



European
Commission

Broadband Coverage in Europe 2013

Mapping progress towards the coverage
objectives of the Digital Agenda

FINAL REPORT

A study prepared for the European Commission
DG Communications Networks, Content & Technology by:



This study was carried out for the European Commission by



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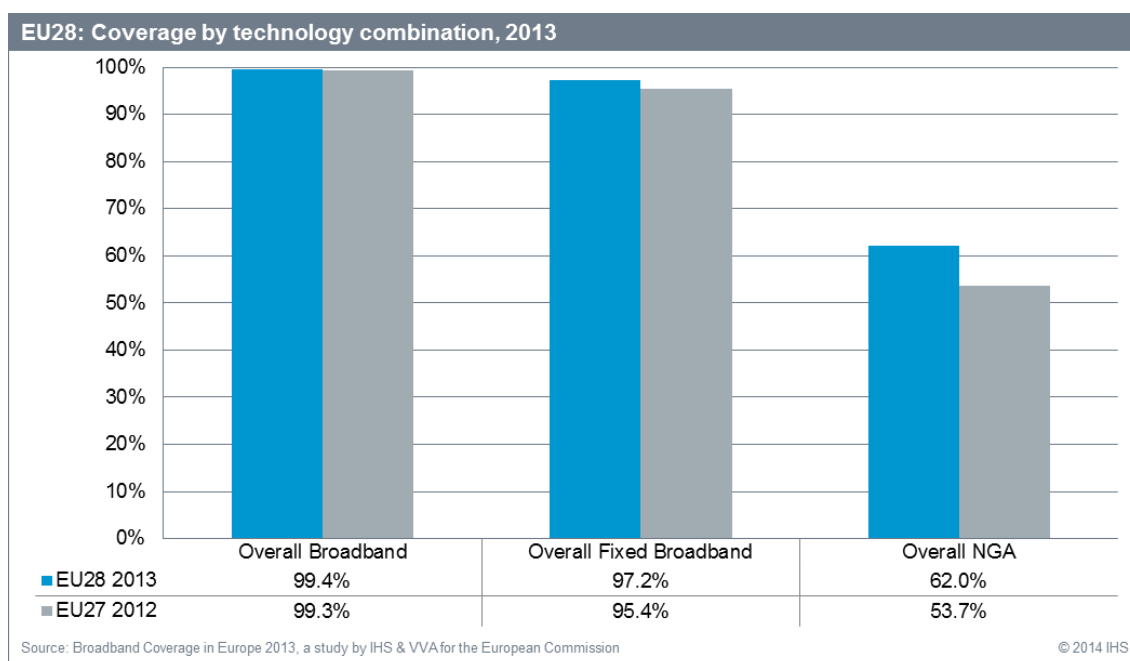
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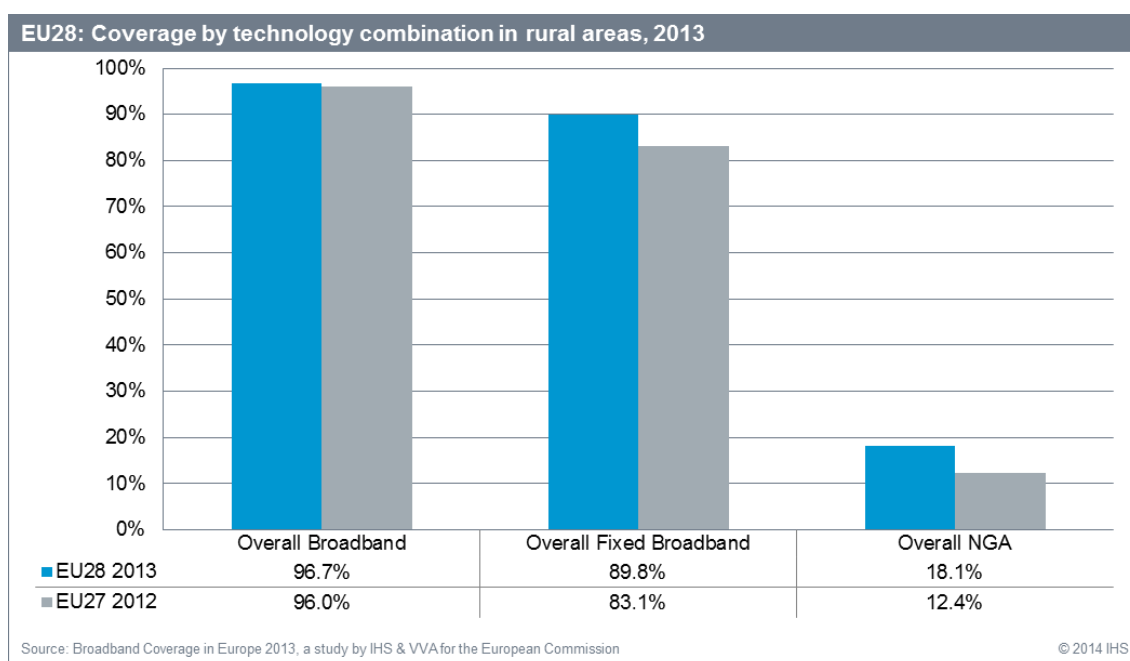
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Executive Summary

- The Broadband Coverage in Europe study is designed to monitor the progress of EU Member States toward their specific broadband coverage objectives – namely: ‘Universal Broadband Coverage by 2013’ and ‘Universal Broadband Coverage with speeds at least 30 Mbps’.
- In previous years (2010-2012), DG Connect appointed a London-based research agency, Point Topic, to conduct the research. In 2013, DG Connect selected the consortium of IHS & VVA to run the project. IHS & VVA surveyed NRAs and telecommunications groups across each participating state to compile the requisite information. Where possible, IHS & VVA adopted similar data collection and analysis methods to those implemented by Point Topic, in order to ensure comparability of datasets for the purposes of time-series assessment.
- This report covers thirty-one countries across Europe – the EU 28, plus Norway, Iceland and Switzerland, and analyses the availability of nine broadband technologies (DSL, VDSL, cable modem, DOCSIS 3, FTTP, WiMAX, HSPA, LTE and satellite) across each market, at national and rural levels. In addition, various combination categories indicating the availability of one or more forms of broadband connection, are also published. These cover overall fixed & wireless broadband availability, fixed broadband availability and next-generation access (NGA) availability.
- According to the study results, over 213 million EU households (99.4%) had access to at least one of the main fixed or mobile broadband access technologies at the end of 2013 (excluding satellite). During 2013, improvements were also made with regard to overall fixed broadband coverage across Europe, with more than 97% of households having access to such services at the end of 2013.

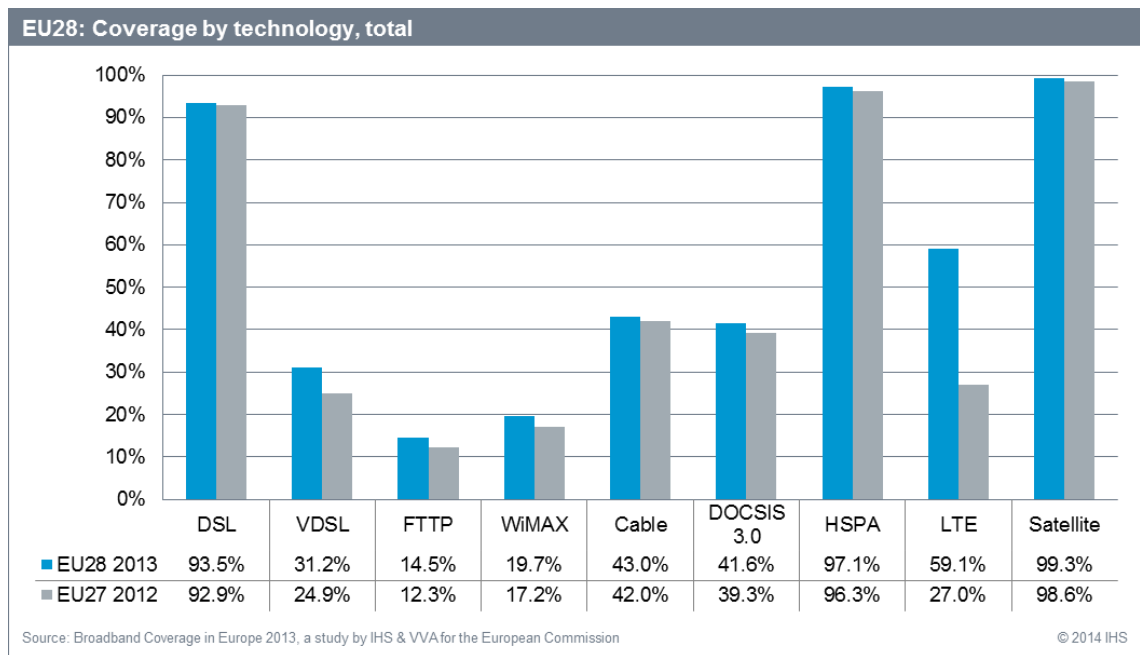


- An increase in availability of access was reported also for next-generation access services (VDSL, DOCSIS 3.0 and FTTP), which increased by 8.3 percentage points compared to the previous edition of the study, translating to 20.5 million new households gaining access to next generation broadband in the year. By the end of 2013, 62.0% of households across the EU Member States had technical access, against 53.7% in 2012.
- In rural areas, access to fast broadband services remains the major priority at European level. While at least one broadband access mechanism is available to nearly 97% of households in European rural areas, fast broadband services are still accessible only to a small percentage of households in such areas. Nevertheless, with investments in rural NGA deployments, NGA coverage increased during 2013 by 5.7 percentage points, reaching 18.1% of rural households (or 5.8 million rural households) by the end of the period.

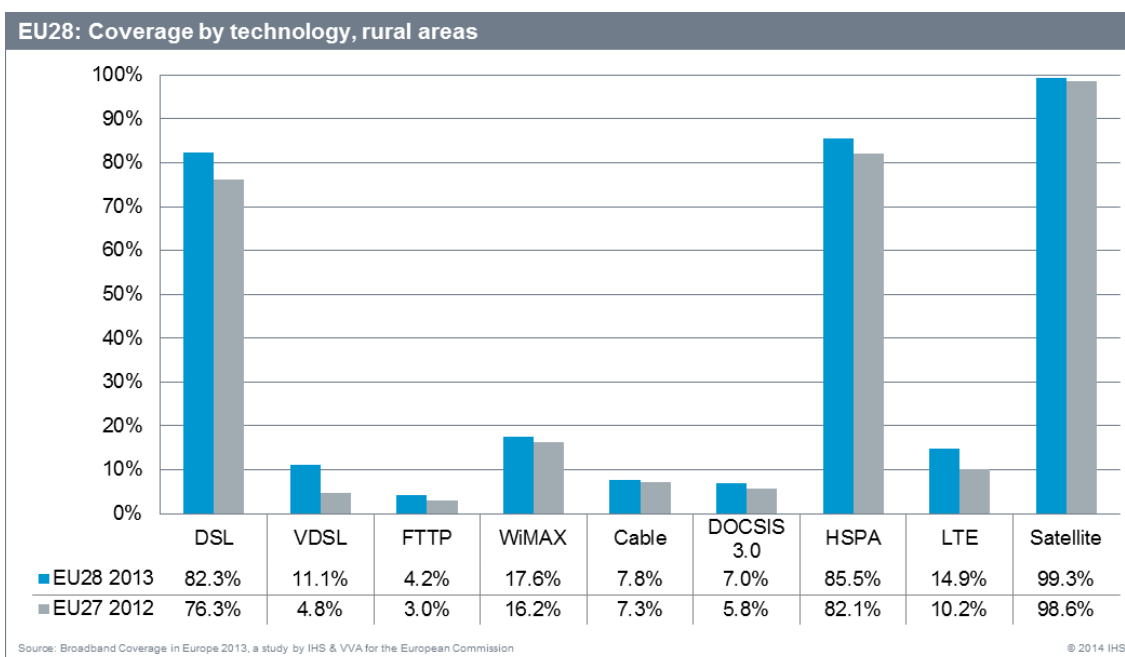


- Satellite continued to be the most pervasive technology in Europe in terms of overall coverage in 2013. KA-band satellites cover all 28 EU countries and are capable of offering broadband services of at least 2 Mbps. However, satellite coverage is limited in the Baltic countries, across which satellite reaches only certain parts of Estonia, Latvia and Lithuania.
- For fixed broadband coverage, DSL remains the most widespread technology, covering nearly 94% of EU households at end 2013. Total DSL coverage increased slightly year-on-year, growing from 92.9% in 2012.
- Cable broadband coverage increased by one percentage point year-on-year, and by the end of 2013 covered 43.0% of households across the EU. WiMAX grew by 2.5 percentage points year-on-year, and reached almost 20% EU households by the end of the study period.
- NGA coverage in 2013 showed developments, particularly with regards to VDSL access, which increased by more than 6 percentage points in the year, reaching

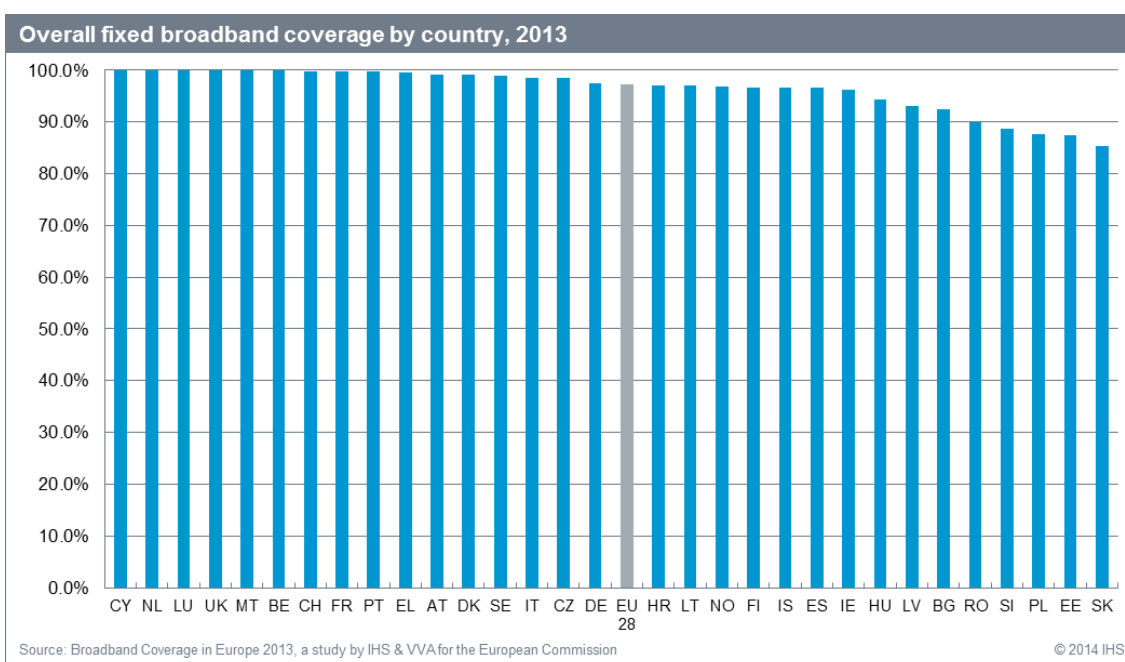
31.2% of households by the end of the year and making it the fastest growing fixed-broadband technology for the second year in a row.



- FTTP and DOCSIS 3.0 coverage also increased, with FTTP coverage growing by 2.2 percentage points to reach 14.5% of households, and DOCSIS 3.0 coverage increasing by a similar amount to reach 41.6% of homes. 96.7% of cable connections are now DOCSIS 3.0 capable across the EU.
- With regards to mobile broadband technologies, HSPA provided nearly universal coverage, reaching over 97% of EU households in 2013. With LTE being commercially launched in all but three Member States (Bulgaria, Cyprus, Malta) by the end of 2013, LTE coverage increased sharply from 27.0% in 2012 to 59.1% in 2013 as operators expanded network coverage and new service providers launched.
- Rural areas remain a challenge in terms of coverage. Rural households continue to be underserved by fixed technologies (89.8% coverage at rural level, compared to 97.2% total EU coverage), and particularly by NGA technologies (18.1% coverage at rural level versus 62.0% of all EU households).
- Nevertheless, progress has been recorded in fixed rural coverage over the last few years as governments and operators have begun to develop and implement more sophisticated rural coverage plans. The biggest rural coverage improvements have been reported for DSL, which reached 76.3% rural coverage in 2012 and which increased to 82.3% of rural households in 2013.
- HSPA reached nearly 86% of rural households at the end of 2013, a 3.4 percentage point increase compared to 2012. With the introduction of LTE in more markets across Europe, LTE coverage recorded significant growth in rural areas, growing from 10.2% coverage in 2012 to nearly 15% in 2013.

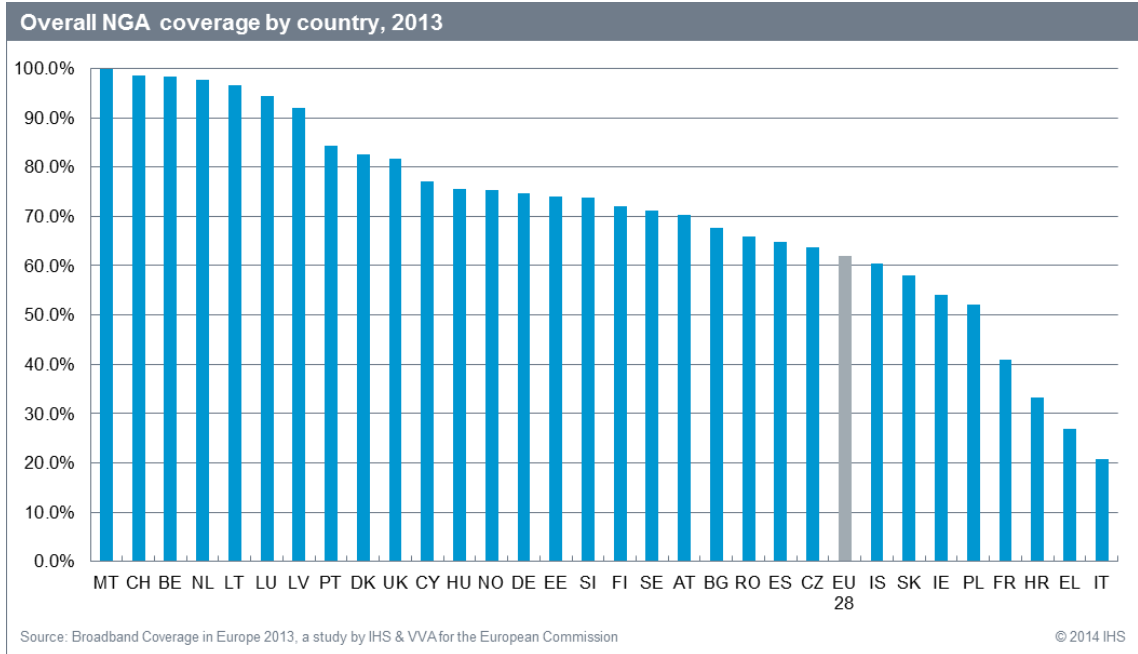


- Out of the 31 study countries, 15 countries had fixed broadband coverage levels of at least 97.2% at the end of 2013, 27 countries had fixed broadband covering at least 90% of their households. Fixed broadband coverage was highest in Cyprus, Netherlands, Luxembourg, United Kingdom, Malta, Belgium and Switzerland, and lowest in Slovenia, Poland, Estonia and Slovakia, across which it reached between 89.9% and 85.0% of households.



- Malta is again the only country to report complete coverage for NGA technologies, followed by Belgium, the Netherlands, Lithuania, Luxembourg and Latvia, all above 90%. However, the pattern of NGA coverage is mixed, reflecting the various strategies and approaches to high-speed broadband deployment adopted across Europe.

- Out of the 31 study countries, 22 countries performed above the European average (62.0%) with regards to NGA availability, and only four countries reported NGA coverage below 50% (France, Croatia, Greece and Italy). Italy had the lowest coverage of NGA technologies, with a total availability of 20.8% of households.



- Mobile technology is widespread in Europe and HSPA services are accessible to more than 97% of EU households. Nearly all of the countries in this study reported coverage levels above 90%, with only Slovakia reporting HSPA coverage of below 90% (at 86.3% for 2013).
- LTE coverage across Europe increased dramatically in 2013. While there were eight countries with no LTE coverage in 2012, there were only three countries (Bulgaria, Cyprus, and Malta) at the end of 2013 which recorded no LTE availability. The EU average LTE coverage grew by 32.1 percentage points, increasing from 27.0% to 59.1% of households. Sweden was the leading country in terms of LTE coverage in 2013 with an extensive LTE network reaching nearly all of its households (99.2%).

1.0 Introduction

In order to foster the development of a network-based knowledge economy and stimulate growth, the Digital Agenda for Europe (DAE), adopted in 2010 as a flagship initiative of Europe 2020, includes a set of specific broadband coverage targets:

- Universal broadband coverage by 2013; and
- Universal broadband coverage of speeds at least 30 Mbps by 2020.

In order to monitor the progress of the broadband coverage objectives of the Digital Agenda, DG Connect (the European Commission Directorate General for Communications Networks, Content and Technology) has commissioned the Broadband Coverage in Europe project to measure the household coverage of all the main fixed and wireless broadband technologies with a specific focus on Next Generation Access (NGA) technologies. In previous years (2010-2012), DG Connect appointed a London-based research agency, Point Topic, to conduct the research.

In 2013, DG Connect selected the consortium of IHS & VVA to run the project. As in previous years, DG Connect requested the study to be based on a survey of broadband network operators and National Regulatory Agencies (NRAs) to obtain a Europe-wide picture of the coverage of the nine main broadband technologies. The study was to cover thirty countries including the EU-28, Norway, and Iceland. A separate study was commissioned by Glasfasernetz Schweiz to conduct identical research of broadband coverage in Switzerland. Results of the study are also included in this report increasing the total number of study countries to thirty-one.

The nine broadband technologies analysed in this study are:

- DSL (including VDSL)
- VDSL
- Cable modem (including DOCSIS 3.0)
- DOCSIS 3.0
- FTTP (Fibre-to-the-property)
- WiMAX
- HSPA
- LTE
- Satellite

Coverage of these technologies is reported on national and rural level based on the number of homes passed by each individual technology.

The study also aims, as requested by DG Connect, to estimate the overall coverage of “combination” of technologies accounting for the overlap of the different technologies capable of delivering a comparable level of performance. The combination categories included in this study, and similar to previous years, are:

- Overall broadband coverage
 - Includes all the main broadband technologies, both fixed and mobile, but excludes satellite
 - Combination of DSL (including VDSL), cable modem (including DOCSIS 3.0), FTTP, WiMAX, HSPA and LTE

- Overall fixed broadband coverage
 - Includes all the main fixed-line broadband access technologies, but excludes satellite
 - Combination of DSL (including VDSL), cable modem (including DOCSIS 3.0), FTTP, and WiMAX
- Next Generation Access (NGA) coverage
 - Includes fixed-line broadband access technologies capable of achieving download speeds meeting the Digital Agenda objective of at least 30Mbps coverage
 - Combination of VDSL, DOCSIS 3.0, and FTTP

Due to the fact that multiple operators may deploy their networks in the same or similar areas, particularly in urban and more densely populated locations, it is necessary to take into account the possibility of overlapping coverage when determining the technology combinations.

IHS & VVA, in agreement with DG Connect, decided to apply similar methodology to the one used by Point Topic in the previous years of the project and use regional approach to measuring overlapping and complementary coverage. Coverage data was collected on a regional level using NUTS 3 statistical units as a research basis. The NUTS (Nomenclature of Units for Territorial Statistics) areas are geographical subdivisions generally based on existing national regional divisions of EU countries and associated countries (such as Norway, Iceland and Switzerland). More specifically, NUTS 3 level areas are smaller regional units of 150,000 to 800,000 inhabitants. There are 1,362 NUTS 3 areas in the 31 study countries. With general statistical data (such as population, household, and area size) readily available on NUTS 3 level, using this regional approach provides a comprehensive and detailed view of broadband coverage across Europe as well as allowing for a year-on-year comparison with the BCE 2012 data.

In addition to individual technology coverage and combination technology coverage, DG Connect required coverage by download speed to be included in the study in 2013. The following speed categories were thus added among the research metrics:

- Coverage by broadband network/s capable of at least 2 Mbps download speed
- Coverage by broadband network/s capable of at least 30 Mbps download speed
- Coverage by broadband network/s capable of at least 100 Mbps download speed

By including the additional metric, it is possible to obtain an additional analytical layer to evaluate the study countries' progress towards the Digital Agenda goals. However, since this was a new metric, the level of quality of received data varied quite substantially. For this reason and with approval from DG Connect, the research team decided to include information on speed categories in the form of an Appendix of this report.

The following table details the scope of the Broadband Coverage in Europe 2013 study.

Scope	Description of Broadband Coverage Metrics
Geographical coverage	<ul style="list-style-type: none"> • EU28 + Iceland, Norway and Switzerland • Rural and national coverage
Technologies	<p>The following technologies are included:</p> <ul style="list-style-type: none"> • DSL (excluding VDSL) • Cable modem (excluding DOCSIS 3.0) • HSPA • FTTP (Fibre to the Home and Fibre to the Building) • VDSL • Cable modem DOCSIS 3.0 • LTE • WiMAX • Satellite <p>The study also covers the following technology combinations:</p> <ul style="list-style-type: none"> • Overall broadband coverage (including DSL, VDSL, FTTP, Cable modem, Cable modem DOCSIS 3.0, WiMAX, HSPA and LTE) • Overall fixed broadband coverage (including DSL, VDSL, FTTP, Cable modem, Cable modem DOCSIS 3.0 and WiMAX) • NGA coverage (including VDSL, FTTP and cable modem DOCSIS 3.0)
Speeds	<p>The study covers the following speed categories:</p> <ul style="list-style-type: none"> • At least 2 Mbps download • At least 30 Mbps download • At least 100Mbps download

Acknowledgements

It would not be possible to deliver the results of this project without the support of all involved parties. First and foremost, the IHS & VVA team would like to thank all survey respondents, both regulators and operators, who took the time to fill in the BCE questionnaire and provide us with the fundamental information and data that form the core of this study. We are very grateful for their involved and responsible approach in addressing the demanding request for information and data. While the figures in our deliverables might not always be exactly the same as those provided by respondents (due to a number of complex factors, such as different statistical bases or definitions), the research team always attempted to prioritise data received directly from respondents and reflect this information in our estimates as much as possible.

The research team is also grateful to the FTTH Council Europe and IDATE, for kindly sharing information from their research of FTTx coverage across Europe. While in most cases the team relied on data collected through the survey, IDATE’s data proved to be an important additional source of information.

Last but certainly not least, we would like to thank DG Connect for their active involvement throughout all stages of the project. At the onset of the project, DG Connect provided the research team with their Europe-wide contact database of both NRAs and ISPs, which proved to be invaluable in ensuring high response rate to the survey questionnaire.

2.0 Project Objectives

The general objective of the study is to provide datasets in line with the specific objectives below:

- Collect coverage data on country level, regional and rural level for different technologies through:
 - a survey of operators (ISPs) and National Regulatory Authorities (NRAs);
 - a review of alternative sources (e.g. operator websites, white papers, consultant reports);
- Estimate coverage for different technology and speed combinations; and
- Report on the findings on EU and country-level and prepare a database with statistical data.

3.0 Methodological approach in detail

Following an extensive discussion with DG Connect at the project's inception meeting, the IHS & VVA team decided to adopt similar methodology to the one applied by Point Topic in previous years, in order to ensure consistency and year-on-year comparability of the data.

As in previous years of the project, a survey of NRAs and broadband network operators forms the core of this study.

The survey results were validated and cross-checked against additional information gathered from other sources (including public announcements by telecoms groups) in parallel with the survey data collection. The additional research also helped to fill in any gaps which resulted from incomplete information from NRAs or operators. Lastly, survey data and additional information were combined and used to calculate national coverages by individual technologies as well as the combination coverage categories and speed coverage categories.

The following chapters of this report provide a detailed description of the project's methodology.

3.1 Survey design and data collection

For the sake of consistency, IHS & VVA used similar wording and formatting of survey questionnaire as was used for the 2012 study. Using near-identical question wording in this year's survey enabled IHS & VVA to deliver findings which can be compared with research undertaken in previous years.

DG Connect kindly provided the research team with a list of survey participants contacted for the 2012 BCE study. While some of the previous year's respondents were not available to participate in the 2013 study, the fact that the BCE project is a long-running project means that most respondents were familiar with the study as well as the survey questionnaire, making it easier for them to fill in the by-now familiar information.

The survey questionnaire was focused on one central question, which asked about the absolute number of homes passed by broadband networks, and was applied to the following key metrics of the research:

- Technology coverage – for each of the technologies (with the exception of satellite) a question was included asking NRAs to supply the number of homes passed by each individual technology in the country
- Regional coverage – NRAs and operators were also asked to supply homes-passed information for each of the NUTS 3 regions in all study countries for each of the technologies
- Rural coverage – the same questions were asked of respondents for homes passed in rural areas of each NUTS 3 region as well as for the total number of rural homes passed country-wide.
- Speed coverage - For the 2013 study, a new metric was introduced – that of speed coverage. Thus the survey questionnaire was extended to include questions asking participants about the numbers of homes passed by networks able to achieve speeds of at least 2 Mbps, 30 Mbps and 100 Mbps.

In a number of cases, coverage data was delivered on a more detailed geographical level than the requested NUTS 3 areas. In these cases, IHS & VVA aggregated the provided data to match the NUTS 3 regions.

In addition to the coverage questions, the survey questionnaire also provided space for additional comments and explanations of the various technologies and speed specifications in cases in which respondents' definitions differed from those outlined in the survey (detailed definitions of the individual broadband technologies are included in the Appendices of this report). These comments provided further insight and were reflected in the final analysis of the data.

Given the nature of satellite broadband coverage, questions regarding satellite coverage were not included in the survey questionnaire. The satellite coverage across Europe was determined based on conversations with leading satellite providers such as Eutelsat, a KA-SAT broadband provider and other smaller satellite operators.

The IHS & VVA team has been from the onset of this project aware of the sensitivity of the requested data provided by operators, as much of the coverage data (especially on such a granular level), could be regarded as commercially sensitive by operators. Therefore, confidentiality of the information gathered from both NRAs as well as individual operators was assured at all stages of the survey data collection and subsequent analysis.

In order to protect the confidentiality of the data, study results for individual coverage technologies are published only on a total country level. On the regional NUTS 3 level, reported data is limited to coverage by technology combinations. As these technology combinations include multiple technologies, coverage by individual technologies or companies is concealed within the combined total coverage.

All of the collected data was treated as commercially confidential and was used solely for the purposes of this study.

3.2 Defining rural areas

As mentioned above one of the dimensions of the study was in gaining information on broadband coverage in rural areas. In order for the rural data to be comparable to the 2012 dataset, the IHS & VVA research team adopted a similar approach to determine rural areas to the one used by Point Topic.

In 2012, Point Topic developed a new approach to defining rural areas using the Corine land cover database and creating a database of population and land type in every square kilometre across Europe. Households in square kilometres with population less than one hundred were classified as rural. This granular approach based on population density enabled Point Topic to identify truly rural areas likely to be unserved or underserved by broadband operators. Using this methodology, Point Topic estimated that approx. 15% of households in the study countries were rural.

In order to be able to analyse rural coverage in a consistent manner, the IHS & VVA team received from DG Connect data indicating the proportion of rural areas in each NUTS 3 area. Combining this information with updated 2013 population and household data from Eurostat, the EU statistical office, allowed the research team to create new estimates for the numbers of rural households across each market and NUTS 3 area.

3.3 Additional research conducted in parallel to the survey

In addition to data gathered through the NRAs and ISPs survey, the IHS & VVA team carried out supplemental research to check the validity of survey data as well as to fill in any missing pieces of information.

The additional research was built on the IHS & VVA team's extensive in-house knowledge of the European broadband sector and was complemented with country and regional-level data collected from publicly available NRAs and ISPs reports and details on broadband strategies and development plans of individual companies and governments.

This desk-based research provided basic estimates on country-level coverage for each technology. In many cases, information on regional deployments of next generation access technologies was also available, or was possible to infer such detail from company communications.

The individual elements of the additional research were determined on a country-by-country basis and included (but were not limited to) desk research of the following publicly available sources:

- NRAs market reports
- ISPs financial reports and press releases
- Industry organisations white papers, special reports and analysis
- Industry news

IHS & VVA also contacted other relevant organisations, such as the FTTH Council Europe and Cable Europe to gain additional insight on individual access technologies deployment and coverage trends. The research team is particularly grateful to the FTTH Council Europe and IDATE, FTTH Council Europe's data provider, for kindly sharing information from their research of FTTx coverage and subscribers across Europe. While in most cases the team relied on data collected through the survey, IDATE's data proved to be an important source for cross-checking the gathered figures and estimating the final coverage results.

IHS has also utilised its close relationship with cable industry association Cable Europe. IHS has been Cable Europe's preferred research partner for the past decade and has access to data from Cable Europe members – used in the publication of the annual 'Cable Yearbook' study. Cable Europe was very helpful in establishing contacts with a number of European cable providers for the purposes of this study.

3.4 Validation and integration of data

In this phase of the study, data collected through the survey and via additional research were brought together to obtain the actual coverage figures for all of the study countries.

The data integration was conducted on a country-by-country basis. Information gathered from additional research was cross-checked with results of the survey. In cases for which data points were missing, for example some of the NUTS 3 regions or rural coverage, a modelling methodology was applied to fill in the gaps. Models used varied on a case-by-case basis, and relied on a range of inputs, which included national coverage and regional presence data as well as the research team's knowledge of individual markets, companies' deployment strategies and ancillary data, such as population density.

Each country's data was integrated for each technology individually. This allowed the research team to first obtain estimates for individual technologies at a NUTS 3 level, which were then used to calculate estimates for technology combinations – again at a NUTS 3 level. Regional data was finally summed to obtain national-level coverage information. When integrating data on individual technologies, special attention was paid to areas for which coverage of the same technology was provided by multiple operators, in order to rule out possible overlap.

At the end of the data validation and aggregation process, the IHS & VVA team was able to provide estimates for each of the nine broadband technologies in all NUTS 3 areas both on total and rural level.

3.5 Estimating coverage for different technology combinations and speed categories

After reaching the broadband coverage figures by individual technologies in each country and NUTS3 regions, the research team calculated estimates for the following three technology combinations, taking into account the overlaps of different technologies:

- Overall broadband coverage (including DSL, VDSL, FTTP, Standard cable modem, DOCSIS 3.0, WiMAX, HSPA and LTE)
- Overall fixed broadband coverage (including DSL, VDSL, FTTP, Standard cable modem, DOCSIS 3.0 and WiMAX)
- Overall NGA coverage (including VDSL, FTTP and DOCSIS 3.0)

For the sake of consistency, IHS and VVA applied similar methodology to the one used by Point Topic in previous study. Unless information provided by NRAs or telecoms groups suggested otherwise, a standardised default formula was used taking the average of:

1. The minimum possible coverage; equal to the coverage of the most widespread technology or operator in the area; and
2. The maximum possible coverage; equal to the sum of the coverage of all the technologies or operators being considered, or to 100%, whichever was the greater.

As in the previous study, a varied formula was used in cases where some technologies' coverage was more complementary than overlapping. In these cases, the minimum coverage was taken as equal to the sum of the complementary technologies, if this was greater than the most-widely available single technology.

Additionally, the estimates for combination coverage at the national level were made by summing the estimates for the NUTS 3 areas rather than applying this formula at a country level. This approach provides a more accurate data output than simply taking the country-level average.

Once the research team completed the final country level dataset, it was passed on to DG Connect and to the NRAs of all of the study countries for their feedback and comments before publication of the finalised data in the 2013 update of the Digital Agenda Scoreboard.

In a number of cases, new and more accurate data was provided to the research team reflecting the 2012 data and thus justifying restatement of the figures published in the Broadband Coverage in Europe 2012 study. Restatements are indicated in the data tables sections of individual country chapters.

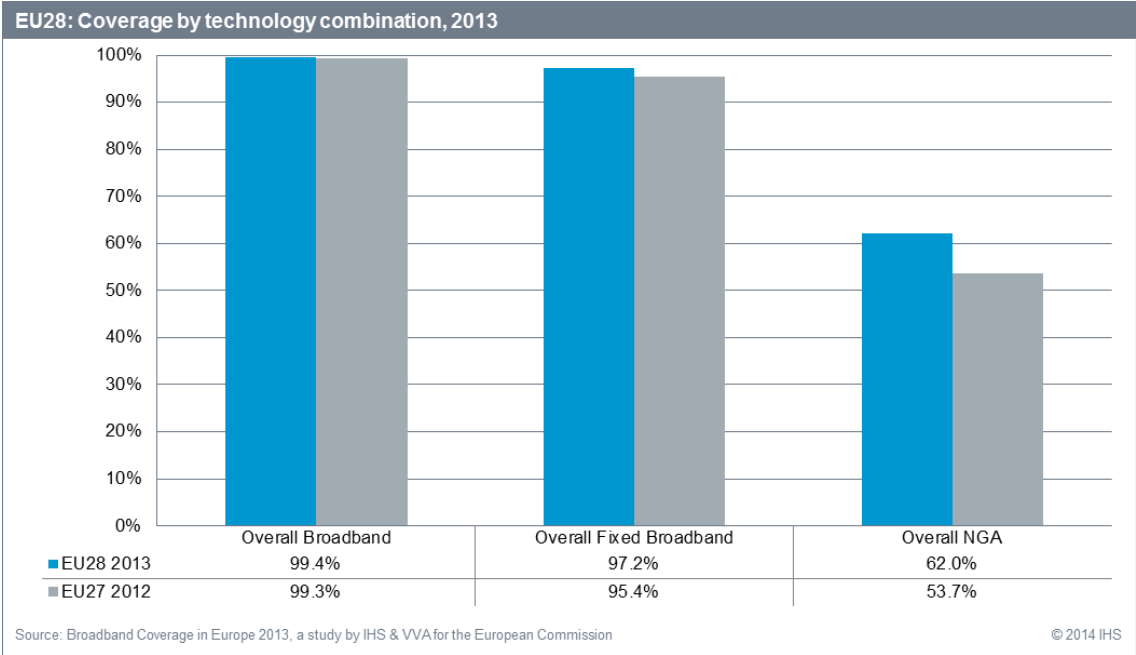
4.0 European Overview

4.1 Europe-wide coverage by technology combinations

As discussed previously in this report, the main objective of Broadband Coverage in Europe in 2013 was to assess the availability of broadband services across the EU, with additional information provided for Norway, Iceland and Switzerland.

The nine main broadband technologies covered in the previous edition of the study were analysed to ensure comparability and to evaluate progress in broadband roll-out across Europe.

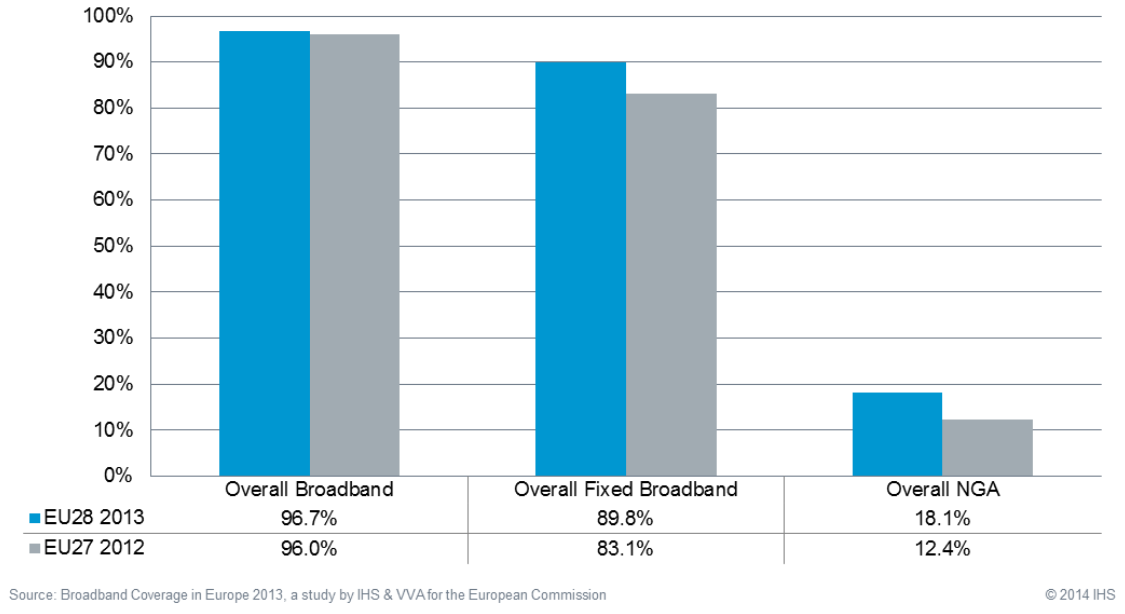
According to the study results, over 213 million EU households (99.4%) had access to at least one of the main fixed or mobile broadband access technologies at the end of 2013 (excluding satellite). With satellite coverage included, basic broadband services are now offered to every household in the EU, thus reaching the European Commission’s Digital Agenda for Europe target of basic broadband for all by 2013.



During 2013, improvements were made with regard to overall fixed broadband across Europe, with more than 97% of households having access to such services. An increase in availability of access was reported also for NGA services (speeds of 30Mbps or more), which increased by 8.3 percentage points compared to the previous edition of the study, translating to 20.5 million new households gaining access to next generation broadband in the year.

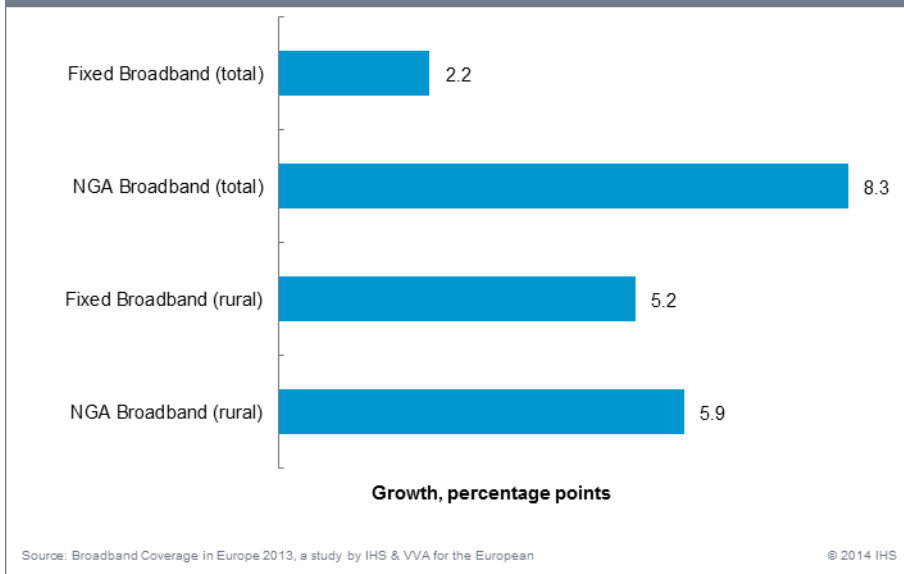
In rural areas, access to fast broadband services remains the major priority at European level. While at least one broadband access mechanism is available to nearly 97% of households in European rural areas, fast broadband services are still accessible only to a small percentage of households in such areas. Nevertheless, with investments into rural NGA deployments, NGA coverage increased during 2013 by 5.7 percentage points, reaching 18.1% of rural households (or 5.8 million rural households) by the end of the period.

EU28: Coverage by technology combination in rural areas, 2013



The graph below shows the increase in overall fixed broadband and overall NGA coverage across EU rural areas and at total EU average.

EU28: Growth by technology combination, 2013

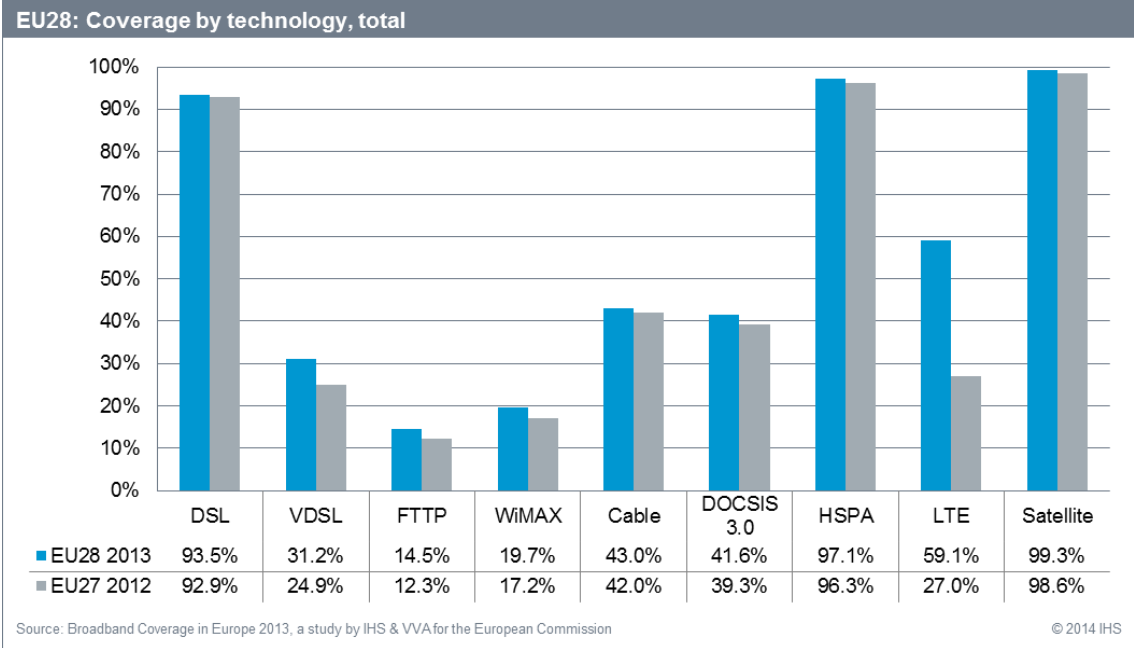


4.2 Europe-wide coverage by individual technologies

4.2.1 Coverage by technology in total

The breakdown by technology shows that satellite continues to be the most pervasive technology in Europe in terms of coverage in 2013. The KA-band satellites cover all 28 EU countries and capable to offer broadband services of at least 2 Mbps. However, satellite coverage is limited in the Baltic countries, where satellite reaches only certain parts of Estonia, Latvia and Lithuania.

For fixed broadband coverage, DSL is by far the most widespread technology, covering nearly 94% of EU households. Total DSL coverage (including VDSL) increased only slightly from 92.9% in 2012. Standard cable (including DOCSIS 3.0) increased by one percentage point and by the end of 2013 covered 43.0% of households across the EU. Out of the fixed broadband technologies included in this category, WiMAX recorded a 2.5 percentage points year-on-year increase, reaching almost 20% EU households by the end of the study period.



NGA coverage in 2013 showed interesting developments with regards to VDSL access, which increased by more than 6 percentage points in the year, reaching 31.2% of households and making it the fastest growing fixed-broadband technology for the second year in a row. This increase clearly shows the impact of recent decisions of European network operators to invest into upgrades of existing copper networks alongside (or in some cases instead of) FTTP deployments. FTTP and DOCSIS 3.0 coverage also increased, with FTTP coverage growing by 2.2 percentage points to reach nearly 15% of households, and DOCSIS 3.0 coverage increasing by a similar amount to reach close to 42% of homes. Cable companies have progressed quickly in upgrading their networks to DOCSIS 3.0, making the difference between standard cable and DOCSIS 3.0 coverage close to negligible, with fewer than 1.5% of households passed by cable broadband having access to standard cable services only.

With regards to mobile broadband technologies, HSPA provided nearly universal coverage, reaching over 97% of EU households in 2013. With LTE being commercially launched in all but three Member States (Bulgaria, Cyprus, Malta), LTE coverage increased sharply from

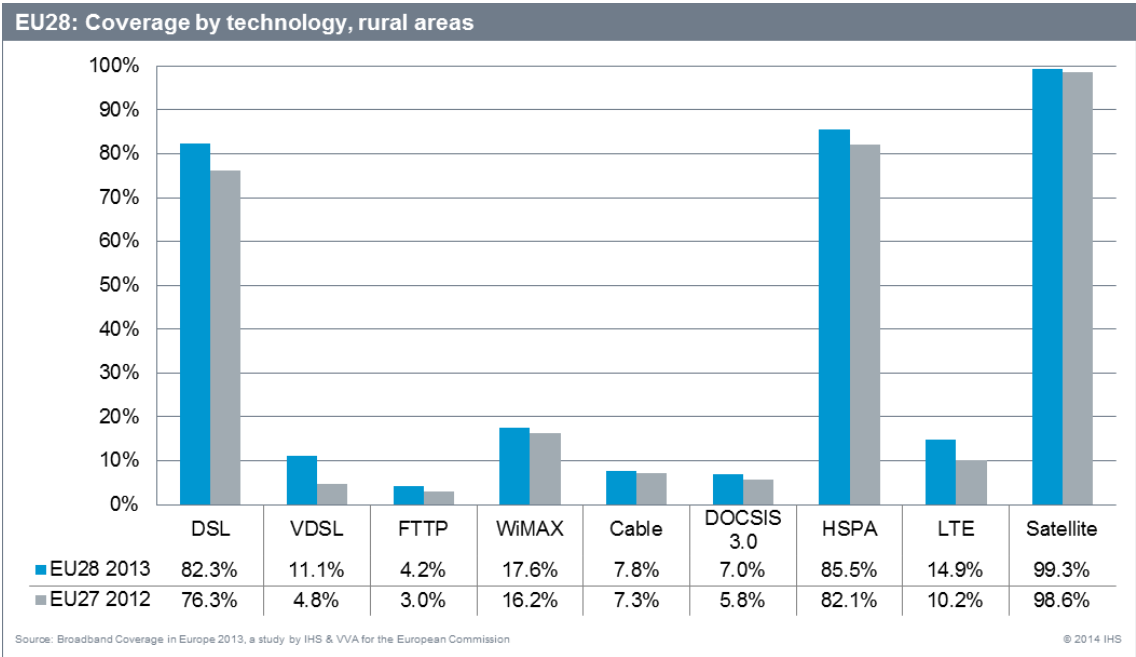
27.0% in 2012 to 59.1% in 2013 as operators expanded network coverage and new service providers launched.

4.2.2 Coverage by technology in rural areas

Rural areas traditionally present a challenging environment for network operators to invest in the deployment of broadband networks. Due to their low population density, it is often difficult for operators to justify investments in these economically less profitable areas. Achieving the DAE goal of universal 30 Mbps coverage by 2020 thus remains a demanding target when considering EU’s rural regions. Rural households continue to be underserved by fixed technologies (89.8% coverage at rural level, compared to 97.2% total EU coverage), and particularly by NGA technologies (18.1% coverage at rural level vs. 62.0% of all EU households).

Nevertheless, considerable progress has been recorded in fixed rural coverage over the last few years as governments and operators have begun to develop more sophisticated rural coverage plans. The biggest rural coverage improvements have been reported for DSL, which reached 76.3% rural coverage in 2012 and which increased to 82.3% of rural households in 2013.

As in 2012, DSL continued to be the most important fixed technology for rural coverage (even more so than at national level) with a large gap between DSL and other fixed technologies. WiMAX was the second most widespread fixed technology, yet it covered little over 17% of rural households, followed by cable, contributing to nearly 8% of rural coverage. As was the case with total cable coverage, on a rural level DOCSIS 3.0 coverage is closing the gap with standard cable coverage - with most cable households having now been upgraded to DOCSIS 3.0. Despite this, cable coverage remained only a small fraction of rural coverage as the economic nature of cable network deployment is generally reliant on higher population densities and operators have largely avoided rural network build-out.



In 2013, VDSL overtook DOCSIS 3.0 as the leading technology contributing to rural NGA coverage. Rural VDSL coverage increased by 6.3 percentage points during the year and recorded the biggest increase among the nine technologies in rural areas, proving its potential for rural NGA coverage improvement. FTTP coverage grew only slightly in rural

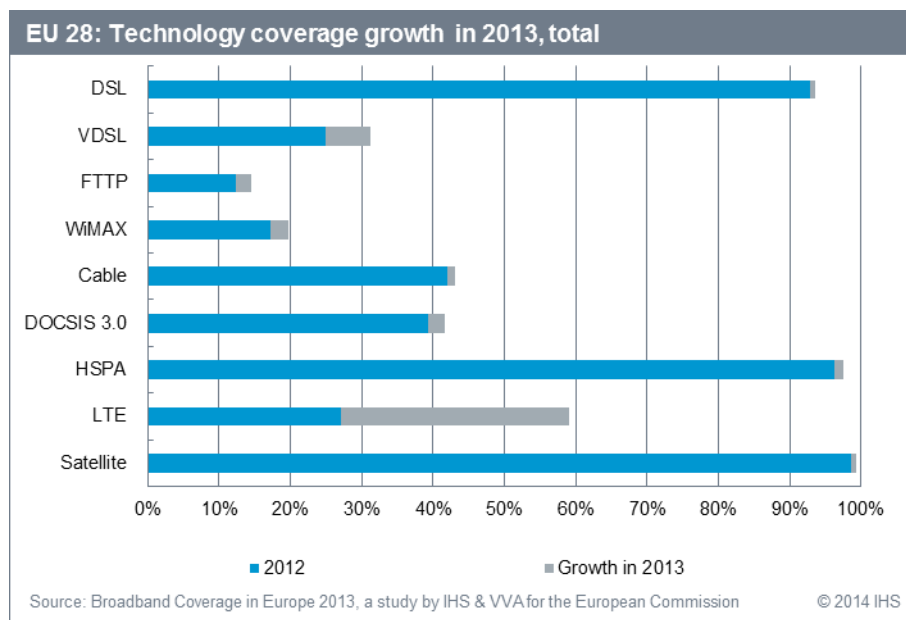
areas and remained the least widespread rural NGA technology, reaching little over 4% of rural homes.

As for mobile technologies, HSPA reached nearly 86% of rural households at the end of 2013, a 3.4 percentage point increase compared to 2012. With the introduction of LTE in more markets across Europe, LTE coverage recorded significant growth in rural areas, growing from 10.2% coverage in 2012 to nearly 15% in 2013. Nevertheless it is important to note that LTE deployment has been so far primarily focused on urban centres and real impact on rural areas has yet to be seen.

Due to the nature of satellite technology, satellite reached roughly the same level of coverage in rural areas as for total coverage (99.3%). In the most sparsely populated and hard-to-reach areas, satellite remains the only option for receiving broadband access.

4.2.3 Coverage growth in 2013

Comparing the results of individual technology coverage levels between 2012 and 2013, it is possible to identify the following developments in terms of growth in technology coverage.

