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Office of Electronic Communications

Department of Strategy and Telecommunications Market Analysis

BROADBAND SERVICES AVAILABILITY INDEX (BSAI) POLISH CASE STUDY

Budva, September 2015



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2. Broadband Services Availability Index (BSAI) definition
3. Data analysis and calculation based on Broadband Services Availability Index
4. Broadband Services Availability Index components and results and conclusions for Poland



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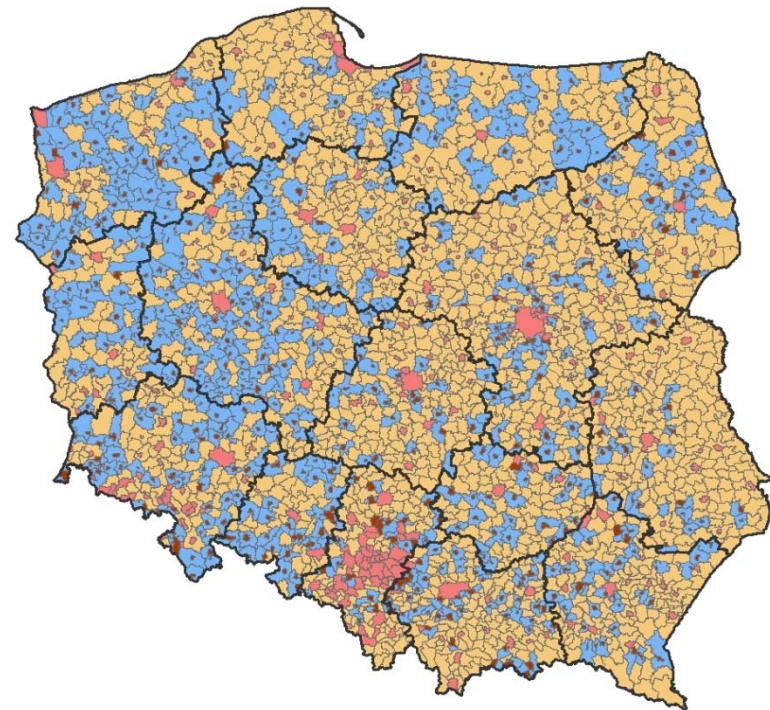
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ADMINISTRATIVE ORGANIZATION OF POLAND

Polish Administrative divisions:

- Voivodeships (16)
- Counties (370)
- Municipalities (2479) divided into:
 - Urban municipalities (305)
 - Rural municipalities (1566)
 - Urban-rural municipalities (608)
- Commune areas (3087) which include:
 - Urban municipalities (305)
 - Rural municipalities (1566)
 - Cities in urban-rural municipalities (608)
 - Rural areas in urban-rural municipalities (608)





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BROADBAND DEVELOPMENT IN POLAND

Situation

- High-speed Internet access networks are already available in dense urban areas, while there are vast rural areas with no progress and prospects for broadband improvement on commercial terms
- Complete Inventories of Broadband Infrastructure and Services with address point precision have been conducted annually since 2011
- The National Broadband Plan, which aims to provide 30 Mbps and 100 Mbps infrastructure was published in 2014
- National broadband development program POPC includes EUR 1 billion subsidies

With all the above-mentioned in place, we needed a tool and unique composite index to:

- Monitor the progress of infrastructure and services development
- Rank the regions by:
 - broadband development progress,
 - infrastructure and services development,
 - broadband infrastructure availability distribution inequality
- Identify the underdeveloped areas within all regions and measure distribution inequality level



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BROADBAND SERVICES AVAILABILITY INDEX

- **Broadband Infrastructure Reachability Indicator**
- **Broadband Services Penetration Indicator**
- **Broadband Infrastructure Competition Indicator**
- **Balanced Infrastructure Availability Index**

A large, vibrant red circle with a slight gradient and shadow, containing the white text "BSAI" in a bold, sans-serif font.

