



FTTH/B in Rural Areas

September 2023

FTTH Council Europe's Market Intelligence Committee

AGENDA

1. Study Background
2. General overview and main trends
3. Per-Country analysis
4. Key conclusions

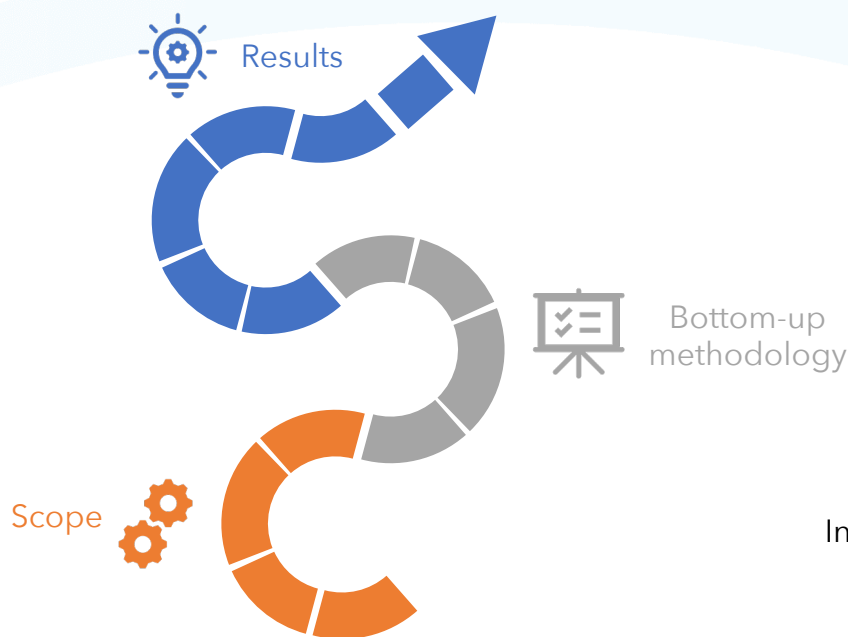
1. Study Background



Methodology

- Mission on behalf of the FTTH Council Europe
 - Provide a general overview of the goals, actions and results of FTTH deployments in rural areas in selected EU countries
- This study is based on data and information collected by the European Commission (through DESI studies) and information gathered from local regulators in each country (if available).

- Desk research
- Interview with authorities
- Information exchange with FTTH Council Europe members



Both quantitative and qualitative data

Monography of the FTTH deployed in rural areas for each country under study based on:

- Regulatory Goals
- Actions implemented
- Budget (if available)
- Results

Individual analysis of 27 EU countries + UK : September 2022

Important definitions

Rural Areas

The EU classification of territorial units, abbreviated NUTS (Nomenclature of Territorial Units for Statistics) subdivides the EU territory into regions at 3 different levels.

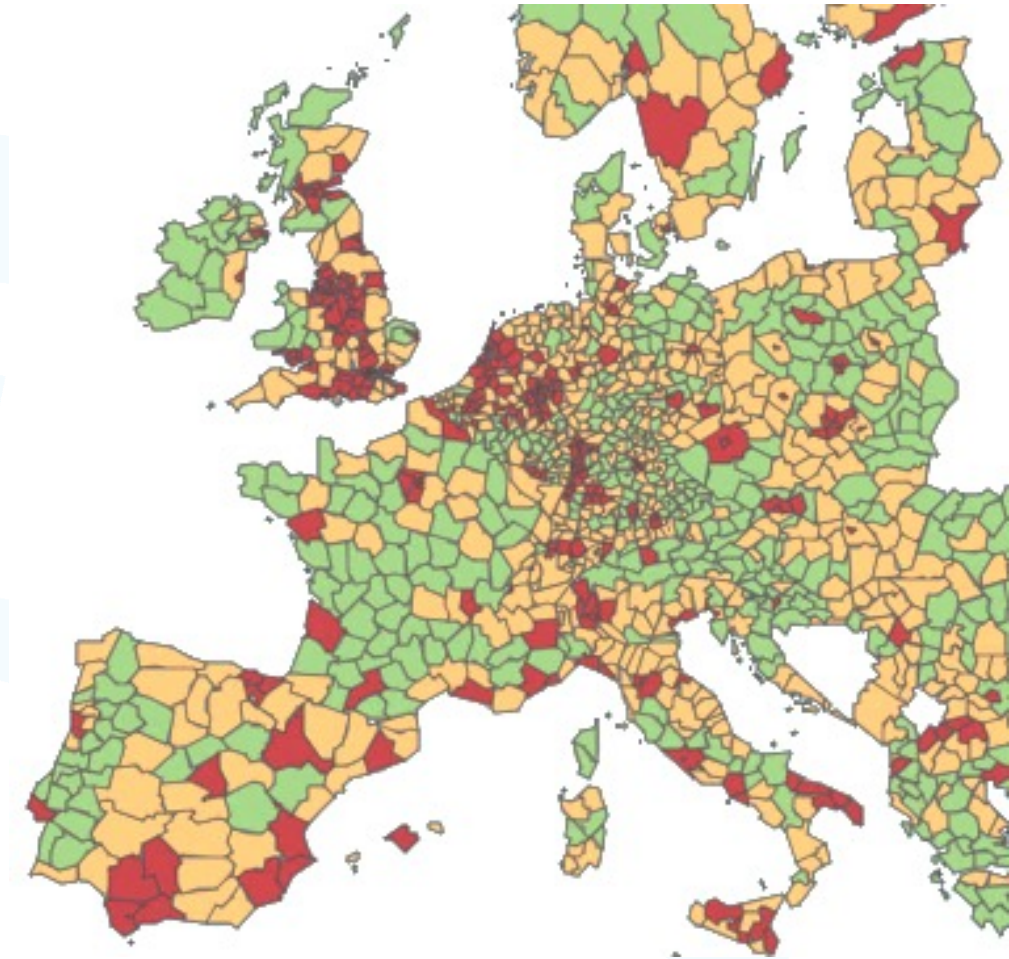
NUTS level 3 regions can be classified as 'Rural' with a population density below 150 inhabitants per km². Many areas designated as Rural can contain higher density locations that can be served via FTTH in an economical way.

FTTH / FTTB

- "Fiber to the Home" (FTTH) is defined as an access network architecture in which the connection to the subscriber's Premises is Optical Fiber. The fiber optic communications path is terminated on or inside the Premises for the purpose of carrying communication services to a single subscriber.
- "Fiber to the Building" (FTTB) is defined as an access network architecture in which the fiber optic communications path is terminated within the building for the purpose of carrying communication services for a single building with potentially multiple subscribers.

NGA

Next Generation Access includes the following technologies: FTTH, FTTB, Cable Docsis 3.0, VDSL and other superfast broadband (at least 30 Mbps download)



Detailed Urban-rural typology by NUTS3 regions

- Predominantly urban regions
- Intermediate regions
- Predominantly rural regions

2. Overview at the European level



Connecting rural Europe with full-fibre

EC guidelines for broadband and per-country approach

Digital Agenda for Europe - main objectives for the years to come

The European Commission's policy framework encourages both private and public investments in ultrafast broadband connectivity and has implemented ambitious targets via "Gigabit Society 2025" as well as the "Digital Compass 2030" strategies.

Key targets included in the "Gigabit Society 2025" programme:

- Provide a 1 Gbps connection to all socio-economic institutions
- Provide an Internet connection of at least 100 Mbps to all European households
- Guarantee uninterrupted 5G coverage in all urban areas and on the main terrestrial transport corridors

"Digital Compass 2030" announced in 2021 also set goals related to broadband coverage to encourage the full digitalization of Europe by 2030. The ambition is that by 2030:

- All European households are covered by a Gigabit network, and
- All populated areas are covered by 5G.

FTTH-ONLY APPROACH

National authorities have promoted and encouraged the use of Fibre-to-the-Home solutions to provide broadband connectivity

INTERMEDIATE APPROACH

Countries where FTTH is massively deployed even though national authorities did not implement a clear and specific strategy towards full-fibre solutions

TECHNOLOGY-NEUTRAL

National authorities have not imposed any specific technological solution when it comes to delivering broadband connectivity for end-users

Strategies and technological approaches

- Intermediate approach
- FTTH-Only
- Technology-neutral

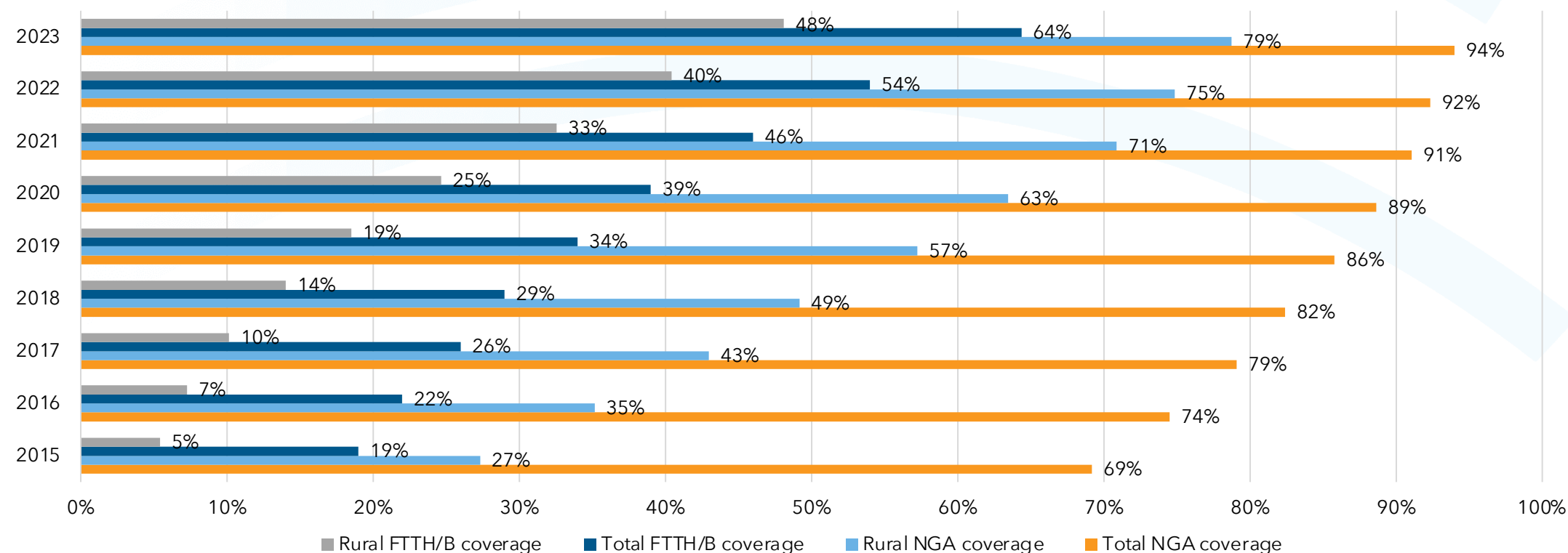
* Country under study: EU27 + UK



Connecting rural Europe with full-fibre

More than 2/3 of rural households with NGA access; About 1/3 of rural households with FTTH/B access

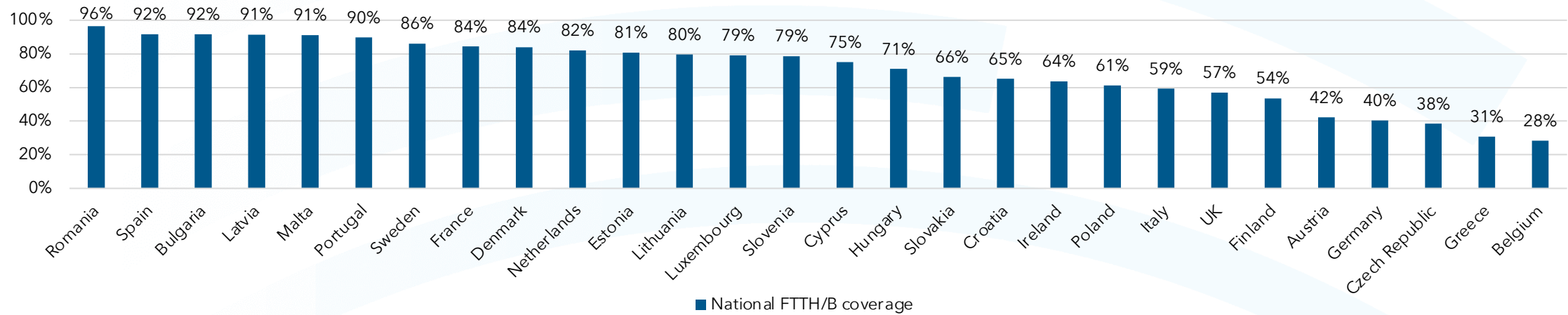
Evolution in rural/total broadband coverage (FTTH/B and NGA), 2015-2023
EU27+UK



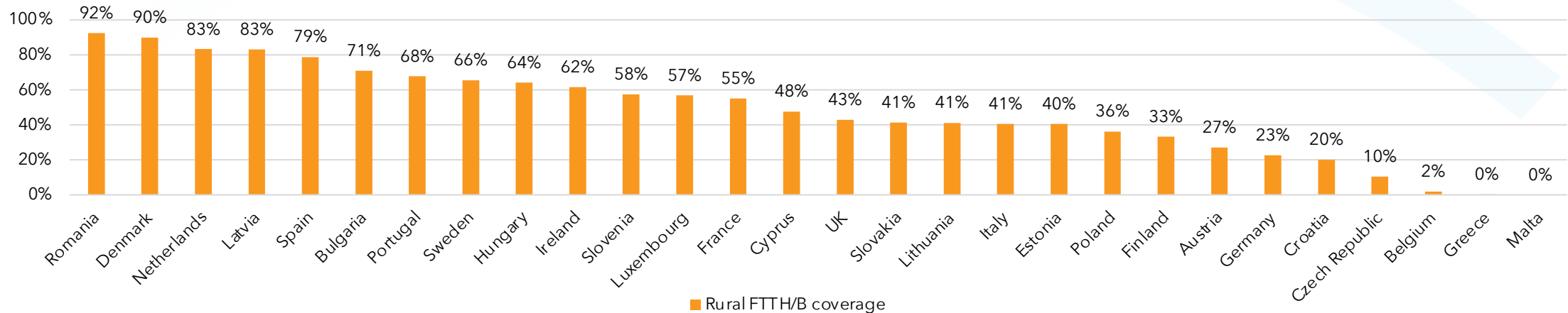
Connecting rural Europe with full-fibre

Ranking of national and rural FTTH/B coverage in UE27+UK

National FTTH/B coverage by country, EU27+UK



Rural FTTH/B coverage by country, EU27+UK



Connecting rural Europe with full-fibre

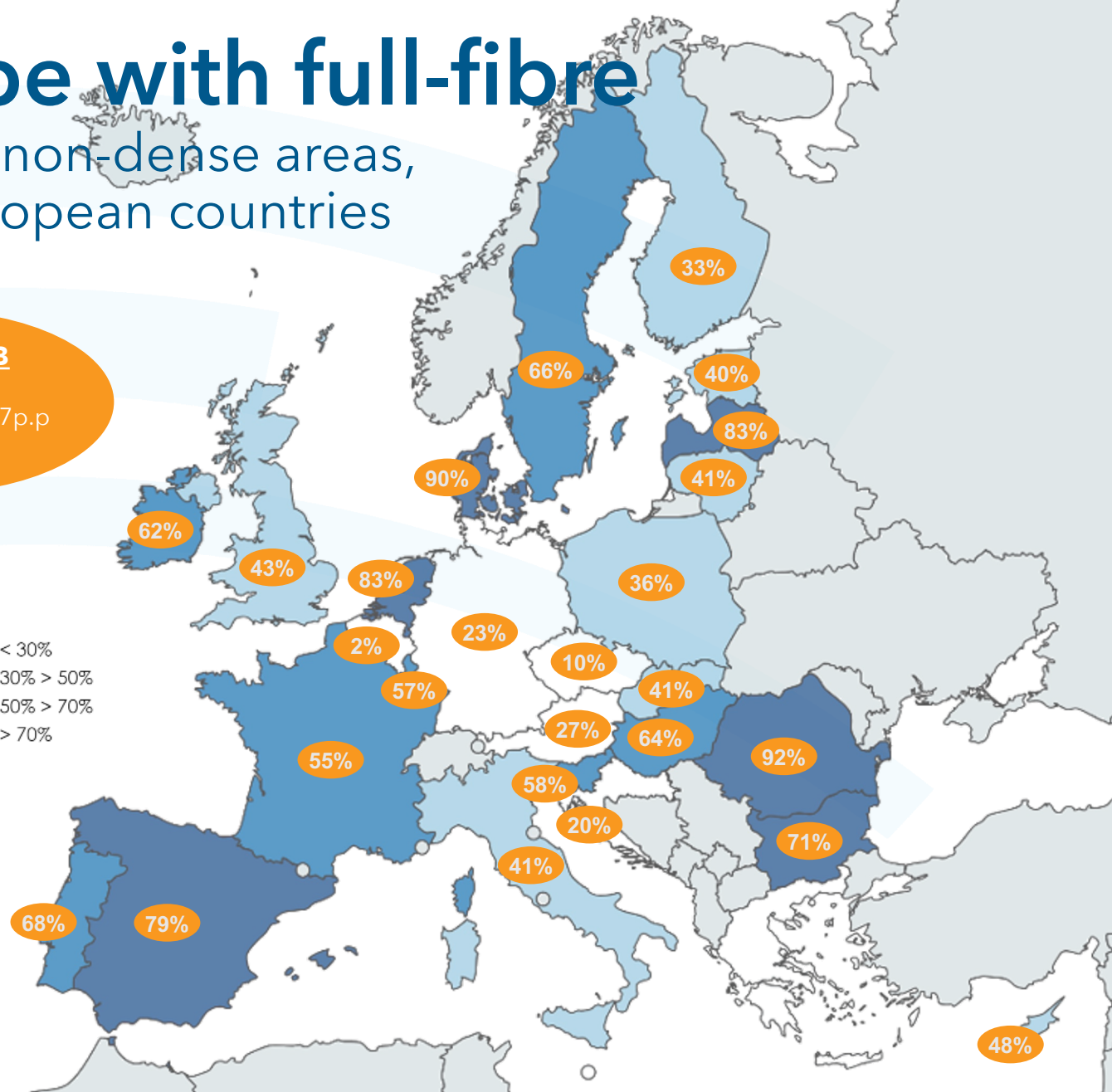
FTTH/B progressively implemented in non-dense areas, but at a very different pace among European countries

Rural FTTH/B coverage (Sept. 2023)

Rank	EU27+UK	Rural FTTH/B Coverage (2023)	Rural FTTH/B Coverage (2015)
1	Romania	92%	25%
2	Denmark	90%	46%
3	Netherlands	83%	18%
4	Latvia	83%	67%
5	Spain	79%	6%
6	Bulgaria	71%	1%
7	Portugal	68%	15%
8	Sweden	66%	14%
9	Hungary	64%	4%
10	Ireland	62%	0%
11	Slovenia	58%	22%
12	Luxembourg	57%	29%
13	France	55%	2%
14	Cyprus	48%	0%
15	UK	43%	1%
16	Slovakia	41%	4%
17	Lithuania	41%	16%
18	Italy	41%	0%
19	Estonia	40%	15%
20	Poland	36%	4%
21	Finland	33%	8%
22	Austria	27%	2%
23	Germany	23%	1%
24	Croatia	20%	0%
25	Czech Republic	10%	5%
26	Belgium	2%	0%
27	Greece	0%	0%
28	Malta	0%	0%

Rural FTTH/B coverage

EU27+UK: 48% (+7p.p YoY)



3. FTTH/B in Rural Areas

Overview at the European level



1. FTTH/B in Rural Areas: Austria



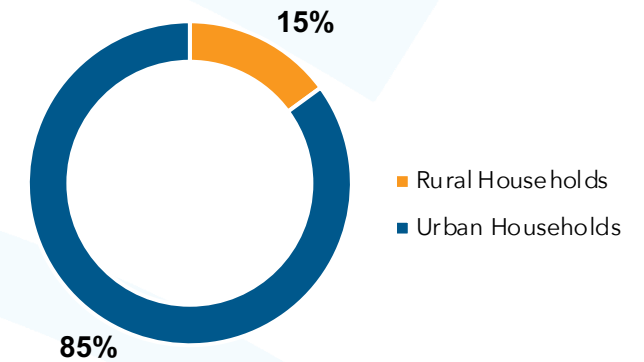
Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

Launch of the 'Breitband Austria 2020' national program by the Federal Ministry of Transport, Innovation and Technology (BMVIT). This program aims to provide ultra-fast broadband nationwide by 2020.

The government opened a public consultation to define a new broadband strategy for the development/investment in high speed broadband access in Austria by 2030. Following the consultation process, the 'Breitbandstrategie 2030' aims for nationwide access of gigabit-capable broadband services by the end of 2030.