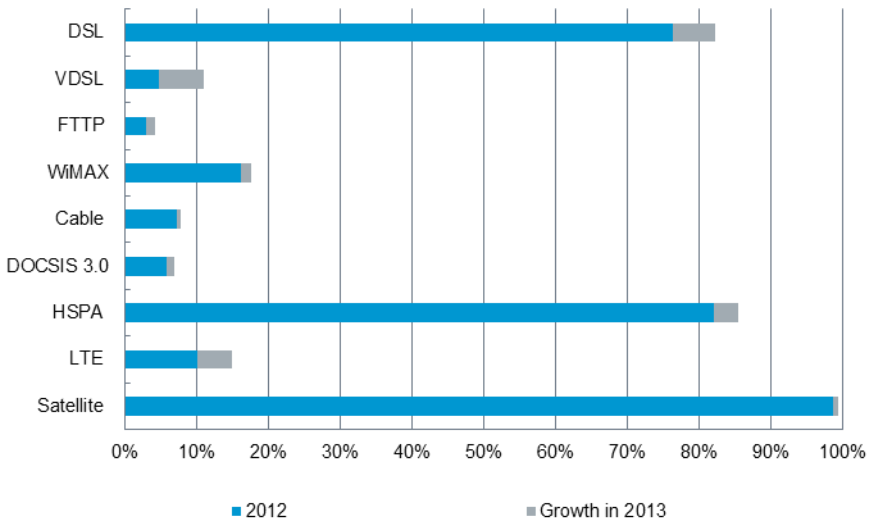


The most significant increase in technology coverage across Europe during 2013 was recorded for LTE. Compared to the previous edition of the study, this technology increased its coverage percentage by 32.1 percentage points, reaching 59.1% of households across the EU28 by the end of 2013.

VDSL coverage showed strong improvements as well, with an increase of 6.2 percentage points, reaching almost a third of European households.

Within rural areas, VDSL increased its rural coverage more than any other single technology in 2013, followed by DSL, LTE and HSPA. Growth for other technologies was low (below 1.4 percentage points).

EU 28: Technology coverage growth in 2013, rural



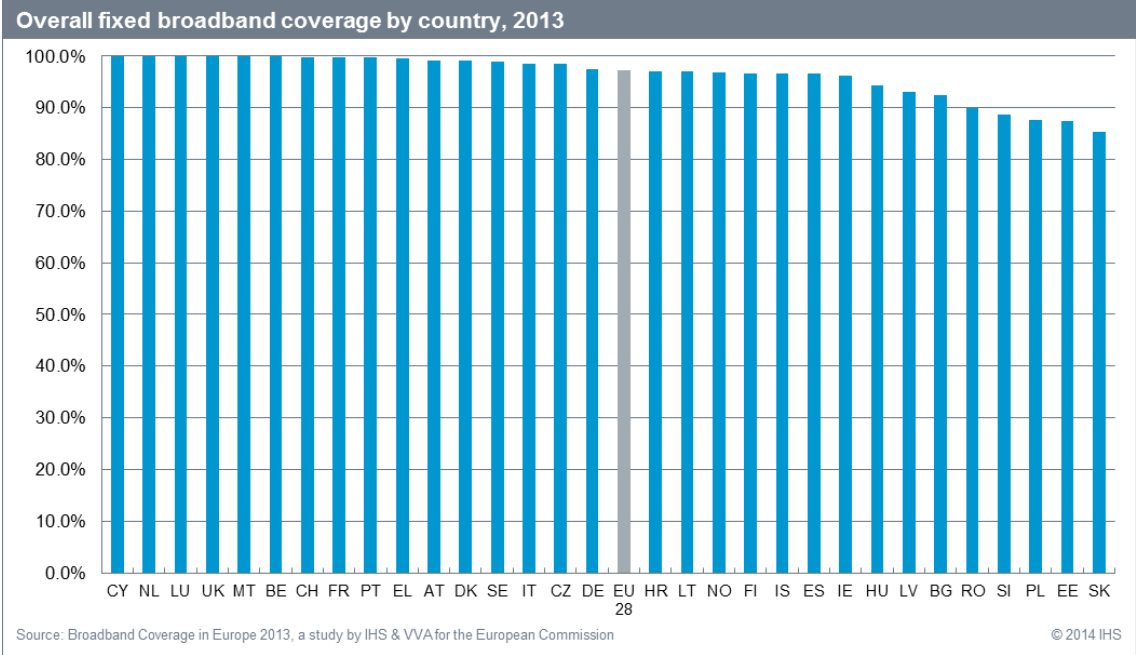
Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

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4.3 Country comparison by total technology coverage

4.3.1 Total overall fixed broadband by country

The overall fixed broadband coverage category has been designed to provide a measure of progress in deployment of fixed broadband access technologies which are capable of providing households with broadband services of at least 2Mbps download speed. Four technologies make up the overall fixed broadband coverage figures: DSL (including VDSL), cable (including DOCSIS 3.0), FTTP, and WiMAX. Note that FTTP coverage trends are discussed in more detail in the following chapter on NGA coverage by country.

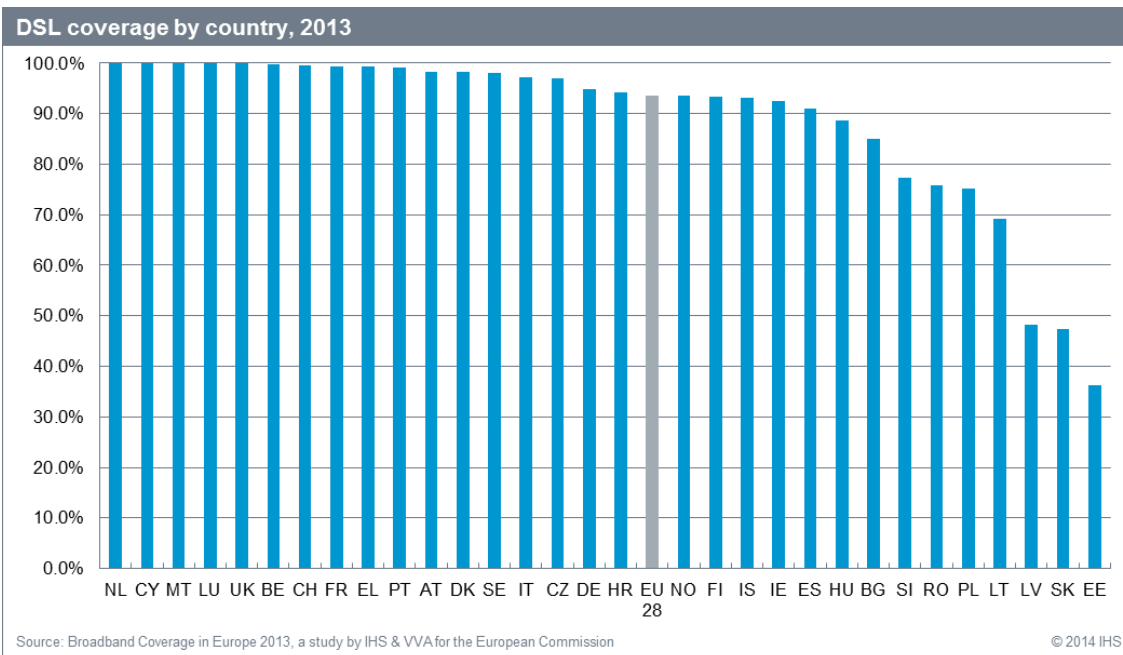


Compared to the previous year, fewer countries are above the European average for overall fixed broadband coverage. Out of the 31 study countries, 15 countries have fixed broadband coverage levels of at least 97.2%, 27 countries have fixed broadband covering at least 90% of their households. Fixed broadband coverage is lowest in Slovenia, Poland, Estonia and Slovakia, in which it reaches between 89.9% and 85.0%, respectively. All of these countries have in common (apart from being located in Eastern Europe) sparsely populated and underserved rural areas, which present coverage challenges.

4.3.1.1 Total DSL coverage by country

As in the previous years of the BCE study, DSL continued to be the leading fixed broadband technology in 2013 with 23 study countries reaching coverage rates above 80%. Five countries in the EU registered DSL infrastructure covering 100% of households in their territories. However, it is important to note that while a universal DSL coverage was reported for these countries, this is generally considered to be accurate to one decimal place to account for the possibility of negligible number of remote homes failing to receive DSL coverage. These countries are Luxembourg, the Netherlands, Cyprus, Malta and the United Kingdom.

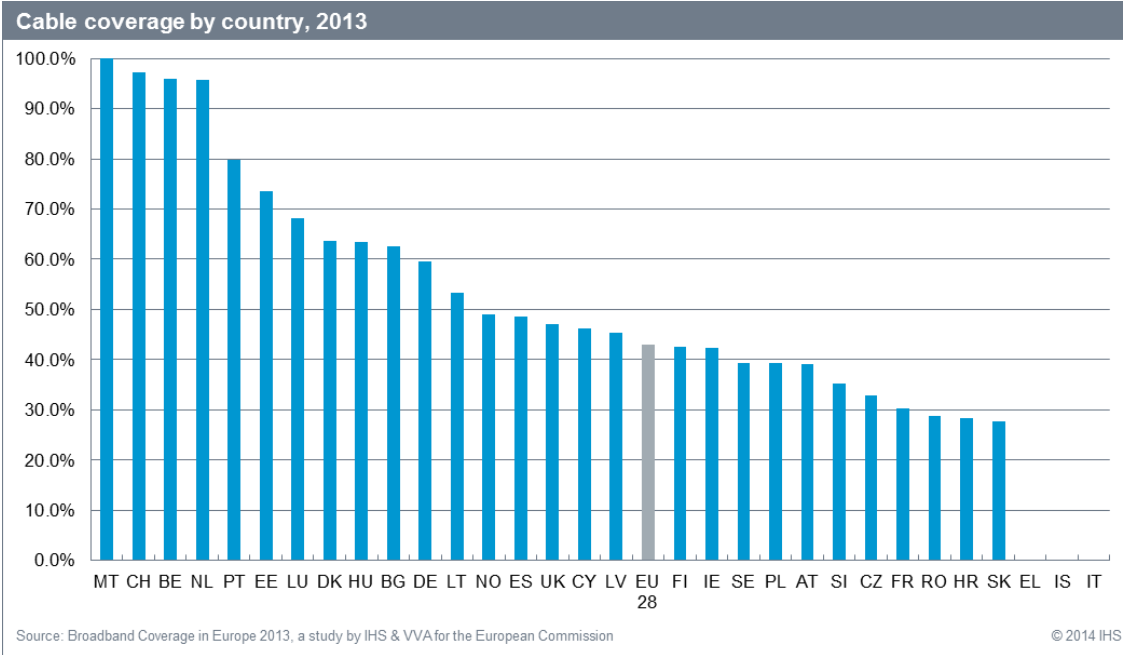
The universal or near-universal DSL coverage was observed in countries with most developed traditional telephone networks, as DSL technology utilizes fixed line twisted-pair copper network infrastructure.



Only nine countries recorded DSL coverage below 90%: Hungary, Bulgaria, Slovenia, Romania, Poland, Latvia, Lithuania, Slovakia and Estonia. In a number of these countries, DSL coverage has begun to give way to NGA technologies such as FTTP – discussed in more detail in the individual country chapters.

4.3.1.2 Total cable coverage by country

The picture for cable coverage is more fragmented than with regards to DSL – with wide variation in coverage levels across countries. Coverage was highest in the most urbanised countries as cable companies traditionally focus on network build-up in densely-populated urban and semi-urban areas. Another important factor influencing cable coverage is the historical presence of cable companies - often originally focused on cable TV delivery. Hence countries with strong tradition of cable TV in their respective markets show high levels of cable broadband coverage while countries in which cable companies failed (such as Italy) or entered at a later stage display an overall lower cable broadband coverage.



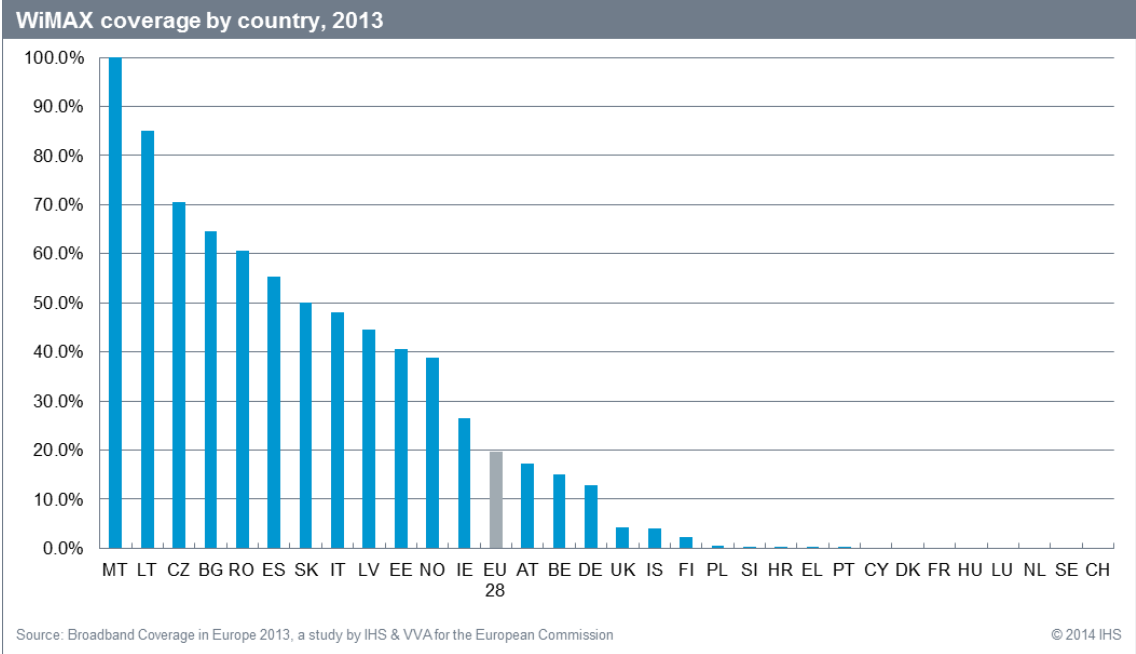
The fact that cable deployment tends to be centred around urban areas leads to generally low levels of extra coverage provided by cable technology due to overlap with DSL in these urban areas. Nevertheless, DOCSIS 3.0 cable services contributed significantly to NGA broadband availability across EU as described in the following chapter.

Malta recorded complete cable coverage, followed by Switzerland with 97% coverage and Belgium and the Netherlands, both reaching nearly 96% cable coverage. Estonia and Portugal reported standard cable coverage of between 70% and 80%, while four countries recorded levels between 60% and 70% and two countries (Lithuania and Germany) reported values between 50% and 60%.

Seventeen countries reported coverage rates of below 50% and three reported a complete absence of cable broadband technology in their territory (Greece, Iceland and Italy). 16 countries were above the EU average of 43.0% for standard cable broadband access.

4.3.1.3 Total WiMAX coverage by country

When determining WiMAX coverage, it is important to keep in mind the limitations of WiMAX signals. WiMAX can technically offer quite extensive geographic reach, yet the number of customers that the network can realistically support may be much smaller than a fixed wireline technology. Another challenging factor is the great fragmentation of the European WiMAX market, which features many small providers operating across Europe. Yet on the other hand, WiMAX technology generally provides a viable broadband solution for less-densely populated and harder-to-reach areas.

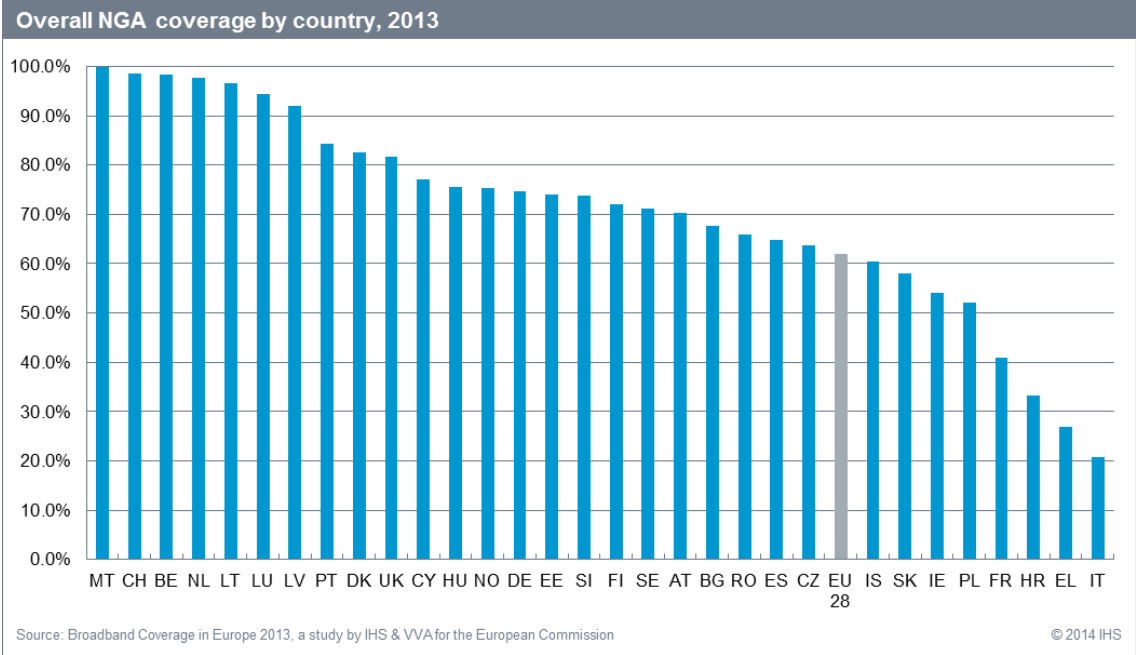


While in ten of the study countries, there is no reported availability of WiMAX networks (and three additional countries reported WiMAX coverage of less than 0.5% of households), in countries such as Lithuania, Czech Republic, Bulgaria, Romania and Slovakia, WiMAX played an important role in contributing to broadband availability and covered more than 50% of households.

In terms of contribution of WiMAX to the fixed broadband coverage combination category, WiMAX coverage accounted for additional coverage, particularly in the abovementioned markets, although its impact EU-wide remained relatively limited.

4.3.2 Total overall NGA coverage by country

The NGA combination category comprises VDSL, FTTP and DOCSIS 3.0 technologies, all typically capable of delivering a service speed of at least 30Mbps (although VDSL local loop lengths mean that actual speeds do vary). The main objective of the Digital Agenda for Europe is to have full coverage of European households at this speed by 2020. The analysis of the combination is then an evaluation of the state of play of the roll-out of the relevant technologies and progress towards this goal.



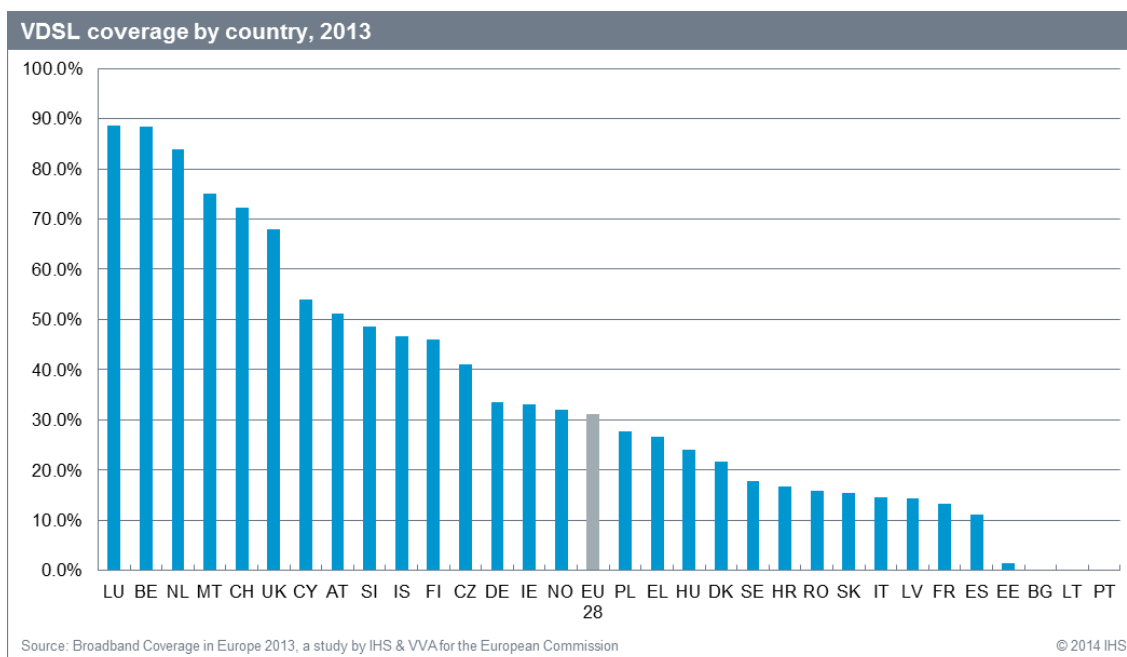
The chart presented above shows that as was the case with cable coverage, the most urbanised countries recorded the highest NGA coverage. Malta is again the only country reporting complete coverage for NGA technologies, followed closely by Belgium, the Netherlands, Lithuania, Luxembourg and Latvia, all above 90%. However, the pattern of NGA coverage is very mixed, reflecting the various strategies and approaches to high-speed broadband deployment adopted across Europe.

Out of the 31 study countries, 22 countries perform above the European average (62.0%), and only four countries reported NGA coverage below 50% (France, Hungary, Greece and Italy). Italy has the lowest coverage of NGA technologies, with a total NGA coverage of 20.8%.

4.3.2.1 Total VDSL coverage by country

In 2013, VDSL continued to be the fastest growing NGA technology, increasing to over 31% of homes from nearly 25% in 2012. With upgrades of cable networks to DOCSIS 3.0 nearly complete and FTTP coverage increasing by two percentage points only, this development demonstrates a shift in broadband strategy in many of the study countries, in which companies are focusing on upgrading of existing copper networks rather than on the typically more costly (but perhaps longer-lived) deployment of fibre optic all the way to consumers' homes.

It is important to note that broadband performance on VDSL lines varies depending on the length of the copper loop from the VDSL enabled cabinet connected to the optic fibre backhaul. Typically households with a VDSL connection and a distance of about 500 metres from a VDSL enabled street cabinet or exchange reach download connection speeds of around 25 Mbps.



With regards to VDSL roll-out, only three countries reached coverage above 80%. Luxembourg and Belgium were the best performers on this measure, with VDSL infrastructure covering nearly 89% of their respective households, followed by the Netherlands (84.0%) and Malta (75.0%). Overall, 14 study countries achieved VDSL coverage above the EU average.

Only three countries (Bulgaria, Lithuania and Portugal) reported that VDSL was not available at all; coverage in Estonia was limited - reaching less than 2% households, and reflecting local market strategies discussed in more detail in the relevant country chapter of this report. In 2013, VDSL was commercially launched in France, Ireland and Slovakia. Remarkably, Ireland managed to reach VDSL coverage above the EU average in the same year as its launch.

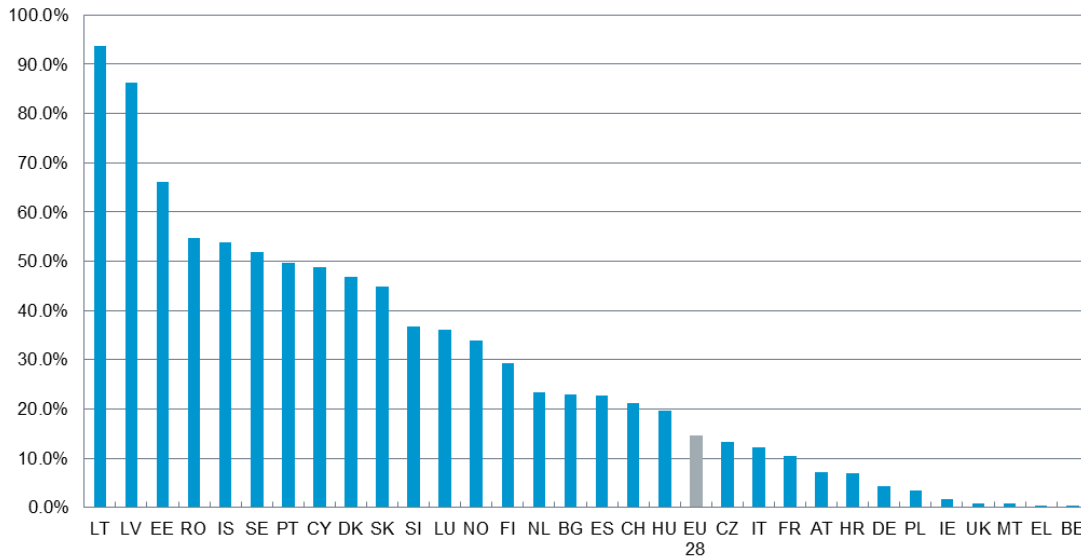
4.3.2.2 Total FTTP coverage by country

Eastern European countries continued to lead the FTTP coverage category in 2013. With large complexes of blocks of flats found in almost every major city and with markets exhibiting generally less-developed telephone copper networks, Eastern European countries present strong incentives for FTTP deployment.

In 2012 the two best performers, Lithuania and Latvia, reported FTTP coverage levels slightly below 80%, while 2013 calculations show that investments in FTTP deployment have led to an increase in coverage for both countries, with homes passed by FTTP reaching nearly 94% of households in Lithuania and 86.2% of households in Latvia.

Estonia was the third highest ranked country for FTTP coverage, with two-thirds (66.2%) of Estonian households being able to gain access to FTTP broadband. Estonia also recorded a massive 30.0 percentage point increase in FTTP coverage compared to 2012, at which point FTTP reached 36.2% households.

FTTP coverage by country, 2013



Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

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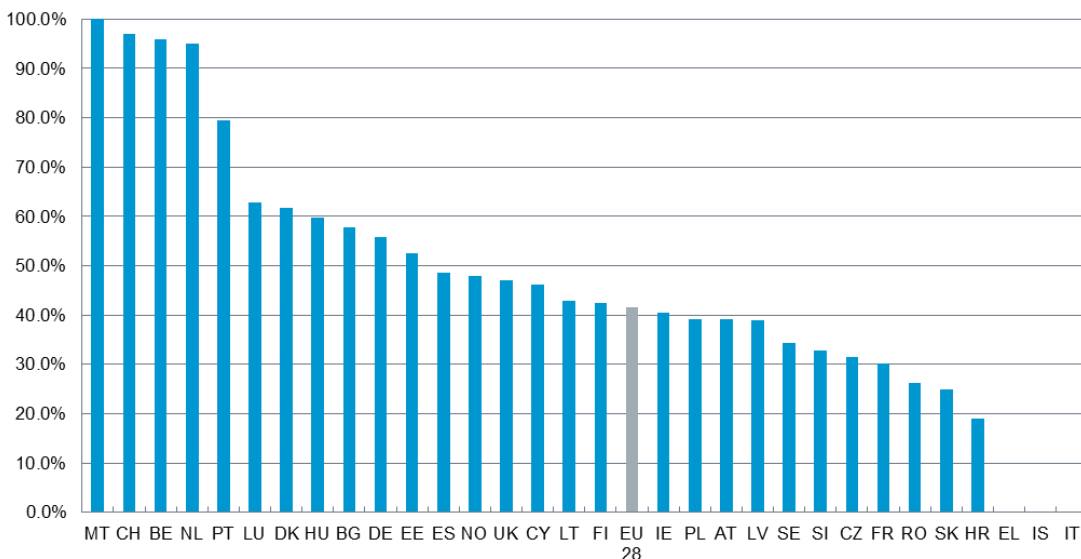
Apart from the three Baltic countries, 15 other countries reported FTTP coverage levels above the EU28 average of 14.5%. The remaining twelve countries reported coverage data below the European average, Greece and Belgium reported the lowest levels of FTTP coverage, at 0.4% each.

In 2012, Cyprus was the only country with no FTTP coverage. 2013 survey results, however, indicated that nearly half (48.7%) of Cyprus households had technical access to FTTP broadband by the end of 2013.

4.3.2.3 Total DOCSIS 3.0 coverage by country

By the end of 2013, European cable network operators had nearly finalised upgrading their cable networks to DOCSIS 3.0. As a whole, almost 97% of EU’s cable networks have been upgraded to DOCSIS 3.0 (compared to 93.5% in 2012).

Docsis 3.0 coverage by country, 2013



Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

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In nine countries, the full upgrade was completed at the end of 2013, two more compared to 2012, and an additional seven countries reported at least 95% of cable networks being DOCSIS 3.0 capable, with the remaining countries recording ranges between 67% and 95%. In 2012, Croatia was the only country with a cable network but no DOCSIS 3.0 upgrade reported. That has changed in 2013, with 66.9% of Croatia's cable network being recorded as upgraded to DOCSIS 3.0.

As was the case with cable broadband coverage, Malta's DOCSIS 3.0 cable network was the most extensive in Europe in relative terms, covering 100% of households in the territory at the end of 2013. Belgium and the Netherlands followed closely, with coverage levels above 95%, and Portugal recorded nearly 80% of households covered by DOCSIS 3.0.

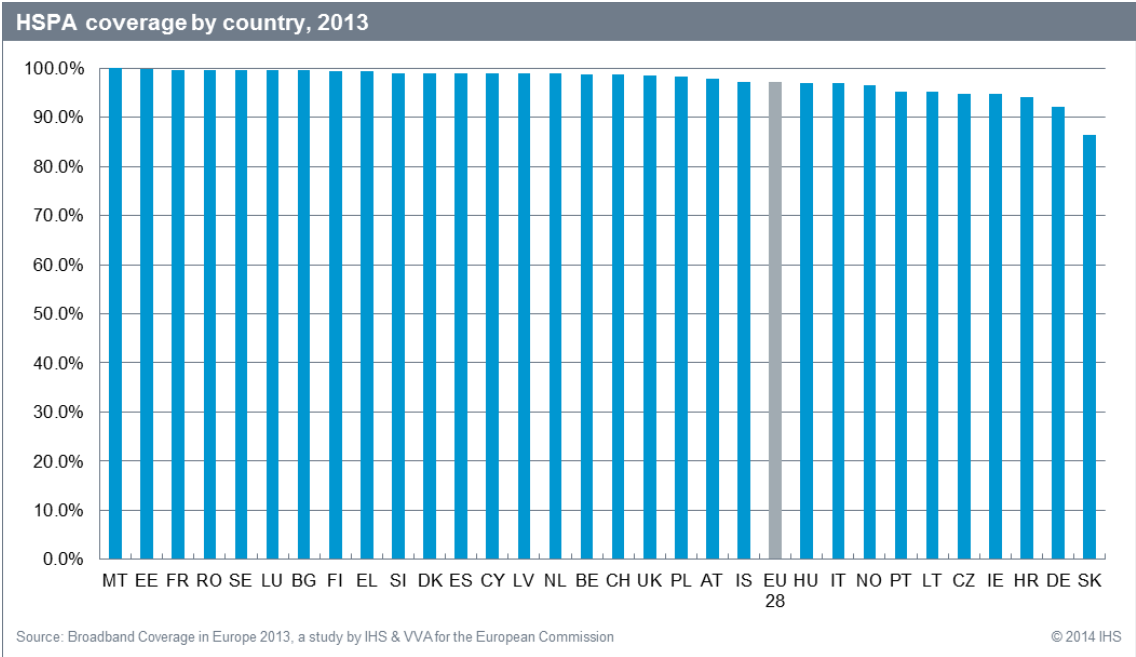
Sixteen of the study countries performed better than the EU average (41.6% of households), but apart from the four top performers mentioned above, all covered less than 63% of households.

Greece, Iceland and Italy lack cable broadband networks, and thus reported no DOCSIS 3.0 coverage.

4.3.3 Mobile broadband technologies coverage by country

4.3.3.1 Total HSPA coverage by country

As mentioned in the previous chapters of this report, mobile technology is widespread in Europe and HSPA services are accessible to more than 97% of EU households. Nearly all of the countries in this study reported coverage levels above 90%, with only Slovakia reporting HSPA coverage of below 90%, at 86.3% for 2013.

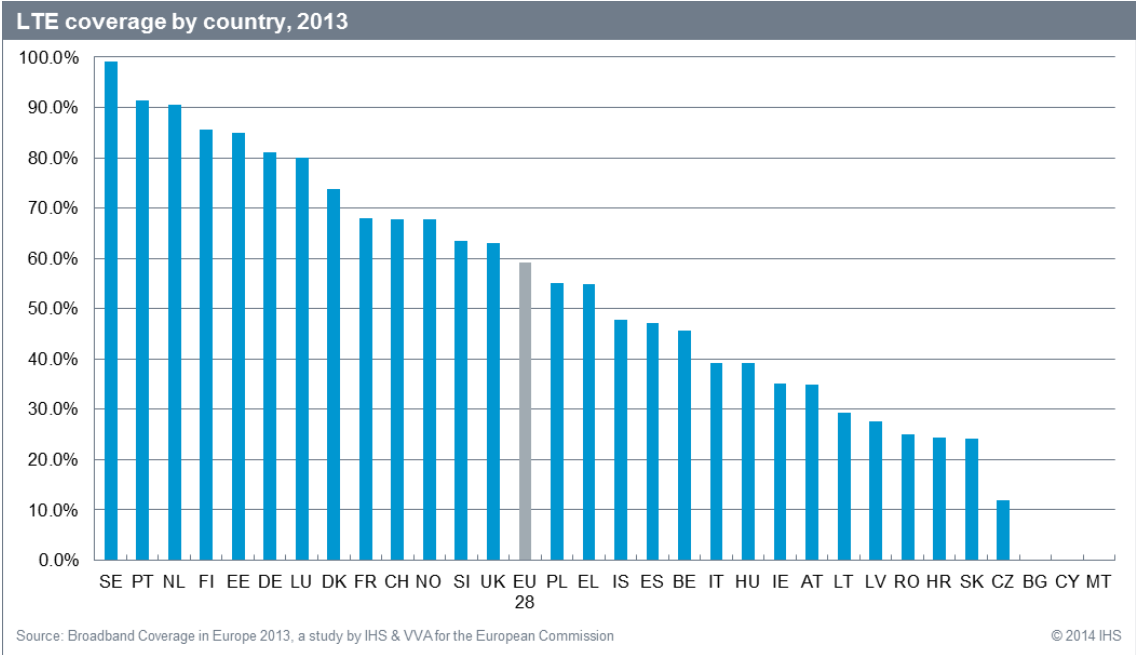


However, it is important to note that the actual performance and user experience of HSPA broadband varies greatly due to varying standards of individual operators as well as actual conditions in each coverage area. CDMA-based mobile networks (such as HSPA) are also subject to changes in the range of the geographical area covered by a cellular telephone transmitter based on the amount of traffic using that transmitter in any given moment – so called cell breathing. Thus, the quality of mobile broadband connection can vary significantly, within an area as a consequence of geographic or building features, and temporally as a

consequence of cell breathing. There can also be significant differences between indoors and outdoors coverage with respect to mobile broadband performance. For the purpose of this study the research team defined HSPA coverage based on outdoors coverage of premises.

4.3.3.2 Total LTE coverage by country

LTE coverage across Europe increased dramatically in 2013. While there were eight countries with no LTE coverage in 2012, there were only three countries (Bulgaria, Cyprus, and Malta) at the end of 2013 which recorded no LTE availability. The EU average LTE coverage grew by 32.1 percentage points, increasing from 27.0% to 59.1% of households. Thirteen study countries reported coverage above the EU average.



Sweden was the leading country in terms of LTE coverage in 2013 with an extensive LTE network reaching nearly all of its households (99.2%). Yet, significant improvements have been made across almost all countries in terms of LTE coverage in 2013.

Standout countries include Slovakia, Ireland, the Netherlands and Spain. In 2012 Slovakia reported 0% LTE coverage, but 2013 data shows an increase to more than 20% of homes covered. Spain's results are even more notable, considering that in the previous year it reported one of the lowest LTE coverage figures, yet at the end of 2013 it was close to the EU average with 47.1% LTE coverage. Ireland reported an increase to almost 40% coverage from the previous 0%, and Iceland also recorded extensive improvements.

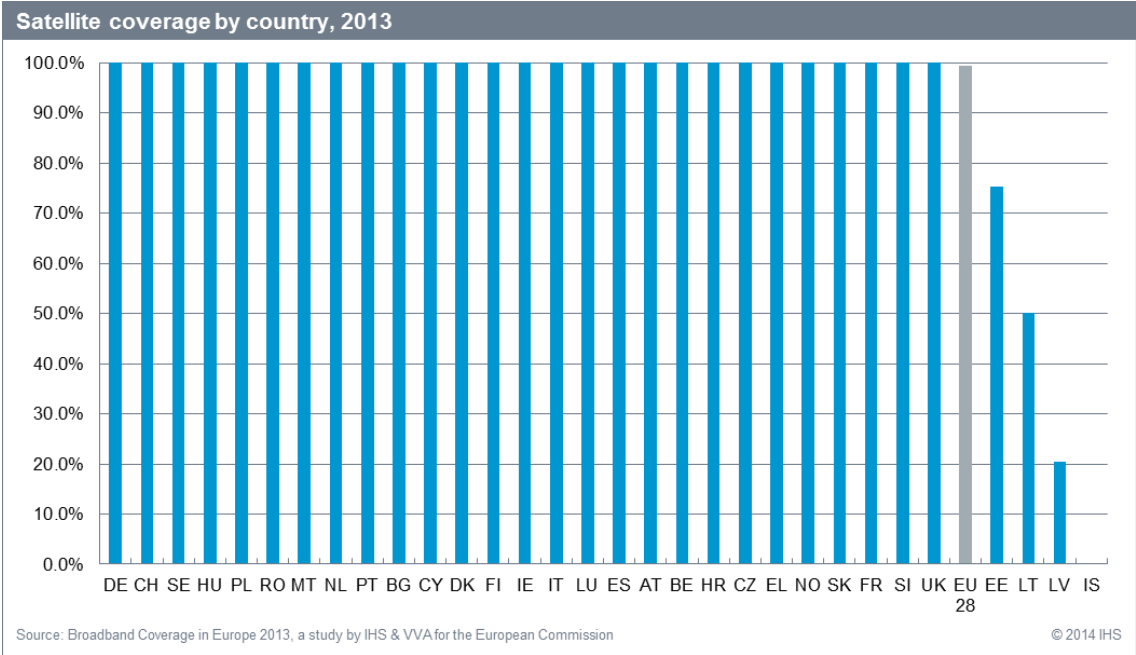
By far the most significant increase however, was recorded by the Netherlands, in which no LTE commercial services were reported to be available in 2012. Netherlands reached 90.4% LTE coverage in 2013 - third place in terms of coverage for LTE services across Europe.

4.3.3.3 Total satellite coverage by country

All but one of the study countries were covered by KA-band satellite capable of delivering 2 Mbps broadband services at the end of 2013. Iceland was the country with no satellite coverage and there was only partial coverage recorded in Estonia, Lithuania and Latvia.

Satellite beams are capable of reaching about 75% of Estonian households, approx. 50% of Lithuanian households and 20% of Latvian homes. However, satellite dishes with 1.2m

diameter are required to receive satellite broadband services in these areas, thus making the widespread use of satellite broadband in these three countries more challenging.



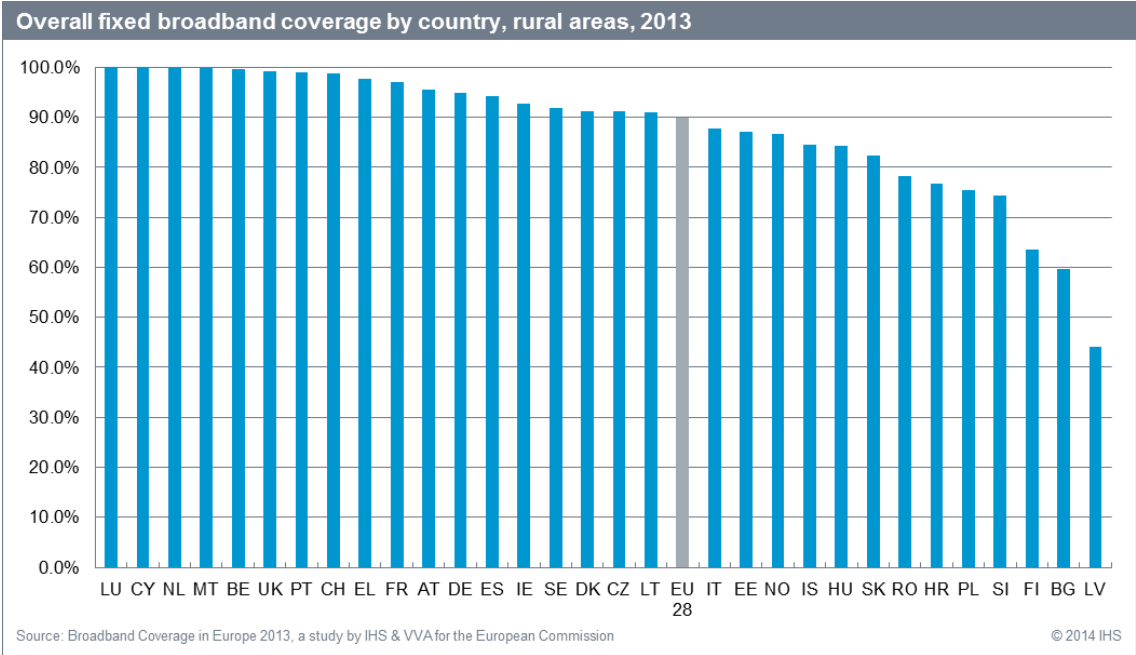
Moreover, it is important to note that while satellites are technically able to cover all households in the reach of a particular beam, the actual number of users that can be serviced by a single beam is limited by the peak average bandwidth usage, thus restricting number of serviceable homes in a particular area.

With that said, the research team was nevertheless able to estimate the total EU coverage of satellite broadband as reaching over 99% of EU households at the end of 2013. Satellite coverage in rural areas was assumed to be identical to the total satellite coverage and satellite coverage for overseas administrative areas was assumed to be the same as coverage of the respective countries they belong to (France, Portugal, and Spain).

4.4 Country comparison by rural technology coverage

4.4.1 Rural overall fixed broadband coverage by country

In 2013, rural fixed coverage in most study countries remained significantly lower than total fixed coverage. However, the gap between total and rural coverage appears to be closing at an EU level. While in 2012 there was a 12.3 percentage points difference between total and rural fixed coverage (95.5% vs 83.2%), this difference in 2013 decreased to only 7.4 percentage points. Compared to the total EU average fixed broadband coverage of 97.2% households, there were nearly 90% of rural EU households covered by at least one fixed broadband technology. Moreover, rural fixed broadband coverage on an EU average basis recorded a 6.7 percentage point increase in 2013.



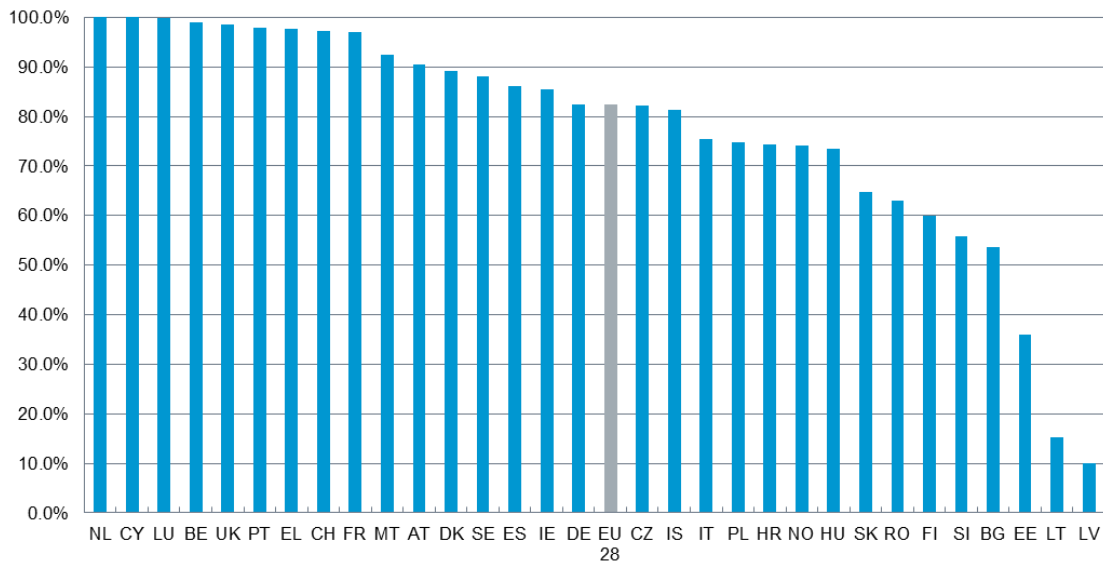
Seventeen study countries reached rural fixed broadband coverage above the EU28 average. Of these, four reported complete rural fixed broadband coverage (Luxembourg, Cyprus, the Netherlands and Malta). However, it is important to note that these are countries with some of the highest levels of urbanisation amongst the study countries. For instance, just 1% of households in Malta were classified as rural, and 8% in case of the Netherlands.

It should be noted that data on rural coverage collected from NRAs and individual operators was not always as comprehensive as total market level data. In cases when information on rural coverage was incomplete, the research team estimated rural coverage using similar approach applied by Point Topic in previous years of the study. These estimations assume that a technology will typically cover a particular rural area only when urban or non-rural areas within the same region reach 100% coverage.

4.4.1.1 Rural DSL, WiMAX and cable coverage by country

As discussed previously, DSL was by far the most important technology in the fixed broadband combination measure in 2013 for rural coverage, and was widely available in almost all countries. Average rural DSL coverage reached over 82.3% of EU rural households compared to nearly 94% of total EU households. However, the difference between total and rural coverage was much larger in many countries.

DSL coverage by country, rural areas, 2013



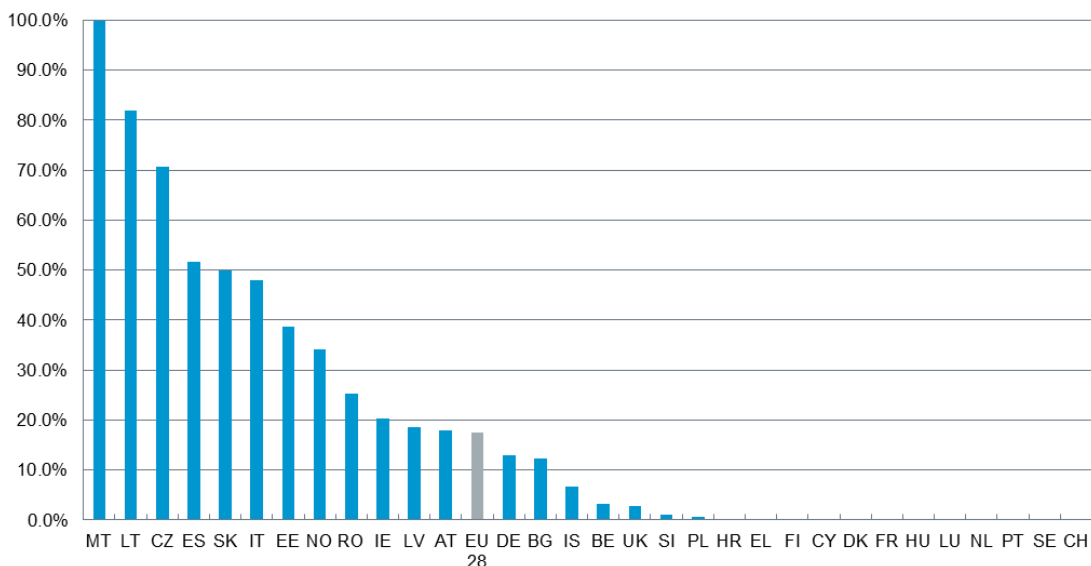
Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

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Fifteen countries reported coverage levels for this technology above the European average. Only Latvia and Lithuania reported DSL coverage figures below 20%, however both countries have more extensive fibre deployments, which have begun to erode the necessity for DSL services.

In addition, in a number of countries, such as Lithuania, Latvia and Estonia, WiMAX provided greater coverage on a rural level than DSL.

WiMAX coverage by country, rural areas, 2013



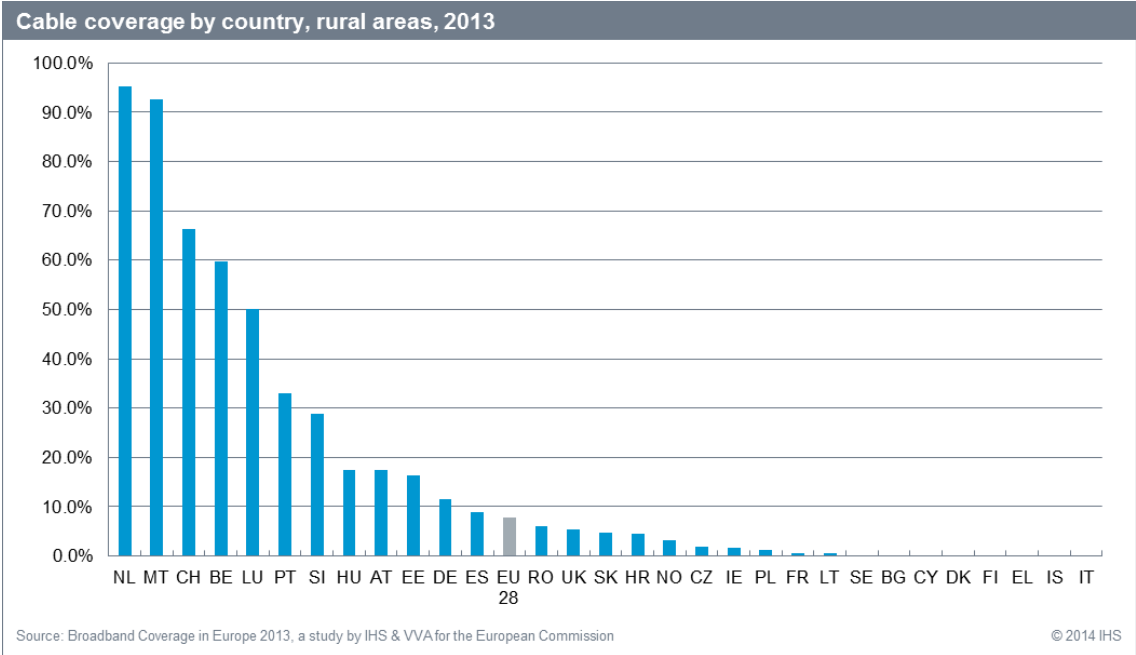
Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

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Eight countries reported that WiMAX was not available to households in rural areas, and four reported rural WiMAX coverage to be less than 1% of households.

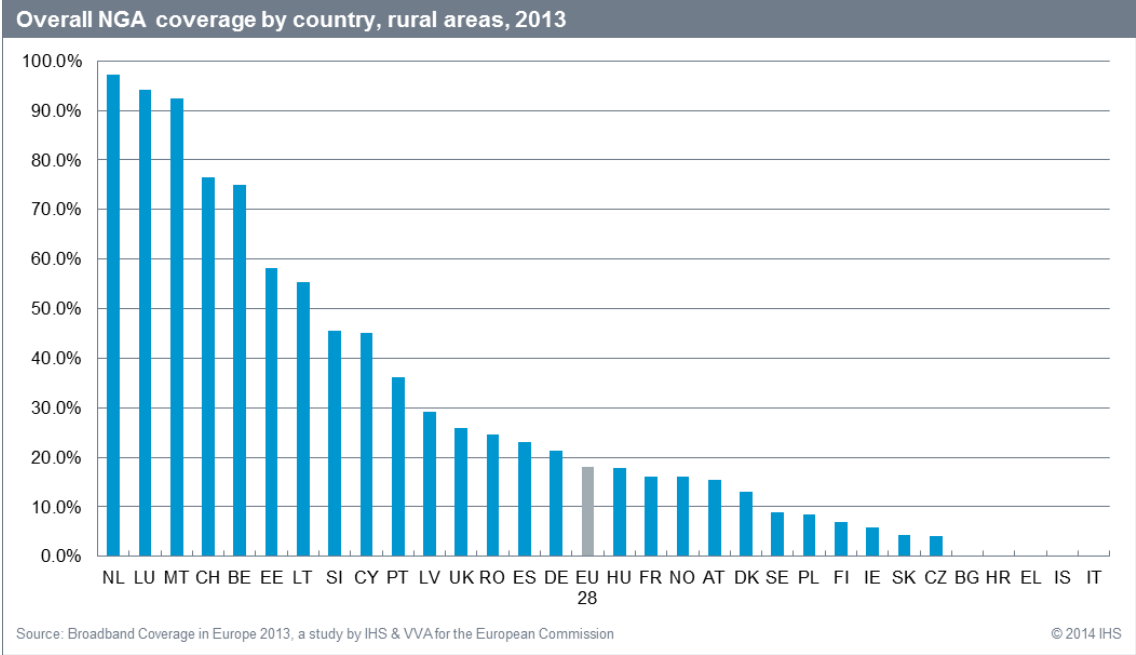
Given the previously discussed economic nature of cable networks deployment (and its concentration in urban and semi-urban areas) it is perhaps not surprising that only 7.8% of rural EU households had access to cable broadband in 2013 and that there was only negligible increase (0.5 percentage points) in rural cable coverage compared to 2012. These

increases were generally to cover households based in countries in which cable has been a strong traditional access technology (Netherlands, Belgium, and Portugal) and in which cable networks were already rolled out outside major cities.



4.4.2 Rural NGA coverage by country

Ensuring access to high speed broadband services for rural households is one of the main challenges that European countries face in implementing their national strategies for achieving the targets set out in the Digital Agenda for Europe.



The chart above indicates that all NGA technologies combined still do not ensure widespread access to 30Mbps speeds in rural areas. None of the countries analysed reported complete coverage. While the total NGA coverage reached nearly two-thirds of EU households, rural

EU coverage remained below 20% in 2013. Fourteen countries performed better than this average, of these, three had an extensive NGA network, reaching more than 90% of households in rural areas (the Netherlands, Luxembourg and Malta), but again strong performance in these markets is partly due to the fact that there are simply not as many rural areas in these countries to cover.

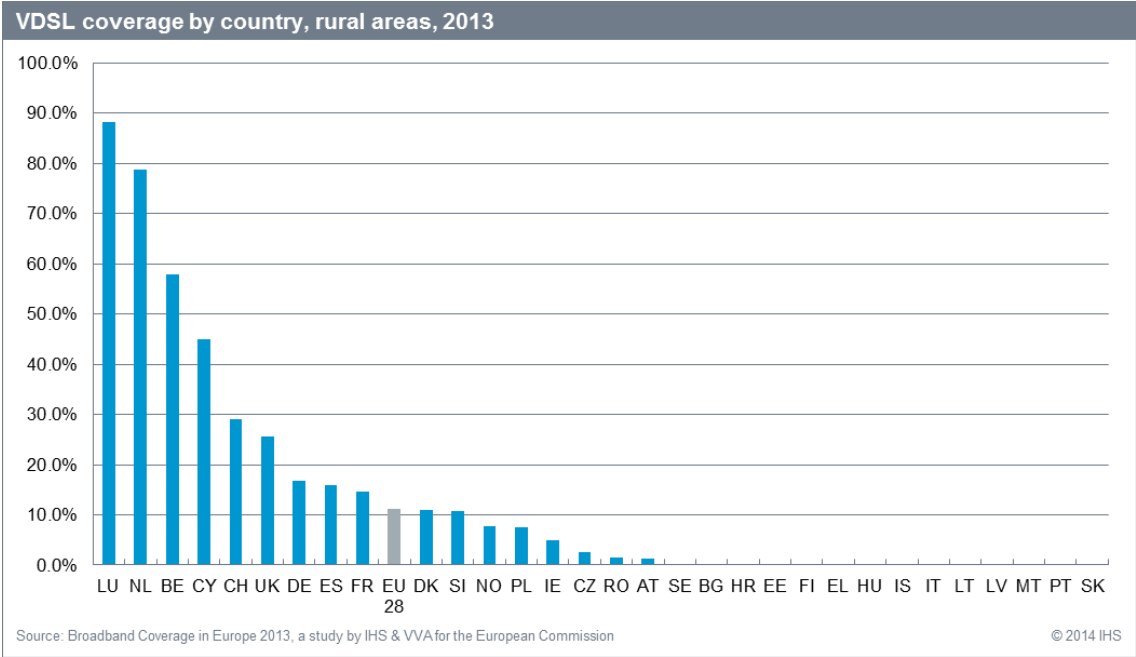
In Belgium, nearly 75% of rural households were covered by NGA technologies at the end of 2013, a 10.4 percentage point increase compared to 2012, achieved mostly due to further VDSL roll-out throughout the country.