BSAI



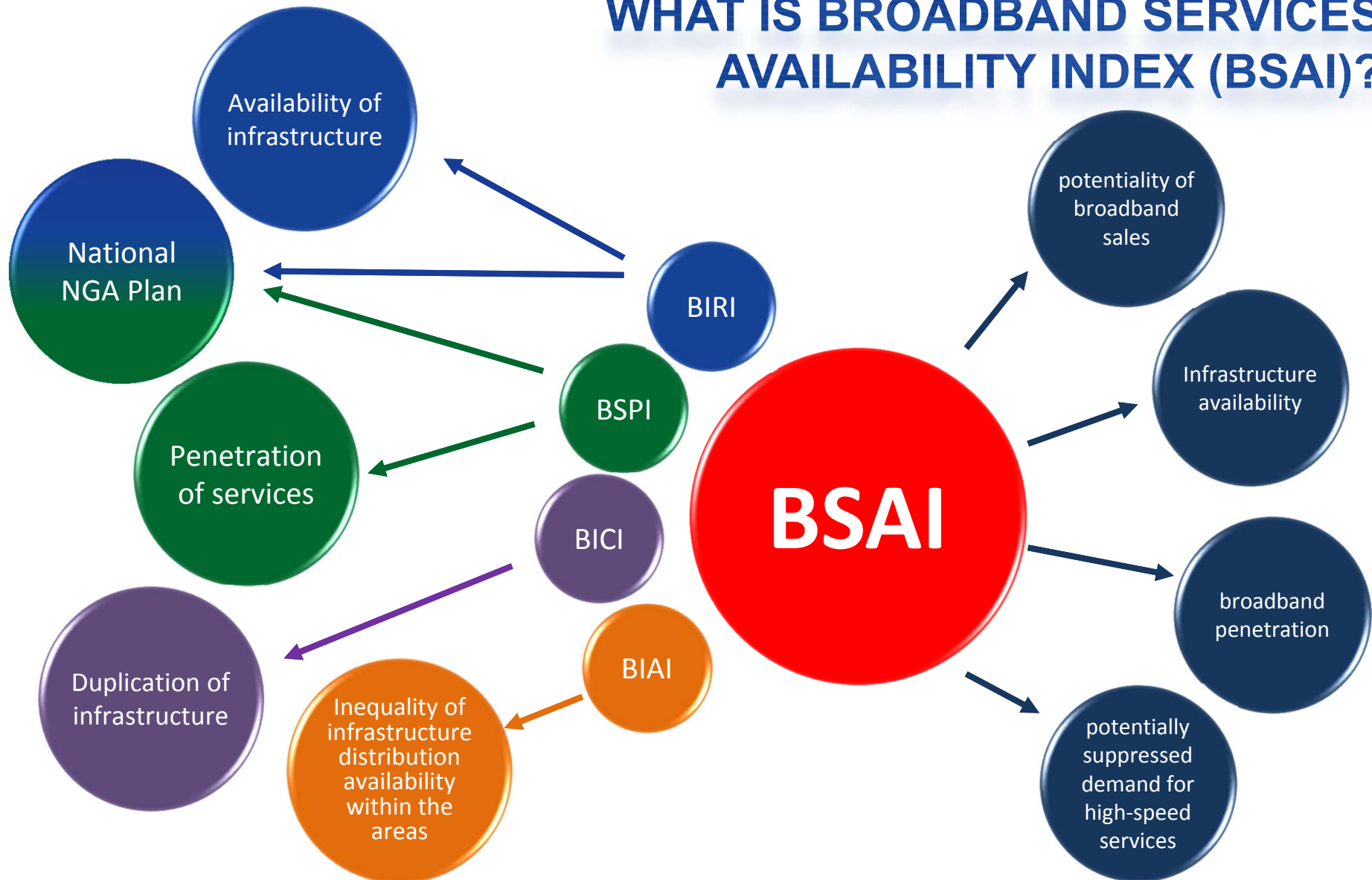
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BSAI

WHAT IS BROADBAND SERVICES AVAILABILITY INDEX (BSAI)?





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A red circular logo with the white text "BSAI" inside.

BSAI

ROADMAP FOR THE BSAI CALCULATIONS

- Data was collected and processed in the Information System on Broadband Infrastructure (SIIS) with an accuracy of each single residential building in Poland.
- Data validation, data cleansing and geocoding is a key factor to reach high quality data and high quality analysis results
- This made it possible to perform all calculations for each data set at any required data aggregation level.
- BSAI basic level of calculation was established at the commune area level.
- Exceptionally, calculations of BIAI Indicator were performed at the level of census enumeration area and then aggregated to commune areas.



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WHAT IS BROADBAND SERVICES AVAILABILITY INDEX (BSAI)?

- Each of the four components affects the BSAI Index with equal strength of 25%
- Indicators are designated for each commune area with regard to the bandwidth equal to or greater than:
 - 2 Mbps,
 - 30 Mbps,
 - 100 Mbps
- Detailed information allows for data analysis to be conducted at various administrative levels such as:
 - voivodeships,
 - counties,
 - municipalities
- Collected data concerns:
 - 3 173 providers,
 - over 3 000 commune areas,
 - more than 180 000 census enumeration areas,
 - over 6 million addresses points,
 - more than 13 million dwellings