Urban/Rural Households breakdown
Austria (2023)



Source: EC

2012

- Launch of the 'Breitband Austria 2020'

2019

- Launch of 'Breitbandstrategie 2030'

2020

- 100 % coverage with 100 Mbps by 2020

2030

- Nationwide access of gigabit-capable broadband services

1. FTTH/B in Rural Areas: Austria

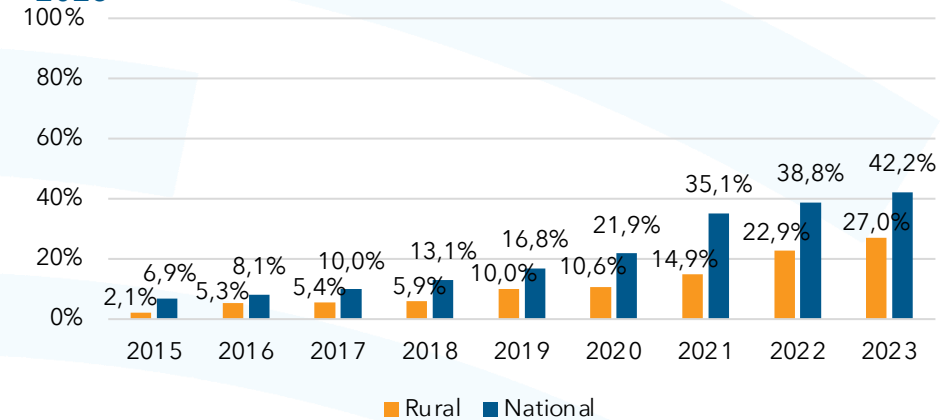
Current status in the country and next steps

Action plans implemented...

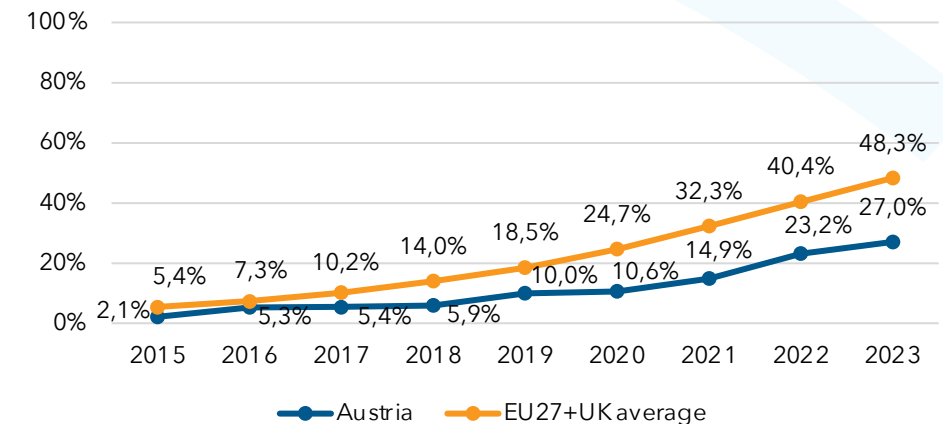
- The government plans to make EUR 1 billion available for NGN deployment in rural areas. Austria plans to provide next generation broadband access to 1.9 million homes identified as having internet speeds lower than 30Mbps.
- Opening a new phase of the tender of the Broadband Billion process of EUR 120 million in order to provide subsidies to expand the fibre infrastructure along the country.
- Setting up another program called "Connect" is in process in order to connect schools and small businesses with fiber.
- Launch of tender process of EUR 30 Million from the Broadband million to provide subsidies to deploy networks in the rural areas.
- The government promoted subsidies to municipalities to take advantage of existing ducts in order to accelerate fiber deployment in each region.
- 2021 : The government has allocated €1.4 billion to broadband expansion
- March 2022 : The European Commission (EC) has supported Austria's €2 billion RRF scheme to deploy passive infrastructure for fixed broadband access networks in areas of the country where there is no current or planned network capable of providing download speeds of at least 100 Mbps

Source: European Commission, IDATE

FTTH/B coverage in Austria (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Austria vs. EU27+UK, 2015-2023



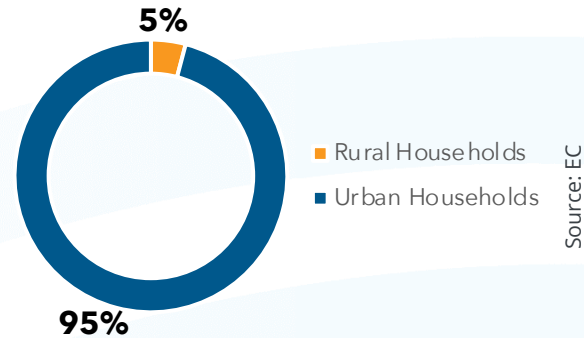
* Rural FTTH/B coverage = Rural FTTH/B Homes passed / Rural households
** National FTTH/B coverage = Total FTTH/B Homes passed / Total households

2. FTTH/B in Rural Areas: Belgium



Current status in the country and next steps

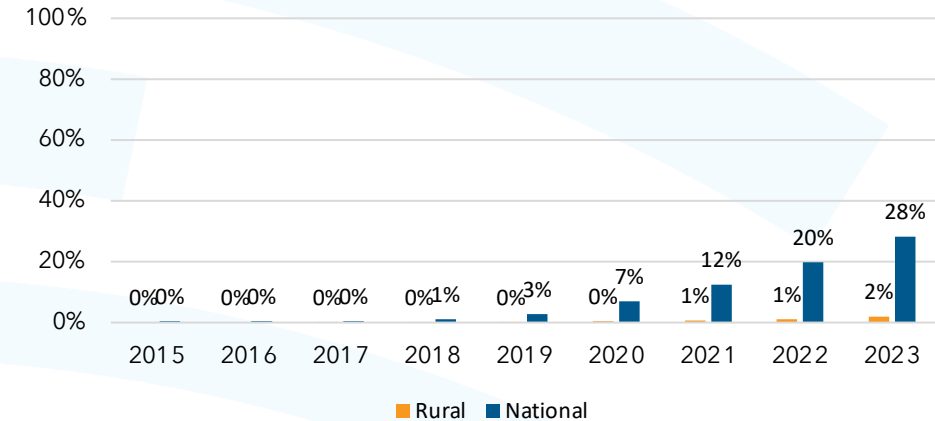
Urban/Rural Households
breakdown Belgium (2021)



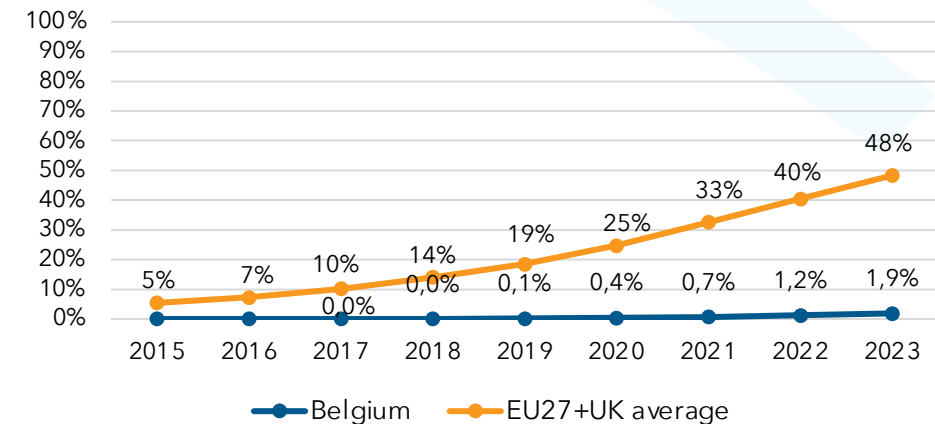
Rural deployment initiatives

- With a view to evolving their HFC and fibre fixed network assets in Flanders into 'the data network of the future', including FTTH technology, Telenet and utility grid operator Fluvius signed a non-binding agreement in October 2021 to create a new self-funding independent infrastructure company that will operate a fully open access network in urban and rural areas, combining their existing infrastructure and developing new build fibre assets.
- VOO announced in February 2022 that gigabit connections were scheduled to be rolled out in selected rural areas in 2022, namely Jalhay, Stree, Ampsin, Waremmes and Latinne.
- A new joint venture - Glasfaser Ostbelgie (GoFiber) - controlled by Ethias (50% plus one share) and Proximus (50% minus two shares), will deploy an open access fibre network in urban and rural areas between 2023 and 2026.

FTTH/B coverage in Belgium (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Belgium vs. EU27+UK, 2015-2023



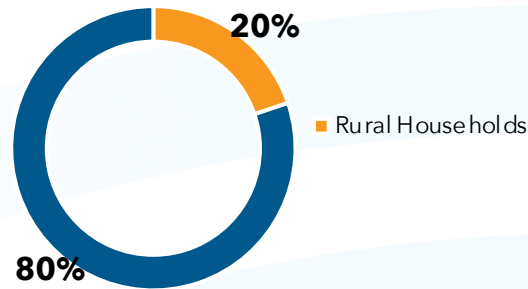
Source: European Commission, IDATE

3. FTTH/B in Rural Areas: Bulgaria



Current status in the country and next steps

Urban/Rural Households breakdown
Bulgaria (2023)



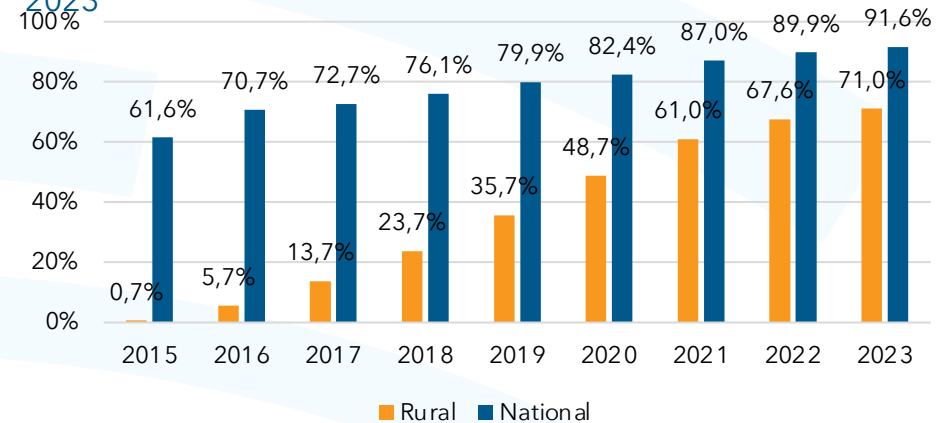
Source: EC

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

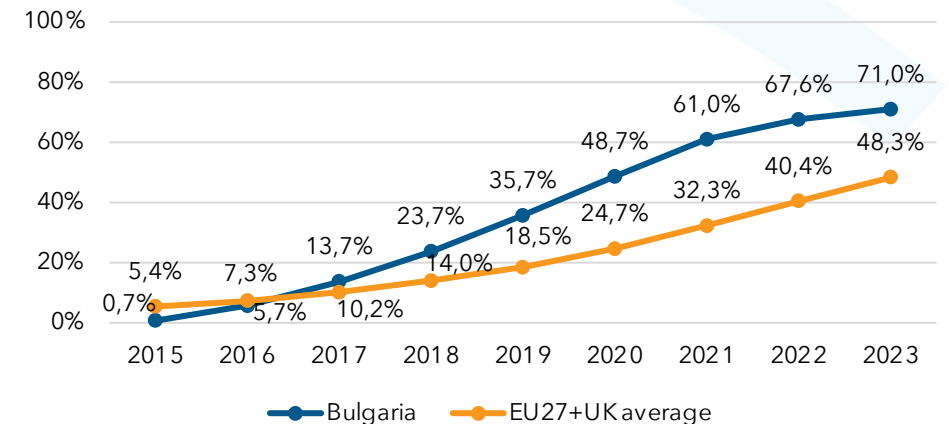
- In 2012, The government launched Plan "Digital Bulgaria 2015" in order to have at least 20 Mbps of speed in existing connections and to promote rollout of networks in rural regions.
- Then, another plan has launched in 2014 "the National Plan for NGA Infrastructure", which aims to provide 30 Mbps Internet service to the 100% of the homes, and 50% with 100Mbps or higher by 2020.
- In August 2020, The government has adopted an updated national broadband strategy, called "Connected Bulgarian". The measures envisage improving access to broadband internet in less populated areas and establish the need for targeted investments in technology development.
- Bulgaria's National Development Program Bulgaria 2030 was updated in December 2022. It prioritises digital connectivity, aiming to build a modern and secure digital infrastructure, including FTTH networks in underserved parts of the country.

Source: European Commission, IDATE

FTTH/B coverage in Bulgaria (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Bulgaria vs. EU27+UK, 2015-2023



4. FTTH/B in Rural Areas: Croatia

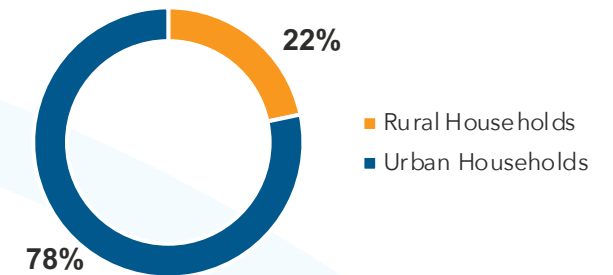


Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- In April 2018, the Croatian government adopted its National Programme for the Development of Shared Broadband Infrastructure, which aims to deploy state-owned open access backhaul networks to help provide internet connectivity in underserved and unserved rural areas.
- Government adopted a new National Plan for the Development of Broadband Access, covering the period 2021-27. The plan aims to deliver the objectives outlined in the EC's 'Connectivity to a Competitive Digital Single Market - Towards a European Gigabit Society' and '5G for Europe' projects.
- The government's plan aims to provide connectivity with download speeds of at least 100Mbps to all households by 2025.

Urban/Rural Households breakdown
Croatia (2022)



Source: EC

2025

- 100Mbps to all households

4. FTTH/B in Rural Areas: Croatia

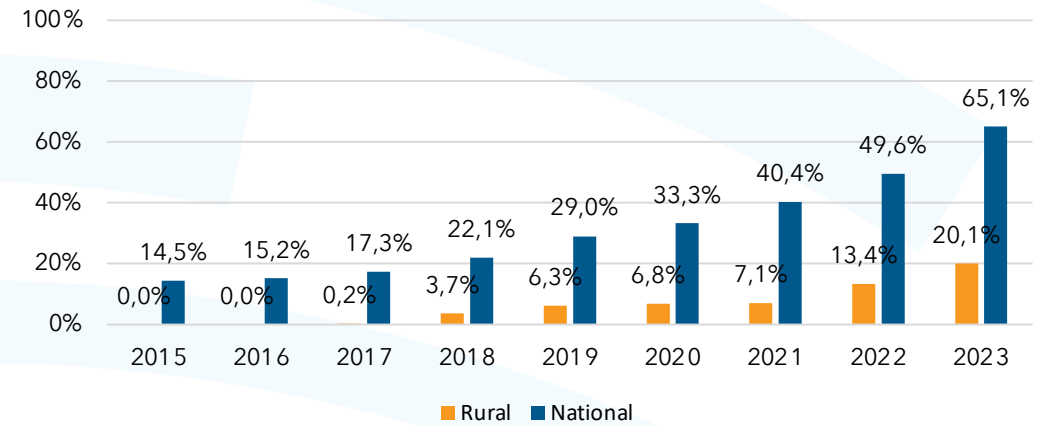


Status in the country and next steps

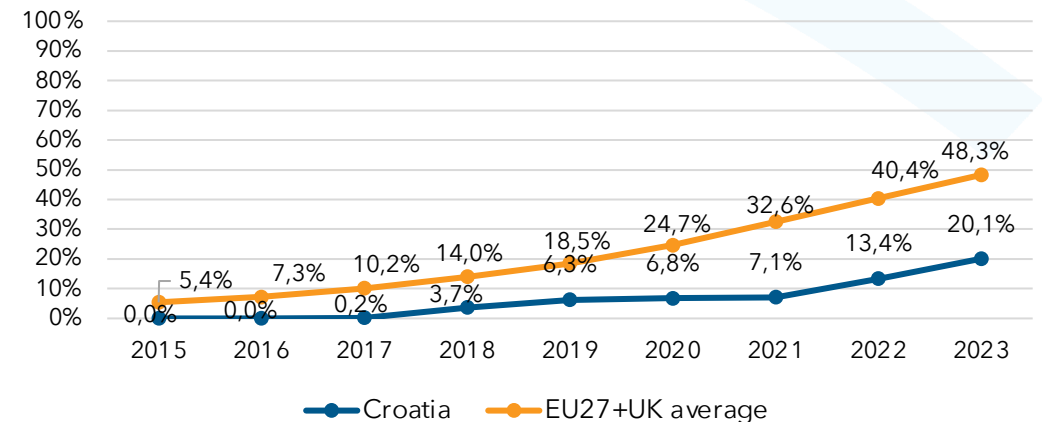
Action plans implemented...

- The HRK 770.6 million (EUR 102 million) project is 85% funded by the European Regional Development Fund (ERDF), with the remainder from the state budget. The programme, which was approved by the EC in June 2017, aims to have a fixed or wireless broadband connection available to every household.
- In October 2020, HT announced that it had 21 areas assigned to deploy fibre in rural areas where HRK 1.4 billion (EUR 185 million) were planned to be invested, almost 50% comes from the European Fund. The goal is to reach to reach 150.000 homes by 2023.
- Croatia is also receiving funding from the Connecting Europe Broadband Fund (CEBF) via its Luxembourg-based subsidiary RUNE Group. In March 2022 RUNE secured EUR130 million in additional financing to cover the deployment of rural broadband infrastructure in Croatia and Slovenia, with almost 150,000 households to be covered under the Croatian part of the deal.
- In December 2023 HT completed the first three of 13 rural broadband network rollout projects under the NP-BBI.

FTTH/B coverage in Croatia (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Croatia vs. EU27+UK, 2015-2023



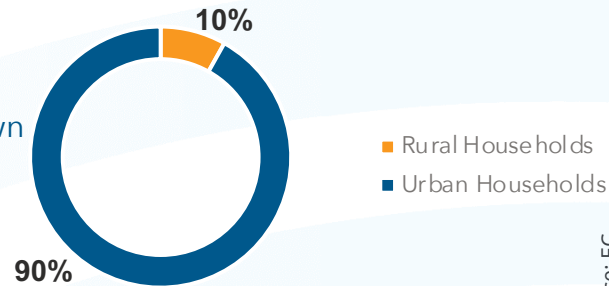
Source: European Commission, IDATE

5. FTTH/B in Rural Areas: Cyprus



Status in the country

Urban/Rural Households breakdown
Cyprus (2022)



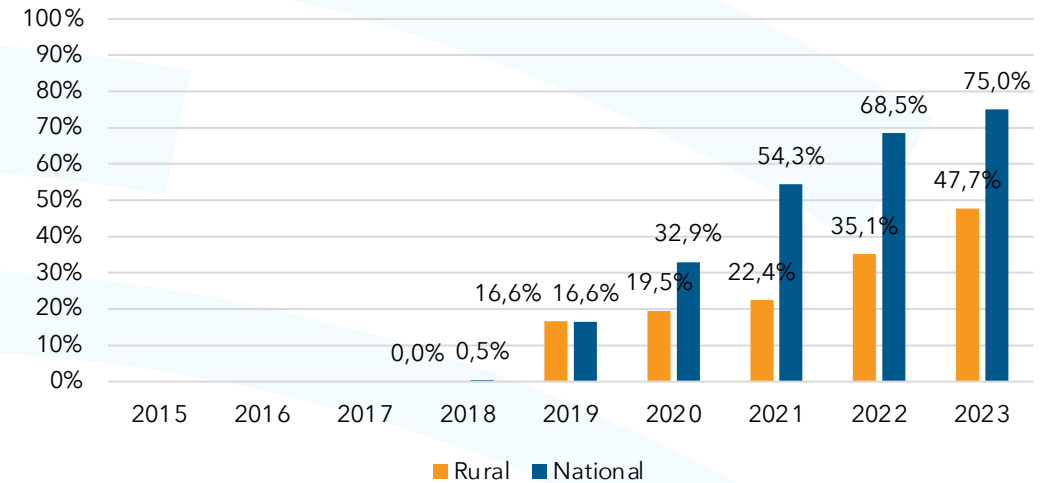
Source: EC

REGULATORY FRAMEWORK

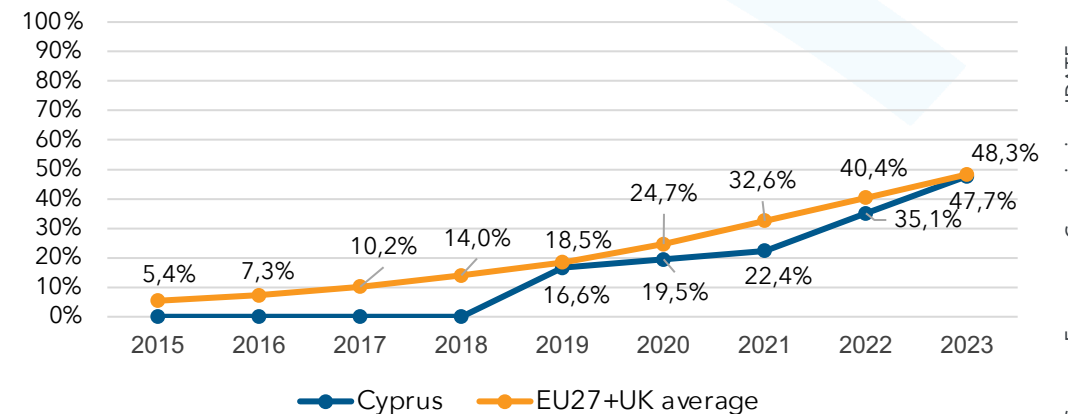
STRATEGY TOWARDS RURAL CONNECTIVITY

- In November 2021, the Department of Electronic Communications (DEC) published the Broadband Plan of Cyprus 2021-2025, which encompassed the country's main broadband action plans and strategic objectives.
- The plan included stated aims that all premises in organised communities (both urban or rural) must have access to internet connectivity with a minimum speed of 100Mbps (upgradable to 1Gbps) by 2025, while 70% households and enterprises should have access to a broadband connection with minimum download speeds of 100Mbps by that date.