Croatia, Greece, Iceland and Italy reported no rural NGA coverage in 2013, an improvement compared to 2012, when eight countries were recorded to not have any rural NGA coverage.

4.4.2.1 Rural VDSL, FTTP and DOCSIS 3.0 coverage by country

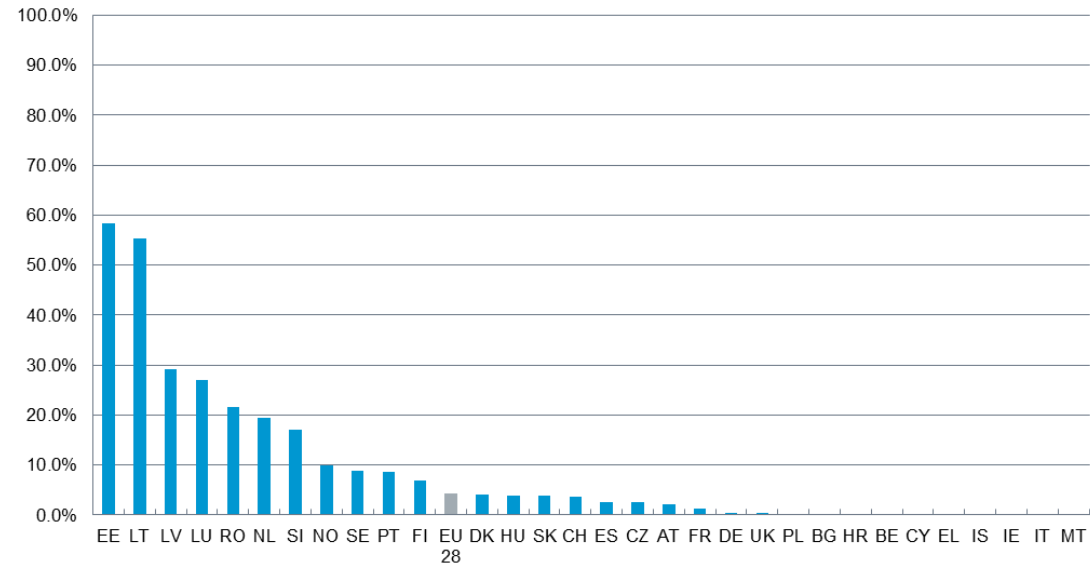
In 2013, VDSL overtook DOCSIS 3.0 as the leading rural NGA technology reaching over 11% of rural EU households. DOCSIS 3.0 covered 7.0% of EU rural households followed by FTTP with little over 4% coverage of EU’s rural homes.

Luxembourg kept its leadership in rural VDSL coverage, with almost 90% of rural households covered, while the continued VDSL roll out in the Netherlands resulted in almost 60 percentage point increase year-on-year, with VDSL now reaching nearly 80% of household units.



With regards to FTTP, Estonia and Lithuania reported the widest coverage across rural areas in 2013. However coverage remains below 60% even in these countries. Ten countries reported no rural FTTP coverage, three fewer than in the previous year.

FTTP coverage by country, rural areas, 2013

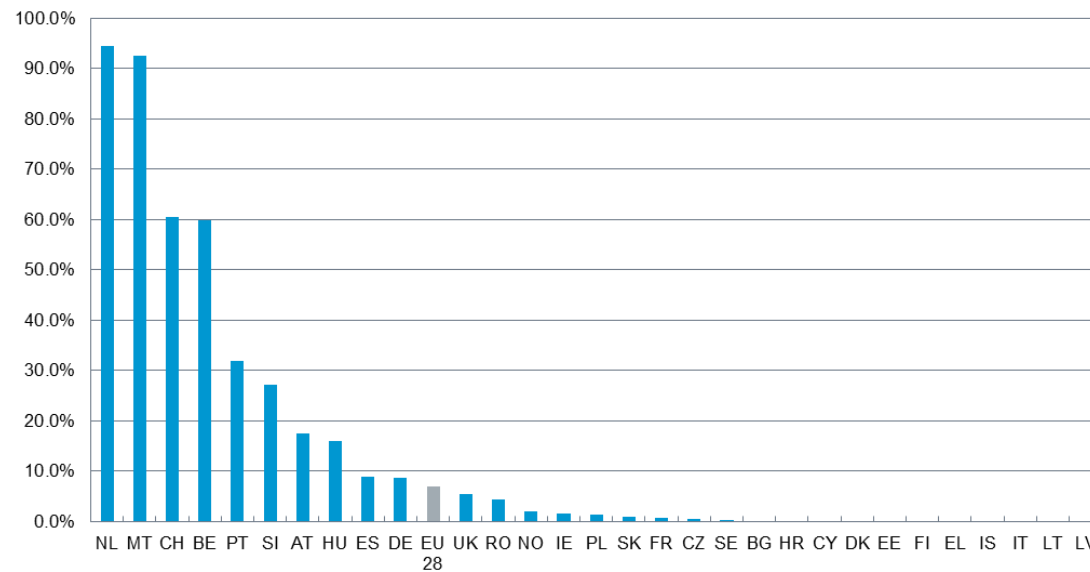


Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

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DOCSIS 3.0 covered 7.0% of rural EU households at the end of 2013. The Netherlands was the top performer in 2013 with respect to rural DOCSIS 3.0, followed by Malta, both with rural DOCSIS 3.0 coverage levels of above 90%. Nine study countries reported improvements in rural DOCSIS 3.0 coverage compared to 2012.

Docsis 3.0 coverage by country, rural areas, 2013



Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

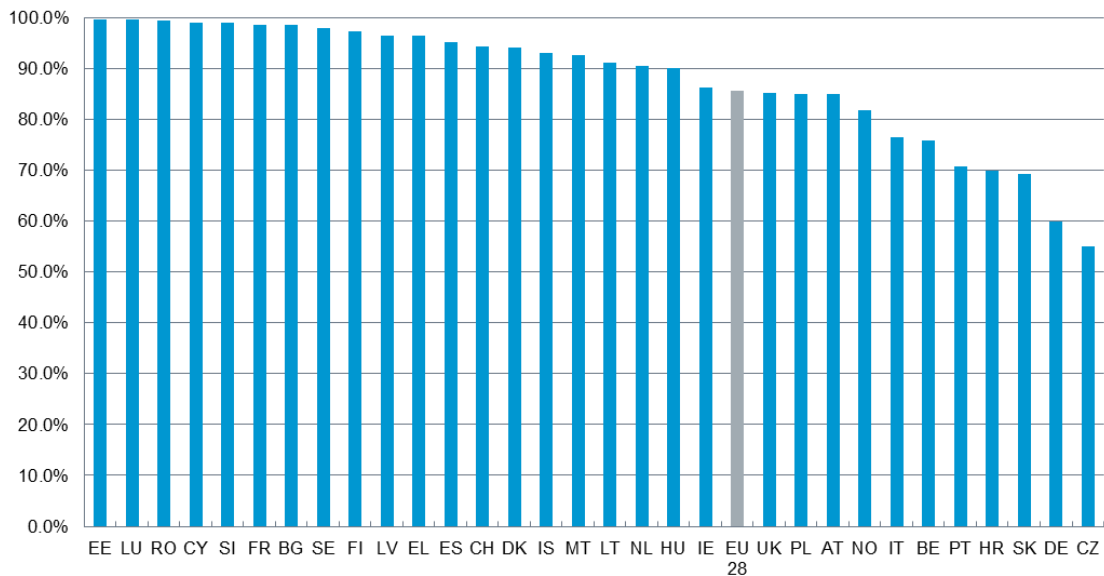
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4.4.3 Rural Mobile coverage by country

4.4.3.1 Rural HSPA coverage by country

Aside from satellite coverage, HSPA offered the most widespread rural broadband coverage across Europe. Eighteen countries reported coverage levels above 90%, with an additional four countries reaching more than 80% rural HSPA availability. Estonia and Luxembourg reported nearly universal (99.6%) coverage.

HSPA coverage by country, rural areas, 2013



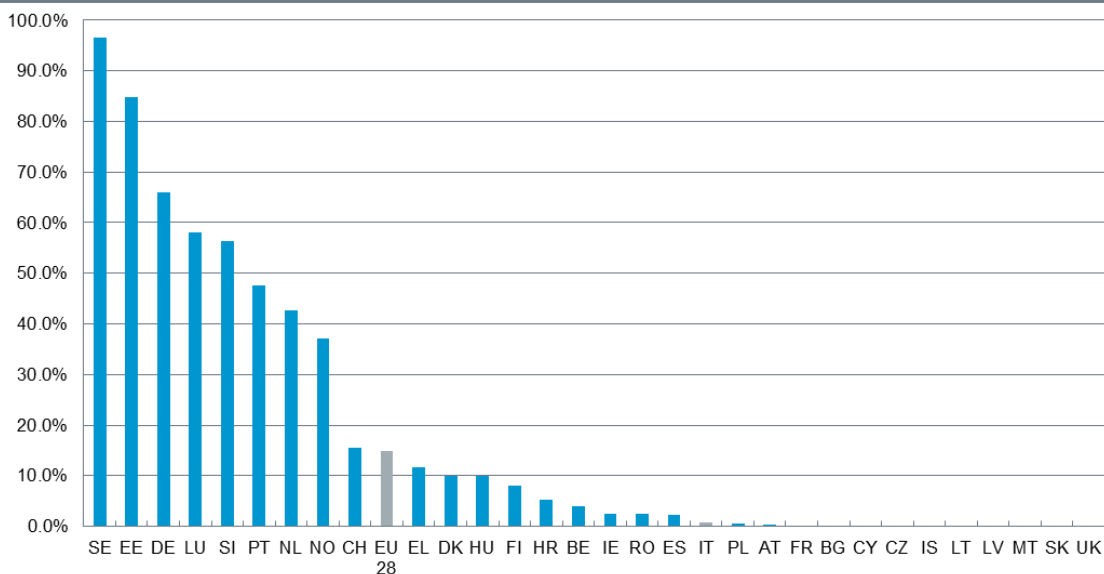
Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

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4.4.3.2 Rural LTE coverage by country

LTE coverage by country shows an interesting picture, with on one hand, clear improvements for some countries but on the other still no access for rural consumers in the majority of European countries.

LTE coverage by country, rural areas, 2013



Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

© 2014 IHS

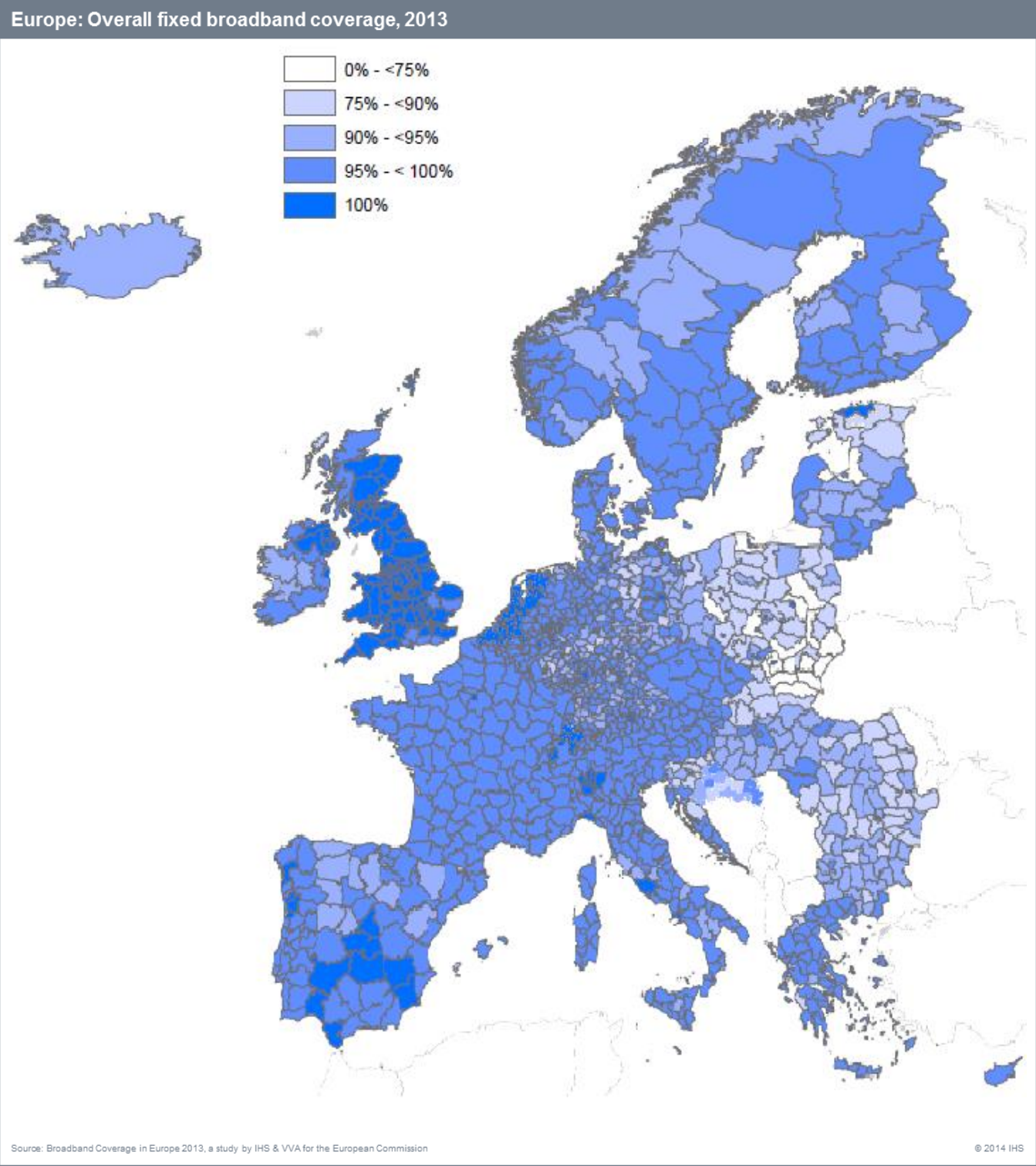
In 2012 only four countries reported LTE coverage values of above 20%. In 2013, by contrast, eight countries recorded at least 20% LTE coverage, each of them increasing coverage compared to the previous year. Sweden was the best performer in this segment, with nearly complete coverage recorded by the end of 2013, an impressive result given the previous year's coverage of less than 70%.

The improvements reported in Estonia are also strong, with an increase of 53.6 percentage points and 84.8% of all rural households covered by an LTE network at the end of the period.

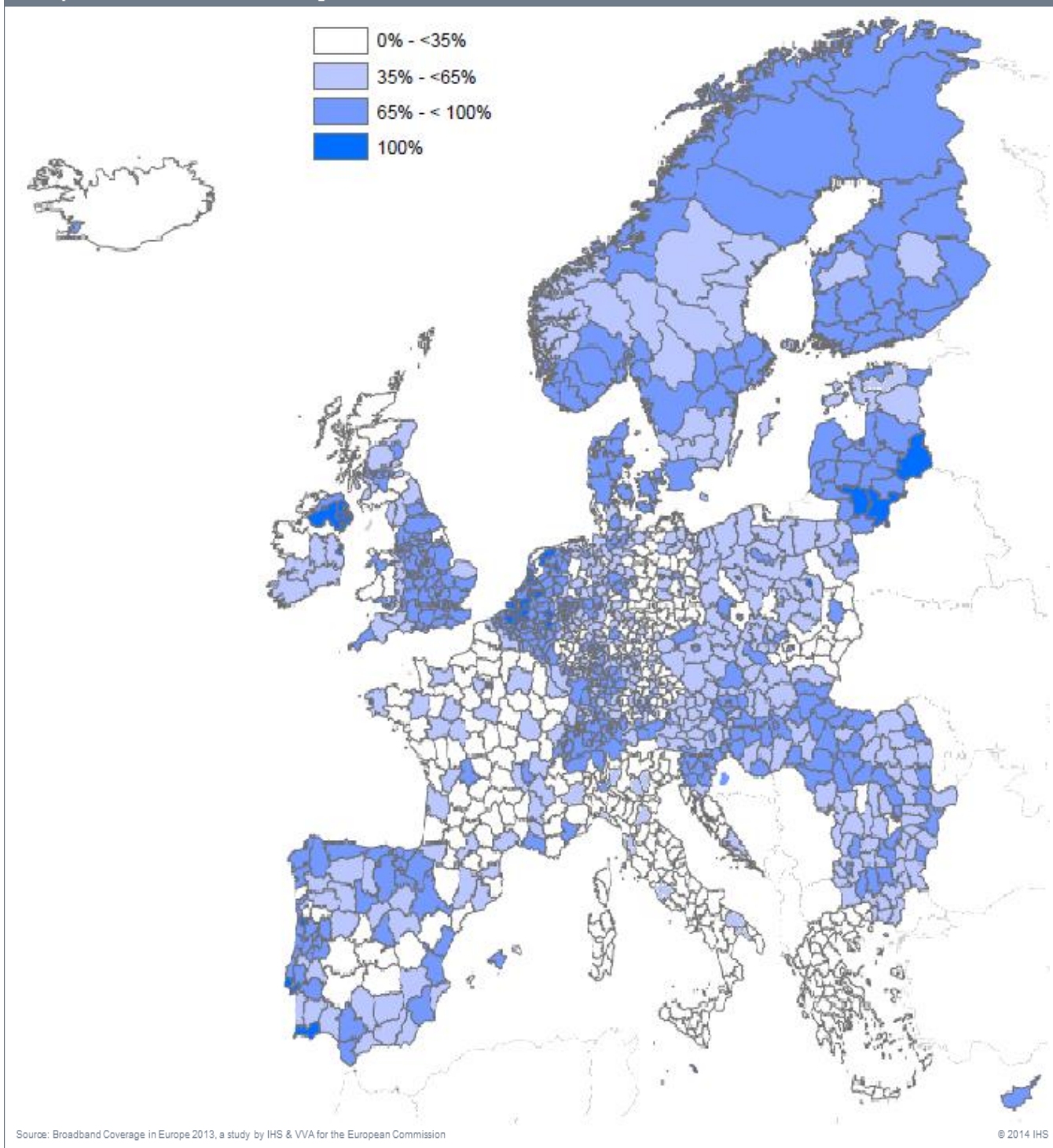
The general increase in LTE coverage in rural areas is reflected in a higher European average in 2013 (14.9% of households covered as a whole) compared with 10.2% rural LTE coverage in 2012.

4.5 NUTS 3 level total coverage

The maps included in this chapter indicate the distribution of fixed and NGA broadband coverage across Europe's regions and demonstrate the study results discussed in the previous chapters of this report.



Europe: NGA broadband coverage, 2013

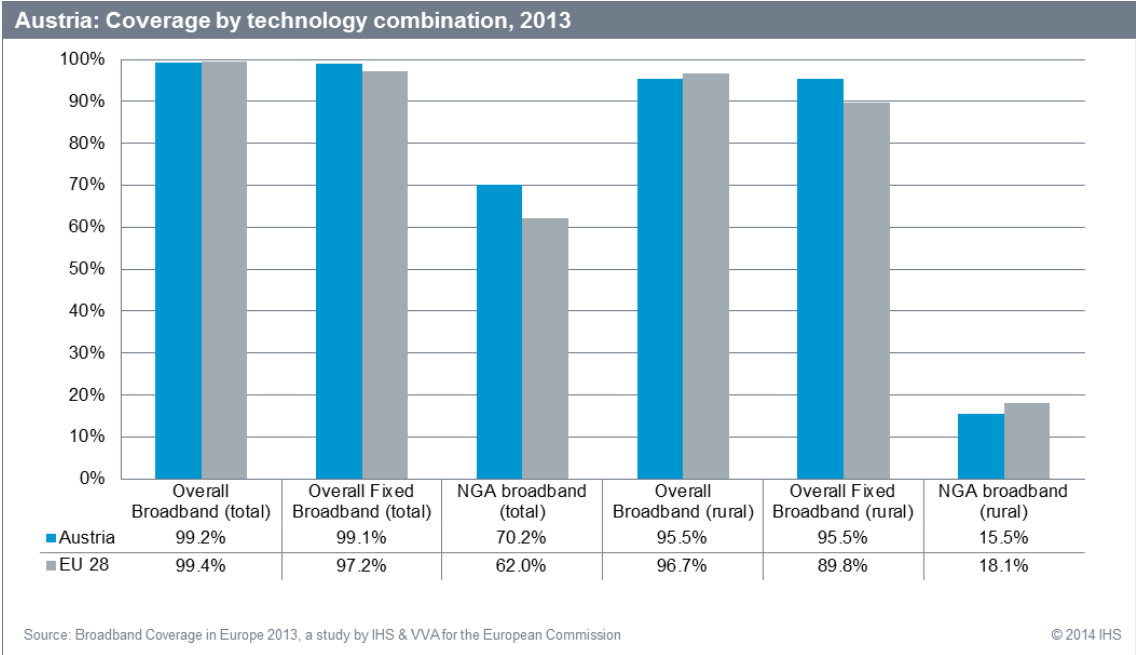


5.0 Coverage by Country

5.1 Austria

5.1.1 National coverage by broadband technology

In 2013, broadband coverage in Austria continued its positive growth trend and remained ahead of European averages for total overall broadband, fixed broadband and NGA broadband coverage. However, due to increases at an EU-level in rural broadband coverage and rural NGA coverage, Austria lagged behind the EU28 averages in rural areas in the overall broadband and NGA broadband coverage categories.



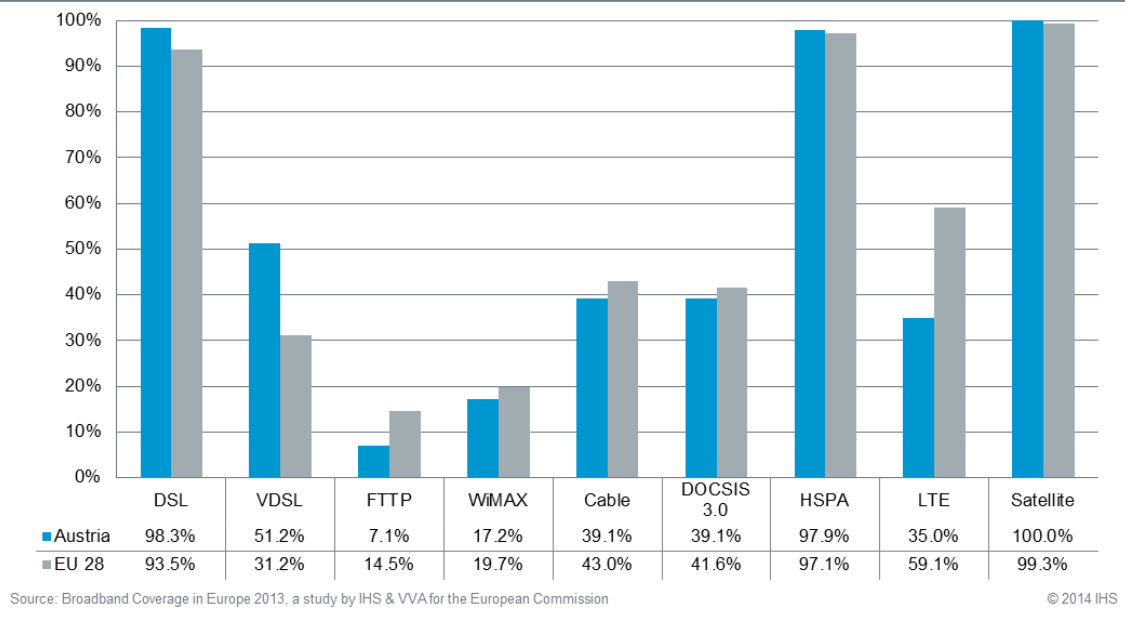
DSL continued to be the most widely available fixed broadband technology in 2013, with 98.3% of households covered by the technology. Austria’s DSL coverage has traditionally been strong and was 4.8 percentage points higher than the EU28 average in 2013.

As in the previous years, standard cable coverage in Austria was lower than the EU28 average, yet the gap between the two is decreasing. This is largely due to a more rapid growth in Austrian coverage relative to coverage across the EU28 as a whole. In 2013, there were 39.1% households passed by cable broadband in Austria compared to 35.6% in 2012. By contrast, there was only one percentage point increase year-on-year in standard cable coverage at EU level. Moreover, DOCSIS 3.0 upgrades to Austria’s cable broadband network were completed during 2013.

With regards to NGA coverage, Austria remained significantly above the EU28 average in 2013. As in 2012, VDSL was the driving NGA technology with more than a half (51.2%) of Austrian households covered by VDSL. Even though VDSL coverage grew significantly across the EU in 2013, Austria’s VDSL coverage is still 20 percentage points higher than the EU28 average.

Austria falls behind the EU28 average in terms of FTTP and DOCSIS 3.0 coverage, yet there was a significant increase in DOCSIS 3.0 coverage, which grew from 35.3% in 2012 to 39.1% in 2013. With NGA deployment from the national telecoms groups focused primarily on VDSL, FTTP coverage grew only slightly from 6.3% in 2012 to 7.1% in 2013.

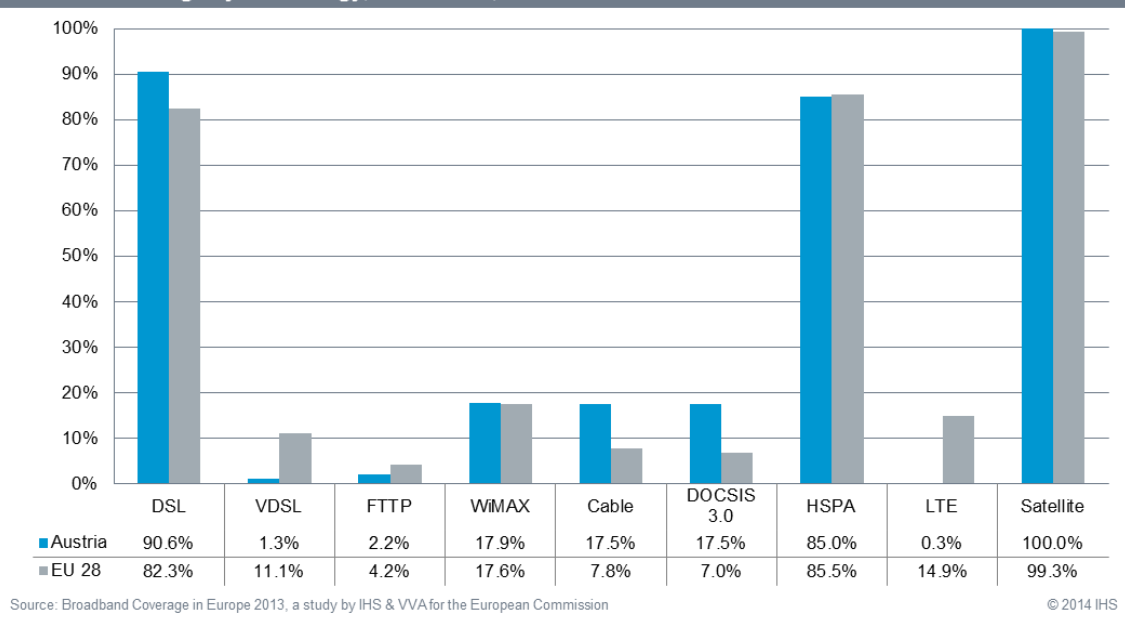
Austria: Coverage by technology, total, 2013



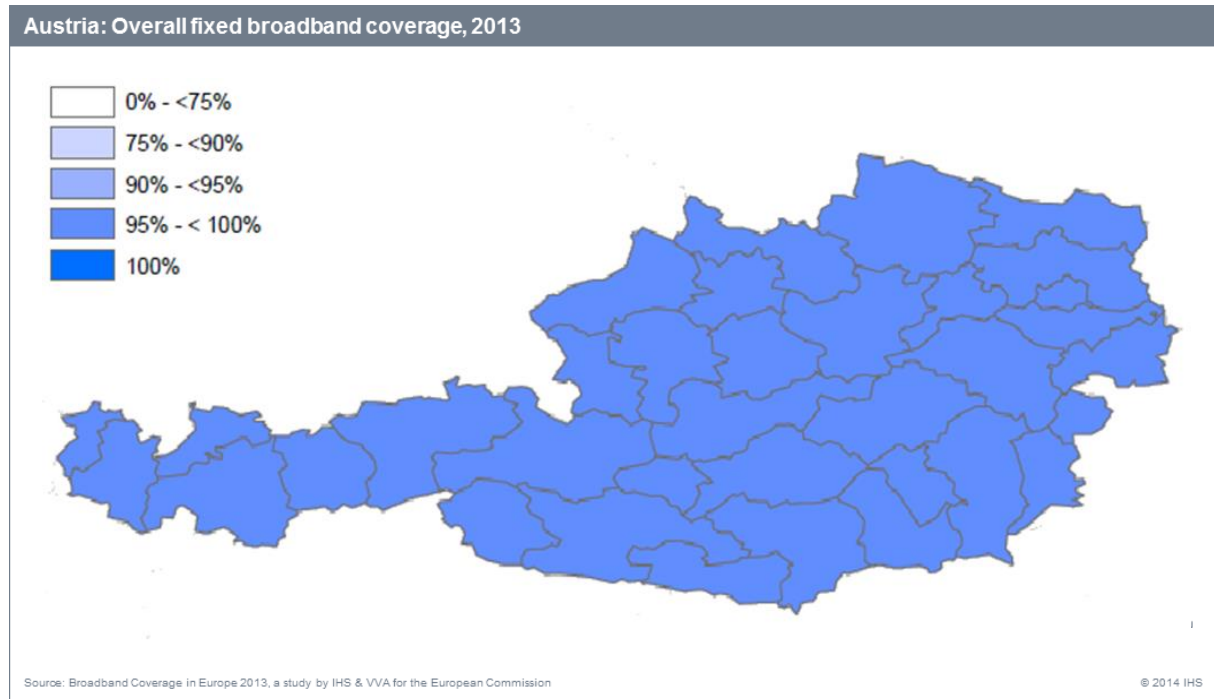
In rural areas, DSL was the leading fixed-broadband service with 90.6% of rural households passed by the technology. Cable modem coverage of rural households was more than double the EU28 average in 2013, similar to 2012.

Rural NGA coverage grew by a modest 1.1 percentage points in 2013. DOCSIS 3 rural coverage registered the highest increase (by 4.1 percentage points compared to 2012) among the NGA technologies, following the cable network upgrades. VDSL and FTTP rural data showed a small increase in 2013, with coverage growing by 1.3 percentage points for VDSL and 2.2 percentage points for FTTP compared to the previous year. DOCSIS 3.0 therefore confirms to be the key technology ensuring NGA connectivity in Austria's rural areas.

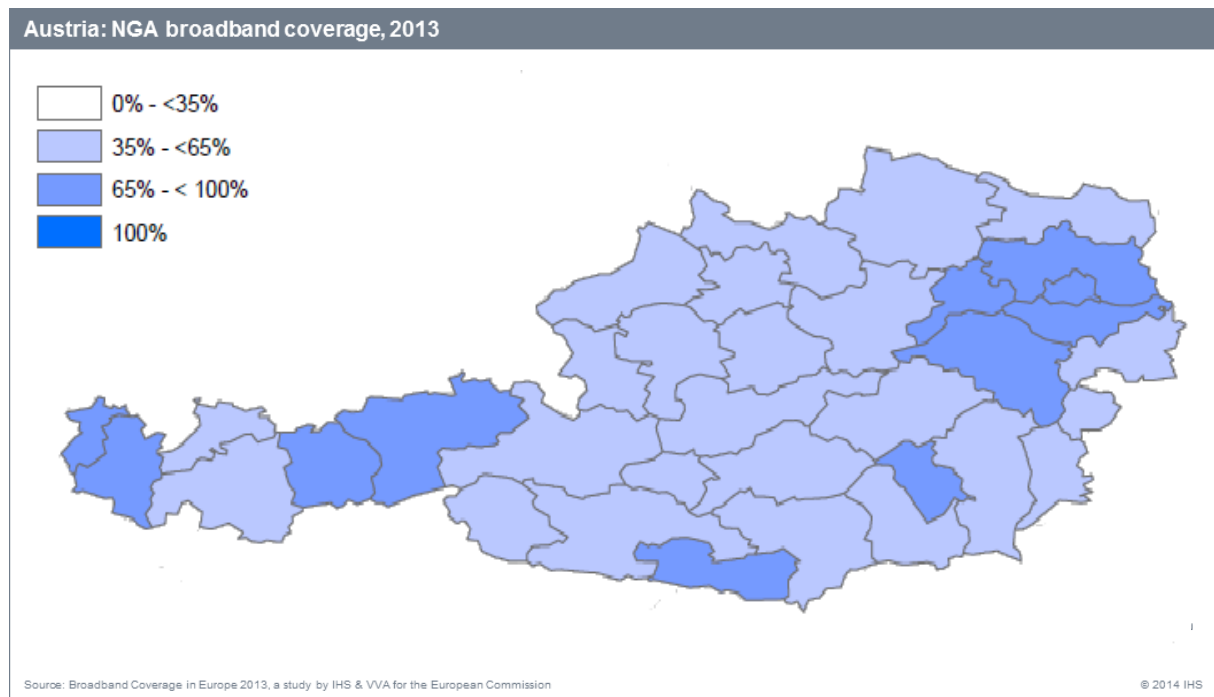
Austria: Coverage by technology, rural areas, 2013



5.1.2 Regional coverage by broadband technology



Compared to 2012, overall fixed broadband coverage improved with four regions reaching near 100% coverage (Vienna, Graz, Innsbruck and Rheintal-Bodenseegebiet), and the rest of the country having fixed broadband coverage rates of above 95%. Moreover, in Bludenz-Bregenzer Wald - the second most western NUTS 3 region - fixed broadband coverage increased from 90-95% coverage to over 95% coverage.



NGA coverage data show an improvement in the regions surrounding Vienna, with NGA coverage between 65% and 100%, while the situation remains similar to previous years across the rest of the country, with coverage between 35% and 65%.

5.1.3 Regulatory and market overview

In November 2012, Austria adopted a new broadband strategy entitled “Broadband Strategy 2020” with the Federal Ministry of Transport, Innovation and Technology (BMVIT) overseeing its implementation. The main goals outlined in the strategy were:

- Provision of broadband access of at least 25 Mbps to the whole population by 2013
- Provision of high-speed internet access in urban areas (70% of households) by 2018
- Provision of nearly universal (99% of households) high-speed internet access by 2010

At a technology level, the Austrian fixed broadband market is largely split between DSL and cable technology providers. A1 Telekom Austria and Tele 2 are the two main DSL providers. DSL services are also offered by a leading cable provider, UPC Austria. Other major cable ISPs include the largely regionally-based Salzburg Cable, Liwest (Linz-Urfahr area) and Kabelplus (Lower Austria). A1 Telekom Austria also offers FTTP services. Most other FTTP providers are small and local companies. For example, the Wien Energy company offers its blizznet FTTP service in the Wien area.

The incumbent, A1 Telekom Austria, has adopted a convergent network strategy focused largely on demand-driven mainly fibre-to-the-curb (FTTC, i.e. VDSL) network rollout with “Vectoring-Ready” hardware. According to the company, the demand-driven rollout is based on two principles of “sell first - build later” and “pre-wiring for self-installation”.¹ The strategies are aimed at reducing the up-front costs associated with both network rollout and with in-house customer installation. It also means that the company is actively selecting urban and suburban areas for FTTP rollout. To help fund the FTTC rollout in rural areas A1 Telekom Austria is relying on funding from EAFRD².

At the end of 2013, the company passed 13% of households with its FTTC or FTTP network, with projections of increasing the number of homes passed to approx. 18% in 2014.³

As mentioned previously, all cable providers’ networks have been upgraded to DOCSIS 3.0 technology during 2013. Liberty Global-backed UPC, which currently occupies the leading market position in the cable broadband sector has a public strategy of competing on speed across all of its markets. Upgrading its network to DOCSIS 3.0 has been a key component in ensuring that its products remain in line with this approach.

¹ Telekom Austria Group, Capital Market Day, A1 Telekom Austria presentation, 15 January 2013, p.22.
<http://cdn1.telekomaustria.com/final/en/media/pdf/Austria.pdf>

² EAFRD: European Agricultural Fund for the Development of Rural Areas.

³ Telekom Austria Group, Results for the Fourth Quarter and Full Year 2013, 26 February 2013, p. 21.
<http://cdn1.telekomaustria.com/final/en/media/pdf/pr-results-qu4-2013.pdf>

5.1.4 Data tables for Austria

Statistic	National
Population	8,443,018
Persons per household	2.3
Rural proportion	14.2%

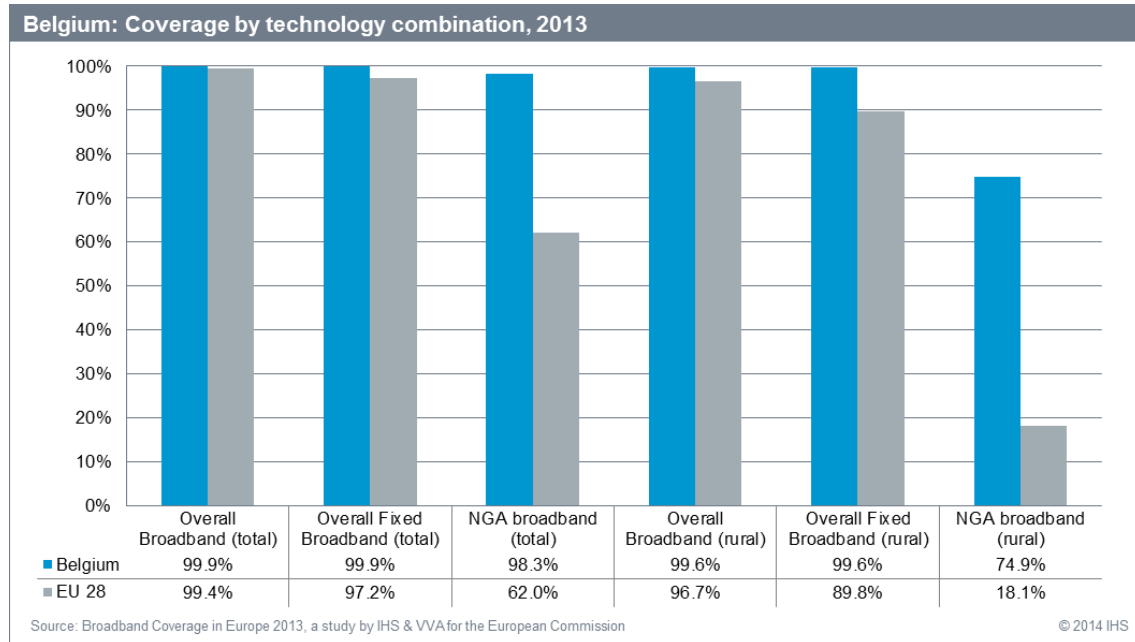
Technology	Austria 2013		Austria 2012		Austria 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	98.3%	90.6%	98.0%	88.7%	97.0%	84.7%	93.5%	82.3%
VDSL	51.2%	1.3%	50.5%	0.0%	46.5%	0.0%	31.2%	11.1%
FTTP	7.1%	2.2%	6.3%	1.2%	5.3%	0.0%	14.5%	4.2%
WiMAX	17.2%	17.9%	17.2%	17.8%	17.2%	17.7%	19.7%	17.6%
Cable	39.1%	17.5%	35.6%	15.9%	34.8%	11.1%	43.0%	7.8%
DOCSIS 3.0	39.1%	17.5%	35.3%	13.4%	34.8%	8.7%	41.6%	7.0%
HSPA	97.9%	85.0%	97.6%	83.0%	97.5%	82.9%	97.1%	85.5%
LTE	35.0%	0.3%	23.5%	0.2%	18.8%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	98.9%	97.7%
Overall broadband	99.2%	95.5%	99.6%	97.0%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	99.1%	95.5%	98.9%	93.8%	98.2%	89.6%	97.2%	89.8%
NGA broadband	70.2%	15.5%	69.5%	14.4%	64.4%	8.7%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

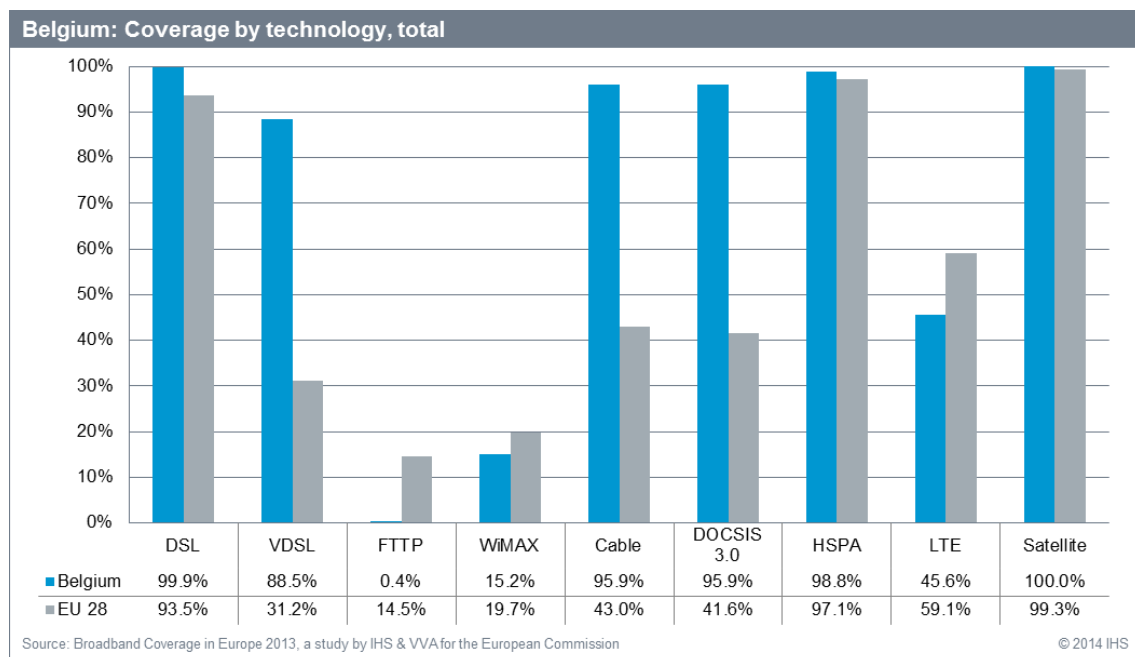
5.2 Belgium

5.2.1 National coverage by broadband technology

Belgium continues to have high NGA coverage, and has managed to improve availability of NGA in rural areas by almost 10 percentage points between 2012 and 2013, increasing coverage from 65.5% to 74.9% at end 2013.



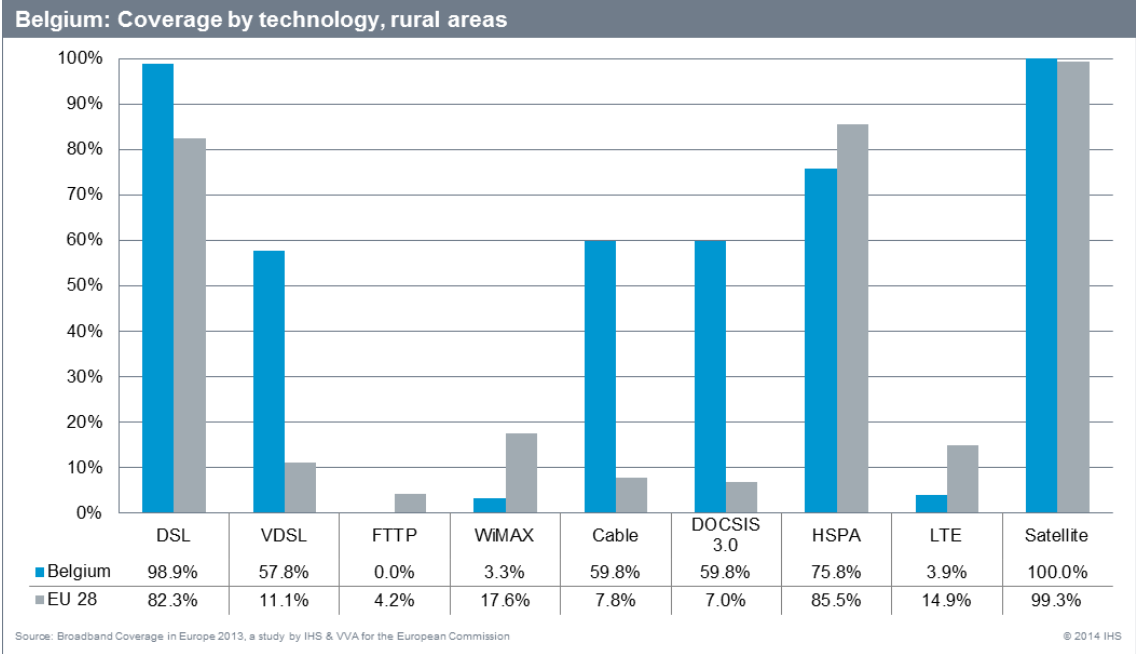
Of the various next-generation technologies, DOCSIS 3.0 offered the most complete coverage in 2013 with 95.9% availability nationally, followed by VDSL with 88.5% coverage, an increase of 3.5 percentage points on last year.



LTE has increased considerably on the previous year, from just over 8% coverage to 45.6%, but this is still below the European average of 59%. Belgacom launched the first national

commercial LTE network in 2012⁴, followed by KPN's Base in 2013⁵, so in comparison to the other NGA technologies LTE is still relatively new in Belgium. The Belgacom LTE service was initially launched in Hasselt, Antwerp, Ghent, Leuven, Liege, Namur, Mons, Waver and the Hassrode Industrial Park.

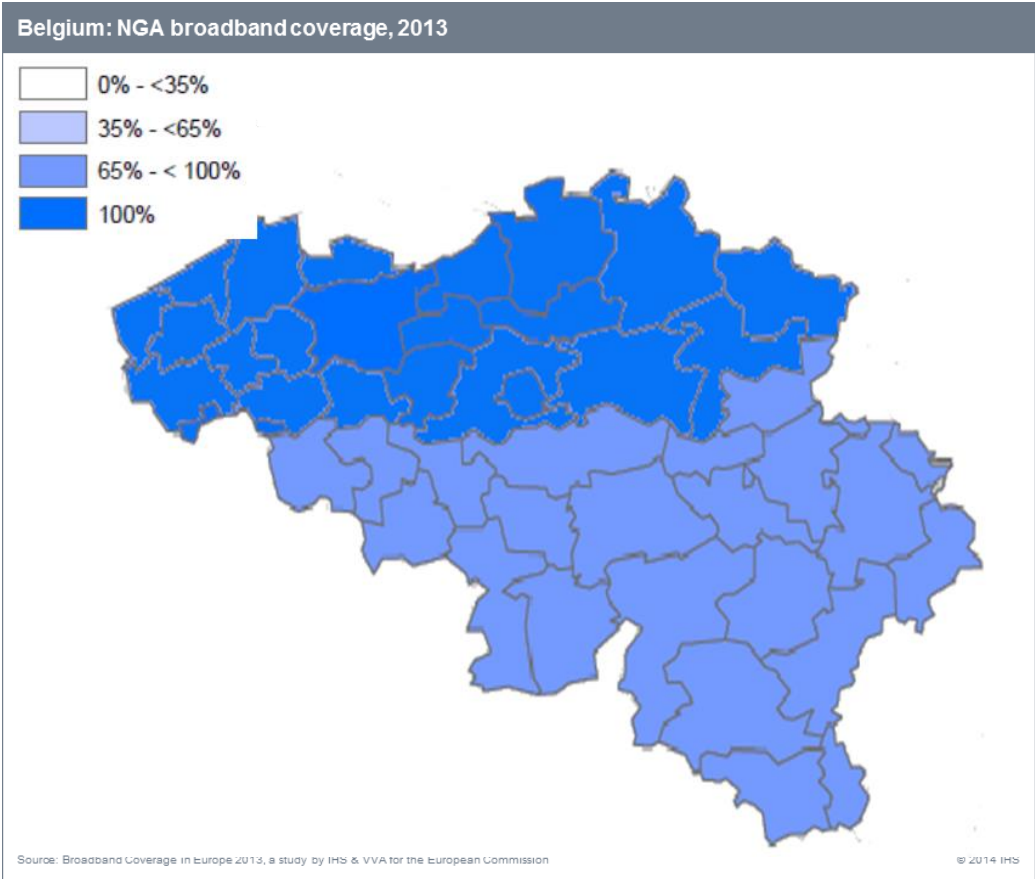
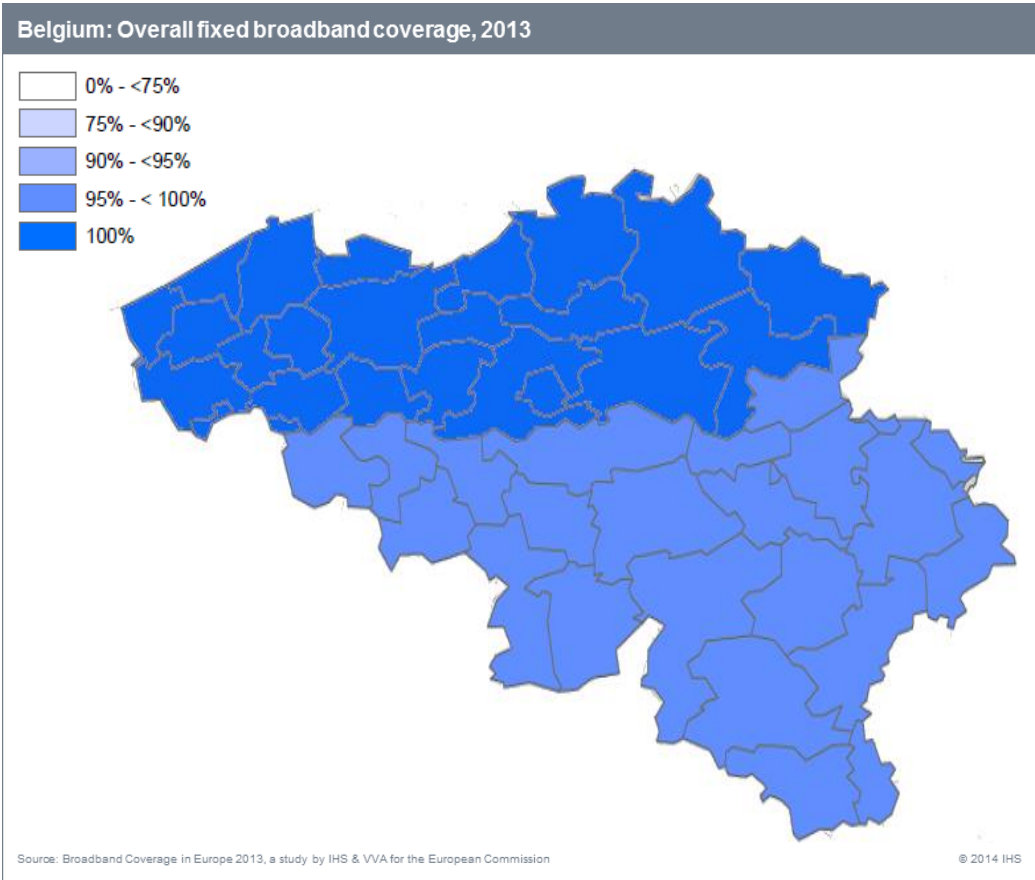
In rural areas, DSL is the main technology for provisioning basic broadband access, with almost 99% coverage, followed closely by VDSL and DOCSIS 3.0 which each cover almost 60% of rural Belgium. Following the launch of LTE services in 2012, coverage in rural areas has increased from 0% to 14.9%.



⁴ <http://www.eurocomms.com/industry-news/49-online-press/8669-belgacom-launches-commercial-4g-lte-service-in-belgium>

⁵ <http://www.fiercewireless.com/europe/press-releases/base-belgium-launches-lte>

5.2.2 Regional coverage by broadband technology



5.2.3 Regulatory and market overview

In 2009, the Belgian government presented a plan, 'Belgium – The digital heart of Europe (2010 – 2015)⁶, which outlines targets and strategies that will boost broadband coverage. The main targets include the connection of 90% of the population by 2015, the provision of more than 50% of school children with a laptop or netbook (up from 12.5% in 2009) and the expansion of mobile internet to at least 50% of the population.

The Belgian incumbent Belgacom has a strategy which concentrates predominantly on convergence between devices and networks. Belgacom has invested heavily in NGA infrastructure and in December 2013 Belgacom activated the country's first commercially available VDSL2 vectoring network which increases delivery speeds from 30 Mbps to 70 Mbps on copper lines. By 2016, Belgacom is aiming to complete the upgrade of its entire VDSL2 network, comprising 22,000 remote cabinets⁷.

The Belgian regulator (BIPT) withdrew Belgacom's obligation to offer access to its competitors via 'sub-loop unbundling' (SLU). As a consequence of this, Belgacom instead allows access to its VDSL lines on a bitstream basis⁸.

Improvement in LTE coverage is the result of the wide deployment of LTE services by Belgacom and Base, the second largest mobile operator in Belgium, which launched LTE services in October 2013. Mobistar allowed existing subscribers access to its LTE services in November 2013 prior to commercial launch in early 2014⁹.

