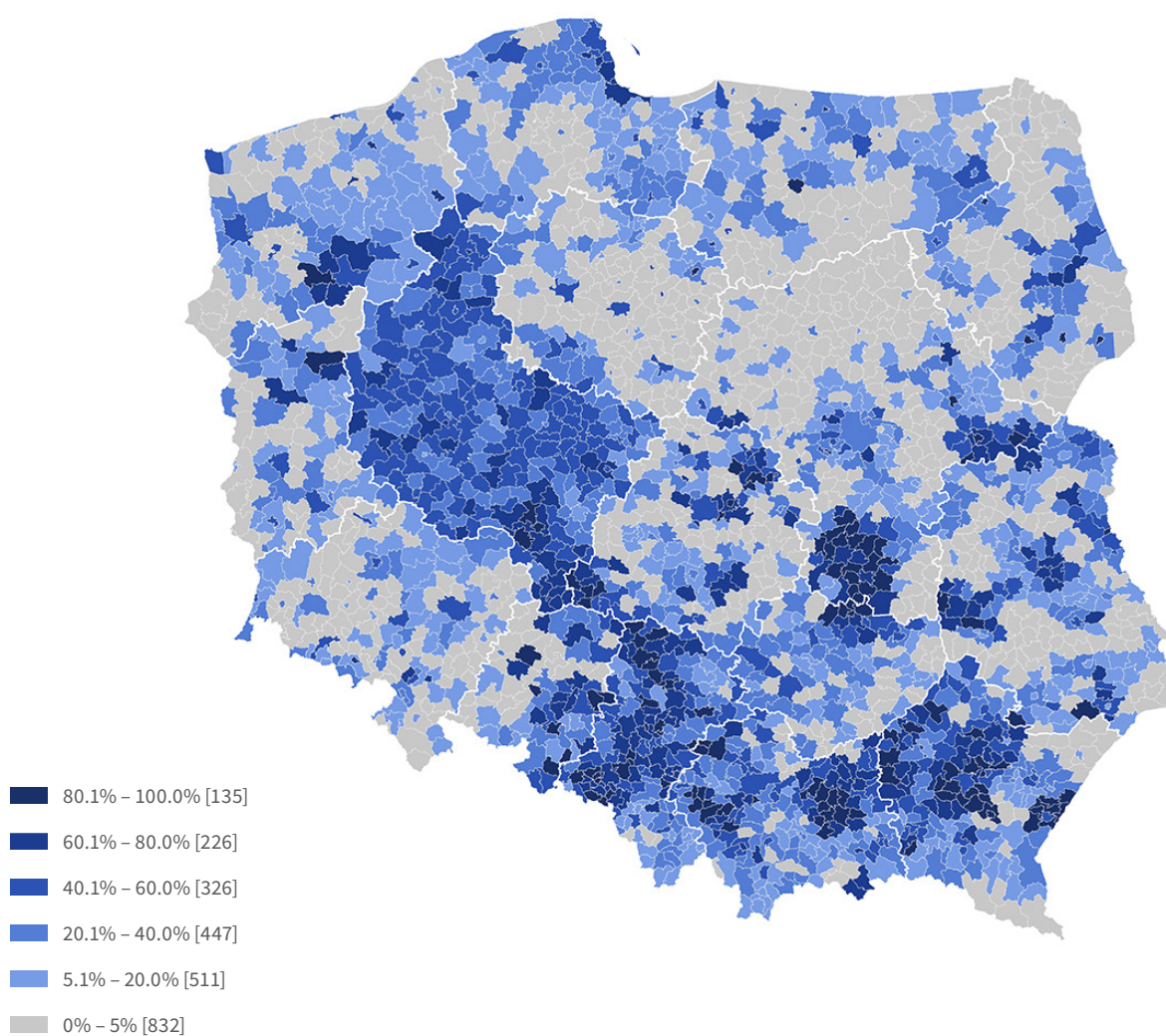
Source: UKE

3.2. HOUSEHOLD PENETRATION

An important objective of the Digital Agenda for Europe (DAE) is to ensure that by the end of 2020 all households in the European Union have internet access of at least 30 Mb/s. In accordance with the monitoring principles set out in the National Broadband Plan (NPS), for the purposes of DAE indicators, a household is understood as a dwelling, therefore, in order to assess the degree of implementation of the above provisions, an indicator of household penetration was used, understood as the ratio of the number of all dwellings in buildings within network

coverage of at least 30 Mb/s (a building in which operators declare the possibility of providing particular services) to the total number of dwellings in the analysed area. At the end of 2019, on average, 75.0% of households had access to a fixed-line internet access service of at least 30 Mb/s. Compared to 2018, the share of such households increased by 3.4 percentage points. The highest penetration is invariably characteristic of the Śląskie Region (88.8%), and the lowest – of the Świętokrzyskie Region (58.7%).

MAP 6. **HOUSEHOLD PENETRATION WITH FIXED-LINE INTERNET COVERAGE OF AT LEAST 30 MB/s**

- ■ 80.1% – 100.0% [493]
- ■ 60.1% – 80.0% [510]
- ■ 40.1% – 60.0% [527]
- ■ 20.1% – 40.0% [590]
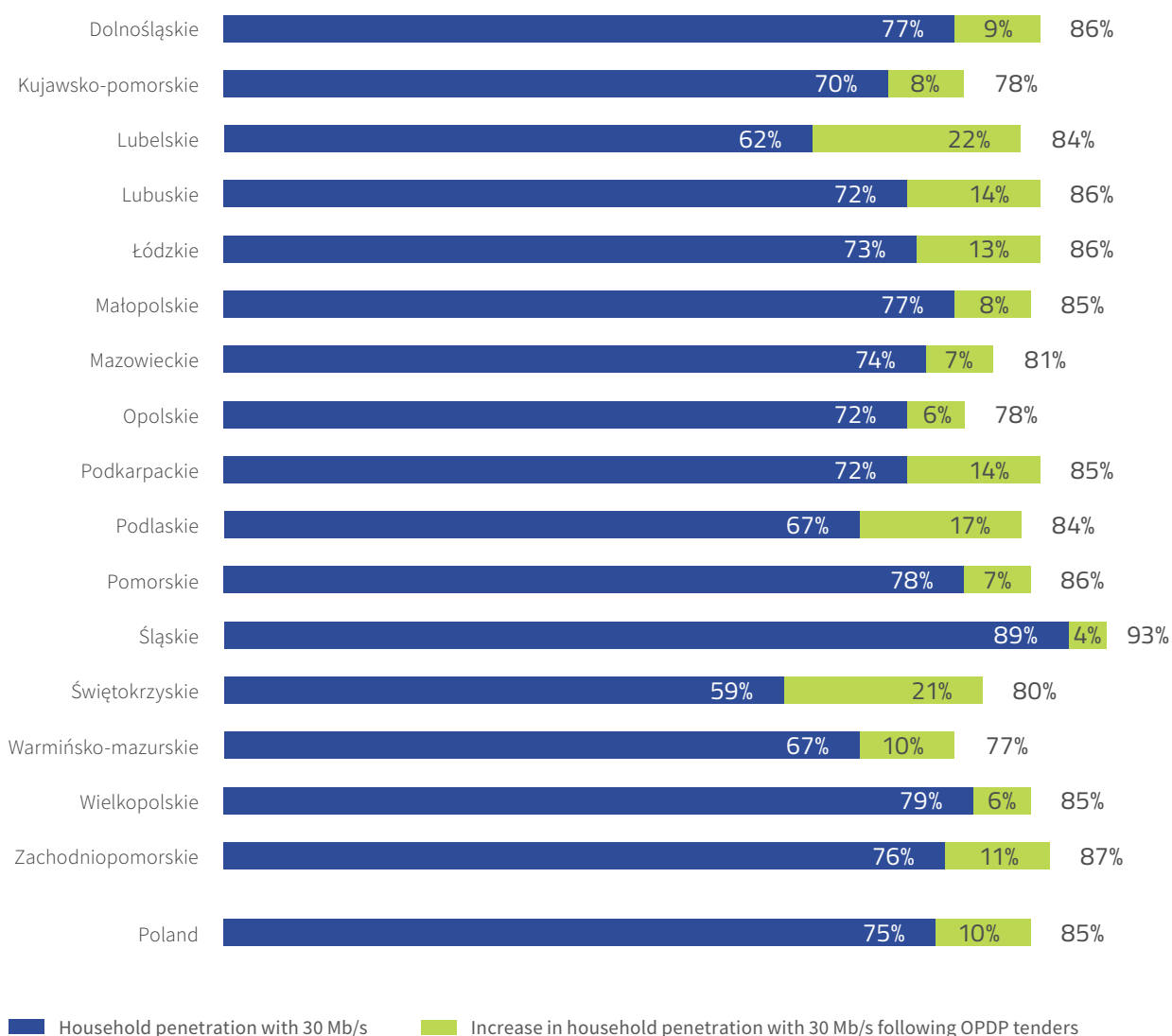- ■ 5.1% – 20.0% [337]
- ■ 0% – 5% [20]

Source: UKE

The implementation of investments related to Measure 1.1 of the Operational Programme Digital Poland should increase household penetration with coverage of at least 30 Mb/s to 84.5%. The best results of these investments are expected in Lubelskie and Świętokrzyskie Regions –

an increase by 22 and 21 percentage points, respectively (CHART 12). The completed investments will allow the Śląskie Region to achieve an increase in household penetration at a level exceeding 90%.