FTTH/B coverage in Cyprus (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Cyprus vs. EU27+UK, 2015-2023



Source: European Commission, IDATE

6. FTTH/B in Rural Areas: Czech Republic

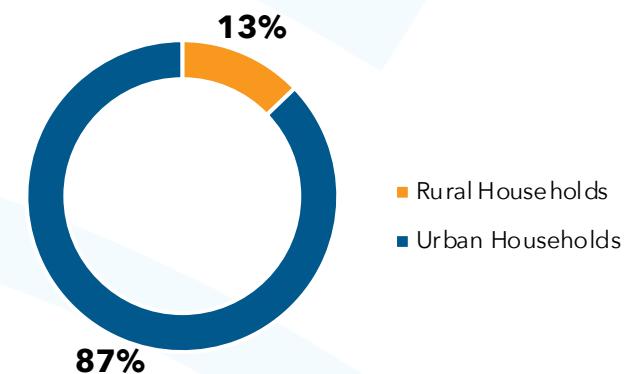


Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- The government has set up a broadband strategy entitled “Digitální Česko v. 2.0 Cesta k digitální ekonomice” aiming at implementing the EU’s Digital Agenda.
- Then, another plan has adopted in 2018 the Digital Czech Republic v.3 which define the strategic approach of the Czech Republic to the construction of broadband networks.
- The government announced in 2019 it will work with CETIN to expand fibre based networks into rural areas.
- In 2020, the government also made amendments to Law 127/2005, introducing additional measures for a faster and more efficient deployment of communication infrastructures.

Urban/Rural Households breakdown
Czech Republic (2023)



Source: EC

2014

- Launch of Republic’s next generation network (NGN) infrastructure V.2

2018

- Launch of Digital Czech Republic v.3

2020

- 100 % coverage with 30 Mbps
- 50 % household penetration with 100 Mbps service

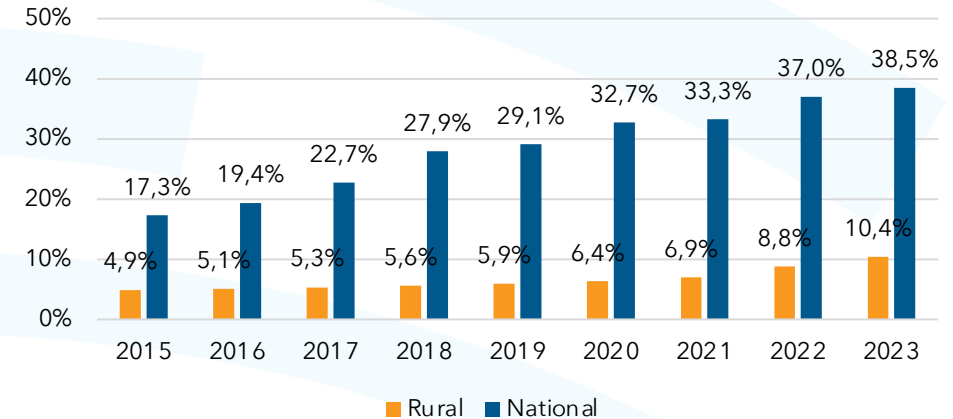
6. FTTH/B in Rural Areas: Czech Republic

Current status in the country and next steps

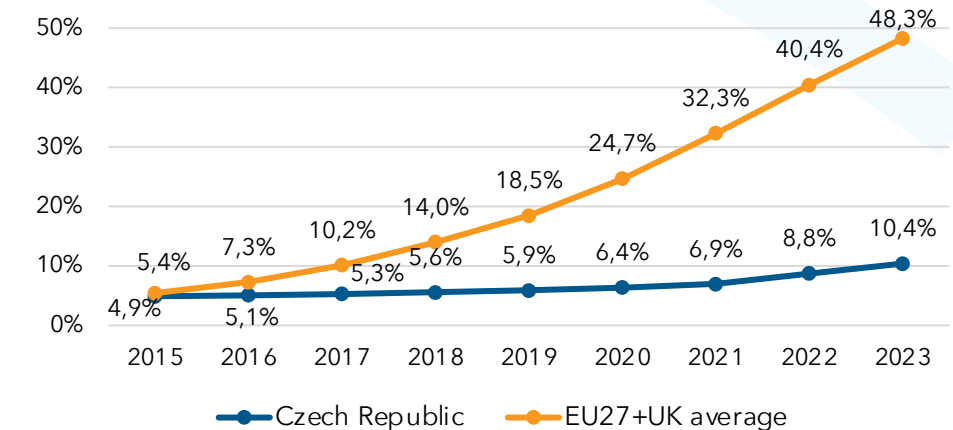
Action plans implemented...

- Promotion of measures to support demand for high-speed internet access.
- Utilization of EU funds to providing broadband access
- Creation of a register of passive infrastructure (RPI)
- A joint venture between T-Mobile and Vodafone plans to build a new fibre network in the Czech Republic. The network will cover 1 million households with speeds of at least 1Gbit/s.

FTTH/B coverage in Czech Republic (in %)
Rural areas* vs National level**, 2015-2023

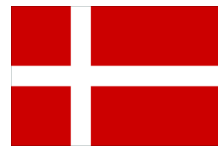


Rural FTTH/B coverage* (in %)
Czech Republic vs. EU27+UK, 2015-2023



Source: European Commission, IDATE

7. FTTH/B in Rural Areas: Denmark

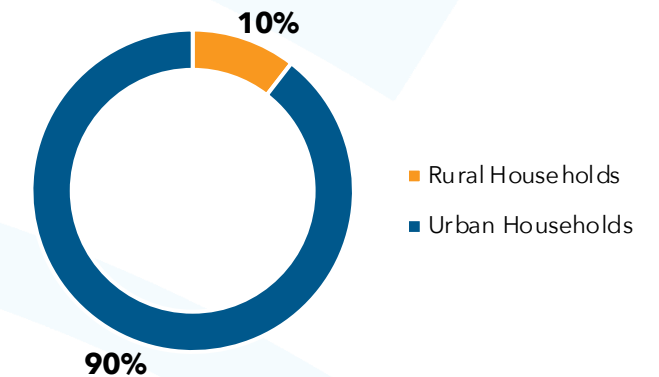


Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- The central government, regions and municipalities have agreed a Digital Strategy 2016-2020 in order to accelerate the adoption of digital solutions in the public sector. The strategy aims at 100 Mbps download and 30 Mbps upload speeds for all households and businesses by 2020.
- Overall, Denmark's primary focus is on the roll-out of high-speed network infrastructure based on private investments with a key role re-served for regional and local actors in coordinating and promoting the process with telecommunication operators. Public funding is reserved for areas with poor broadband coverage.
- The National Broadband Fund, which was established in 2016, and has been more strictly focused on less populated areas since 2018, offers grants for rolling-out broadband with at least 100/30 Mbps in areas which only have access to maximum 10/2 Mbps. For 2019 the fund had a volume of DKK 100 million (EUR13.5 million). In 2020, the DEA was planning a state aid scheme, establishing a more concise framework for financial grants from municipalities to support the local roll-out of digital infrastructure.
- In March 2022, the government is providing DKK 100 million subsidy to encourage broadband expansion.
- In May 2022, the Danish Government launched a new national strategy for digitalization after the central government covering the 2022-2025 period. The strategy includes initiatives, which are to remedy worker shortages, support climate change mitigation and digital inclusion.

Urban/Rural Households breakdown
Denmark (2023)



Source: EC

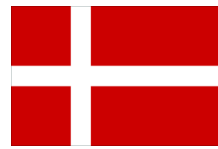
2016

- National Broadband Fund

2020

- National broadband target: 100% of households with access to speeds of 100 Mbps download / 30 Mbps upload

7. FTTH/B in Rural Areas: Denmark

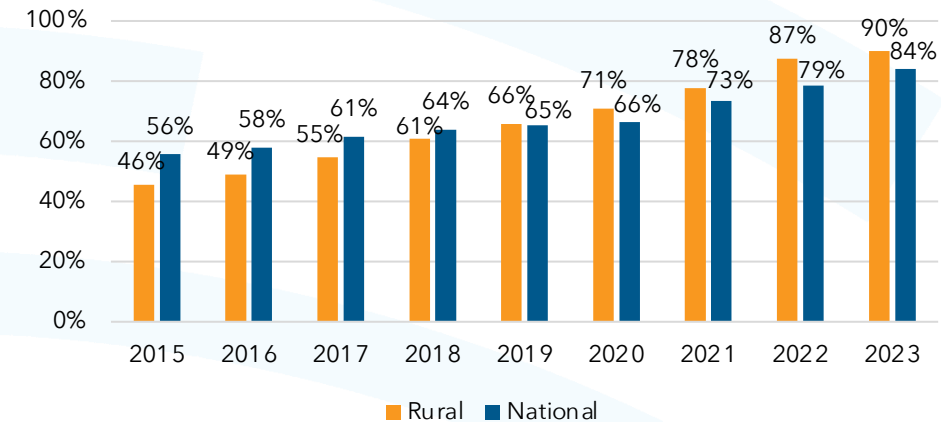


Current status in the country and next steps

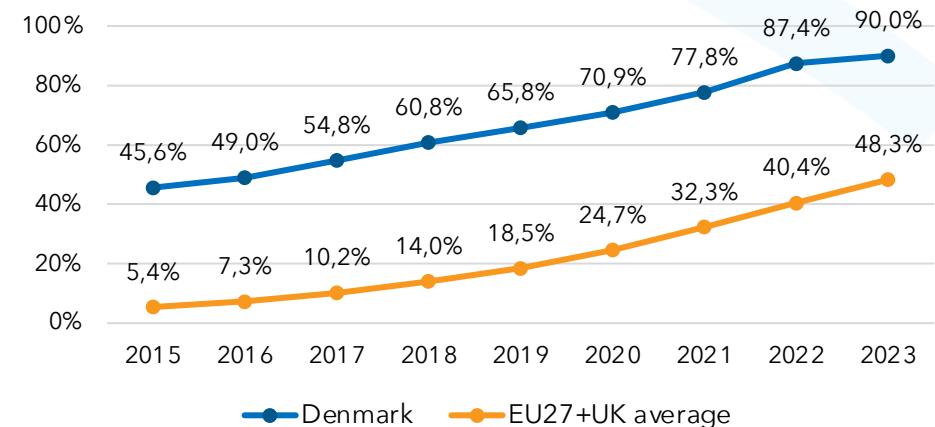
Action plans implemented...

- Fibre roll-out by (regional) energy utilities (typically owned by their users) continues, with the aim of first connecting all co-owners and then entire regions. One consortium alone has announced investment of an additional DKK 4.6 billion (EUR 0.62 billion) in fibre between 2019 and 2023.
- The incumbent telecoms operator, TDC Group, increased its investment budget in 2019 from DKK 3.5 billion to DKK 4.5 billion (€0.47 billion to €0.6 billion) and announced an ambitious investment programme for its network company (TDC NET) to connect one million addresses to fibre by 2025.
- Denmark prioritizes the deployment of high-speed broadband infrastructure through private investments and technologically neutral regulation, with limited public financial support allocated to unprofitable rural areas, involving collaboration between municipalities and telecommunications operators. In 2022, €13.5 million was allocated to the national broadband pool for these initiatives.

FTTH/B coverage in Denmark (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Denmark vs. EU27+UK, 2015-2023



Source: European Commission, IDATE

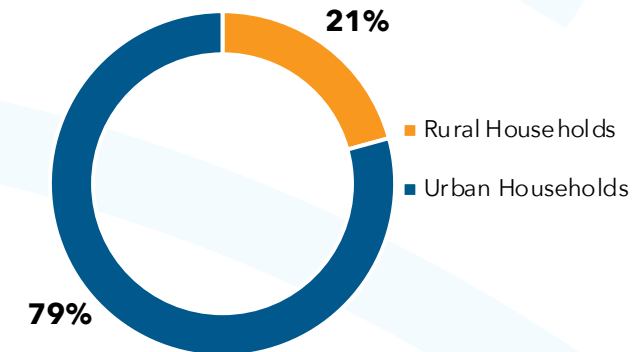
8. FTTH/B in Rural Areas: Estonia



REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- The Government announced in 2010 the investment in a nationwide broadband network by 2015, called the "EstWin" project. This project should cost 383.5 million EUR.
- Then, the government announced in 2017 plans to award a subsidy of EUR 20 million in order to create a public-private partnership and connect rural areas. Government plans aim to provide broadband speeds to the entire population by 2022.
- In October 2018, the government has awarded a contract to Elektrilevi (a telecommunications and energy provider) in a €20 million public tender to roll out last-mile connections in rural areas.
- Estonia's Digital Agenda 2030 was adopted in October 2021. The strategy is in line with the Gigabit Society connectivity targets. The overall objective of the strategy is to achieve high-speed, reliable, and affordable electronic communications connections in the country by 2030, irrespective of the location.

Urban/Rural Households breakdown
Estonia (2023)



Source: EC

2030

- 100Mbps to all households

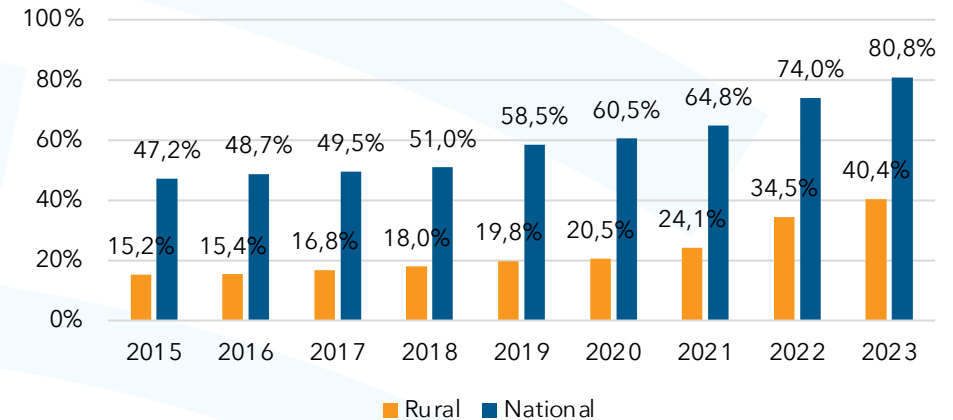
8. FTTH/B in Rural Areas: Estonia



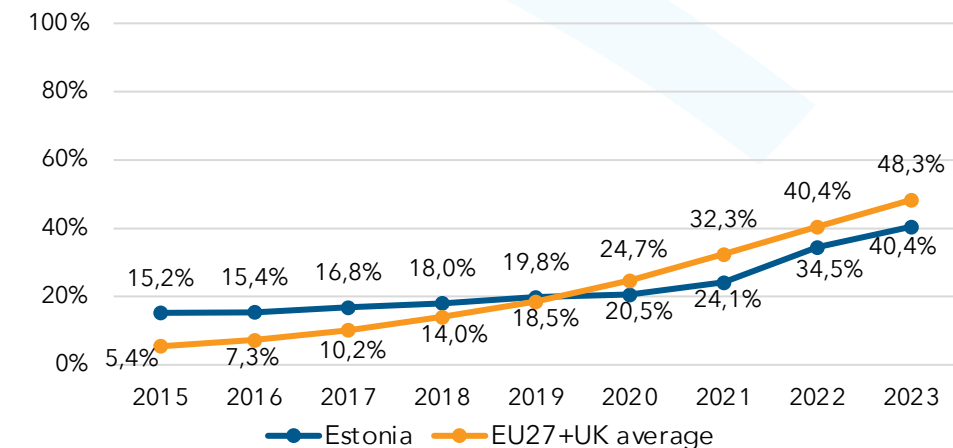
Action plans implemented...

- In July 2021, the regulator (TTJA) began a consultation to determine the regions still needing government support to develop fixed broadband infrastructure. EUR69.29 million has been pledged to help market failure areas between 2021 and 2027.
- The third phase of the country's rural rollout project began in May 2022.
- In July 2023, EUR 800,000 was allocated to five separate rollout projects
- Eesti Energia will receive a EUR70 million loan from the European Investment Bank (EIB) to support the increase in fibre coverage within Estonia. Eesti Energia will provide fibre to 266 000 households by the end of 2023, 219 000 of which will be in rural and underserved areas.
- The EstWin project, funded by the European Structural and Investment Funds, has led to the deployment of 7,000 km of fiber backhaul networks in rural areas and settlements with less than 10,000 inhabitants. The project is nearing completion, with the backhaul network almost finalized, and only a small part of southeast Estonia remaining to be covered.
- The European Commission is granting €238.5 million to Estonia under the Recovery and Resilience Facility.

FTTH/B coverage in Estonia (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Estonia vs. EU27+UK, 2015-2023



9. FTTH/B in Rural Areas: Finland



Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

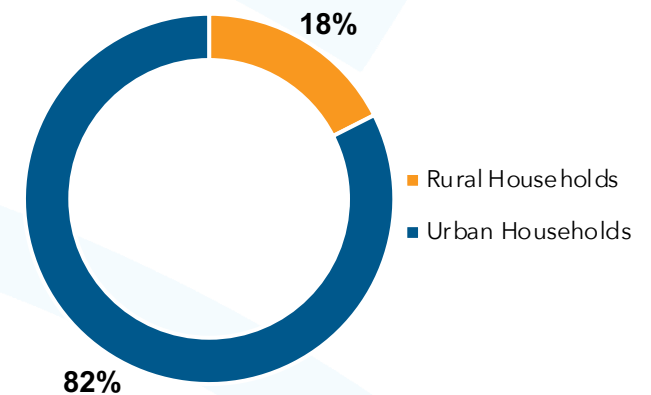
The Finnish Government launched the "Broadband 2015" project in 2008. The plan was to provide by end 2015, that 99% of users to have accesses to network that enables a 100 Mbps connection speed.

The Finnish government favors a fiber-based network roll-out, with a special focus on and assistance for underserved areas, especially through public funds. Private equity investors have also been involved in investing in rural fiber in Finland.

A National Broadband Strategy is being prepared, under the leadership of the Ministry of Transport and Communications, setting targets and implementation measures for 2025 and 2030. The strategy would be technology neutral : promotion of the construction of both fiber-optic and wireless broadband connectivity.

Through this strategy, the government aims to develop the national digital infrastructure so that all households, in both urban and rural areas, have access to a downstream connection of at least 100 Mbps by 2025.

Urban/Rural Households breakdown
Finland (2023)



Source: EC

2008

- Launch of "Broadband 2015" project

2015

- 99% of the population - within 2km of a fiber-optic or cable network capable of transfer speeds of up to 100Mbps

2025

- All households should have access to at least 100 Mbps connections
- Increase the speed of the connection to 1 Gbps

9. FTTH/B in Rural Areas: Finland



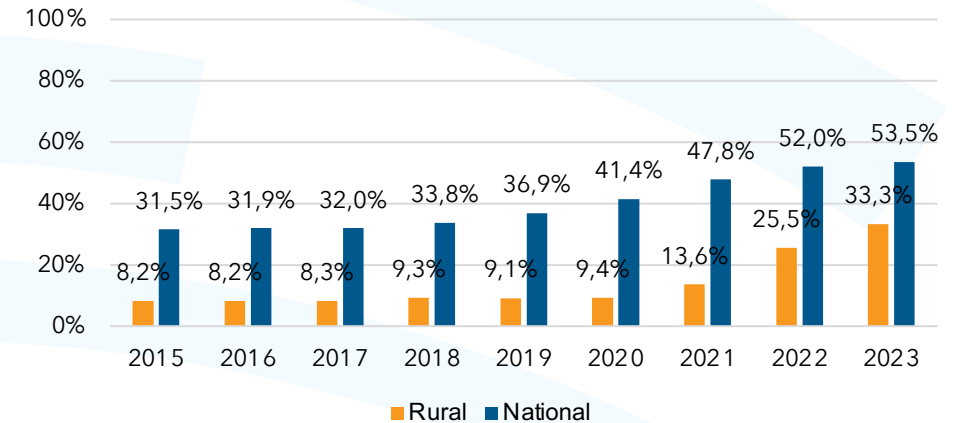
Current status in the country and next steps

Action plans implemented...