⁶ <http://www.awt.be/contenu/tel/dem/DigitalBelgiumFR.pdf>

⁷ http://www.belgacom.com/be-en/newsdetail/ND_20140219_alcatel_lucent.page

⁸ <http://www.t-regs.com/index.php/2012/10/30/vectoring-and-potentialpartial-phasing-out-of-copper-sub-loop-unbundling-obligations-full-text-of-eu-nras-actual-decisions/>

⁹ <http://www.fiercewireless.com/europe/story/belgium-gets-third-lte-provider-oranges-mobistar/2013-11-26>

5.2.4 Data tables for Belgium

Statistic	National
Population	11,094,850
Persons per household	2.4
Rural proportion	4.6%

Technology	Belgium 2013		Belgium 2012		Belgium 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	99.9%	98.9%	99.8%	97.0%	99.8%	97.0%	93.5%	82.3%
VDSL	88.5%	57.8%	85.0%	58.6%	81.0%	55.9%	31.2%	11.1%
FTTP	0.4%	0.0%	0.3%	0.0%	0.2%	0.0%	14.5%	4.2%
WiMAX	15.2%	3.3%	15.1%	3.2%	14.7%	3.1%	19.7%	17.6%
Cable	95.9%	59.8%	95.9%	59.1%	95.9%	58.9%	43.0%	7.8%
DOCSIS 3.0	95.9%	59.8%	95.9%	59.1%	95.9%	58.9%	41.6%	7.0%
HSPA	98.8%	75.8%	98.7%	75.4%	98.7%	75.4%	97.1%	85.5%
LTE	45.6%	3.9%	8.1%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.9%	99.6%	99.97%	99.4%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	99.9%	99.6%	99.96%	99.1%	99.96%	97.3%	97.2%	89.8%
NGA broadband	98.3%	74.9%	97.1%	65.4%	96.8%	65.4%	62.0%	18.1%

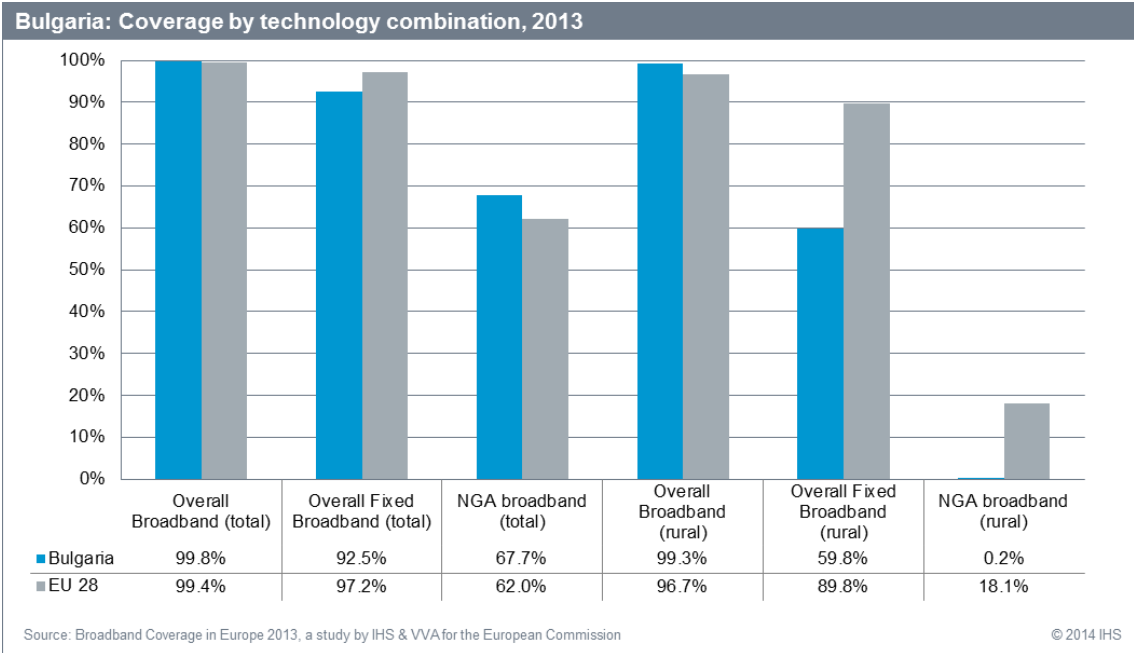
Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

5.3 Bulgaria

5.3.1 National coverage by broadband technology

At the end of 2013, Bulgaria was behind the EU average in terms of fixed broadband coverage, at both a national and rural level. While on a national level, fixed broadband coverage in Bulgaria lagged by less than five percentage points, on rural level the difference between average EU fixed broadband coverage and that in rural Bulgaria was 30.0 percentage points. This significant gap can be partly explained by the fact that only a negligible improvement (0.6 percentage points) was reported in rural fixed broadband coverage in Bulgaria compared to 2012.

In terms of NGA coverage, Bulgaria maintained higher than average total NGA coverage in 2013 with at least one NGA technology passing nearly 68% of households, compared to an EU average of 62% households. Total Bulgarian NGA coverage in 2013 improved by 7 percentage points compared to the previous year. In rural areas, a minor improvement in NGA broadband coverage was recorded from no rural NGA coverage in 2012, yet it remained close to 0% of rural Bulgarian households.

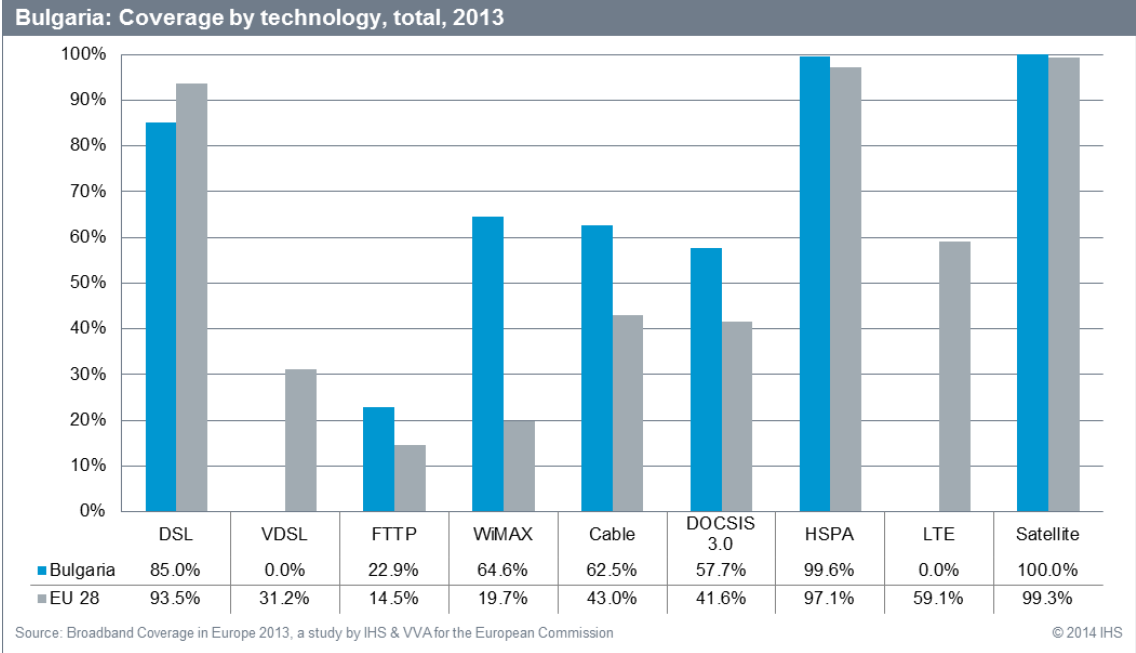


Closer look at individual technology coverage in Bulgaria trends provides more context for the developments across technology combination categories' coverage. As in almost all study countries, DSL is the driving technology for fixed coverage in Bulgaria. Yet, while its coverage is relatively high, passing 85.0% of households, it is below the EU average of nearly 94%, thus contributing to the lower-than-average overall fixed broadband coverage.

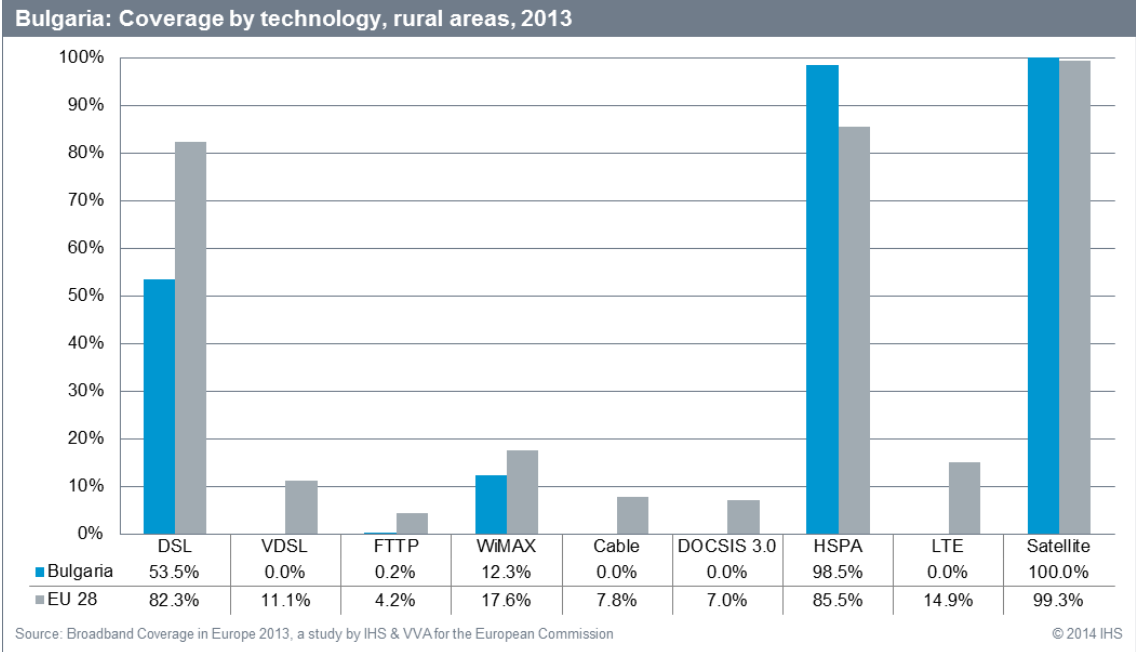
Total coverage of both FTTP and WiMAX services have improved respectively by 15.6 percentage points and 43.5 percentage points compared to 2012, reaching total coverage of nearly 23% Bulgarian households for FTTP and 65% for WiMAX. Cable modem coverage improved as well, increasing from a 2012 total of 57.1% of homes to almost 63% in 2013

DOCSIS 3.0 continued to be the most important contributor to NGA coverage reaching nearly 58% of homes. As in 2012, no coverage was reported for VDSL in Bulgaria.

With regards to FTTP coverage, it is important to note one specific aspect of the Bulgarian broadband market: In many areas, fibre optic cable is rolled out very near to individual properties or blocks of flats, with coaxial cable used in the distance from the last amplifier to the customers' homes. While this FTTLA (fibre-to-the-last-amplifier) architecture is sometimes described as FTTB, in the case of Bulgaria this coverage was classified as DOCSIS 3.0 rather than FTTP. This classification was applied by Point Topic in previous years of the study and the IHS & VVA research team maintained this approach in the 2013 analysis.



As for mobile broadband technologies, while there was a nearly universal (99.6%) HSPA coverage reported in 2013, there was no LTE coverage, with commercial launch planned by mobile operator Max Telecom for early 2014¹⁰ with other providers such as Bulsatcom scheduled to follow later in the year or into 2015.

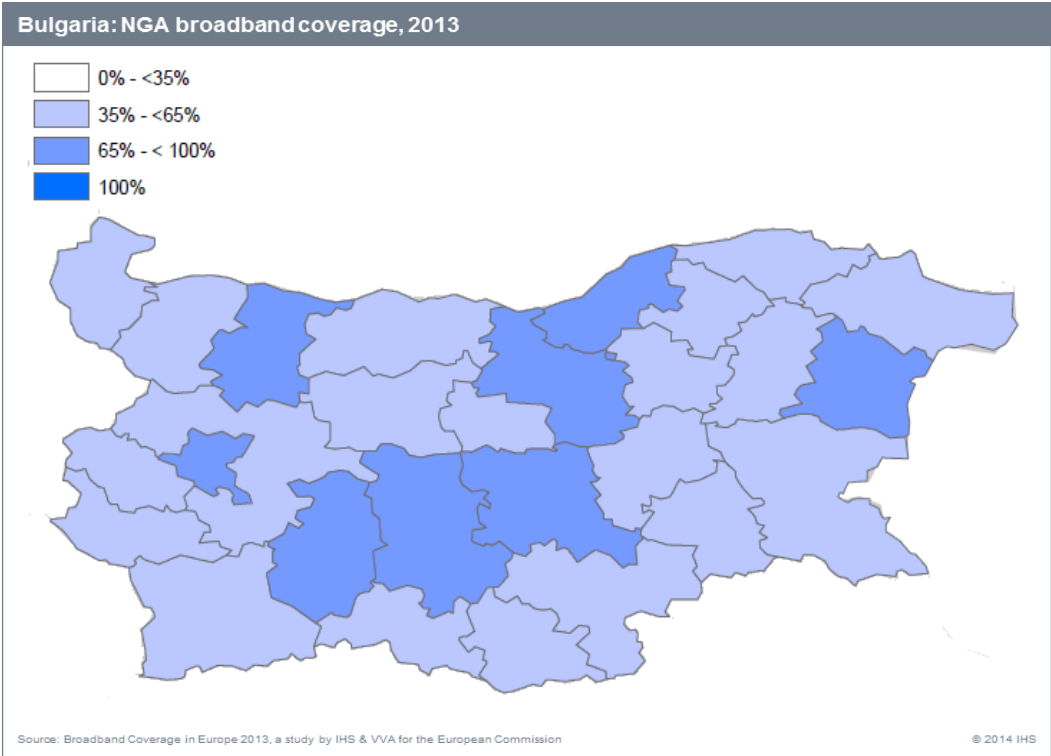
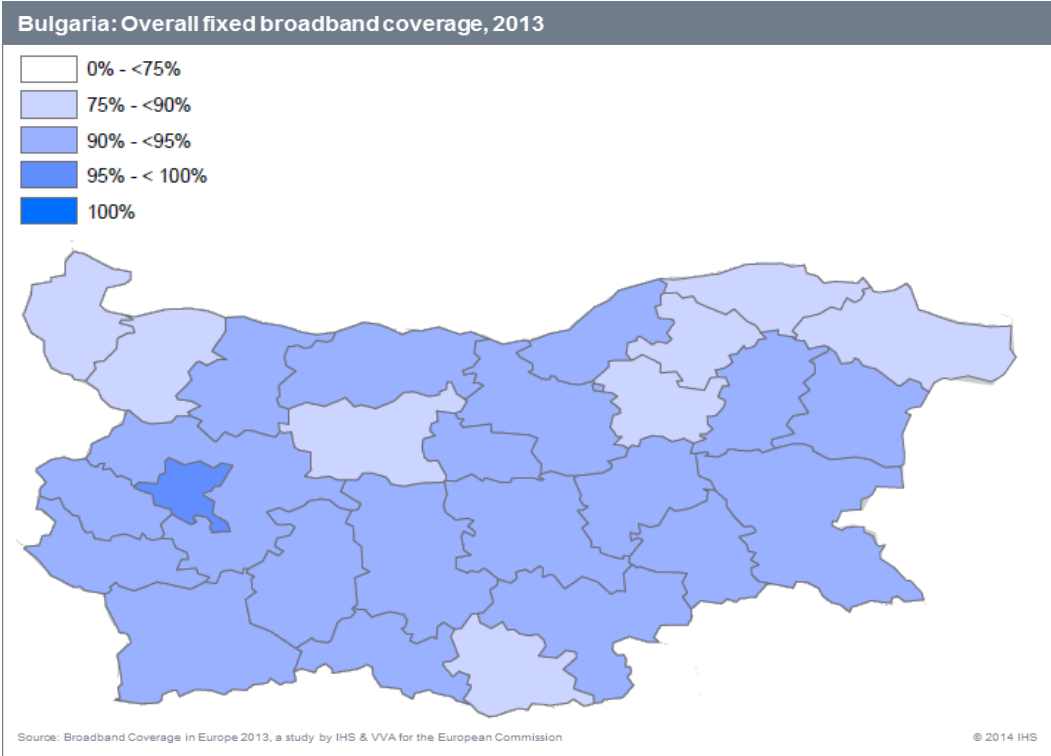


¹⁰ <http://www.telegeography.com/products/commsupdate/articles/2014/02/05/max-telecom-to-launch-lte-in-1h14/index.html>

Coverage in rural areas showed very little improvement compared to 2012, with DSL falling behind the EU average by nearly 30 percentage points. FTTP technology recorded a small improvement from no coverage reported in 2012 to a total of 0.2% in 2013 due to a FTTP rollout in the larger Sofia region surrounding the Bulgarian capital.

Small improvements were also reported for rural WiMAX, standing at 12.3%, and HSPA coverage, reaching nearly 99% of households in rural areas at the end of 2013 and well above the EU average.

5.3.2 Regional coverage by broadband technology



5.3.3 Regulatory and market overview

Bulgaria's national digital strategy was first articulated in 2009 and subsequently updated in 2013 laying out broadband development plans up to 2015 with an objective of universal broadband coverage and 100 Mbps downstream broadband for 50% of households by 2020.¹¹

The financial resources needed to implement the national broadband strategy come from three main sources: EU Structural Funds; private investments; and national budget funding, with the Bulgarian government considering securing funds from the state budget to promote broadband infrastructure build-up in cooperation with local authorities.

Typical for Bulgaria's broadband market (similar to other Eastern European markets) is high fragmentation with hundreds of smaller operators providing mostly fibre-based services on a local level.

The incumbent, Vivacom (brand name of Bulgarian Telecommunications Company), is the main telecom operator in the Bulgarian market, offering DSL, FTTP and HSPA services. Vivacom launched its FTTP network rollout in 2011 with an objective of reaching one million households by 2014 and initial investment of EUR600 million.¹² At the end of 2013, Vivacom announced its fibre network offering up to 100 Mbps download connection speeds passed 680 thousand homes.¹³

As indicated by this research, most of Bulgaria's cable networks (92%) have been already upgraded to DOCSIS 3.0 technology. In 2011, leading Bulgarian cable operator, Blizoo, announced a EUR50 million investment in the upgrade of its network to allow support of 400 Mbps downstream speeds.¹⁴ As of December 2013, the operator offered connections of up to 150Mbps.

A number of alternative providers originally focused on different access technologies have also begun to invest in fibre networks rollout in recent years. These include a satellite and pay-TV operator, Bulsatcom, or mobile operator MTel (MobilTel) via its subsidiary, SpectrumNet.

Investment in mobile broadband networks has so far been focused on HSPA networks, translating in one of the most widespread and nearly universal HSPA coverage across Europe. Moreover, Vivacom, MTel, and Globul all offer HSPA services with selected areas being able to receive 42 Mbps downstream speeds.¹⁵

Even though most of the leading mobile operators have secured licenses for LTE networks deployments, so far only Max Telecom had completed fist LTE trials in the fall of 2013 and seemed to be on track for commercial launch of its LTE network in 2014.¹⁶

¹¹ <http://ec.europa.eu/digital-agenda/en/country-information-republic-bulgaria>

¹² <http://www.telegeography.com/products/commsupdate/articles/2011/06/23/vivacom-to-invest-eur600-million-in-network-upgrade/>

¹³ <http://www.vivacom.bg/en/about/about-us/company/investors/news>

¹⁴ <http://www.broadbandtvnews.com/2010/05/19/leading-bulgarian-cableco-becomes-blizoo/>

¹⁵ <https://www.etno.eu/home/press-corner/etno-press-releases/2013/144>

¹⁶ <http://www.lyncmigration.com/news/2013/10/01/7450653.htm>

5.3.4 Data tables for Bulgaria

Statistic	National
Population	7,284,552
Persons per household	2.4
Rural proportion	19.6%

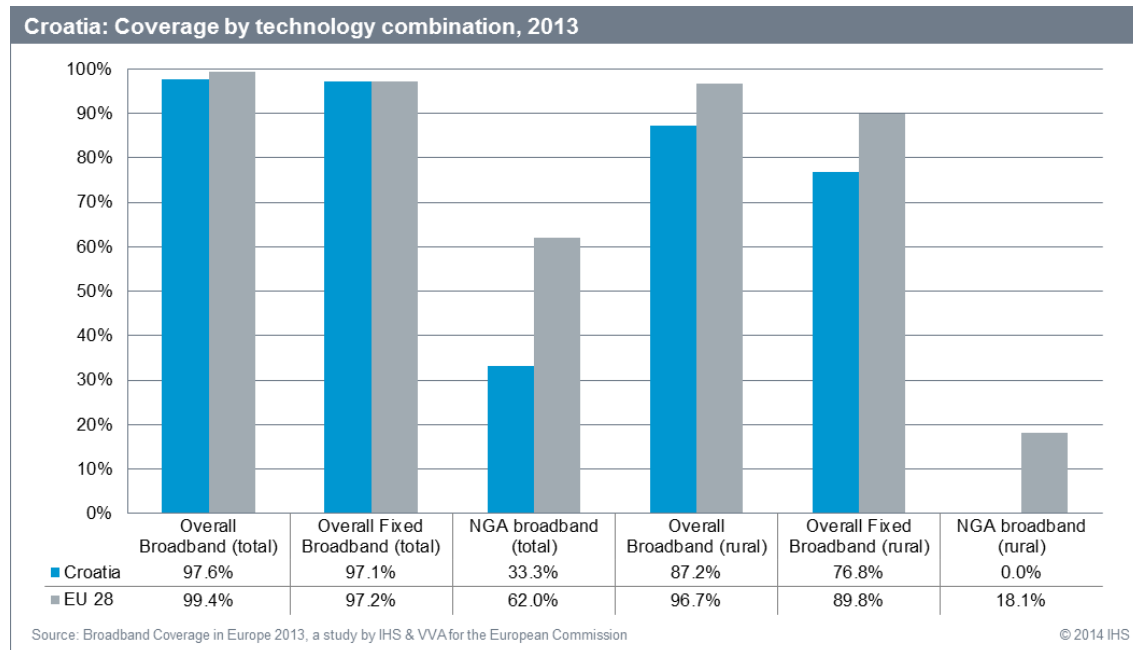
Technology	Bulgaria 2013		Bulgaria 2012		Bulgaria 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	85.0%	53.5%	85.1%	53.5%	84.8%	53.7%	93.5%	82.3%
VDSL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	31.2%	11.1%
FTTP	22.9%	0.2%	7.3%	0.0%	5.6%	0.1%	14.5%	4.2%
WiMAX	64.6%	12.3%	21.1%	11.9%	16.9%	9.4%	19.7%	17.6%
Cable	62.5%	0.0%	57.1%	0.0%	56.2%	0.0%	43.0%	7.8%
DOCSIS 3.0	57.7%	0.0%	57.1%	0.0%	56.2%	0.0%	41.6%	7.0%
HSPA	99.6%	98.5%	99.4%	97.0%	98.0%	90.1%	97.1%	85.5%
LTE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.8%	99.3%	99.8%	99.0%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	92.5%	59.8%	89.6%	59.2%	89.1%	58.3%	97.2%	89.8%
NGA broadband	67.7%	0.2%	60.7%	0.0%	59.3%	0.1%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

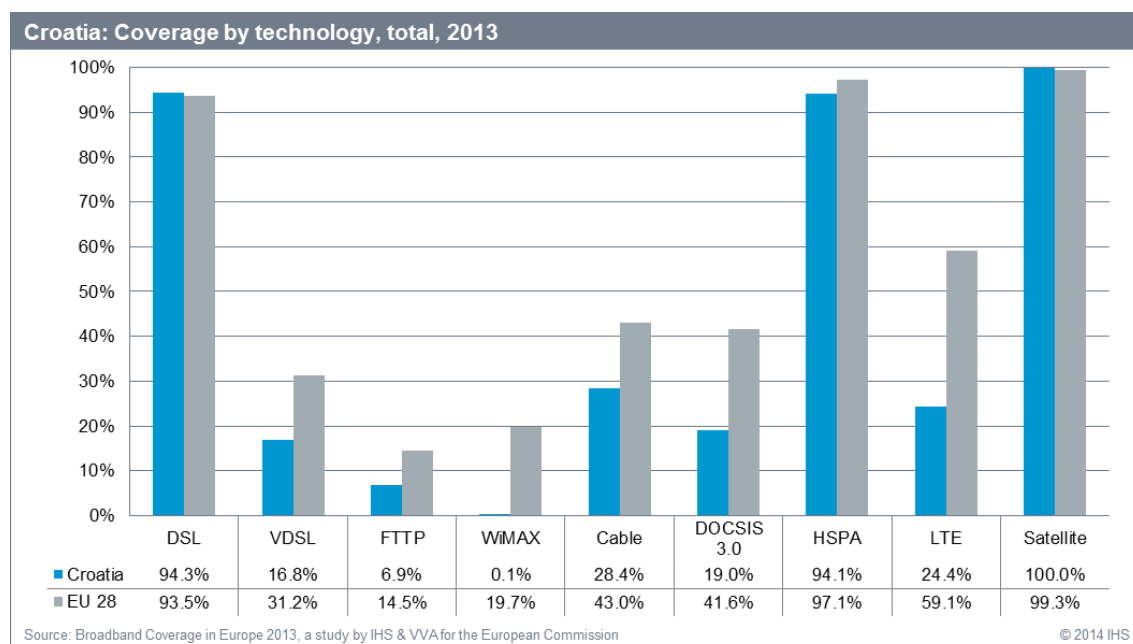
5.4 Croatia

5.4.1 National coverage by broadband technology

This is the second year that Croatia has been included in the BCE study, and since the previous year total overall NGA coverage experienced solid improvement. NGA coverage increased by more than 14 percentage points year-on-year, from 19.1% to 33.3%, although this remains below the EU average which was 62.0% at end 2013. NGA coverage in rural Croatia remains negligible.

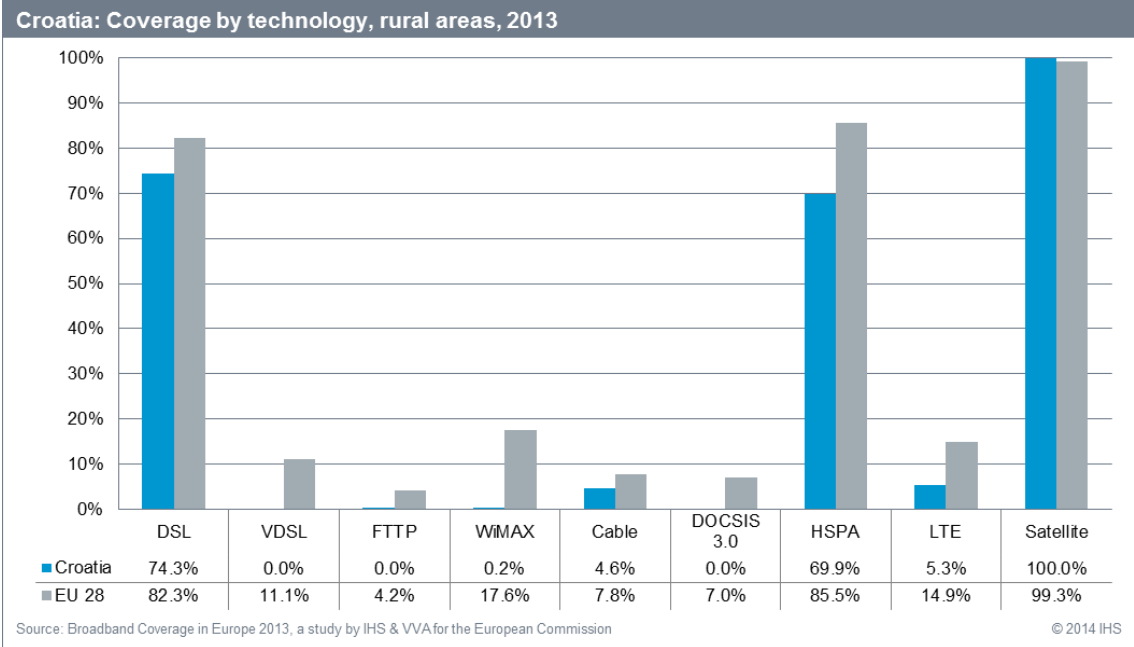


Improved total overall NGA coverage was largely due to an increase in the coverage of DOCSIS 3.0, which rose from 0% of homes in 2012 to 19.0% in 2013. This is still half the EU average (of nearly 42%), leaving DSL is the only single fixed technology which registered as having coverage above the EU average, at 94.3% compared with an EU average of 93.5%.

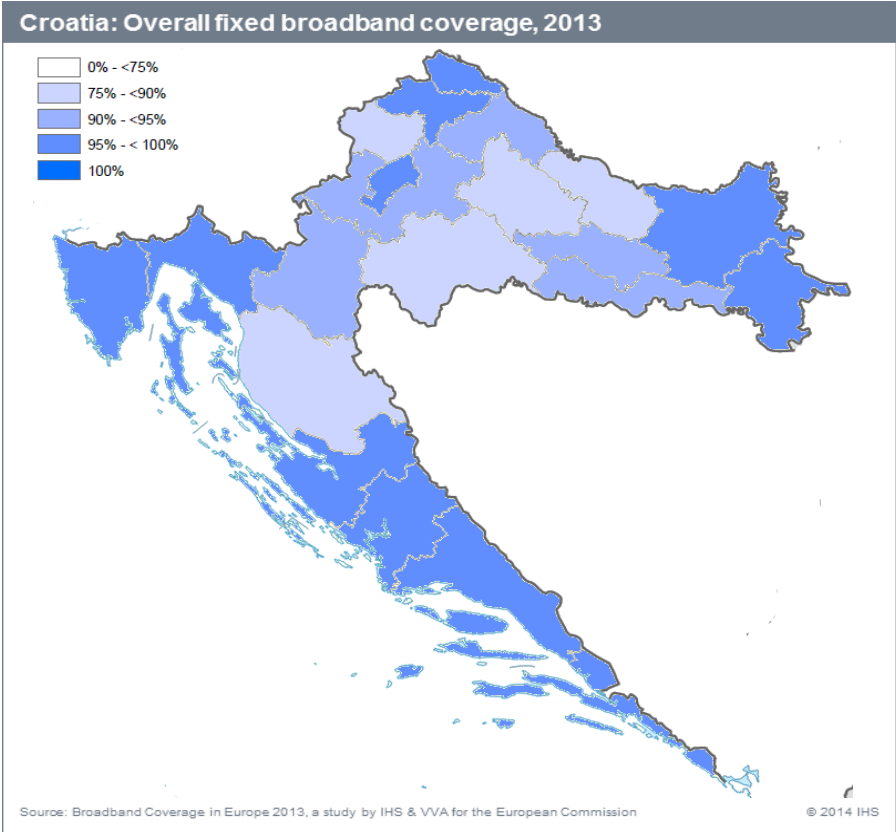


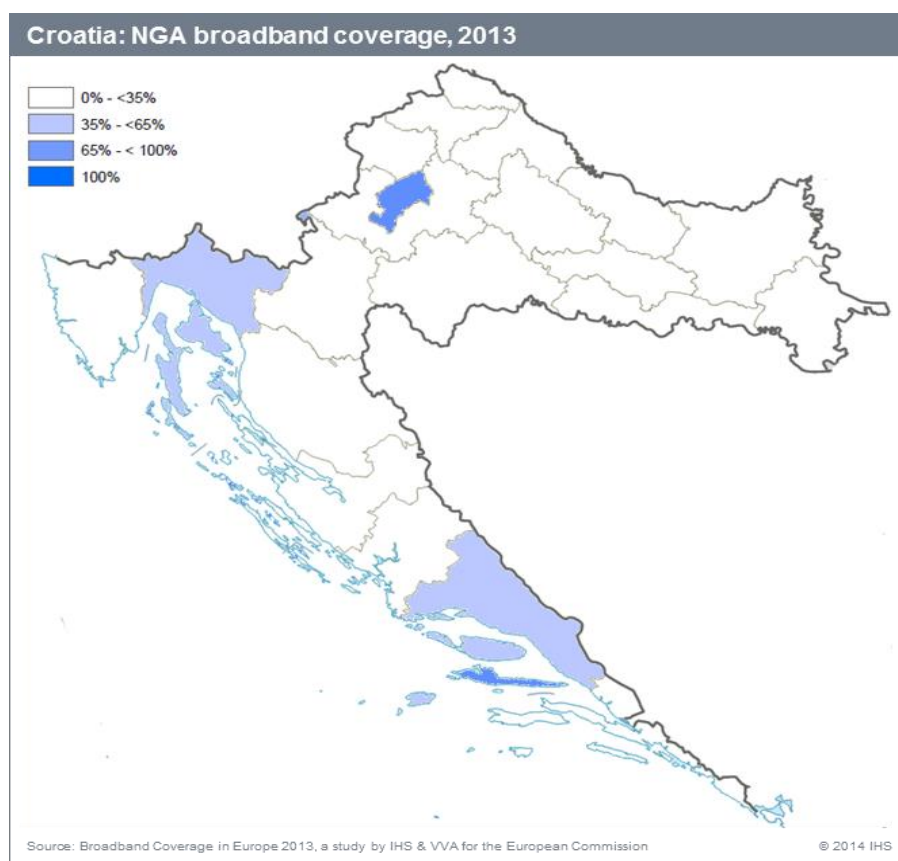
LTE coverage was recorded as having reached 24.4% at national level in Croatia in 2013, reflecting earlier rollouts from the main mobile telecommunications providers as Hrvatski Telekom and VIPNet launched LTE services in 2012.

In rural areas coverage via fixed NGA technologies (VDSL, FTTP and DOCSIS 3.0) remained low. LTE coverage improved by more than 2 percentage points, growing from 2.9% to 5.3% of rural households – although this remained below the EU rural average of 14.9%.



5.4.2 Regional coverage by broadband technology





5.4.3 Regulatory and market overview

The 'Strategy for Broadband Development in the Republic of Croatia 2012 – 2015' was published in 2011 by the Croatian government and defines the main policies for the development of broadband technologies nationally¹⁷.

Specific targets include 75% fixed coverage via basic broadband (greater than 2 Mbps) by end 2013 and 35% fixed coverage via broadband faster than 30 Mbps by end 2015. In addition, 90% of the population will have access to fixed or wireless broadband access (greater than 2 Mbps) by end 2013 and 50% will have fixed or wireless access via broadband faster than 30% by end 2015.

An alternative network operator, H1 Telekom announced the launch of VDSL2 services in 2013, offering headline speeds of up to 100Mbps¹⁸, depending on package selected.

In August 2014 the Croatian incumbent, Hrvatski Telekom announced a five year plan to outsource construction and upgrade of its telecommunications network to be capable of supporting next-generation fixed and mobile services¹⁹.

Both Hrvatski Telekom and VIPnet launched its commercial LTE network in 2012 and providing coverage in four main cities of Zagreb, Rijeka, Osijek and Split²⁰ and other parts of Croatia.

¹⁷ http://www.mppi.hr/UserDocsImages/w%20StrategyBB%205_12.pdf

¹⁸ www.vecernji.hr/kompanije-i-trzista/h1-telekom-prvi-u-hrvatskoj-predstavio-vdsl2-internet-uslugu-564347

¹⁹ <http://wire.seenews.com/news/hrvatski-telekom-ericsson-unit-sign-5-yr-managed-services-deal-434832>

²⁰ <http://www.itu.int/ITU-D/ict/newslog/Hrvatski+Telekom+Launches+Commercial+LTE+In+Croatia.aspx>

5.4.4 Data tables for Croatia

Statistic	National
Population	4,398,150
Persons per household	2.8
Rural proportion	22.3%

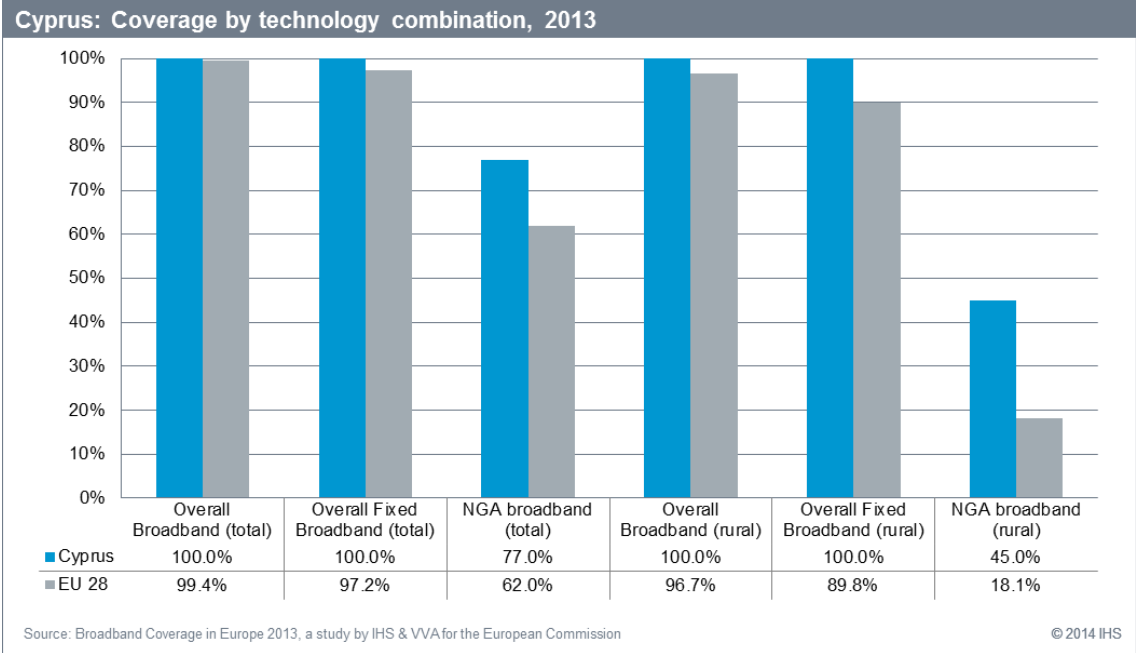
Technology	Croatia 2013		Croatia 2012		Croatia 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	94.3%	74.3%	94.1%	73.8%	n/a	n/a	93.5%	82.3%
VDSL	16.8%	0.0%	15.9%	0.0%	n/a	n/a	31.2%	11.1%
FTTP	6.9%	0.0%	6.2%	0.0%	n/a	n/a	14.5%	4.2%
WiMAX	0.1%	0.2%	0.0%	0.3%	n/a	n/a	19.7%	17.6%
Cable	28.4%	4.6%	19.6%	0.0%	n/a	n/a	43.0%	7.8%
DOCIS 3.0	19.0%	0.0%	0.0%	0.0%	n/a	n/a	41.6%	7.0%
HSPA	94.1%	69.9%	93.1%	69.7%	n/a	n/a	97.1%	85.5%
LTE	24.4%	5.3%	25.0%	2.9%	n/a	n/a	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	n/a	n/a	99.3%	99.3%
Overall broadband	97.6%	87.2%	97.5%	88.8%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	97.1%	76.8%	94.1%	73.9%	n/a	n/a	97.2%	89.8%
NGA broadband	33.3%	0.0%	19.1%	0.0%	n/a	n/a	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

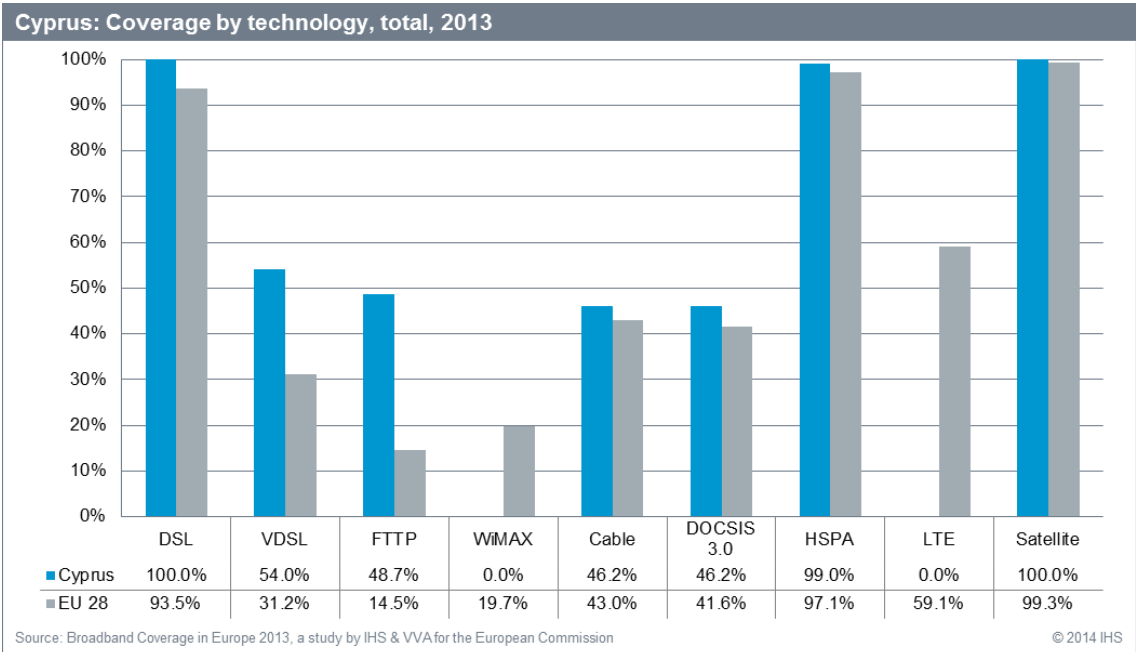
5.5 Cyprus

5.5.1 National coverage by broadband technology

In 2013, Cyprus confirmed its previous strong performance with regards to overall broadband access, reaching 100% coverage for overall broadband and fixed broadband combinations at rural and national levels. NGA coverage was reported to be higher than the European average, improving by 3.9 percentage points in the year and reaching 77.0% of households by year-end.



During the year, FTTP coverage data indicated solid improvements, increasing from 0% reported in 2012 to 48.7% in 2013, substantially above the EU average (14.5%). VDSL coverage also increased marginally during the year, growing by two percentage points from 52.0% to 54.0% by year-end 2013.

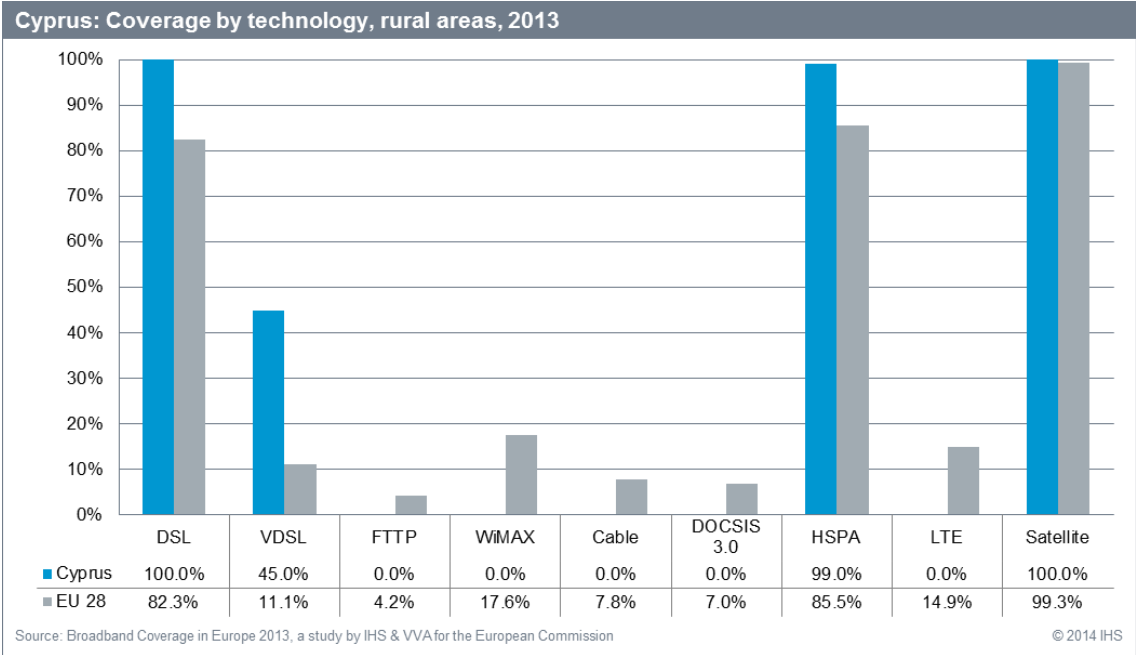


As in 2012, basic DSL coverage was registered at 100% of households.

Despite strong fixed NGA results in 2013, LTE coverage still registered as absent in 2013 – although 4G licenses have now been awarded to telecoms groups including ex-MVNO PrimeTel²¹. Other companies including CYTA and MTN also plan to launch LTE services²².

In rural areas, limited changes were reported compared to the previous year, aside from an increase in HSPA coverage, which improved by 7 percentage points reaching 99% of rural homes.

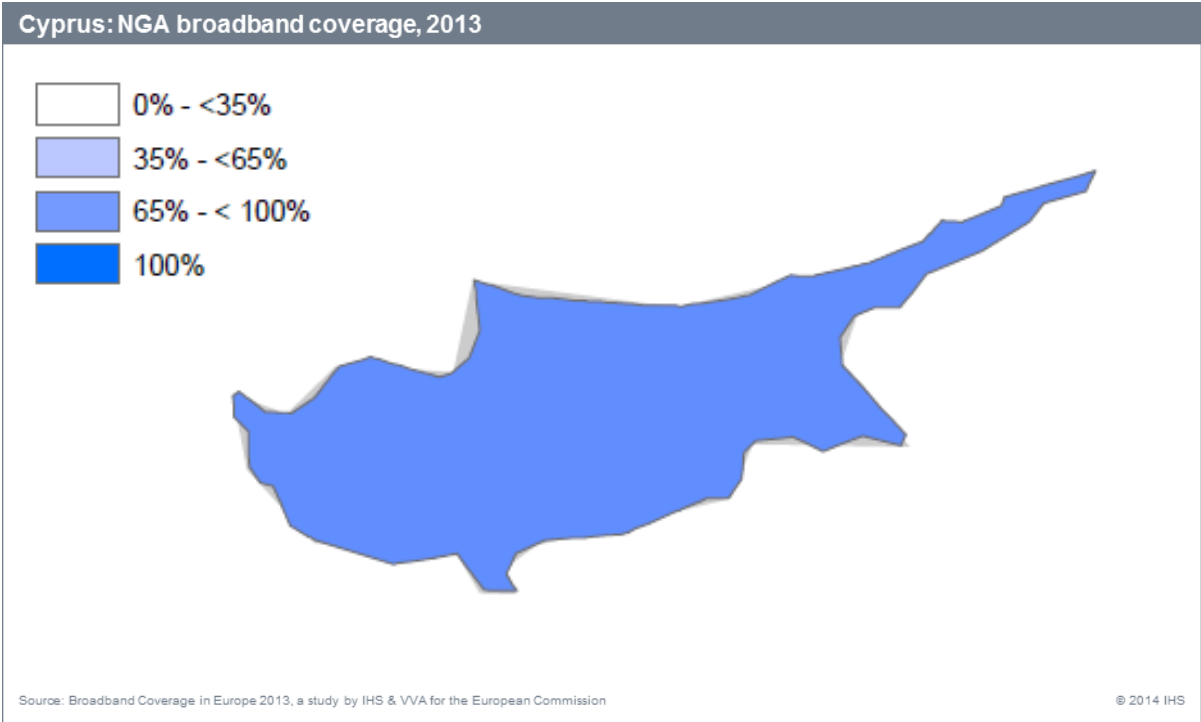
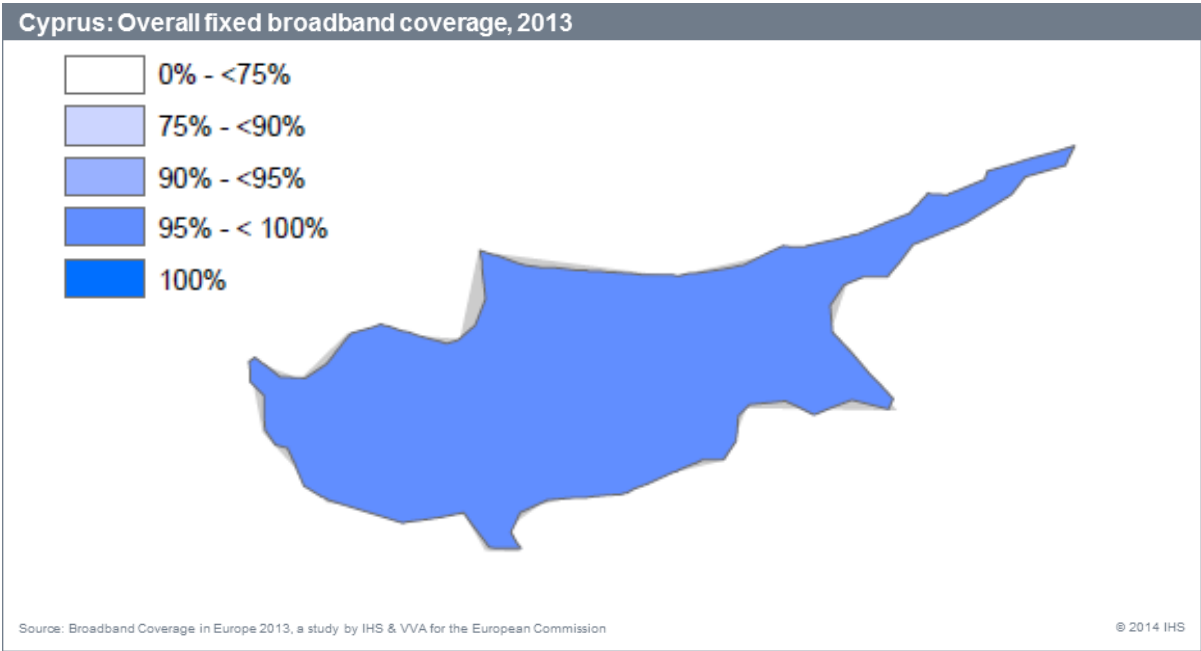
FTTP, WiMAX, standard cable, DOCSIS 3.0 and LTE coverage data were recorded to negligible in rural areas in 2013, and VDSL coverage of 45% showed no change from 2012.



²¹ <http://cyprus-mail.com/2014/02/10/primetel-secures-licence-for-4g-network/>

²² <http://itemaps.org/home/country/cyprus>

5.5.2 Regional coverage by broadband technology



5.5.3 Regulatory and market overview

The “Digital Strategy for Cyprus” was published in 2012 and it sets the objectives and the measures to reach them from 2012 to 2020. The main goals of the strategy are in line with EU-wide objectives, and include ensuring that all households and businesses have access to the Internet with at least 30 Mbps by 2020, and that 50% of households and businesses have access to 100Mbps speeds.

Given the complete availability of basic fixed broadband services, focus in Cyprus has primarily surrounded the provisioning of the next-generation access services required to meet the objectives. To-date, the most significant advances have been made via fixed technologies. Telecoms group CYTA began to roll out VDSL2 services at the end of 2011, provisioning homes with advertised speeds of up to 32Mbps. In 2012, the company had drawn up plans to roll-out an FTTH project²³, which were further built upon through 2013. In addition, MTN, an alternative operator provides speeds of up to 50Mbps (as of September 2014) and finished upgrades to its network already in 2010.²⁴

CYTA’s VDSL rollout followed cable operator Cablenet’s launch of DOCSIS 3.0 services in 2010. Since July 2012, Cablenet offers speeds of up to 100Mbps downstream as part of triple-play (TV, telephony, broadband) packages²⁵.

Rural areas of Cyprus remain largely unaddressed by technologies beyond DSL and basic wireless HSPA and satellite broadband services. However, with LTE launches from operators expected within the next year²⁶, rural availability of higher speed broadband is likely to increase – beyond that caused by further rollout of VDSL services or other fixed technologies.

²³ https://www.cyta.com.cy/mp/informational/cyta_htmlIPages/media_center/annualreports/docs/Annual_Report_2012_en.pdf

²⁴ <http://www.mtn.com.cy/en/mtncyprus/>

²⁵ <http://cablenet.com.cy/home-services-2/cable-single-play/>

²⁶ <http://litemaps.org/home/operator/cyta-mobile-vodafone>

5.5.4 Data tables for Cyprus

Statistic	National
Population	862,011
Persons per household	2.8
Rural proportion	12.5%

Technology	Cyprus 2013		Cyprus 2012		Cyprus 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	93.5%	82.3%
VDSL	54.0%	45.0%	52.0%	45.0%	0.0%	0.0%	31.2%	11.1%
FTTP	48.7%	0.0%	0.0%	0.0%	0.0%	0.0%	14.5%	4.2%
WiMAX	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	19.7%	17.6%
Cable	46.2%	0.0%	47.4%	0.0%	45.9%	0.0%	43.0%	7.8%
DOCSIS 3.0	46.2%	0.0%	47.4%	0.0%	0.0%	0.0%	41.6%	7.0%
HSPA	99.0%	99.0%	99.0%	92.0%	99.0%	92.0%	97.1%	85.5%
LTE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	100.0%	100.0%	100.0%	100.0%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	97.2%	89.8%
NGA broadband	77.0%	45.0%	73.1%	45.0%	0.0%	0.0%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

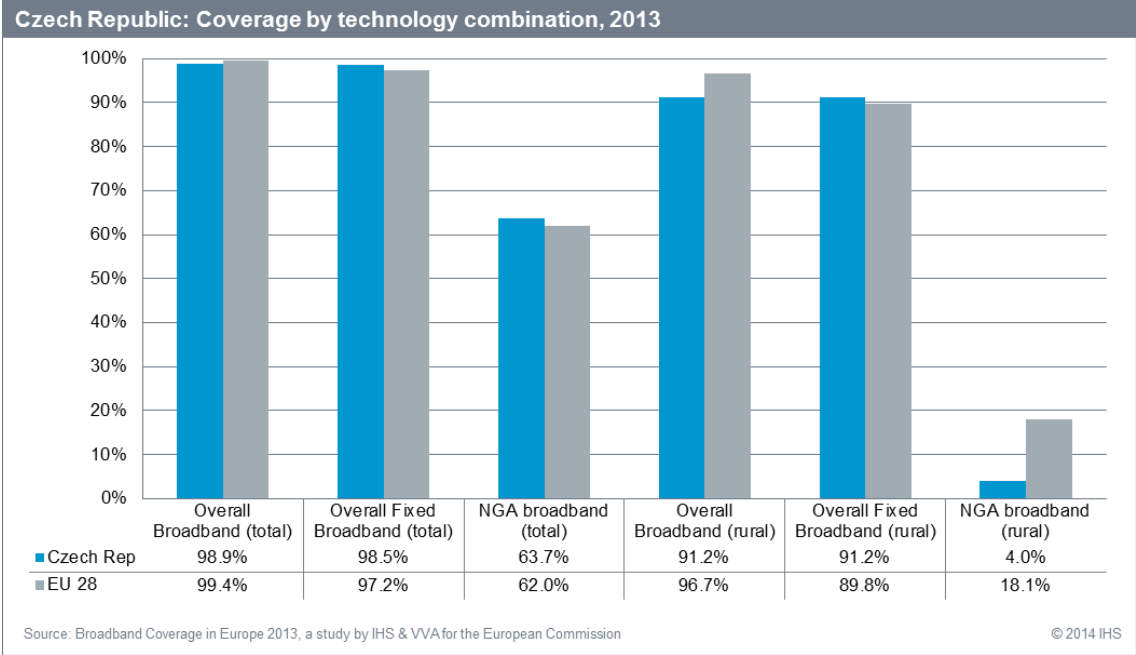
5.6 Czech Republic

5.6.1 National coverage by broadband technology

Compared to 2012, broadband coverage in Czech Republic registered improvement both across the country as a whole as well as in rural areas. In particular total NGA coverage recorded a significant increase, growing from 49.3% homes passed in 2012 to nearly 64% of Czech households having access to at least one NGA technology in 2013. In rural areas, NGA coverage also increased, albeit less dramatically, reaching 4.0% of rural homes, up from 1.5% in the previous year.

Overall broadband coverage improved in particular in rural areas, increasing from 88.0% of rural homes passed in 2012 to 91.2% in 2013. This is mostly due to progress in rural HSPA coverage, which helped to boost broadband coverage in those rural areas across which fixed technologies were not available.

When compared to the EU as a whole, Czech Republic performed better than the EU average in both total and rural fixed broadband coverage and in total NGA broadband coverage.



The fact that Czech Republic reached higher fixed broadband coverage than the EU average can be explained by the traditionally strong presence of DSL networks across the country. In 2013, DSL technology passed 97.0% of Czech homes compared to the nearly 94% of EU households.

Cable coverage in the Czech Republic is largely limited to urban areas with most big cities already passed by cable networks. As a consequence, cable coverage remained largely unchanged compared to 2012.