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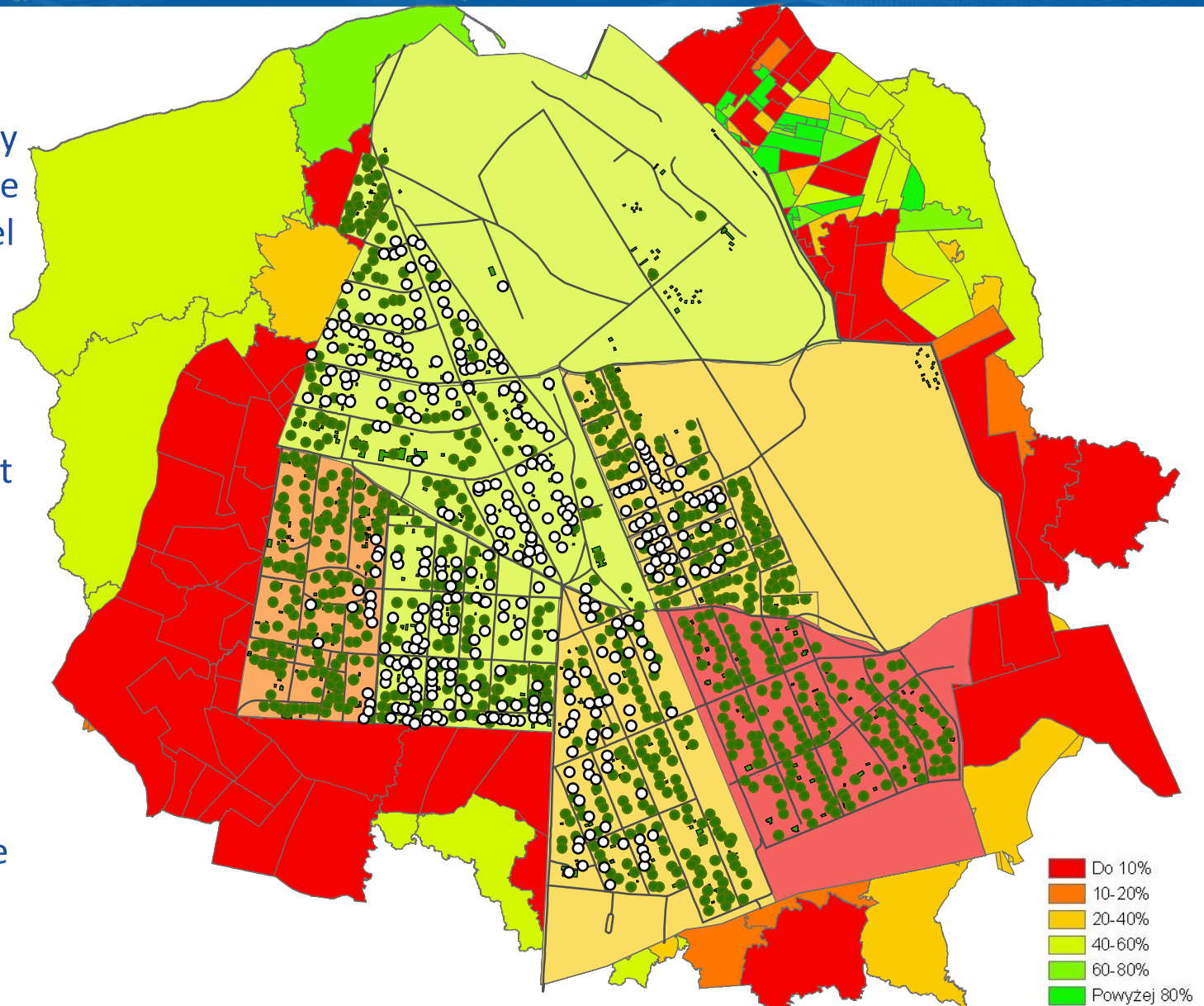
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Thanks to the inventory we possess very precise information at the level of particular address points

Data aggregation level has a significant impact on results of the performed analysis

Drill down analysis allows to rank regions with unequally distributed broadband infrastructure with one single indicator.





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Broadband Infrastructure Reachability Indicator

- **Goal**
 - To ascertain infrastructure availability per dwelling in the analysed area
- **Definition**
 - Technical capability to provide broadband services depends on the operator's infrastructure presence in a given residential building
 - For the purpose of this indicator it has been assumed that all the dwellings in residential buildings have access to broadband infrastructure, if at least one provider reports fixed network coverage at given postal address
- **Calculation**
 - The ratio is the number of dwellings in residential buildings which have access to fixed broadband infrastructure against the total number of dwellings in particular commune areas



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Broadband Infrastructure Reachability Indicator

Voivodeships level

≥ 2 Mbps



≥ 30 Mbps



≥ 100 Mbps



BIRI for Voivodeships areas

	2 Mbps	30 Mbps	100 Mbps
Highest value	0,9145	0,6490	0,6444
Average	0,8131	0,5098	0,4970
Lowest value	0,6665	0,3425	0,3239





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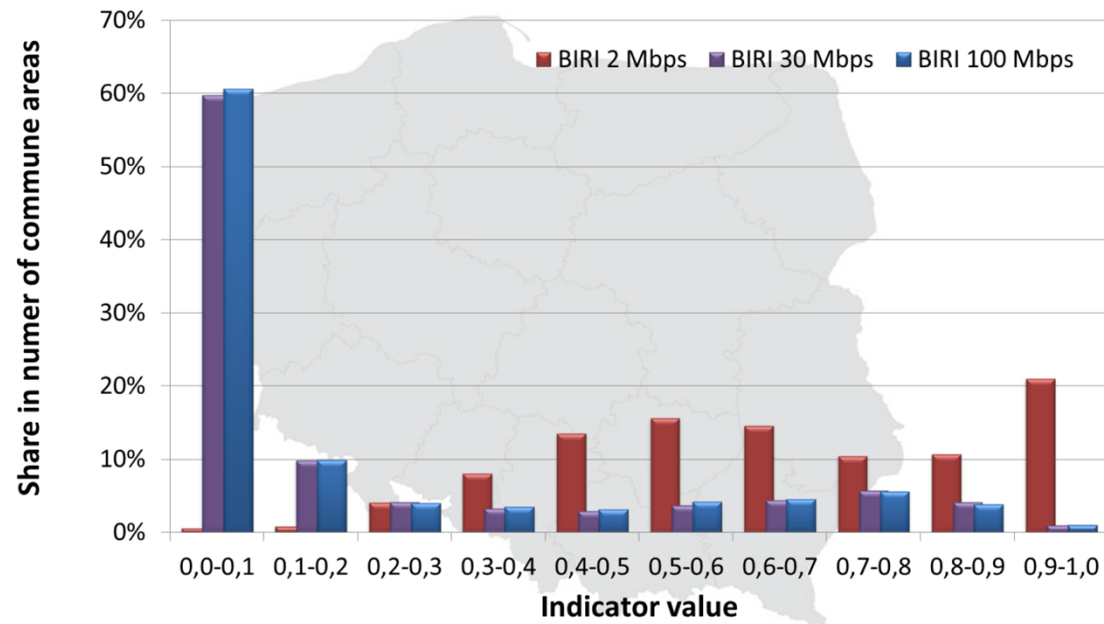
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Broadband Infrastructure Reachability Indicator