CHART 12. **HOUSEHOLD PENETRATION WITH FIXED-LINE INTERNET COVERAGE OF AT LEAST 30 MB/s AFTER THE IMPLEMENTATION OF INVESTMENT PROJECTS WITHIN OPDP**

Region	Household penetration with 30 Mb/s	Increase following OPDP tenders	Total
Dolnośląskie	77%	9%	86%
Kujawsko-pomorskie	70%	8%	78%
Lubelskie	62%	22%	84%
Lubuskie	72%	14%	86%
Łódzkie	73%	13%	86%
Małopolskie	77%	8%	85%
Mazowieckie	74%	7%	81%
Opolskie	72%	6%	78%
Podkarpackie	72%	14%	85%
Podlaskie	67%	17%	84%
Pomorskie	78%	7%	86%
Śląskie	89%	4%	93%
Świętokrzyskie	59%	21%	80%
Warmińsko-mazurskie	67%	10%	77%
Wielkopolskie	79%	6%	85%
Zachodniopomorskie	76%	11%	87%
Poland	75%	10%	85%

■ Household penetration with 30 Mb/s   ■ Increase in household penetration with 30 Mb/s following OPDP tenders
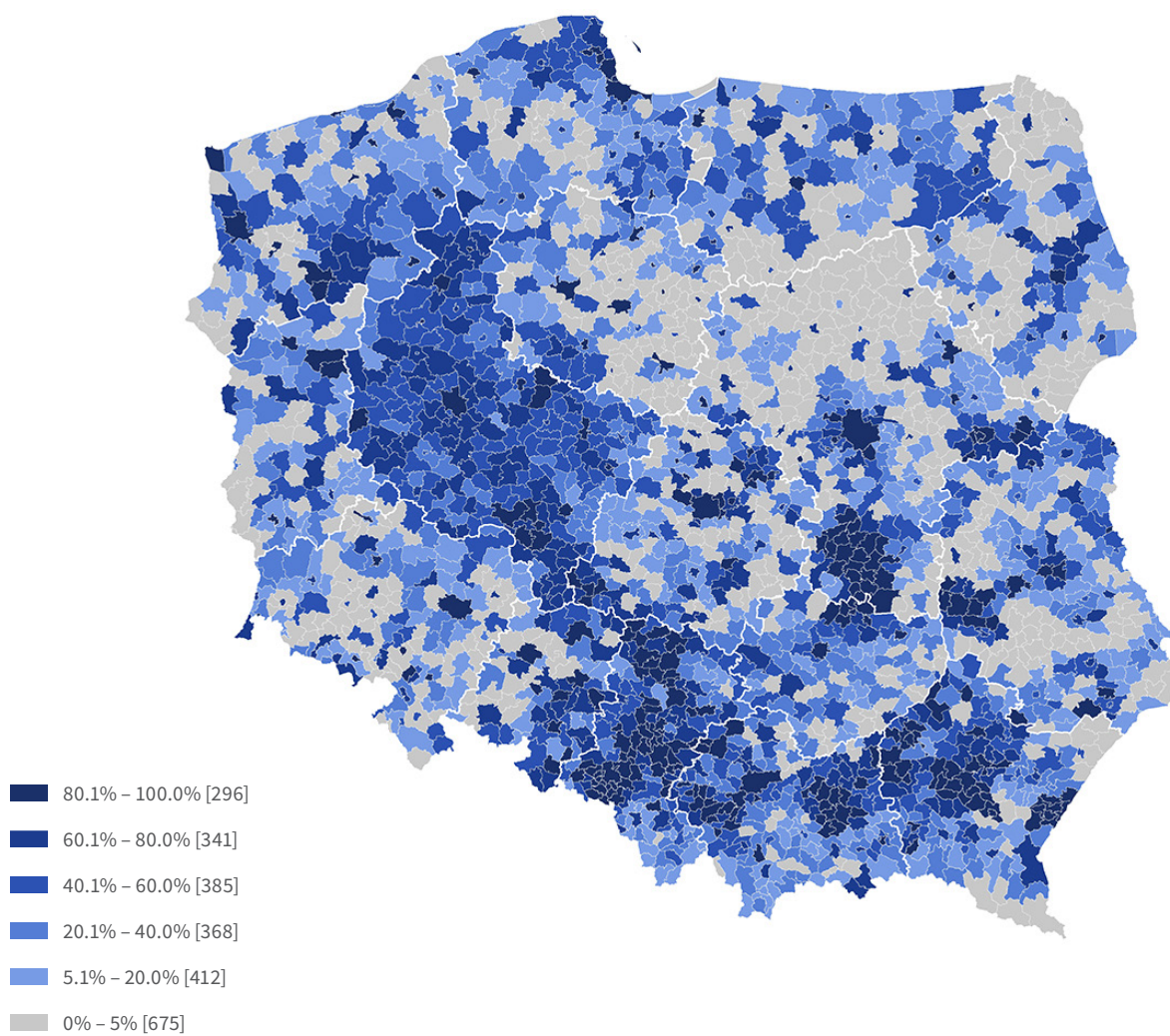
Source: UKE

At the moment, 63.4% of all households in Poland have access to services with the highest speeds of at least 100 Mb/s. In comparison with 2018, the share of such households increased by 4.8 percentage points. Increasingly, they are located in small localities in rural areas. However, households in the highly urbanised Śląskie Region are still in the best situation (78.7%). Currently, the lowest penetration occurs in the Lubelskie Region (49.8%). In other regions, it exceeded 50%.

MAP 7. **HOUSEHOLD PENETRATION WITH FIXED-LINE INTERNET COVERAGE OF AT LEAST 100 MB/s**

- 80.1% – 100.0% [296]
- 60.1% – 80.0% [341]
- 40.1% – 60.0% [385]
- 20.1% – 40.0% [368]
- 5.1% – 20.0% [412]
- 0% – 5% [675]

Source: UKE

The Digital Agenda for Europe also sets a target for the EU countries to build demand for high-speed services and to ensure that by the end of 2020, 50% of households use internet access services of at least 100 Mb/s. As at the end of 2019, the usage level of such services in all households amounted to 23.3% (CHART 11).
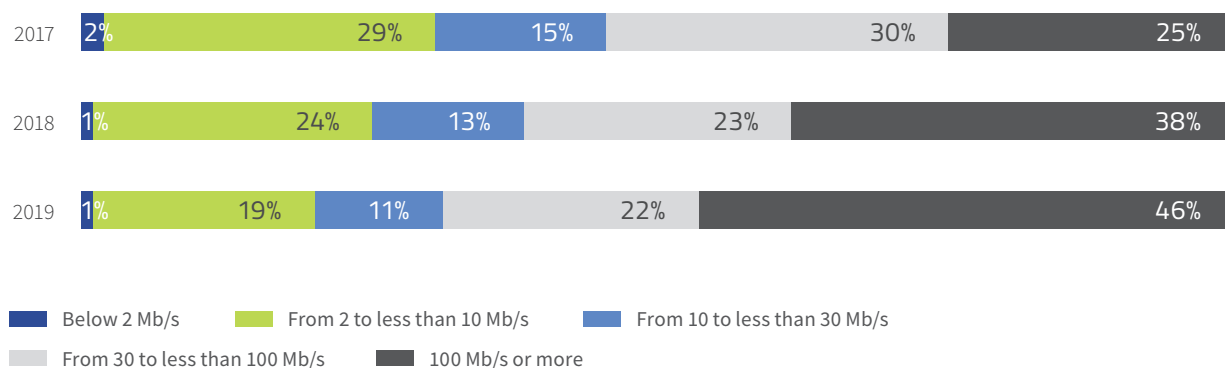
Every year, an increase in the share of high-speed services in the total volume of fixed-line internet access services can also be observed – in 2019, services of at least 100 Mb/s were used in 46% of households that had fixed-line internet access (CHART 13). In comparison to 2018, the share of such services increased by 8 percentage points, reducing the percentage of services with the lowest speed.