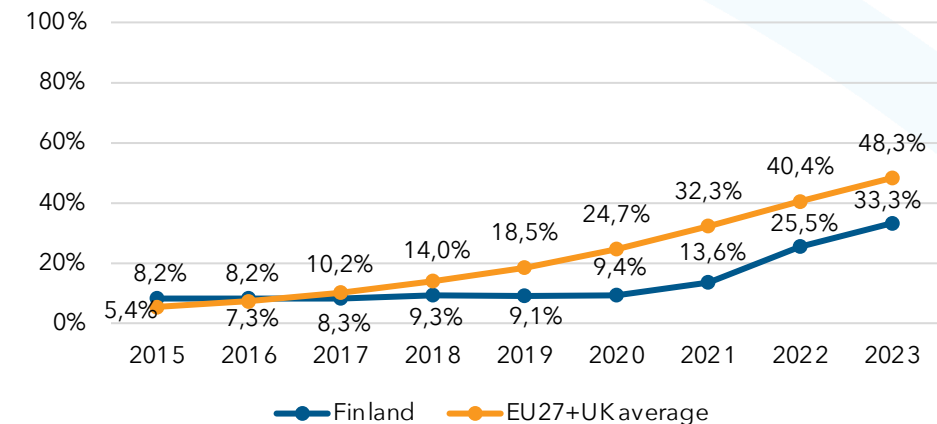
- The government's plan was to co-invest with operators.
- The total funds that could be invested until 2015 could reach: 130 million EUR public aid, including 66 million EUR from state aid, 24.6 million EUR from EU Rural Development Program and 40 million EUR from Finnish municipalities. The aid is intended to improve the connection in the most remote areas.
- Sunet, a non-profit municipality-owned network, is bringing fiber connections to homes, institutions, and businesses in a 5,000 km² area of rural Finland.
- In 2022, Cube Infrastructure invests €14m in Finnish rural fibre. It was planned to build fibre-to-the-home (FTTH) networks in 41,000 premises over the next three years, reaching six municipalities in semi-urban and rural communities in Finland.
- Traficom received EUR27m in support for fibre network construction in 2022-23

Source: European Commission, IDATE

FTTH/B coverage in Finland (in %)
Rural areas* vs National level**, 2015-2023

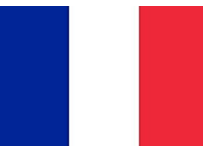


Rural FTTH/B coverage* (in %)
Finland vs. EU27+UK, 2015-2023



* Rural FTTH/B coverage = Rural FTTH/B Homes passed / Rural households
** National FTTH/B coverage = Total FTTH/B Homes passed / Total households

10. FTTH/B in Rural Areas: France



Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

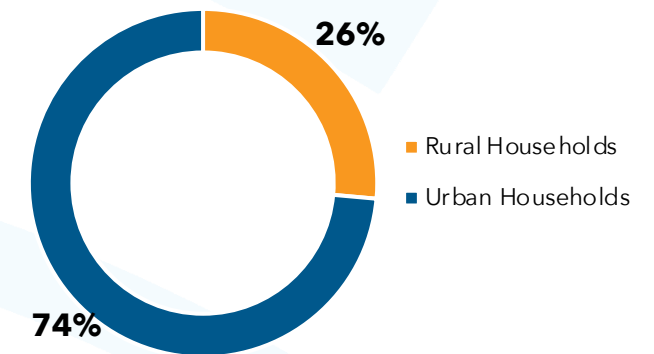
The objectives set by the Government within the framework of the current Very High Speed France Plan are to guarantee 8 Mbps minimum by the end of 2020 and very high broadband (30 Mbps) for all by the end of 2022.

To achieve these objectives, three types of zones have been defined and the roles divided between private actors and local authorities:

- "High Density Areas" (ZTD) on which the private operators, access providers, must all deploy their own network;
- "AMII Areas" (Call for expression of investment interest), in which one or more private operators have expressed their interest in deploying or financing together a fiber optic network for end-users
- "RIP Areas" (Public Initiative Network), in which the network is deployed by local authorities, mobilizing public funding, in the absence of expression of interest by private operators for these less densely populated areas (often rural areas)

In 2021, the French government increased state support for the deployment of fibre-optic networks in the country under the France Relance project (part of the Plan THD). 570 million of additional funding has been provided for the roll-out of fibre to rural areas, with €420 million to be distributed to public initiative networks not yet funded by the government.

Urban/Rural Households breakdown
France (2023)



Source: ARCEP, INSEE

2013

2020

2022

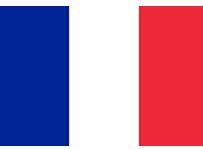
2025

▪ 8 Mbps speeds should be available nationwide

▪ 100% coverage with 30 Mbps speeds, regardless of technologies used
▪ 80% of households to be covered with FTTH

▪ 98% FTTH coverage to be achieved in 2025

10. FTTH/B in Rural Areas: France



Action plans implemented...

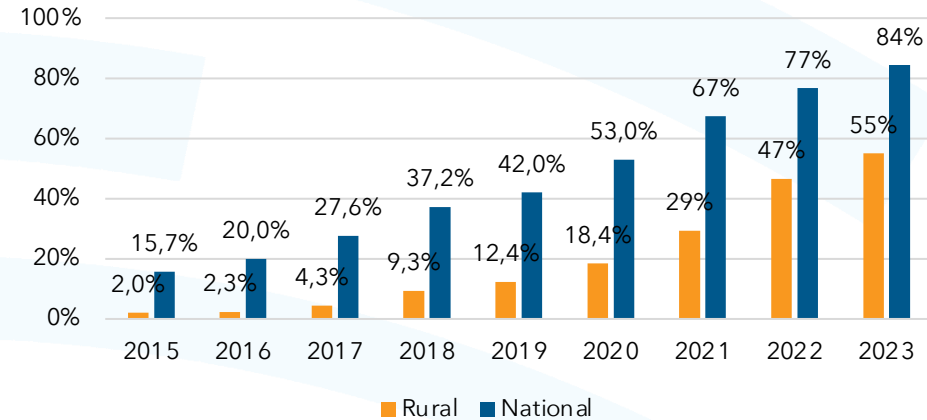
- Introduction of mechanisms for accessing the incumbent carrier's infrastructure
- Regulation on network sharing indoors and outdoors
- Introduction of coercive measures for operators that fail to meet obligations
- Subsidised loans for operators
- Creation of a support fund to outfit households that do not have an 8 Mbps connection by 2020 (call for "consistent regional digital coverage")
- Introduction in 2017 of new form of cooperation between local authorities and operators through "AMEL" initiatives (Calls for expressions of local commitments): local authorities select specific areas (often rural) where they want to oversee operators' commitments (legally binding and subject to penalties if operators fail to meet their rollout objectives)

... and next steps

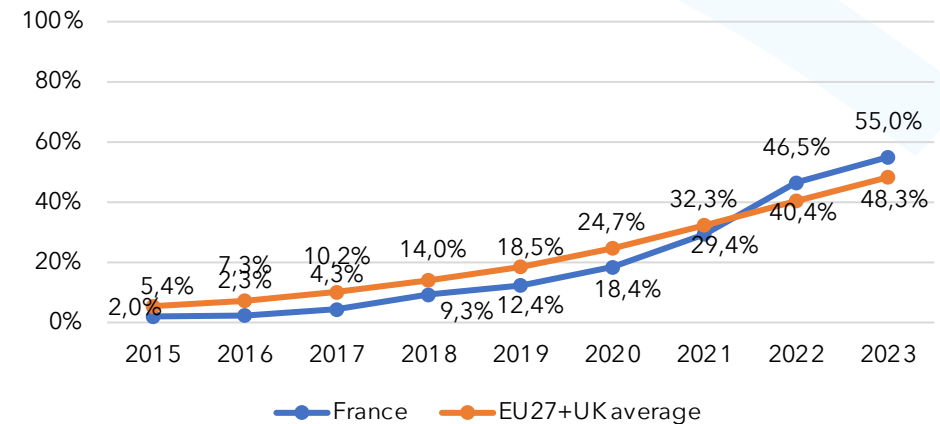
- The French programme leans massively in favour of FTTH so that 80% of total homes are passed with FTTH by 2022. The whole country should be covered by FTTH in 2025.
- The use of alternative technologies is also planned in certain specific cases:
 - Increasing speeds at the neighbourhood cabinet level, enabling access to VDSL, is planned as a transitional solution for emergency situations in certain areas, while awaiting FTTH rollouts.
- Fixed-wireless access (Fixed LTE, future 5G FWA) and satellite networks are also supported as part of "consistent regional digital coverage" projects.
- Implementation of the copper switch-off plan by Orange

Source: European Commission, IDATE

FTTH/B coverage in France (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
France vs. EU27+UK, 2015-2023



* Rural FTTH/B coverage = Rural FTTH/B Homes passed / Rural households
** National FTTH/B coverage = Total FTTH/B Homes passed / Total households

11. FTTH/B in Rural Areas: Germany

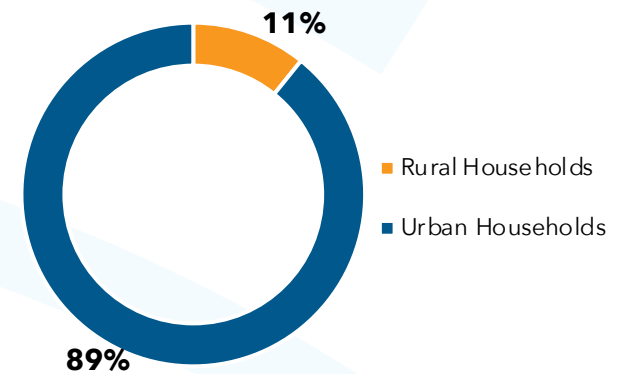


Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- The government has begun reducing the digital gap specially in rural (and underserved) areas. The initiatives are coordinated by the Federal Ministry of Transport and Digital Infrastructure (BMVI), Federal Broadband Office (Breitbandbüro) and Local Authorities in rural areas.
- The German government announced the 'Gigabit Initiative 2017-2025' in order to achieve gigabit speeds by end 2025 and to eliminate underserved areas. It targets private players that are willing to work with local authorities in these areas.
- The guidance provides for a technology-neutral approach allowing for technology competition where the main goal is to reach the coverage and bandwidth requirements in the agenda for underserved areas.
- In November 2020, the EC has approved a program to support the deployment of gigabit broadband networks in Germany, particularly in rural and unserved areas. The plan will have an estimated national budget of EUR 6 billion, which will be supplemented by contributions to individual projects from regional and local budgets.
- In March 2022, Federal Ministry for Digital Affairs and Transport presents new 'Gigabit Strategy 2030'. One of the aims is the supply of at least half of all German households and businesses with fibre-to-the-home/building (FTTH/B) networks by the end of 2025.

Urban/Rural Households breakdown
Germany (2023)



Source: EC

2020

- 100% of households able to have access to 30 Mbps speeds
- 50% of households able to have access to 100 Mbps speeds
- Cover all <30 Mbps areas with improved service through public or private investment
- Provide public funds to operators working with local authorities in the deployment of networks in areas with no private supply >50mbps

2025

- 100% of premises should be covered by gigabit-capable networks (technology-neutral approach)

11. FTTH/B in Rural Areas: Germany



Action plans implemented...

Infrastructure (BMVI). Federal Government, the federal states (Länder) and the local authorities each provide funds for the projects.

- Under the current federal funding scheme, over 4 billion EUR had been made available until 2018. The measures targeted German households located in white spots. The conversion of the ongoing subsidy schemes to fibre optic technology was made possible, and municipalities had been able to change their copper-based projects to fibre until the end of 2018. Since 1 August 2018, in practice, only FttB/H projects had been awarded. Before that, FttC projects had also been awarded, but the funding was already limited to the fibre part only.
- As part of the 'Gigabit Initiative' to cover all premises with gigabit connections by 2025, a 10-12 billion EUR investment fund is envisaged.
- The Landwirtschaftliche Rentenbank offers loans to support projects intending to establish or improve communication infrastructure including broadband networks in rural areas.

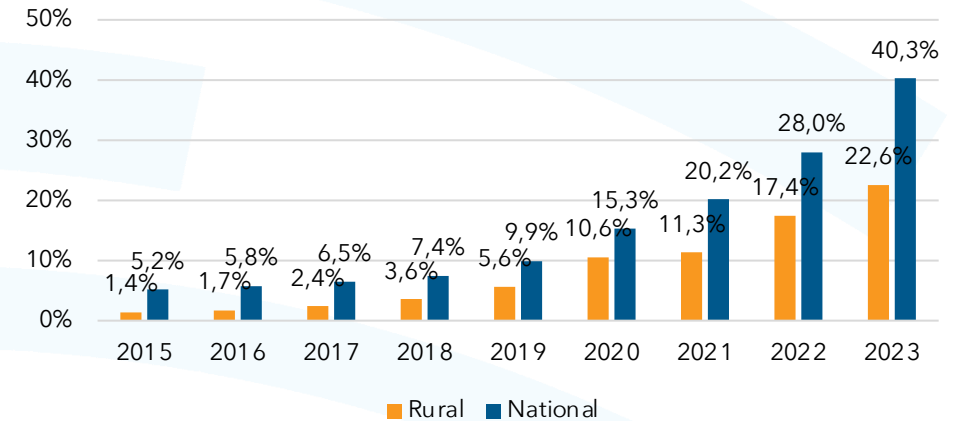
... and next steps

In areas where connections cannot be upgraded to gigabit speeds, the German government is working on a programme to subsidise such 'grey areas'. It is also working on ensuring the rollout of direct fibre connections for socio-economic drivers (schools, hospitals, business parks etc.) by 2021.

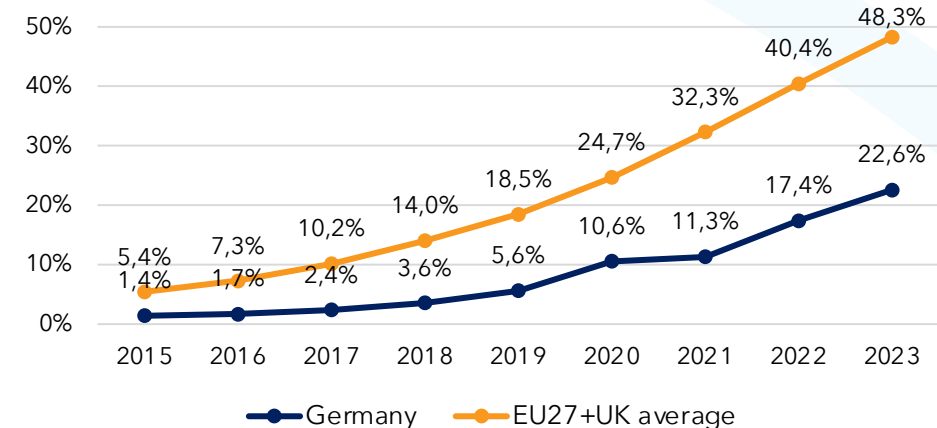
- Besides the subsidy programme for gigabit connectivity, the coalition agreement between the political parties forming the federal government announced a legal 'right to fast internet' with effect from 1 January 2025.
- In 2023, The EIB is providing 415 million in loans to support the roll-out of fibre optics. The loans totalling €415 million will be used to develop a fibre optic network in northern Germany that aims to connect up to 500 000 households in less densely populated regions.

Source: European Commission, IDATE

FTTH/B coverage in Germany (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Germany vs. EU27+UK, 2015-2023



* Rural FTTH/B coverage = Rural FTTH/B Homes passed / Rural households

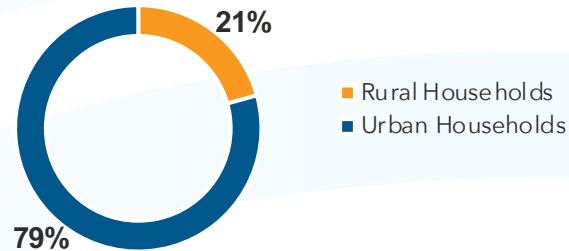
** National FTTH/B coverage = Total FTTH/B Homes passed / Total households

12. FTTH/B in Rural Areas: Greece



Status in the country

Urban/Rural Households breakdown
Greece (2022)



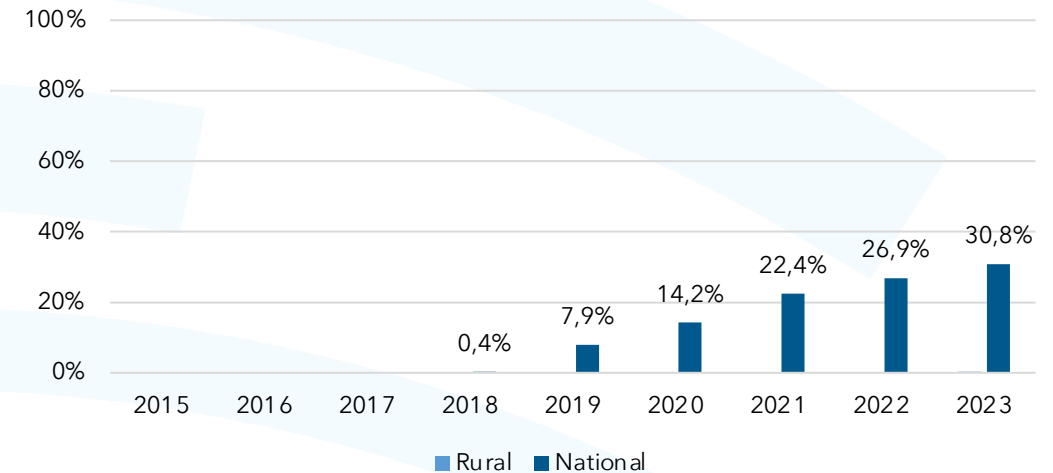
Source: EC

REGULATORY FRAMEWORK

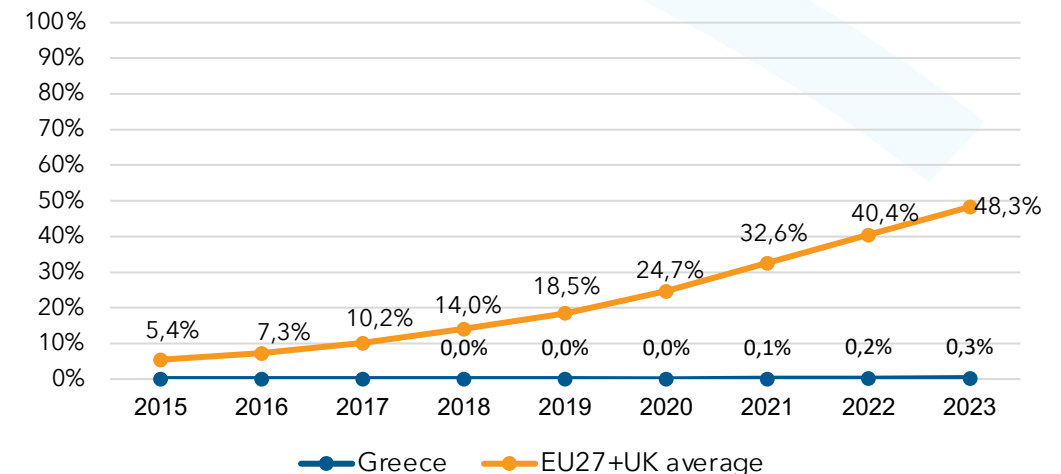
STRATEGY TOWARDS RURAL CONNECTIVITY

- The Ministry of Digital Policy, Telecoms and Information detailed a tender worth EUR870 million for the rollout of its Ultra Fast Broadband project. This plan aims to deliver broadband connectivity to rural areas via public-private partnerships. The UFBB plan is looking to cover around 2.5 million people, with speeds from 100 Mbps up to 1 Gbps.
- The country is split into seven regions, with the winners of the regional tenders committing to deploy high speed networks and then leasing these on a wholesale basis to third-party service providers such as OTE/Cosmote and Vodafone. OTE won three regions, while the consortium of Grid Telecom and Terna Energy secured the remaining four regions.
- In July 2022 the EC approved Greece's 'Operational Programme Digital Transformation 2021-2027', which has a budget of EUR913 million and aims to enhance broadband connectivity in rural areas (EUR400 million) among other digital transformation objectives.

FTTH/B coverage in Greece (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Greece vs. EU27+UK, 2015-2023



Source: European Commission, IDATE

13. FTTH/B in Rural Areas: Hungary

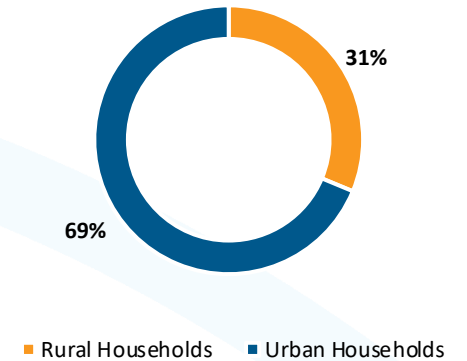


Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- The National Infocommunication Strategy 2014-2020 included major actions for broadband development, supported by state aid as well as by private investments. The goal was to achieve 100% NGA networks by end 2020. The Superfast Internet Program (SIP) provided state aid for NGA roll-out (around EUR 250 million) in economically less attractive, primarily rural, areas.
- The SIP gives preference to future-proof FTTH solutions and most of the participating undertakings are deploying this technology.
- The Hungary's National Digitization Strategy 2021-2030, announced in June 2021, was prepared by the Ministry of Innovation & Technology and the Ministry of the Interior. The strategy is based on the four pillars: digital infrastructure, digital skills, digital economy and digital state and sets targets to be achieved by 2030: 95% of households covered by gigabit networks.