BIRI for Commune areas

	2 Mbps	30 Mbps	100 Mbps
Highest value	0,9963	0,9889	0,9889
Average	0,6538	0,1999	0,1936
Lowest value	0,0000	0,0000	0,0000



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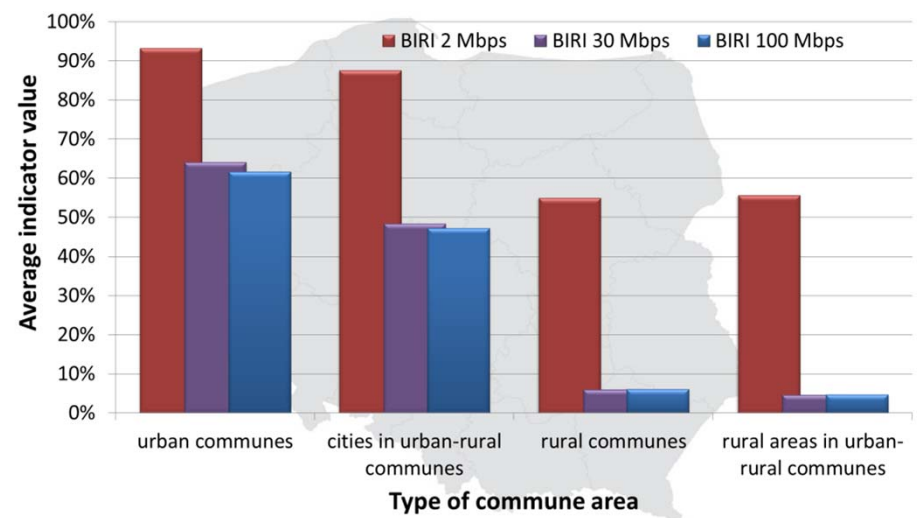
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Broadband Infrastructure Reachability Indicator

Average Indicator values for different type of commune areas

	2 Mbps	30 Mbps	100 Mbps
GLOBAL AVERAGE	0,8131	0,1999	0,1939
Average for:			
urban communes	0,9330	0,6403	0,6167
cities in urban-rural communes	0,8765	0,4845	0,4716
rural communes	0,5504	0,0625	0,0604
rural areas in urban-rural communes	0,5572	0,0483	0,0462





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Broadband Services Penetration Indicator

- **Goal**
 - To determine the degree of broadband services penetration in the analyzed area
- **Definition**
 - Indicator has been defined in order to rank commune areas in terms of broadband services penetration
 - The number of broadband services in a residential building cannot be higher than the number of dwellings in that building
- **Calculation**
 - The ratio is the amount of broadband services utilized in residential buildings (capped to the number of the dwellings) to the total number of dwellings in the analyzed area



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Broadband Services Penetration Indicator

Voivodeships level

≥ 2 Mbps



≥ 30 Mbps



≥ 100 Mbps



BSPI for Voivodeships areas

	2 Mbps	30 Mbps	100 Mbps
Highest value	0,4281	0,1454	0,0236
Average	0,3528	0,0688	0,0073
Lowest value	0,2678	0,0203	0,0001





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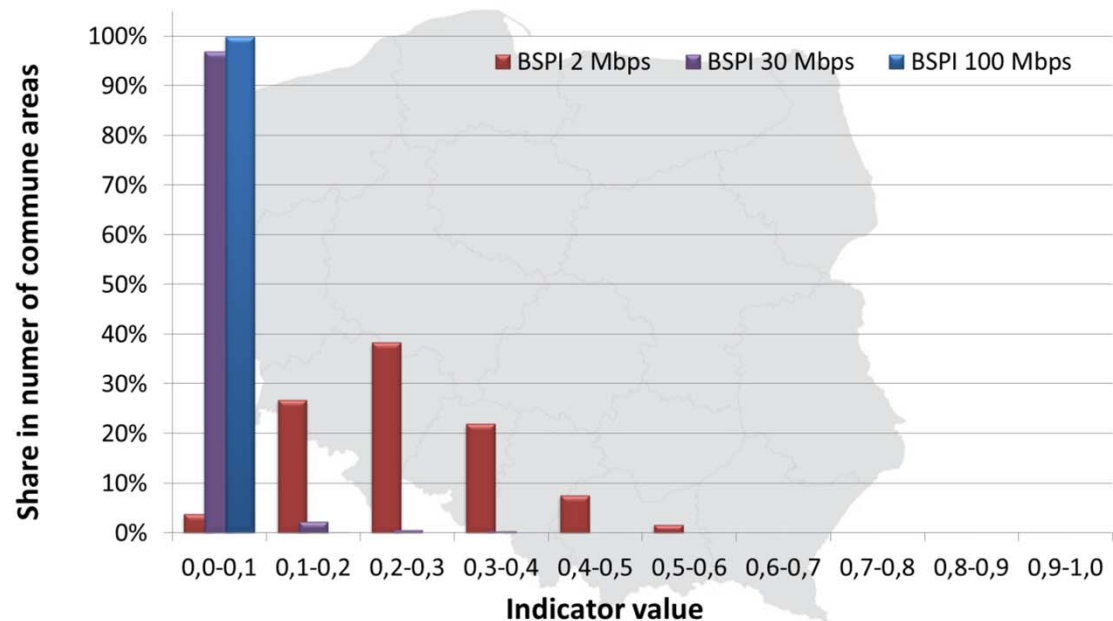
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BAI