CHART 13. **SHARE OF HOUSEHOLDS USING INTERNET ACCESS SERVICES OF AT LEAST 100 MB/s IN THE TOTAL OF ALL HOUSEHOLDS**
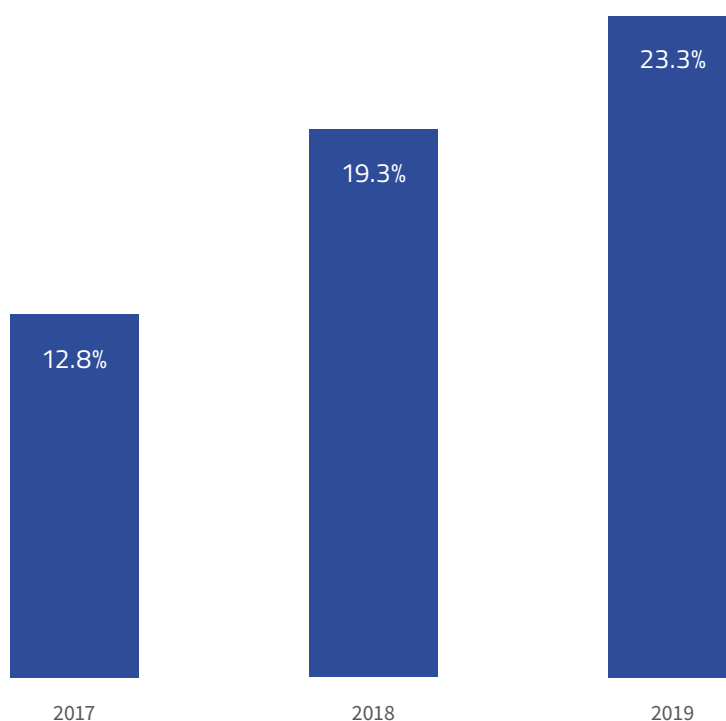
Source: UKE

Year	Below 2 Mb/s	From 2 to less than 10 Mb/s	From 10 to less than 30 Mb/s	From 30 to less than 100 Mb/s	100 Mb/s or more
2017	2%	29%	15%	30%	25%
2018	1%	24%	13%	23%	38%
2019	1%	19%	11%	22%	46%

■ Below 2 Mb/s ■ From 2 to less than 10 Mb/s ■ From 10 to less than 30 Mb/s
■ From 30 to less than 100 Mb/s ■ 100 Mb/s or more

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) sets out objectives concerning broadband development for the EU, to be met by 2025. The strategic objective for 2025 is for all European households to have access to internet providing downlink speeds of at least 100 Mb/s, with the option of upgrading to speeds measured in gigabits. For the assessment of the implementation of the above objective, households are understood as dwellings, as when assessing the implementation of the DAE objectives. Households having access to the internet with a downlink speed of at least 100 Mb/s, with the possibility of upgrading to a speed measured in gigabits, are understood as dwellings in those buildings which are within the coverage of fibre-optic networks, coaxial copper cables – limited to *(EURO)DOCSIS 3.x* technology, twisted pair copper cables – limited to *1 Gigabit Ethernet, 10 Gigabit Ethernet, 100 Mb/s Fast Ethernet* technology, and those dwellings where services with a speed above 100 Mb/s using a radio medium are already provided. Taking into account the above assumptions, at the end of 2019 the percentage of households in the range of internet access with capacity of at least 100 Mb/s, with the possibility to increase it to the capacity measured in gigabits, amounted to 61.7% and increased by 3.5 percentage points in relation to 2018.

3.3. MOBILE NETWORK COVERAGE

Mobile internet coverage is reported by spatial indication of address points located in the technological range of base stations. The coverage reported by operators for 2019 indicate that among mobile technologies, LTE technology, with a share amounting to 82.3%, continues to lead the way (CHART 15).

CHART 15. **SHARE OF INDIVIDUAL TECHNOLOGIES IN MOBILE INTERNET COVERAGE**

2.7%
HSPA

3.9%
HSPA+

10.2%
CDMA

0.9%
Other

82.3%
LTE
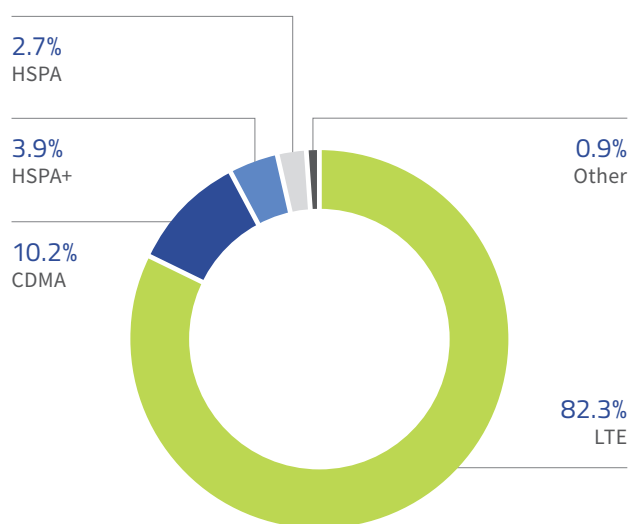
Source: UKE

Compared to previous years, in this report we changed our approach to determining the number of localities deprived of internet access. As the SIMC system* reflects the *List of official names of localities and their parts*, which also includes places where residential buildings are not located, only inhabited localities were used for this year's analyses. Inhabited localities are those where at least one building with residential dwellings is located, according to the NOBC system** which is part of the TERYT register kept by the President of Statistics Poland. Additionally, the existence of uninhabited localities was the subject of UKE's information campaign, which is presented in Annex 2 to this report.

Taking into account inhabited localities with the status of autonomous localities, there are 24 localities in Poland which are completely deprived of access to the internet in the LTE technology. In total, there are 114 residential building addresses in these localities. At the end of 2019, the number of inhabited localities completely deprived of both fixed and mobile network coverage was 8 – there are 15 residential building addresses in these localities. The list of inhabited localities deprived of internet access in the LTE technology is presented in Table 7 – additionally, the table indicates localities completely deprived of internet access.

* System of identifiers and localities names

** System for address identification of streets, real estates, buildings and dwellings.

	Name of autonomous locality	SIMC code	Locality type	Internet access in general
1	Bielice	0855546	village	
2	Brzegi Górne	0356122	village	
3	Caryńskie	0356139	settlement	none
4	Dubne	0454787	village	
5	Dziewięcierz	0602785	settlement	
6	Huta Polańska	0355520	village	
7	Janowo	0784929	settlement	
8	Kopciowice	0941620	village	
9	Krasnołąka	0997513	settlement	none
10	Morskie Oko	0418432	Tourist shelter	
11	Moszczany	0609681	settlement	
12	Nakielno	1010472	forest settlement	none
13	Nasiczne	0356240	settlement	
14	Niwki	0603017	settlement	
15	Noskowo	1010130	settlement	none
16	Ornak	0468654	Tourist shelter	none
17	Piaskowice	0851459	village	none
18	Przatówek	0990190	settlement	
19	Roztoka	0418455	Tourist shelter	
20	Stary Las	0173568	settlement	none
21	Tarnawa Niżna	0356317	village	none
22	Wołosate	0356330	settlement	
23	Żychlikowo	1067383	settlement	
24	Żydowskie	0355370	settlement	

