



THE REPUBLIC OF SLOVENIA

# THE NEXT- GENERATION BROADBAND NETWORK DEVELOPMENT PLAN TO 2020

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ACCESS TO HIGH-SPEED INTERNET FOR ALL



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DIGITAL  
SLOVENIA

**Document Information**

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## 1 Purpose of the document

The Next-Generation Broadband Network Development Plan to 2020 (hereinafter: the NGN Development Plan–2020) is a strategic document that lays down strategic guidelines for the development of the broadband network. By this document, Slovenia pursues one of the strategic goals set in DIGITAL SLOVENIA 2020 – an umbrella Development Strategy for the Information Society by 2020, i.e. to provide high-speed access to the Internet to all households in Slovenia by 2020. Given the low population density and dispersed settlement of rural areas, the limitations of the available technologies and the associated costs attributable to broadband infrastructure deployment, as much as 96% of households are to be provided access to broadband at a speed of at least 100 Mbps, whereas all other citizens are to be provided broadband speed of not less than 30 Mbps. The document pursues and upgrades the goals set in the 2008 *Broadband Network Development Strategy in the Republic of Slovenia*<sup>1</sup>.

*The Partnership Agreement with Slovenia for the period 2014–2020*<sup>2</sup> was approved by the European Commission on 30 October 2014, and the *Operational Programme for the Implementation of the EU Cohesion Policy for the period 2014–2020*<sup>3</sup> on 15 December 2014. The two documents identify priority investments that are to receive Slovenia's development funds in the next development period until 2020. The funds will primarily be directed towards four key areas that will generate economic growth and create new jobs, namely:

- research and innovation;
- information and communications technologies;
- enhancing the competitiveness of SMEs;
- supporting the shift towards a low-carbon economy.

The NGN Development Plan–2020 follows the EU 2020 strategy and the Digital Agenda for Europe (DGA). It sets strategic objectives for broadband infrastructure and a strategic basis for the use of the funds available from the European Regional Development Fund (ERDF) and the European Agricultural Fund for Rural Development (EAFRD). Within the framework of Priority Axis 2 – *Enhancing access to, and use and quality of, Information and Communications Technology*, the ERDF funds allocated to Slovenia will be used to co-finance the deployment of broadband infrastructure with a view to providing high-speed Internet access and supporting the adoption of emerging technologies and networks for the digital economy. The *ex-ante* conditionality requires the development of a national NGN Plan that takes account of measures to reach the high-speed Internet access targets, focusing on areas where the market fails to provide an open infrastructure at an affordable cost and of a quality in line with the EU competition and State aid rules.

On 13 February 2015, the European Commission approved Slovenia's Rural Development Programme for the period 2014–2020<sup>4</sup>, which is a joint programme document representing a basis for the absorption of the EAFRD funds. The measure under Focus Area 6C – Enhancing the accessibility, use and quality of information and communication technologies (ICT) in rural areas – will improve the access of the rural population to broadband Internet connections. The aim is to support investments in the broadband

electronic communications network, thus providing the rural population and households access to the information and services provided by the Internet.

The development of the broadband infrastructure entails substantial investments that can only be financed through the mobilisation of private capital. At the end of 2014, the European Commission published *An Investment Plan for Europe*<sup>5</sup>, with a view to making it easier for investors to obtain funds. The Investment Plan is based on three sets of measures:

- measures to mobilise at least EUR 315 billion in additional investment by the end of 2017, thus maximising the impact of public resources and unlocking private investment;
- targeted initiatives to ensure that this extra investment meets the needs of the real economy; and
- measures to provide greater regulatory predictability and to remove barriers to investment, making Europe more attractive and thereby multiplying the impact of the Investment Plan.

In the context of this plan, Member States should commit to significantly increasing their use of innovative financial instruments in key investment areas such as SME support, energy efficiency, information and communication technology, transport and R&D support. This would achieve at least an overall doubling of the use of financial instruments under the European Structural and Investment Funds for the programming period from 2014 to 2020. In line with the Investment Plan, the digital single market should be opened to new business models, while ensuring that essential public interest objectives are met. Consumers should be given unhindered access to online content and services across Europe without discrimination based on their nationality or place of residence.

The NGN Development Plan–2020 is a strategic document of the Republic of Slovenia for broadband infrastructure deployment that will provide high-speed Internet access and will not be a bottleneck as regards the free movement of digital content and services for at least the next two decades. It also forms a basis for the allocation of cohesion policy funds in the period 2014–2020 (from the ERDF and EAFRD) and other public funds in this area. The approval of this document satisfies the criterion of the *ex-ante* conditionality for the deployment of broadband infrastructures in white areas.

## 2 Introduction

Modern global development trends pose a challenge for the creation of a knowledge-based society that is based on universal use of information and communication technology (ICT) in all areas of social life. To this end, it is essential to develop electronic communication services and deploy a high-performance electronic communications network infrastructure that will enable unhindered access to these services.

Currently, at the end of the 20<sup>th</sup> century and the beginning of the 21<sup>st</sup> century, the Internet has penetrated into practically all activities and encompassed all spheres of human life. By providing easy access to a wide range of topics and services, it fundamentally changes the way in which our modern society functions. The functioning and use of the Internet largely depend on the electronic communications infrastructure that provides broadband Internet access and is increasingly considered of vital importance, along with the water supply, electricity and transport infrastructures.

Broadband Internet access brings positive social and economic impacts for the country and its citizens. It enables balanced development throughout the state territory, reduces the digital divide and increases the involvement of individuals in contemporary social movements. It thus creates new opportunities in all areas of private and public life – learning, employment, access to information and public services, access to a range of topics and social networks; it increases productivity, creates innovative business models, products and services, and establishes efficient communication.

Consequently, broadband infrastructure that provides access to the Internet is one of the key factors for economic and social development and its deployment is strongly in the public interest.

European strategic documents underline that Europe needs widely available and competitively-priced fast and ultra-fast broadband Internet access. The Europe 2020 Strategy draws attention to the importance of broadband deployment to promote social inclusion and competitiveness in the EU. The Digital Agenda for Europe<sup>6</sup> makes proposals for actions that need to be taken to get Europe on track for smart, sustainable and inclusive growth. One of the key actions is "fast and ultra-fast Internet access". The future economy will thus be a knowledge-based economy with ultra-fast Internet service.

To this end, the EU has set two essential targets to be achieved by 2020: (i) that all EU citizens have access to broadband speeds of above 30 Mbps and (ii) at least 50% of European households subscribe to Internet connections above 100 Mbps.

To reach these targets, Member States should:

- develop national broadband plans that meet the coverage, speed and take-up targets defined in the Europe 2020 strategy;
- adopt measures, including legal provisions, to facilitate broadband investment, such as avoiding multiple spatial interventions, making joint investments in other community infrastructure projects, encouraging passive infrastructure sharing in the deployment of electronic communications networks, upgrading in-building wiring;
- fully use the Structural and Rural Development Funds that are already earmarked for investment in ICT infrastructures and services; and
- implement the European Spectrum Policy Programme so as to ensure the coordinated allocation of the spectrum needed to meet the target of 100% coverage with 30 Mbps Internet by 2020 where it is not possible to ensure coverage with 100 Mbps by 2020 by means of more reliable technologies.

Following the conclusion of the financial perspective 2007–2013, in which the available structural funds for the deployment of broadband infrastructure in white areas were used, and at the beginning of the new multiannual financial framework for 2014–2020, new strategic guidelines for broadband infrastructure deployment need to be developed. In so doing, the starting position of the European Commission, the current status of broadband infrastructure and electronic communications, the low population density and dispersed settlement of rural areas, the limitations of the available technologies and the associated costs of broadband infrastructure deployment must all be taken into account. The Electronics Communications Act (ZEKom-1) provides a framework of regulatory measures to encourage investment in broadband infrastructure. These measures, however, will be effective if fully implemented and their implementation supervised, which falls under the responsibility of the Agency for

Communication Networks and Services of the Republic of Slovenia (AKOS). Furthermore, stakeholders should be encouraged to look for synergistic effects. The AKOS, tasked with radio spectrum management, has already allocated radio frequencies for mobile communication in the 800 MHz band, which will contribute to the deployment of 4G mobile networks and enable broadband Internet access mainly in the areas where no fixed infrastructure is available, or where such infrastructure is not cost-effective in the first phase, or until the deployment of fixed broadband infrastructure. The relevant conditions and requirements have been included in the procedure for the assignment of radio frequencies. Slovenia's further efforts towards a final solution to broadband Internet access should focus on providing structural and additional integral funds and on drafting the next-generation broadband network development plan (NGN Development Plan) for systematic use of such networks.

The European Commission's guidance on *ex-ante* conditionality (ExAC)<sup>7</sup> in the European Cohesion Policy for 2014–2020 requires the fulfilment of ExAC, i.e. the drawing up and adoption of the national NGN development plan.

An accessible and quality broadband infrastructure is a crucial factor in addressing the economic, social and environmental challenges, contributing substantially to the economic and general development of the modern digital society; thus its deployment is strongly in the public interest.

Investment in quality broadband infrastructure is of vital importance to the development of the Republic of Slovenia should it wish to pursue the goal of developing the Internet/digital society and a digital economy that will generate economic growth. Broadband infrastructure is a core element of the infrastructure of modern society and its development should therefore be considered a national investment priority within the development period up to 2020.

### 3 The socio-economic benefits of broadband networks

Studies on the socio-economic impact of investment in broadband infrastructure have established a strong interdependence between broadband penetration and economic growth, and a positive impact on employment and productivity. According to OECD research, there is a direct correlation between the penetration of broadband services and GDP growth. A 10% increase in broadband penetration raises per capita GDP growth by 0.9-1.5%. In some cases, depending on the structure of the economy, growth has even doubled. Broadband networks in rural areas enable balanced development of the countryside and create a favourable environment for the development of SMEs<sup>8</sup>.

Similar interdependence has also been observed in other studies<sup>9</sup> at both the macroeconomic (national) and microeconomic (household) levels. The main results of the studies can be summarised as follows:

Doubling broadband speeds can lead to an increase in GDP of 0.3 percentage points.

Economic benefits:

- broadband access is a condition for the digitisation of the economy and entrepreneurship;
- it is a basis for the development of the Internet of Things;

- it has a short-term GDP growth effect on account of the deployment of broadband networks;
- it creates new jobs due to the deployment of new infrastructures;
- it increases short-term productivity on account of time savings and improved mobility;
- it increases innovativeness and more advanced types of business due to increased broadband speed leading to:
  - more advanced Internet services;
  - new public services;
  - facilitated teleworking.

#### Social benefits:

- consumer benefits include improved social relations between people regardless of distance, e.g. through social media;
- higher broadband speeds also allow:
  - the provision of improved services, e.g. video sharing;
  - better consumer experience and higher quality of on-line media content and HD transfers;
- improved forms of distance e-learning;
- improved quality of life through e-healthcare services.

#### Environmental benefits:

- improved capabilities as to dealing with larger amounts of digital content online (dematerialization), which results in:
  - enabling video conferences;
  - the reduction of paper consumption;
  - working from home/teleworking;
- new types of computer and network services:
  - the Internet of Things;
  - smart electric grids;
  - smart towns;
  - smart homes.

A study on the socio-economic effects of broadband speed at the microeconomic level has shown that increased Internet speed access has positive effects on households, thus increasing their annual income.

The next-generation broadband networks will enable a high level of Internet use in Slovenia that is comparable to developed countries. Such networks will lead to an improved user experience, the availability of e-services in the public administration (e-government) and health (e-health) sectors regardless of the location of inhabitants, and to the improved quality of mobile e-services as a result of there being a high-capacity backbone infrastructure throughout the entire state territory. Positive effects will also be seen in the increased digital literacy, increased user needs for modern and innovative



Internet services, and the use of the Internet to create new and innovative, collaborative business models.

Fast broadband network speeds will facilitate the development of cloud computing and services based on mass data. Site-specific digital divides will be eliminated or at least reduced. A modern and high-capacity broadband infrastructure will provide a basis for Slovenia to become an exemplary environment for the introduction of innovative approaches in the use of digital technologies in the international context. It will also be an incentive for development-oriented foreign enterprises in Slovenia, which will further contribute to the economic development of the country.

In this context, we should not overlook the impact of broadband infrastructure on improving general access to the digital cultural heritage and historical archives for all inhabitants.

The studies of the socio-economic effects of broadband infrastructure confirm its extremely positive impact on the development of the economy and the entire society.

#### **4 Analysis of the current status of broadband Internet access**

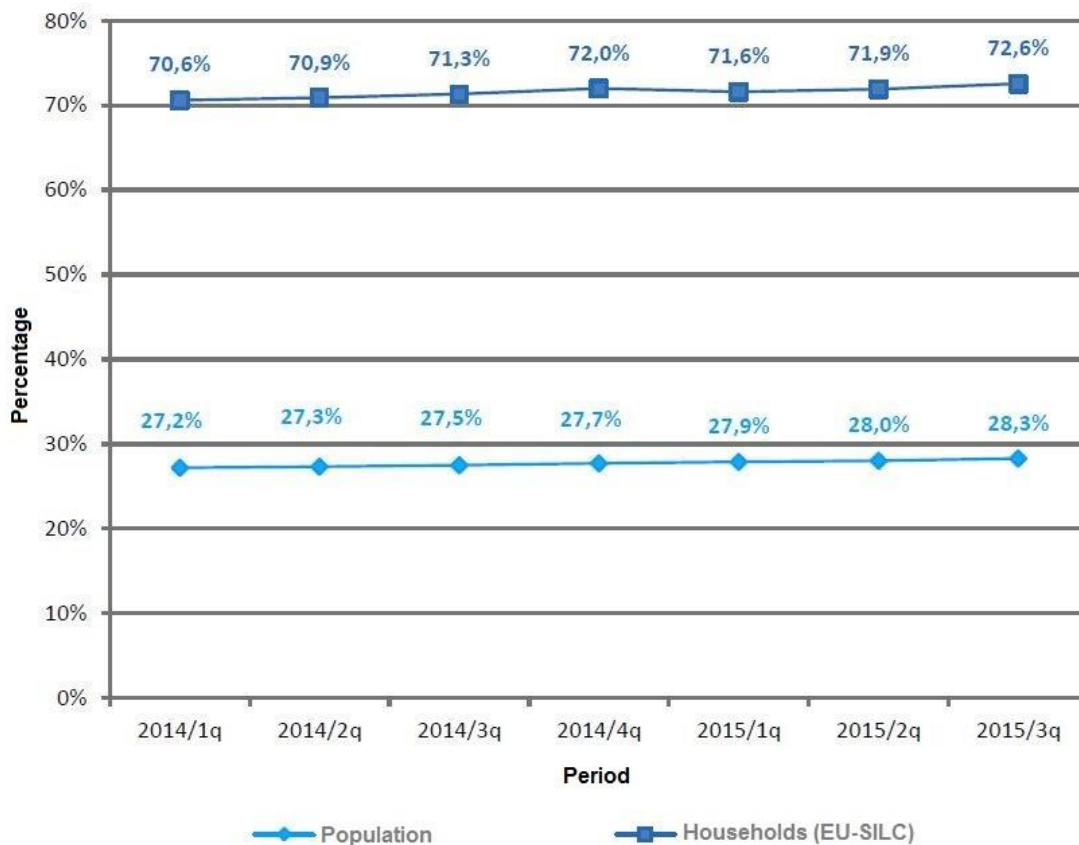
One of the most important indicators reflecting the development of the electronic communications market is the penetration of broadband access, calculated as the number of broadband residence and business subscriptions per 100 inhabitants or households in Slovenia.