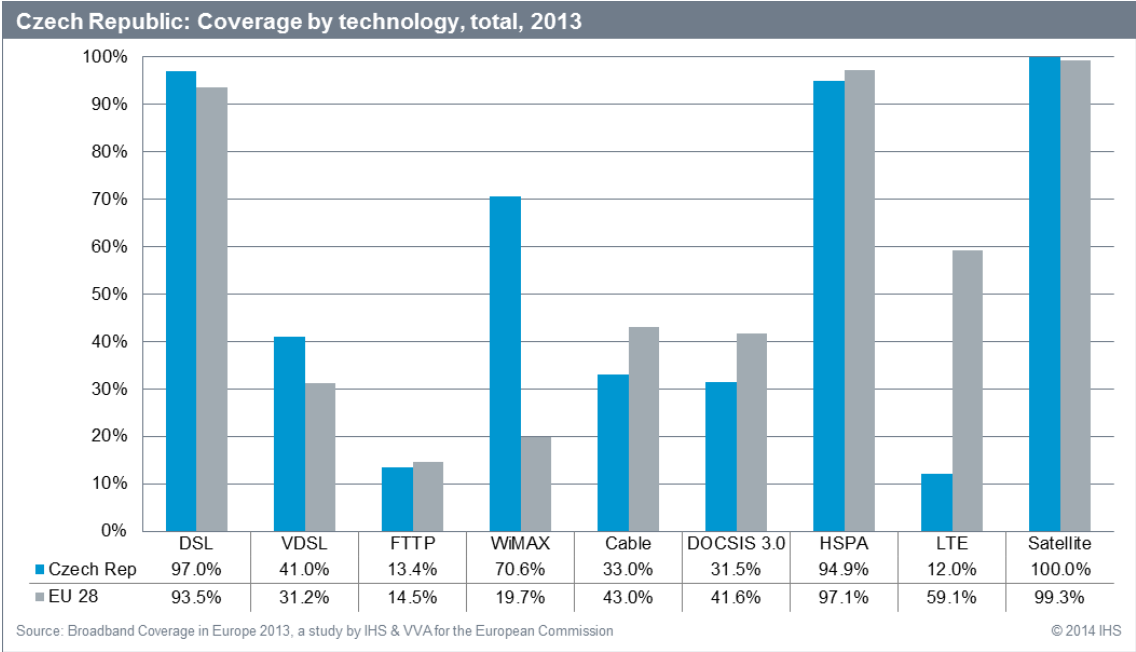
Progress in VDSL rollout, carried out by the incumbent Telefonica O2, resulted in Czech Republic reaching level of total NGA broadband coverage above the EU average. Total VDSL coverage increased by 16 percentage points compared to 2012. Minor improvements were also registered in terms of total FTTP and DOCSIS 3.0 coverage, however both of

these increases were less than 1.5 percentage points and thus did not have much impact on the total NGA coverage increase.

One specific aspect of the Czech broadband market is a large number of small local WiMAX providers. Conversations with local ISPs’ representatives and a discovery of an online database of WiMAX providers with information on addressable users resulted in much higher level of WiMAX coverage than those reported in the previous years of the study. Based on this new data, total WiMAX coverage in Czech Republic was determined to be reaching over 70% of Czech households at the end of 2013.

Despite certain improvements in mobile broadband coverage, both HSPA and LTE coverage remained below the EU average. Especially LTE coverage showed a large gap compared to the EU average (12.0% in Czech Republic, as opposed to an average of 59.1% across the EU 28).

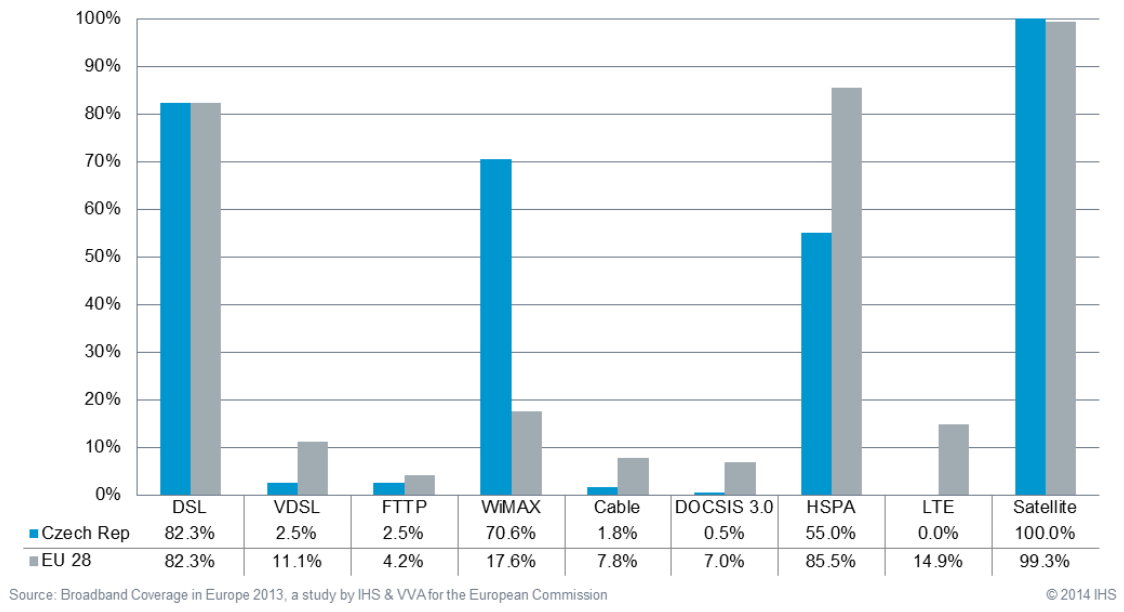
The continued low level of LTE coverage was partly caused by a failure of spectrum auction in March 2013 after bids rose three-fold on the reserve price raising worries that such high sums would hamper operators’ efforts to roll out LTE, and leading them to attempts to offset investment losses by imposing higher charges on end users.²⁷ The Czech NRA therefore decided to cancel the original tender and launch a revised frequency auction at the end of 2013 with spectrum awards expected in early 2014.



In rural areas, year-on-year improvements were reported for almost all the technologies included in the study. Rural HSPA coverage recorded highest increase (six percentage points) compared to 2012 as mobile operators started to extend their HSPA network rollout beyond the already covered urban and semi-urban areas.

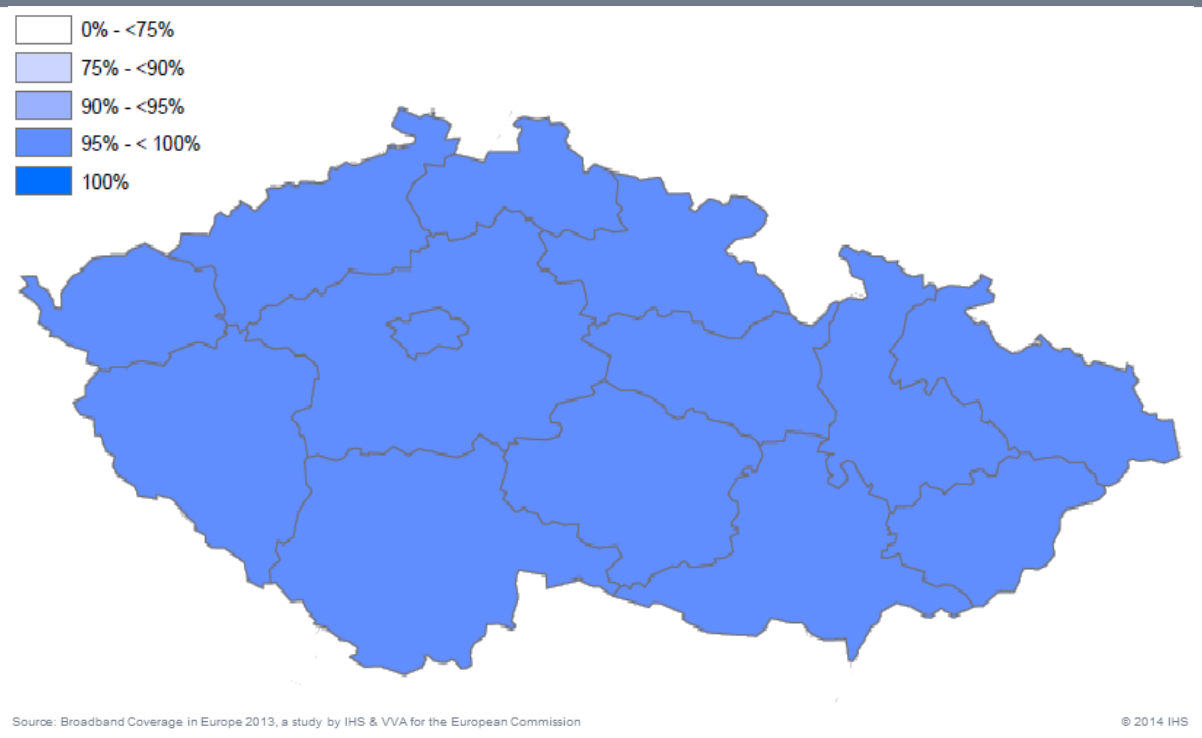
²⁷ <http://www.telegeography.com/products/commsupdate/articles/2013/08/28/ctu-relaunches-4g-mobile-frequencies-auction/>

Czech Republic: Coverage by technology, rural areas, 2013

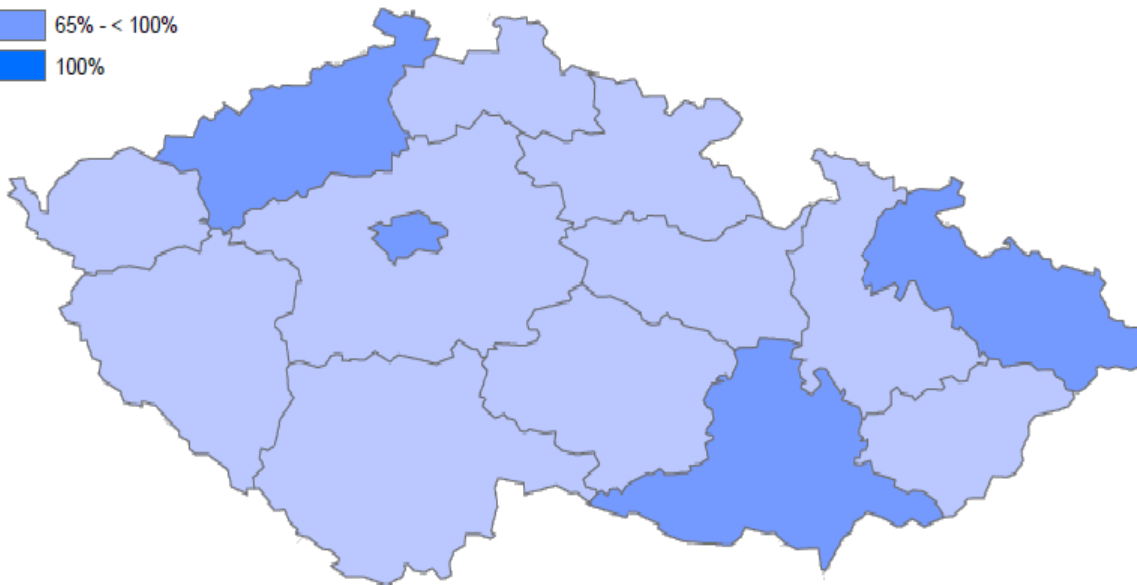
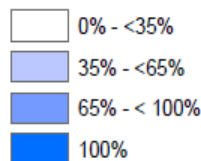


5.6.2 Regional coverage by broadband technology

Czech Republic: Overall fixed broadband coverage, 2013



Czech Republic: NGA broadband coverage, 2013



Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

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5.6.3 Regulatory and market overview

The Czech Republic's current national broadband strategy "Digital Czech Republic 2.0" was announced in 2013 as an updated version of a 2011 initiative. The strategy's main goals are generally in line with the Digital Agenda's targets of universal 30 Mbps coverage and 100 Mbps coverage of 50% of households by 2020.

The Czech broadband market is largely dominated by competition between the incumbent, Telefonica O2, and cable operators led by Liberty Global-backed UPC. Telefonica O2 launched VDSL upgrades of its network in 2011, primarily focused on migration of customers in key urban areas in order to compete with high-speed DOCSIS 3.0 services offered by cable operators.

FTTP deployments are limited to smaller and local-based network providers such as Rio Media (also a cable network operator) or Smart Comp Net, active in selected cities across the country.²⁸

As mentioned above, LTE rollout has been delayed due to the repeated frequency auction held in November 2013. The Czech NRA hoped the conditions of the new tender would attract a fourth operator apart from Telefonica, Vodafone and T-Mobile to enter into the market to increase competition and ultimately drive down prices of mobile broadband services. However, in the end only the three established operators were awarded LTE licences.

²⁸ <http://www.internetprovsechny.cz/stav-broadbandu-v-cr-aneb-zaostreno-na-optiku/>

5.6.4 Data tables for Czech Republic

Statistic	National
Population	10,509,286
Persons per household	2,4
Rural proportion	14.2%

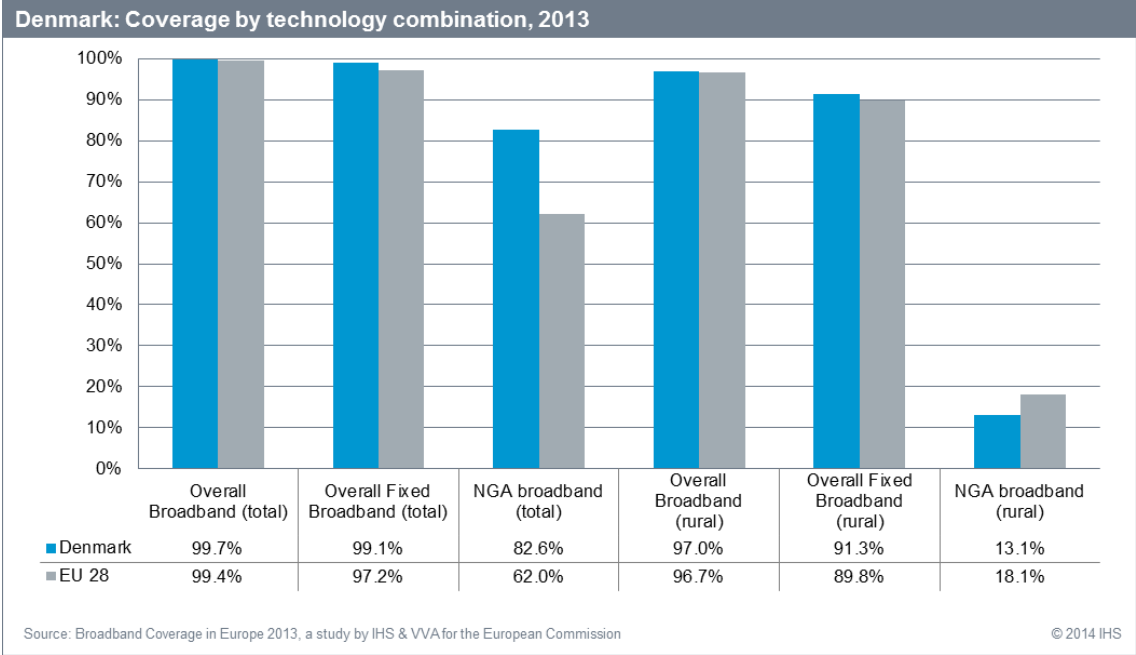
Technology	Czech Rep. 2013		Czech Rep. 2012		Czech Rep. 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	97.0%	82.3%	97.0%	78.9%	92.0%	45.5%	93.5%	82.3%
VDSL	41.0%	2.5%	25.0%	0.0%	9.6%	0.0%	31.2%	11.1%
FTTP	13.4%	2.5%	12.2%	1.3%	11.3%	0.0%	14.5%	4.2%
WiMAX	70.6%	70.6%	17.7%	17.7%	17.7%	17.7%	19.7%	17.6%
Cable	33.0%	1.8%	33.1%	1.1%	32.8%	0.0%	43.0%	7.8%
DOCSIS 3.0	31.5%	0.5%	30.2%	0.2%	29.3%	0.0%	41.6%	7.0%
HSPA	94.9%	55.0%	92.3%	49.0%	90.0%	35.6%	97.1%	85.5%
LTE	12.0%	0.0%	9.9%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	98.9%	91.2%	98.3%	88.0%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	98.5%	91.2%	98.1%	86.8%	94.5%	55.5%	97.2%	89.8%
NGA broadband	63.7%	4.0%	49.3%	1.5%	40.3%	0.0%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

5.7 Denmark

5.7.1 National coverage by broadband technology

In 2013, Denmark was ahead of the European average in terms of overall broadband coverage and overall fixed broadband coverage. The overall NGA total for the market was also above average, at 82.6% (against 62.0% EU-wide) but rural NGA coverage was lower than the EU average, at 13.1% (against 18.1% EU-wide). However, compared to the previous year, rural NGA coverage had increased by 10 percentage points, illustrating Denmark’s commitment to increasing broadband coverage in rural areas.



Nationally, the two most widespread technologies continued to be HSPA and DSL, covering 99.1% and 98.2% respectively in 2013.

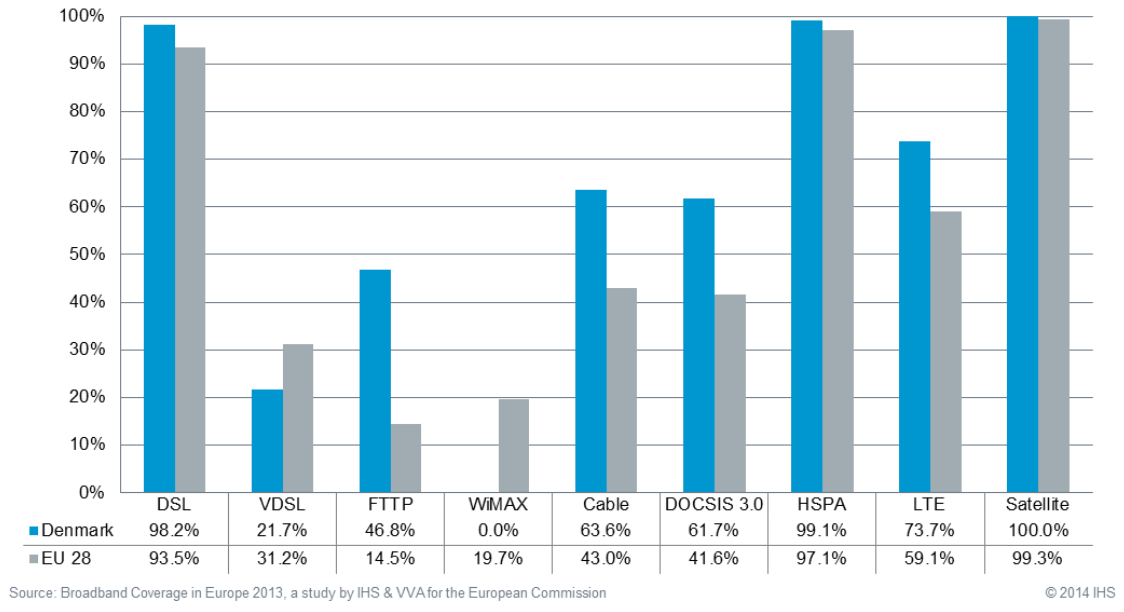
LTE coverage increased by more than 8 percentage points in 2013, reaching 73.7% of Danish homes. This market segment is currently experiencing fierce competition between the operators offering LTE services, namely Telia, TDC, Telenor and Hi3G via its Danish subsidiary Three Denmark.

The only technologies for which Denmark falls behind the European average at national level are WiMAX, which registered negligible coverage and VDSL with 21.7% coverage, compared to 31.2% across the EU28. Yet this is not surprising given the long term focus of Danish operators on FTTP rollout.

DOCSIS 3 cable broadband remains the key contributor to overall NGA coverage in Denmark however, reaching 61.7% of households at the end of 2013 – compared to FTTP (46.8%) and VDSL (21.7%). Cable companies including TDC-subsiary YouSee have now nearly completed their upgrades to DOCSIS 3.0 (97% of cable homes-passed are now DOCSIS 3.0 enabled). As of September 2014, YouSee was offering downstream speeds of up to 100Mbps on its DOCSIS 3.0 network²⁹.

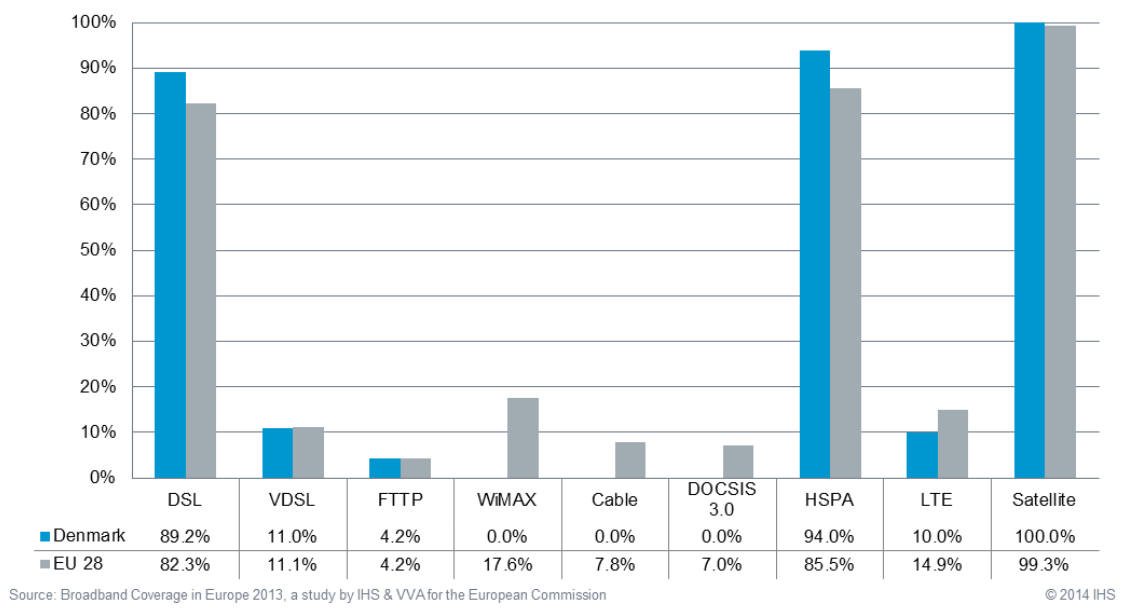
²⁹ <http://yousee.dk/Bredbaand/Overblik.aspx>

Denmark: Coverage by technology, total, 2013

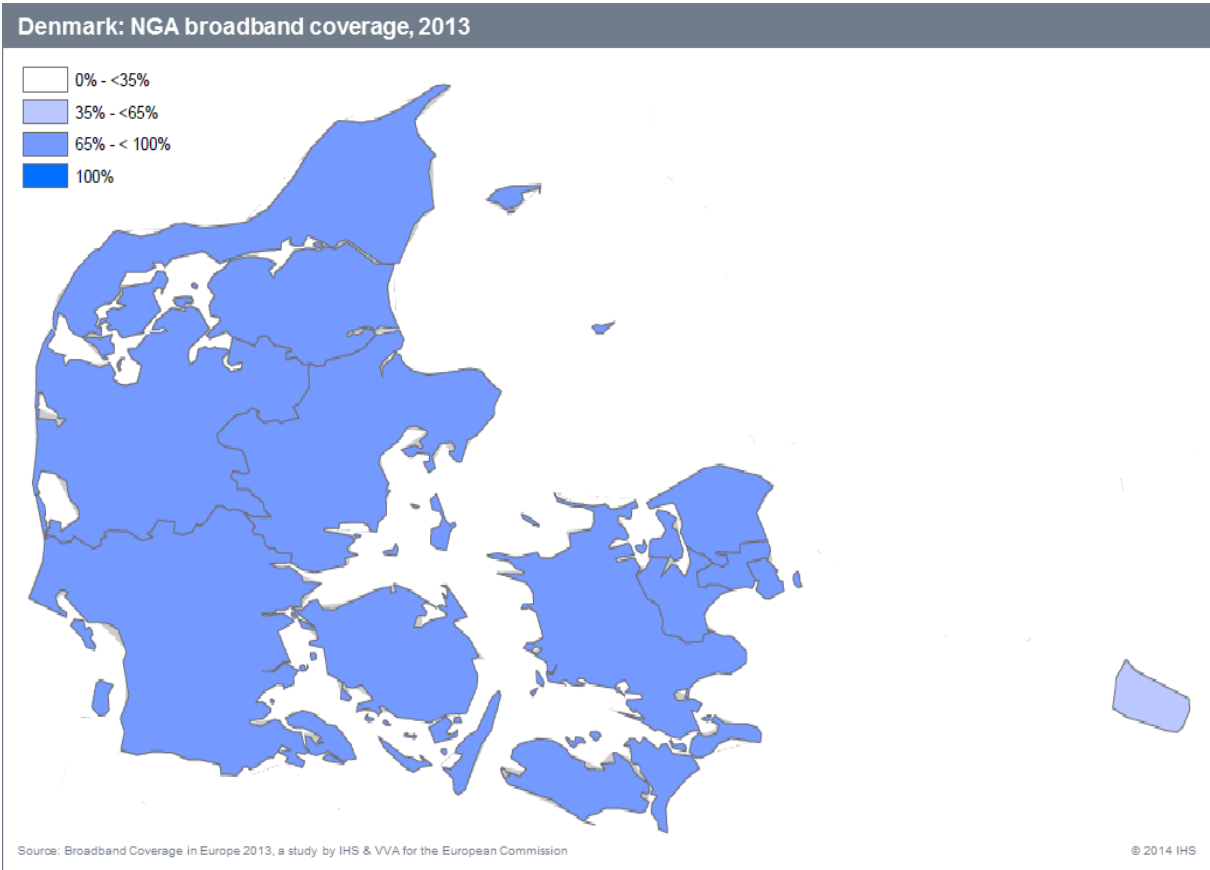
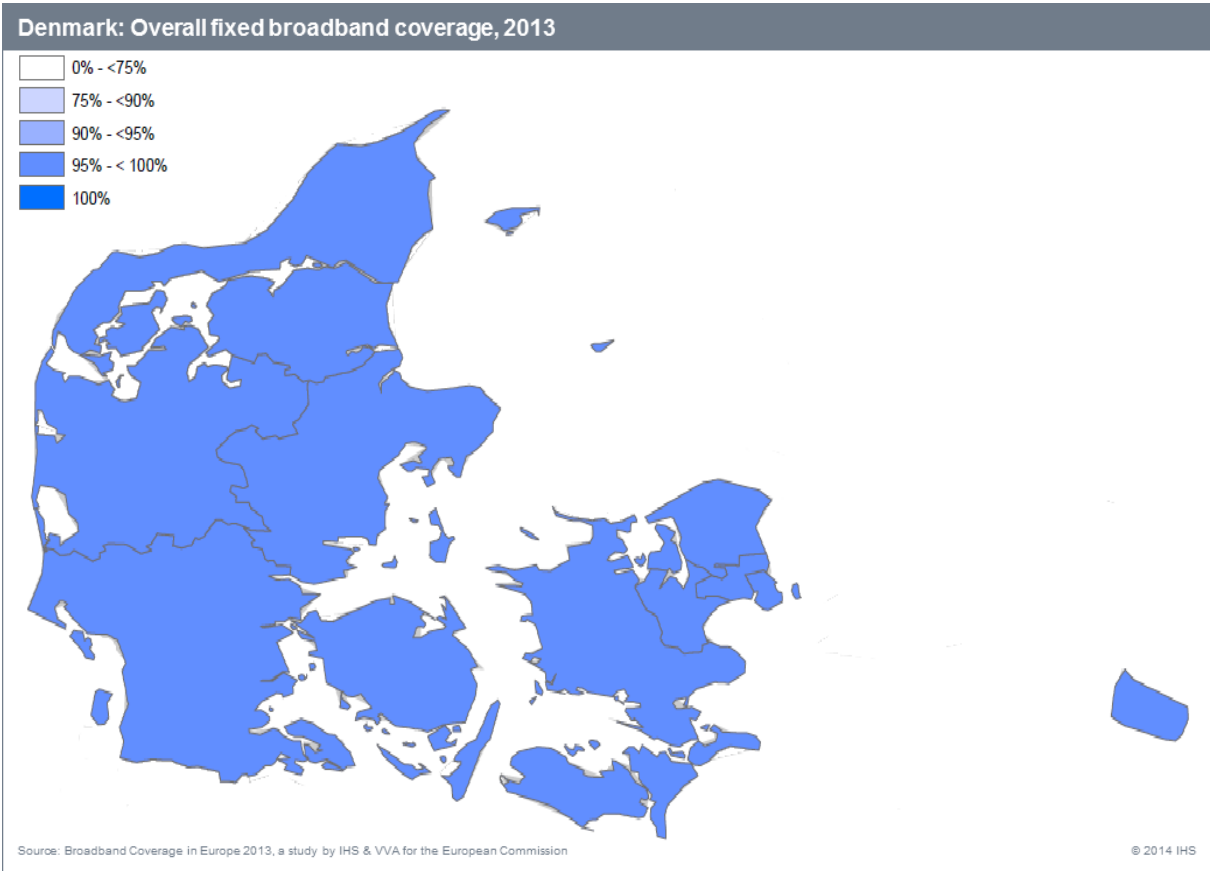


In rural areas LTE coverage has increased by almost 8 percentage points to 10% reflecting the rollout of LTE networks by the main mobile network operators. VDSL now has a presence in rural Denmark, increasing from 0% in 2012 to 11.0% in 2013, only marginally below the EU average of 11.1%.

Denmark: Coverage by technology, rural areas, 2013



5.7.2 Regional coverage by broadband technology



5.7.3 Regulatory and market overview

According to the Danish national broadband strategy published in 2013, the government has set the goal for all homes and businesses to have access to broadband services with speeds of at least 100 Mbps download and 30 Mbps upload by 2020.

In April 2014, the European Investment Bank (EIB) announced the provision of a SEK1.8 billion loan to Hi3G (Three Denmark) which it will use to upgrade, expand and construct its mobile networks in Sweden and Denmark. The investment will result in increased coverage and improved LTE services with peak download speeds up to 130 Mbps³⁰.

The EIB also announced that it would be investing EUR 500 million in an upgrade and network expansion project headed by TDC Denmark. The project, worth EUR 1 billion, will result in the provision of ultra-high speed fixed broadband services. The network rollout will include technologies such as FTTP, VDSL and DOCSIS 3.0. The project started in 2014 and will conclude in 2017³¹.

³⁰ <http://www.totaltele.com/view.aspx?ID=378136>

³¹ <http://www.eib.org/projects/pipeline/2013/20130457.htm>

5.7.4 Data tables for Denmark

Statistic	National
Population	5,580,516
Persons per household	2
Rural proportion	17.5%

Technology	Denmark 2013		Denmark 2012		Denmark 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	98.2%	89.2%	98.2%	89.0%	98.1%	88.8%	93.5%	82.3%
VDSL	21.7%	11.0%	20.7%	0.0%	19.9%	0.0%	31.2%	11.1%
FTTP	46.8%	4.2%	43.0%	3.0%	37.2%	0.0%	14.5%	4.2%
WiMAX	0.0%	0.0%	0.0%	0.0%	8.0%	9.6%	19.7%	17.6%
Cable	63.6%	0.0%	63.1%	0.0%	62.6%	0.0%	43.0%	7.8%
DOCSIS 3.0	61.7%	0.0%	60.2%	0.0%	54.4%	0.0%	41.6%	7.0%
HSPA	99.1%	94.0%	99.0%	94.0%	98.1%	89.3%	97.1%	85.5%
LTE	73.7%	10.0%	65.0%	2.2%	54.1%	0.8%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.7%	97.0%	99.7%	98.2%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	99.1%	91.3%	98.3%	89.9%	99.0%	93.3%	97.2%	89.8%
NGA broadband	82.6%	13.1%	73.2%	3.0%	61.9%	0.0%	62.0%	18.1%

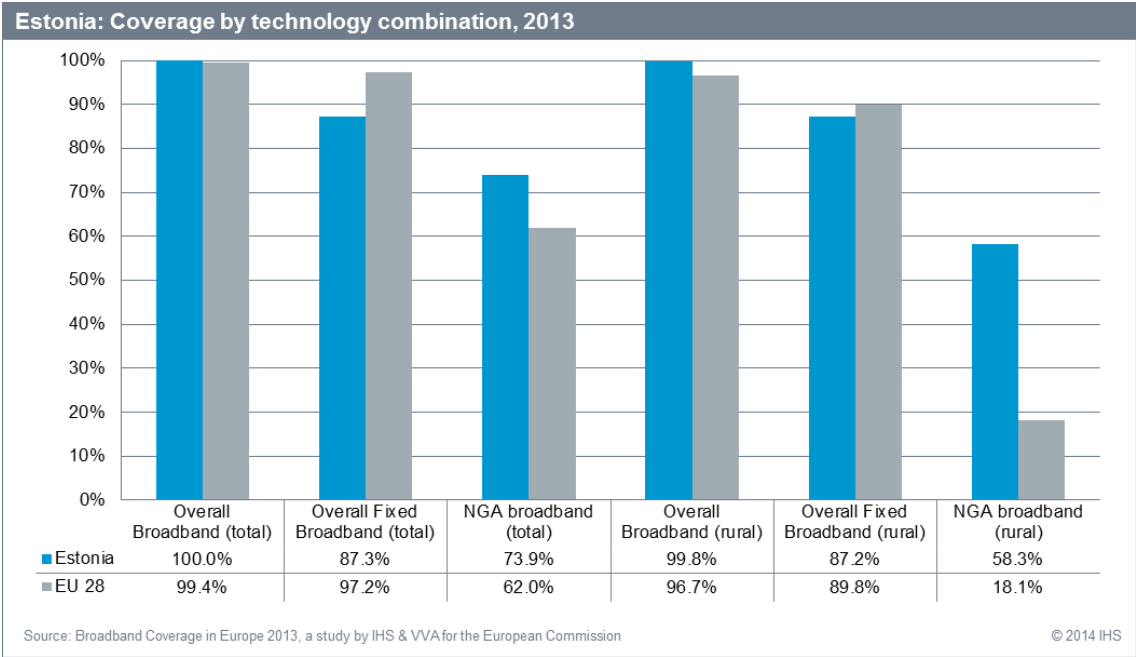
Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

5.8 Estonia

5.8.1 National coverage by broadband technology

Estonia saw notable improvements in all technology combinations in 2013. From a general point of view the country registered full coverage of overall broadband access, and NGA coverage increased by 12 percentage points to nearly 74% of homes, ending the year significantly above the European average.

But it is in rural areas that the main improvements were reported, with fixed broadband almost matching the EU average, increasing by 35.0% points in 2013 to reach 87.2% of rural homes. NGA coverage was recorded as showing the most significant growth, increasing from a near-total absence in rural areas in 2012 to 58.3% in 2013.



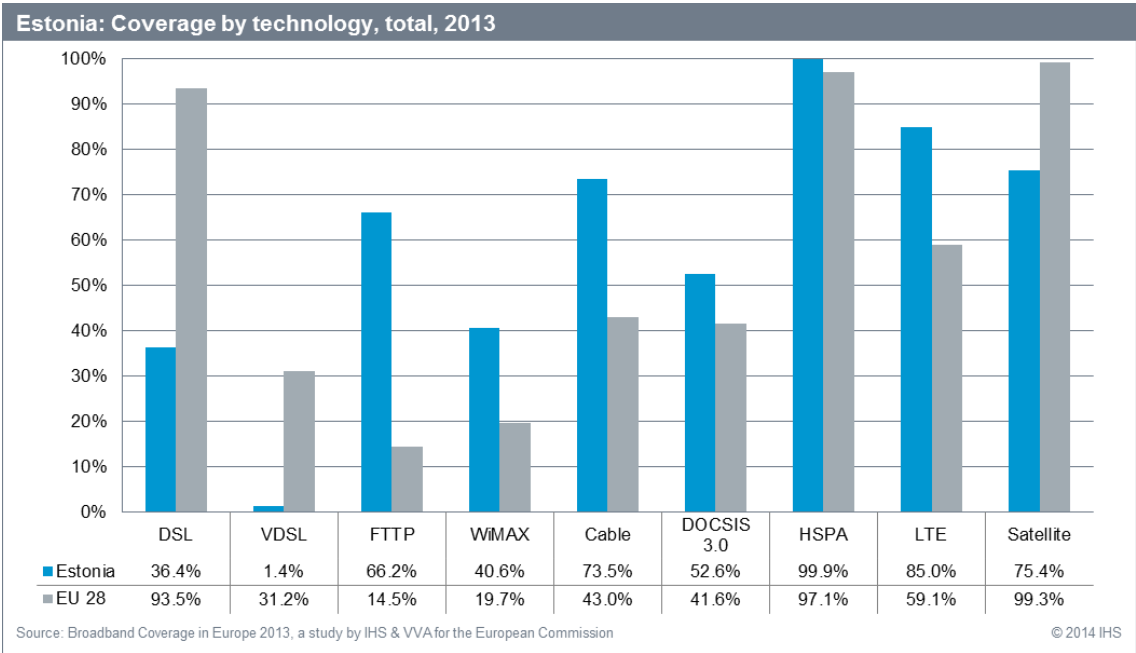
From a single technology perspective, the most significant results were reported for FTTP, HSPA and LTE.

FTTP coverage increased by 30.0 percentage points reaching in a total of 66.2% homes passed in 2013, above the European average for this technology. HSPA reached near-universal coverage of 99.9% of homes. With regard to LTE, Estonia already had an extensive network in 2012, which was improved further in 2013, reaching 85% coverage. Operator Elisa launched LTE services in 2013, joining EMT and Tele2, which had launched services in 2010 and 2012 respectively.

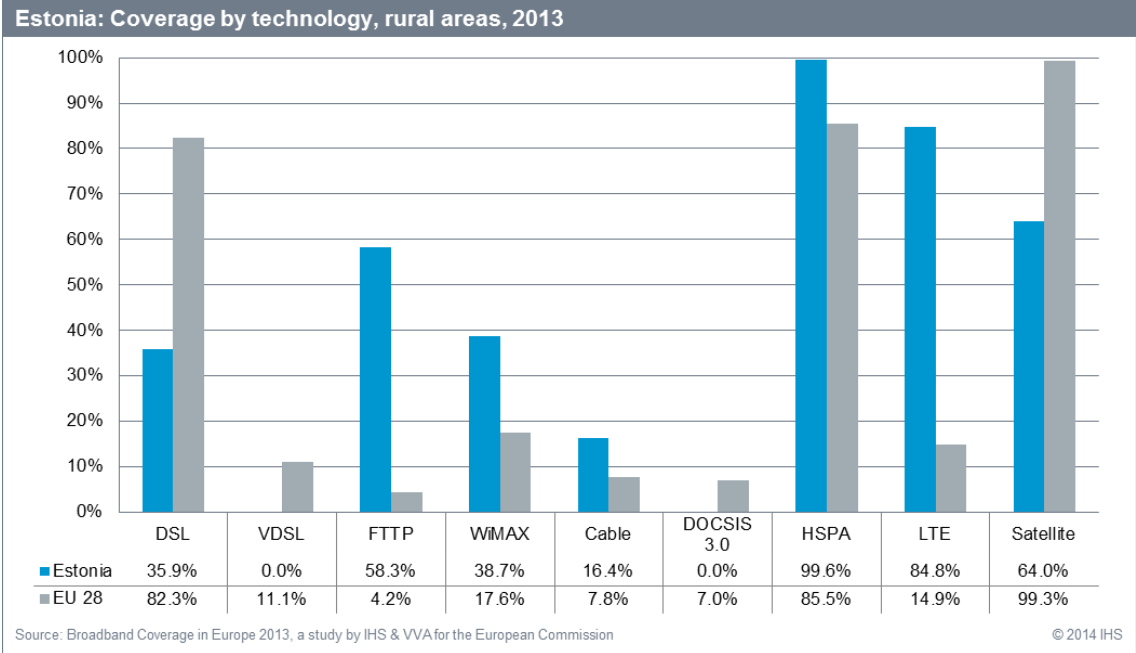
DSL coverage in Estonia is low compared to the European average, which reflects the rollout of FTTP networks by the major telecoms groups in favour of DSL-based technologies. DOCSIS 3.0 coverage (largest operators including Starman and STV) ended 2013 at just over half of households – 20 percentage points short of overall national cable broadband coverage.

Satellite, which was completely absent in the previous year, was reported to have improved dramatically in 2013, reaching 75.4% coverage. Estonia, Latvia and Lithuania remain only partially addressed by satellite broadband services – with significant limitations on

addressable market in a number of areas due to the orbital slots of the relevant satellites and the subsequent local requirements for larger dishes to receive the satellite signals.

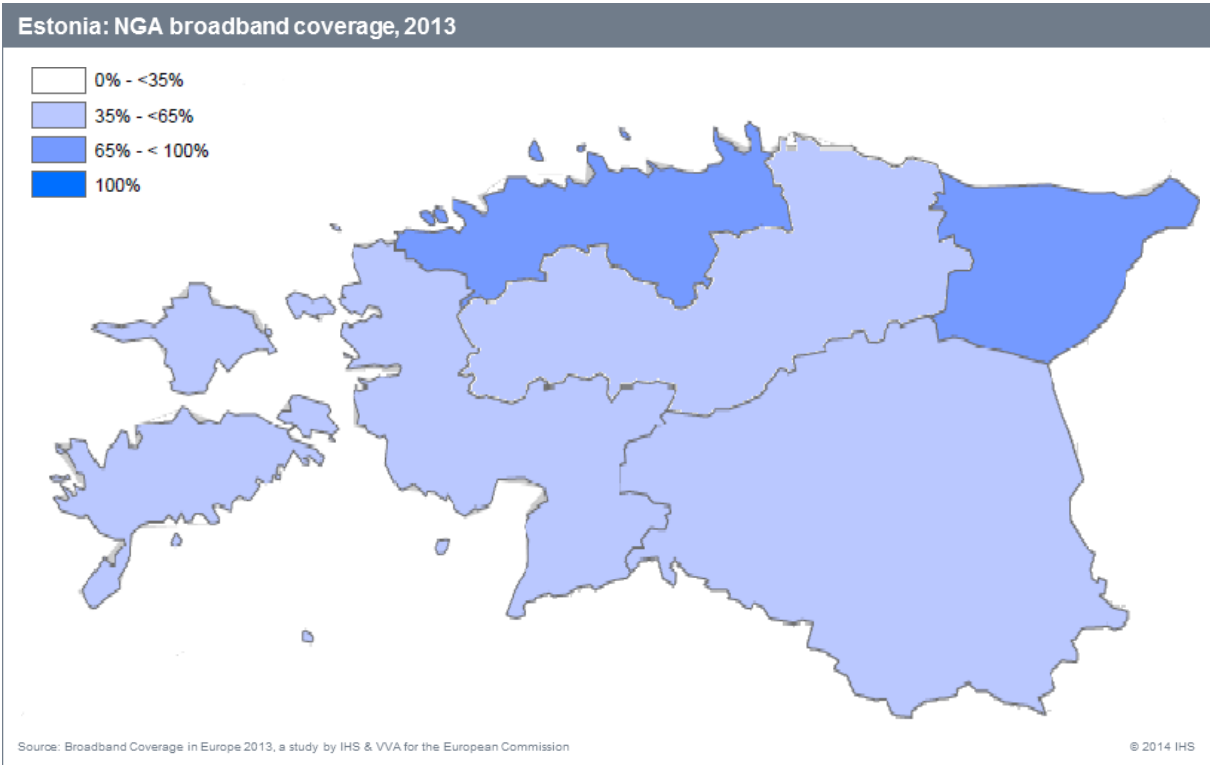
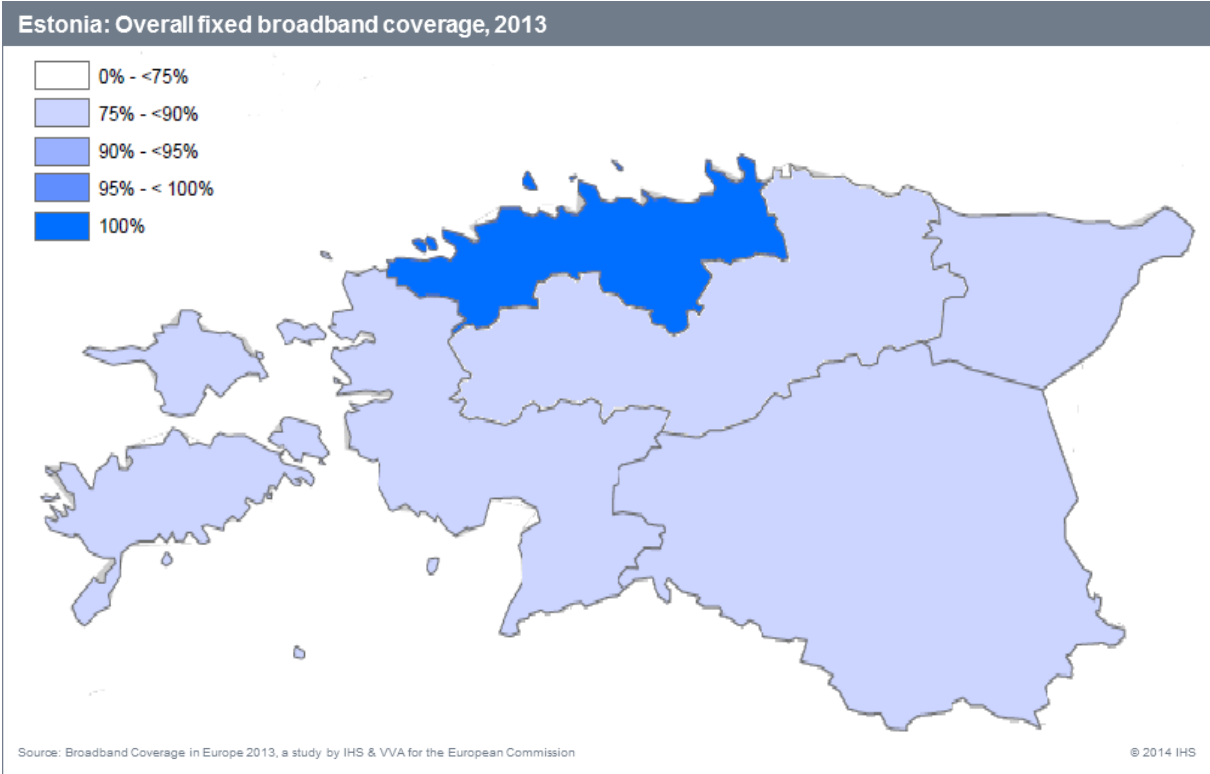


In rural areas Estonia’s performance improved still further during 2013. DSL coverage increased to 36.4%, although this was still below the European average. FTTP technology coverage increased from negligible levels in 2012 to 58.3% of homes during 2013, one of the strongest results in Europe for rural access to an NGA technology.



HSPA coverage reached near complete coverage in 2013, with 99.6% of rural areas now covered by this technology, above the EU 28 average. LTE coverage also improved, increasing by more than 50 percentage points year-on-year, reaching 84.8% in 2013, above the European average. As at national level, satellite broadband coverage is only partial in Estonia.

5.8.2 Regional coverage by broadband technology



5.8.3 Regulatory and market overview

The national strategy for broadband roll-out in Estonia was published in 2009. The objective of the programme is to bridge the digital gap between urban and rural areas by developing NGA infrastructure in rural areas.

The general aim is to have all residential houses, businesses and authorities connected, or potentially connected, to NGA infrastructure by 2015 and, depending on the access technology, achieve speeds of up to 100 Mbit/s downstream. The three-phase strategy aims to cover basic fibre optic infrastructure deployment, equipment provisioning and lastly build-out of networks in areas, which commercial deployments have failed to cover.

The Estonian market features an unusually high FTTP penetration compared to most other European markets, reflecting both the government strategy and telecoms group approach with regards to next-generation access – largely forgoing VDSL in favour of FTTP.

Three of the largest communications brands in Estonia – EMT, Elion and Eesti Telekom signed a merger agreement in 2014, and have also indicated that they intend to increase accessible downstream speeds to 300Mbps in areas covered by EMT 4G and Elion fibre deployments³².

³² <https://www.telekom.ee/en/uudised/-/uudisvoog/uudis/8648417>

5.8.4 Data tables for Estonia

Statistic	National
Population	1,320,174
Persons per household	2.3
Rural proportion	21.7%

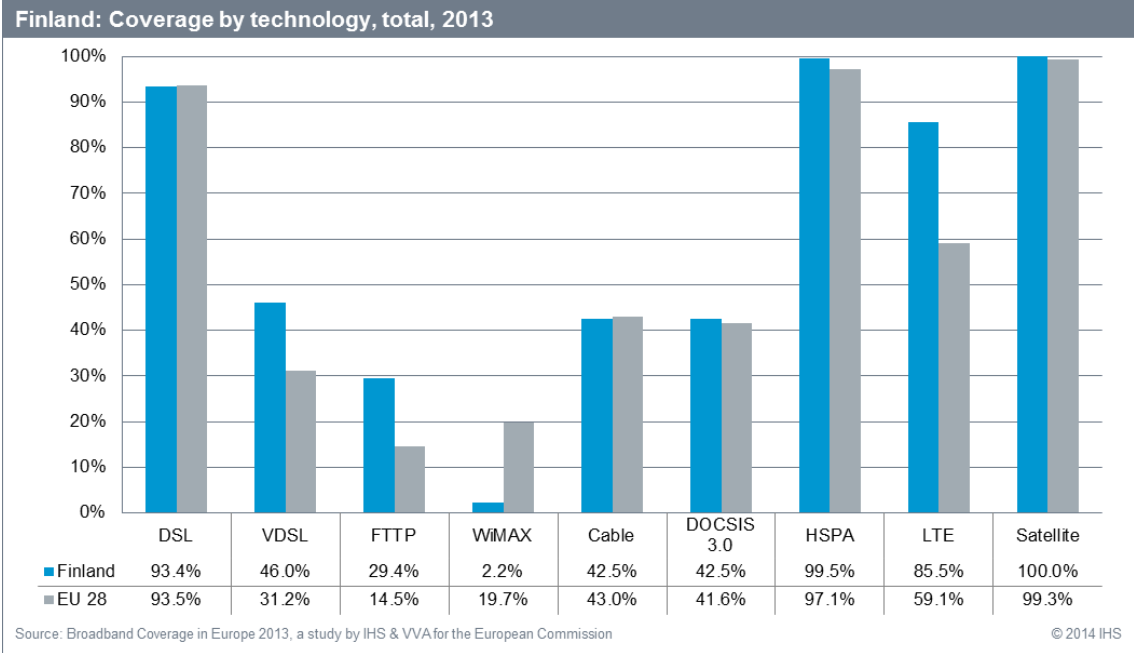
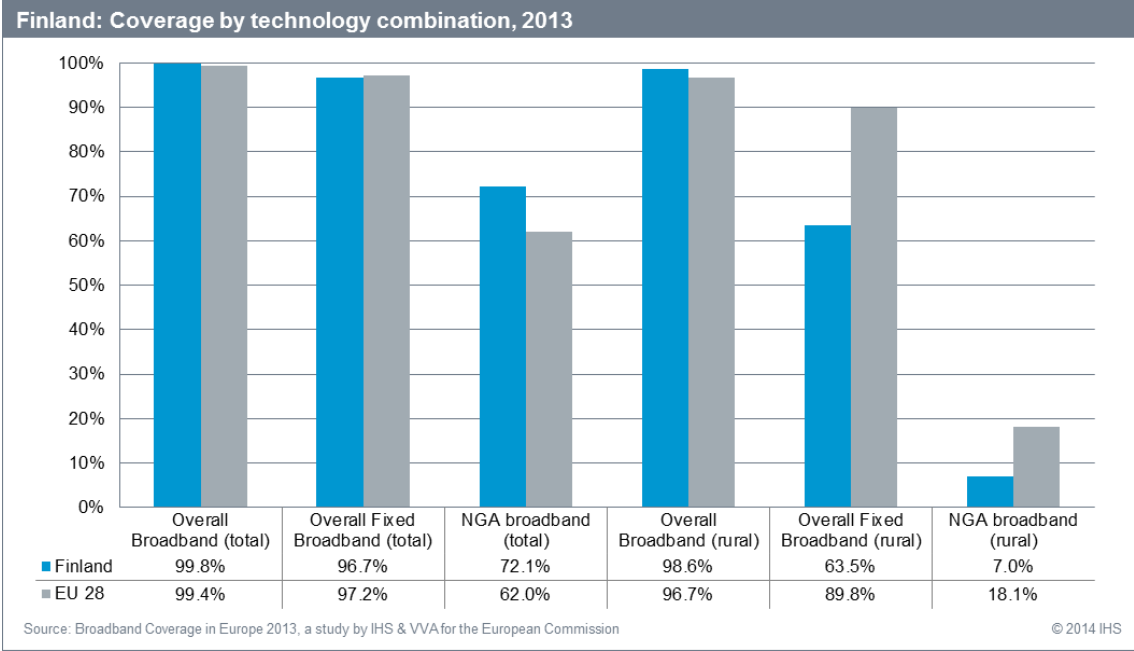
Technology	Estonia 2013		Estonia 2012		Estonia 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	36.4%	35.9%	39.3%	16.2%	38.5%	16.1%	93.5%	82.3%
VDSL	1.4%	0.0%	0.6%	0.0%	2.4%	1.4%	31.2%	11.1%
FTTP	66.2%	58.3%	36.2%	0.0%	30.7%	0.0%	14.5%	4.2%
WiMAX	40.6%	38.7%	40.0%	35.9%	40.0%	35.9%	19.7%	17.6%
Cable	73.5%	16.4%	71.6%	25.1%	71.5%	13.7%	43.0%	7.8%
DOCSIS 3.0	52.6%	0.0%	51.0%	0.0%	37.0%	0.0%	41.6%	7.0%
HSPA	99.9%	99.6%	87.0%	53.6%	87.0%	53.6%	97.1%	85.5%
LTE	85.0%	84.8%	70.0%	31.2%	70.0%	31.0%	59.1%	14.9%
Satellite	75.4%	64.0%	0.0%	0.0%	0.0%	0.0%	99.3%	99.3%
Overall broadband	100.0%	99.8%	96.4%	84.8%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	87.3%	87.2%	84.1%	52.2%	86.0%	50.4%	97.2%	89.8%
NGA broadband	73.9%	58.3%	61.0%	0.0%	52.1%	1.4%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

5.9 Finland

5.9.1 National coverage by broadband technology

Coverage in Finland was above average with respect to the national coverage combinations in 2013, but in rural areas only overall broadband coverage registered as above average. Rural coverage of fixed broadband and overall NGA increased by less than 1 percentage point apiece to 63.5% and 7.0% respectively. The biggest change was in national overall NGA coverage, which was up by more than 6 percentage points to 72.1%.

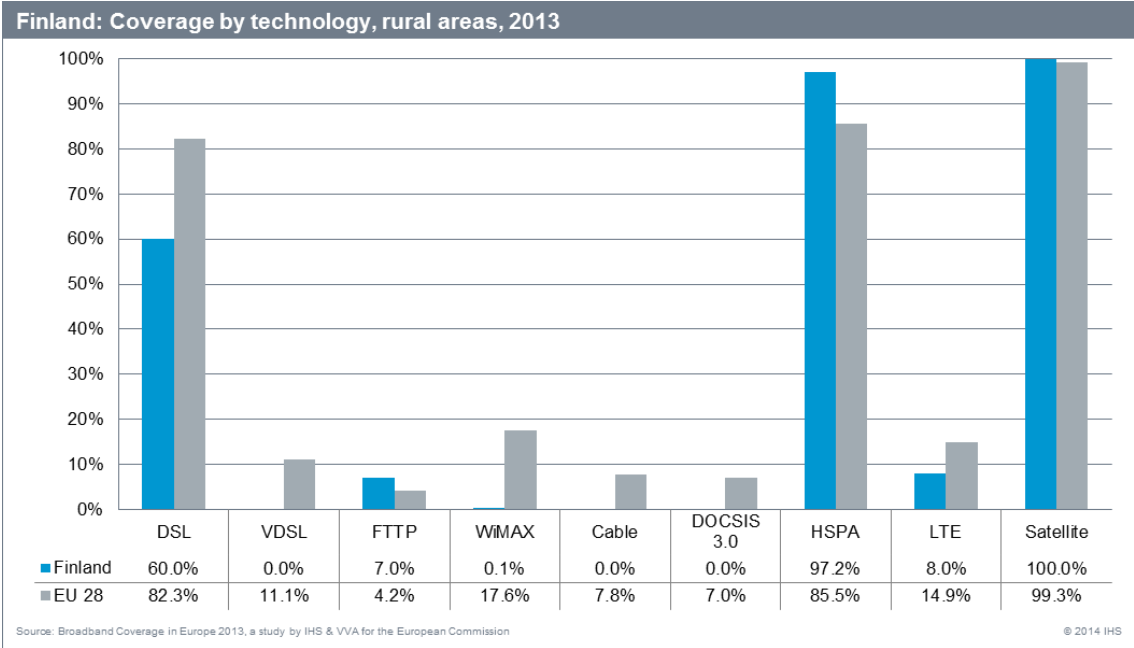


When addressing coverage by technology, there was a significant change in LTE coverage, which rose from 68.5% to 85.5%. LTE coverage in Finland is now more than 26 percentage

points above the EU average of 59.1%. Operators TeliaSonera, Elisa and DNA launched LTE services between 2010 and 2011³³ and have been expanding coverage.