Urban/Rural Households breakdown
Hungary (2022)



Source: EC

2025

- 95 % coverage with gigabit networks by 2030

13. FTTH/B in Rural Areas: Hungary



Status in the country and next steps

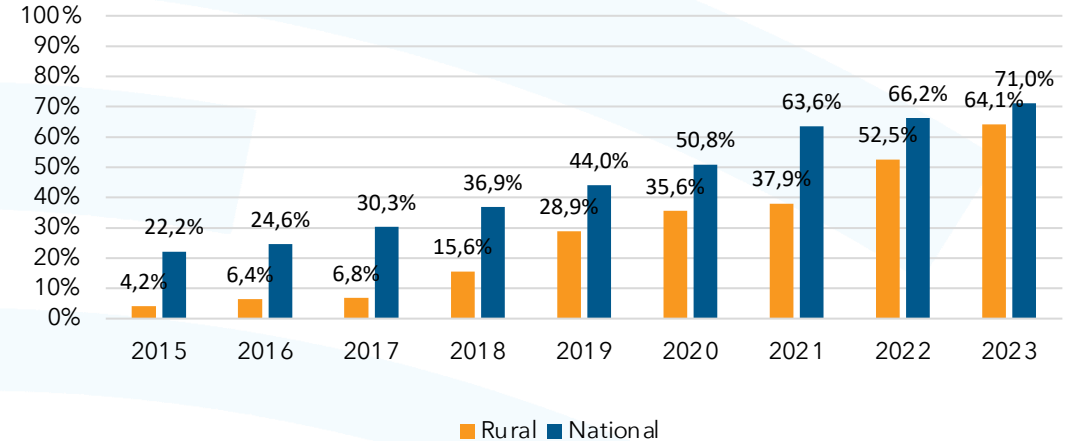
Action plans implemented...

- in December 2021 DIGI completed a three-year project to connect 16 rural/regional centres with over 2,000km of new backbone fibre-optics connected to its central Budapest headquarters, providing end-to-end FTTH to all connected towns.
- Most projects under the SIP deployed FTTH technology, laying ground for speeds foreseen by the Gigabit Society strategy.
- Considering the recent progress and the efforts of the Superfast Internet Programme (SIP), Hungary is on the way to reaching "Access to 1 Gbps (download/upload) for all schools, transport hubs and main providers of public services and digitally intensive enterprises" target by 2025.

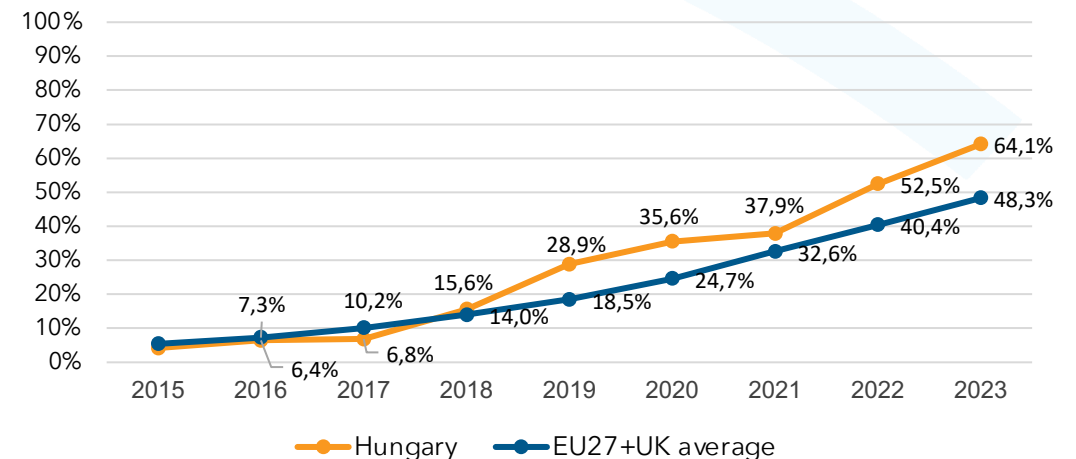
... and next steps

- Planning and implementation of a nationwide "Gigabit Hungary 2030" network development programme, in order to have an Internet connections with speeds of at least 1 Gbps available by end-2030,

FTTH/B coverage in Hungary (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Hungary vs. EU27+UK, 2015-2023



Source: European Commission, IDATE

14. FTTH/B in Rural Areas: Italy



Overview of regulatory background & action plans underway to address rural areas

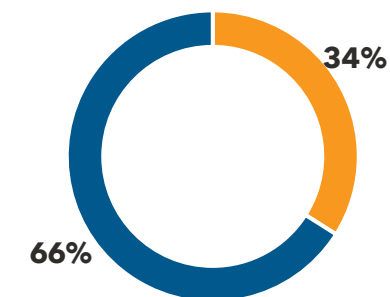
REGULATORY FRAMEWORK

STRATEGY TOWARDS RURAL CONNECTIVITY

Alongside the launch of its **National "Ultrafast Broadband plan"** (Nuova strategia Banda Ultralarga 2015-2020), Italian regulator AGCOM in October 2015 published a resolution regarding public financing of **NGN deployments in 'white areas'** underserved by broadband networks. To do so, the country has been **split into 4 'clusters'**:

- **Cluster A** areas include the **15 main cities with substantial NGA coverage** and **economically viable rollouts** of 100 Mbps infrastructure (cover around 15% of Italian population).
- **Cluster B** areas with a **high penetration of 30Mbps services** but **no guaranteed return on investment for 100Mbps** rollouts (cover around 45% of total population).
- **Cluster C** areas are **rural regions** where operators would require subsidies to proceed with ultra-high speed deployments (around 25% of the population)
- **Cluster D** areas are **rural regions** where there is no business case for 100Mbps rollouts without substantial financial aids from the public sector (15% of the population)

Urban/Rural Households breakdown Italy (2022)



■ Rural Households ■ Urban Households

Source: Italian ministry of Economic Development

2020

2026

- 100% of households with 30 Mbps coverage by 2020
- 85% of households with 100 Mbps coverage by 2020
- 100% of socio-economic establishments covered in 100 Mbps by 2020
- Implementation of Cost-reduction directive to reduce network rollout costs

- 1Gbps download and 200 Mbps upload for all by 2026.
- If the private sector can not reach that, the State will create the infrastructure to achieve it.

14. FTTH/B in Rural Areas: Italy



Status in the country and next steps

Action plans implemented...

6 billion EURO (from national, regional and European Community sources) with the aim to obtain the following objectives by 2020:

- 100 Mbps to 85% of the Italian population,
- at least 30 Mbps to the remaining 15%

Total coverage: 9,6 million households + public administration sites

Open Fiber coverage goals:

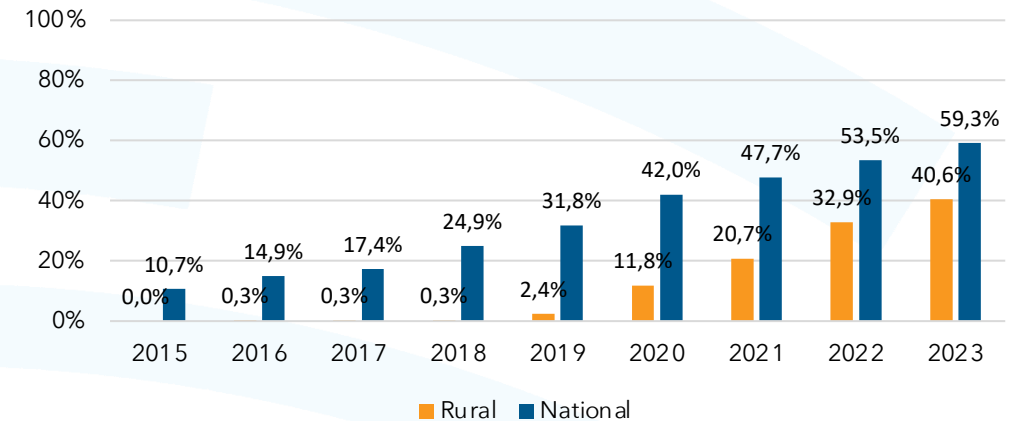
- 7,9 million households FTTH
- 1,6 million households FWA

... and next steps

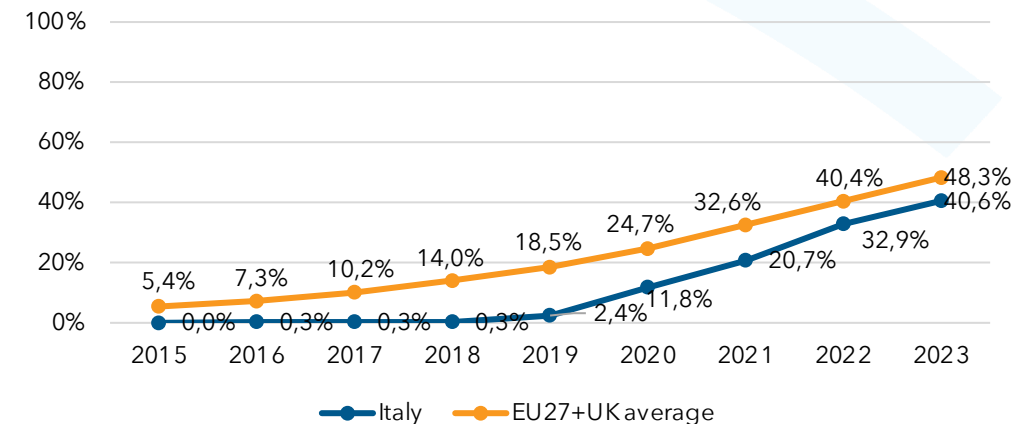
> National Recovery and Resilience Plan 2022:

- Connectivity NRRP with a planned investment of EUR 6,7 billion overall to contribute to reach by 2026 the European Digital Decade targets for 2030.
- The Plan exceed the objectives set by the European Commission for 2030 by introducing a target of at least 1 Gbps download and 200 Mbps upload for all by 2026.
- The 'Italia a 1 Giga' Plan aims to provide 1 Gbps download and 200 Mbps upload speeds to about 6.2 million households in Italy that won't be covered by networks with 300 Mbps download speed by 2026. If private networks can't guarantee this, the state will create the necessary infrastructure to achieve the target.
- **The 'Collegamento isole minori'** (Connected smaller Islands) Plan has the objective of providing 19 smaller islands with submarine fibre optic backhauling, in order to ensure adequate ultra-broadband connectivity with the mainland.
- For 2022 and 2023, 589 mln Eur were made available to sustain demand for fast connectivity. SME and professionals are entitled to discounted offers (between 500 and 2000 Eur for 18-24 months subscriptions, for connections with maximum download speed in the 300 Mbit/s - 1 Gbit/s range, or over 1 Gbit/s).

FTTH/B coverage in Italy (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Italy vs. EU27+UK, 2015-2023



Source: Italian ministry of Economic Development, AGCOM, IDATE

15. FTTH/B in Rural Areas: Ireland

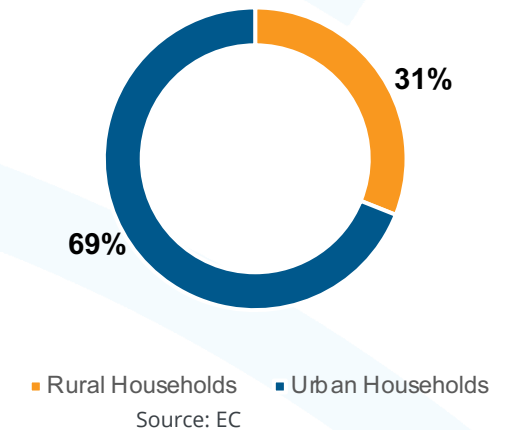


Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- In 2015, the target for the National Broadband Plan was updated. The new definition focused on several areas: to increase connectivity in rural areas, to provide high speed Internet services to at least 30% of premises and to offer by 2022 a universal broadband speed of 30 Mbps.
- In September 2020, the DCCAE aimed to accelerate the National Broadband Plan in response to the COVID crisis. The rollout plan to 540,000 rural homes and businesses could be finished within five years, instead of seven. Originally, under the terms of the NBP agreement, 7,900 rural premises are to be 'passed' by the fibre broadband network by the end of 2020, with 115,000 passed by the end of 2021 and between 70,000 to 100,000 premises connected for each of the five years after that.

Urban/Rural Households breakdown
Ireland (2022)



2025

- Half a million rural homes and businesses to be connected with fibre broadband

15. FTTH/B in Rural Areas: Ireland



Status in the country and next steps

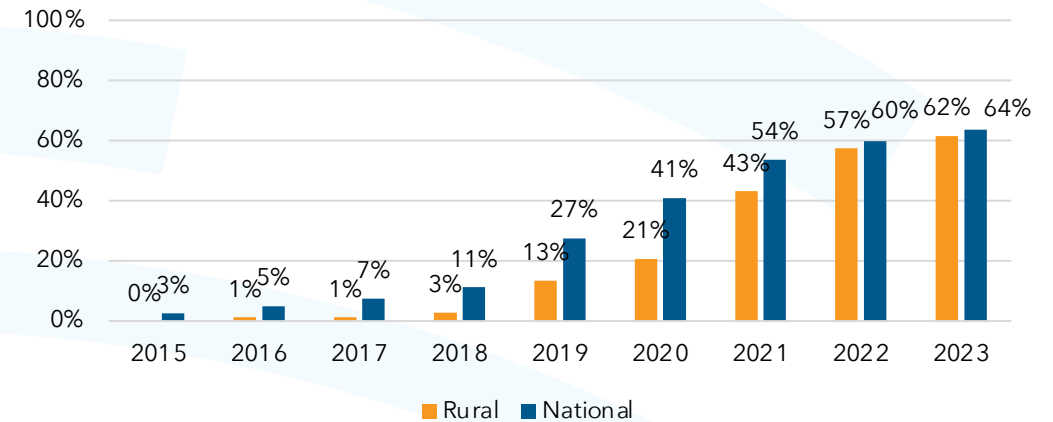
Action plans implemented...

- National Broadband Ireland (NBI) has been officially contracted by the government to implement the National Broadband Plan (NBP). As part of this initiative, NBI will deploy fiber-based connectivity to serve 1.1 million individuals and will extend coverage to over half a million premises in rural areas where commercial operators had previously deemed deployment of their own fiber networks economically unfeasible.

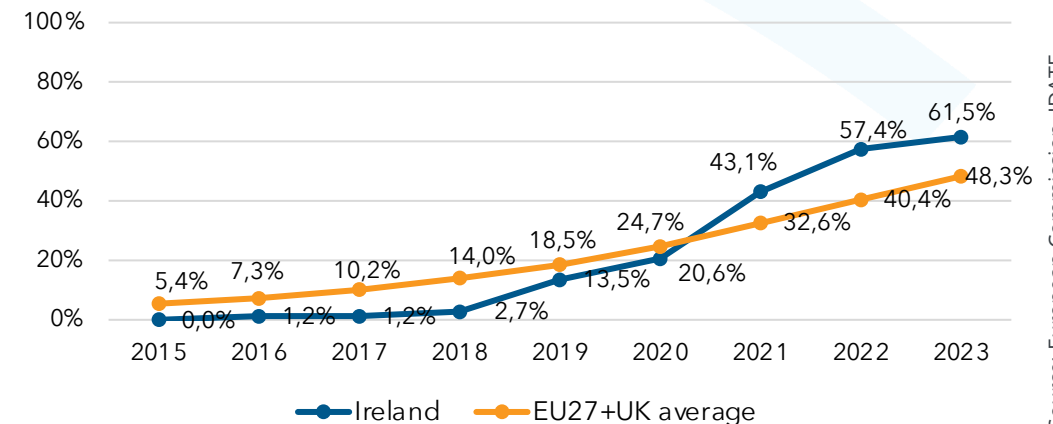
... and next steps

- The Digital Connectivity Strategy (2022) is a component of Ireland's national digital strategy, 'Harnessing Digital - The Digital Ireland Framework'. The Department of Environment, Climate and Communications (DECC) has announced that the Digital Connectivity Strategy is primarily focused on enhancing the physical telecommunication infrastructure and services that provide digital connectivity. The strategy aims for all Irish households and businesses to be covered by a gigabit-capable network by 2028, 5G coverage in all populated areas by 2030, and digital connectivity for all 'Connected Hubs' and schools by 2023.
- To achieve these objectives, the strategy includes deploying gigabit connectivity in primarily rural areas through the state-led National Broadband Plan (NBP), implementing a universal service obligation (USO) for broadband, and immediately deploying high-speed connectivity to key locations.

FTTH/B coverage in Ireland (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Ireland vs. EU27+UK, 2015-2023



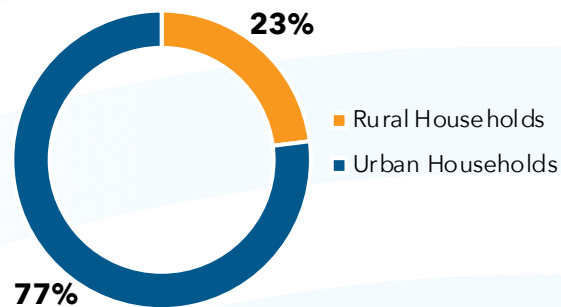
Source: European Commission, IDATE

16. FTTH/B in Rural Areas: Latvia



Current status in the country and next steps

Urban/Rural Households breakdown
Latvia (2023)



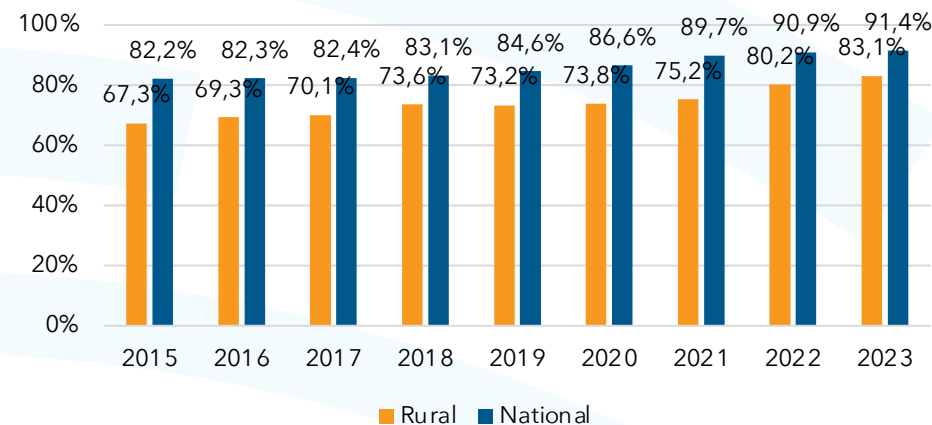
Source: EC

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

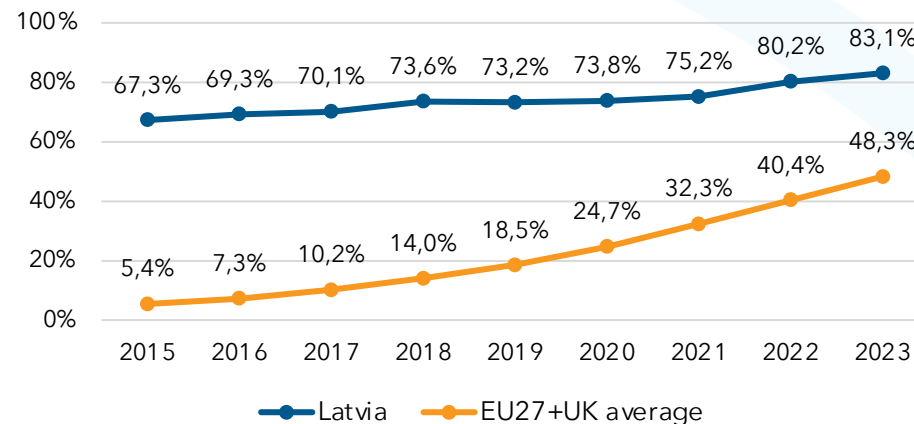
No specific regulation about FTTx. Actions from Regulator are more focused towards net regulation and Quality of Service to end users.