Broadband Services Penetration Indicator



BSPI for Commune areas

	2 Mbps	30 Mbps	100 Mbps
Highest value	0,6590	0,3587	0,1592
Average	0,2577	0,0137	0,0012
Lowest value	0,0005	0,0000	0,0000



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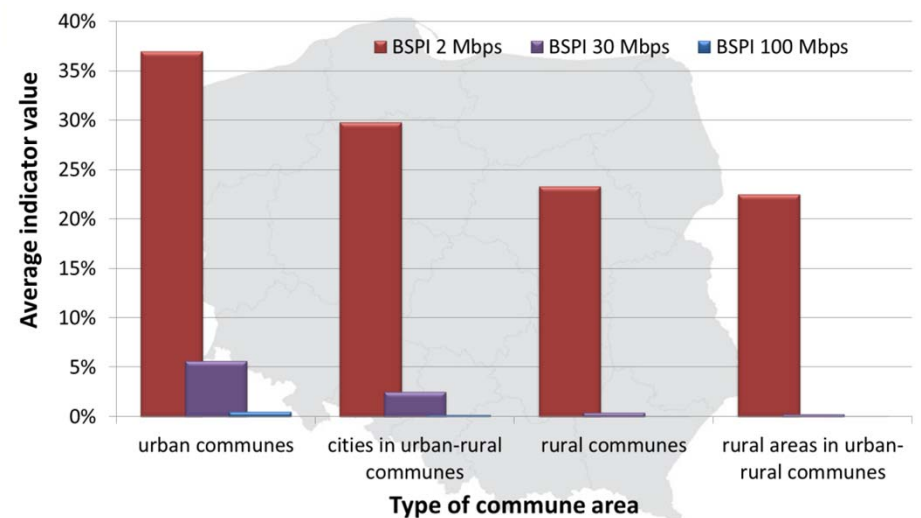
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BIAI

Broadband Services Penetration Indicator

Average Indicator values for different type of commune areas

	2 Mbps	30 Mbps	100 Mbps
GLOBAL AVERAGE	0,2577	0,0137	0,0012
Average for:			
urban communes	0,3696	0,0566	0,0049
cities in urban-rural communes	0,2976	0,0258	0,0018
rural communes	0,2331	0,0046	0,0005
rural areas in urban-rural communes	0,2251	0,0034	0,0006





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Broadband Infrastructure Competition Indicator

- **Goal**

- To ascertain commune areas of independent broadband infrastructure per dwelling in the analyzed area

- **Definition**

- The availability of at least two different and independent broadband infrastructures within a residential building
- Wholesale services (BSA, WLR, LLU) are excluded from the Indicator

- **Calculation**

- The ratio is the number of dwellings that have access to at least two independent broadband network infrastructures against the number of dwellings with access to broadband infrastructure with a declared level of bandwidth (BS - Broadband Speed) equal to or greater than 2 Mbps in residential buildings of the analyzed area



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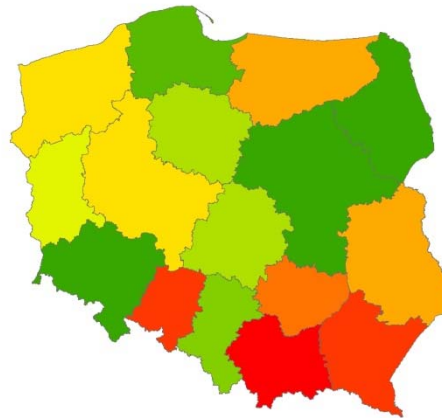
BAI

Broadband Infrastructure Competition Indicator

Voivodeships level
 ≥ 2 Mbps



≥ 30 Mbps



≥ 100 Mbps



BSPI for Voivodeships areas

	2 Mbps	30 Mbps	100 Mbps
Highest value	0,6703	0,4210	0,4143
Average	0,5275	0,3380	0,3136
Lowest value	0,4009	0,2616	0,2337





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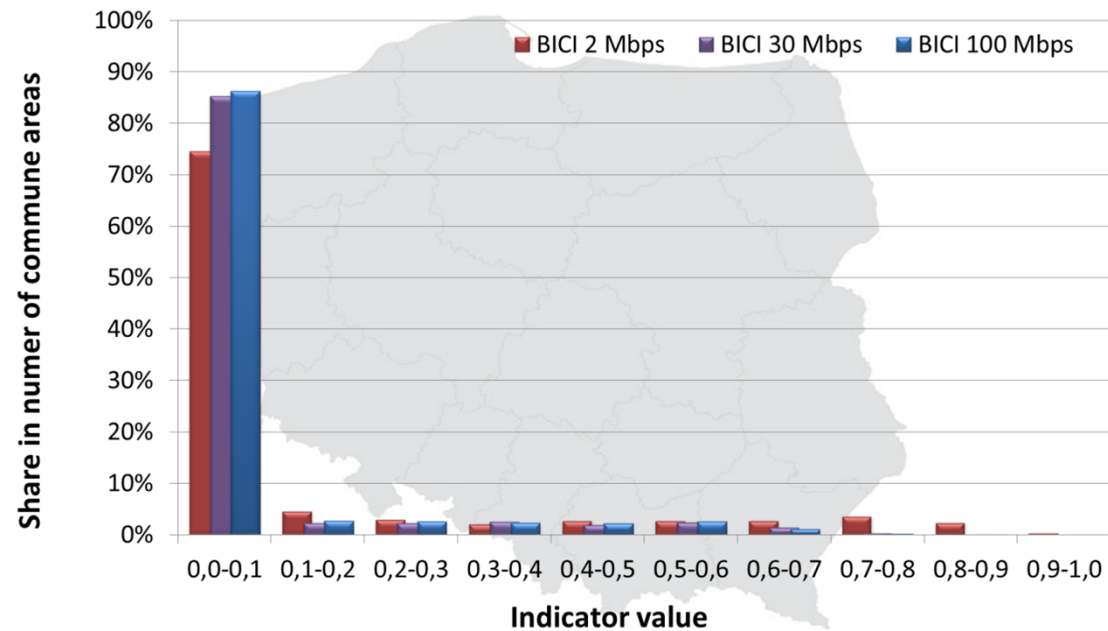
BIRI