According to the data of the Agency for Communication Networks and Services (AKOS), in Q3 of 2015, 28.3% of the population and 72.6% of households in Slovenia had fixed broadband Internet access, with both figures falling below the EU average. Market shares for fixed broadband access by the number of connections in the above period stood at: 34.4% – Telekom Slovenija, 20.2% – Telemach, 18.6% – T-2, 11.4% – Amis, and 15.4% – all other minor operators.

xDSL technology accounted for 42.8% of the technologies used, followed by cable modems at 31.4%, FTTH at 23.4%, with other technologies accounting for 2.4%.

In recent years, an increase in the number of fixed next-generation broadband access connections has been recorded, which applies to both cable modems as well as optical cables connected to homes (FTTH).

In terms of Internet access speed, 3.8% of users have access to the Internet at a speed of below 2 Mbps, 28.6% of users have access to the Internet at a speed between 2 Mbps and 10 Mbps, 44.9% of users have access to the Internet at a speed between 10 Mbps and 30 Mbps, and 22.7% of users have access to the Internet at a speed above 30 Mbps.



**Figure 1: Penetration of fixed broadband access**

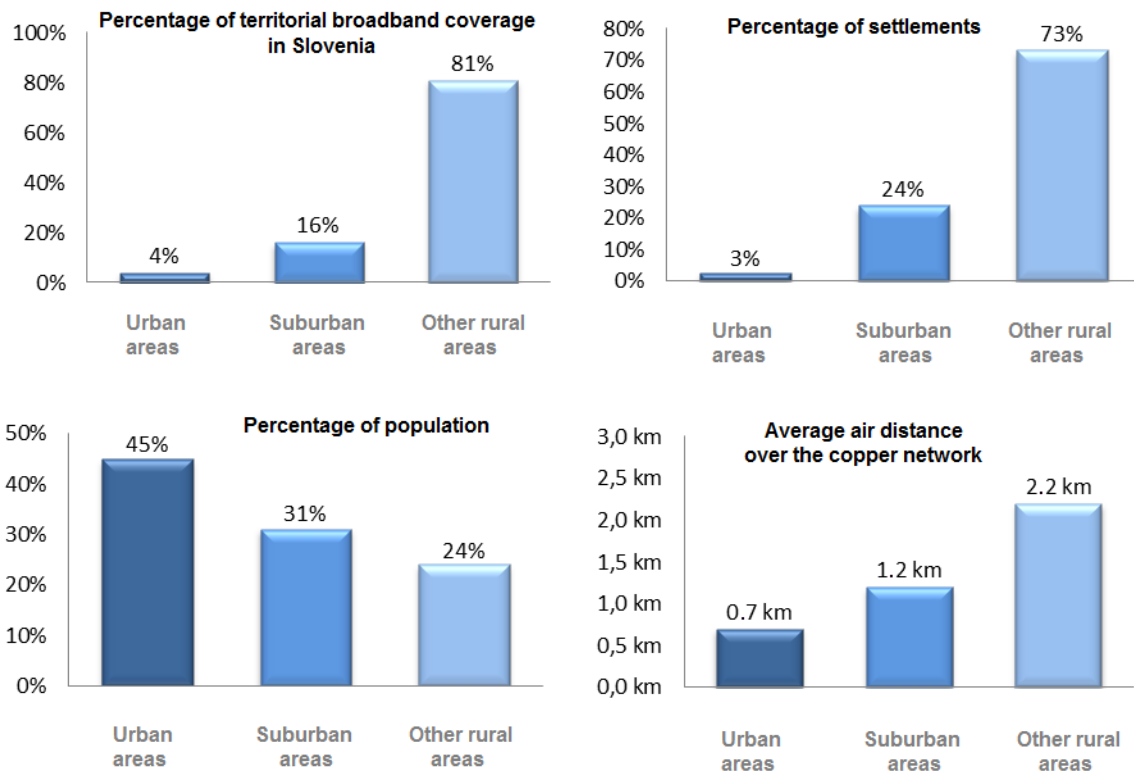
Source: AKOS, Report on the development of the electronic communications market for Q3 2015

The average EU share of households with standard fixed broadband networks stands at 96.9%, whereas in 12 Member States such coverage amounts to more than 99%. In Slovenia, the overall fixed broadband coverage stands at 95.4%, ranking it 22<sup>nd</sup>. In terms of the availability of standard fixed broadband connections in rural areas, Slovenia is ranked in the lower third of countries (Slovenia: 82.1%, EU average: 89.6%)<sup>10</sup>. Better, although still not satisfactory, is coverage with next-generation access (NGA) technologies (Slovenia: 78.2%, EU average: 68.1%). In recent years, Slovenia has been noticeably lagging behind in the development of broadband infrastructure and this gap is widening. In terms of broadband access penetration, the lag behind the EU average is increasing, which stems from the slow pace of broadband infrastructure deployment, compared to other EU countries.

This is due, in part, to the poor rural broadband infrastructure. Future development planning should take into consideration the typical dispersed settlement pattern of the rural population in Slovenia, which potential private investors, i.e. electronic communications operators, consider to be the main impediment to creating sustainable business models in these areas.

Slovenia is a country with low population density and dispersed settlement across most of its territory, which encompasses almost a quarter of all households. Urban areas (163 settlements or 3% of all settlements) cover 4% of Slovenia's territory, encompassing 45% of all inhabitants. The average direct

distance from a subscriber's location to active devices providing broadband access over the copper network to these settlements is 0.7 km. There are 1,453 suburban settlements, accounting for 24% of all settlements and covering 16% of Slovenia's territory and encompassing 31% of all inhabitants. The average direct distance over the copper network is 1.2 km. The remaining urban areas (4,420 settlements or 73% of all settlements) cover 81% of Slovenia's territory, encompassing only 24% of the population. The average direct distance over the copper network in these areas amounts to 2.2 km.



According to the Digital Economy and Society Index (DESI), which is a composite index developed by the European Commission to assess the development of EU countries towards a digital economy and society, Slovenia has an overall score of 0.41 and is ranked 19<sup>th</sup> out of the 28 EU Member States. Slovenia ranks the lowest on connectivity given that fixed broadband networks are available to only 89% of households, which is below the EU average (97%). The 2015 Country Profile states that Slovenia faces a number of challenges, with the first one being to improve broadband network coverage<sup>11</sup>.

In light of the above, it can be established that the availability of the broadband infrastructure in rural areas is unacceptably poor and that private investors lack commercial interest in individual investments. The root causes are the low population density and long distances between communication connections, both of which increase the costs of broadband infrastructure deployment for single connections. The mobilisation of public funds for broadband infrastructure deployment in white areas is thus essential for balanced development throughout the territory of Slovenia.

Assessment of the situation in terms of internal strengths and weaknesses and external opportunities and threats – SWOT analysis

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> <li>• High penetration rate of broadband infrastructure in white areas, deployed with structural funds</li> <li>• Competitive market of electronic communications</li> <li>• Balanced rural and urban development</li> <li>• Well-developed copper network</li> <li>• Developed fibre optic networks in urban areas</li> <li>• High investments in electronic communications infrastructure in recent years</li> <li>• Experience with public-private partnerships (PPPs) for GOŠO projects (GOŠO – Deployment of Open Broadband Networks), and cooperatives in other areas</li> </ul>	<ul style="list-style-type: none"> <li>• The high costs of building high-capacity broadband infrastructure in white areas</li> <li>• The dispersed settlement pattern of the rural population increases the costs of building broadband infrastructure.</li> <li>• High need for investments within a set time frame</li> <li>• High returns on investment capital required</li> </ul>
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> <li>• Local optical connections and FFTH connections in white areas</li> <li>• Sharing of existing utility infrastructure</li> <li>• Co-investment and inter-sectoral assistance</li> <li>• Increase in productivity, reduction of operating costs, and improvement in the competitiveness of white areas</li> <li>• Infrastructural basis for setting up data centres</li> <li>• Self-employment opportunities for inhabitants residing in white areas</li> <li>• Establishing crossroads for electronic communication routes for neighbouring states</li> <li>• Increased interest in attracting Foreign Direct Investment (FDI)</li> <li>• Improved ICT use in the learning process</li> <li>• Improved development environment for SMEs</li> <li>• Bridging the digital divide between rural and urban areas</li> <li>• Slowing down the out-migration of young people</li> <li>• Countryside revitalisation</li> <li>• Ensuring safety in the event of major natural and other disasters</li> </ul>	<ul style="list-style-type: none"> <li>• Possible implementation deficiencies of public-private partnerships (PPPs)</li> <li>• Lack of interest from private investors and electronic communications operators</li> <li>• Lack of interest from local communities in participation in projects</li> <li>• Lack of interest from end users in broadband Internet access</li> <li>• Insufficient or too late acquisition of European funds</li> </ul>

The broadband infrastructure in rural areas is unacceptably poor and there is a lack of interest from private investors in individual investments. The low density of the population and dispersed settlement patterns require high deployment costs and make it impossible to create sustainable private business investment models. The mobilisation of public funds for broadband infrastructure deployment in white areas is thus essential.

## 5 Current investments in the development of infrastructure

### 5.1 Investments in the electronic communications sector in the Republic of Slovenia for the 2008–2014 period

Data on investments in the electronic communications sector show a substantial drop in the volume of investments in 2009. The decreasing trend continued until 2011, resulting in a further 35.5% drop relative to 2009. This is a cause for additional concern since in this period public financing for the deployment of open broadband networks was the most intensive, which points to an actual deadlock as regards private investments in the electronic communications sector. In 2012 the investment curve shifted upward, while, a substantial improvement was not expected until after 2014. An important portion of investment will presumably be made in the roll-out of 4G mobile networks. In order to attain the targets as regards broadband infrastructure development, this trend needs to be further strengthened at least until 2020.

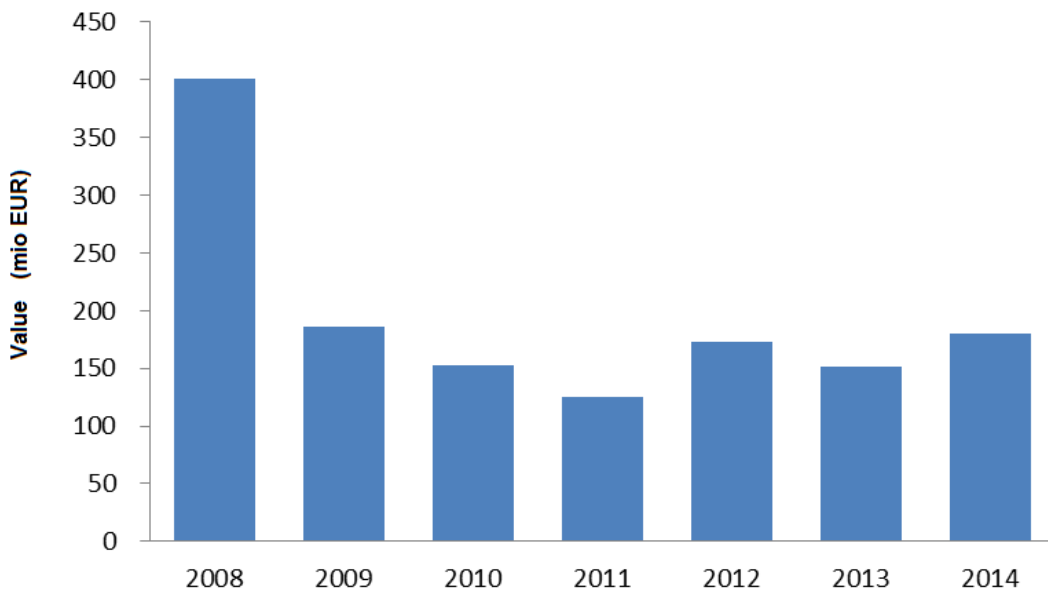


Figure 2: Investments in electronic communications

Source: The Statistical Office of the Republic of Slovenia (hereinafter: SURS), Performance of enterprises in the telecommunication sector, Slovenia, 2014, published on 28 September 2015 at <http://www.stat.si/StatWeb/en/show-news?id=5406&idp=25&headerbar=3>.

## 5.2 Co-financing and the effects of open broadband network deployment from public funds in the 2007–2013 period

Within the 2007–2013 financial perspective, Slovenia allocated EUR 82 million of public funds from the European Regional Development Fund (ERDF) for the development of open broadband networks in white areas. To this end, two public tenders were carried out in local communities. With public funds and the injection of private capital amounting to EUR 39 million, the applicants awarded contracts – in the consortium of PPPs – carried out the projects and deployed broadband networks in white areas in 43 municipalities. The roll-out of open broadband networks under both tenders provided 29,454 broadband connections in white areas, using predominantly fibre optic technology. On the cut-off date of 31 December 2015, the areas in which broadband networks were deployed had 15,211 active broadband connections (See: Table 1). The number of deployed active broadband connections by the end of 2015 accounted for 51.64% of all available broadband connections.