Source: UKE

The data reported in the course of the data inventory shows that approx. 12% of buildings in Poland are deprived of the LTE Internet access. 10 regions have higher coverage than the national average (Map 8). The highest LTE technology percentage coverage of buildings occurs in Świętokrzyskie (92.4%), Opolskie (92%) and Podlaskie (92.1%) Regions. Meanwhile, the lowest one in 2019 was recorded for the Dolnośląskie Region (76.4%).
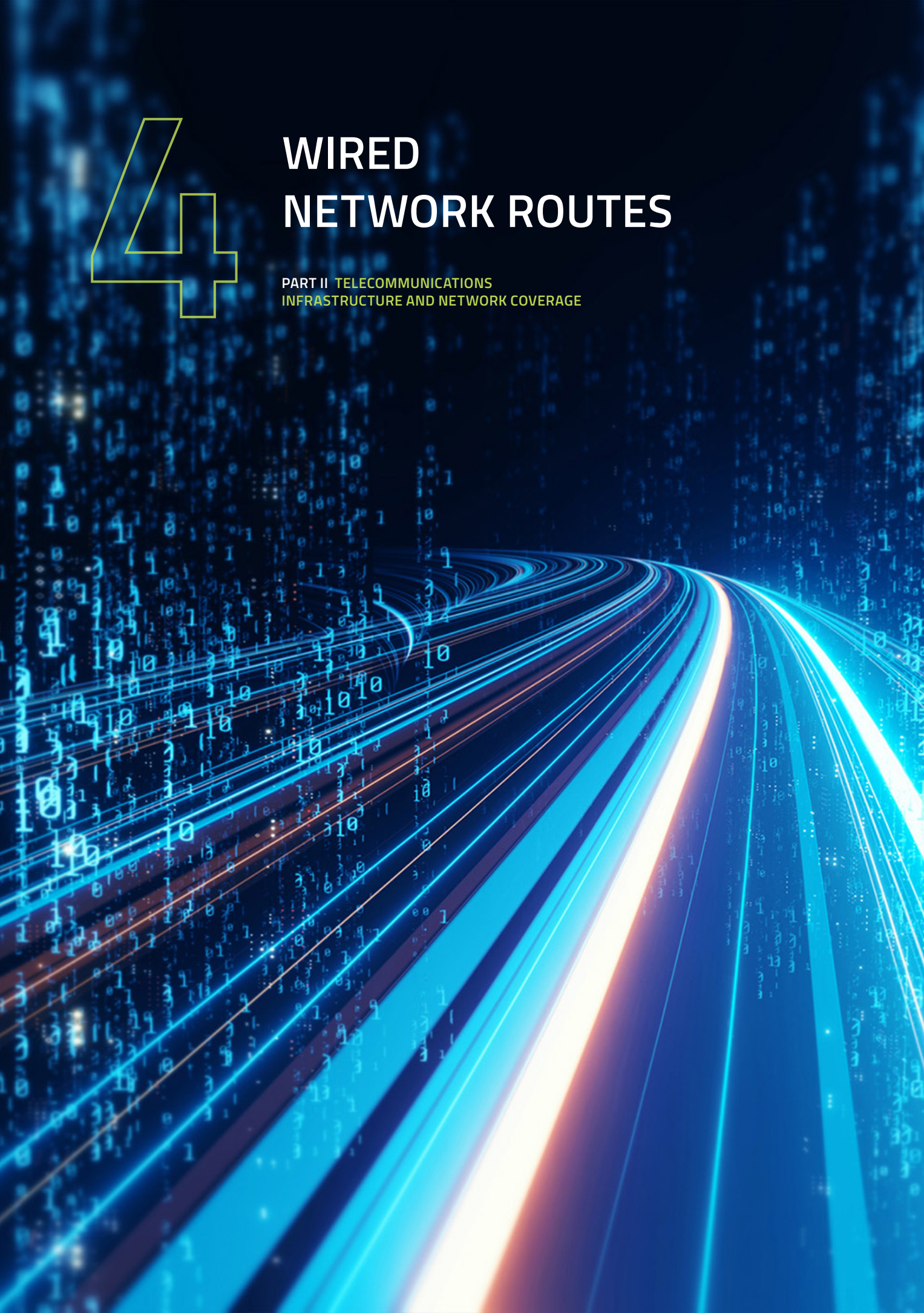
MAP 8. **PERCENTAGE OF BUILDINGS WITH LTE TECHNOLOGY COVERAGE**

Legend:
- 76.4 – 85.0%
- 85.1 – 87.0%
- 87.1 – 89.0%
- 89.1 – 91.0%
- 91.1 – 92.4%
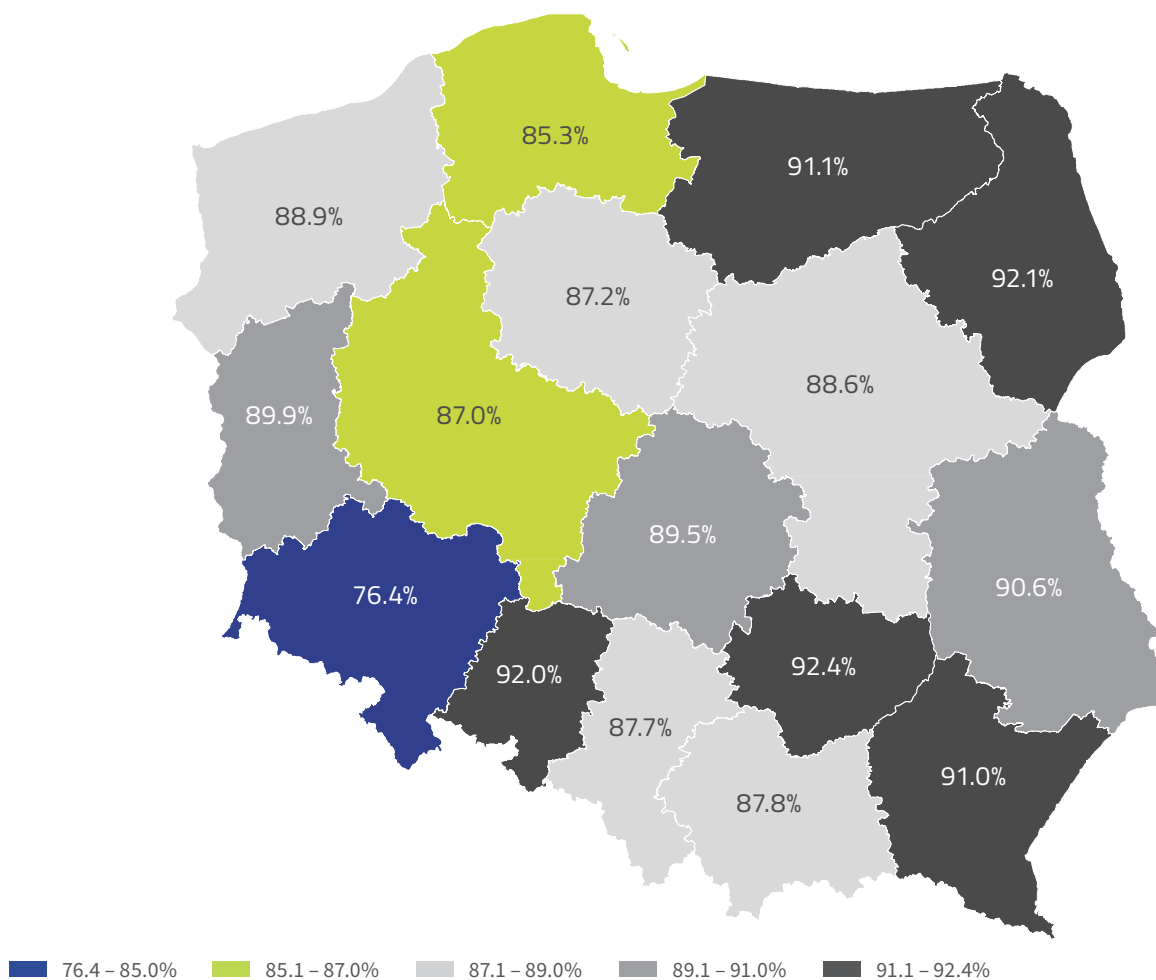
Source: UKE

4

WIRED
NETWORK ROUTES

**PART II TELECOMMUNICATIONS
INFRASTRUCTURE AND NETWORK COVERAGE**

The length of the routes of wired telecommunications lines, estimated on the basis of information provided by the entities obliged to do so, as at 31 December 2019, amounted to 432,000 km.