Source: European Commission, IDATE

FTTH/B coverage in Latvia (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Latvia vs. EU27+UK, 2015-2023

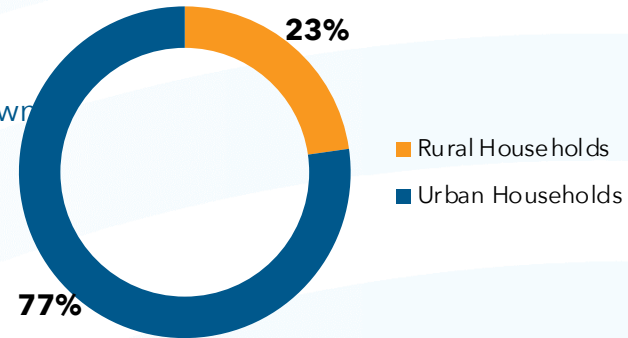


17. FTTH/B in Rural Areas: Lithuania



Current status in the country and next steps

Urban/Rural Households breakdown
Lithuania (2023)



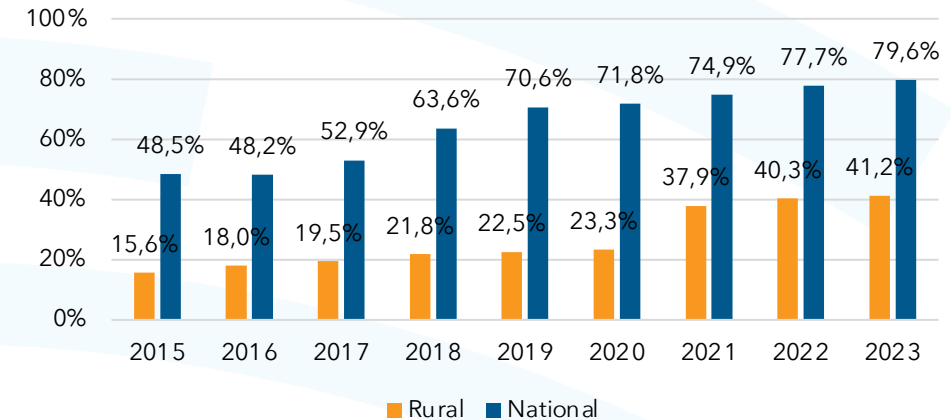
Source: EC

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

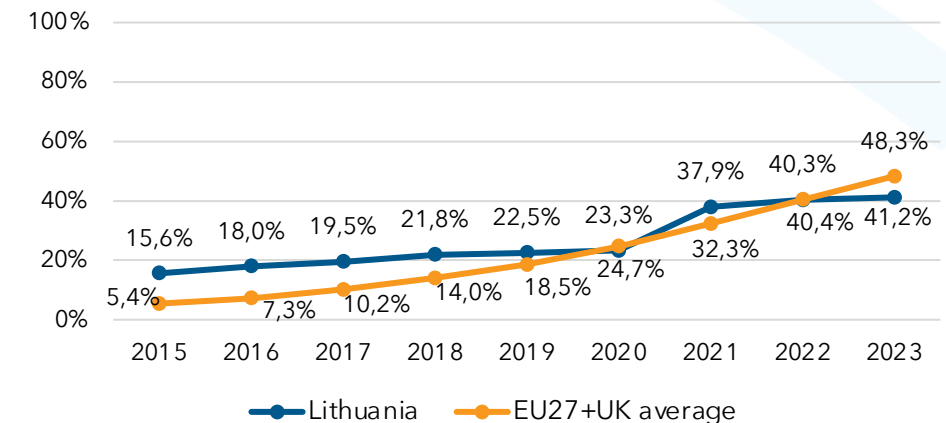
- The Regulator in Lithuania (Rysiu Reguliavimo Tarnyba, RRT) has not defined specific rules towards the development on fibre networks.
- In 2014, the Lithuania Digital Agenda is launched by the Government with the aim to provide an Internet connection of at least 30 Mbps to 95% of the total homes and at least 100 Mbps to 50% of the total homes by 2020.
- In 2021, the Ministry of Transport and Communications has planned to allocate EUR 49 million for the development of high-speed broadband in remote areas of the country in the Plan for Recovery and Resilience Framework (RRF) for the period 2021-2026. The aim is to enable all Lithuanian households to have access to 100 Mbps broadband for downloading by 2025.

Source: European Commission, IDATE

FTTH/B coverage in Lithuania (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Lithuania vs. EU27+UK, 2015-2023



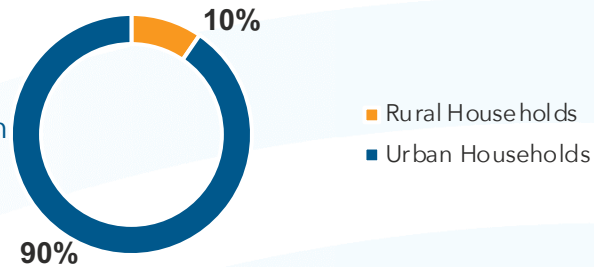
* Rural FTTH/B coverage = Rural FTTH/B Homes passed / Rural households
** National FTTH/B coverage = Total FTTH/B Homes passed / Total households

18.FTTH/B in Rural Areas: Luxembourg



Status in the country and next steps

Urban/Rural Households breakdown
Luxembourg (2022)



Source: EC

REGULATORY FRAMEWORK

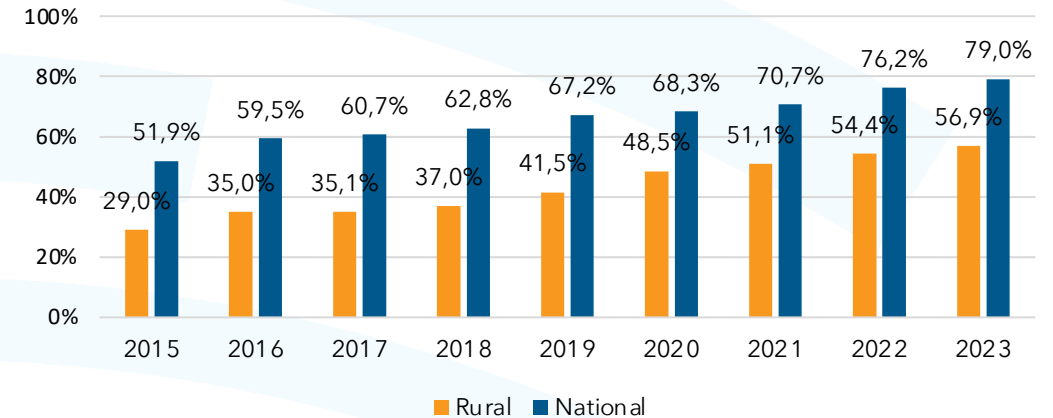
STRATEGY TOWARDS RURAL CONNECTIVITY

The government launched a national plan for "ultra-haut débit" divided into several phases

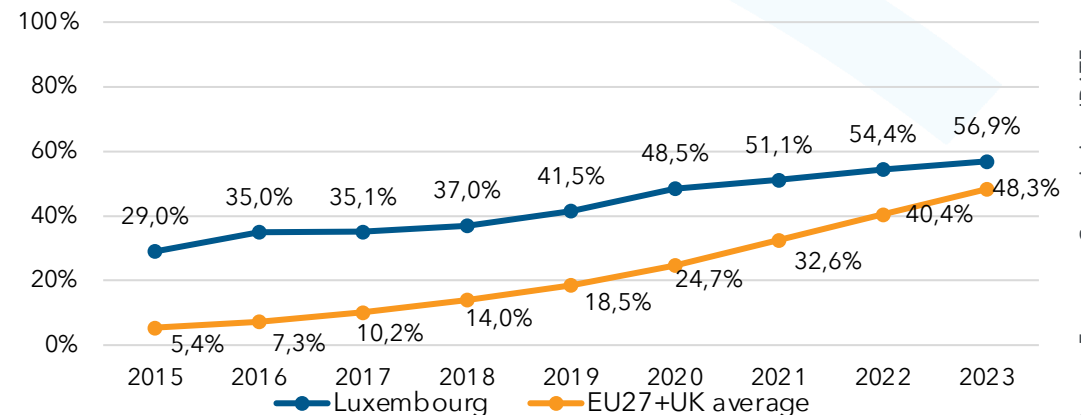
- By end-2011: 95% of the population would have access to Internet with speeds up to 25 Mbps
- By end-2013: 80% with 100 Mbps, 25% with 1 Gbps
- By 2015: 100% of the population should have access to 100 Mbps
- By end-2020: the whole population covered with an Internet access of up to 1 Gbps.

Believing 5G technologies provide a viable alternative for providing high speed internet in less accessible rural locations, Post's original goal of ultimately achieving nationwide FTTH coverage has since been reduced to 90% of territory, with the new target to be hit by 2025.

FTTH/B coverage in Luxembourg (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Luxembourg vs. EU27+UK, 2015-2023



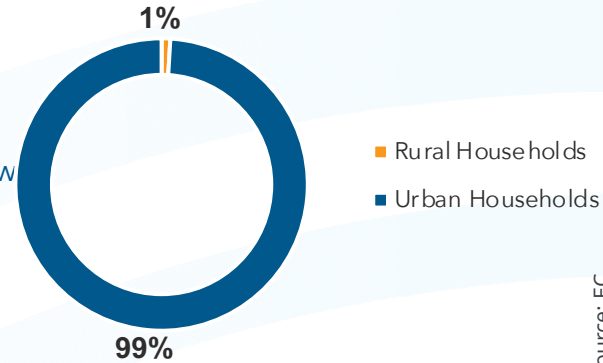
Source: European Commission, IDATE

19. FTTH/B in Rural Areas: Malta



Status in the country and next steps

Urban/Rural Households breakdown
Malta (2022)

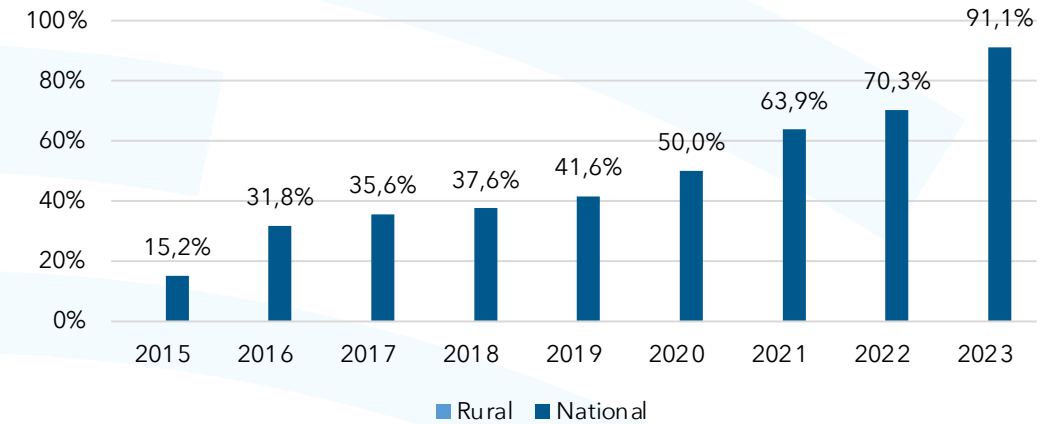


Source: EC

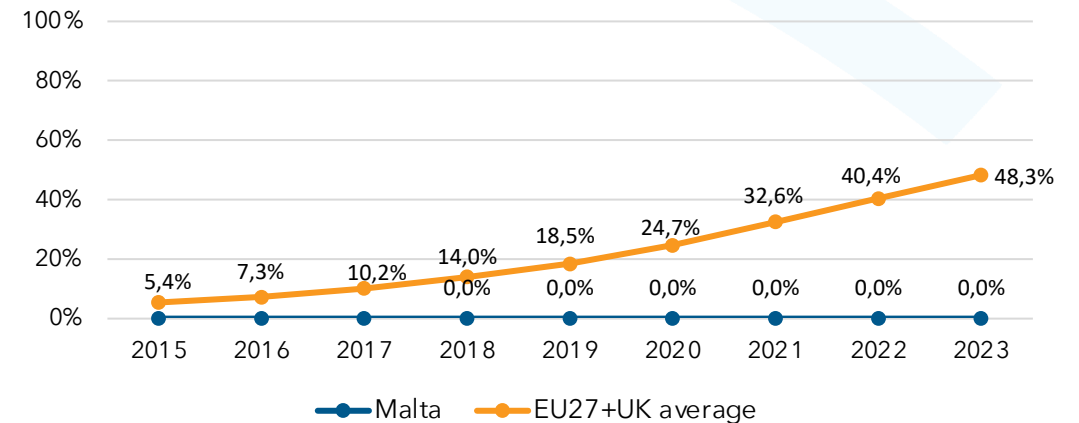
REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

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FTTH/B coverage in Malta (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Malta vs. EU27+UK, 2015-2023



Source: European Commission, IDATE

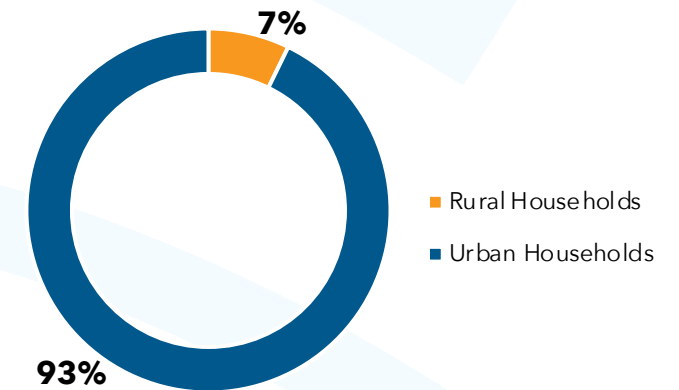
20. FTTH/B in Rural Areas: Netherlands

Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- Dutch authorities launch their 'Digital Connectivity Action Plan' in July 2018 with specific goals to achieve in terms of ultrafast broadband coverage in the coming years, described as follows:
 - Achieve 100% coverage with 100 Mbps speeds by 2023
 - Ensure that « a vast majority of citizens » could benefit from 1 Gbps speeds by 2023
 - The Dutch broadband strategy opts for a market-based infrastructure roll-out. Most of the broadband infrastructure roll-out is done by private operators autonomously. Here, removing barriers and facilitating the exchange of information and best practices among stakeholders are the principal tasks of local governments to stimulate investment by operators.
- No funding scheme has been put in place in Netherlands for broadband networks, thus there is no dedicated state aid programme for broadband connectivity in rural areas.
- In November 2022, MEACP presents new Digital Economy strategy setting broadband/digitisation targets for 2030
- MEACP to reconsider potential aid to connect remaining remote locations to 100Mbps networks by June 2024.

Urban/Rural Households breakdown
Netherlands (2023)



Source: EC

2019

- The Netherlands has already achieved the Digital Agenda goals for 2020 regarding broadband coverage

2020

- More than 50% of the households and businesses can benefit from 100 Mbps or higher.

2023

- 100% coverage with 100 Mbps speeds, regardless of technologies used
- 1 Gbps speeds available for 'a vast majority of citizens'

2030

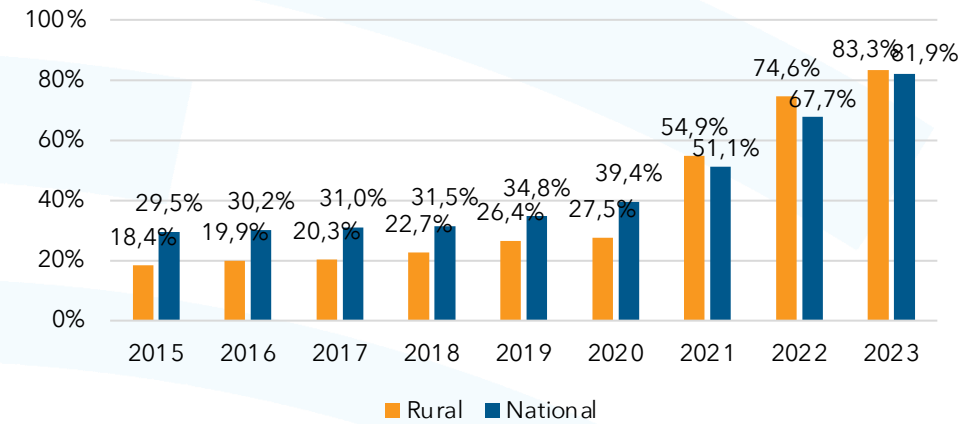
- 100% of citizens and companies nationwide to have access to a 1Gbps fixed internet connection

20. FTTH/B in Rural Areas: Netherlands

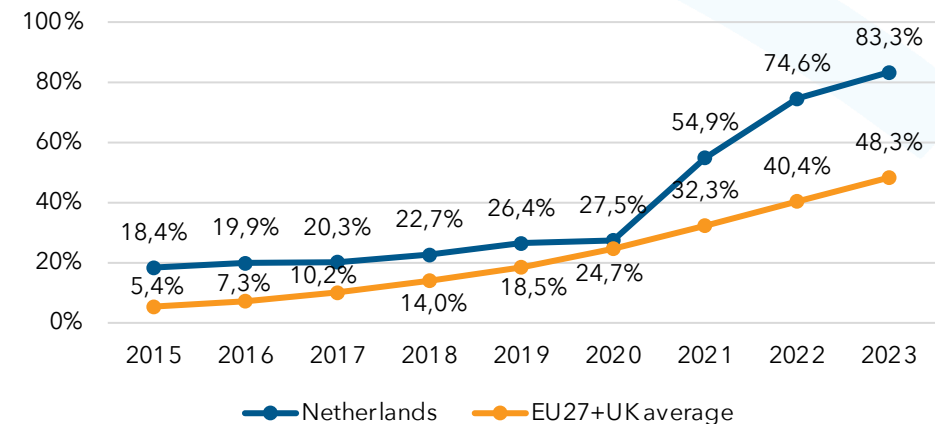
Action plans implemented...

- Local authorities have the responsibility for ensuring sufficient funding if there is a lack of private investment in ultrafast networks.
- In Netherlands, the Dutch government has a facilitation role, creating the right conditions for the rollout of broadband connections without public funding (i.e., by sharing knowledge or best practices e.g., Broadband Expertise Platform)
- However, government authorities can engage in public funding whether a state intervention is needed in certain areas. The State aid framework may also be used to facilitate the task of local authorities.

FTTH/B coverage in Netherlands (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Netherlands vs. EU27+UK, 2015-2023



Source: European Commission, IDATE

21. FTTH/B in Rural Areas: Poland

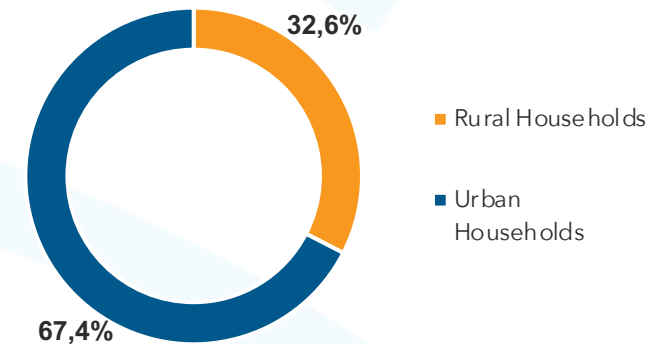


Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- The government is engaged to improve fast broadband coverage along the country, where rural areas are included. These actions are articulated from the Poland's Ministry of Digitalization.
- Regulations have been oriented towards the definition of wholesale rules to share infrastructure not only in the main cities but also in small municipalities.
- Government has announced that the main goal is to cover 100% of homes (even rural ones) with FTTx networks by end 2022. Public funds will be allocated for projects in rural areas.

Urban/Rural Households breakdown
Poland (2022)



Source: EC

2020

- 100% of households enjoying at least 30 Mbps connectivity, no specific use of technology mentioned
- 50% of households with at least 100 Mbps speeds.

2022

- 100% of households should be covered with FTTx networks by year-end

21. FTTH/B in Rural Areas: Poland

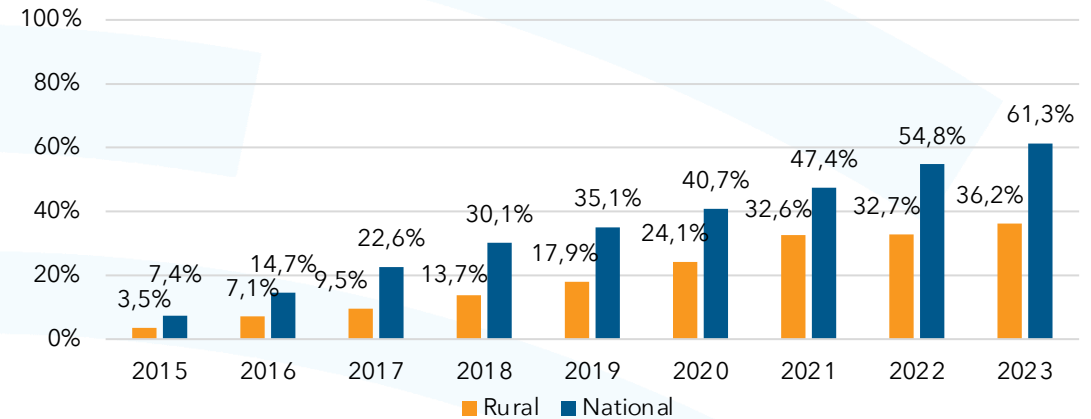


Status in the country and next steps

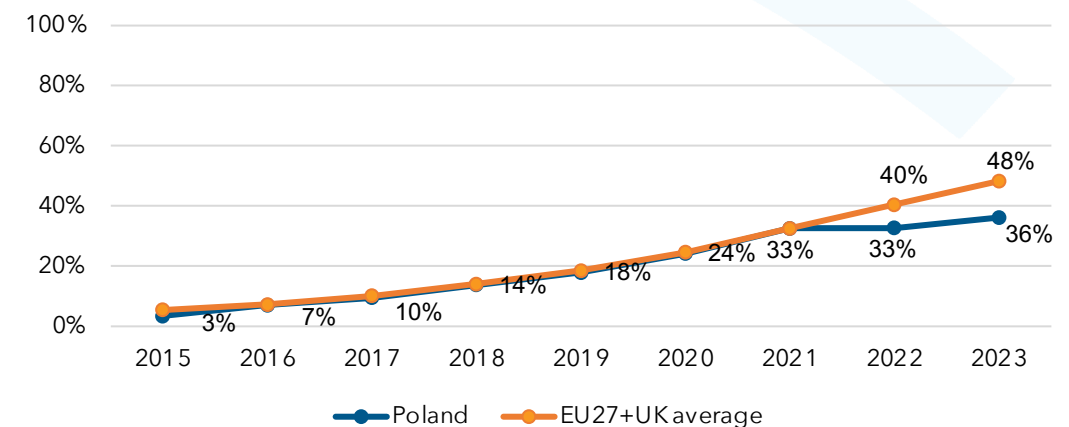
Action plans implemented...