**Table 1: The number of available and deployed broadband connections by the end of 2015 per individual operation**

Operations GOŠO	Municipalities in consortium - Public partner	Number of municipalities	Number of enabled connections	Status of active connections as of 31 December 2015
<b>Operations GOŠO 1</b>				
Velike Lašče Municipality	-	1	502	477
Dolenjske Toplice Municipality	-	1	834	421
Vitanje Municipality	-	1	413	238
Komen Municipality	-	1	901	597
Postojna Municipality	-	1	2178	1333
Železniki Municipality	-	1	869	696
Gorenja vas - Poljane Municipality	-	1	673	282
Loški Potok Municipality	-	1	208	96
Krško Municipality	-	1	2600	2138
Slovenj Gradec Municipality	Mislinja, Dravograd, Muta, Vuzenica, Radlje ob Dravi, Ribnica na Pohorju	7	3187	2598
Ormož Municipality	Občina Sv. Tomaž, Občina Središče ob Dravi	3	2469	1351
Semič Municipality	-	1	1123	532
<b>TOTAL GOŠO 1</b>		<b>20</b>	<b>15957</b>	<b>10759</b>
<b>Operations GOŠO 2</b>				
Mokronog - Trebelno Municipality	Trebnje, Mirna, Mirna Peč, Šentrupert, Žužemberk, Sevnica	7	5585	2627
Sežana Municipality	Ilirska Bistrica, Hrpelje-Kozina, Komen	3	3535	1002
Pivka Municipality	-	1	1011	244
Mozirje Municipality	Gornji Grad, Rečica ob Savinji, Luče, Ljubno, Solčava, Vransko, Prebold, Polzela, Tabor, Apače	11	2339	240
Slovenske Konjice Municipality	-	1	1027	339
<b>TOTAL GOŠO 2</b>		<b>23</b>	<b>13497</b>	<b>4452</b>
<b>TOTAL GOŠO 1, GOŠO 2</b>		<b>43</b>	<b>29454</b>	<b>15211</b>
<b>Operations GOŠO MKO</b>				
Gornja Radgona Municipality	-	1	461	183
Radenci Municipality	-	1	493	156
Odranci Municipality	-	1	326	213
<b>TOTAL GOŠO MKO</b>		<b>3</b>	<b>1280</b>	<b>552</b>
<b>TOTAL GOŠO 1, GOŠO 2 and GOŠO MKO</b>		<b>46</b>	<b>30734</b>	<b>15763</b>

Under the Rural Development Programme of the Republic of Slovenia 2007–2013, a public tender was carried out for investments in rural broadband networks, amounting to EUR 4.3 million. Grants for the roll-out of broadband networks in white areas were allocated to three municipalities in the Pomurje region. The public tender provided white areas with 1,280 broadband connections based on fibre optic technology. On the cut-off date of 31 December 2015, these areas had 552 active broadband connections, which accounted for 43.13% of all available broadband connections.

The public funding in this period provided for a total of more than 30,000 broadband connections, mainly based on fibre optic technology. The deployment of public infrastructure improved the conditions for the further roll-out of networks from private funds. The private sector investment has been estimated to deliver an additional 90,000 connections. The infrastructure deployed within the GOŠO projects will have strong incentive effects in terms of financially more favourable deployment of broadband connections in white areas.

PPPs in GOŠO projects linked local communities and private enterprises and encouraged approximately one third of private funding, which proved that, with some modifications, such an approach is appropriate for further investment in the deployment of broadband infrastructure in white areas.

## 6 Setting a target

The broadband infrastructure that provides access to high-speed Internet forms a basis for the infrastructure of the modern digital society, without which it is difficult to imagine any social life. It increasingly shapes the opportunities of individuals in all fields of private and public life, from learning, employment, access to information and public services, and freedom of expression, to participation and relationships in public and private life. It has the same far-reaching impacts on the economy, the public sector and civil society. In terms of directing development, Internet access provides a backbone infrastructure that increases productivity, creates innovative business models, products and services, enables more efficient communication, and contributes to the increased overall efficiency of society.

Broadband infrastructure is of vital importance for the development of the Republic of Slovenia. Consequently, its deployment has become a strategic focus and a national priority in the development of the digital economy and digital society.

In setting the 2020 development target, the following has been taken into consideration:

- The importance of access to broadband infrastructure for the development of the Internet/digital society and the digital economy, which will generate economic growth.
- Broadband infrastructure is a core element of the infrastructure of modern society and its development is therefore considered a national investment priority within the development period up to 2020.

- The Broadband Network Development Strategy of the Republic of Slovenia, adopted in 2008, sets as an objective that the broadband infrastructure enables coverage of 90% of the population by fibre to the home (FTTH) or comparable broadband connections of greater capacity by 2020.
- To this end, the Digital Agenda for Europe has set two targets to be achieved by 2020: (i) all EU citizens have access to broadband speeds of above 30 Mbps and (ii) at least 50% of European households subscribe to Internet connections above 100 Mbps.
- The third recital of Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks states that given the rapid evolution of technologies, the exponential growth in broadband traffic and the increasing demand for e-services, the targets laid down in the Digital Agenda should be considered to be an absolute minimum and the Union should aim for more ambitious broadband targets in order to achieve more growth, competitiveness and productivity.
- In terms of Internet access, mobile communication technologies are complementary to fixed broadband networks.
- The targets are set by taking into account the low population density and dispersed settlement of rural areas, the limitations of available technologies and the associated costs of broadband deployment.
- According to the guidance provided by the European Commission, public funds should be invested in the deployment of broadband infrastructure such that the final solutions do not require subsequent re-interventions drawing from public funds. Only a significant leap in development may be financed.
- In terms of cost-effectiveness, two-phase interim solutions leading to a final solution for the broadband infrastructure are more expensive than the financing of the final solution in one phase.
- The latest trends in the deployment of broadband infrastructure in EU Member States increasingly set broadband targets of above 100 Mbps, which Slovenia should follow to narrow the development gap of its poorly developed infrastructure. The European Commission is also in favour of increasing the targets, recently drawing attention to the importance of next-generation broadband network deployment as a prerequisite for the development and growth of the digital society.
- Increase in data traffic: on the basis of trends, a substantial increase in data traffic is expected in the coming years, namely from 51 EB/month in 2013 to 132 EB/month in 2018.<sup>12</sup>
- At the global level, some countries have set very advanced targets within a short period of time. South Korea, for example, set a 2015 target of upgrading the existing broadband network to a speed of 1 GB for everyone.

Slovenia will mobilise its public funds to co-finance the deployment of next-generation open broadband networks providing an access speed of at least 100 Mbps for 96% of households and a speed of not less than 30 Mbps for 4% of households.

The networks will allow access to broadband electronic communication services in areas where such services are not provided by the operators and also where no commercial interest in broadband investment has been demonstrated. The use of public funds will enable the deployment of new next-generation broadband connections that will in turn allow high Internet access speeds in the two cohesion regions. Experience has shown that in the first three years the share of interested end users to



be connected to the newly deployed broadband networks accounts for approximately 50%. Access to broadband at a speed of at least 30 Mbps will be provided to 4% of the most remote households that would otherwise incur disproportionately high costs for access to broadband at a speed of 100 Mbps. In this case, available mobile, wireless and satellite-based technologies will be used, as well as cable networks and the shortening of copper rods, which, in terms of investments, are more favourable for the attainment of the set targets.

At the same time, the strategic goal of 100 Mbps has also been established for areas exempt from the testing of commercial interest in speeds of 100 Mbps, serving as a recommendation for private investments in the deployment of broadband infrastructure and guidance for the requirements of end users.

Target progress monitoring falls within the regime of regular monitoring of the development of the electronic communications market, which is a task of the Agency for Communication Networks and Services (AKOS).

The below-stated 2020 strategic target will be pursued for the purpose of developing the digital society and exploiting the opportunities provided by ICT and the Internet to ensure permanent economic and social benefits, e.g. the development of the digital economy, improved competitiveness, the creation of new and quality jobs, and the balanced development of rural and urban areas.

**The goal to 2020:**

- The provision of broadband Internet access at a speed of not less than 100 Mbps to 96% of households;
- The provision of broadband Internet access at a speed of not less than 30 Mbps to 4% of households.

## 7 Available technologies

The Broadband Network Development Strategy in the Republic of Slovenia defines broadband networks as those transmission networks that enable a constant connection and high responsiveness to users in the interactive use of multimedia applications, services and content which are used in practice. They are divided into backbone networks, access networks, wired and wireless networks, etc.

For the purposes of State aid assessment, *the EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks*<sup>13</sup> (hereinafter: the EU Guidelines on State aid rules) distinguish between basic and next-generation access (NGA) networks.

Several different technology platforms can be considered as basic broadband networks, including asymmetric digital subscriber lines (up to ADSL2+ networks), non-enhanced cable (e.g. DOCSIS 2.0), third-generation mobile networks (UMTS) and satellite systems.

At the current stage of market and technological development, NGA networks are access networks that rely wholly or partly on optical elements and which are capable of delivering broadband access services with enhanced characteristics as compared to existing basic broadband networks. NGA networks are those deemed to have at least the following characteristics:

- they can deliver services reliably at a very high speed per subscriber through optical (or equivalent technology) backhaul sufficiently close to user premises to guarantee actual delivery of a very high speed;
- they can support a variety of advanced digital services including converged all-IP services;
- they have substantially higher upload speeds (compared to basic broadband networks).

At the current stage of technological development, NGA networks are:

- Fibre optic access networks (FTTx);
- advanced upgraded cable networks and advanced upgraded digital subscriber lines; and
- certain advanced wireless access networks capable of delivering reliable high speeds per subscriber.

In accordance with the above stated guidelines, the final connection to the end user may be ensured by both wired and wireless technologies. Given the rapid evolution of advanced wireless technologies, such as LTE-Advanced, and the intensifying market deployment of LTE or Wi-Fi, next-generation fixed wireless access (e.g. based on possibly tailored mobile broadband technology) could be a viable alternative to certain wired NGA (FTTCab, for example) if certain conditions are met. Since the wireless medium is 'shared' (the speed per user depends on the number of connected users in the area covered) and is inherently subject to fluctuating environmental conditions, in order to reliably provide the minimum download speeds per subscriber that can be expected of an NGA, next-generation fixed wireless networks may need to be deployed at a certain degree of density and/or with advanced configurations (such as directed and/or multiple antennas). Next-generation wireless access based on tailored mobile broadband technology must also ensure the required quality of service level to users at a fixed location while serving any other nomadic subscribers in the area of interest.

In the longer term, NGA networks are expected to supersede existing basic broadband networks rather than just upgrade them. To the extent that NGA networks require a different network architecture, offering significantly better quality broadband services than today, as well as the provision of multiple services that could not be supported by today's broadband networks, it is likely that in the future marked differences will emerge between areas that are covered and areas that are not covered by NGA networks. If the difference between an area where only narrowband Internet is available (dial-up) and an area where broadband exists means that the former is a 'white' area, then an area that lacks next-generation broadband infrastructure, although it might still have one basic broadband infrastructure in place, should today also be considered a 'white' NGA area.

In Slovenia, there are four operators providing electronic communication services with their own mobile networks. The majority of them cover 90% of the Slovenian population with a UMTS (3G) signal, whereas two operators have already been operating LTE 4G networks with data transfer rates of up to several tens of Mbps.

Following a public tender for assigning radio frequencies in 2014, three operators were assigned a spectrum for the radiofrequency bands of 800 MHz, 900 MHz, 1800 MHz, 2100 MHz, and 2600 MHz for a period of 15 years. In accordance with the auction conditions, they have to provide mobile communication services to 75% of the total population of Slovenia within three years of the date on which they were assigned use of radio frequencies in the stated frequency band. An operator that receives part of the spectrum in the 800 MHz band, which comes with special coverage obligations, must provide at least 95% of the population of the Republic of Slovenia with mobile communication services at a bitrate of at least 10 Mbps downlink (outdoor) between the base station and the end user's mobile terminal, and with a minimum data transfer rate of at least 2 Mbps, as well as terminally-ensured uplink speeds of at least 1 Mbps, within three years of the date on which it was assigned use of the radio frequencies in the stated frequency band. The operator must ensure broadband coverage of specially designated rural settlements where fixed broadband access is especially poor. It must provide mobile services as well as suitable services substituting for fixed broadband access (FWBA) by installing appropriate internal or external customer-premises equipment (CPE) with a suitable antenna, providing a transfer speed for a user experience of at least 10 Mbps downlink and with a minimum data transfer rate of at least 2 Mbps, and terminally-ensured uplink speeds of at least 1 Mbps to the base station. In developing broadband access in rural areas, some remote households will be provided broadband Internet access through 4G mobile networks, which will play an important role when including broadband access among universal services.

In the coming years, the new assignment of free radio frequencies in the frequency bands of 700 MHz, 1400 MHz, 1800 MHz, 2100MHz, 2300 MHz, 3500 MHz, and 3700 MHz has been envisaged. By the efficient and fast deployment of UMTS 3G and LTE 4G networks in all the above stated frequency bands, mobile operators in Slovenia will help to attain one of the three targets set in the Digital Agenda for Europe, i.e. to provide all Europeans with access to Internet speeds of above 30 Mbps.

## 8 The design of the measure to deploy broadband infrastructure in white areas

The design of the measure is based on the assumptions that infrastructural projects in rural areas (white areas) may only be granted one-off aid from public funds and that co-financing is only granted to projects that can ensure a substantial developmental leap and provide white areas with the best and, possibly, final solutions by applying the principle of positive action in these areas. The assumptions include the creation of an investment model that will provide a final and long-term solution to broadband Internet access without necessary subsequent interventions requiring additional public funds. The target and design of the measure take into consideration that any investment in interim solutions and subsequent upgrading will be more expensive than an investment that achieves the final solution in one step. In terms of the efficient use of public funds, interim solutions are not eligible\*.

Interventions that use public funds should not disrupt private investments. In planning investments in the deployment of broadband infrastructure from public funds, it is necessary to analyse the current situation in this area since the use of public funds is only eligible where such infrastructure is not available and commercial interest in its deployment is non-existent or there is a market failure. In order to assess market failure, a distinction should be made between the types of areas that are targeted for deployment by public funding in terms of the presence of broadband network operators:

- *'black areas'* – areas in which there are or will be in the next three years at least two broadband network operators and where the users are provided with an optimal combination of service quality and prices;
- *'grey areas'* – areas in which one broadband network operator is present and another network is unlikely to be developed in the near future. The users are not provided with a suboptimal combination of service quality and prices;
- *'white areas'* – areas which lack the required quality of broadband infrastructure and which also lack commercial interest in the deployment thereof.