BSPI

BICI

BAI

Broadband Infrastructure Competition Indicator



BICI for Commune areas

	2 Mbps	30 Mbps	100 Mbps
Highest value	0,9774	0,8950	0,8719
Average	0,1295	0,0609	0,0541
Lowest value	0,0000	0,0000	0,0000



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BIRI

BSPI

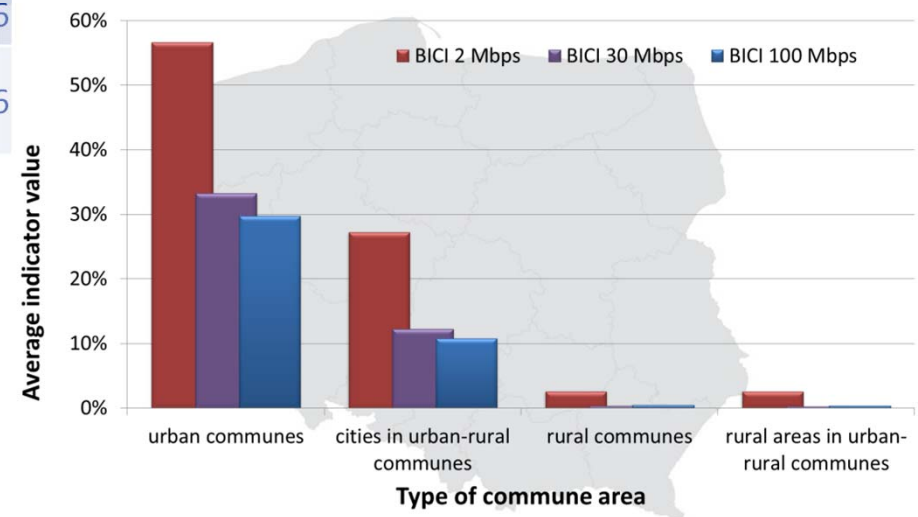
BICI

BAI

Broadband Infrastructure Competition Indicator

Average Indicator values for different type of commune areas

	2 Mbps	30 Mbps	100 Mbps
GLOBAL AVERAGE	0,1295	0,0609	0,0541
Average for:			
urban communes	0,5668	0,3328	0,2975
cities in urban-rural communes	0,2730	0,1234	0,1078
rural communes	0,0269	0,0050	0,0046
rural areas in urban-rural communes	0,0267	0,0037	0,0036





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Balanced Infrastructure Availability Index

- **Goal**

- Indicator has been defined in order to rank commune areas in terms of broadband infrastructure availability distribution equality as areas with similar Broadband Infrastructure Reachability Indicator (BIRI) may have significantly different infrastructure equality proliferation.

- **Definition**

- Indicator is based on a series of data on broadband infrastructure availability to the level of individual census enumeration areas for the researched municipal area and it is determined with the use of second-order stochastic dominance methodology

- **Calculation**

- Indicator accepts the maximum value, which is equal to the value of the Broadband Infrastructure Reachability Indicator (BIRI)
- Any higher value of the Indicator is preferred, as it indicates greater availability and even wider distribution in the analysed area



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BICI

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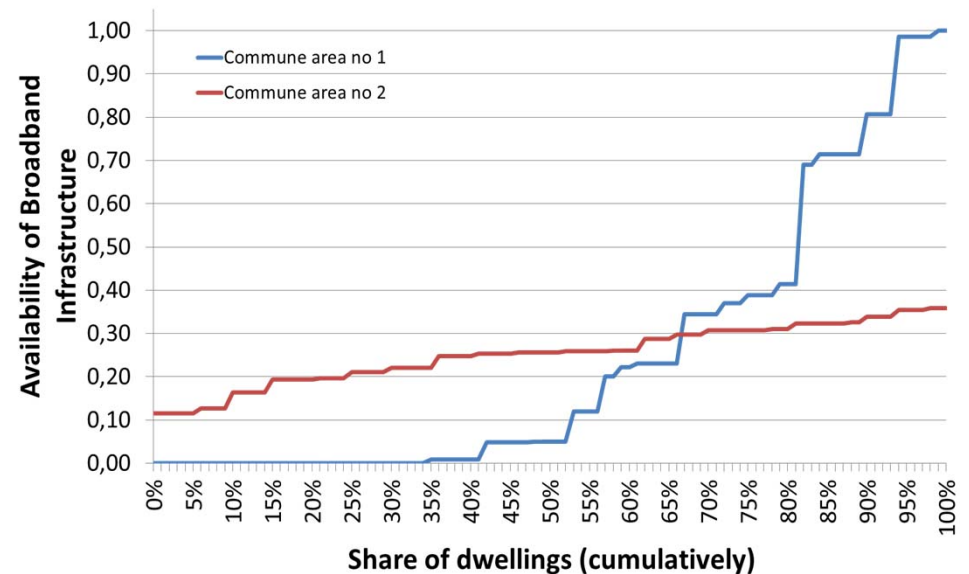
Balanced Infrastructure Availability Index

Example of distribution infrastructure availability

Both commune areas have similar BIRI rates about 25% but they differ BIAI. For the bandwidth equal to or greater than 2 Mbps, in commune area No. 1 BIAI reached 0.0835 while in commune area No.2 - 0.2029.