- Many initiatives have been conducted allocating public fund, mainly European and National fund to deploy open access networks in rural areas.
- The government has implemented a model to co-invest with players that are in charge to deploy and to operate these open access networks in rural areas. Local Municipalities are in charge of the coordination and allocation of funds to deploy networks in those remote areas.
- Several firms secured contracts to deploy open access fiber networks in rural areas through government and EU-subsidized Operational Programme Digital Poland (POPC). INEA, with its wholesale unit Fiberhost, expanded its network to cover 1.15 million properties by end-2022, up from 740,000 the previous year. Additionally, utility group Tauron participated in POPC rollouts, reaching 126,000 households across 900 communities by October 2023, with 25,000 premises having active subscriptions through ISP partners.
- In a September 2023 update Orange said that it had covered more than 400,000 houses and 3,000 schools under the scheme, having deployed 25,164km of fibre network in 4,200 towns.

FTTH/B coverage in Poland (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Poland vs. EU27+UK, 2015-2023



Source: European Commission, IDATE

22. FTTH/B in Rural Areas: Portugal



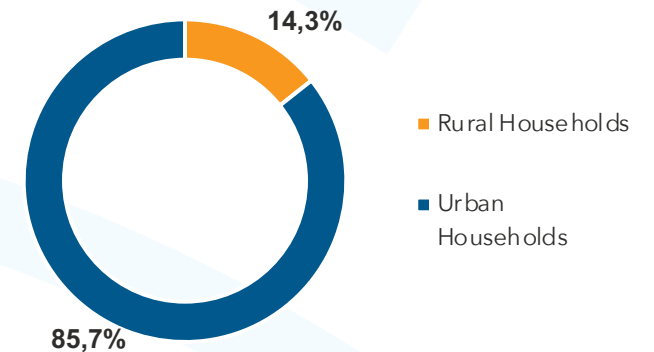
Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK

STRATEGY TOWARDS RURAL CONNECTIVITY

- In June 2009 the EC released a provisional set of guidelines regarding state aid for NGN development which emphasised the need for funding to be directed at reaching poorly served rural communities without broadband coverage, rather than investing in competing networks in built-up areas.
- The state also committed to developing legislation to reduce barriers to investment in new networks and ensure equal access to the new infrastructure. It claimed that it would also work on developing more fibre ducts, improving fibre access to buildings and supporting rural broadband projects through the distribution of tax benefits.
- ANACOM divides the Portuguese territory into two distinct geographic retail markets: 'competitive' parishes (mostly urban areas where alternative operators have significant NGN coverage) and 'non-competitive' parishes (mostly rural, where MEO is by far the strongest provider of broadband services). In January 2017 the regulator confirmed that it was maintaining its decision not to impose access regulation on the rural fibre-optic infrastructure owned by PT Portugal (MEO).

Urban/Rural Households breakdown Portugal (2022)



Source: EC

2020

- 100% of households able to have access to 30 Mbps
- 50% of households able to have access to 100 Mbps

22. FTTH/B in Rural Areas: Portugal

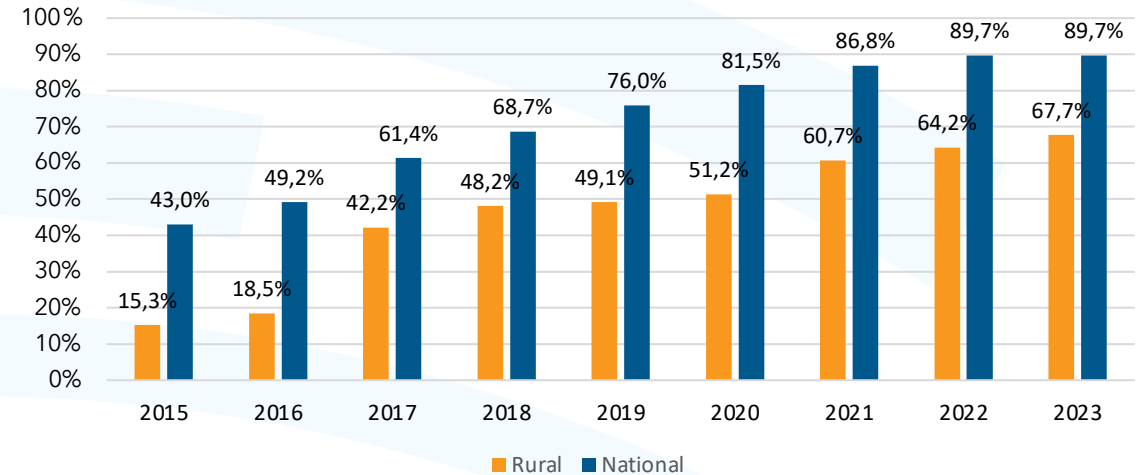


Status in the country and next steps

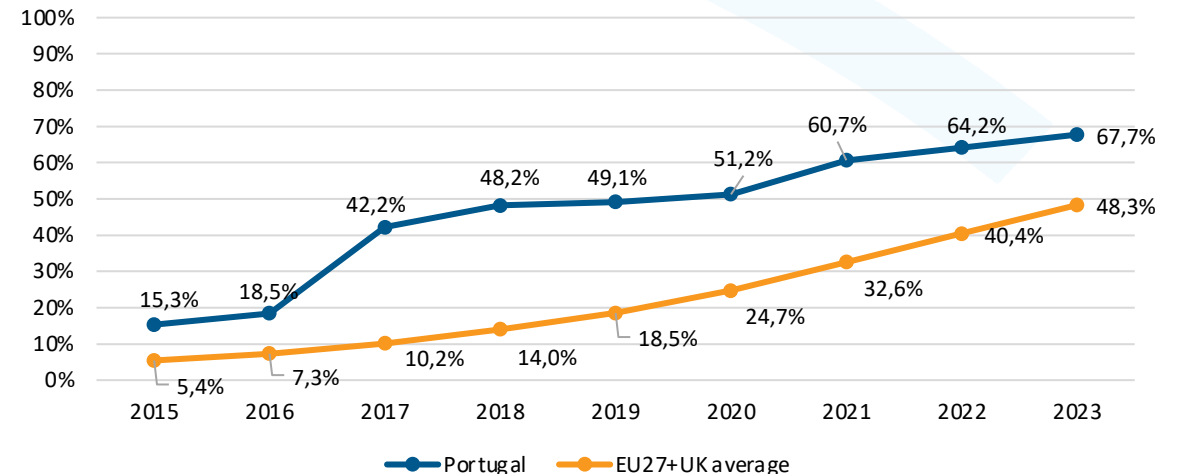
Action plans implemented...

- Regulation of infrastructure deployed by the incumbent (strong position along the country) to allow other players to invest in reaching isolated areas.
- Regulations towards the use of public infrastructure already deployed in remote areas and the use of existing ducts to deploy networks and therefore to reach more homes along the country.
- Coordination between the Ministry of Infrastructure, the Ministry of Communications and the Regulator in order to grant public funds to private players to deploy fixed networks in rural areas.
- Obligation of mobile operators to cover all rural areas in the country.
- The government provided a financial package of EUR182 million – of which EUR106.2 million was supplied by the EU – to subsidise NGN rollouts in six 'rural' regions of Portugal.

FTTH/B coverage in Portugal (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Portugal vs. EU27+UK, 2015-2023



Source: European Commission, IDATE

23. FTTH/B in Rural Areas: Romania

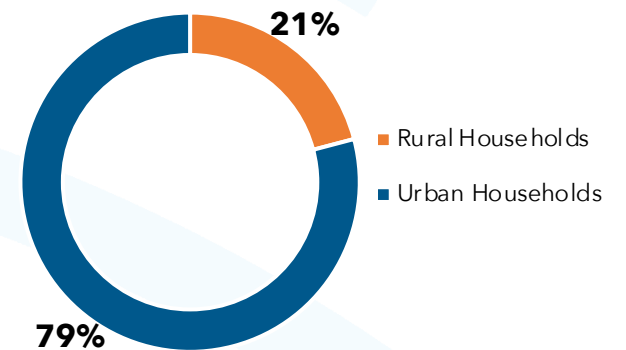


Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- In Romania, public authorities announced their 'National Next-Generation Networks Plan' in 2015 in order to promote the rollout of high-speed broadband networks at a national level, and thus comprising fibre deployments in white areas. This national plan also encourages fibre implementation as close to the end-user as possible.
- As part of this broadband programme, Romania launched its Ro-NET project, which uses structural funds (approximately EUR 69 million) to build up broadband infrastructure in areas still uncovered (middle mile funding). The direct beneficiary and recipient of the all grants of state aid is the Ministry of Communication and Information Society through a project implementation unit, which will remain the owner of the newly created backhaul infrastructure.

Urban/Rural Households breakdown
Romania (2023)



Source: EC

2020

- 100% of households should have access to fixed broadband connectivity, regardless of technologies used
- 80% of households with at least 30 Mbps speeds
- 45% of households with 100 Mbps connectivity

23. FTTH/B in Rural Areas: Romania



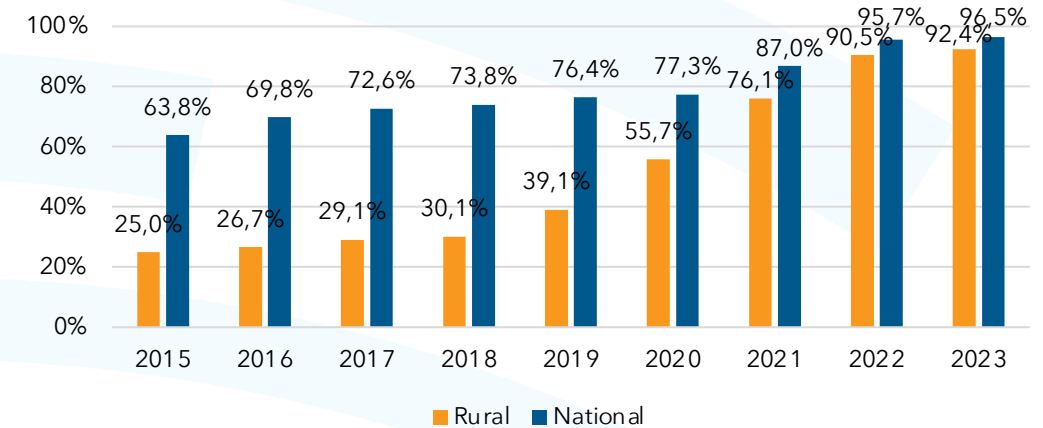
Current status in the country and next steps

Action plans implemented...

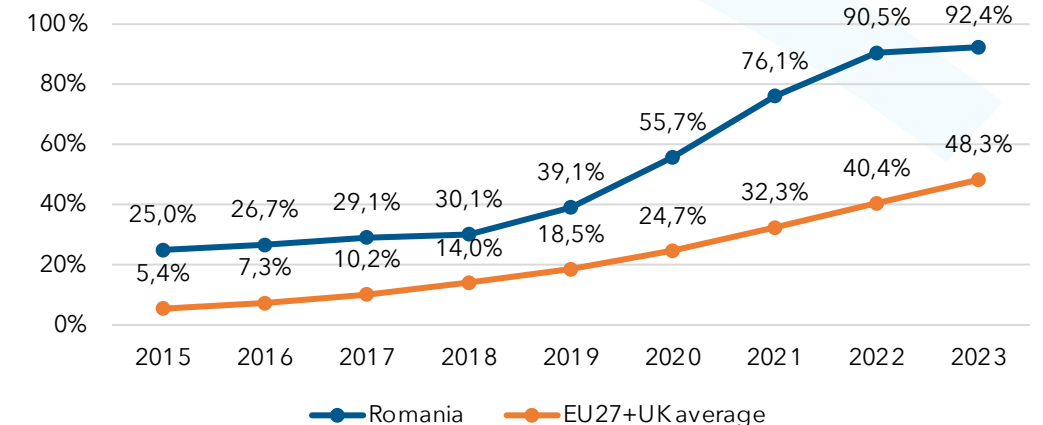
- Implementation of 'Ro-Net' initiative: dedicated fibre networks to be deployed in rural and underserved areas
- By 2014, Romanian government launched the deployment of a 'Ro-Net' broadband network for areas lacking high-speed broadband connectivity, under co-financing of the European Regional Development Fund. This initiative included Bucharest region and a total of 783 municipalities with low broadband coverage, with the government having awarded Telekom Romania for the rollout of this network dedicated to rural areas.
- By end 2016, 'Ro-Net' network rollouts had covered 259 localities.
- The initiative was initially supposed to complete Ro-net network deployment by end 2016 but the completion deadline was delayed. By the end of September 2019, works were completed in 606 localities, while an additional 82 localities are in an advanced stage of completion.
- Romania's RO-NET project has expanded broadband coverage by building distribution networks in more than 700 localities across the country where they were not previously available and where there were no plans for development by the private sector. The infrastructure serves about 200 000 households, 399 000 people and over 8 000 public institutions and private firms.

Source: European Commission, IDATE

FTTH/B coverage in Romania (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Romania vs. EU27+UK, 2015-2023



24. FTTH/B in Rural Areas: Spain



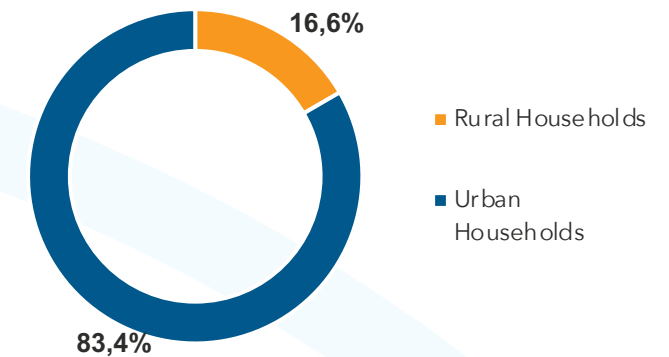
Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK

STRATEGY TOWARDS RURAL CONNECTIVITY

- Since December 2020, the Spanish government has unveiled its 'Digital 2025 Agenda' (now 2026) with strategic priorities to advance the country's digital transformation. Regarding broadband plans, the country aims to guarantee 100 Mbps coverage for the entire population by 2026, focusing in the transition period on strengthening broadband connectivity with a minimum access speed of 30 Mbps in those geographical areas that currently do not have broadband connections.
- The quick inclusion of white areas with UFBB is part of the agenda from the regulator. Therefore, Spanish government is promoting the reduction of administrative obstacles to facilitate operators' investment and to encourage partnerships and sharing agreements.
- The government's rural 5G towers backhaul programme, UNICO-5G Redes Backhaul Fibra Optica (2022), aims to distribute EUR448 million to build out 8,162 sites for fibre-optic backhaul connection to mobile network locations in sparsely populated areas with fewer than 10,000 inhabitants.

Urban/Rural Households breakdown Spain (2022)



Source: EC

2021

- 95% of households with 100 Mbps coverage
- Special attention to white areas in the country

2025

- 100% of the population covered by 100 Mbps-capable networks (no specific technology)

24.FTTH/B in Rural Areas: Spain

Status in the country and next steps



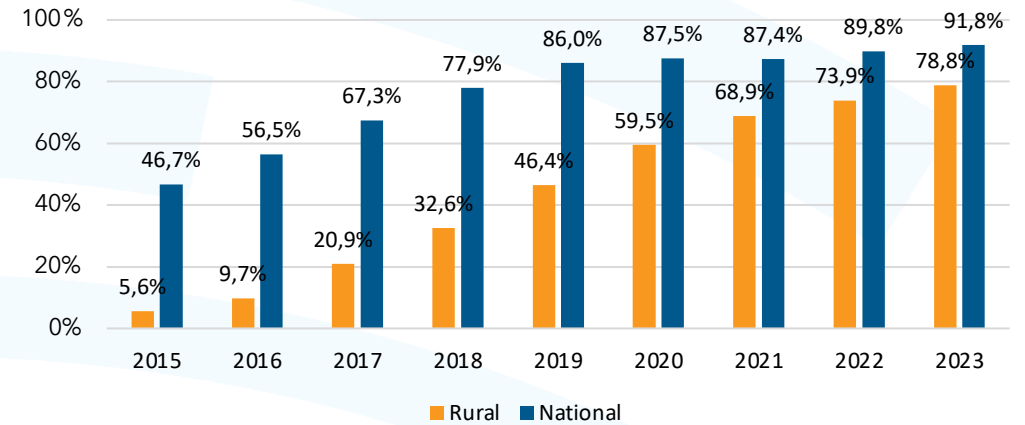
Action plans implemented...

- Public funds allocated to small and medium towns to deploy its own fibre networks.
- Creation of a State-aid Scheme called PEBA /UNICO where players receive public funds that help them to reach isolated areas with fibre and other technologies.
- Creation of the Plan 300x100 to deliver at least 100Mbps to 95% of homes in Spain by 2021. The plan included at least 203 rural areas in the country.
- Many sharing agreements and co-investment initiatives between operators with the objective to reach non deserved areas with fibre.

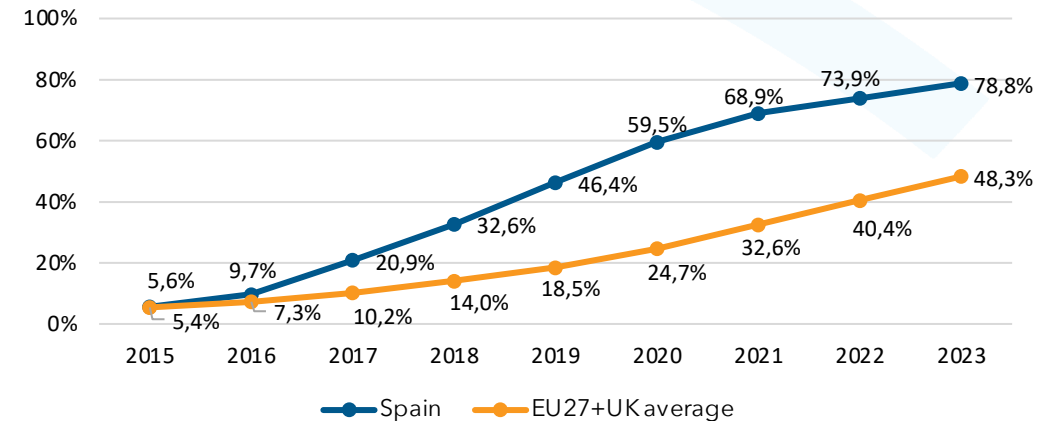
... and next steps

- Many initiatives created by the government to allocate public funds: PEBA/UNICO, Plan 300x100 and local deployments in municipalities.
- The recent Spain Digital 2026 Agenda is to be financed between 2020 and 2022 with around EUR 20 billion in public funds, of which approximately EUR 15 billion EUR is intended to come from the various EU programmes under the Next Generation EU Recovery Plan. This is expected to be complemented by around EUR 50 billion from the private sector.
- Telefonica established a new subsidiary and brand, Bluevia Fibra, in July 2022, with the aim of developing its FTTH network - especially those located in rural and remote areas. Bluevia Fibra is designed to form a key pillar to Movistar's plan to migrate 100% of its subscribers by that date. Bluevia Fibra hopes to bring services to a total of five million homes in the medium-term.
- Other operators owned by CEBF Fund are focusing on rural deployment.

FTTH/B coverage in Spain (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Spain vs. EU27+UK, 2015-2023



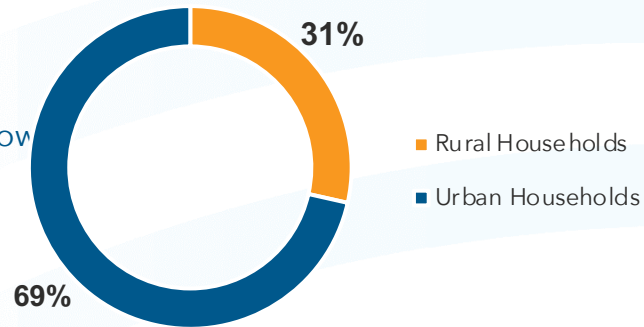
Source: European Commission, CNMC, IDATE

25.FTTH/B in Rural Areas: Slovakia



Status in the country and next steps

Urban/Rural Households breakdown
Slovakia (2022)

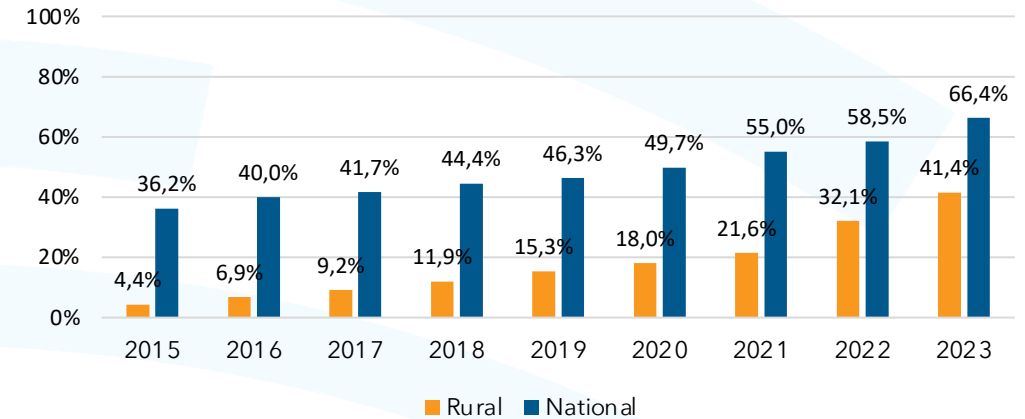


Source: EC

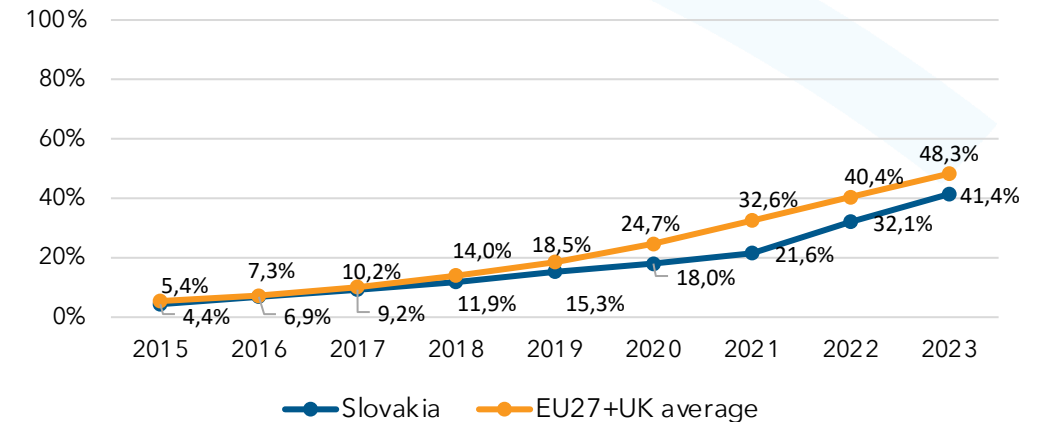
REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

Under a continuation of the national broadband policy, at the end of December 2012 Slovakia's National Agency for Network and Electronic Services published details of a tender for prospective operators to deploy passive high speed fibre-optic network infrastructure in areas with little or no broadband connectivity, under a total project budget of EUR213 million to be partly funded by the EU.