### 8.1 Definition of the measure

The basic elements of the measure are as follows:

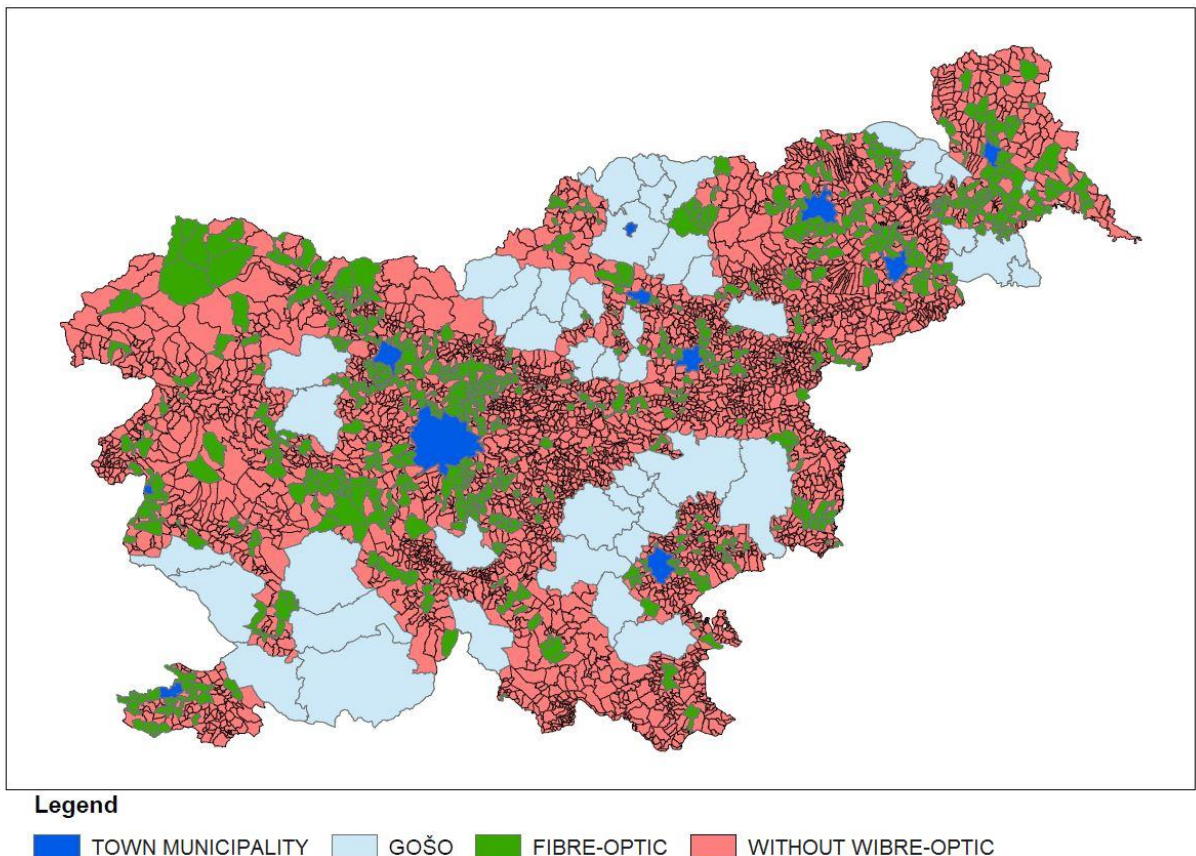
- The measure will be designed so as to fulfil all conditions to demonstrate the proportionality of the measure contained in the EU Guidelines on State Aid Rules: detailed mapping and analysis of coverage, the testing of commercial interest, the identification of white areas, public consultation, a competitive selection process, the most economically advantageous offer, technological

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\*In accordance with the EU Guidelines on State Aid Rules, a subsidised network should be able to ensure a 'step change' in terms of broadband availability. A 'step change' can be demonstrated if as a result of the public intervention (1) the selected bidder makes significant new investments in the broadband network and (2) the subsidised infrastructure brings significant new capabilities to the market in terms of broadband service availability and capacity, speeds and competition. The step change is compared to existing as well as concretely planned network deployments. For instance, marginal investments related merely to the upgrade of the active components of the network should not be considered eligible for state aid. Similarly, although certain copper-enhancing technologies (such as vectoring) could increase the capabilities of the existing networks, they may not require significant investments in new infrastructure and, hence, should not be eligible for state aid. The provisions of the EU Guidelines on State Aid Rules are taken into account with regard to projects that are co-financed from public funds.

neutrality, the use of existing infrastructure, wholesale access, wholesale access pricing, a monitoring and 'clawback' mechanism, transparency, reporting, fair and non-discriminatory treatment.

- White areas will be designated on the basis of the testing of commercial interest in the deployment of the necessary broadband infrastructure. The testing will exclude urban areas with more than 500 inhabitants/km<sup>2</sup> and areas that have already received funds from the ESRR and the ERDF (see the list in APPENDIX 4).
- Geographic mapping of the current infrastructure and the exempt areas is shown in Figure 3. The testing of commercial interest will be made in areas lacking infrastructure that would allow speeds exceeding 100 Mbps. These areas are marked "No fibre optic broadband" (in pink) and present potential white areas or areas targeted for future public funding.



**Figure 3: Geographic overview of the current infrastructure and the exempt areas**

- The testing of commercial interest in white areas will be made in two geographic segments in the entire territory of Slovenia. The analysis of mapping and population density will be carried out in order to create a geographic segment with low population density to cover approximately 4% of the households where the deployment of independent fixed broadband infrastructure would disproportionately increase costs. A geographic segment with high population density will be created from this boundary to a boundary area with 500 inhabitants/km<sup>2</sup>.
- The geographic segment with low population density will undergo the testing of commercial interest in providing a broadband connection with a download speed of 30 Mbps.

- The geographic segment with a high population density will undergo testing of commercial interest in a broadband connection with a download speed of 100 Mbps.
- The data on entirely private investment projects will be available after testing the commercial interest. In accordance with the law, whoever expresses a commercial interest in building a broadband network must deploy such within three years.
- Based on the results of testing the relevant commercial interest, in the two segments white areas will be designated to receive support from public funds for projects associated with the deployment of broadband infrastructure.
- Pursuant to the Public-Private Partnership Act, the funding of projects for the deployment of broadband infrastructure will be provided to PPPs between the municipality or a group of municipalities and a private partner – an operator.
- Subject to conditions for designating white areas in the both geographic segments, eligible costs comprise the costs arising from backhaul connections, last-mile access to the end user, and fixed wire communication lines to base stations of mobile communication networks.
- The funds earmarked for the co-financing of broadband infrastructure in white areas, which is provided to individual subscribers with broadband connections of 100 Mbps or 30 Mbps, will be restricted.
- In the geographic segment with low population density, a PPP may demonstrate the coverage of a particular household with a broadband connection of at least 30 Mbps through the measurement of the LTE mobile network that will be used as a substitute for fixed wireless broadband access – FWBA. For such coverage, other technologies may also be used, however, subject to ensuring or demonstrating the possibility of a broadband connection with a minimum 30 Mbps downlink speed.
- At each central access point, a PPP must set a public Wi-Fi access point that is free of charge but has time-limited access.
- A tender will define in detail the elements of access to the broadband network and the provision of quality services (including symmetrical access speeds) with a view to ensuring a quality of access that will be comparable with access to open networks as provided for in the decisions issued by the Agency for Communication Networks and Services (AKOS). The broadband network operator and the network service provider will sign a contract ensuring access to end users. The reference offer of the broadband network operator will specify the conditions for the provision of services, such as the procedures for the provision of access to the open broadband network, response times, troubleshooting, the level of service provision, etc.
- In terms of technological neutrality, PPPs will be entitled to select the technologies or network topologies to meet the requirements, conditions and objectives of this measure. They will be able to choose from amongst at least the technologies presented in Chapter 7 and possible combinations thereof.

The projects for co-funding will be selected on the basis of the call to submit bids, allowing all PPPs to bid with their projects for the roll-out of broadband infrastructure in white areas throughout the territory of Slovenia. In the selection process, priority will be given to PPP projects that:

- are based on the highest possible private input (at least 50% of the total investment value);
- are cost-effective in terms of achieving the set targets: i.e. they will provide the best coverage of households per unit of invested funds in eligible areas within the designated unit (municipality or

consortium of municipalities), with the infrastructure at target speeds, in the two geographic segments;

- use the existing channel and other infrastructure or benefit from the effects of legal measures aimed at promoting investments, reducing deployment costs, seeking synergistic effects in relation to investments in other public municipal infrastructure (smart grids, water supply networks), and thus ensure the lowest possible total costs for the deployment and management of infrastructure throughout the entire period of operation or at least in a 20-year period;
- will additionally cover the largest part of the geographic segment with low population density with an infrastructure network providing 100 Mbps;
- will provide fixed connections to the base stations of mobile communication networks in the PPPs, providing end users in the geographic segments with low population density Internet access through FWBA;
- be large in terms of the area and municipalities included.

Public funds will be allocated to PPP projects that will provide target speeds for all white areas in the territory of local communities that are included in the partnership and fulfil any commitments made with respect to white areas or areas exempt from the testing of commercial interest.

The roll-out of the access network to business entities will be financed by a private partner within the PPP, exclusively with private funds; also in this case, the target speed of at least 100 Mbps is applicable. The eligible costs also comprise connections provided to public institutions engaged in education, science, sport and culture.

## 8.2 Geographic segmentation

Geographic segmentation is based on an analysis of the mapping of the existing electronic communications infrastructure and data on the relevant population and households, which have been collected from the available databases of the Statistical Office of the Republic of Slovenia (SURS), the Surveying and Mapping Authority of the Republic of Slovenia (GURS), the Ministry of the Interior, and the Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES). The analysis was performed by the Agency for Communication Networks and Services (AKOS). An overview of the existing capacities of the network termination points by municipality is presented in Appendix 3. The analysis for designating the two geographic segments excludes urban areas with a population density of 500 inhabitants/km<sup>2</sup> and local communities that have already been allocated structural funds for the deployment of broadband infrastructure.

The analysis defines the following:

- the agglomeration areas;
- the locations of central access points to which fibre optic connections need to be provided;
- broadband coverage from central access points in agglomerations within a 1.4 km radius for geographic segments with high population density;
- the status of available infrastructure in these areas;
- areas outside a 1.4 km radius from central access points for geographic segments with low population density.

Figures 4 and 5 present the geographic segmentation based on the designation of agglomeration areas and central access points. In either case, areas coloured pink indicate geographic segments with low population density. On the basis of conducted procedures and after defining a 1.4 km radius around the central access points, the geographic segments with low population density encompass approximately 4% of households, regarding which commercial interest in 30 Mbps broadband will be tested.

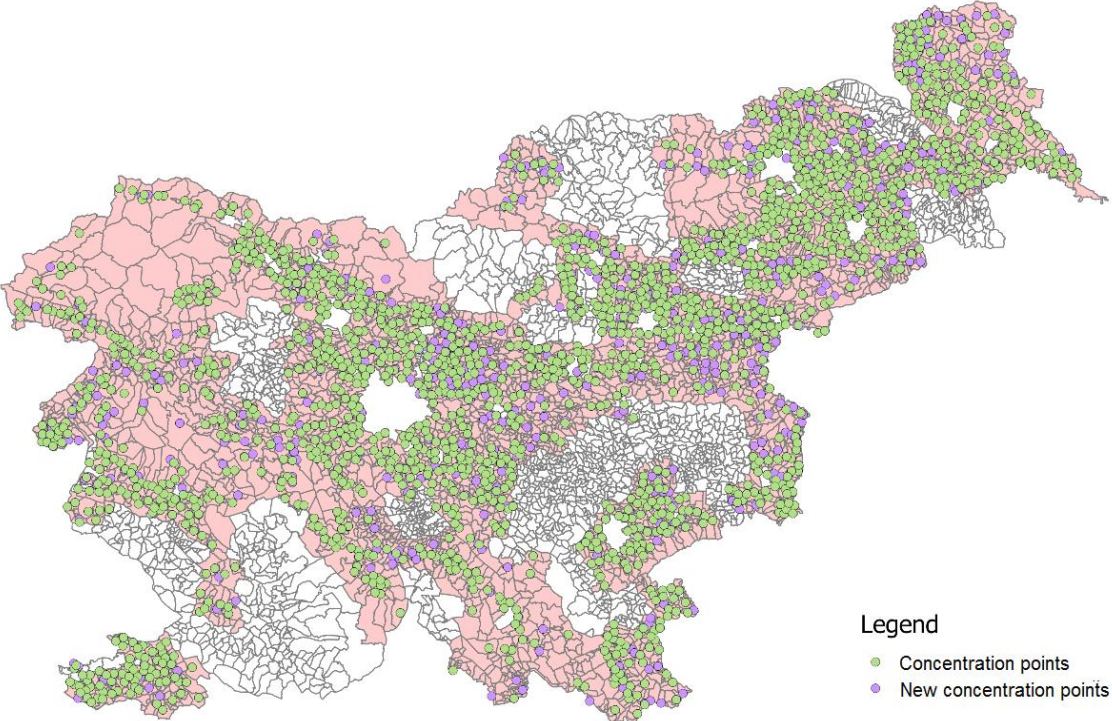


Figure 4: Geographic overview of existing and new central access points

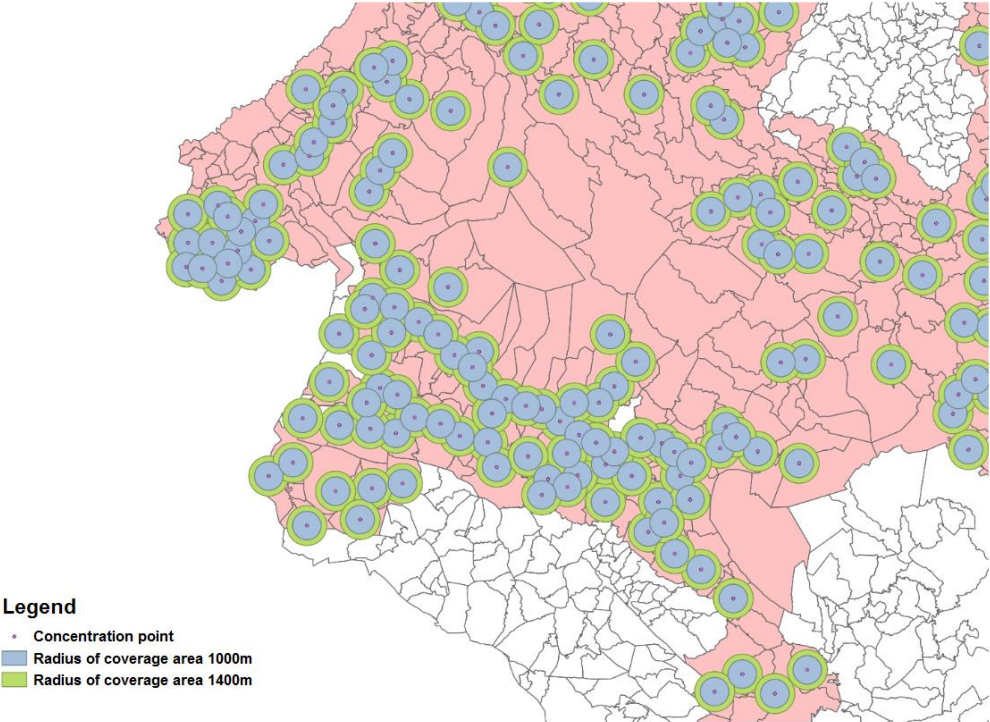


Figure 5: An example of the delineation of a geographic segment with low and high population density



Analysis of the data and geographic segmentation has shown that:

- there are 321,758 households or 218,492 inhabited buildings in the geographic segment with high population density;
- there are 32,590 households or 24,451 inhabited buildings in the geographic segment with low population density;
- there are 1,762 central access points in the geographic segment with high population density;
- 232 central access points in three quadrants have fibre optic connections;
- There are still 1,530 central access points in the areas for which access to a network with download speeds of at least 100 Mbps needs to be deployed;
- 3,042 km of long-distance connections need to be built;
- 500 km of wired communication links to base stations need to be set up;
- 22,788 km of connections at speeds above 100 Mbps need to be deployed in the accessible part of the geographic segment with high population density.