CHART 16 presents the share of different media in the line infrastructure. Over the last few years, the ratio of their size has remained unchanged and the fibre-optic medium has been definitely predominant.
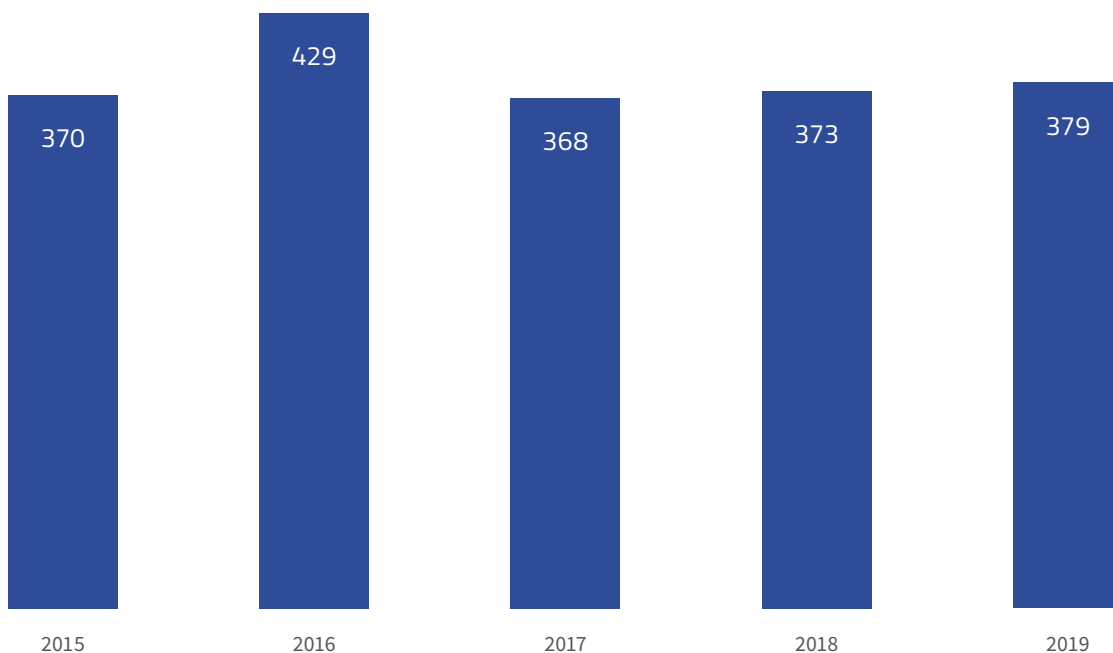
CHART 17 shows the change in the total length of own fibre-optic networks in different years. In 2019, it amounted to 379,000 km out of a total of 425,000 km of fibre-optic network, including leased infrastructure.

CHART 16. **SHARE OF MEDIA IN LINE INFRASTRUCTURE**

1.65%
copper pair cables

0.10%
coaxial copper cables

98.25%
fibre-optic
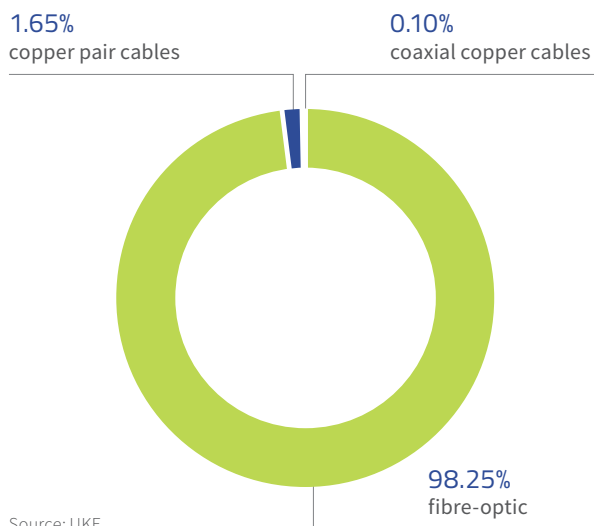
Source: UKE

CHART 17. **LENGTH OF OWN FIBRE-OPTIC NETWORKS IN 2015 – 2018 (THOUSANDS OF KM)***

2015	2016	2017	2018	2019
370	429	368	373	379

Source: UKE

* The increase in the length of the fiber-optic network in 2016 and its subsequent decrease in 2017 results from incorrect data provided by some entities, which was also explained in the *Report on the state of the telecommunications market in Poland in 2017*. In 2017, for example, in the case of only one entity, there was a decrease of approx. 72,000 km – from 76,724 km to 4,513 km The subsequent decrease in the length of the fiber-optic network, with the values remaining at a similar level, is due to a more precise data provided to the SIIS by the stakeholders.

Map 9 presents the routes of fibre-optic lines in Poland (straight-line connections of network nodes). The distinct density of fibre-optic lines is linked with strongly urbanised areas (Silesian conurbation, Tricity, Warsaw, Poznań, Wrocław, etc.) and with main transport routes connecting to the largest agglomerations in the country.

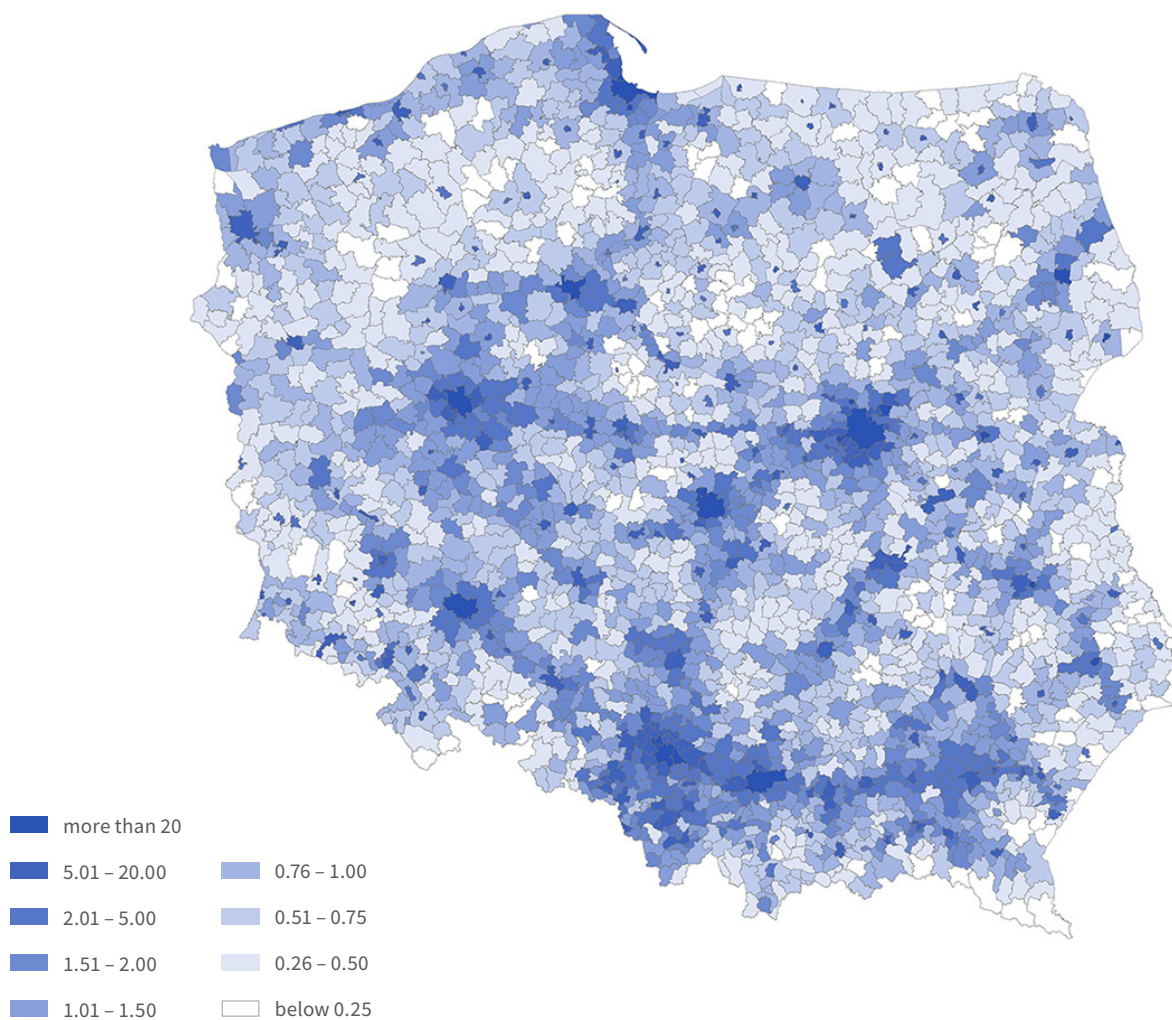MAP 9. **FIBRE-OPTIC NETWORK ROUTES IN POLAND**