DOCSIS 3.0 upgrades are now complete in Finland, with 100% of cable broadband homes passed capable of delivering broadband services via the technology at the end of 2013. With 42.5% of homes passed by DOCSIS 3.0, the technology is the second-most significant contributor to NGA coverage, lying just behind VDSL (at 46% of homes) at year end 2013. Cable groups including DNA are now offering connections (as of September 2014) of speeds up to 350Mbps³⁴.

Rural coverage of NGA technologies in Finland remained low at the end of 2013, at just 7% of homes. The absence of DOCSIS 3.0 and VDSL connections in such areas leaves FTTP services as the sole contributor to rural NGA access. FTTP in rural areas increased marginally from 6.6% to 7% in 2013.

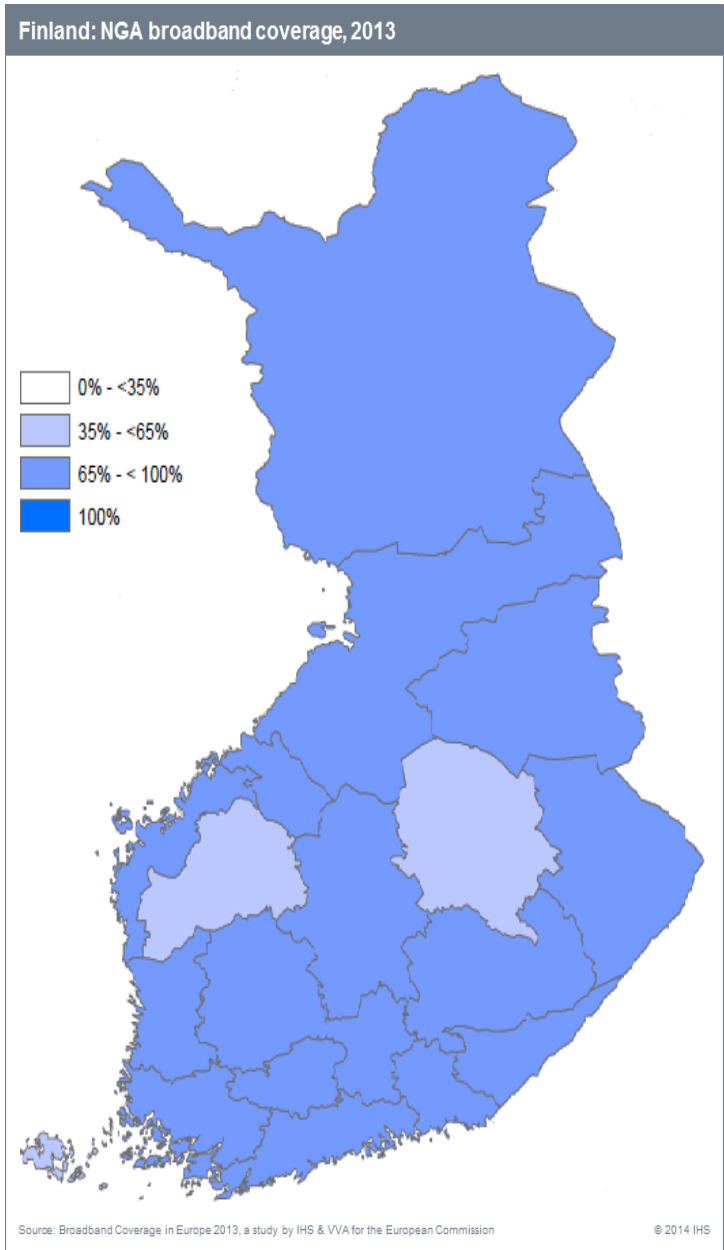
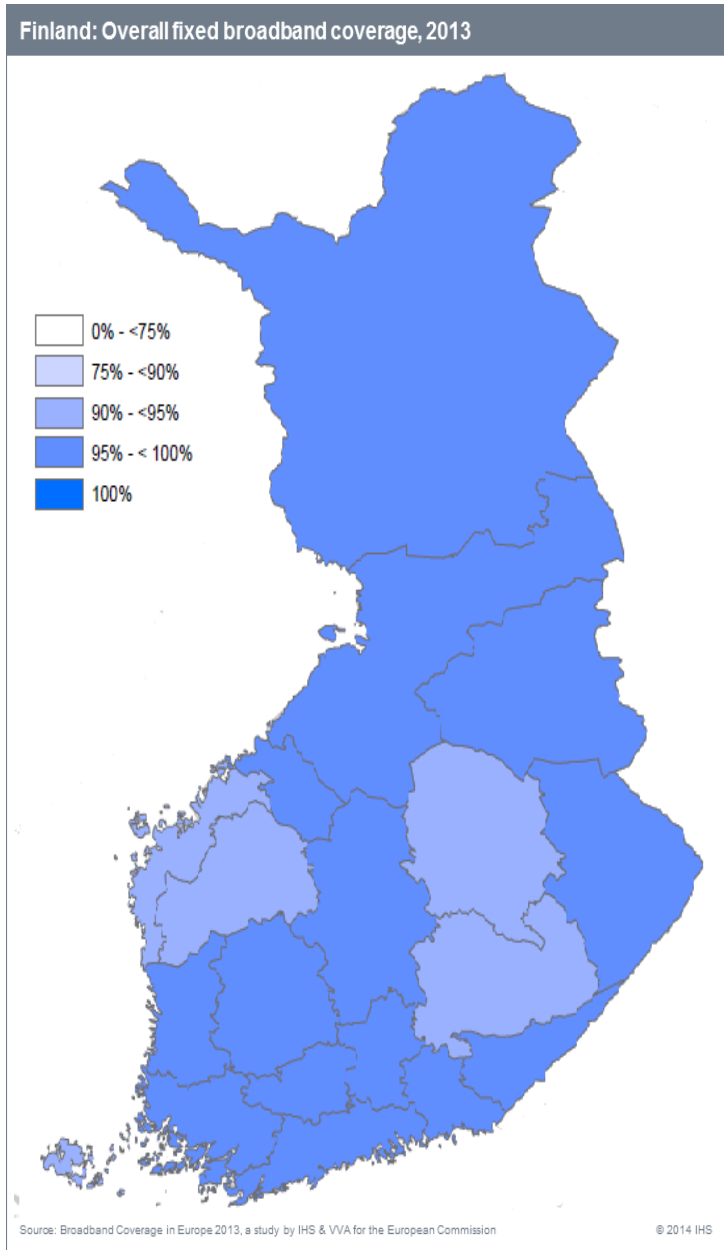


Rural LTE coverage also increased – more significantly - growing from 1.9% to 8% of rural homes. Rural areas in Finland exhibit low levels of overall broadband coverage, with minimal availability of fixed NGA technologies such as VDSL, FTTP and DOCSIS 3.0. HSPA coverage however was recorded at higher than the EU average in 2013, at 97.2% of rural homes.

³³ According to IHS Mobile Technology Intelligence – 4G launch tracker

³⁴ www.dna.fi/ - DNA Welho Überkaista 350

5.9.2 Regional coverage by broadband technology



5.9.3 Regulatory and market overview

In 2009, the Finnish Ministry of Transport and Communications announced that it would make access to a 1 Mbps broadband service a legal right by the end of 2015³⁵. At the end of 2012 the Finnish government said that the country was on track to meet this target and has provided subsidies to local operators serving rural communities.

The Finnish government launched the Broadband 2015 project in December 2008 with the aim of providing state aid for the construction of high-speed broadband networks in areas deemed less attractive by operators. As part of the Broadband 2015 project, aid totalling EUR 130 million is available for funding broadband projects. This aid has been supplied by the Finnish regulator (FICORA), the EU Rural Development Programme for Mainland Finland and Finnish municipalities³⁶.

Due to a difference of opinion between the FICORA and TeliaSonera regarding the Finnish incumbent's universal service obligation, fixed NGA broadband coverage has progressed slowly³⁷. Both Elisa and TeliaSonera have fibre optic networks³⁸ but increasing coverage has been slow in comparison to the progress made with LTE.

In order to meet targets Finnish operators have increased LTE coverage in both urban and rural areas and the government is actively encouraging the use of LTE. In October 2013, the Finnish government reported raising more than EUR 100 million from the auction of spectrum in the 800 MHz frequency band. DNA, Elisa and TeliaSonera were all winning bidders and they will be using the spectrum to roll out LTE networks³⁹.

³⁵ <http://www.bbc.co.uk/news/10461048>

³⁶ <https://www.viestintavirasto.fi/en/steeringandsupervision/broadband2015subsidies.html>

³⁷ https://www.viestintavirasto.fi/en/ficora/news/2010/P_25.html

³⁸ <https://www.viestintavirasto.fi/en/ficora/news/2014/availabilityofhigh-speedbroadbandimprovedinfinland.html>

³⁹ <http://www.fiercewireless.com/europe/story/finland-raises-more-100m-800-mhz-auction/2013-10-30>

5.9.4 Data tables for Finland

Statistic	National
Population	5,401,267
Persons per household	2.1
Rural proportion	18.0%

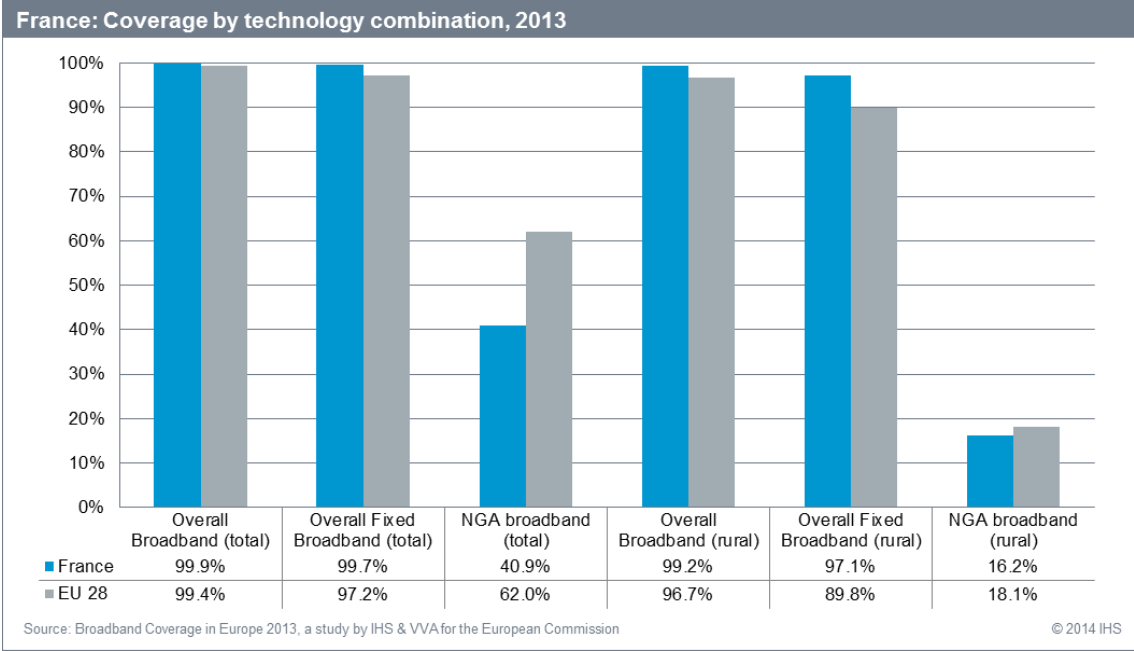
Technology	Finland 2013		Finland 2012		Finland 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	93.4%	60.0%	92.5%	58.5%	94.5%	69.6%	93.5%	82.3%
VDSL	46.0%	0.0%	45.0%	0.0%	46.0%	0.0%	31.2%	11.1%
FTTP	29.4%	7.0%	33.3%	6.6%	31.0%	0.0%	14.5%	4.2%
WiMAX	2.2%	0.1%	2.4%	2.4%	3.0%	3.0%	19.7%	17.6%
Cable	42.5%	0.0%	42.0%	0.0%	41.6%	0.0%	43.0%	7.8%
DOCSIS 3.0	42.5%	0.0%	42.0%	0.0%	41.6%	0.0%	41.6%	7.0%
HSPA	99.5%	97.2%	99.5%	97.2%	98.7%	97.2%	97.1%	85.5%
LTE	85.5%	8.0%	68.5%	1.9%	24.5%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.8%	98.6%	99.8%	98.6%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	96.7%	63.5%	93.3%	62.6%	95.0%	71.2%	97.2%	89.8%
NGA broadband	72.1%	7.0%	65.5%	6.6%	63.9%	4.2%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

5.10 France

5.10.1 National coverage by broadband technology

France ended 2013 above the EU28 average for overall broadband and fixed broadband. Overall NGA coverage nationally and rurally was below average but improved on the previous year. Overall NGA coverage on a nation-wide basis had increased by 16.7 percentage points in 2013, whereas overall NGA coverage in rural areas had grown by almost 16 percentage points in the same period, from 0.6% to 16.2%.



The breakdown by technology shows more specifically the source of increased NGA coverage. Significant increases were reported for DOCSIS 3.0, FTTP and VDSL.

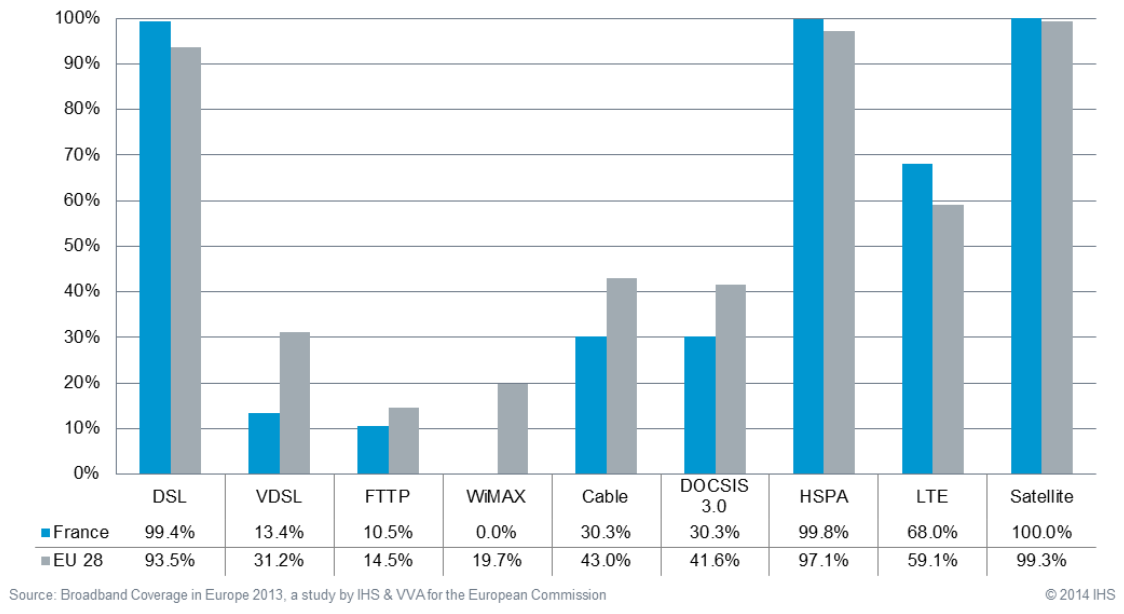
LTE showed the largest increase of any single technology, growing from 5.5% to 68.0% at the end of 2013, which was above the EU28 average of 59.1%.

VDSL also witnessed significant expansion in coverage, growing from 0% coverage in 2012 to 13.4% at the end of 2013. This development is result of a shift in network deployment strategy of French network operators from previously preferred FTTP only roll-out to a more diversified approach utilizing existing copper networks.

DOCSIS 3.0 coverage increased by 8.9 percentage points from 21.4% to 30.3%, and overall cable broadband availability increased from 25.5% to 30.3%.⁴⁰ Cable operator Numericable continued to implement DOCSIS 3.0 upgrades to its network through 2013. FTTP coverage increased from 6.5% to 10.5%.

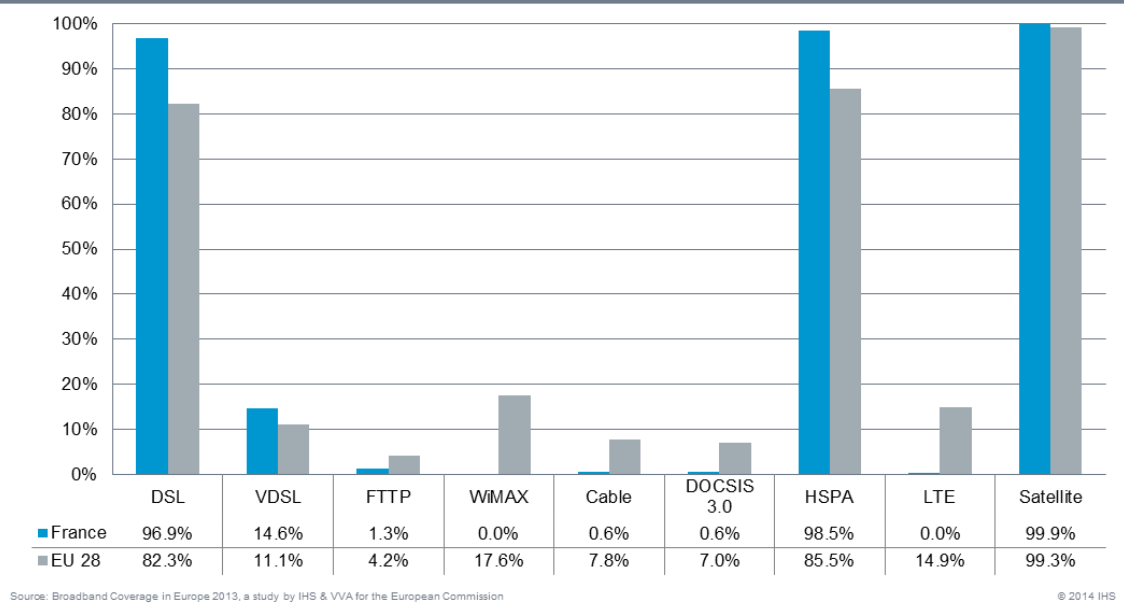
⁴⁰ It was pointed out by the French regulator, ARCEP, that detailed data related to different technologies on coaxial cable is not available for France. However, as indicated, 30,3% of the population has a fixed Internet access to high speed broadband via a coaxial cable network, all available technologies included.

France: Coverage by technology, total, 2013

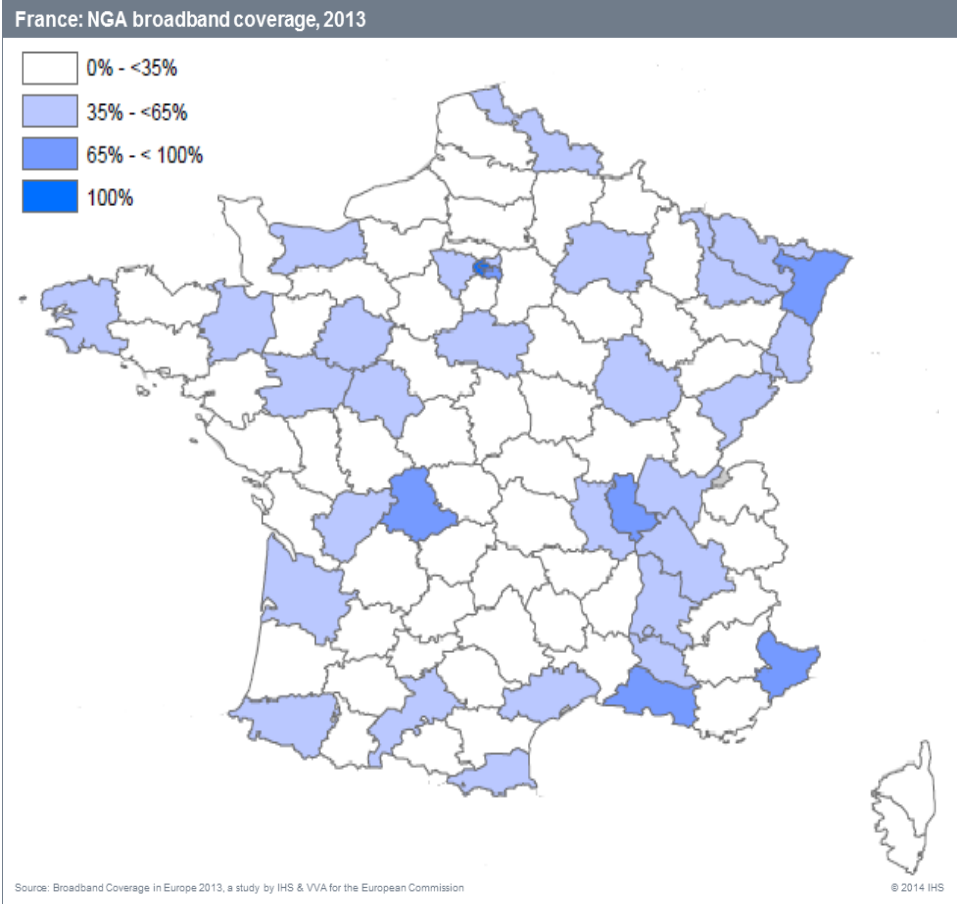
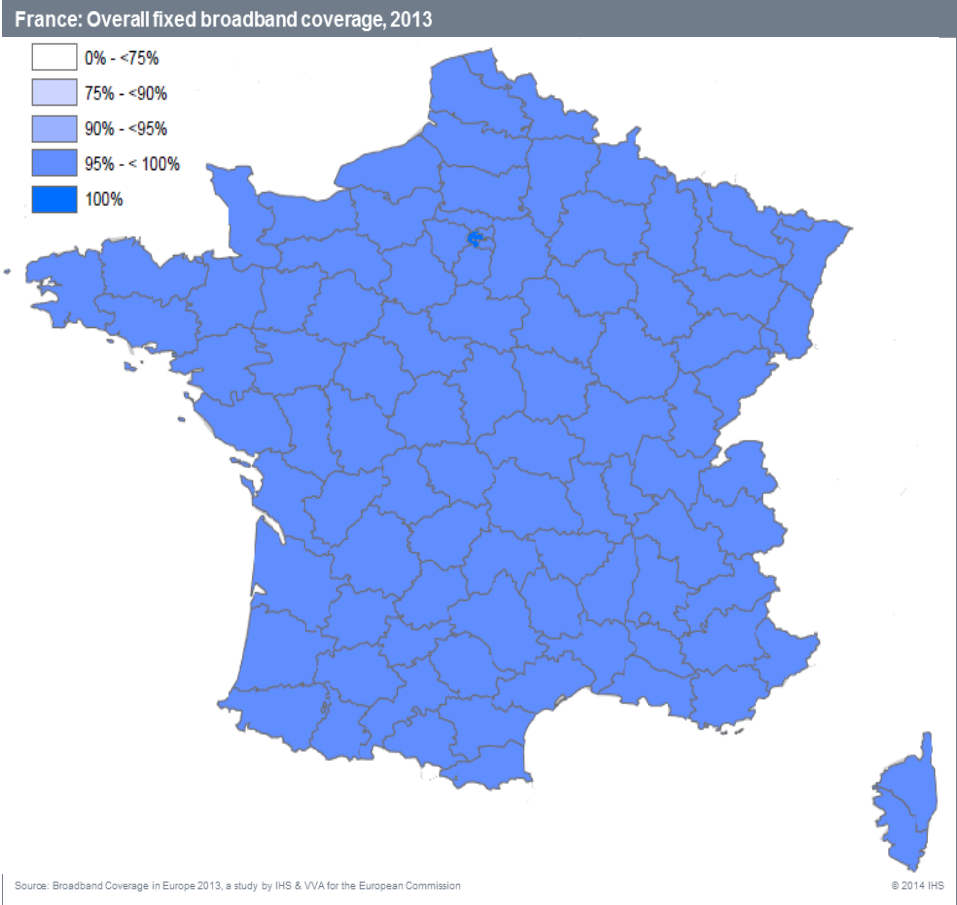


In rural areas there was a large increase in VDSL coverage, which grew from 0% to 14.6%. Coverage using the remaining NGA technologies (FTTP and DOCSIS 3.0) in rural areas remained negligible. WiMax and LTE coverage was also negligible.

France: Coverage by technology, rural areas, 2013



5.10.2 Regional coverage by broadband technology



5.10.3 Regulatory and market overview

The strategy for broadband development in France runs from 2011 until 2022. The main aim is to provide high-speed access to 100% of the population, mainly via FTTH technologies.

The National Fund for Digital Society set up by the state has funding worth EUR 3 billion, of which EUR 1.67 will be used for the development of high speed networks⁴¹. Network operators can apply for loans to fund development of high-speed networks in rural areas. Grants are also available for local authority-led projects and research and development into satellite technologies.

In February 2013, the French government announced a EUR 20 billion pledge comprising public and private funds to be used for the development of high-speed fibre broadband networks⁴². The funds will be distributed three stages of more than EUR 6 billion each. One stage will be paid by French network operators, one from a blend of operators and local government and the last stage will be funded by the French state and local government. The French government have set themselves a target of 50% coverage by 2017.

LTE coverage grew significantly during 2013, due to a number of operators launching LTE services following the French LTE auctions in 2011⁴³. The first phase of auctions, ending in September 2011, raised EUR 936 million with licences granted to Orange, SFR, Bouygues Telecom and Free (Iliad). Orange and SFR launched LTE services at the end of 2012, while Bouygues and Iliad launched their LTE services in 2013.

More recently, French operators have been focusing on VDSL launches, which follow prior development of FTTP infrastructure. Past investments in FTTP include the widespread rollout of FTTP by Orange and SFR from 2009 onwards, and various investments from Iliad group (including the 2007 acquisition of Paris-based CitéFibre and subsequent network build-out).

French consumers however now have the option of choosing from a selection of VDSL services following launches by Orange France, SFR and Free in October 2013^{44,45}. Both SFR and Free now offer services with speeds up to 1 Gbps while Orange offers speeds up to 50 Mbps.

⁴¹ <http://www.caissedesdepots.fr/en/news/all-the-news/half-year-2009-2010-sales-up-10-on-a-reported-basis-03-like-for-like/a-fund-dedicated-to-sme-innovative-in-the-digital-technology.html>

⁴² <http://www.zdnet.com/france-to-invest-20bn-in-high-speed-broadband-for-the-entire-country-7000011671/>

⁴³ <http://www.zdnet.com/4g-in-europe-how-far-how-fast-and-how-much-is-lte-in-france-7000009821/>

⁴⁴ <http://www.zdnet.com/frances-sfr-and-free-go-head-to-head-on-1gbps-fibre-as-vdsl2-goes-national-7000021452/>

⁴⁵ <http://www.telegeography.com/products/commsupdate/articles/2013/10/17/orange-france-launches-vdsl2-service/>

5.10.4 Data tables for France

Statistic	National
Population	65,327,724
Persons per household	2.3
Rural proportion	17.5%

Technology	France 2013		France 2012		France 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	99.4%	96.9%	99.3%	95.8%	99.1%	95.0%	93.5%	82.3%
VDSL	13.4%	14.6%	0.0%	0.0%	0.0%	0.0%	31.2%	11.1%
FTTP	10.5%	1.3%	6.5%	0.6%	3.8%	0.0%	14.5%	4.2%
WiMAX	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	19.7%	17.6%
Cable	30.3%	0.6%	25.5%	0.7%	23.7%	0.0%	43.0%	7.8%
DOCSIS 3.0	30.3%	0.6%	21.4%	0.0%	21.1%	0.0%	41.6%	7.0%
HSPA	99.8%	98.5%	99.7%	98.1%	97.0%	82.9%	97.1%	85.5%
LTE	68.0%	0.0%	5.5%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.9%	99.2%	99.9%	99.3%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	99.7%	97.1%	99.3%	96.1%	99.4%	95.0%	97.2%	89.8%
NGA broadband	40.9%	16.2%	24.2%	0.6%	23.2%	0.0%	62.0%	18.1%

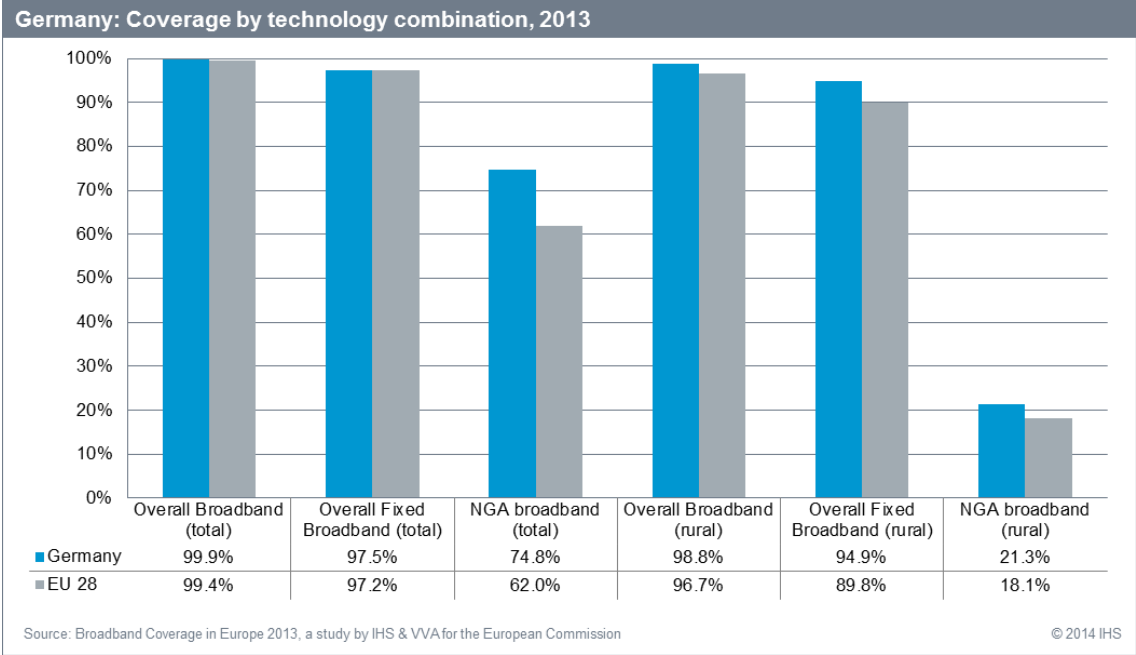
Note: It was pointed out by the French regulator, ARCEP, that detailed data related to different technologies on coaxial cable is not available for France. However, as indicated, 30.3% of the population has a fixed Internet access to high speed broadband via a coaxial cable network, all available technologies included.

The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

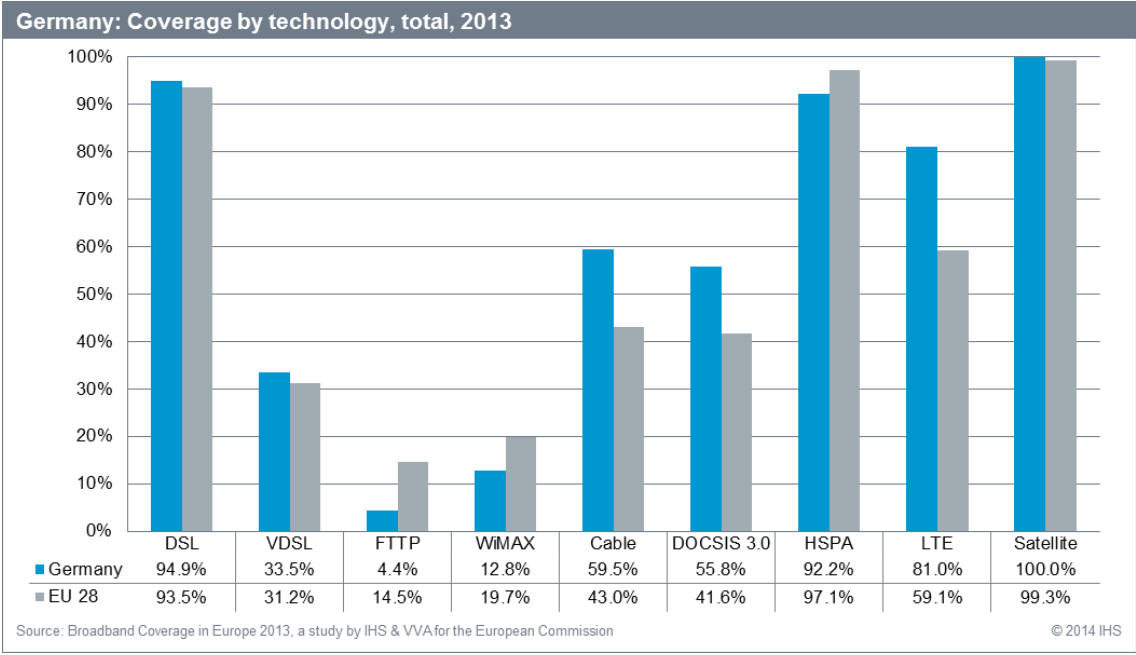
5.11 Germany

5.11.1 National coverage by broadband technology

Germany remains above the European average in all technology combinations, with noteworthy improvements in overall NGA coverage recorded in 2013. Near-100% coverage of overall broadband and 97.5% coverage with fixed technologies were reported in 2013 as well. NGA access rose through the year, ending the period on 74.8% of households (21.3% in rural areas) – nearly 9 percentage points higher than the previous year.



Within fixed access, Germany is ahead of the EU average for most technologies, with higher than typical coverage for DSL, VDSL, cable and DOCSIS 3.0 categories. FTTP coverage lags the EU average, partly reflecting the focus of some of the key telecoms groups on upgrading existing copper infrastructure to VDSL, rather than replacement with FTTP lines.

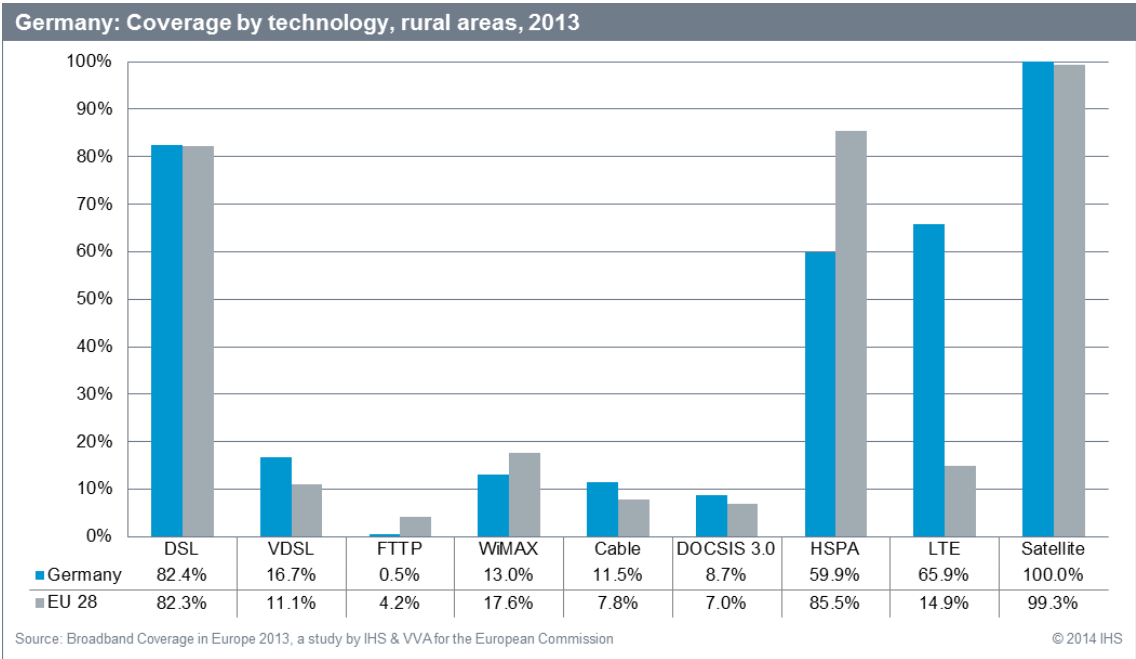


DOCSIS 3.0 upgrades are now mostly complete in Germany, with DOCSIS 3.0 services available to nearly 56% of homes – against an overall cable broadband coverage of 59.5%.

LTE coverage is also strong in Germany, with over 80% of homes covered at the end of 2013. LTE services were first launched in Germany by Vodafone in 2010, with Telefonica and Deutsche Telekom following suit in 2011⁴⁶.

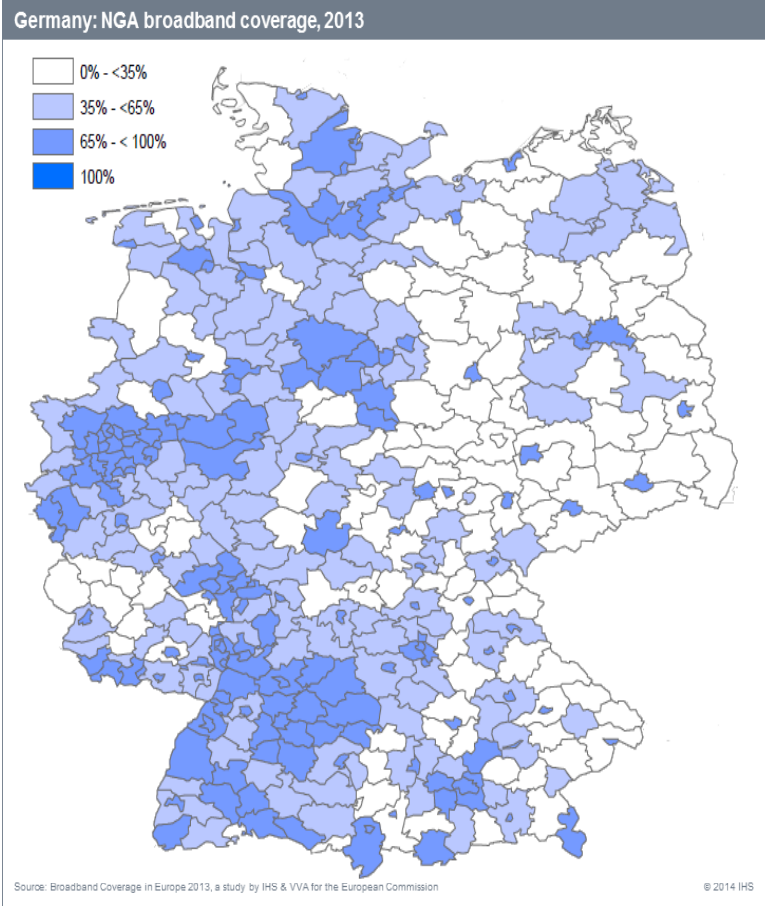
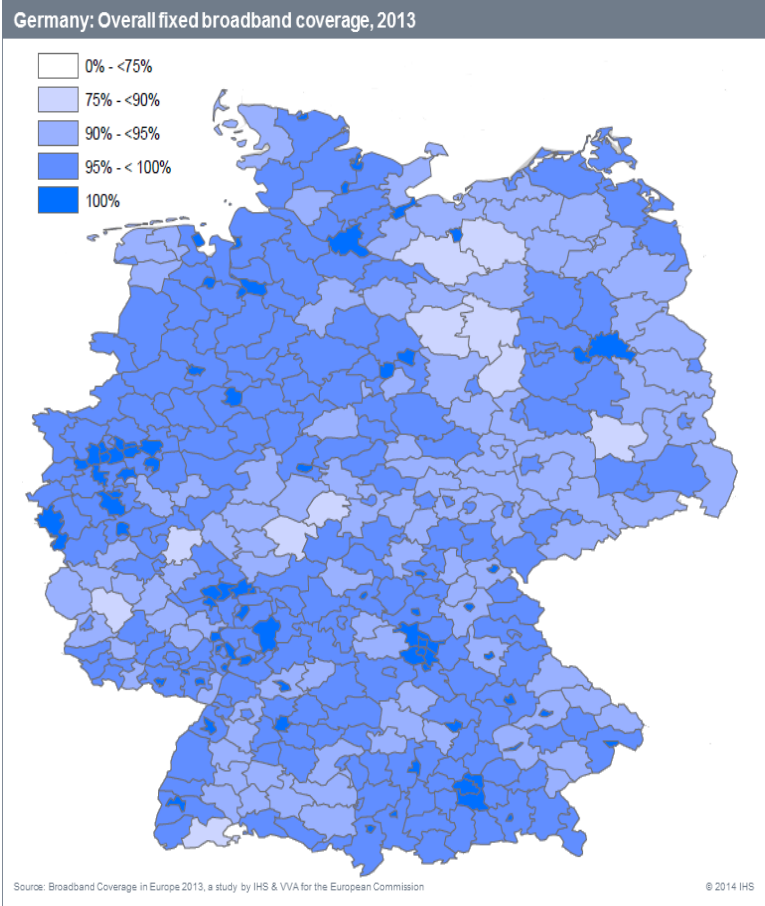
In rural areas, overall fixed broadband availability is slightly higher than the EU average, reflecting availability of a mix of technologies across different areas. DSL offers the single most widespread fixed access mechanism at 82.4% coverage (in line with the EU average). NGA coverage is still low (at 21.3% of homes), and led by VDSL which covered 16.7% of rural homes in 2013.

LTE offers relatively widespread coverage, at 65.9% of rural homes – substantially greater than the EU average of 14.9%.



⁴⁶ IHS Mobile Technology 4G launch tracker

5.11.2 Regional coverage by broadband technology



5.11.3 Regulatory and market overview

Germany's approach to broadband rollout has historically been laid-out in The Federal Government's Broadband Strategy, published in 2009⁴⁷. The strategy document aimed to provide additional impetus for broadband rollout, and set targets of closing broadband coverage gaps by end 2010 and ensuring that 75% of households had access to 50Mbps connections by the end of 2014. Later documents published by the coalition cabinet expanded the targets to 100% coverage with 50Mbps connections by the end of 2018⁴⁸.

Telecoms group Deutsche Telekom launched VDSL services in 2006, alongside its IPTV service – the group has more recently launched vectored VDSL. The company expects to have passed 3.5 million homes with its vectored services by the end of 2014⁴⁹.

Cable companies have also been rolling out next generation broadband services. Historically, network and access level ownership divisions have slowed upgrades for the cable sector in Germany, but with increasing consolidation, DOCSIS 3.0 coverage has improved substantially and now represents 94% of homes passed by cable broadband connections. Leading cable groups Kabel Deutschland and Liberty Global both offered 100Mbps+ connections to consumers as of September 2014.

Germany was the sixth European country in which mobile operators launched LTE services, joining territories including Austria, Sweden, Finland, Poland and Norway. Vodafone was the first to launch services locally, with launch occurring at the end of 2010 and was followed in the subsequent year by Telefonica and Deutsche Telekom⁵⁰.

Improving rural coverage now remains a priority to ensure that Germany meets its coverage targets. Deutsche Telekom has suggested alternative access means including hybrid LTE-DSL access connections, and in 2014 launched a hybrid router combining the two technologies – it intends to roll out the option to all covered households in 2015⁵¹.

⁴⁷ <https://ec.europa.eu/digital-agenda/en/news/federal-government%E2%80%99s-broadband-strategy-german-national-broadband-strategy>

⁴⁸ <http://www.zeit.de/politik/deutschland/2013-11/koalitionsvertrag-beschluesse-ueberblick/seite-9>

⁴⁹ http://www.telekom.com/media/media-kits/ifa_2014/249160

⁵⁰ IHS Mobile Technology 4G launch tracker

⁵¹ <http://www.telecompaper.com/news/deutsche-telekom-unveils-hybrid-dsl-lte-home-router--1035238>

5.11.4 Data tables for Germany

Statistic	National
Population	80,527,679
Persons per household	2.0
Rural proportion	10.1%

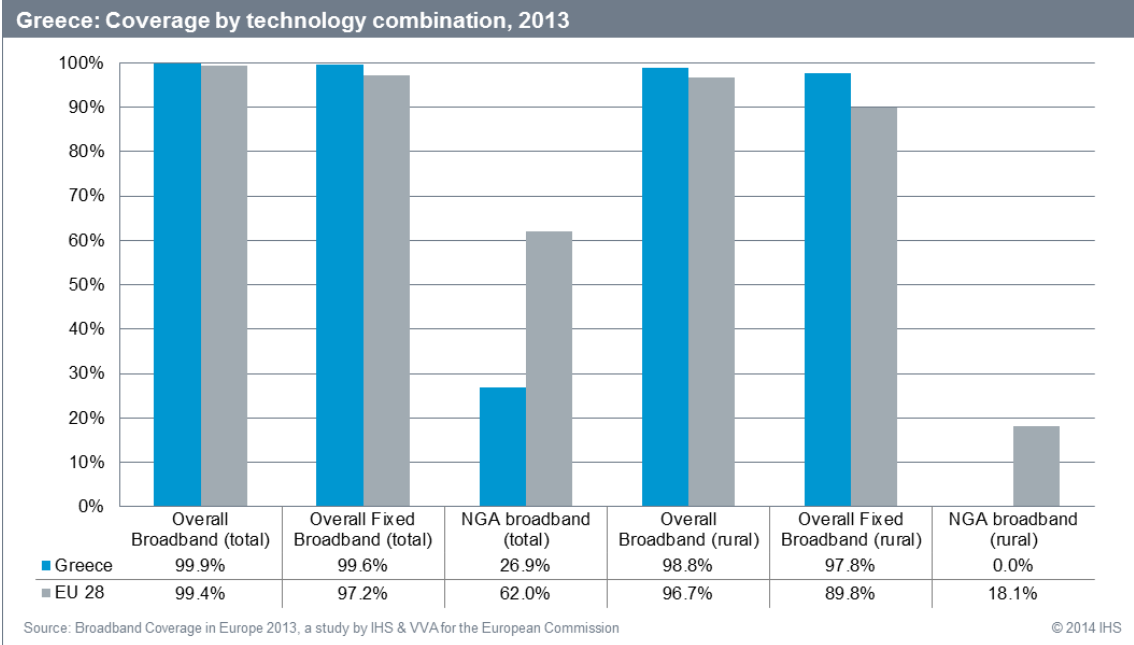
Technology	Germany 2013		Germany 2012		Germany 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	94.9%	82.4%	94.8%	80.6%	93.8%	76.8%	93.5%	82.3%
VDSL	33.5%	16.7%	46.3%	21.8%	40.6%	13.1%	31.2%	11.1%
FTTP	4.4%	0.5%	2.6%	0.7%	2.4%	0.4%	14.5%	4.2%
WiMAX	12.8%	13.0%	12.2%	12.0%	11.5%	10.8%	19.7%	17.6%
Cable	59.5%	11.5%	59.1%	9.3%	55.1%	7.2%	43.0%	7.8%
DOCSIS 3.0	55.8%	8.7%	52.3%	5.9%	45.9%	3.5%	41.6%	7.0%
HSPA	92.2%	59.9%	90.4%	53.6%	88.5%	49.0%	97.1%	85.5%
LTE	81.0%	65.9%	51.7%	50.0%	21.5%	33.3%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.9%	98.8%	99.8%	98.5%	99.3%	95.4%	99.4%	96.7%
Overall fixed broadband	97.5%	94.9%	96.6%	85.6%	95.7%	81.7%	97.2%	89.8%
NGA broadband	74.8%	21.3%	66.2%	26.4%	63.8%	21.5%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

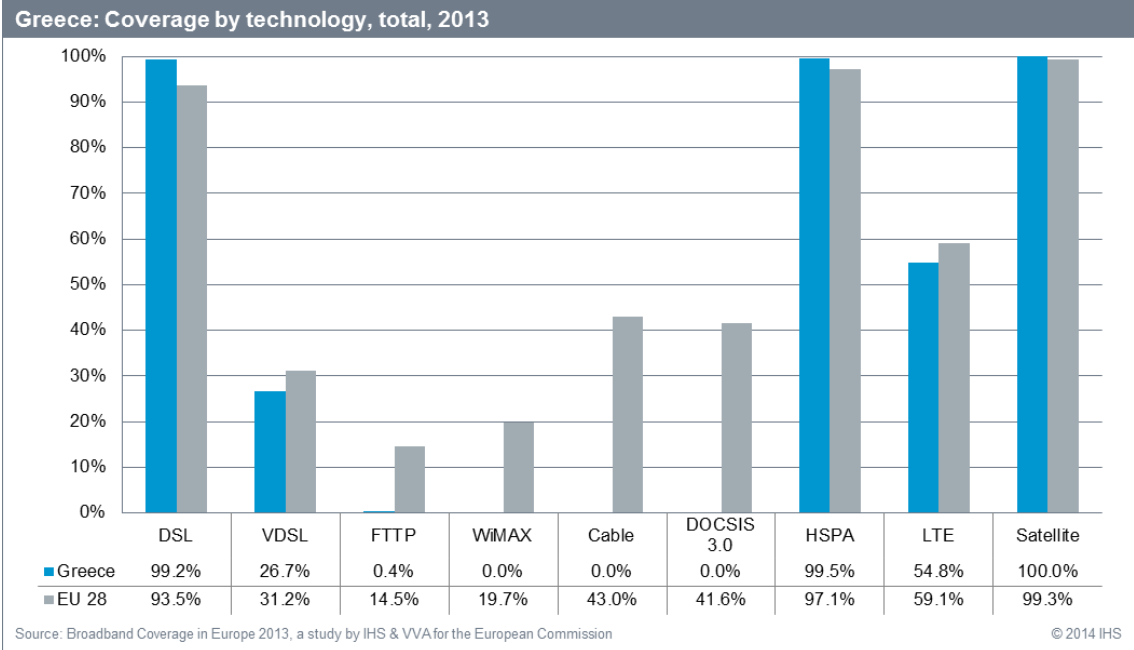
5.12 Greece

5.12.1 National coverage by broadband technology

In 2013, Greece remained ahead of the EU average for overall broadband coverage, both nationally and in rural areas. Total overall NGA coverage increased slightly year-on-year to 26.9%, although this was still below the EU average of 62.0%.

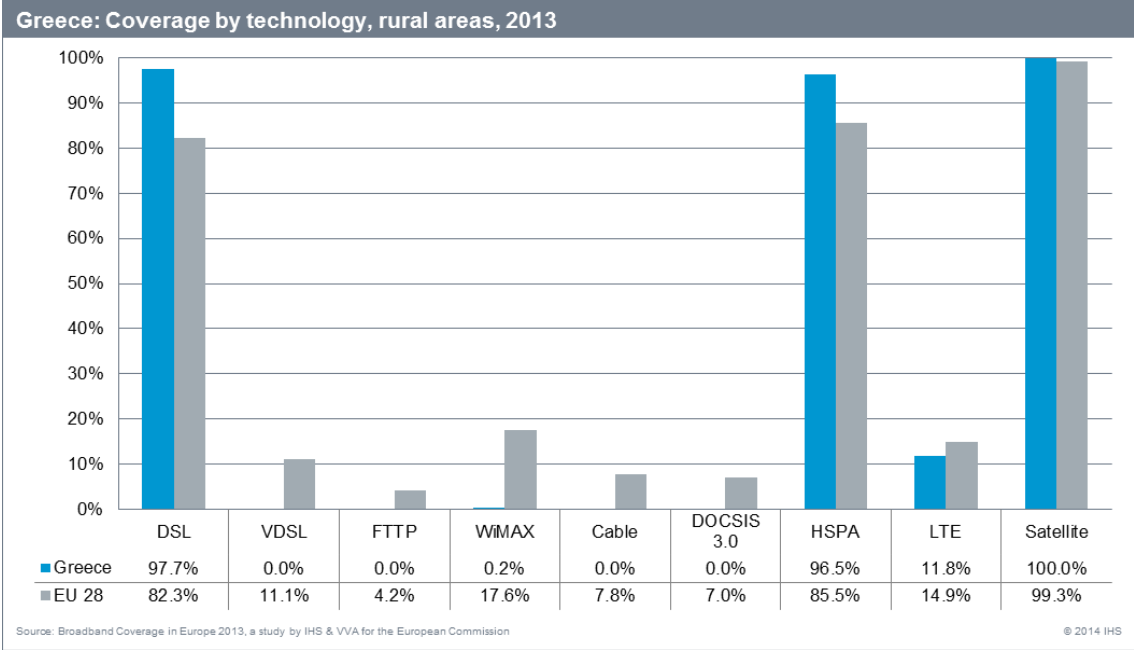


Due to the absence of a cable network in Greece, DSL remains the main source of NGA coverage, with operators having begun to upgrade the network to provide VDSL services. However, progress has been relatively slow. VDSL coverage increased by 5.0 percentage points between 2012 and 2013, growing from 21.7% to 26.7% and remains below the EU average, which was more than 31% at end 2013.