After the testing of commercial interest, the plan is to be amended by taking into consideration the assessed commercial interest, the list of white areas, the adjusted strategic goals in view of available public funds and the envisaged calls to submit bids.

### **8.3 The description of a model for co-financing the deployment of broadband infrastructure**

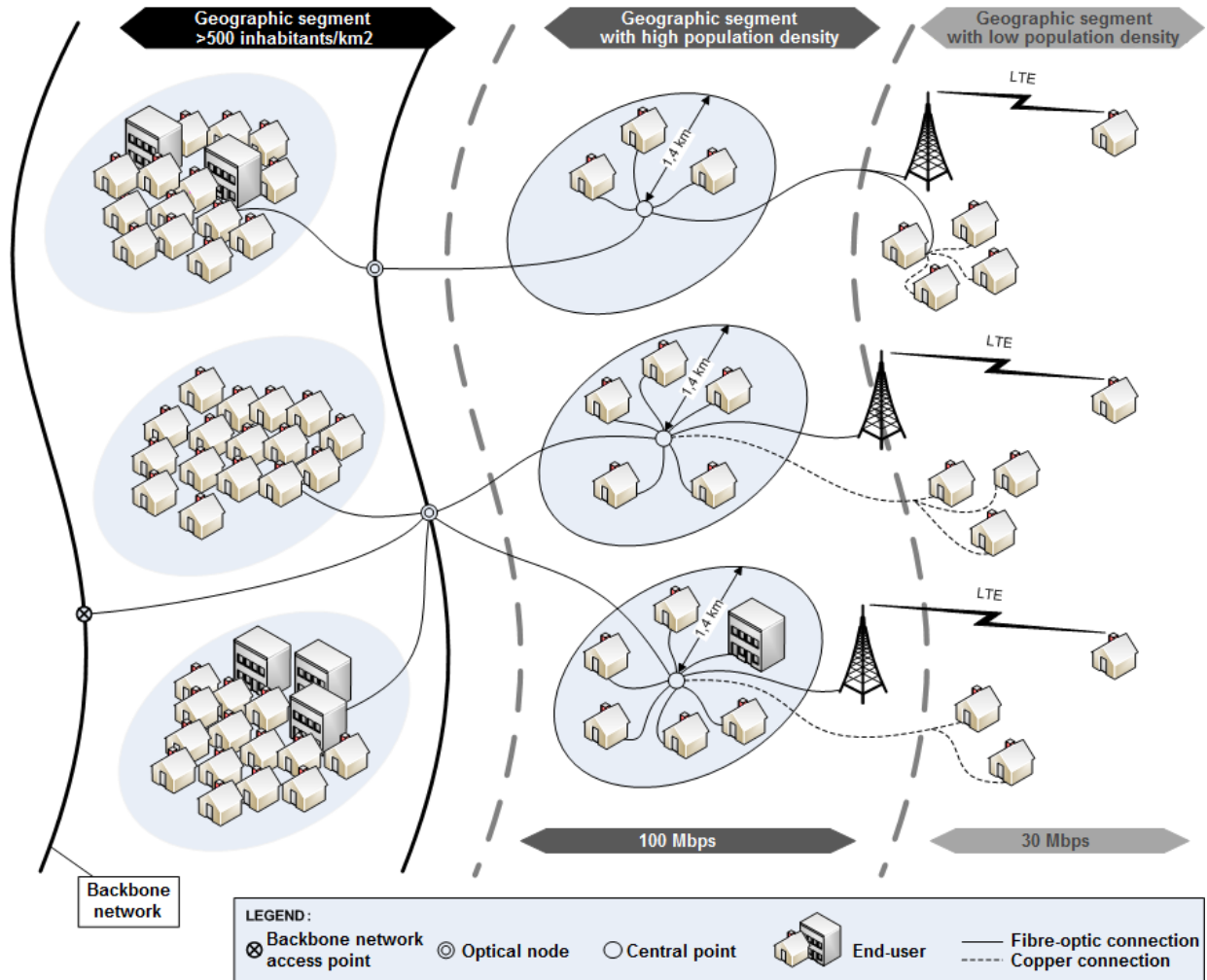
Figure 6 shows a model for the deployment of broadband infrastructure, which is based on the co-financing of projects in white areas within geographic segments with low and high population density.

The co-financing with public funds will enable the development of economically viable projects of private investors within the PPPs. The mobilisation of public funds will encourage private investment in broadband infrastructure deployment, based on the expressed commercial interest and established white areas within the PPPs. For the purposes of public funding in the next development period to 2020, white areas are defined as areas in which there are no next-generation broadband networks and where commercial interest in broadband infrastructure deployment is non-existent. This means that in plans for the next three years, electronic communications operators have not envisaged any deployment of networks to provide Internet access at a speed of at least 100 Mbps in the geographic segment with high population density, or at least 30 Mbps in a geographic segment with low population density. The areas with more than 500 inhabitants/km<sup>2</sup> and the areas of local communities that have already received funds from the ESRR and the ERDF for this purpose will not be tested as regards white areas. The measure is designed to co-finance projects of the PPPs between private enterprises – electronic communications operators and local communities in line with the State Aid Rules.

The following type of costs associated with the projects will be eligible:

- costs for the deployment of passive broadband infrastructure;
- deployment costs associated with broadband infrastructure;

- costs for long-distance connections and next-generation access networks;
- costs for wired communication links to wireless communication base stations.



**Figure 6: A model scheme for the deployment of broadband infrastructure**

The measure is designed to co-finance projects of the PPPs between public partners – local communities and private partners – electronic communications operators. The financial injection of a private partner must account for at least 50% of the total investment value. On the basis of experience from previous calls to tender (Deployment of Open Broadband Networks – GOŠO1 and GOŠO2), the positive effects of the PPPs may be projected. The role of a public partner is to provide utility easements on municipal land at no charge, make its passive channel and other community infrastructures available, and ensure an accurate understanding of the local environment. Its importance is also in terms of the experience obtained in the administrative management of infrastructural community development projects. All of the above-mentioned may substantially contribute to a successful investment. However, of particular significance is the public interest of local communities, which is to provide the residents of a municipality

with high-performance broadband infrastructure. In addition to the injection of private investment, the role of a private partner includes its contribution of expertise and experience in project management, its transparent business interest in successfully completing the project and, subsequently, maintaining and operating the open broadband networks that have been deployed. The creation of a public-private partnership (PPP) requires municipalities to set up a consortium (should they opt to do so) and select a private partner in accordance with the required procedure. Once the consortium is structured, a joint project is submitted in response to the Ministry's call to tender. Local communities or PPPs will be given sufficient time to produce the required project documentation and ensure a quality application for participation in the Ministry's call to tender. The application submitted by the consortium is to include a business plan that demonstrates that the deployment of the NGN broadband network in the target areas is not economically justified unless partially co-financed with public funds.

After the conclusion of the deployment of the broadband network, the ownership of the network is transferred to the local community or private partner in proportion to their invested funds. A part of the network, which is equal to the proportion of the investment made by the local community and to the amount of national budgetary funds for cohesion policy used therefor, is transferred to the ownership of the local community. The selected private partner is obliged to deploy, maintain and operate the network for a period of at least 20 years (or a maximum of 30 years). During the 20 to 30 years following the completion of the deployment of an open broadband network, the ownership of the part of the network deployed with private funds remains private, whereas the ownership of the part of the network deployed with public funds remains public. After the lapse of 20 years (but no more than 30 years), the selected private partner shall transfer its ownership right to the local community.

The Public-Private Partnership Act also provides for other forms of PPPs.

State aid will be allocated in accordance with the provisions of the General Block Exemption Regulations (GBER) (Commission Regulation No 651/2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty). In this regard:

- investments will be focused on areas where there is no infrastructure of the same category;
- the competitive selection process will be open, transparent and non-discriminatory;
- the widest possible active and passive wholesale access will be required;
- the wholesale access price will be set after the methodology has been developed and approved;
- a monitoring and clawback mechanism will be put in place.

An alternative form of broadband infrastructure deployment will also be encouraged. For the purpose of planning broadband infrastructure deployment, social entrepreneurship organisations, cooperatives and local communities will be provided with professional assistance by the Ministry in accordance with paragraph 8 of Article 9 of the Electronic Communications Act (ZEKom-1).

## 9 Financial structure of the measure and sources of funding

The financial structure of the measure is based on:

- the co-financing of white areas from public funds in the amount of up to 50% of the investment, with a defined upper limit;
- at least 50% of co-financing from private funds, and
- the projected commercial interest in the deployment of broadband infrastructure for approximately 260,000 households in the geographic segment with high population density (100 Mbps).

The financial feasibility assessment takes into consideration:

- the data on the mapping of network termination points (NTP) of all operators and network owners (as of 13 July 2015) who are obliged to report pursuant to the Electronic Communications Act (ZEKom-1);
- the analysis of mapping of the existing electronic communications infrastructure and data on the population and households collected from the available databases of the Statistical Office of the Republic of Slovenia (SURS), the Surveying and Mapping Authority of the Republic of Slovenia (GURS), the Ministry of the Interior, and the Agency of the Republic of Slovenia for Public Legal Records and Related Services (AJPES). The analysis was performed by the Agency for Communication Networks and Services (AKOS);
- the target values of access speeds, set in terms of geographic segments of high and low population density;
- EU Guidelines for the application of State Aid Rules in relation to the rapid deployment of broadband networks (2013/C 25/01)<sup>14</sup>;
- private investors' projects with a total amount of EUR 470 million, focused on broadband infrastructure deployment in rural areas of the Republic of Slovenia, in line with the illustrative list of projects identified by the European Commission;
- data on the investment plans of electronic communications operators and network owners for fixed broadband infrastructure in an amount exceeding EUR 250 million;
- the estimated number of kilometres of fixed long-distance connections at a speed of at least 100 Mbps: 3,042 km;
- the estimated number of kilometres of access connections in settlements, at a speed of at least 100 Mbps: 22,788 km;
- the estimated number of kilometres of fixed broadband connections to base stations, at a speed of at least 100 Mbps: 500 km;
- the average cost estimates for the deployment of fibre optic connections per kilometre amount to approximately EUR 11,000, which is in line with the measures for the reduction of costs for the deployment of broadband infrastructure.

The cost estimates are based on the assumption that all potential white areas are identified as white areas.

On the basis of the estimated number of kilometres of lines in the distribution network of backhaul connections, and last-mile access to the end user, the cost estimates for the deployment of broadband infrastructure at a speed of 100 Mbps in the geographic segment with high density population amount to approximately EUR 290 million. The estimated costs for active equipment amount to EUR 65 million. Co-financing with public funds will be limited to the connection.

In the geographic segment with low population density there will still remain approximately 32,590 households or 25,000 inhabited buildings, which the PPPs will cover by a combination of technologies allowing speeds of at least 30 Mbps. The PPP is entitled to additional co-financing in the amount of EUR 300 per line, totalling approximately EUR 10 million.

The total estimated cost for the deployment of broadband networks that will enable high-speed Internet access in line with the set target access speeds is EUR 365 million.

Taking into account the 4% of households with 30 Mbps access in the geographic segment with low population density and if commercial interest in 100 Mbps access for 260,000 households is demonstrated in the geographic segment with high population density, the available funds will co-finance approximately 60,000 connections with 100 Mbps speed and 30,000 households with access to 30 Mbps broadband.

If public funding is available and there is commercial interest in the deployment of infrastructure in a geographic segment with high population density with more than 260,000 households that, consequently, decreases the number of white areas, or if additional public funding is provided, the geographic segment with low population density may be deemed to be a geographic segment with high population density, also as regards the amount of co-financing from public funds per connection. In such case, the number of households in the geographic segment with low population density can be decreased.

### **9.1 Eventual shifting of a boundary between the two geographic segments with high and low population density**

If commercial interest is shown for less than 260,000 households in a geographic segment with high population density, there may be insufficient funds available for the co-financing of 100 Mbps connections.

There are two possible solutions:

- The needed public funds are provided to co-finance 100 Mbps connections in the geographic segment with high population density. The -4% boundary between the two geographic segments remains in place.
- If the missing public funds are not provided, the boundary between the two geographic segments is shifted – following the criteria of the average link distance per connection – so as to

appropriately decrease the number of households in the geographic segment with high population density and increase the number of households in the geographic segment with low population density. As a result, the geographic segment with high population density will still have 60,000 households, for which the deployment of 100 Mbps connections can be covered from available public funds. New areas in the segment with a target access speed of 30 Mbps (shifted from the segment with 100 Mbps speed) will again undergo testing as regards commercial interest. The shifting of the boundary between the two geographic segments depends on the commercial interest shown for 100 Mbps connections in the geographic segment with high population density. If the commercial interest is low and the financial shortfall too large, the boundary needs to be shifted from –4% to the appropriate percentage (e.g. –10% or even –20%), to overcome the shortfall. This will decrease the percentage of households that are to be provided with Internet access of 100 Mbps and increase the percentage of those households that are to be provided with Internet access of 30 Mbps.