Source: UKE

Map 10 shows diversification in terms of the density index of the line telecommunications infrastructure in Poland, which confirms the aforementioned dependence on the distribution pattern of infrastructure in Poland. However, it ought to be reminded that the infrastructure inventory aims to collect information about the routes between nodes and not about the actual network routing, which translates into limited precision of the density index estimates for selected areas. This may apply in particular to municipalities that are located in sections between large cities.
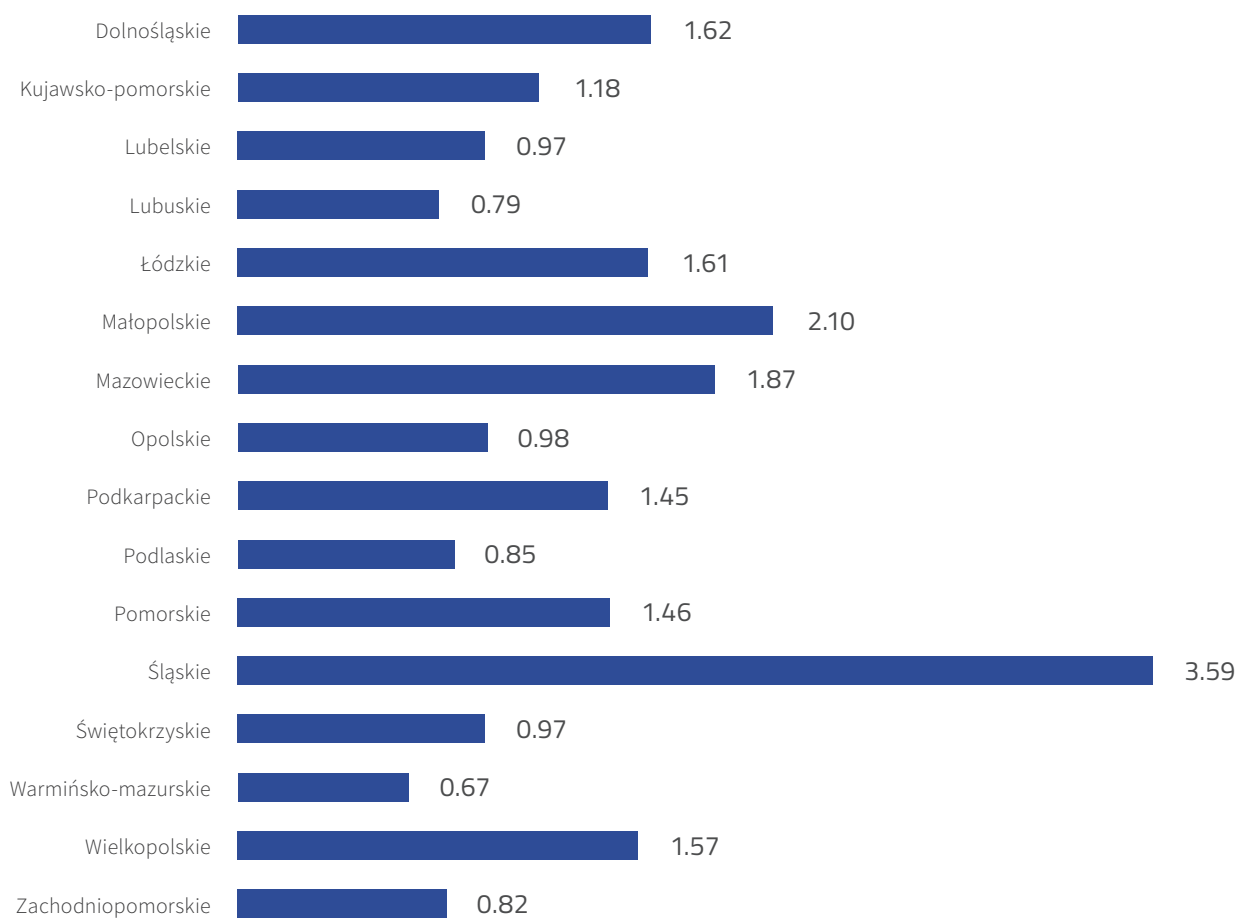
MAP 10. **DENSITY OF LINE TELECOMMUNICATIONS INFRASTRUCTURE IN MUNICIPALITIES (KM/KM²)**

■ more than 20	
■ 5.01 – 20.00	■ 0.76 – 1.00
■ 2.01 – 5.00	■ 0.51 – 0.75
■ 1.51 – 2.00	■ 0.26 – 0.50
■ 1.01 – 1.50	□ below 0.25

Source: UKE

The average density of line infrastructure in Poland is 1.38 km/km². According to CHART 18, the highest density of linear infrastructure (over 1.50 km/km²) can be found in Wielkopolskie, Śląskie, Mazowieckie, Małopolskie, Łódzkie and Dolnośląskie Regions.

CHART 18. **DENSITY OF LINE TELECOMMUNICATIONS INFRASTRUCTURE IN REGIONS (KM/KM²)**

Region	Value
Dolnośląskie	1.62
Kujawsko-pomorskie	1.18
Lubelskie	0.97
Lubuskie	0.79
Łódzkie	1.61
Małopolskie	2.10
Mazowieckie	1.87
Opolskie	0.98
Podkarpackie	1.45
Podlaskie	0.85
Pomorskie	1.46
Śląskie	3.59
Świętokrzyskie	0.97
Warmińsko-mazurskie	0.67
Wielkopolskie	1.57
Zachodniopomorskie	0.82

Source: UKE

Pie charts for different regions on "Map 11" show the shares of own fibre-optic networks as part of underground and overhead routes in the total length of fibre-optic networks. The share of overhead routes, depending on the region, equals from 6 percent in the Wielkopolskie Region to 40 percent in the Podkarpackie Region. The differences in the share of overhead routes are due to, i.a., the topography of the region. The following illustration shows the spatial relationship. Regions located in the south of Poland are characterised by a higher share of overhead routes, while in lowland areas such as Mazowieckie or Wielkopolskie Regions, the share of underground routes is visibly greater.

Similarly to previous years, there is a constant link between the ratio of ground to underground infrastructure and the level of urbanisation. In the west of Poland, the share of the underground route reaches its highest values, which is related to a higher level of urbanisation in the region and thus, higher cost-effectiveness of investments in cable ducts.