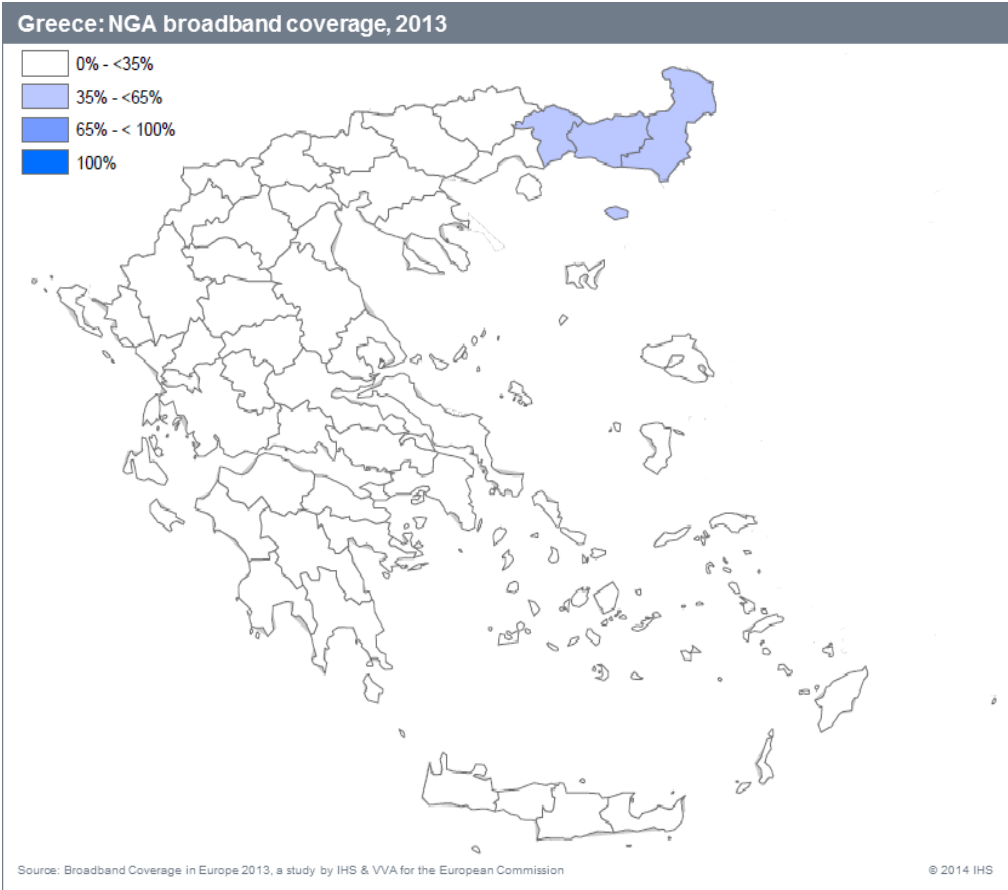
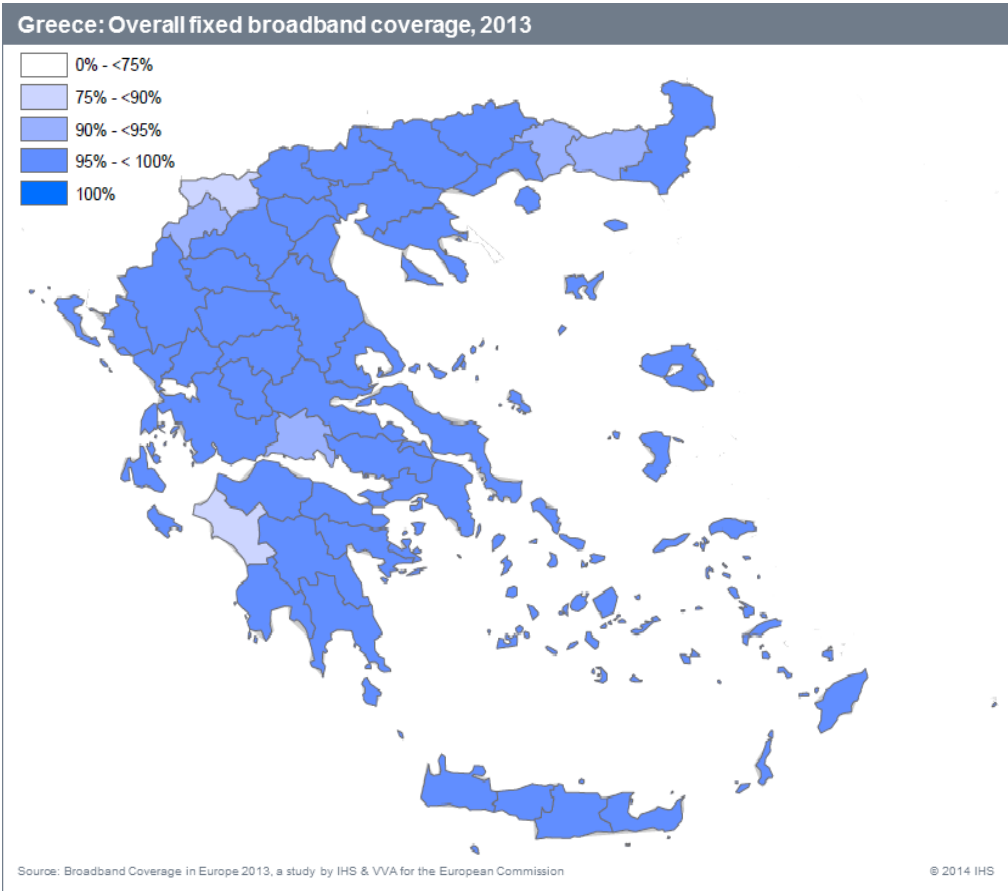
LTE coverage is broadly in line with the EU average. Since Cosmote Greece launched the first commercial LTE mobile network in Athens and Thessaloniki in 2012⁵², LTE coverage has increased, and grew by 12.4 percentage points between 2012 and 2013, from 42.4% to 54.8% at end 2013.

Rural coverage of NGA technologies remains very limited, with negligible FTTP and VDSL coverage recorded in 2013. LTE coverage reflects the 2012 launch of Cosmote’s network, with addressable homes growing from 2.3% to 11.8% in 2013. Rural coverage of LTE is currently less than 5 percentage points below the EU average.



⁵² <http://www.telegeography.com/products/commsupdate/articles/2012/11/20/cosmote-launches-first-lte-network-in-greece/>

5.12.2 Regional coverage by broadband technology



5.12.3 Regulatory and market overview

The Greek broadband plan 'Digital Greece and the Greek digital strategy' was devised to run from 2008 until 2013. Currently, there is no Greek broadband plan, which runs beyond 2013.

Greek market players are keen to upgrade and expand their networks such that they can offer high-speed fixed broadband services.

In November 2012, Greek incumbent OTE launched its VDSL broadband service with speeds up to 50 Mbps⁵³, in addition to the 4G LTE service launched by its mobile subsidiary Cosmote. Two years later in July 2014 OTE announced the expansion of its VDSL and LTE networks⁵⁴. A further 1,500 street cabinets will be activated by the end of 2014 in areas across Athens and Thessaloniki and the 4G network is expected to have 70% population coverage by end 2014.

In August 2014 Vodafone Greece acquired 72.7% of Hellas Online (HOL) for EUR 72.7 million⁵⁵. The deal is subject to regulatory approval, but if it goes ahead it will increase Vodafone's stake in HOL to 91.1%, and Vodafone has future plans to acquire the remaining 8.9%. Following the acquisition, Vodafone will own one of the largest fibre-optic network in Greece, although has yet to confirm specific NGA rollout plans.

⁵³ <http://www.fiercetelecom.com/story/greeces-ote-debuts-vdsl-double-play-data-voice-package/2012-11-27>

⁵⁴ <http://www.telegeography.com/products/commsupdate/articles/2014/07/15/ote-cosmote-expand-vdsl-lte-networks/>

⁵⁵ <http://www.vodafone.com/content/index/media/vodafone-group-releases/2014/hellas-online.html>

5.12.4 Data tables for Greece

Statistic	National
Population	11,290,067
Persons per household	2.4
Rural proportion	20.0%

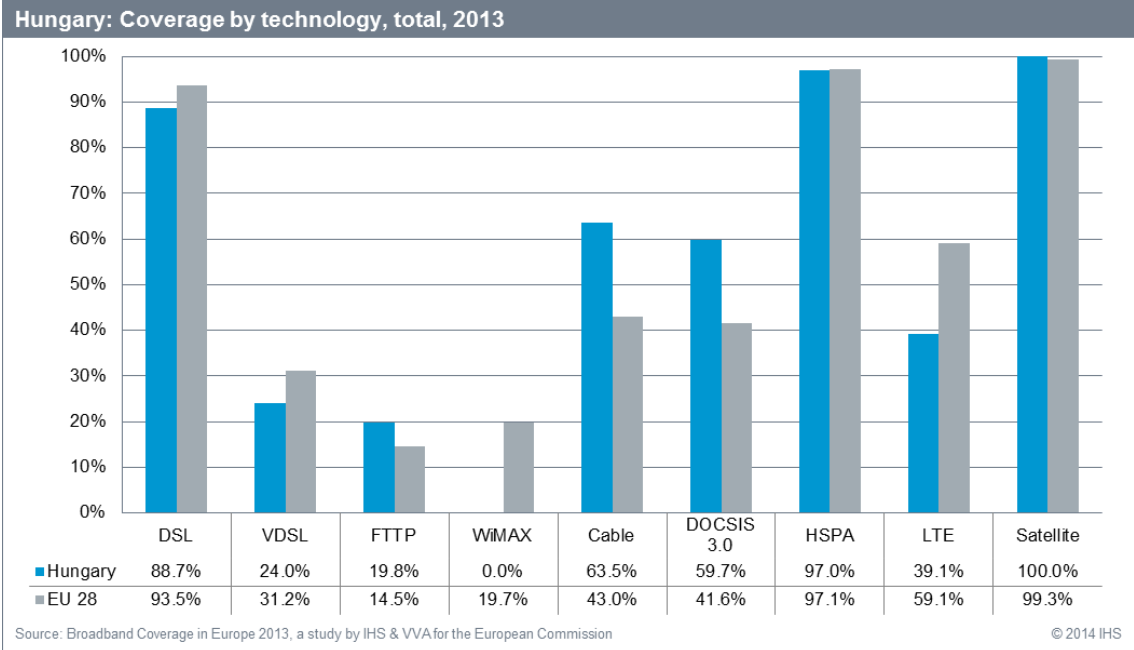
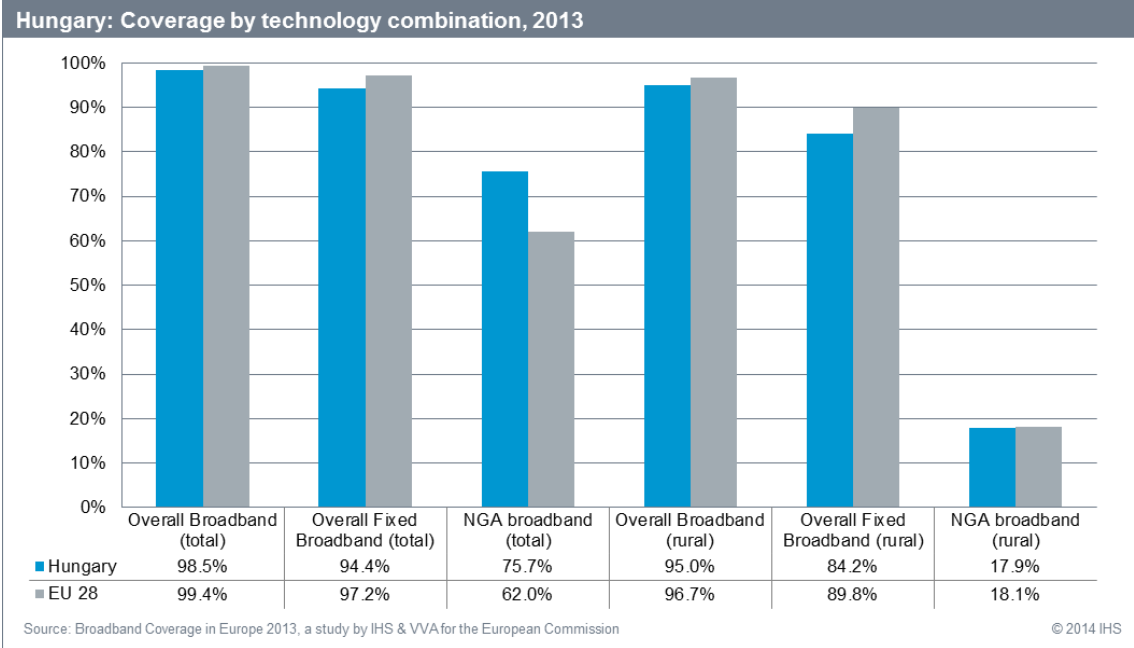
Technology	Greece 2013		Greece 2012		Greece 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	99.2%	97.7%	99.1%	95.3%	98.5%	92.3%	93.5%	82.3%
VDSL	26.7%	0.0%	21.7%	0.0%	4.2%	0.0%	31.2%	11.1%
FTTP	0.4%	0.0%	0.4%	0.0%	0.0%	0.0%	14.5%	4.2%
WiMAX	0.0%	0.2%	0.0%	0.2%	0.0%	0.1%	19.7%	17.6%
Cable	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	43.0%	7.8%
DOCSIS 3.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	41.6%	7.0%
HSPA	99.5%	96.5%	99.4%	96.8%	99.4%	96.8%	97.1%	85.5%
LTE	54.8%	11.8%	42.4%	2.3%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.9%	98.8%	99.8%	98.9%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	99.6%	97.8%	99.1%	95.3%	98.5%	92.4%	97.2%	89.8%
NGA broadband	26.9%	0.0%	21.9%	0.0%	4.2%	0.0%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

5.13 Hungary

5.13.1 National coverage by broadband technology

During 2013 there were significant improvements in Hungary across total and rural NGA coverage combinations and also for rural standard fixed coverage. Total overall NGA coverage increased by 16.0 percentage points, growing from 59.7% to 75.7% of households, while rural overall NGA coverage increased by more than 7 percentage points to 17.9% - in line with the EU average. Rural standard fixed coverage was up by almost 7 percentage points to 84.2%, five percentage points behind the EU average.

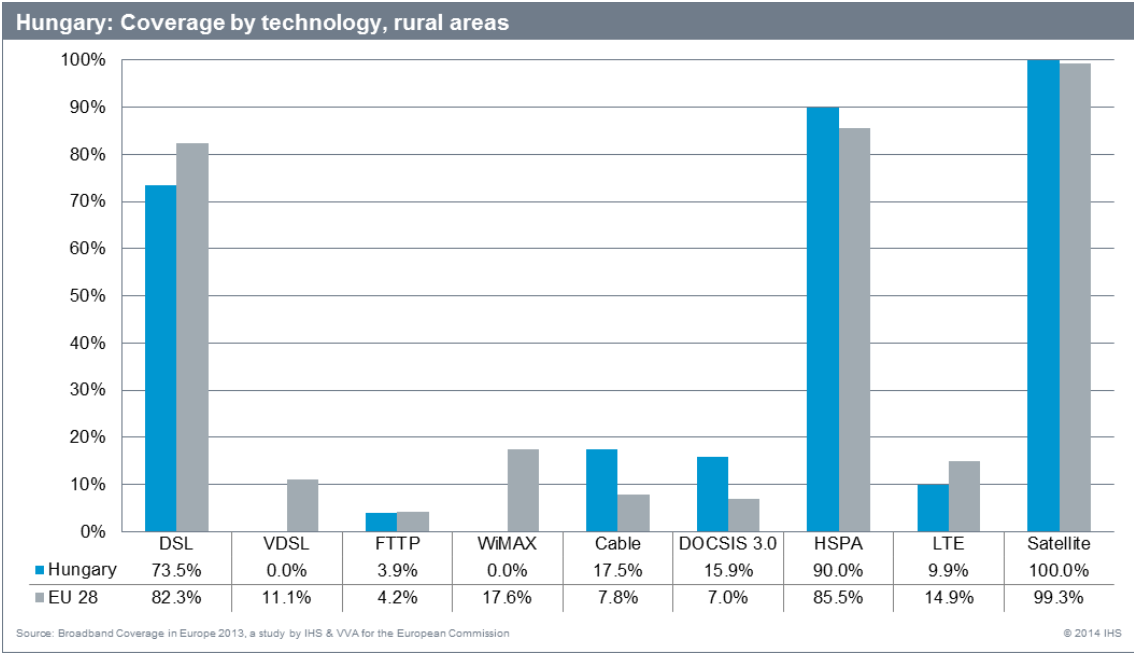


The increased NGA coverage registered in 2013 was largely due to an increase in VDSL coverage, up more than 21 percentage points year-on-year, increasing from 2.8% in 2012 to

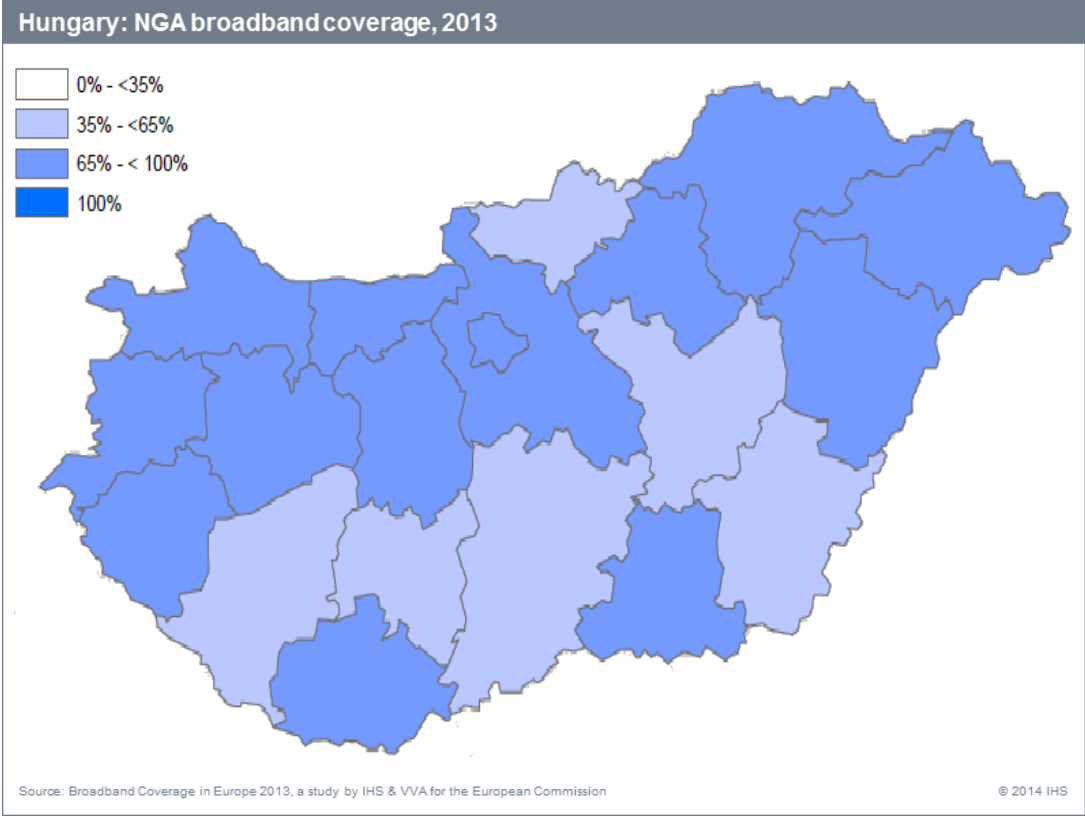
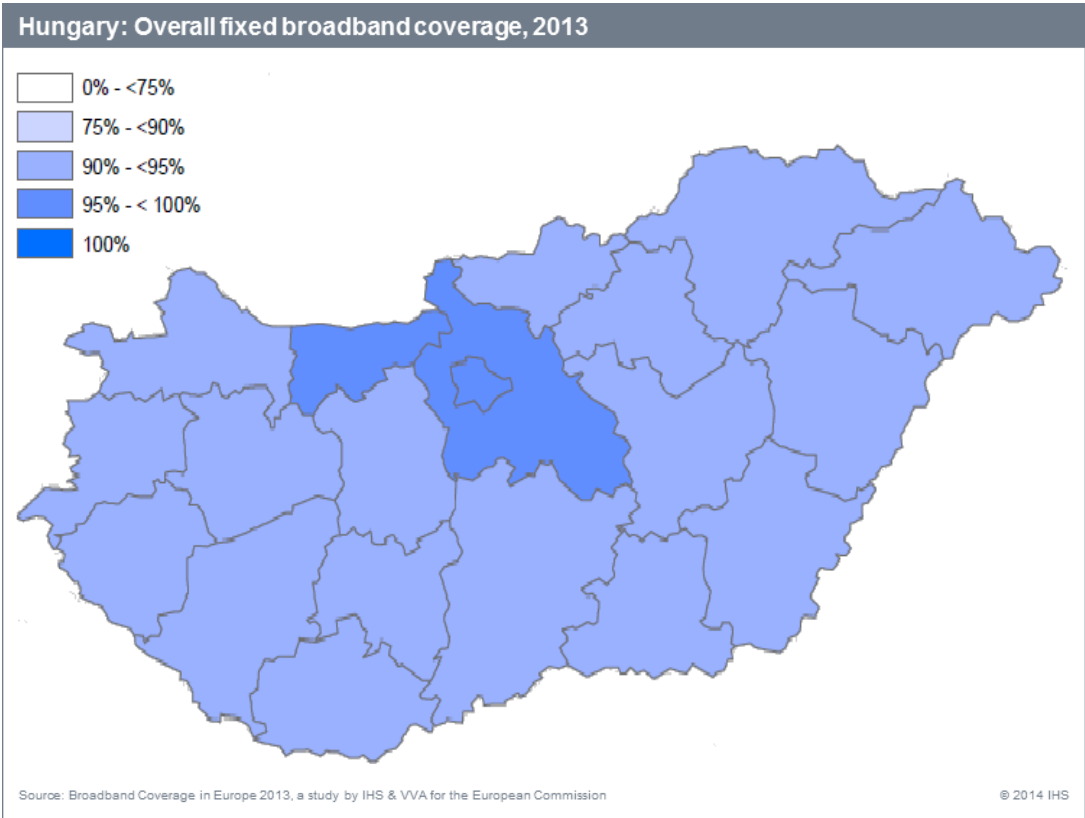
24.0% in 2013. Growth in VDSL is a result of the incumbent, Magyar Telecom, rolling out VDSL upgrades to its copper network throughout the year.

LTE was the only other technology to register a significant change - up 3.6 percentage points to more than 39% coverage. However, whereas LTE coverage was above the EU average in 2012, it was below the EU average in 2013 (59.1%) – limited growth locally relative to more significant growth EU-wide pushed Hungary’s relative performance down in the rankings.

In rural areas, standard cable, DOCSIS 3.0, HSPA and satellite all registered at coverage levels above the EU average, while DSL was below average, at 73.5%, versus the EU average of 82.3%. DOCSIS 3.0 coverage showed the greatest improvement in rural areas, up by more than 8 percentage points from 7.3% to 15.9%, now representing the bulk of cable broadband connections. Both VDSL and WiMAX were recorded to still be absent in rural areas, while FTTP coverage remained low at 3.9% of households.



5.13.2 Regional coverage by broadband technology



5.13.3 Regulatory and market overview

The most recent national broadband strategy document for Hungary covers the period 2005 – 2013⁵⁶. The main aim of the national broadband strategy is to develop and improve infrastructure required for broadband communications.

Increased NGA coverage both nationally and in rural areas is primarily due to growth in VDSL and DOCSIS 3.0 coverage.

Magyar Telecom was one of the first operators to launch VDSL services on a retail and wholesale basis, rolling out the technology in 2008, following the subsequent year with an FTTP deployment project. However, by late 2009 the telecoms group was forced to slow the rollout due to the economic downturn⁵⁷. LTE services followed, with launches in Hungary by Magyar Telecom in early 2012 and Pannon in 2013.

Following the acquisition of ISP Fibernet Communications in January 2010, telecommunications provider Invitel launched its VDSL service a year later in 2011 with downstream speeds of up to 50 Mbps⁵⁸. In March 2014 Mid Europa Partners, parent company of Invitel, announced that it was planning to sell Invitel⁵⁹. The company was valued at EUR 200 – 300 million.

⁵⁶ <https://ec.europa.eu/digital-agenda/en/news/national-broadband-strategy-hungary>

⁵⁷ <http://www.telegeography.com/products/commsupdate/articles/2009/09/03/mtel-slows-ftth-deployment-as-economic-downturn-bites/>

⁵⁸ <http://www.hsw.hu/hirek/47138/vdsl-xdsl-adsl-internet-invitel.html>

⁵⁹ <http://www.telegeography.com/products/commsupdate/articles/2014/03/28/mid-europa-partners-poised-to-sell-hungarys-invitel/>

5.13.4 Data tables for Hungary

Statistic	National
Population	9,908,798
Persons per household	2.2
Rural proportion	31.0%

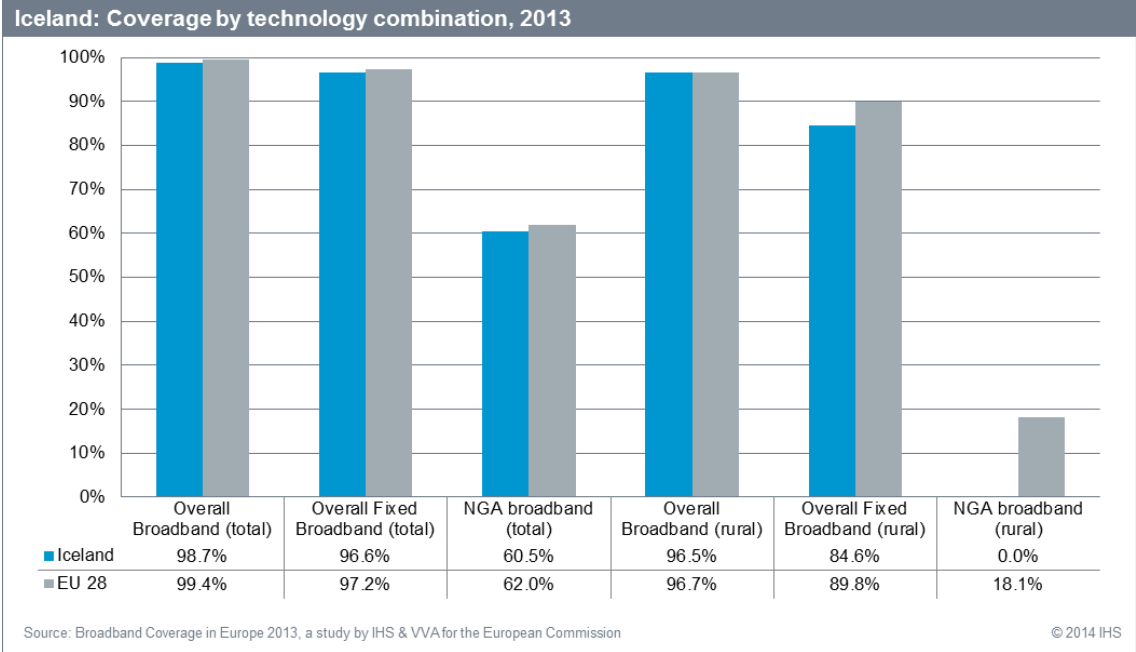
Technology	Hungary 2013		Hungary 2012		Hungary 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	88.7%	73.5%	89.4%	73.1%	89.4%	73.1%	93.5%	82.3%
VDSL	24.0%	0.0%	2.8%	0.0%	2.8%	0.0%	31.2%	11.1%
FTTP	19.8%	3.9%	21.6%	3.5%	17.1%	3.4%	14.5%	4.2%
WiMAX	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	19.7%	17.6%
Cable	63.5%	17.5%	62.9%	16.1%	62.0%	14.4%	43.0%	7.8%
DOCSIS 3.0	59.7%	15.9%	55.3%	7.3%	47.3%	3.9%	41.6%	7.0%
HSPA	97.0%	90.0%	95.7%	86.5%	91.3%	73.9%	97.1%	85.5%
LTE	39.1%	9.9%	35.5%	7.3%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	98.5%	95.0%	98.0%	93.7%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	94.4%	84.2%	91.8%	77.5%	89.4%	77.4%	97.2%	89.8%
NGA broadband	75.7%	17.9%	59.7%	10.1%	52.8%	3.9%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

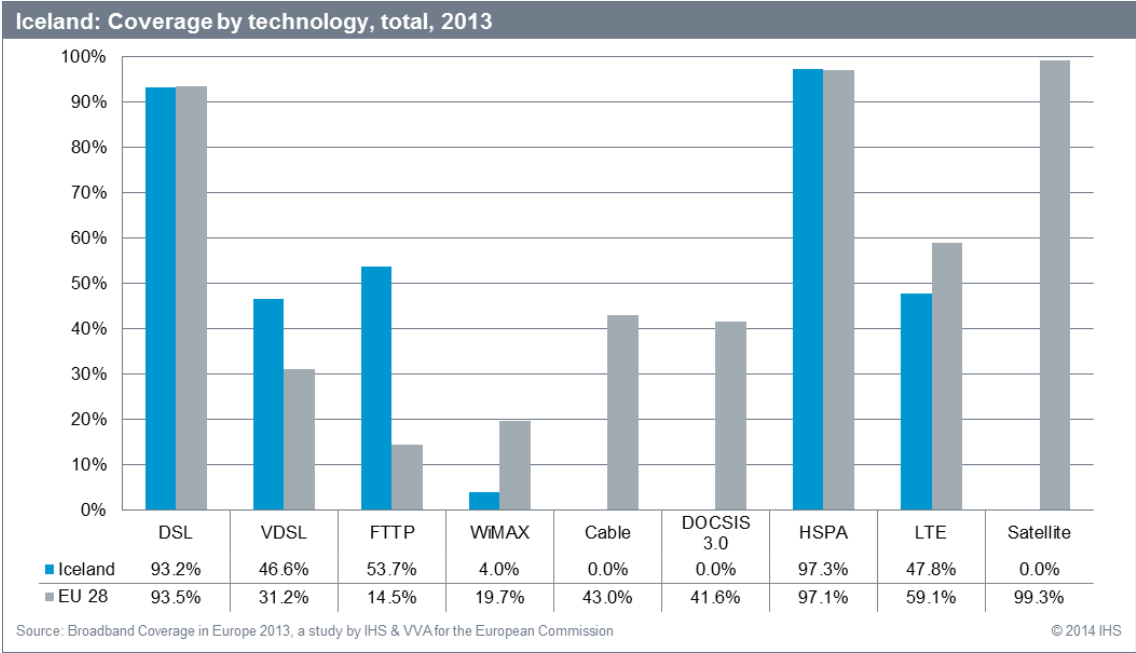
5.14 Iceland

5.14.1 National coverage by broadband technology

Iceland maintained its position close to the European Union average in all of the technology combinations in 2013, with improvements registered relative to 2012 across each of them, aside from NGA rural coverage. The most relevant increase was reported for total NGA, which reached 60.5% of homes, closing the gap with the EU 28 average.



From a specific technology perspective the most prominent change in 2013 was in LTE coverage. Expansion in LTE availability was significant, and coverage grew from 0% in 2012 to 47.8% of households in 2013. Telecoms groups Nova and Vodafone Iceland both launched LTE services in 2013.

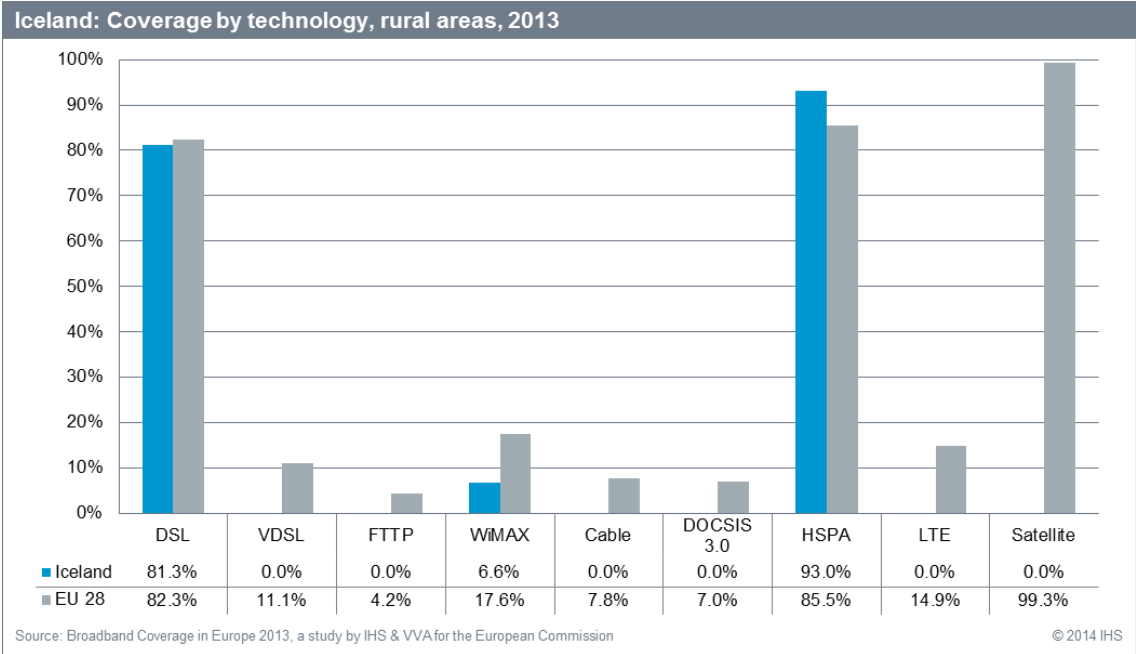


FTTP also increased slightly in coverage, with a total of 54.7% homes passed in 2013, above the European average. In 2012 FTTP and VDSL registered solid improvements, although in 2013 the increases slowed in rate, with VDSL increasing by less than 2 percentage points.

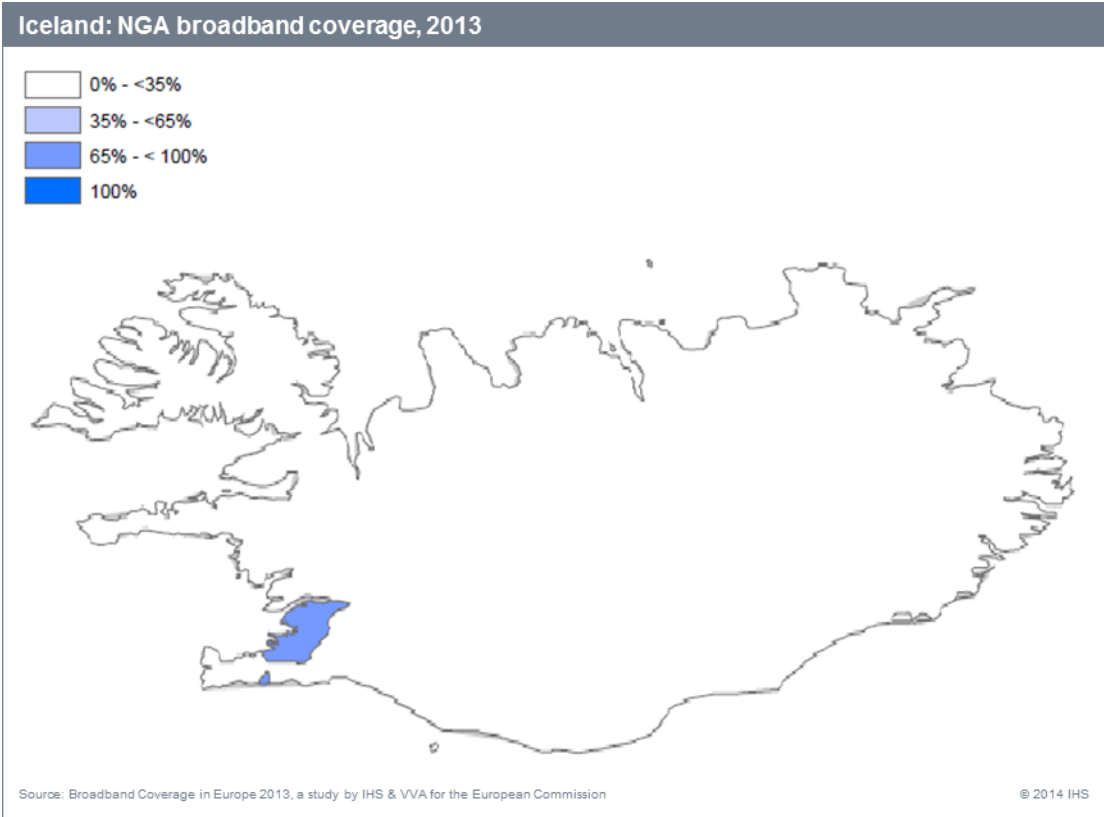
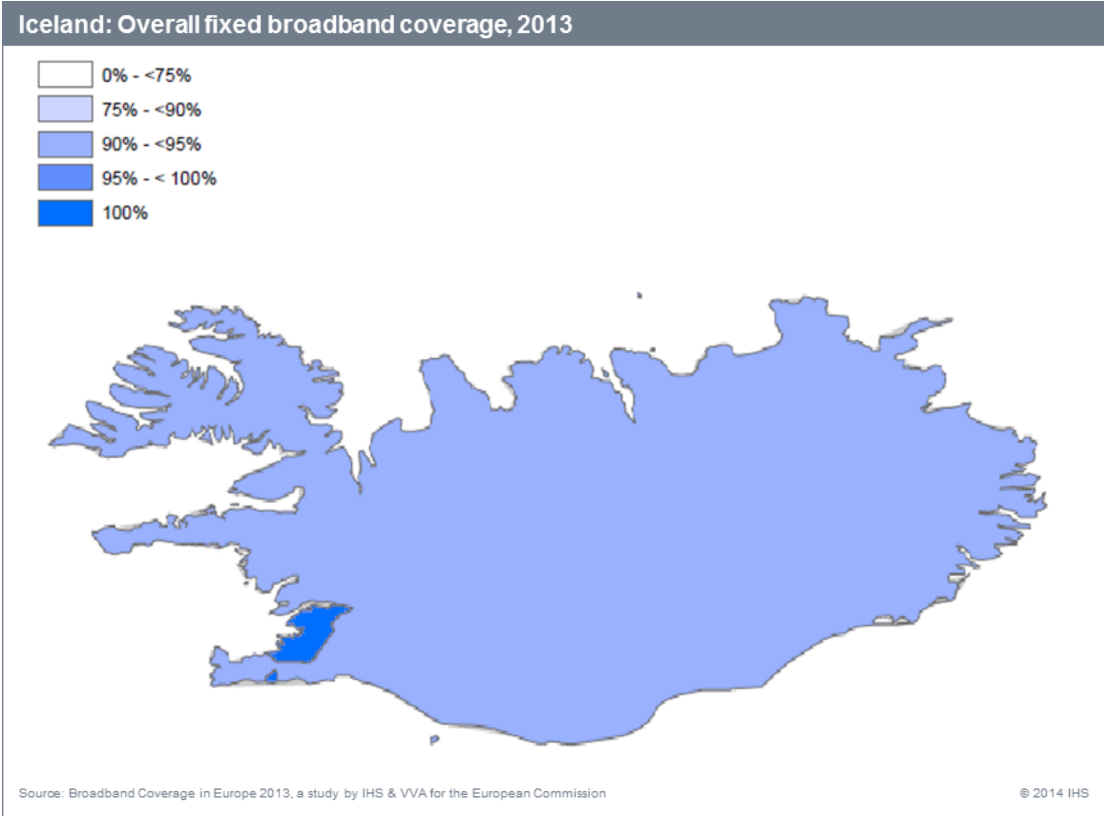
Cable broadband and satellite coverage were both reported to be absent in the country in 2013.

In rural areas, few changes were reported in 2013. HSPA coverage increased by 3.9 percentage points in the year, reaching 93.0% of rural households at the end of 2013. But alongside cable broadband and satellite, which were not available across Iceland as a whole in 2013, VDSL, FTTP and LTE (available in urban areas) were reported as unavailable in rural areas. Rural DSL and WiMAX coverage did not change significantly during the year compared to 2012.

These results (particularly for fixed technologies) are partly explained by the geographical nature of Iceland, and its impact on distribution of people – Iceland has very low population density outside the major towns.



5.14.2 Regional coverage by broadband technology



5.14.3 Regulatory and market overview

The most comprehensive description of Icelandic governmental policy on IT and broadband was published in 2008, in “Iceland the e-nation”⁶⁰, with aims including improved service, efficiency of public service administration and participation of citizens in ecommerce, education and democracy.

Iceland’s telecom’s groups have adopted a mixed-technology strategy with regards to provisioning next-generation access, using both VDSL and FTTH technologies to provide fixed NGA coverage. Power company Reykjavik Energy began to develop a fibre access network in 2005⁶¹ which a range of ISPs rely on via an open-access model. Providers using the network include Vodafone Iceland, 365 and Simafelagid.

LTE services made their debut in Iceland in 2013, with two operators, Nova and Vodafone, launching operations. Telecommunications group Siminn followed at the beginning of 2014 with its own services⁶².

⁶⁰ http://eng.forsaetisraduneyti.is/media/utgefifedfni/Iceland_the_eNation.pdf

⁶¹ http://www.alacrastore.com/moodys-credit-research/Orkuveita-Reykjavikur-PBC_101741

⁶² <http://gvpublication.com/siminn-launches-lte/>

5.14.4 Data tables for Iceland

Statistic	National
Population	319,575
Persons per household	2.5
Rural proportion	36.2%

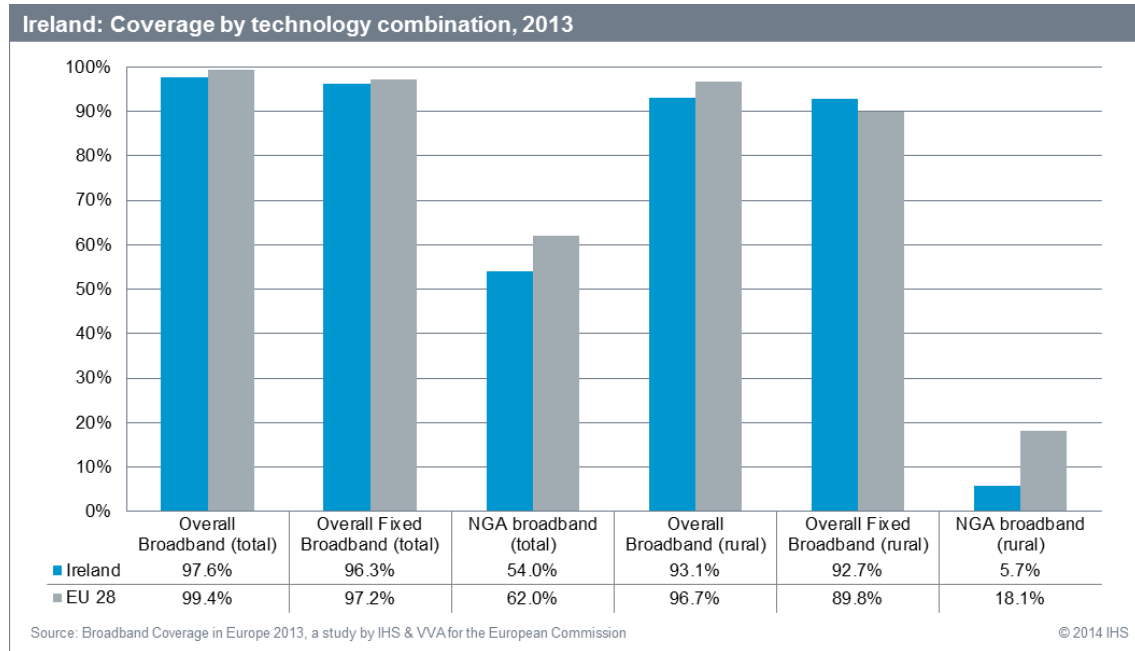
Technology	Iceland 2013		Iceland 2012		Iceland 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	93.2%	81.3%	93.2%	81.3%	93.2%	81.3%	93.5%	82.3%
VDSL	46.6%	0.0%	44.7%	0.0%	22.4%	0.0%	31.2%	11.1%
FTTP	53.7%	0.0%	45.1%	0.0%	38.3%	0.0%	14.5%	4.2%
WiMAX	4.0%	6.6%	4.0%	6.6%	4.0%	6.6%	19.7%	17.6%
Cable	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	43.0%	7.8%
DOCSIS 3.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	41.6%	7.0%
HSPA	97.3%	93.0%	96.0%	89.1%	96.0%	89.1%	97.1%	85.5%
LTE	47.8%	0.0%	0.0%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	99.3%	99.3%
Overall broadband	98.7%	96.5%	98.2%	95.0%	-	-	99.4%	96.7%
Overall fixed broadband	96.6%	84.6%	94.4%	84.6%	94.4%	84.6%	97.2%	89.8%
NGA broadband	60.5%	0.0%	54.1%	0.0%	44.6%	0.0%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

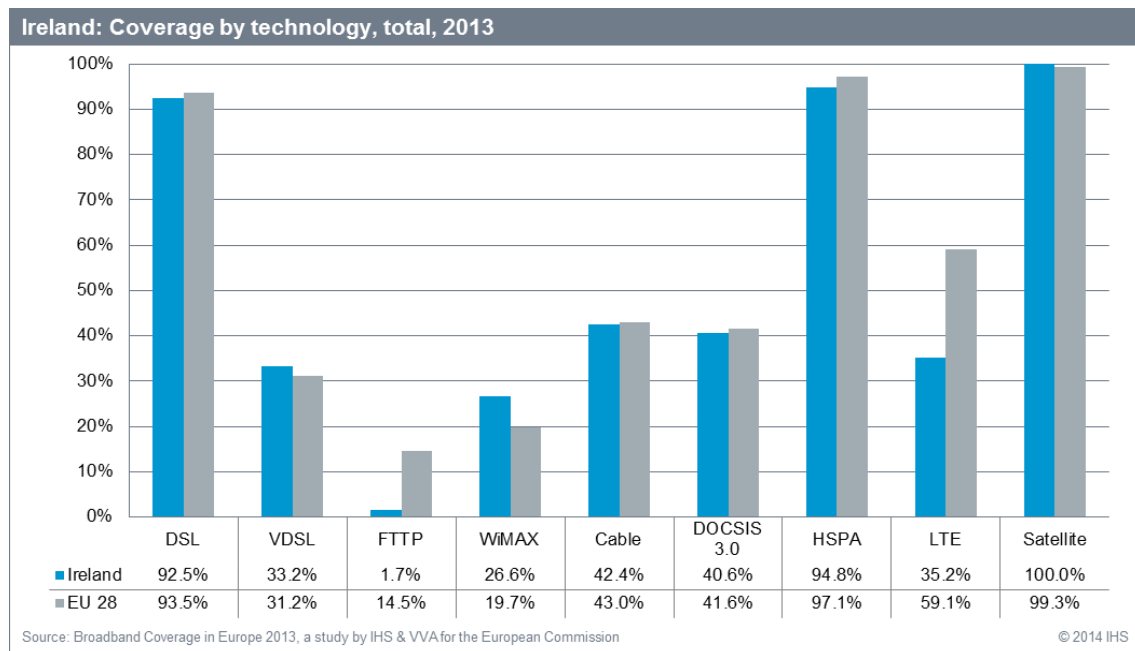
5.15 Ireland

5.15.1 National coverage by broadband technology

During 2013 Irish operators reported significant increases in NGA coverage. Nationally, NGA coverage increased in 2013 by almost 12 percentage points to 54% of homes, while in rural areas the increase was of 4.3 percentage points to 5.7%. Overall fixed broadband in rural areas is above the European average, although NGA coverage remains below average.

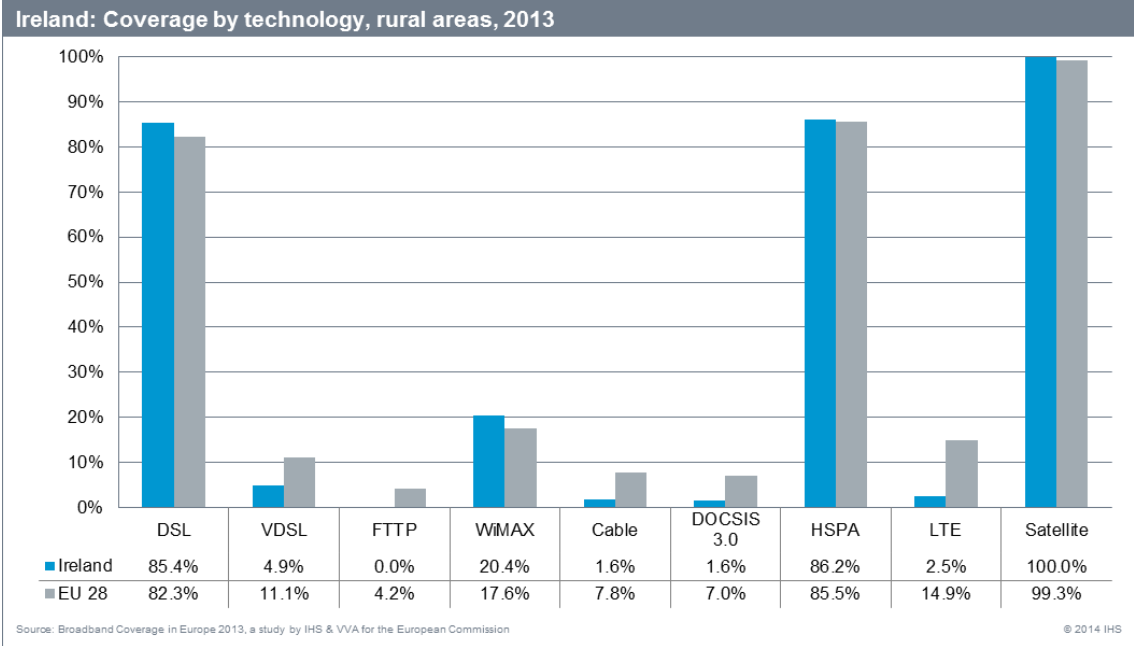


Charting coverage by technology illustrates the launch of VDSL and LTE services which took place during 2013. VDSL coverage increased from 0% to 33.2% while LTE coverage increased from 0% to 35.2%.



The Irish incumbent, Eircom, launched its 'eFibre' service in May 2013 offering a downstream speed up to 70 Mbps and in September 2013 became the first telco to launch an LTE service in Ireland⁶³. Vodafone Ireland launched its 'fibre powered broadband' service offering speeds up to 70 Mbps in May 2013⁶⁴.

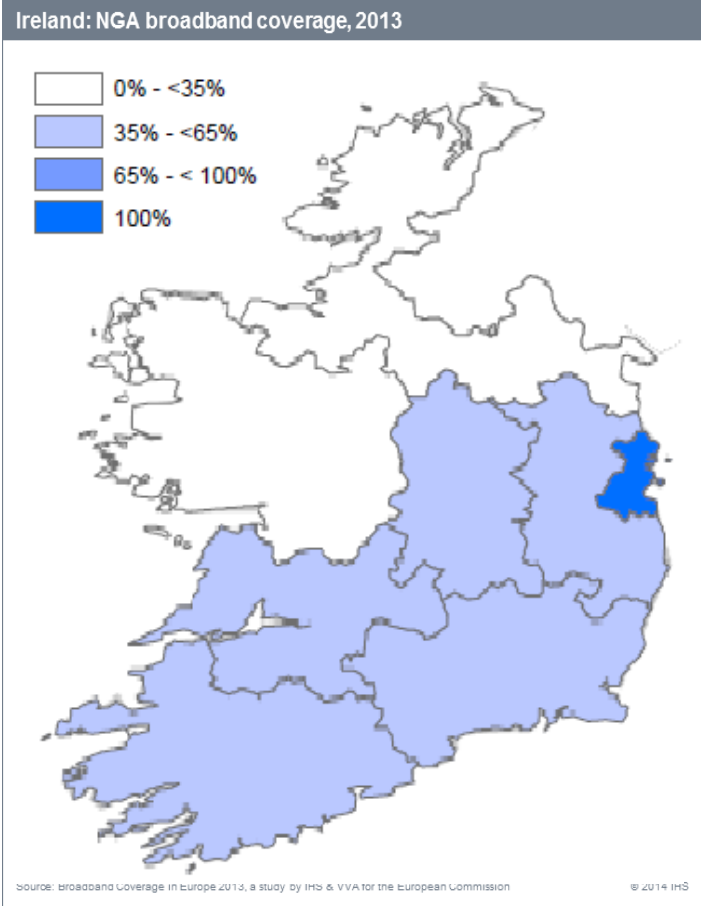
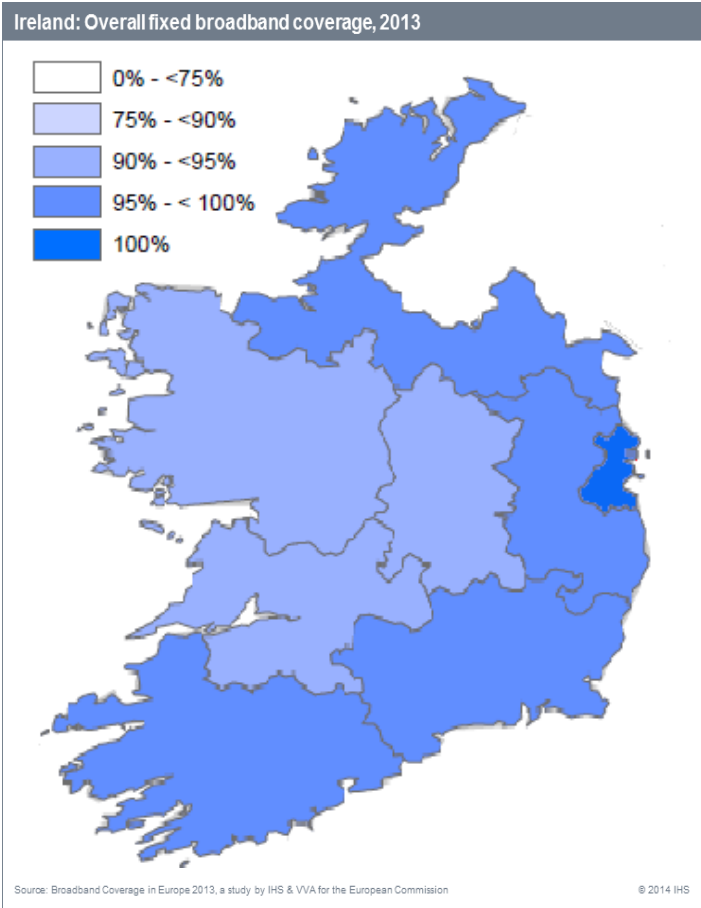
In rural areas both VDSL and LTE are now present due to recent service launches. VDSL increased from 0 to 4.9% but ended the year at half the European average. LTE services, alongside their urban rollout, recorded low-level increases in coverage in rural areas, with 2.5% of rural homes covered in 2013. WiMAX coverage did not show increase, but remained ahead of the EU 28 average.



⁶³ <http://www.siliconrepublic.com/comms/item/32664-eircom-goes-live-with-up-to>

⁶⁴ <http://www.telecompaper.com/news/vodafone-ireland-launches-fibre-broadband-services--944361>

5.15.2 Regional coverage by broadband technology



5.15.3 Regulatory and market overview

The National Broadband plan published in 2012 outlines the government policy on the delivery of high speed broadband services and specifies targets for delivery and roll-out⁶⁵.

The main target speeds expected as a result of industry and government investment include:

- 70 Mbps – 100 Mbps available to at least 50% of the population whereby the majority has access to 100 Mbps,
- At least 40 Mbps to at least a further 20% of the population and as much as 35% around smaller towns and villages,
- A minimum of 30 Mbps available to all.

The Next Generation Broadband Taskforce (NGBT) assessed the current situation to see how far they were from their targets. They found that, due to services available at that time, they were close to meeting their some of their targets.

Due to cable broadband services offered by UPC Ireland, 35% of the population had access to speeds of 100 Mbps. Looking forward, due to services recently launched by Eircom and Vodafone Ireland more than 50% of the population will have access to speeds of 70 Mbps and above and 41% will have access to speeds of 100 Mbps.

In 2013, Hutchinson's Three Ireland agreed to acquire O2 Ireland for EUR 850 million⁶⁶ (the acquisition was completed in May 2014). Hutchinson launched its LTE service in January 2014⁶⁷ while O2 also provides LTE services. This launch is expected to further increase LTE coverage over the subsequent 12 months.

In the long term, FTTP coverage in Ireland is set to increase following Vodafone Ireland's EUR 450 million agreement with state-owned electricity provider ESB for the construction of a 100% FTTP network capable of supporting speeds up to 1 Gbps. The 50:50 joint venture will utilize ESB's electricity infrastructure for network deployment initially covering 500,000 premises (representing 30% of all Irish households) across 50 towns⁶⁸.