If a shift in the boundary of geographic segments (and, consequently, the repeated testing of commercial interest in providing 30 Mbps broadband in areas where no interest has been shown for 100 Mbps broadband) is required due to insufficient commercial interest and the consequent financial shortfall, the expanded geographic segment with low population density will be entitled to funds for the deployment of infrastructure delivering a download speed of at least 30 Mbps. Co-financing with public funds will be limited to the connection.

**Table 2: Investments planned for the attainment of the 2020 targets**

(mio EUR)

REGION	Year of investment	PUBLIC FUNDS				PRIVATE FUNDS		TOTAL
		EU funds - ERDF	SLO funds	EAFRD funds	SLO funds	Participation in PPP - White areas Private funds - ERDF and EAFRD	Commercial projects in grey and black areas	
East	2016						11.6	11.6
West							7.7	7.7
East	2017	2.4	0.6			3	7.5	13.5
West		1.6	0.4			2	5	9
East	2018	12	3			15	37.5	67.5
West		8	2			10	25	45
East	2019	12	3	4.5	1.5	21	52.5	94.5
West		8	2	3	1	14	35	63
East	2020	3.6	0.9			4.5	11.3	20.3
West		2.4	0.6			3	7.5	13.5
East	2021						11.7	11.7
West							7.7	7.7
<b>Total</b>		<b>50.0</b>	<b>12.5</b>	<b>7.5</b>	<b>2.5</b>	<b>72.5</b>	<b>220.0</b>	<b>365.0</b>
<b>Public funds - ERDF and SLO</b>		<b>62.5</b>		<b>10.0</b>				
<b>Total - public funds ERDF, SLO and EAFRD, SLO</b>		<b>72.5</b>						
<b>Total - ERDF, EAFRD, SLO and private funds in white areas</b>		<b>145.0</b>						
<b>Total - private funds</b>						<b>292.5</b>		
<b>Total public and private funds</b>								<b>365.0</b>

## 10 Designation of areas to receive public funds

The mapping of the electronic communications infrastructure was introduced in 2004 on the basis of the provisions of the Electronic Communications Act in terms of the protection of existing public communications networks. In the same year, the Surveying and Mapping Authority of the Republic of Slovenia established the Consolidated Cadastre of Public Infrastructure – a database to which operators send data on their networks. As a result, all networks are listed in public records. The data collected on the owners and locations of lines are accessible to all interested users.

The mapping of infrastructure is an important tool for planning the investments in the electronic communications infrastructure since precise knowledge of existing infrastructure is crucial for the designation of white areas. In cooperation with the Surveying and Mapping Authority of the Republic of Slovenia and on the basis of the amended Electronic Communications Act (Uradni list RS (Official Gazette of the Republic of Slovenia), Nos. 109/12 and 110/13, hereinafter: ZEKom-1), the mapping of infrastructure has been upgraded so as to provide a more detailed overview of the existing electronic communications infrastructure, which is essential for the designation of white areas down to the household level. The cadastre was upgraded in 2012/13. At the beginning of 2014, the operators provided more detailed data for entry into the records of infrastructure networks, including the data on the type of infrastructure, the use of connections and their minimum transfer rate.

The system for the testing of commercial interest and the mapping of investments was upgraded in 2014. A comprehensive overview of existing electronic communications infrastructure allowing the assessment of commercial interest has been available to users upon request since the second half of 2015. Once the NGN Development Plan–2020 has been approved by the Government of the Republic of Slovenia (hereinafter: the Government), the procedure for testing commercial interest will be carried out through information support based on the Consolidated Cadastre of Public Infrastructure.

### The time frame for the testing of the commercial interest of operators and the fulfilment of *ex-ante* conditionality

T <sub>0</sub>	Approval of the NGN Development Plan–2020
T <sub>+1m</sub>	Call to operators to submit expressions of commercial interest
T <sub>+2m</sub>	Submission of expressions of commercial interest
T <sub>+3m</sub>	Analysis of commercial interest and a repeated call to promoters to submit expressions of interest if the geographic segment boundary needs to be shifted
T <sub>+4m</sub>	Submission of expressions of commercial interest
T <sub>+5m</sub>	Analysis of data on commercial interest and the designation of white areas, amendment of the plan
T <sub>+6m</sub>	The Government is notified of the amended plan, which is submitted to the European Commission for review
T <sub>+8m</sub>	Publication of the public call to co-finance the deployment of broadband infrastructure in white areas

The entire territory of Slovenia will undergo the testing of the commercial interest of operators in the deployment of broadband networks to provide Internet access at a speed of at least 100 Mbps in the geographic segments with high population density, or at least 30 Mbps in the geographic segments with

low population density. The testing will exclude urban areas with more than 500 inhabitants/km<sup>2</sup> and areas that have already received ESRR and ERDF funds (see the list in APPENDIX 4) for this purpose.

The testing will be conducted in accordance with the Electronic Communications Act (ZEKom-1), which stipulates that whoever has expressed commercial interest in deploying a broadband network must deploy it in the areas and to the extent indicated in their expression of interest within three years of notifying the ministry responsible for electronic communications and the Agency for Communication Networks and Services (AKOS) of their interest in writing. A contract will be signed between the Ministry and the undertakings that have expressed commercial interest, imposing obligations, timeframes and reporting on progress towards the implementation of their expression of commercial interest. The approval of an expression of commercial interest will be subject to credible business plans, a detailed timetable for the deployment and evidence demonstrating the financial feasibility of the investments. Within a period of 12 months at the latest, licences for the majority of easements must be obtained and the execution of contractual works must also start. Additional timeframes on progress may be imposed for subsequent 6-month intervals until the expiry of the three-year completion date.

The Agency for Communication Networks and Services (AKOS) keeps records of expressions of commercial interest in the deployment of the broadband network and supervises the implementation in accordance with the Electronic Communications Act (ZEKom-1). All network owners that have submitted expressions of commercial interest in the deployment of the broadband network are obliged to do so within three years of notifying the ministry responsible for electronic communications. Parallel deployment of the network, or parts of it, along different rights of way would be irrational, which explains why the network owners that are interested in the deployment of the broadband network must consistently comply with the provisions of the Electronic Communications Act (ZEKom-1) regarding the deployment of networks and pertaining infrastructure, e.g. the use of existing infrastructure, transparency and the co-ordination of deployment works and inter-sectoral cooperation. When one of the owners commences with the deployment activities, it is imperative that others who have also submitted expressions of commercial interest in this area follow, which will decrease costs and make the deployment more efficient. Their co-operation must be in line with the Electronic Communications Act (ZEKom-1) for joint and comprehensive fulfilment of the commitments undertaken in their expressions of commercial interest. Delaying activities while waiting for other parties in no case justifies the absence of activities or the non-fulfilment of the parties' own commitments undertaken in expressions of commercial interest. In this way, the end users in the area concerned will be provided with services in which they are interested and for the provision of which network owners have also submitted their expressions of commercial interest.

In accordance with the timeframe, a public call for co-financing the projects for the deployment of the next-generation broadband networks in white areas will be published eight months after the approval of the NGN Development Plan–2020 by the Government.

In line with the timeframe for the deployment of the next-generation broadband networks in white areas, the majority of works are envisaged to be carried out by the end of 2019. As much as 60% of households are expected to be provided with broadband Internet access at a speed of not less than 100 Mbps by 2018 and 96% of households by 2020.



The electronic communications structure, including the data on the available capacity of the existing network in Mbps for each building, is entered in the Consolidated Cadastre of Public Infrastructure.

Prior to publishing the call to co-finance the deployment of open broadband networks in white areas, the Ministry will call on electronic communications operators to submit expressions of commercial interest. This will provide the basis to precisely define and identify in the Consolidated Cadastre of Public Infrastructure the households that lack broadband Internet access at a speed of at least 100 Mbps or 30 Mbps and for which the operators have no commercial interest in providing such access in the next three years.

## **11 Measures to stimulate private investment and reduce the costs of broadband infrastructure deployment**

### **11.1 Ensuring competition**

The most efficient measure to accelerate the deployment of broadband networks is to ensure competition. Namely, competition enables that anywhere with enough demand for broadband services an appropriate offer of broadband access is developed. Such competition may be promoted in several ways:

- with the regulated operation of operators enjoying special or exclusive rights, operators of public communications networks relating to network interconnection and operators' access, the shared use of property or communications facilities, the shared use of building installations, and the shared use of other commercial public infrastructure, in accordance with the provisions of Articles 89 to 94 of the Electronic Communications Act (ZEKom-1);
- with *ex-ante* regulation of markets, in accordance with the provisions of Articles 95 to 108 of the ZEKom-1;
- with policies aimed at promoting the development of competition as regards service and technology-platform levels, e.g. the reduction of deployment costs, the implementation of the policy programme for the radio frequency spectrum and the consistent implementation of the operators' commercial interest.

### **11.2 Reducing the costs for the deployment of the broadband infrastructure**

The Digital Agenda for Europe has identified the need for policies to lower the costs of broadband deployment, including proper planning and coordination and the reduction of administrative burdens. Reducing the costs of deploying broadband networks would also contribute to achieving the digitisation of the public sector, allowing a digital leverage effect on all sectors of the economy, in addition to a reduction in the costs of public administrations and increased efficiency of the services provided to citizens.

Measures to support broadband development, e.g. the use of existing infrastructures, transparency and the coordination of civil engineering works, cross-sectoral assistance, etc., may significantly facilitate broadband infrastructure investments and contribute to reducing the costs of high-speed

communications infrastructures. In drafting the relevant legal provisions, these issues have received particular attention over the last ten years.

The summary of some crucial provisions of the Electronic Communications Act (ZEKom-1), which entered into force on 15 January 2013:

- For the purposes of spatial planning, a public communications network and the associated infrastructure are considered to be commercial public infrastructure. This enables the provision of land with infrastructure.
- The deployment of primary electronic communications networks and associated infrastructure and other electronics networks and associated infrastructure on property owned by legal entities under public law is deemed to be of public benefit. The legal provision determining that the deployment of such communications networks is of public benefit allows for the initiation of an expropriation procedure or the establishment of easements on property owned by other entities.
- Where practically and technically feasible, electronic communications networks and associated infrastructure must be deployed so as to enable their shared use. To this end, broadband deployment must envisage and establish access points that allow joint use. With a view to limiting unnecessary spatial development, this obligation applies to all new deployments.
- In order to ensure the efficient installation of house communications lines in multiple dwellings and commercial buildings, a central access point must be envisaged and established so as to enable individual operators to access each part of the (subscriber's) premises separately.
- Within the framework of their competences, local communities shall accelerate the deployment of public communications networks.
- Access to civil engineering infrastructure is crucial for the deployment of parallel networks and, indirectly, to ensure competition. Consequently, it is important for the Agency for Communication Networks and Services (AKOS) to obtain all relevant information so as to be able to locate the capacity and availability of facilities that may be useful for the interested co-investors in their deployment. In view of the above, investors in public communications networks and associated infrastructure, investors in electronic communications networks and associated infrastructure for the purposes of security, policing, defence, protection, rescue and relief, and investors in other electronic communications networks and associated infrastructure built on property owned by bodies governed by public law, must notify the Agency for Communication Networks and Services (AKOS) of their intention to commence the planned deployment and issue a call to interested joint investors for the joint deployment of the electronic communications network. Natural persons or legal entities that provide communications networks are thus given the possibility to simultaneously deploy their own networks, which enables the sharing of the costs of civil engineering works with investors. In order to enable this, investors must notify the Agency for Communication Networks and Services (AKOS) of their intention to commence planned deployments within a timeframe that still allows the requests of potential co-investors to be taken into consideration.
- On its website, the Agency for Communication Networks and Services (AKOS) has set up a specific section entitled "call to investors", announcing the intentions of investors to commence planned deployments and calling on co-investors to participate in the joint deployment of electronic communications networks.
- Investors in other types of public economic infrastructure (such as transport, energy, municipal and water infrastructure) must design their networks such that, where technically feasible,

electronic communications networks and the associated infrastructure can be deployed simultaneously. This will avoid unnecessary duplication of work and spatial developments and reduce the associated costs since co-investors will share the deployment costs, which ultimately also reduces the cost for the provision of services to end users.

- Where the deployment of the communications network and associated infrastructure, or of other public economic infrastructure, is financed from public funds, a special and additional obligation is imposed on the investor, pursuant to which in deploying such infrastructure the investor must install vacant cable ducts of sufficient capacity if, according to the data from the records of the Consolidated Cadastre of Public Infrastructure, the planned construction site does not already contain such cable ducts and if the investor fails to obtain a co-investor in the joint deployment. This provision aims to limit unnecessary spatial developments.

At the EU level, Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications networks was adopted. The Directive entered into force on 20 June 2014 and imposed the obligation to transpose its provisions into the national legislation of EU Member States by 1 July 2016. The Directive falls under the remit of the Ministry of Education, Science and Sport, which is responsible for the area of electronic communications. However, it also concerns other ministries and types of infrastructure (e.g. energy, municipal, traffic and water).

The Directive complements the regulatory framework for electronic communications networks and aims to facilitate and incentivise the deployment of high-speed electronic communications networks by promoting the joint use of existing physical infrastructure and by enabling more efficient deployment of new physical infrastructure so that such networks can be deployed at lower cost. It seeks minimum harmonisation, which provides Member States with a degree of flexibility in regulating this area in their national legislation. The Electronic Communications Act (ZEKom-1) already provides some solutions that comply with the requirements of Directive 2014/61/EU. However, full transposition of the Directive requires amendments to the legislation, including the amendment of the applicable ZEKom-1 and of the legislation under the remit of other relevant ministries.