In the commune area No. 1 we have to deal with more diverse distribution of broadband infrastructure availability than in the commune area No. 2.

Despite of similar BIRI results in both commune areas, higher rated is commune area No. 2 regarding the inequality of infrastructure distribution availability .





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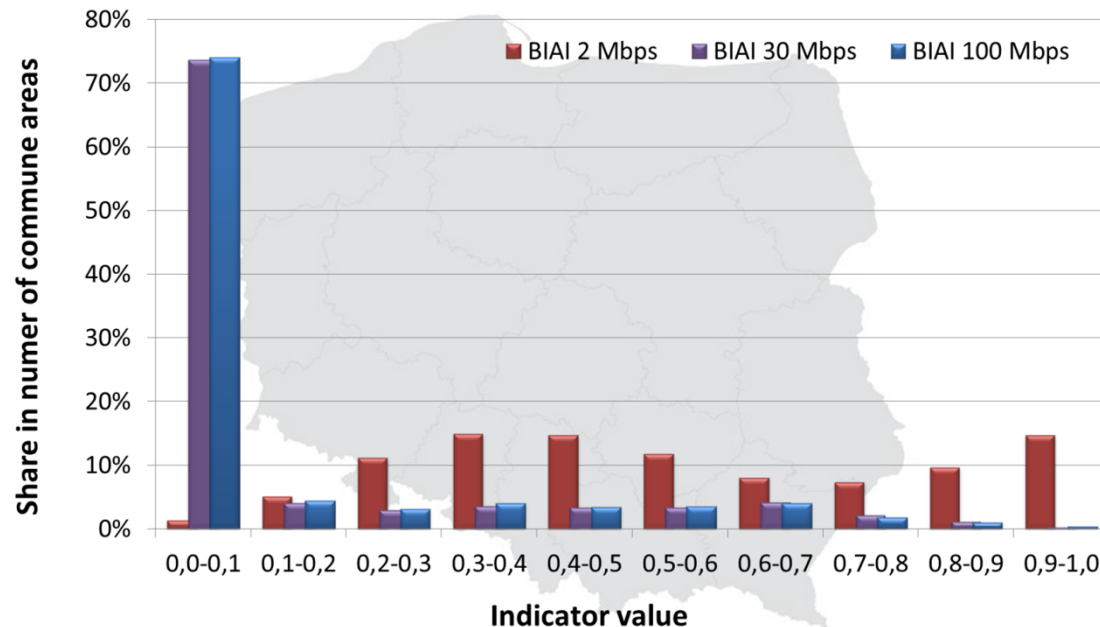
BIRI

BSPI

BICI

BIAI

Balanced Infrastructure Availability Index



BIAI for Commune areas

	2 Mbps	30 Mbps	100 Mbps
Highest value	0,9929	0,9787	0,9787
Average	0,5540	0,1282	0,1223
Lowest value	0,0000	0,0000	0,0000



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BIRI

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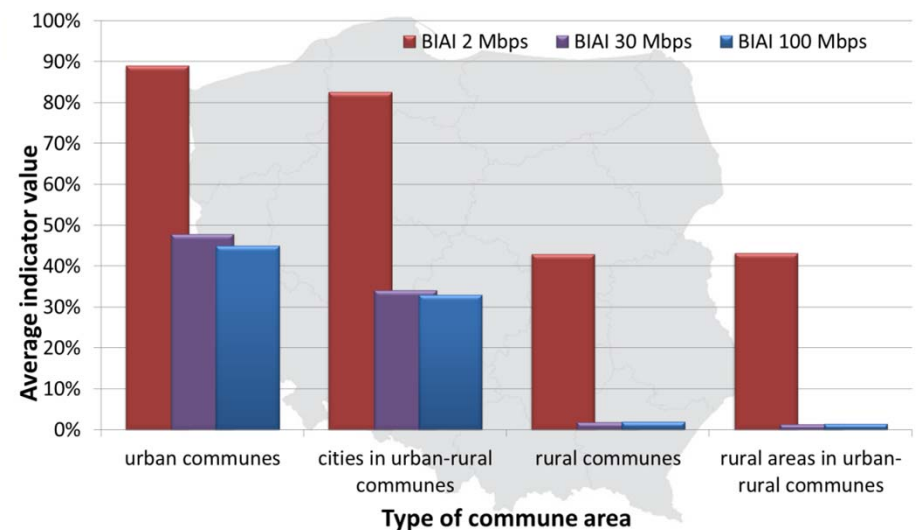
BICI

BAI

Balanced Infrastructure Availability Index

Average Indicator values for different type of commune areas

	2 Mbps	30 Mbps	100 Mbps
GLOBAL AVERAGE	0,5540	0,1282	0,1223
Average for:			
urban communes	0,8895	0,4789	0,4503
cities in urban-rural communes	0,8257	0,3428	0,3301
rural communes	0,4299	0,0204	0,0196
rural areas in urban-rural communes	0,4333	0,0155	0,0148