MAP 11. **SHARE OF ROUTES: UNDERGROUND AND OVERHEAD IN THE TOTAL LENGTH OF FIBRE-OPTIC NETWORKS**

■ Underground route (312,000 km)
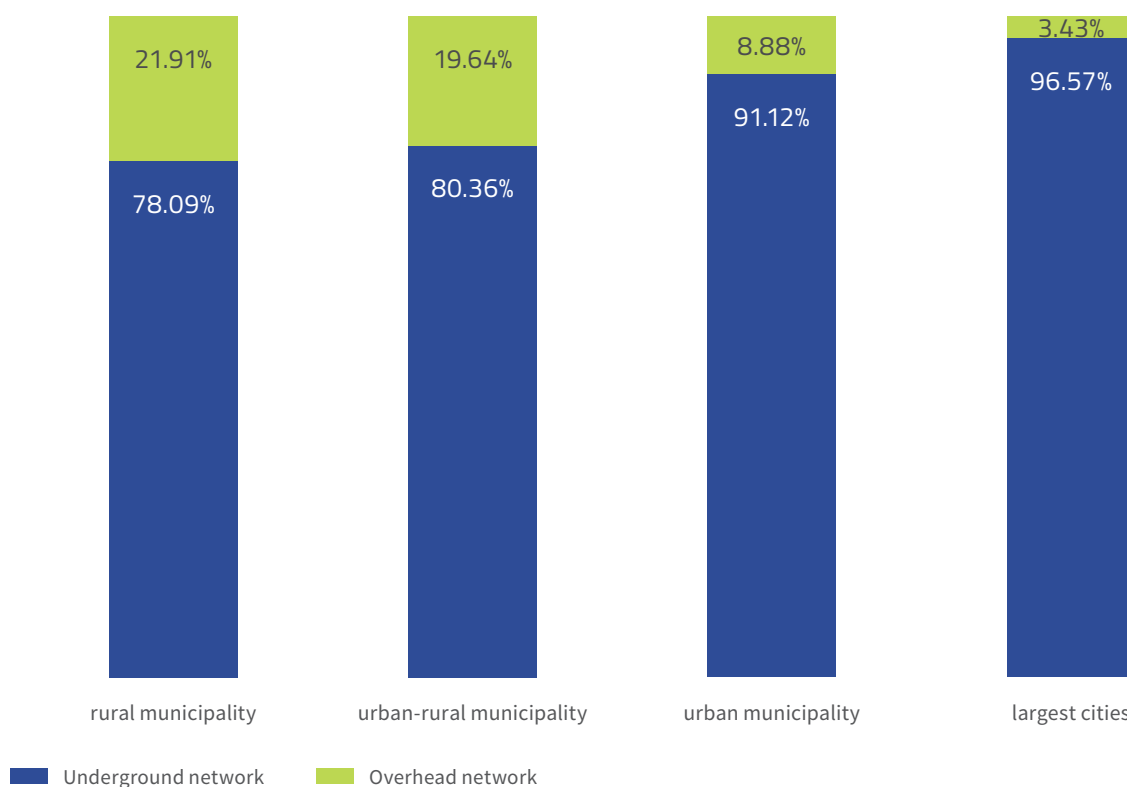
■ Overhead route (67,000 km)
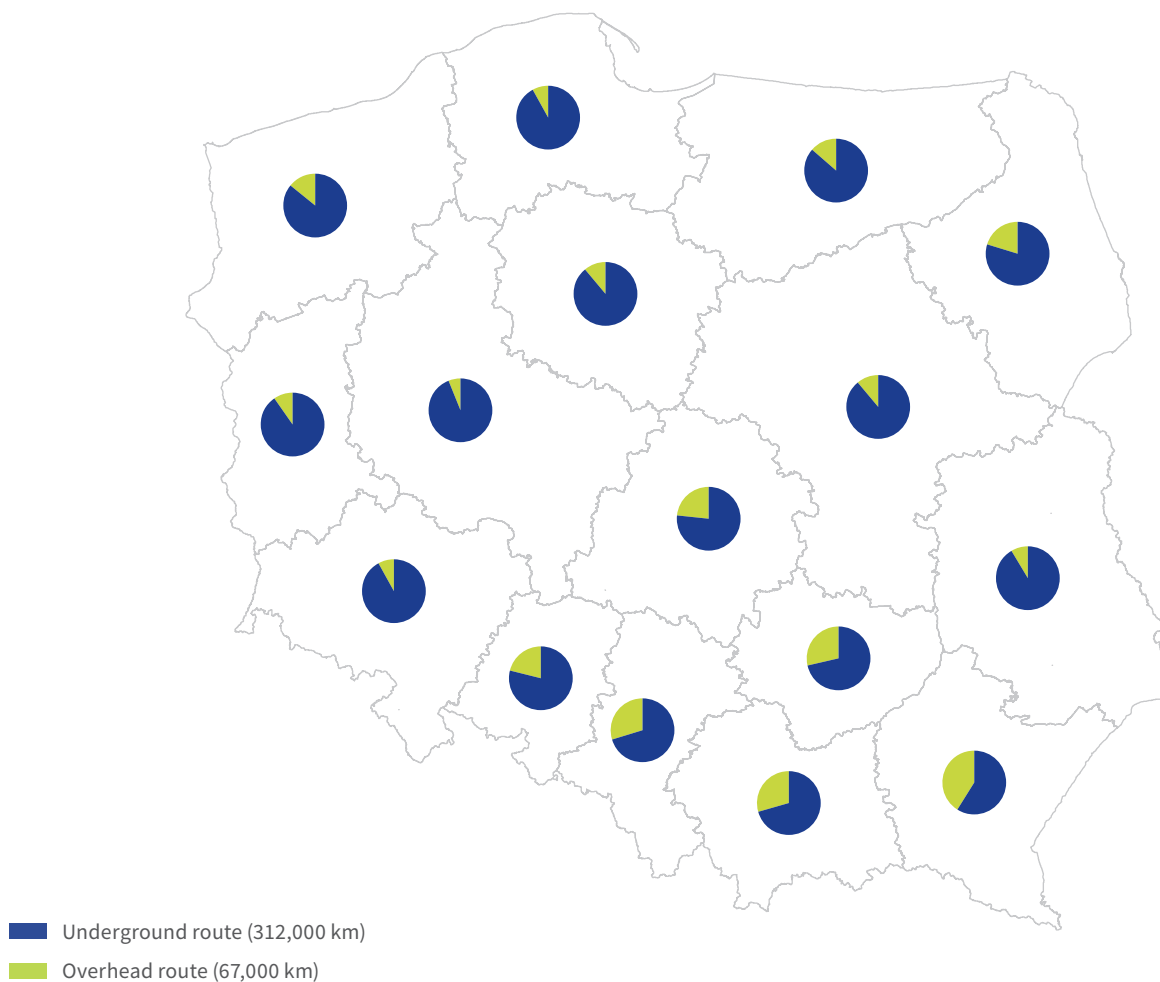
Source: UKE

Data presented in CHART 19 show that overhead networks in rural areas have a significantly higher share (approx. 22%) than networks in urbanised areas (approx. 9%). Moreover, rural areas are increasingly more similar to small towns in this respect. The impact of new types of investments, carried out with the use of underground routes, often located along road lanes, is also noticeable. Undoubtedly, the largest share of underground routes can be observed in major towns (the analysis includes top twenty biggest cities in Poland), and accounts for as much as 97% of the routing.

CHART 19. **NETWORK ROUTES IN DIFFERENT TYPES OF AREAS**

	rural municipality	urban-rural municipality	urban municipality	largest cities
Overhead network	21.91%	19.64%	8.88%	3.43%
Underground network	78.09%	80.36%	91.12%	96.57%

■ Underground network ■ Overhead network

Source: UKE

ANNEXES TO THE REPORT ON THE STATE OF THE TELECOMMUNICATIONS MARKET IN POLAND IN 2019

METHODOLOGY FOR CREATING A REFERENCE DATABASE OF ADDRESS POINTS FOR INVENTORY PURPOSES

The efficient execution of the inventory process required creating a uniform and coherent address database for all data providers. The quality of data collected during the inventory process has a significant impact on the analysis of the telecommunications market, including the identification of areas requiring financial support.

The reference address database for the purposes of the inventory was created on the basis of registers kept by the Surveyor General of Poland and the President of Statistics Poland by merging NOBC registers (system of address identification of streets, real estate, buildings and flats) and PRG (state register of borders and areas of the country's territorial division units). The reference database used in the Information System on Broadband Infrastructure (SIIS), upon consolidation of the state registers, contained 7,816,762 addresses in the country. The database, named Address Points Database, is made available to the public in the SIIS system's 'Help' tab.

The reporting entities are liable for the accuracy of the data they provide. Pursuant to Article 29(2) of the 7 May 2010 *on supporting the development of telecommunications services and networks* (Polish Journal of Laws of 2017, item 2062), in the course of the inventory entities are required to provide updated, factually correct, complete and inventory-adequate information.

It should be noted that in line with the Ordinance of the Minister of Administration and Digitisation of 24 February 2014 *on telecommunications infrastructure and services inventory* (Polish Journal of Laws, item 276), there is no discretion as to indicating the addresses. Exceptions are made in the following situations:

– a given locality has a street that is not included in TERYT – if this is the case, the person completing the form should indicate the street's name to their best knowledge;

– a building or a structure has no unique number assigned – if this is the case, it is not obligatory to provide the number.

However, the Ordinance does not provide for the possibility

of reporting address points that are not included in the said reference databases in situations other than those mentioned above.

UKE ran an overall analysis of the addresses, which revealed potential inconsistencies as regards address points indicated by certain entities in the course of inventories carried out in the SIIS.

Therefore, during this year's inventory, UKE asked the reporting entities to verify the factual accuracy of the network termination address points. In particular, verification was required to confirm that the address points indicated in the SIIS but not included in the available address database actually existed.