One of the crucial resources for the reduction of the costs of the deployment of the broadband infrastructure is also the mutual complementarity of capacities and investments in other commercial public infrastructures, such as the electricity grid. Electricity networks or smart grids can integrate, in a cost efficient manner, all generating sources, consumers and those that both generate and consume, in order to ensure an economically efficient and sustainable power system with low losses and high levels of quality, security of supply, and safety. A smart grid includes an increasing range of generators producing electricity from renewable sources, which – along with electric vehicles and new technologies for the storage of electricity – requires far more efficient energy use. Electricity distributors have started to use smart metering of energy consumption, which will allow the control and regular remote reading of meters and the capturing of other data on consumption, and in some places also the remote metering of the consumption of gas, water, energy and district heating. In practice, this entails the deployment of fibre optic communications infrastructure to all substations in settlements that are not located more than 500 m from the most remote end user.

In order to enable these measures to be implemented in practice as soon as possible and to contribute to reducing broadband deployment costs, and to accelerate deployment in synergy with the deployment of other public commercial infrastructures, additional incentive measures will be taken to provide information to the relevant ministries and stakeholders and in particular to relevant majority state-owned companies, as well as measures for active marketing of the excess capacities of the broadband infrastructures in state-owned companies and institutions. The above-mentioned measures shall be approved by the Government.

### **11.3 The implementation of the EU's Radio Spectrum Policy Programme**

Wireless broadband communications are, like complementary technologies, an important means to boost competitiveness, consumer choice and Internet access in rural and other areas where the deployment of wired broadband is difficult or not economically viable unless other incentives are provided.

In line with Decision No 243/2012/EU of the European Parliament and of the Council establishing a multiannual radio spectrum policy programme, the radiospectrum for mobile communications is assigned in the Republic of Slovenia in a harmonised manner. In line with the multiannual Radio Spectrum Policy Programme, the Agency for Communication Networks and Services (AKOS) issued on 30 May 2014 decisions assigning parts of the spectrum for the radiofrequency bands of 800 MHz, 900 MHz, 1800 MHz, 2100 MHz and 2600 MHz. The Ministry of Education, Science and Sport provided the AKOS with strategic guidelines, requesting the immediate assignment of non-assigned frequencies within the radiofrequency bands of 1800 MHz and 2100 MHz and the assignment of frequencies within the radiofrequency band of 700 MHz in accordance with the decisions adopted by the International Telecommunication Union (ITU) and the EU in light of the needs and expectations of electronic communications operators. The assignment of additional frequencies for mobile communications within the radiofrequency bands of 700 MHz and 800 MHz will enable basic broadband connectivity in the interim period until the deployment of fixed broadband infrastructure. The 700 MHz radiofrequency band is also envisaged for the provision of broadband access in the event of major natural and other disasters, emergency situations and for the purposes of national security.

### **11.4 The commercial interest of operators**

Operators who submit their expressions of commercial interest in the deployment of broadband access to the Internet are obliged to fulfil their commitments within a 3-year period in accordance with the provisions of the Electronic Communications Act (ZEKom-1). The implementation of the commitments made in the expressions of commercial interest is supervised by the Agency for Communication Networks and Services (AKOS).

The most efficient measure for accelerated deployment of broadband networks is to ensure competition. Namely, competition enables that an appropriate offer of broadband access is developed anywhere with enough demand for broadband services. The measures to reduce the broadband deployment costs, the use of the available radiofrequency spectrum, and the implementation of the commitments made by operators in the expressions of commercial interest will significantly contribute to the faster development of the high-speed communications infrastructure.

## **12 Monitoring and management of the implementation of the NGN Development Plan–2020**

In Slovenia, the system for monitoring the development of the information society is already in place. It is based on the research of the SURS, harmonised methodologies, and Eurostat indicators. The results of statistical surveys of the development of the information society are also published on the Digital Agenda Scoreboard. The key performance indicator of the implementation of the NGN Development Plan–2020 will be the Digital Economy and Society Index (DESI)<sup>17</sup>. In accordance with the Operational Programme for the Implementation of the European Cohesion Policy 2014–2020, the performance of the NGN Development Plan–2020 will be verified once per year through the number of households newly connected to a broadband network at a speed of at least 100 Mbps. The final 2023 target is to connect 20,800 households.

After testing commercial interest, a feasibility assessment will be made for the NGN Development Plan–2020 on the basis of the commercial interest expressed by operators. Should the commercial interest of operators not be sufficient and if the available public funds do not enable the provision of coverage of all households in white areas, the possibility of obtaining additional public funds will be considered. If it is not possible to obtain additional public funds to provide the households in white areas with broadband coverage, the NGN Development Plan–2020 will be revised.

The financial feasibility of the project of broadband infrastructure deployment in rural areas is based on geographic segmentation based on high and low population densities. Within the framework of the available cohesion policy funds, amounting to EUR 72.5 million for the attainment of the established targets, 62,700 connections can be provided in the geographic segment with high population density with the envisaged co-financing of EUR 1,000 per connection, whereas in the geographic segment with low population density, 32,000 households can be provided with connections, which are to be co-financed in the amount of EUR 300 per connection. The financial feasibility of the project is thus based on the assumption of the existence of commercial interest in broadband deployment for 260,000 households in the geographic segment with high population density.

Should the expected commercial interest not exist, the lacking public funds will have to be provided to fill the gap in the envisaged financial structure. Should the need arise, the NGN Development Plan–2020 will be revised by shifting the boundary between two geographic segments with high and low population densities. As a result, the number of households to be provided with 100 Mbps broadband will decrease, whereas the number of households to be provided with broadband infrastructure at a speed of at least 30 Mbps will increase. Such modifications will result in a balance between investment needs, commercial interests and private financial resources.

In order to achieve the effectiveness of the measures and projects under the NGN Development Plan–2020, additional training must be provided in the following areas:

- public procurement and public tenders;
- public-private partnerships in the area of broadband infrastructure deployment;
- EU legislation, recommendations and state aid rules relating to the co-financing of the deployment of broadband infrastructure;
- investment project and business models for the deployment of broadband infrastructure;
- information and communication technologies: the Internet of things, cloud computing, mass data and mobile technologies;
- resolution of the issues of e-inclusion, digital literacy and the stimulation of demand.

Events providing information will be organised for local communities and those engaged in the preparation of projects, along with training and workshops for the successful implementation of public tenders and project management. These training activities will entail the preparation of projects in the area of electronic communications, business models for the deployment and operation of broadband infrastructure and topics on state aid, PPPs and public procurement.

## 13 Conclusions

With the implementation of the proposed plan, the strategic goals set under the initiative of DIGITAL SLOVENIA 2020 and, consequently, also the targets of the Digital Agenda for Europa will be achieved.

Broadband infrastructure that provides access to high-speed Internet forms a basis for the infrastructure of the modern digital society, without which it is difficult to imagine any social life. Such access increasingly shapes the opportunities of individuals in all fields of private and public life and has similar far-reaching impacts on the economy, the public sector and civil society.

The next-generation broadband networks will enable a high level of Internet use in Slovenia that is comparable to developed countries due to the resulting better user experience; furthermore, the speed

of the network will enable access to applications and data stored remotely in the so-called “cloud”. In this context, we should not overlook the impact of broadband infrastructure on improving general access to the digital cultural heritage and historical archives for all inhabitants.

It is a given that economic and general development in the contemporary digital society is closely connected with the development of broadband access. And for this reason, broadband development should be a strategic focus of Slovenia and considered a national priority. In order to keep pace with the most developed countries, Slovenia should set ambitious development goals since the digital service infrastructure is increasingly becoming one of the crucial infrastructures ensuring the provision of quality high-speed Internet access for all. It could be claimed that this falls in the category of basic human rights.

The proposal for the development of the broadband infrastructure in the next developmental period takes into consideration the importance and impact of such infrastructure, the current situation, the positive experiences gained in development projects carried out within PPPs, the industry's positions, and the guidelines provided by the European Commission, and it as well avoids interim solutions. At the same time, it pursues the targets of broadband infrastructure development so as to enable, as soon as possible, that the provision of broadband Internet access is included among the services universally ensured.

The estimated development funds to be provided to attain the set targets are relatively high and divided between the public and private sectors. Furthermore, all legislative options will be considered and additional measures will be carried out to lower broadband deployment costs, which should result in a substantial reduction in the funds necessary to achieve the 2020 targets.

In order to achieve the target – to provide broadband Internet access at a speed of at least 100 Mbps to 96% of households by 2020 and a speed of not less than 30 Mbps to the remaining percentage of households – the clear support of all stakeholders as regards these ambitious targets, the provision of developmental structural and integral funds and support for the projects at all levels will be required.

The expected positive impact of the high-performance broadband infrastructure on the overall development of the society is so significant and valuable that Slovenia should not miss such a great development opportunity.

## 14 Appendices

### 14.1 Appendix 1: List of abbreviations

<b>OECD</b>	The Organisation for Economic Co-operation and Development
<b>GDP</b>	Gross domestic product
<b>SME</b>	Small and medium-sized enterprises
<b>DAE</b>	Digital Agenda for Europe
<b>Mbps</b>	Megabits per second
<b>EU</b>	European Union
<b>ICT</b>	Information and communication technology
<b>FTTH</b>	Fibre-to-the-home
<b>FTTC</b>	Fibre-to-the-Curb
<b>AKOS</b>	Agency for Communication Networks and Services of the Republic of Slovenia
<b>xDSL</b>	X Digital Subscriber Line on cooper loops
<b>ZEKom-1</b>	Electronic Communications Act
<b>OTT</b>	<b>Over-The-Top</b> content delivered over the Internet
<b>FWBA</b>	Fixed Wireless Broadband Access
<b>ERDF</b>	European Regional Development Fund
<b>EAFRD</b>	European Agricultural Fund for Rural Development
<b>SURS</b>	Statistical Office of the Republic of Slovenia
<b>SMARS</b>	Surveying and Mapping Authority of the Republic of Slovenia
<b>AJPES</b>	Agency of the Republic of Slovenia for Public Legal Records and Related Services



## 14.2 Annex 2: List of Notes

1. [http://www.arhiv.mvzt.gov.si/fileadmin/mvzt.gov.si/pageuploads/DEK/Elektronske\\_komunikacije/Strategije/Strategija\\_BB\\_2008-07-10\\_SI.pdf](http://www.arhiv.mvzt.gov.si/fileadmin/mvzt.gov.si/pageuploads/DEK/Elektronske_komunikacije/Strategije/Strategija_BB_2008-07-10_SI.pdf)
2. [http://www.svrk.gov.si/fileadmin/svrk.gov.si/pageuploads/Dokumenti\\_za\\_objavo\\_na\\_vstopni\\_strani/PS\\_koncna\\_potrjena\\_141028.pdf](http://www.svrk.gov.si/fileadmin/svrk.gov.si/pageuploads/Dokumenti_za_objavo_na_vstopni_strani/PS_koncna_potrjena_141028.pdf)
3. [http://www.svrk.gov.si/fileadmin/svrk.gov.si/pageuploads/KP\\_2014-2020/OP\\_SFC\\_poslano\\_11\\_12\\_2014.pdf](http://www.svrk.gov.si/fileadmin/svrk.gov.si/pageuploads/KP_2014-2020/OP_SFC_poslano_11_12_2014.pdf)
4. [http://www.program-podezelja.si/images/Programme\\_Commission\\_Decision\\_2014SI06RDNP001\\_1\\_3\\_sl.pdf](http://www.program-podezelja.si/images/Programme_Commission_Decision_2014SI06RDNP001_1_3_sl.pdf)
5. <http://eur-lex.europa.eu/legal-content/SL/TXT/PDF/?uri=CELEX:52014DC0903&from=EN>
6. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2010:0245:FIN:SL:PDF>
7. [http://ec.europa.eu/regional\\_policy/sources/docgener/informat/2014/eac\\_guidance\\_esif\\_part2\\_en.pdf](http://ec.europa.eu/regional_policy/sources/docgener/informat/2014/eac_guidance_esif_part2_en.pdf)
8. [http://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports\\_Impact-of-Broadband-on-the-Economy.pdf](http://www.itu.int/ITU-D/treg/broadband/ITU-BB-Reports_Impact-of-Broadband-on-the-Economy.pdf)
9. As established by the research study of Ericsson in Arthur D. Little and Chalmers University of Technology and published at <http://www.ericsson.com/res/thecompany/docs/corporate-responsibility/2013/ericsson-broadband-final-071013.pdf>  
Similarly: Analysys Mason, <http://ec.europa.eu/digital-agenda/en/fast-and-ultra-fast-internet-access-analysis-and-data>
10. [http://digital-agenda-data.eu/charts/analyse-one-indicator-and-compare-countries#chart={"indicator-group":"broadband","indicator":"bb\\_scov","breakdown":"TOTAL\\_POPHH","unit-measure":"pc\\_hh\\_all","ref-area":\["BE","BG","CZ","DK","DE","EE","IE","EL","ES","FR","IT","CY","LV","LT","LU","HU","MT","NL","AT","PL","PT","RO","SI","SK","FI","SE","UK","EU27","HR","IS","NO"\]}](http://digital-agenda-data.eu/charts/analyse-one-indicator-and-compare-countries#chart={)
11. <https://ec.europa.eu/digital-agenda/en/scoreboard/slovenia>
12. <http://ec.europa.eu/digital-agenda/en/news/broadband-investment-guide>
13. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2013:025:0001:0026:SL:PDF>
14. <http://eur-lex.europa.eu/legal-content/SL/TXT/PDF/?uri=OJ:C:2013:025:FULL&from=EN>
15. [http://ec.europa.eu/information\\_society/newsroom/cf/dae/document.cfm?doc\\_id=777](http://ec.europa.eu/information_society/newsroom/cf/dae/document.cfm?doc_id=777)
16. [http://www.mizs.gov.si/si/delovna\\_podrocja/direktorat\\_za\\_informacijsko\\_druzbo/digitalna\\_slovenija\\_2020](http://www.mizs.gov.si/si/delovna_podrocja/direktorat_za_informacijsko_druzbo/digitalna_slovenija_2020)
17. The Digital Economy and Society Index (DESI) is a composite index developed by the European Commission (GD CNECT) to assess the development of EU Member States in the field of the digital economy and society. The index summarises a series of indicators based on five characteristics: connectivity, human capital, use of the Internet, integration of digital technology and digital public services. More information on DESI is available at: <http://ec.europa.eu/digital-agenda/en/digital-agenda-scoreboard>.