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Broadband Services Availability Index

- **Goal**

- Enabling comparisons between broadband service availability of analyzed selected areas of Poland using a single composite indicator that takes into account several key elements affecting the level of broadband availability

- **Definition**

- Indicator has been defined in order to measure availability of broadband infrastructure and services for consumers in their dwellings

- **Calculation**

- Indicator is based on normalized results of 4 sub-Indicators
- Normalization
 - Comparison of the components for the analyzed area with results of other commune areas,
 - Establishing position of the sub-index against the other sub-indexes calculated for the remaining commune areas in Poland
- BSAI rate was determined for an individual commune area, for each selected capacity as the sum of normalized sub-indexes



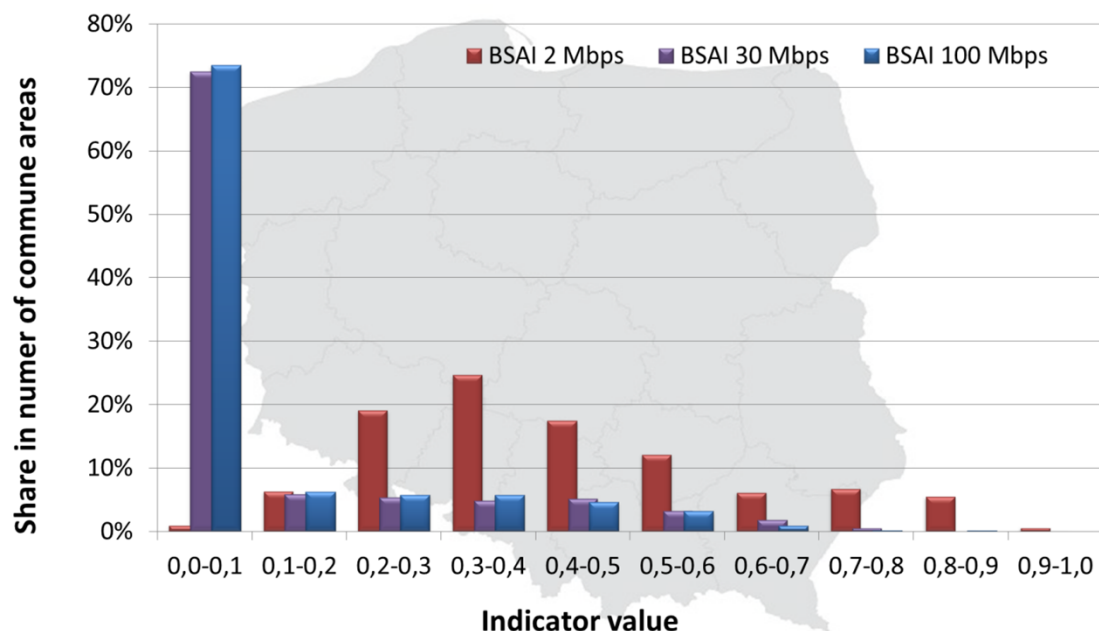
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BSAI

Broadband Services Availability Index



BSAI for Commune areas

	2 Mbps	30 Mbps	100 Mbps
Highest value	0,9806	0,9186	0,8056
Average	0,4341	0,1097	0,0974
Lowest value	0,0005	0,0000	0,0000



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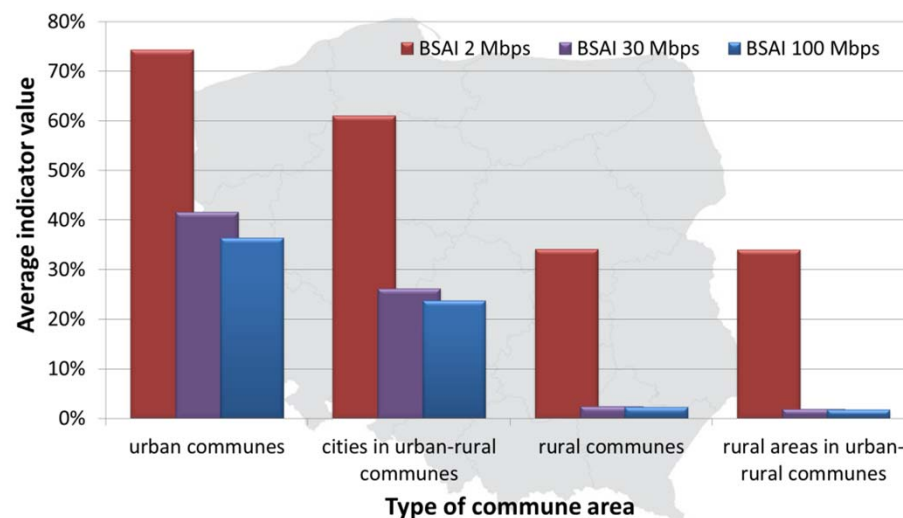
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BSAI

Broadband Services Availability Index

Average Indicator values for different type of commune areas

	2 Mbps	30 Mbps	100 Mbps
GLOBAL AVERAGE	0,4341	0,1097	0,0974
Average for:			
urban communes	0,7432	0,4166	0,3639
cities in urban-rural communes	0,6105	0,2625	0,2372
rural communes	0,3415	0,0256	0,0223
rural areas in urban-rural communes	0,3410	0,0196	0,0174





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THANK YOU!

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