FTTH/B coverage in Slovakia (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Slovakia vs. EU27+UK, 2015-2023



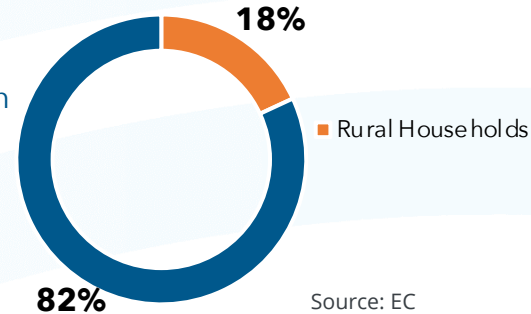
Source: European Commission, IDATE

26. FTTH/B in Rural Areas: Slovenia



Current status in the country and next steps

Urban/Rural Households breakdown Slovenia (2023)



Source: EC

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

The Slovenian plan for the development of the next generation broadband network until 2020 was published in 2015 and updated in March 2016. Under this plan, the country aimed to provide 96% of households with speeds of at least 100 Mbps by the end of 2020, and the remaining 4% with at least 30 Mbps.

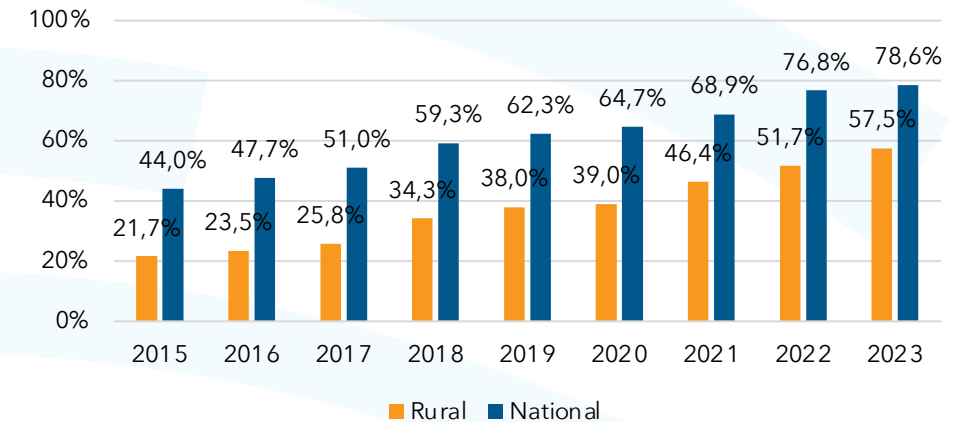
In October 2021, AKOS announced that the government was working on a new digital transformation strategy up to 2030 based on the policy guidelines issued by the EC.

The plan was published in August 2022 and included a target of 100Mbps speeds for all households by 2025, upgradeable to 1Gbps where possible, plus a gigabit connection for 'the main promoters of social and economic development' such as schools, cultural institutions, transport hubs and public service providers.

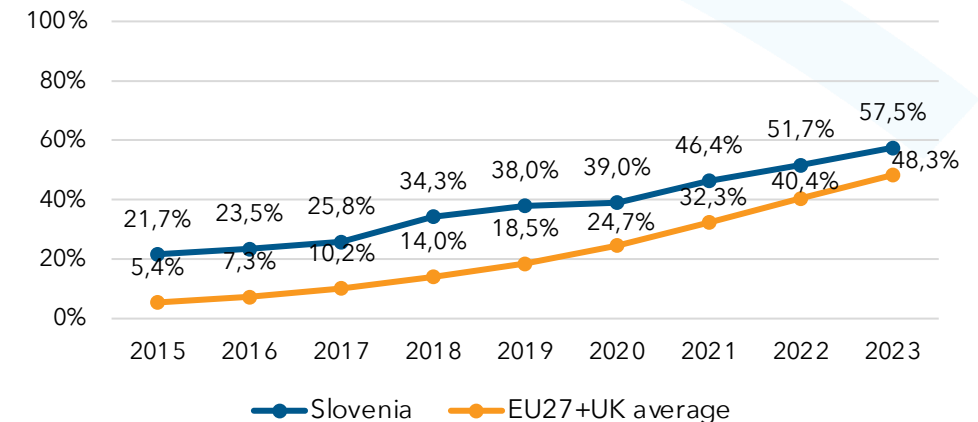
The FTTH roll-out in rural areas of Slovenia is progressing, with initiatives such as the RUNE (Rural Network) project aiming to finance the FTTH roll-out in rural areas of Slovenia. The project is a partnership between Slovenia and Croatia, focusing on rural and semi-urban areas. The project involves the construction of a new, approximately 1,600 km long, optical network in Slovenia, which will benefit around 52,000 households.

Source: European Commission, IDATE

FTTH/B coverage in Slovenia (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Slovenia vs. EU27+UK, 2015-2023



* Rural FTTH/B coverage = Rural FTTH/B Homes passed / Rural households

** National FTTH/B coverage = Total FTTH/B Homes passed / Total households

27. FTTH/B in Rural Areas: Sweden

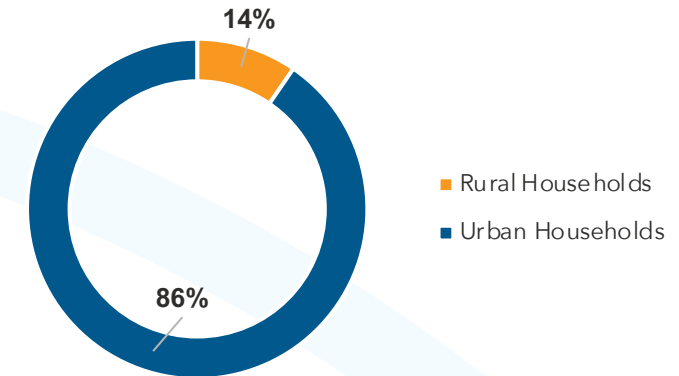


Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- Overall, Sweden's strategy for meeting coverage objectives is rooted in a **market-based approach backed by government support**. The government awards **subsidies** to encourage operators to invest in the remotest parts of the country.
- Fibre rollouts in **rural areas** are driven by the **village fibre or "fibre to the farm" strategy**. This approach includes **community involvement** in planning, building and operating local fibre networks, in cooperation with the municipalities and private sector operators.

Urban/Rural Households breakdown
Sweden (2022)



Source: EC

2020

- 95 % of all households and businesses should have broadband access of at least 100 Mbps by 2020
- 50% household penetration with 100 Mbps by 2020

2025

- 98% coverage with 1 Gbps speeds by 2025
- The remaining 1.9% should have access to 100 Mbps, and 0.1% at 30 Mbps speeds

27.FTTH/B in Rural Areas: Sweden



Status in the country and next steps

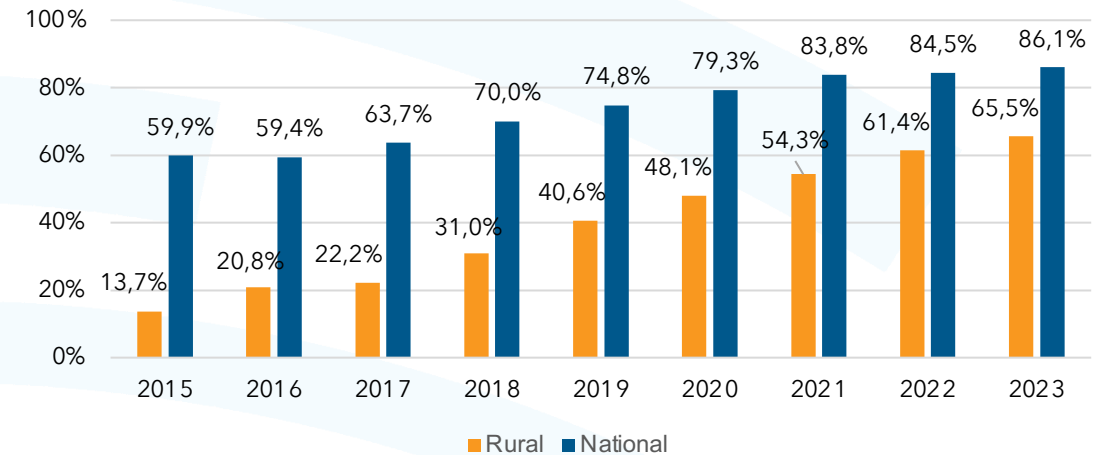
Action plans implemented...

- To support broadband expansion in rural areas, public authorities launched a 'Rural Development Programme' (for years 2014-2020) in which municipalities and local operators could apply for grants to build broadband networks.
- Sweden announced an investment of around SEK3.25 billion (EUR 30 million) by 2020 via subsidies for fibre expansion across rural and underserved regions across the country.
- FTTH technology has been deployed in both urban and rural areas. The current high coverage level can be attributed to:
 - **The importance of municipal networks**, which are responsible for supplying a large percentage of the infrastructure needed to deploy fibre.
 - **Increased investment from operators and local authorities in rural areas**

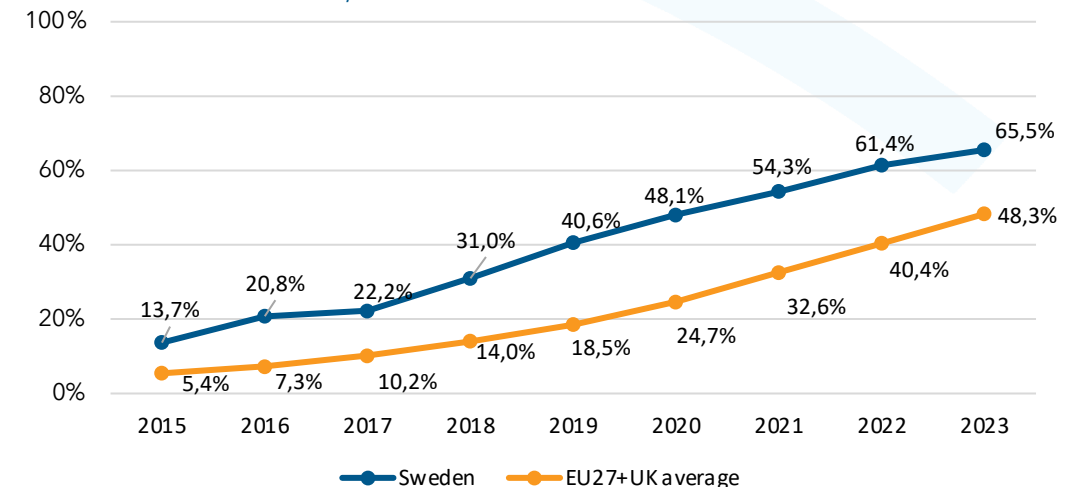
... and next steps

- Furthermore, the Swedish regulator PTS will offer EUR650 million in subsidies by 2023 to fund broadband rollouts in isolated areas with insufficient broadband connectivity. Of this total, EUR150 million were available in 2020 to support projects to bring high speed access to rural communities in four regions.

FTTH/B coverage in Sweden (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
Sweden vs. EU27+UK, 2015-2023



Source: European Commission, PTS, IDATE

28. FTTH/B in Rural Areas: UK

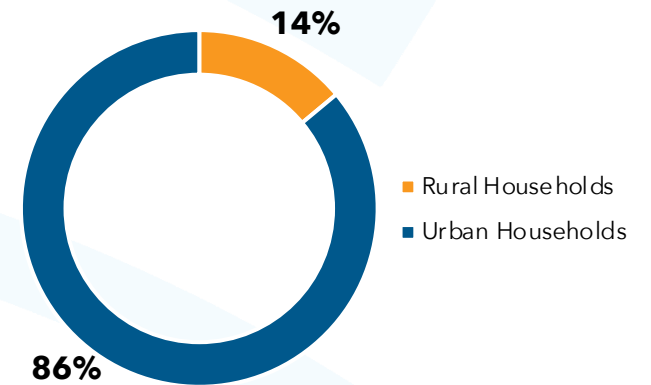


Overview of regulatory background & action plans underway to address rural areas

REGULATORY FRAMEWORK STRATEGY TOWARDS RURAL CONNECTIVITY

- Government has delegated rural deployments in different organisms. The Department for Culture, Media and Sport (DCMS) is in charge of the Ultra Fast Broadband Policy. The Regulator Ofcom is in charge of the promotion of competition and transparency. Local Authorities are in charge to manage public funds and project coordination.
- Regulations have been focused in the delivery of defined bandwidth speeds to all the population in the UK. Since 2010, it was implemented a Superfast Broadband Plan in order to expand all kind of technologies to reach more homes.
- Since 2016, the regulation have turned around the use of the existing infrastructure and sharing agreements, especially from BT/Openreach, to take advantage of poles and ducts to expand networks in isolated areas.
- Certainly for rural areas, there is not an obligation to deploy FTTH. However, the Universal Service Obligation (USO), and many incentives to get public funds are promoting these kind of fibre-based projects in isolated areas of the country. The target is to reach the USO of at least 10 Mbps to 99% homes in UK by 2022 and 15 million homes passed with FTTH/B by 2025.

Urban/Rural Households breakdown
United Kingdom (2023)



Source: EC

2020

- 100% of households able to have access to 30 Mbps by 2020
- 50% of households able to have access to 100 Mbps by 2020

2022

- Covering isolated areas along the country with the USO reaching 99% UK homes with at least 10Mbps by 2022

2025

- 15 million homes passed with FTTH by 2025
- ... and nationwide full-fibre coverage by 2033 according to BDUK initiative

28. FTTH/B in Rural Areas: UK



Action plans implemented...

- Regulation has turned into the reduction of administrative obstacles to facilitate network rollouts in isolated areas and the implementation of a Universal Service Obligation in order to provide higher bandwidth nationwide and not only in dense areas.
- The incumbent BT/Openreach must open the access of existing ducts and poles to other players in order to use it and to allocate investments to reach areas not yet covered with fibre.
- Government has created different initiatives to allocate public funds for co-investment or public loans for private operators in remote place. Some of them: Digital Infrastructure Investment Fund (DIIF) or the Broadband Delivery UK (BDUK) scheme.

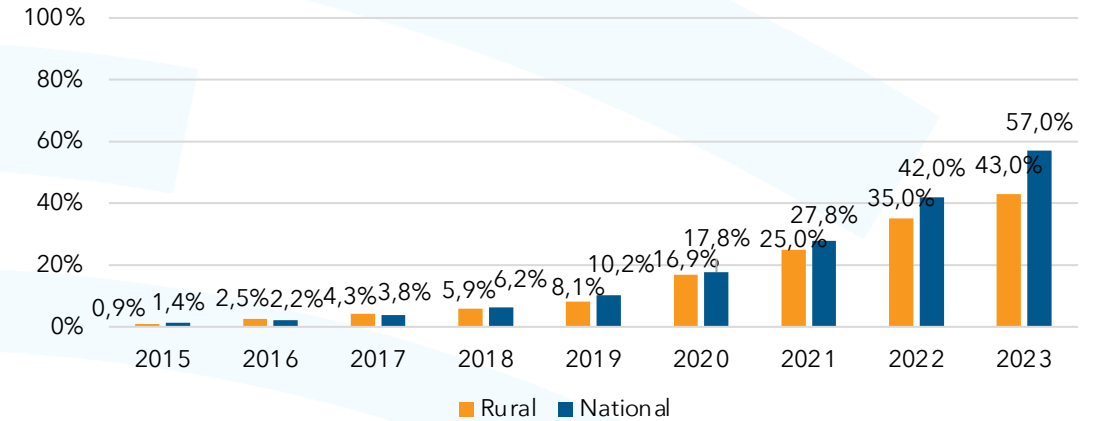
... and next steps

along the country from 2021 to 2026 which included plans to deploy FTTH/B in rural areas.

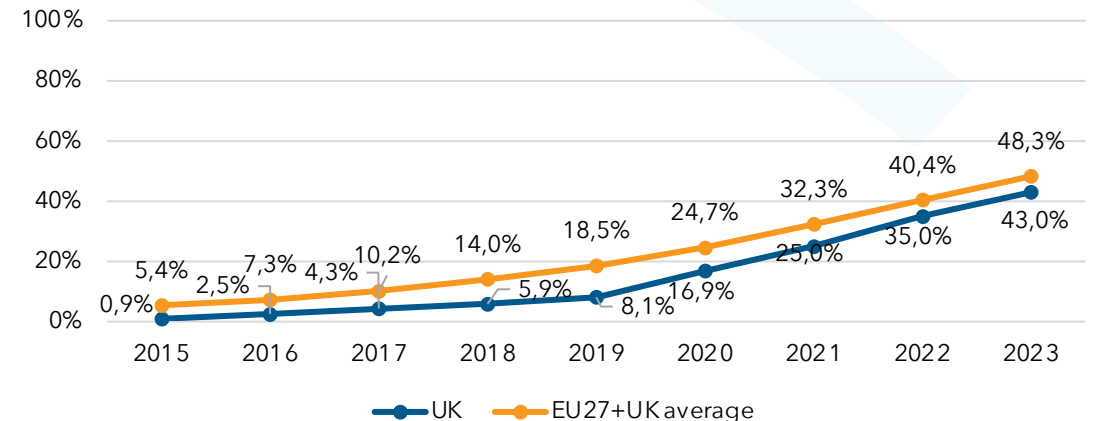
- The incumbent BT is studying copper switch off of its network and launched trials of FTTH in more than 200 rural areas.
- More than one million hard to reach homes and businesses will have gigabit broadband built to them in the first phase of a £5 billion government infrastructure project (Project Gigabit)
- Recently (February 2024) UK Government has signed £1 billion in contracts to connect around 677,000 rural homes and businesses to lightning-fast full fibre. Six major internet infrastructure contracts worth more than £450m have been awarded, allowing suppliers to begin surveying work to connect around 236,000 premises

Source: European Commission, IDATE

FTTH/B coverage in the United Kingdom (in %)
Rural areas* vs National level**, 2015-2023



Rural FTTH/B coverage* (in %)
United Kingdom vs. EU27+UK, 2015-2023



* Rural FTTH/B coverage = Rural FTTH/B Homes passed / Rural households
** National FTTH/B coverage = Total FTTH/B Homes passed / Total households

4. Conclusions



Conclusions

1

INCREASING FTTH
FOOTPRINT IN RURAL
AREAS

- An increasing number of countries have launched projects to address underserved areas, particularly rural regions, where reliable networks are essential. Authorities and regulators are defining ambitious national programs to achieve Digital Agenda goals for 2025/2030.
- By the end of 2023, approximately 64% of European households (EU27+UK) are covered by FTTH/B networks, with 48% of rural inhabitants now enjoying the capabilities offered by full-fibre connectivity, marking an increase of 7 percentage points year-on-year.

2

SEVERAL WAYS TO
PROGRESS

- The next steps should prioritize comprehensive efforts to address the needs of rural areas and eliminate existing "white spots" in broadband coverage.
- This requires a concerted and proactive approach, including aggressive promotion and intensified support through subsidies, public-private partnerships, and other means, to ensure that broadband connectivity reaches every premise across Europe, particularly in rural regions where access has historically been limited or lacking.

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KEY CHALLENGES TO
COME

- The entire ecosystem has heightened its focus on achieving full-fibre connectivity, speeding up both deployments and adoption rates. In European countries with a technology-neutral approach, FTTH/B deployment is advancing, although VDSL technologies continue to play a significant role, as seen in the UK, Germany, and Italy.
- Moreover, there's a growing trend towards fiber-oriented broadband deployments in less densely populated areas, with some countries opting for full FTTH networks over other technologies.