### 14.3 Appendix 3 Overview of existing capacities of the network termination points by municipality

MUNICIPALITY	NUMBER OF HOUSEHOLDS	NUMBER OF COMPANIES	NUMBER OF NTP 0<capacity<30	NUMBER OF NTP 30 ≤capacity<100	NUMBER OF NTP 100 ≤capacity
Ajdovščina	7,079	2,122	4,385	4,254	1,110
Ankaran	1,360	354	360	1,639	78
Apače	1,485	235	607	446	48
Beltinci	3,187	614	1,512	1,950	410
Benedikt	853	162	398	301	110
Bistrica ob Sotli	592	117	288	151	2
Bled	3,566	1,461	1,312	3,049	1,475
Bloke	630	162	273	201	19
Bohinj	2,327	927	725	1,655	152
Borovnica	1,616	305	421	808	429
Bovec	1,616	568	568	996	37
Braslovče	2,202	498	896	1,258	87
Brda	2,197	541	999	693	35
Brezovica	4,282	1,354	1,553	1,731	79
Brežice	10,437	2,707	7,897	2,795	1,473
Cankova	747	167	296	154	8
Celje	24,104	7,017	7,102	25,329	4,980
Cerklje na Gorenjskem	2,513	831	1,312	1,093	306
Cerknica	4,466	1,245	1,377	2,019	348
Cerkno	1,786	465	854	476	24
Cerkvenjak	737	115	326	213	2
Cirkulane	1,042	130	500	151	0
Črenšovci	1,443	286	613	971	151
Črna na Koroškem	1,549	235	364	592	37
Črnomelj	5,776	1,304	2,183	2,273	538
Destrnik	1,047	157	529	145	180
Divača	1,683	407	563	686	193
Dobje	419	83	204	88	0
Dobrepolje	1,392	317	662	447	58
Spa	875	164	311	551	31
Dobrova-Polhov Gradec	2,618	706	1,225	1,246	112
Dobrovnik	567	126	126	482	61
Dol pri Ljubljani	2,148	581	725	794	520
Dolenjske Toplice	1,344	278	618	312	1,734
Domžale	13,856	4,252	3,708	6,275	10,132
Dornava	1,049	195	409	705	23
Dravograd	3,785	831	963	1,299	125

MUNICIPALITY	NUMBER OF HOUSEHOLDS	NUMBER OF COMPANIES	NUMBER OF NTP 0<capacity<30	NUMBER OF NTP 30 ≤capacity<100	NUMBER OF NTP 100 ≤capacity
Duplek	2,888	552	957	889	214
Gorenja vas-Poljane	2,313	703	1,048	760	2,506
Gorišnica	1,488	285	686	754	55
Gorje	1,176	308	331	699	184
Gornja Radgona	3,690	851	1,233	3,248	668
Gornji Grad	1,039	258	253	954	8
Gornji Petrovci	856	157	540	346	49
Grad	872	126	492	180	20
Grosuplje	7,402	2,132	2,157	4,220	3,056
Hajdina	1,624	374	677	1,066	9
Hoče-Slivnica	5,034	1,140	1,881	2,575	769
Hodoš	114	24	94	4	0
Horjul	959	299	393	566	145
Hrastnik	4,442	658	1,521	2,216	1,605
Hrpelje-Kozina	1,752	580	839	864	1,971
Idrija	4,884	1,346	1,278	2,907	171
Ig	2,604	675	1,320	967	42
Ilirska Bistrica	5,676	1,386	3,872	1,917	6,455
Ivančna Gorica	5,952	1,430	2,699	2,660	176
Izola	7,592	2,427	2,010	4,023	1,465
Jesenice	9,261	1,608	2,533	4,946	3,554
Jezerško	276	82	88	176	3
Jurišinci	910	134	573	113	1
Kamnik	11,453	3,088	4,381	4,069	563
Kanal	2,338	433	894	990	18
Kidričevo	2,746	543	919	2,264	58
Kobarid	1,836	506	829	797	18
Kobilje	235	44	20	307	18
Kočevje	7,132	1,315	1,995	4,630	1,077
Komen	1,428	376	961	293	1,186
Komenda	2,094	682	1,068	554	692
Koper	20,072	7,793	5,926	15,248	4,080
Kostanjevica na Krki	949	214	373	303	36
Kostel	355	76	223	54	1
Kozje	1,434	282	640	479	16
Kranj	22,926	6,573	6,638	10,637	5,363
Kranjska Gora	2,534	766	792	3,266	294
Križevci	1,343	284	514	640	355
Krško	10,639	2,657	4,880	2,263	3,314
Kungota	2,041	392	706	580	5

MUNICIPALITY	NUMBER OF HOUSEHOLDS	NUMBER OF COMPANIES	NUMBER OF NTP 0<capacity<30	NUMBER OF NTP 30 ≤capacity<100	NUMBER OF NTP 100 ≤capacity
Kuzma	630	90	354	121	4
Laško	5,983	1,163	2,574	3,232	523
Lenart	3,038	857	1,721	1,445	626
Lendava	5,105	1,073	2,090	2,903	936
Litija	6,033	1,395	2,778	2,802	354
Ljubljana	126,376	51,409	30,289	117,547	65,417
Ljubno	1,172	291	477	389	353
Ljutomer	4,798	1,125	1,914	2,842	1,161
Logatec	4,925	1,481	1,403	4,687	905
Log-Dragomer	1,338	396	686	359	517
Loška dolina	1,533	307	618	369	43
Loški potok	774	122	329	448	863
Lovrenc na Pohorju	1,450	215	396	1,101	13
Luče	657	207	220	317	1
Lukovica	1,896	491	967	558	310
Majšperk	1,705	276	876	508	5
Makole	856	130	329	142	2
Maribor	53,726	15,126	15,967	57,195	16,235
Markovci	1,526	320	721	777	109
Medvode	6,168	1,743	4,804	1,777	129
Mengeš	2,819	916	753	1,476	852
Metlika	3,345	770	1,120	1,220	507
Mežica	1,736	322	217	1,122	467
Miklavž na Dravskem polju	2,838	620	1,095	1,469	102
Miren-Kostanjevica	1,935	501	429	1,111	88
Mirna Peč	1,040	173	469	185	372
Mirna	1,045	234	407	432	472
Mislinja	1,965	360	739	995	34
Mokronog-Trebelno	1,184	222	422	287	483
Moravče	1,778	368	1,050	289	0
Moravske Toplice	2,431	553	1,396	812	223
Mozirje	1,688	539	475	1,353	100
Murska Sobota	8,301	2,808	1,613	6,978	8,609
Muta	1,510	306	1,128	684	33
Naklo	1,931	641	538	999	198
Nazarje	1,115	297	615	730	39
Nova Gorica	13,315	4,728	3,478	10,205	4,844
Novo mesto	14,568	4,011	4,630	7,093	9,385
Odranci	517	113	362	222	322
Oplotnica	1,613	282	810	380	3

MUNICIPALITY	NUMBER OF HOUSEHOLDS	NUMBER OF COMPANIES	NUMBER OF NTP 0<capacity<30	NUMBER OF NTP 30 ≤capacity<100	NUMBER OF NTP 100 ≤capacity
Ormož	5,228	992	2,370	2,278	2,424
Osilnica	227	32	111	1	12
Pesnica	3,098	660	1,063	1,029	56
Piran	8,757	3,309	1,906	6,066	1,216
Pivka	2,427	623	1,161	1,440	219
Podčetrtek	1,412	361	731	455	15
Podlehnik	813	139	345	134	24
Podvelka	1,223	195	904	324	27
Poljčane	1,903	355	374	1,284	31
Polzela	2,443	514	752	1,679	195
Postojna	6,690	1,908	2,450	7,235	5,670
Prebold	2,097	529	486	1,988	149
Preddvor	1,260	354	510	947	22
Prevalje	2,990	589	709	2,545	88
Ptuj	10,476	3,197	4,482	8,189	2,126
Puconci	2,317	423	1,031	720	369
Rače-Fram	3,257	653	980	1,272	293
Radeče	1,923	401	516	1,030	285
Radenci	2,175	432	1,490	879	146
Radlje ob Dravi	2,827	712	832	971	47
Radovljica	7,717	2,506	1,793	7,788	1,078
Ravne na Koroškem	5,356	1,102	939	4,072	237
Razkrižje	504	78	144	352	10
Rečica ob Savinji	973	226	423	369	4
Renče-Vogrsko	1,714	441	646	499	456
Ribnica na Pohorju	590	91	190	121	12
Ribnica	3,540	934	1,142	2,113	665
Rogaška Slatina	4,861	1,285	2,449	2,745	119
Rogašovci	1,215	187	556	184	1
Rogatec	1,563	276	491	761	40
Ruše	3,486	685	5,266	1,483	82
Selnica ob Dravi	2,054	428	2,441	411	9
Semič	1,561	270	543	424	1,871
Sevnica	7,303	1,543	2,621	2,121	2,187
Sežana	5,284	2,094	2,230	3,665	7,254
Slovenj Gradec	7,514	2,069	2,289	5,972	1,710
Slovenska Bistrica	10,507	2,662	4,143	6,077	1,864
Slovenske Konjice	6,050	1,538	3,671	3,102	1,263
Sodražica	892	211	323	381	120
Solčava	220	122	124	149	2

MUNICIPALITY	NUMBER OF HOUSEHOLDS	NUMBER OF COMPANIES	NUMBER OF NTP 0<capacity<30	NUMBER OF NTP 30 ≤capacity<100	NUMBER OF NTP 100 ≤capacity
Središče ob Dravi	907	153	322	371	146
Starše	1,690	331	620	905	156
Straža	1,482	322	461	451	492
Sveta Ana	795	117	300	171	119
Sveta Trojica v Slov. goricah	787	127	304	234	26
Sveti Andraž v Slov. goricah	447	75	197	7	8
Sveti Jurij ob Ščavnici	1,138	199	332	299	233
Sveti Jurij v Slov. goricah	728	104	172	101	1
Sveti Tomaž	835	88	346	116	435
Šalovci	598	118	296	218	14
Šempeter-Vrtojba	2,670	1,002	573	2,298	385
Šenčur	3,048	989	1,206	1,166	1,068
Šentilj	3,539	608	1,192	1,643	196
Šentjernej	2,550	594	1,119	961	524
Šentjur	8,096	1,863	3,698	3,505	419
Šentrupert	930	210	500	181	299
Škocjan	1,174	215	551	292	14
Škofja Loka	8,471	2,556	3,544	5,598	3,236
Škofljica	3,753	1,097	1,174	1,123	3,054
Šmarje pri Jelšah Primary School	4,142	889	1,919	1,616	75
Šmarješke Toplice	1,216	233	468	312	29
Šmartno ob Paki	1,301	236	443	910	49
Šmartno pri Litiji	1,958	415	961	731	6
Šoštanj	3,656	678	1,015	2,721	110
Štore	1,928	358	565	1,684	33
Tabor	671	137	286	282	1
Tišina	1,569	257	779	921	319
Tolmin	5,003	1,484	1,791	2,423	148
Trbovlje	8,055	1,465	2,740	6,754	1,790
Trebnje	4,625	1,266	2,021	1,770	1,721
Trnovska vas	471	82	186	120	4
Trzin	1,461	1,173	133	2,836	105
Tržič	6,066	1,494	2,446	3,927	440
Turnišče	1,128	187	490	448	558
Velenje	14,409	2,903	2,696	7,776	5,236
Velika Polana	560	66	266	21	396
Velike Lašče	1,639	468	485	201	2,329
Veržej	504	125	111	461	49
Videm	2,340	315	1,073	893	31

MUNICIPALITY	NUMBER OF HOUSEHOLDS	NUMBER OF COMPANIES	NUMBER OF NTP 0<capacity<30	NUMBER OF NTP 30 ≤capacity<100	NUMBER OF NTP 100 ≤capacity
Vipava	2,066	609	784	1,193	194
Vitanje	868	159	313	411	950
Vodice	1,675	448	545	585	40
Vojnik	3,614	751	1,352	1,947	46
Vransko	1,004	267	504	552	18
Vrhnika	6,312	1,801	1,891	5,848	2,246
Vuzenica	1,203	227	286	352	15
Zagorje ob Savi	6,978	1,434	4,402	3,025	734
Zavrč	680	90	246	72	18
Zreče	2,606	630	1,052	1,696	94
Žalec	9,270	2,509	3,254	8,420	1,038
Železniki	2,143	590	1,121	674	2,630
Žetale	511	70	223	94	1
Žiri	1,693	485	532	989	116
Žirovnica	1,696	435	551	1,308	273
Žužemberk	1,755	309	707	566	561
<b>Total</b>	<b>865,958</b>	<b>243,498</b>	<b>308,828</b>	<b>557,647</b>	<b>246,592</b>

## **14.4 Appendix 4: The list of GOŠO (Deployment of Open Broadband Networks) and EAFRD (European Agricultural Fund for Rural Development) municipalities and settlements**

### **GOŠO 1 Municipalities**

Velike Lašče, Dolenjske Toplice, Vitanje, Komen, Postojna, Železniki, Gorenja vas - Poljane, Loški potok, Krško, Slovenj Gradec, Mislinja, Dravograd, Muta, Vuzenica, Radlje ob Dravi, Ribnica na Pohorju, Ormož, Sveti Tomaž, Središče ob Dravi, Semič

### **GOŠO 2 Municipalities**

Mokronog - Trebelno, Trebnje, Mirna, Mirna Peč, Šentrupert, Žužemberk, Sevnica, Sežana, Ilirska Bistrica, Hrpelje-Kozina, Komen, Pivka, Mozirje, Gornji Grad, Rečica ob Savinji, Luče, Ljubno, Solčava, Vransko, Prebold, Polzela, Tabor, Apače, Slovenske Konjice

### **Municipalities that received EAFRS funds**

The Municipality of Odranci

and individual settlements where the GOŠO project was carried out:

The Municipality of Radenci

Boračeva, Hrašenski vrh, Janžev vrh, Kapelski vrh, Kobilščak, Kocjan, Murski vrh, Muščak, Okoslavci, Paričjak, Račji vrh, Radenski vrh, Spodnji Kocjan, Turjanski vrh, Zgornji Kocjan, Žrnova

The Municipality of Gornja Radgona

Gornji Ivanjci, Ivanjševci ob Ščavnici, Ivanjševski vrh, Kunova, Lokavci, Negova, Radvenci, Rodmošči, Aženski vrh, Lastomerci, Lomanoše, Plitvički vrh, Spodnja Ščavnica, Zagajski vrh, Ivanjski vrh, Očeslavci, Spodnji Ivanjci, Stavešinci, Stavešinski vrh