Identification of inconsistencies in the addresses provided by entities has been facilitated by the implementation of a function of data validation in the SIIS based on specified rules. This function generates warnings of a potential inconsistency that appear in the SIIS, indicating the specific data records. In particular, addresses that have not been found in the reference address points database are identified and signalled in the system through Data Validation Rule 11 "Address point not matched in the reference database" (code 811).

Where an address point does not appear in the reference database, but according to the best knowledge of the reporting person this is a correct address in Poland, we recommended verification of the address and asked for a confirmation via the SIIS.

There were several ways in which an entity was able to confirm the existence of an address unmatched in the database:

– attaching a photo of the property with a clear indication of the number on the plaque located on the fencing or building;

– attaching a certification from the municipality on the building's unique number;

– attaching screen shots of two independent map services,

such as maps.google.com or mapa.targeo.pl, provided that once entered, the searched address point directly hits the building, not an empty, non-developed area or a middle of a road.

In total, in the 2019 inventory, entities reported nearly 42 million network terminations, of which approx. 8 million were unique address network terminations. Data validation rules in the SIIS identified a total of just over 1 million addresses unmatched in the reference database indicated by 1,355 entities, as flagged by the same number of warnings generated under Rule 11. Following verification processes of the data collected, approx. 450,000 unique addresses unmatched in the reference databases were found.

It should be noted that nearly a half (slightly over 600) of entities that received the Rule 11 warning provided a maximum of 10 addresses unmatched in the reference database. For another 526 entities, inconsistencies were found regarding 11 to 100 addresses. 5 entities received well above 10,000 alerts on unmatched addresses. For these entities, in total, the SIIS generated approx. 86% of all unmatched address alerts. CHART 1 presents the number of entities for which the SIIS generated alerts on addresses unmatched in the reference database by the number of such warnings per entity.

32 entities carried out the address analysis as recommended by UKE, providing verification documents for a total of 1,302 addresses. A majority chose to confirm the existence of their addresses by attaching screen shots of maps with an indication of these address points.

The addresses provided in the documents were aligned and, as agreed following a preliminary examination, they will be forwarded to the Head Office of Geodesy and Cartography in order to verify potential inconsistencies and missing data in the state registers. In justified cases, following the analysis of the individual addresses and their entry on the municipal registers of localities, streets and addresses, they will be entered on the registers. This will ensure that the data in the National Register of Boundaries is complete.

As part of its effort to continue verification of the addresses reported in 2020 that raise doubts as to the accuracy of the data provided, UKE intends to contact some of the entities in writing in order to clarify the inconsistencies in relation to the reference address database.

CHART 1. **NUMBER OF ENTITIES WITH THE "ADDRESS POINT NOT MATCHED IN THE REFERENCE DATABASE" ALERT BY THE NUMBER OF SUCH WARNINGS**
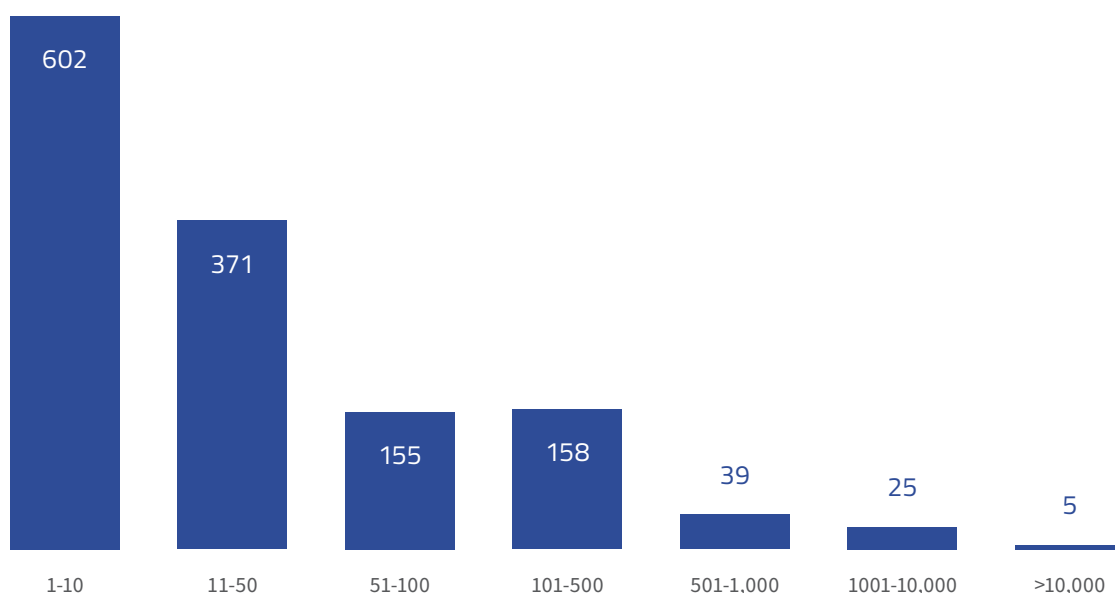
1-10	11-50	51-100	101-500	501-1,000	1001-10,000	>10,000
602	371	155	158	39	25	5

Source: UKE

ANALYSIS OF UNINHABITED LOCALITIES

As regards the task of the President of the Office of Electronic Communications (UKE) to determine areas within the coverage of internet access networks, attention was drawn to the issue of uninhabited localities, including undeveloped localities or localities whose names have been out of use. Such localities, which in fact could be considered non-existent, are still placed on the List of official names of localities and their parts, and consequently in the National Official Register of the Territorial Division of the Country (TERYT) reflecting this List.

Based on UKE's analysis (verification of the data on the System of identifiers and localities names from the TERYT register against the list of dwelling addresses in the System for address identification of streets, real estates, buildings and dwellings (NOBC/TERYT)), 3,423 localities without dwelling addresses where found. These included mainly colonies and forest settlements.

From 3 October 2019 to 14 November 2019, UKE sent letters to 1,149 municipalities (including 798 rural municipalities and 351 urban-rural municipalities) where the said abnormalities were observed, asking them to analyse the cases and, where appropriate, take actions to abolish the names that had been out of use.

The letters were informative and did not require replies. However, based on the replies received, part of the municipalities had already attempted to abolish the names of uninhabited municipalities in the past, but eventually this did not materialize, due to the historical and cultural features of these names.

Yet replies from several dozen municipalities confirmed the identified irregularities with a declaration to take the necessary steps to abolish such names.

Since the letters were sent in Q3 2019, and as the process to abolish names is time-consuming (an official name is established, changed or abolished upon request of the Municipality Council in which the locality or physiographic object is located; the request is then forwarded via Voivode to the Minister competent for administration), any changes to the List – should there be grounds for abolishing a locality name – can be expected at the end of 2020.

MAP 1. **UNINHABITED LOCALITIES**

Share of uninhabited localities in a region

- 5.51 – 5.88
- 4.01 – 5.50
- 2.51 – 4.00
- 1.01 – 2.50
- 0.65 – 1.00
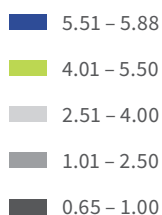
Source: UKE
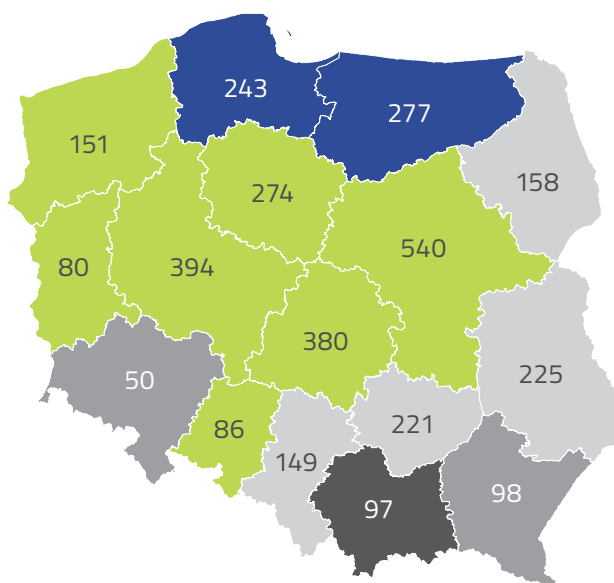
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