⁶⁵ <http://www.dcenr.gov.ie/Communications/Communications+Development/Next+Generation+Broadband/>

⁶⁶ <http://www.siliconrepublic.com/business/item/33180-telef-nica-agrees-to-sell-o>

⁶⁷ <http://www.eurocomms.com/industry-news/49-online-press/9574-three-ireland-to-launch-4g-lte-next-week>

⁶⁸ <http://www.vodafone.com/content/index/media/vodafone-group-releases/2014/esb-vodafone-ireland.html>

5.15.4 Data tables for Ireland

Statistic	National
Population	4,582,769
Persons per household	2.6
Rural proportion	38.6%

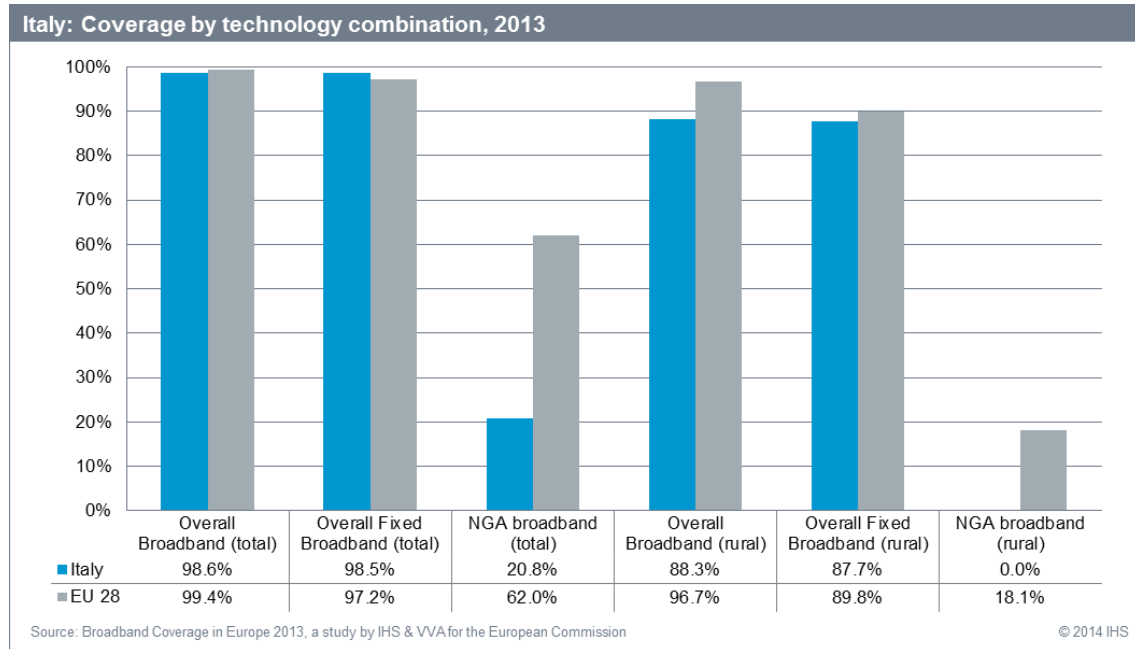
Technology	Ireland 2013		Ireland 2012		Ireland 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	92.5%	85.4%	94.3%	85.3%	94.3%	85.3%	93.5%	82.3%
VDSL	33.2%	4.9%	0.5%	0.0%	0.5%	0.0%	31.2%	11.1%
FTTP	1.7%	0.0%	1.7%	0.0%	1.7%	0.0%	14.5%	4.2%
WiMAX	26.6%	20.4%	26.6%	20.4%	26.6%	20.4%	19.7%	17.6%
Cable	42.4%	1.6%	42.4%	1.4%	38.4%	1.4%	43.0%	7.8%
DOCSIS 3	40.6%	1.6%	41.8%	1.4%	30.1%	0.0%	41.6%	7.0%
HSPA	94.8%	86.2%	94.6%	86.0%	94.6%	86.0%	97.1%	85.5%
LTE	35.2%	2.5%	0.0%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	97.6%	93.1%	97.8%	94.4%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	96.3%	92.7%	97.1%	92.5%	94.5%	92.5%	97.2%	89.8%
NGA broadband	54.0%	5.7%	42.1%	1.4%	31.2%	0.0%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

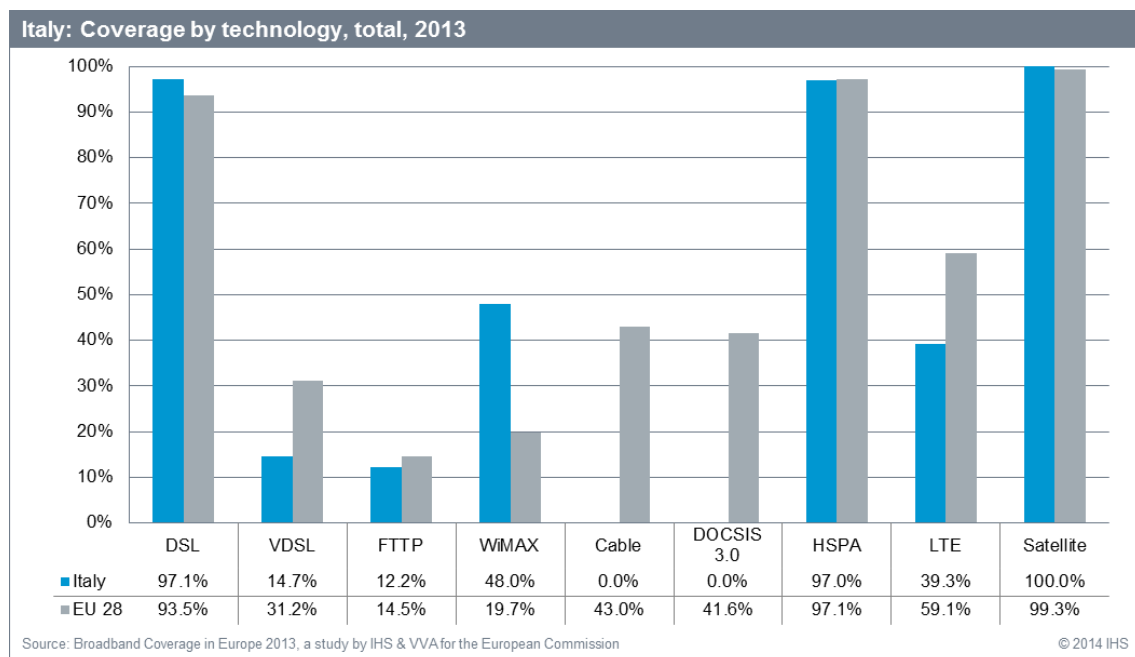
5.16 Italy

5.16.1 National coverage by broadband technology

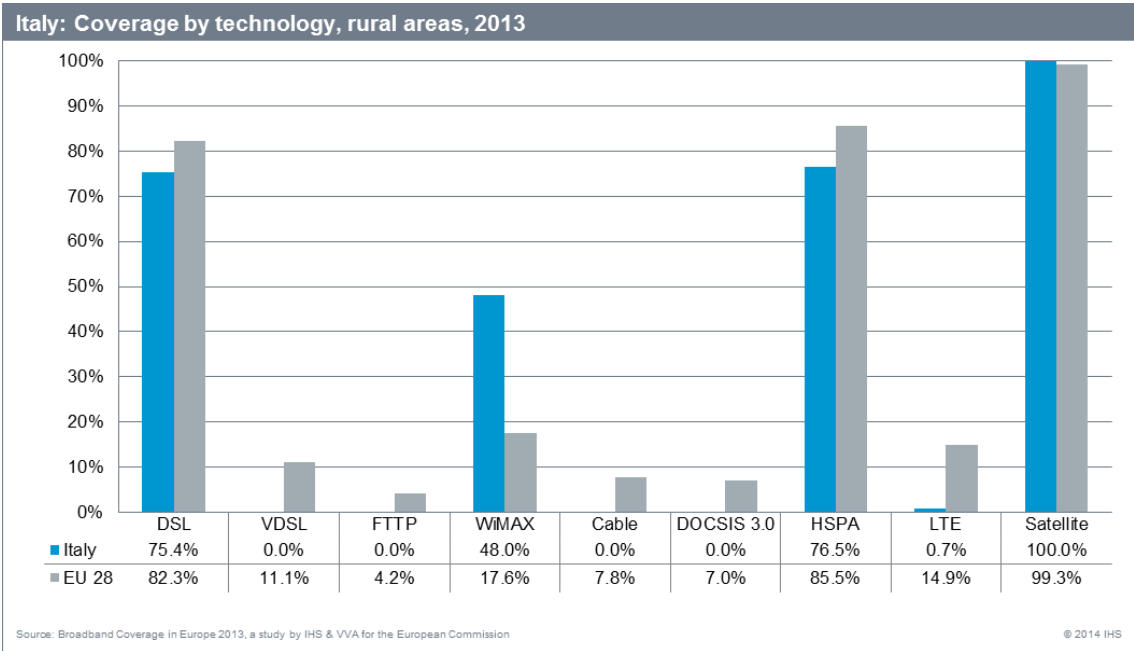
Overall broadband coverage and overall fixed broadband coverage in Italy in 2013 registered at close to the EU average for overall and fixed coverage combinations, but Italian NGA access remains below average nationally and negligible in rural areas.



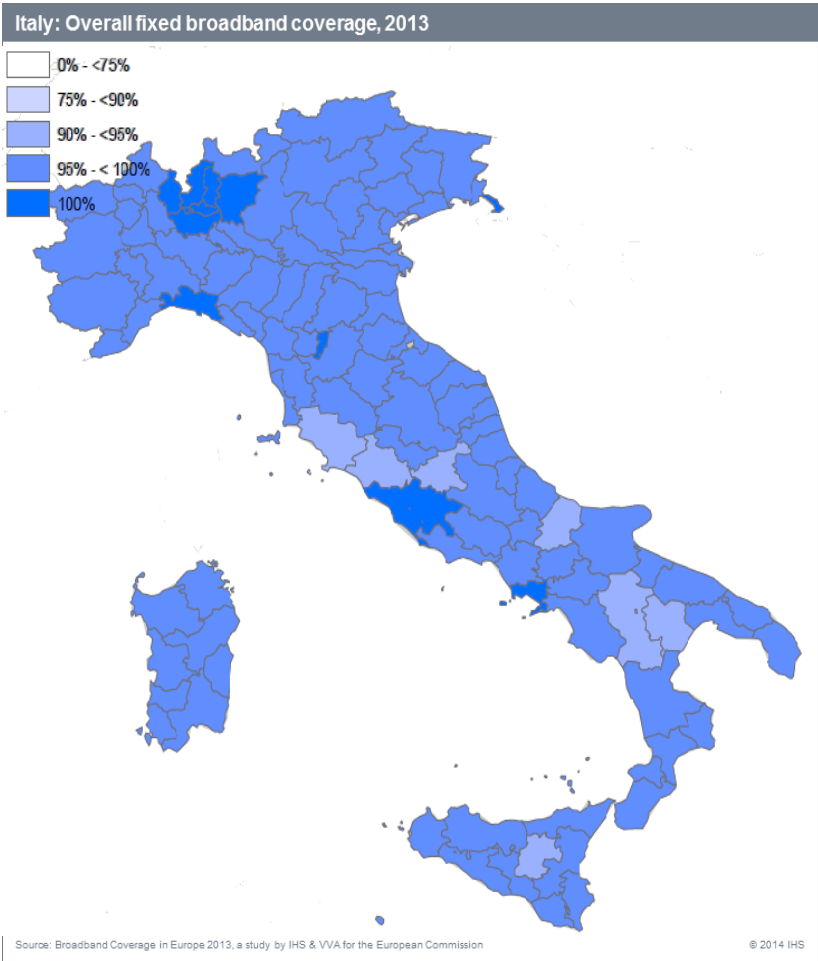
NGA coverage in Italy is behind that of average EU markets, but Italian operators have progressed with respect to VDSL and LTE coverage during 2013. VDSL coverage increased by more than 10 percentage points from 4.5% to 14.7% as Telecom Italia began to deploy next-generation infrastructure, but still registered at below the EU average at 31.2%. LTE coverage more than doubled from 17.0% to 39.3% in the year but again, this ended the period below the EU average which was more than 59%.



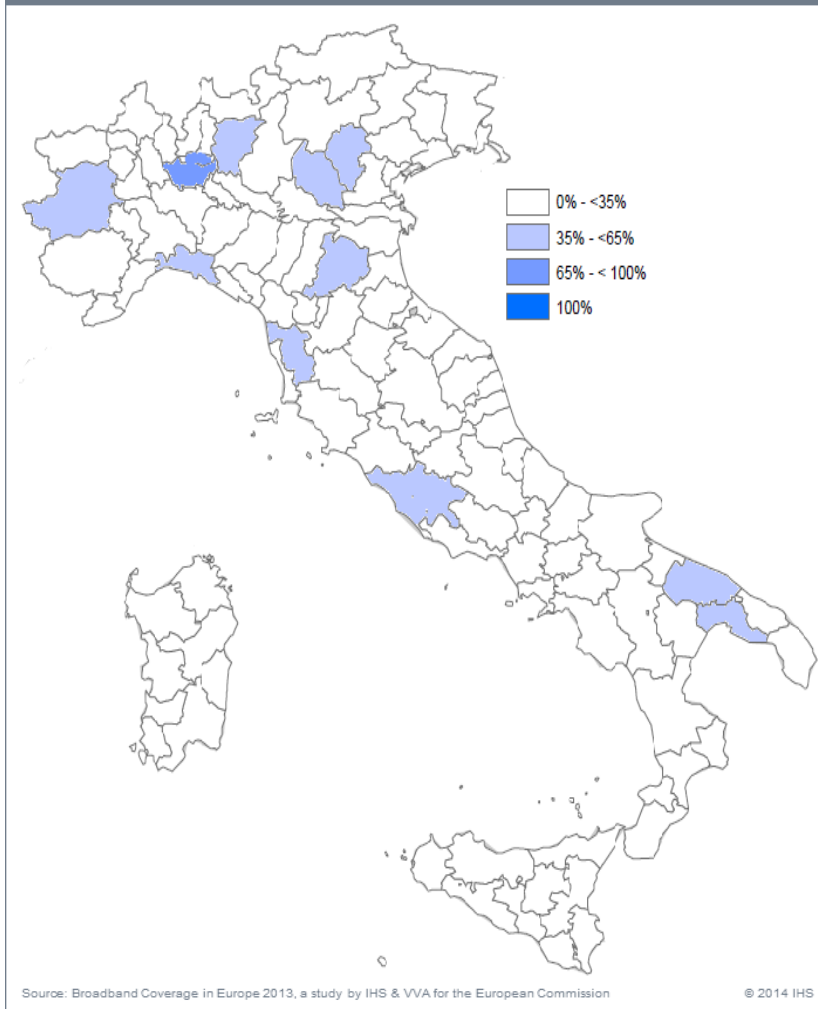
There were very few changes overall in the broadband coverage of rural Italy compared to 2012. Representation of NGA technologies in rural areas was non-existent, as evidenced by 0% coverage of VDSL, FTTP and DOCSIS 3.0.



5.16.2 Regional coverage by broadband technology



Italy: NGA broadband coverage, 2013



5.16.3 Regulatory and market overview

The roll-out of next-generation networks in Italy has been slow, but there have been a number of agreements announced over the past year. Many of these agreements involved wholesale infrastructure provider Metroweb and Italian incumbent Telecom Italia (TI).

Metroweb Italy, responsible for the extensive Milan-based fibre network rolled out by 2012 (in collaboration with Vodafone Italy and Wind), signed a deal with Bologna city council worth around EUR 15 million for the connection of 40,000 homes to a high-speed FTTH network. Works started in April 2014⁶⁹. TI also signed a deal with Bologna council, and by July 2014, had connected 200,000 property units to its high-speed broadband network in Bologna with a view to further expansion. As part of the works, the council gave both parties access to its electronic database showing available underground ducts so that the roll-out was as non-invasive as possible⁷⁰.

TI also signed a deal with Metroweb in March 2014 involving collaboration over fibre-optic networks in Milan. The deal includes 26,000 Milanese buildings, half of which have vertical FTTH connections owned by either Metroweb or TI. The deal is designed to prevent the unnecessary duplication of vertical fibre and to ensure appropriate network sharing⁷¹.

⁶⁹ <http://www.telecompaper.com/news/metroweb-to-roll-out-eur-15-mln-ftth-network-in-bologna--1000007>

⁷⁰ <http://www.telecomitalia.com/tit/en/archivio/media/comunicati-stampa/telecom-italia/mercato/business/2014/04-14.html>

⁷¹ <http://www.tmcnet.com/usubmit/2014/03/25/7743955.htm>

Following the signing of their cooperation agreement in 2012, Fastweb and TI plan to work on a number of high-speed network projects throughout the country⁷².

5.16.4 Data tables for Italy

Statistic	National
Population	58,931,702
Persons per household	2.4
Rural proportion	12.8%

Technology	Italy 2013		Italy 2012		Italy 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	97.1%	75.4%	96.9%	75.3%	97.0%	75.9%	93.5%	82.3%
VDSL	14.7%	0.0%	4.5%	0.0%	0.0%	0.0%	31.2%	11.1%
FTTP	12.2%	0.0%	11.8%	0.0%	10.7%	0.0%	14.5%	4.2%
WiMAX	48.0%	48.0%	45.0%	45.0%	30.0%	30.0%	19.7%	17.6%
Cable	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	43.0%	7.8%
DOCSIS 3.0	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	41.6%	7.0%
HSPA	97.0%	76.5%	96.5%	74.9%	95.5%	68.9%	97.1%	85.5%
LTE	39.3%	0.7%	17.0%	0.3%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	98.6%	88.3%	98.9%	91.1%	-	-	99.4%	96.7%
Overall fixed broadband	98.5%	87.7%	98.4%	87.5%	98.5%	87.9%	97.2%	89.8%
NGA broadband	20.8%	0.0%	14.0%	0.0%	10.7%	0.0%	62.0%	18.1%

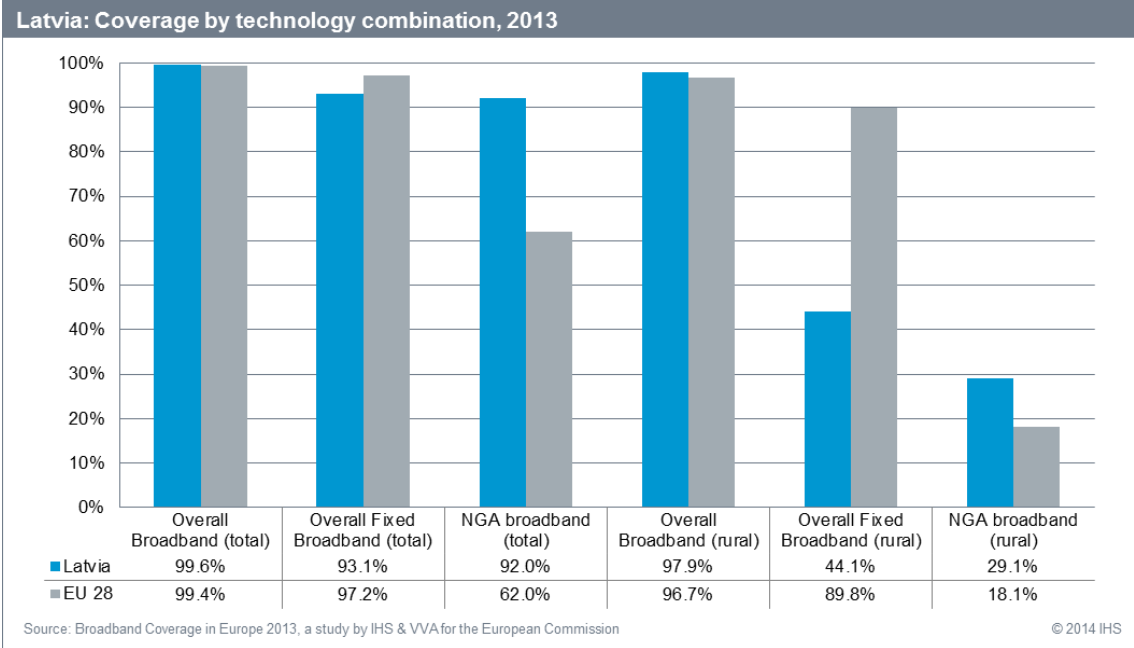
Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

⁷² <http://www.telecomitalia.com/tit/en/archivio/media/comunicati-stampa/telecom-italia/corporate/economico-finanziario/2012/09-14.html>

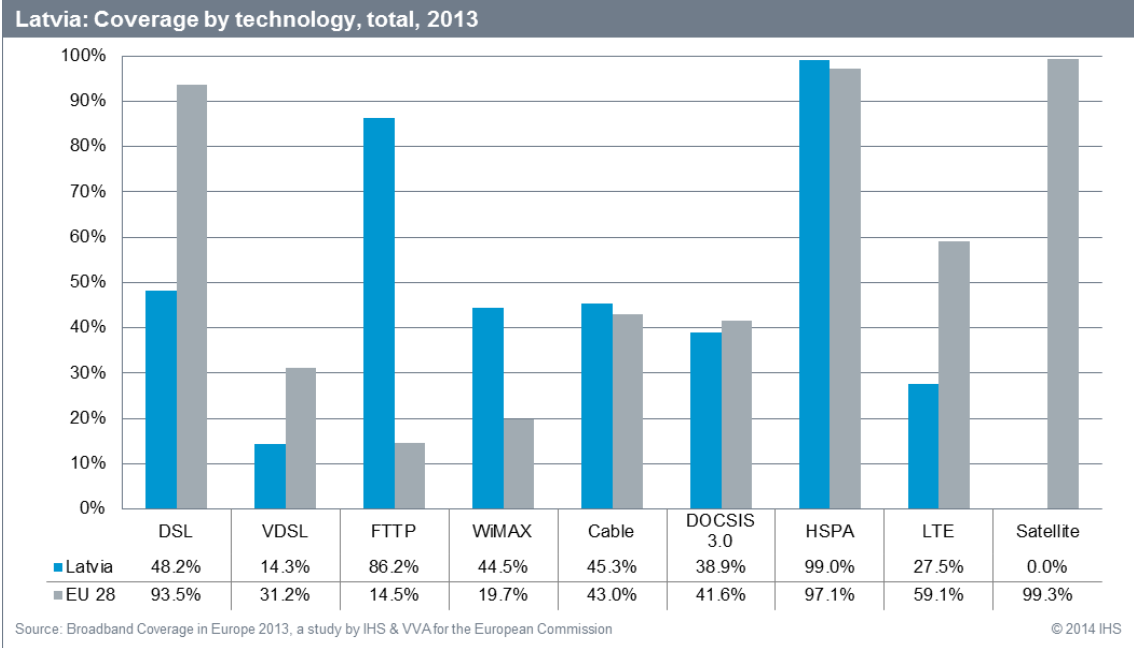
5.17 Latvia

5.17.1 National coverage by broadband technology

During 2013, Latvia improved its coverage using overall fixed broadband nationally and in rural areas. In particular, overall fixed broadband at a national level was up more than 10 percentage points to 93.1%. In terms of overall NGA coverage, availability nationally had also significantly increased, by more than 13 percentage points in the year, ending 2013 on 92.0% - above the EU average of 62.0%.



Investment in next generation access in Latvia has focused on FTTP at the expense of next-generation DSL technologies (in accordance with the national broadband strategy) - evidenced by FTTP coverage, which at 86.2% is more than five times higher than the EU average. VDSL coverage is consequently lower than the EU average, at 41.3% at year-end 2013 versus 31.2% across the EU as a whole.

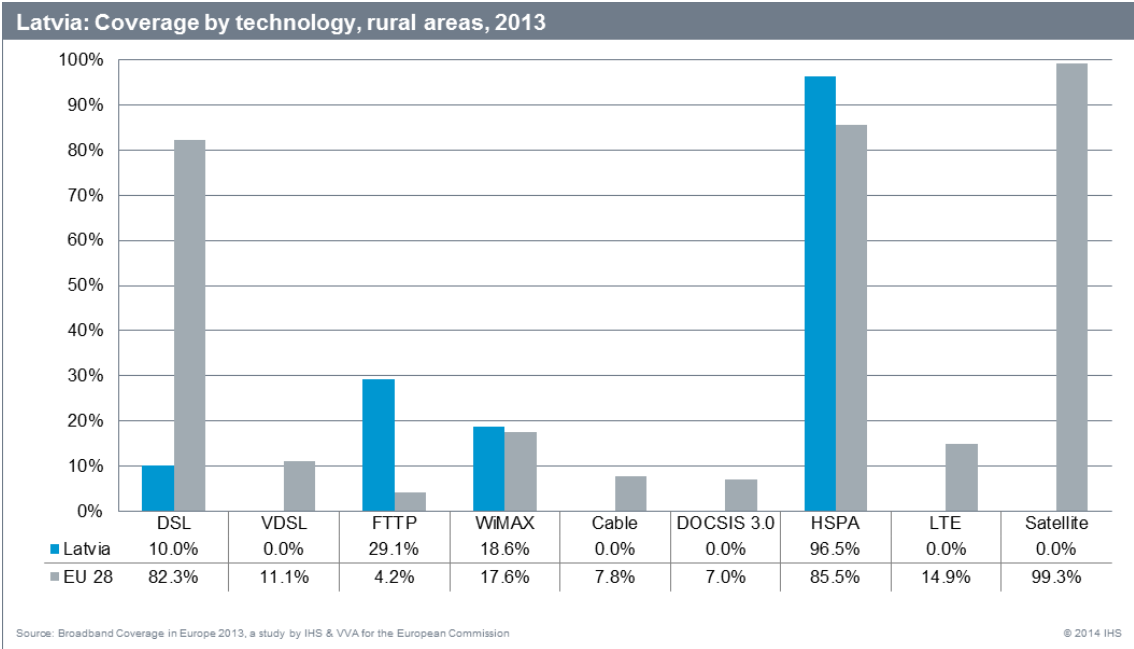


The majority of cable lines have now been upgraded to DOCSIS 3.0, and at 38.9%, coverage of DOCSIS 3.0 is close to the EU average of 41.6%.

LTE coverage also showed improvement in the year, increasing by 5.7 percentage points to 27.5%. Despite this increase, coverage remains below the EU average which increased from 27.9% in 2012 to more than 59% in 2013. Mobile operator LMT launched LTE services in Latvia in 2011⁷³.

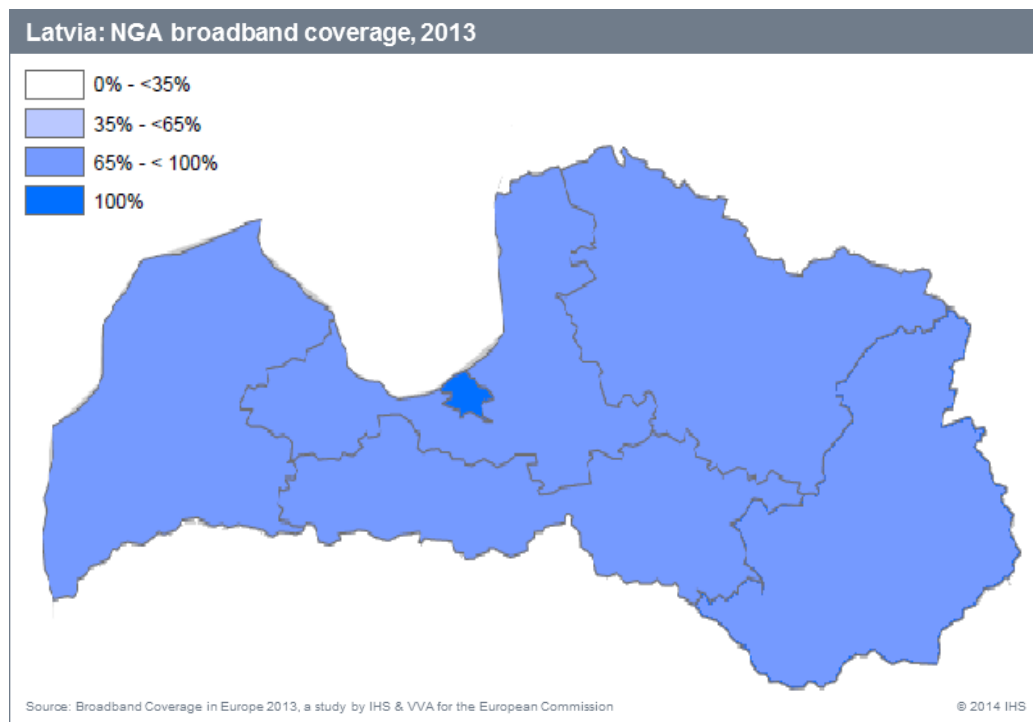
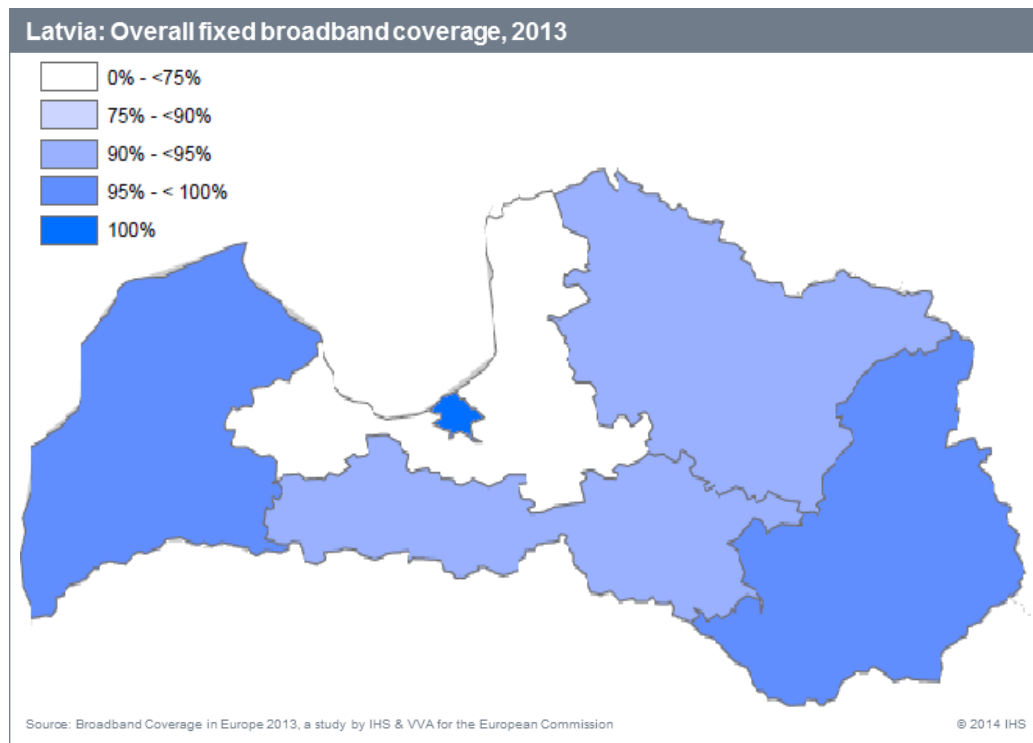
In rural areas across Latvia, overall fixed broadband coverage was low in 2013, at just 44.1% - roughly half the EU average. DSL coverage reached just 10% at year-end, although FTTP connections were available to 29.1% of rural homes.

Due to the absence of coverage by VDSL and DOCSIS 3.0, FTTP was solely responsible for rural NGA coverage during 2013. At 29.1%, this coverage had increased by almost 5 percentage points year-on-year and was more than seven times the EU average (4.2%). LTE coverage remained lacking at year-end, although HSPA technologies passed 96.5% of rural homes.



⁷³ IHS Mobile Technology 4G launch tracker

5.17.2 Regional coverage by broadband technology



5.17.3 Regulatory and market overview

Latvia's national broadband strategy was adopted in 2013 and will be valid until 2020. The main objective is to expand its existing FTTP network so it is capable of supporting high-speed services nationally by 2020⁷⁴.

As part of the project, the Latvian government will support the development of fibre networks in rural areas with no broadband coverage. There will be two distinct phases, the first being that by 2015 there will be 1900 – 2000 Km of fibre lines installed and by 2020 there will be 7000 Km of fibre lines.

Latvian incumbent Lattelecom initially announced plans to roll out a FTTP network in early 2009, and was in a position to offer high-speed broadband services later that year⁷⁵. A few years later the EC approved a financial support scheme worth LVL 71.5 million for the deployment of next generation networks in the country capable of supporting speeds ranging from 30 to 100 Mbps⁷⁶.

LTE services were first launched in August 2011 by LMT, the largest mobile operator in Latvia⁷⁷. LMT has been working on increasing coverage and in May 2014 announced extending its LTE coverage to 50% of the population⁷⁸.

⁷⁴ <https://ec.europa.eu/digital-agenda/en/news/latvia-next-generation-network-rural-areas>

⁷⁵ http://site.lattelecom.lv/Lattelecom_group/about_Lattelecom_group/Lattelecom/?lvc_nav35826=7428

⁷⁶ <http://www.telegeography.com/products/commsupdate/articles/2011/11/10/ec-approves-latvian-support-scheme-for-superfast-broadband-infrastructure/>

⁷⁷ <http://nsn.com/news-events/press-room/press-releases/latvijas-mobilais-telefons-customers-first-in-latvia-to-enjoy-ultra-fast-4g-services>

⁷⁸ <http://www.itu.int/ITU-D/ict/newslog/Latvias+LMT+Extends+LTE+Footprint+To+50+Of+Population.aspx>

5.17.4 Data tables for Latvia

Statistic	National
Population	2,041,763
Persons per household	2.6
Rural proportion	28.2%

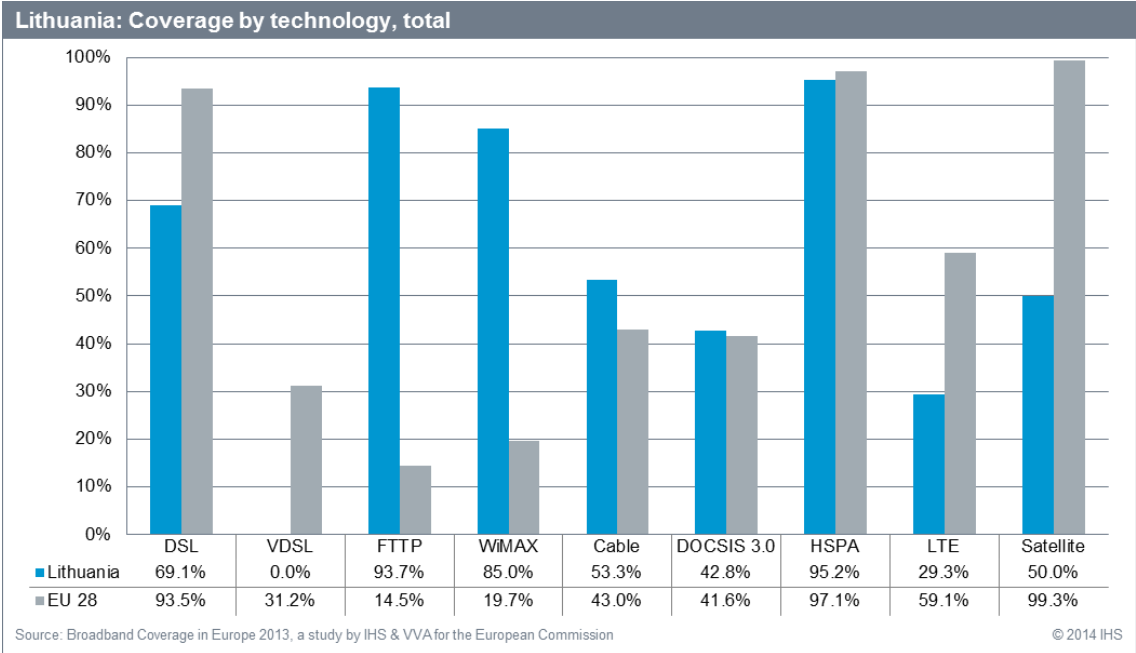
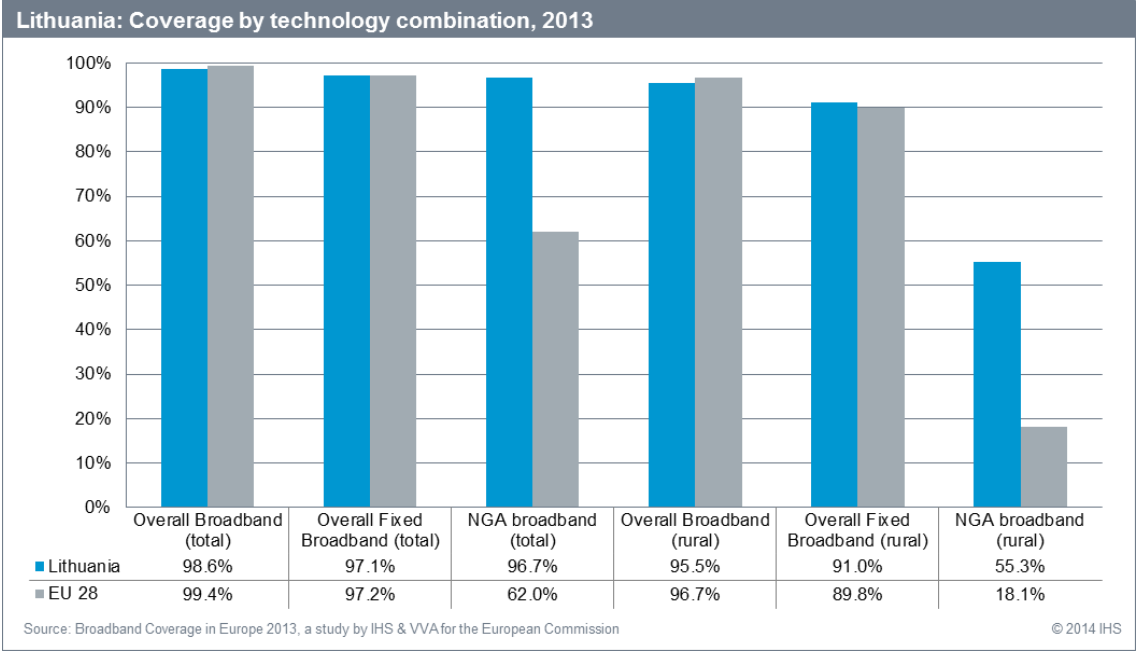
Technology	Latvia 2013		Latvia 2012		Latvia 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	48.2%	10.0%	47.9%	9.4%	52.9%	12.2%	93.5%	82.3%
VDSL	14.3%	0.0%	7.1%	0.0%	1.6%	0.0%	31.2%	11.1%
FTTP	86.2%	29.1%	78.5%	24.4%	60.8%	7.4%	14.5%	4.2%
WiMAX	44.5%	18.6%	39.4%	13.3%	31.6%	1.2%	19.7%	17.6%
Cable	45.3%	0.0%	41.4%	0.0%	33.1%	0.0%	43.0%	7.8%
DOCSIS 3.0	38.9%	0.0%	33.1%	0.0%	26.5%	0.0%	41.6%	7.0%
HSPA	99.0%	96.5%	99.0%	96.5%	99.0%	96.5%	97.1%	85.5%
LTE	27.5%	0.0%	21.8%	0.0%	2.4%	0.0%	59.1%	14.9%
Satellite	20.0%	20.0%	0.0%	0.0%	0.0%	0.0%	99.3%	99.3%
Overall broadband	99.6%	97.9%	99.5%	98.3%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	93.1%	44.1%	82.9%	39.8%	75.5%	20.8%	97.2%	89.8%
NGA broadband	92.0%	29.1%	78.5%	24.4%	66.0%	7.4%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

5.18 Lithuania

5.18.1 National coverage by broadband technology

In 2013 Lithuanian broadband coverage increased across all technology combinations, but in particular NGA coverage had increased notably. Nationally NGA coverage was up by more than 16 percentage points year-on-year, to 96.7%, higher than the EU average which was 62.0%. In rural areas, NGA increased by more than 13 percentage points to 55.3%, substantially higher than the EU average of 18.1%.



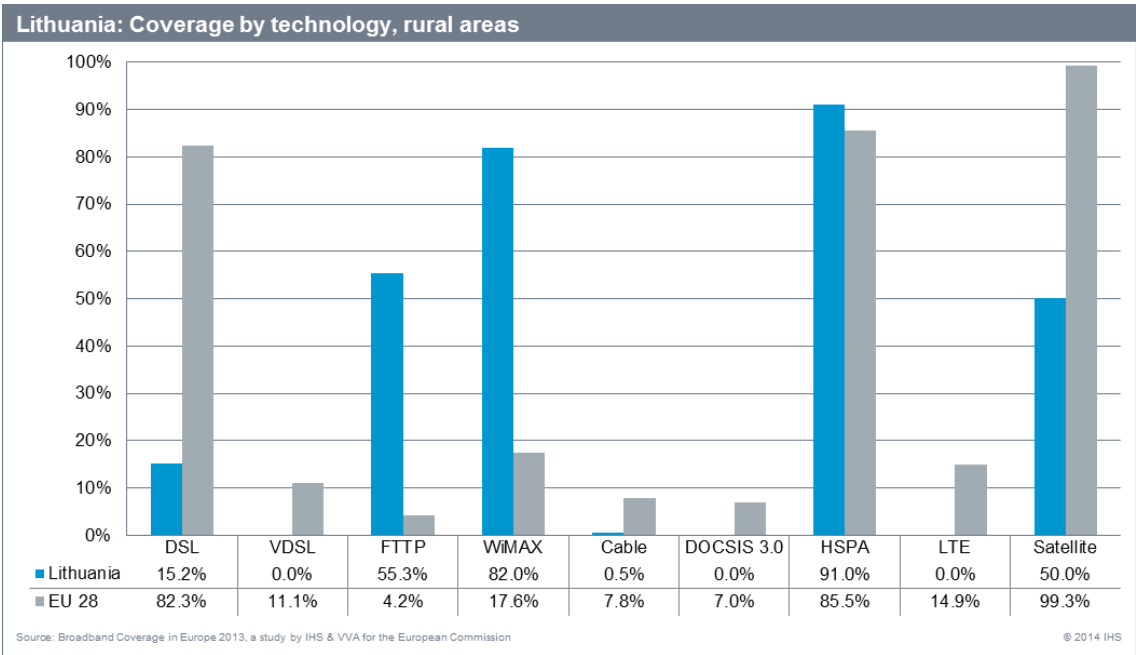
VDSL coverage in Lithuania is currently negligible and DOCSIS 3.0 coverage remained largely unchanged at 42.8% compared with 2012's 42.2%. Year-on-year changes in NGA availability were consequently largely a result of growth in FTTP coverage. Rather than upgrading copper infrastructure to VDSL services, telecoms groups in Lithuania have

focused primarily on FTTP. At 93.7% of households, this coverage was almost 14 percentage points higher year-on-year and over six times higher than the EU average.

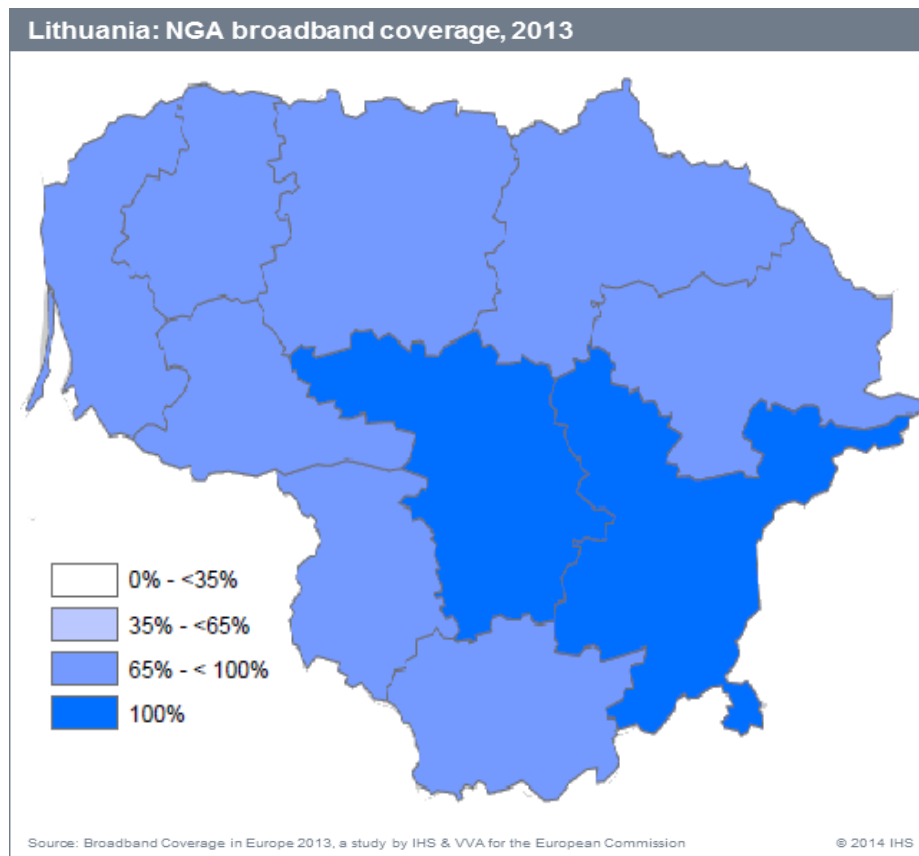
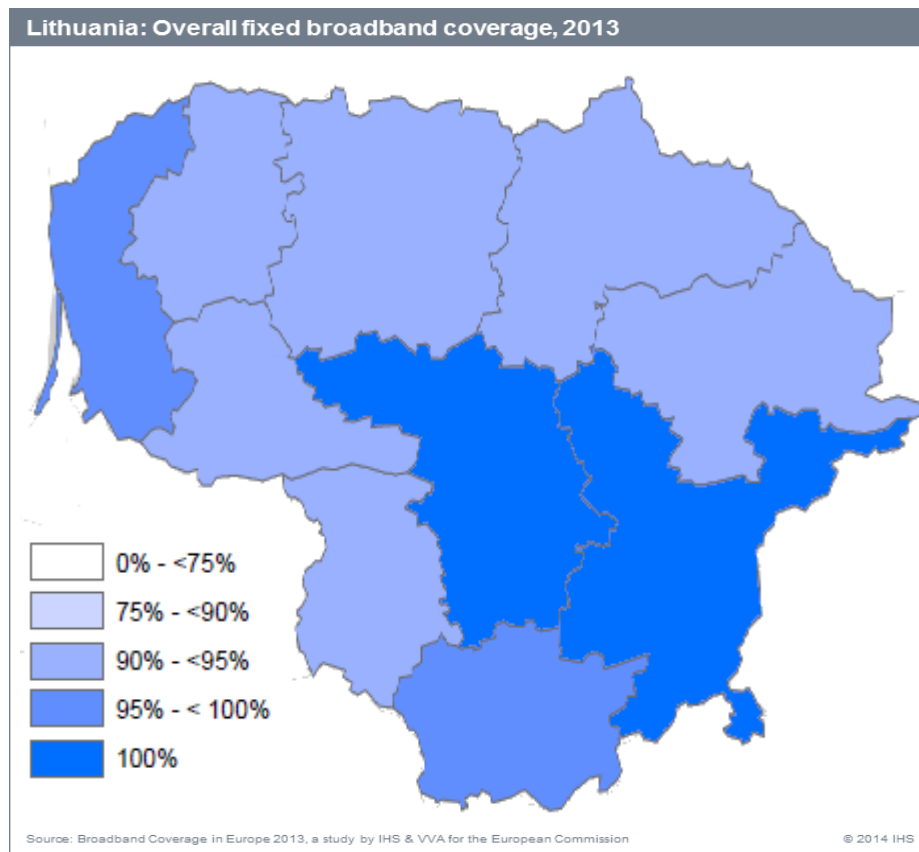
LTE coverage also increased by more than 10 percentage points to 29.3% but was still below the EU average at 59.1%. Mobile service provider Omnitel had launched LTE services in 2011, followed by Tele2 in 2013.

FTTP, WiMAX and HSPA are the main technologies used to cover rural areas, and all three reported high coverage. FTTP coverage of rural areas reached 55.3% in 2013 – over ten times the EU average.

HSPA coverage is also widespread with 91% coverage, an increase of more than 5 percentage points on 2012. WiMAX coverage at 82% was up only slightly on 2012 from 81.4%. FTTP coverage showed the greatest improvement however, and increased by more than 13 percentage points over the year to 55.3% as telecoms groups continued to roll-out infrastructure.



5.18.2 Regional coverage by broadband technology



5.18.3 Regulatory and market overview

The Lithuanian Information Society Development Programme was approved by the Lithuanian government in 2011 and is set to run until 2019⁷⁹ with a strategic review of the Programme planned in 2014. The main objectives of the programme include the provision of infrastructure in areas which are not economically viable for operators, increased competition in the broadband market and the enhancement of market regulation. The programme notes that all efforts should be made to ensure that all Lithuanian residents have access to broadband services with speeds higher than 30 Mbps by the end of the scheme.

Two projects currently being implemented which are aimed at the provision of broadband services in rural areas are the “Development of Rural Area Information Technology Broadband Network” (RAIN) from 2005 - 2008 and RAIN-2 from 2009 - 2013⁸⁰. The project is valued at EUR 60.5 million, EUR 51 million supplied by the ERDF and the rest supplied by the state⁸¹.

In Lithuania, FTTP is the technology of choice for NGA services and to this effect, the Lithuanian incumbent TEO has invested LTL 325 million in the expansion and upgrade of its fibre network from 2007 – 2011⁸². TEO is now in a position to offer services with speeds as high as 500 Mbps⁸³ to more than half the households in Lithuania.

⁷⁹ http://www3.lrs.lt/pls/inter3/dokpaieska.showdoc_l?p_id=425996

⁸⁰ http://nmhh.hu/dokumentum/2504/03__rain_tvaronavicius.pdf

⁸¹ http://www.mir.gov.pl/aktualnosci/fundusze_europejskie/Documents/RAIN_Varsuva_20100519_final.pdf

⁸² <http://arstechnica.com/tech-policy/2011/05/want-super-fast-broadband-try-lithuania/>

⁸³ <http://www.teo.lt/internetas/sviesolaidinis/9109>

5.18.4 Data tables for Lithuania

Statistic	National
Population	3,007,758
Persons per household	2.3
Rural proportion	34.3%

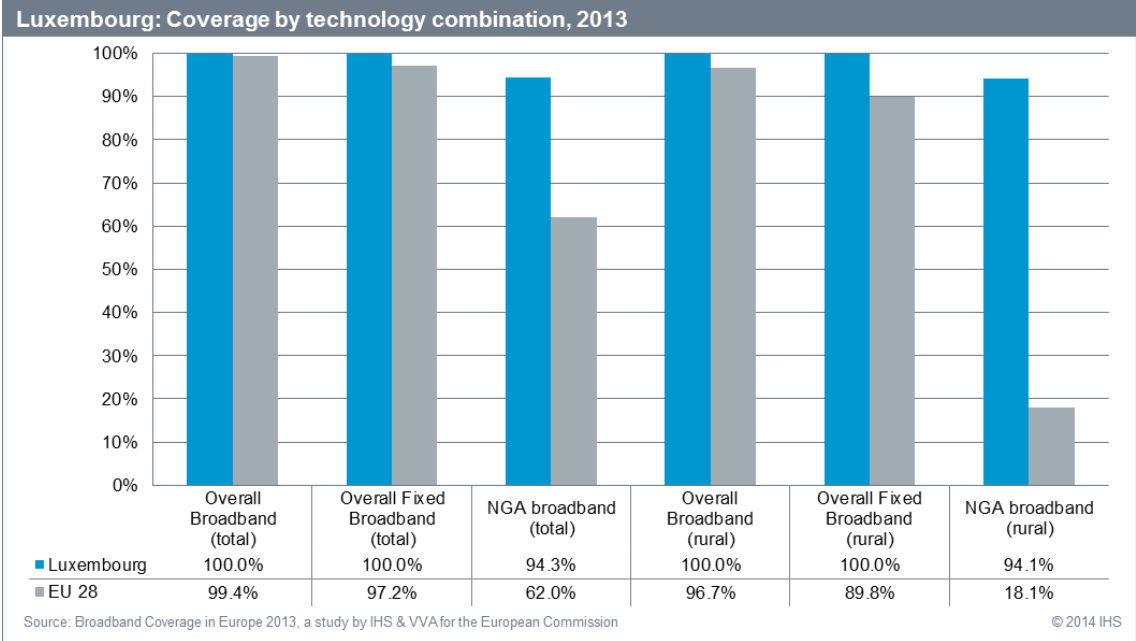
Technology	Lithuania 2013		Lithuania 2012		Lithuania 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	69.1%	15.2%	68.8%	15.1%	68.5%	14.8%	93.5%	82.3%
VDSL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	31.2%	11.1%
FTTP	93.7%	55.3%	80.0%	42.2%	59.4%	22.1%	14.5%	4.2%
WiMAX	85.0%	82.0%	84.9%	81.4%	60.0%	60.0%	19.7%	17.6%
Cable	53.3%	0.5%	53.0%	0.3%	52.8%	0.3%	43.0%	7.8%
DOCSIS 3.0	42.8%	0.0%	42.2%	0.0%	41.7%	0.0%	41.6%	7.0%
HSPA	95.2%	91.0%	95.1%	85.7%	95.0%	85.6%	97.1%	85.5%
LTE	29.3%	0.0%	18.7%	0.0%	12.1%	0.0%	59.1%	14.9%
Satellite	50.0%	50.0%	0.0%	0.0%	0.0%	0.0%	99.3%	99.3%
Overall broadband	98.6%	95.5%	97.8%	93.5%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	97.1%	91.0%	96.8%	90.7%	88.4%	70.1%	97.2%	89.8%
NGA broadband	96.7%	55.3%	80.0%	42.2%	62.2%	22.1%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

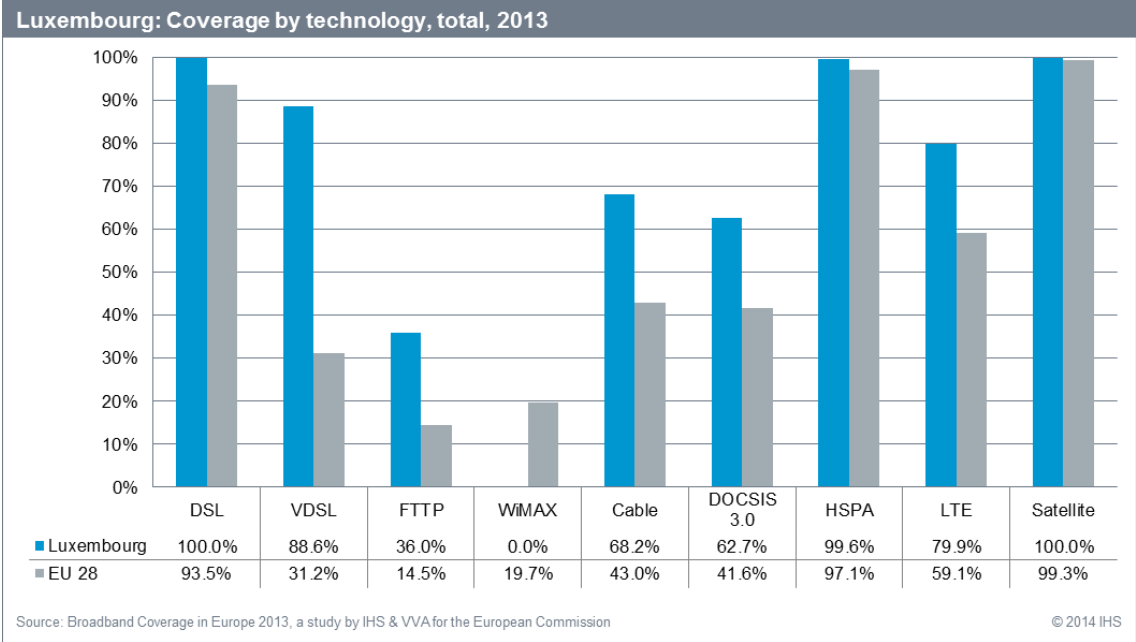
5.19 Luxembourg

5.19.1 National coverage by broadband technology

In 2013, Luxembourg remained ahead of the EU28 averages in 2013 across all technology combinations. The country has strong coverage for overall broadband (at 100% of homes) and overall fixed broadband, both nationally and in rural areas. The country also exhibits extensive NGA coverage, with 94.3% of households covered nationally.



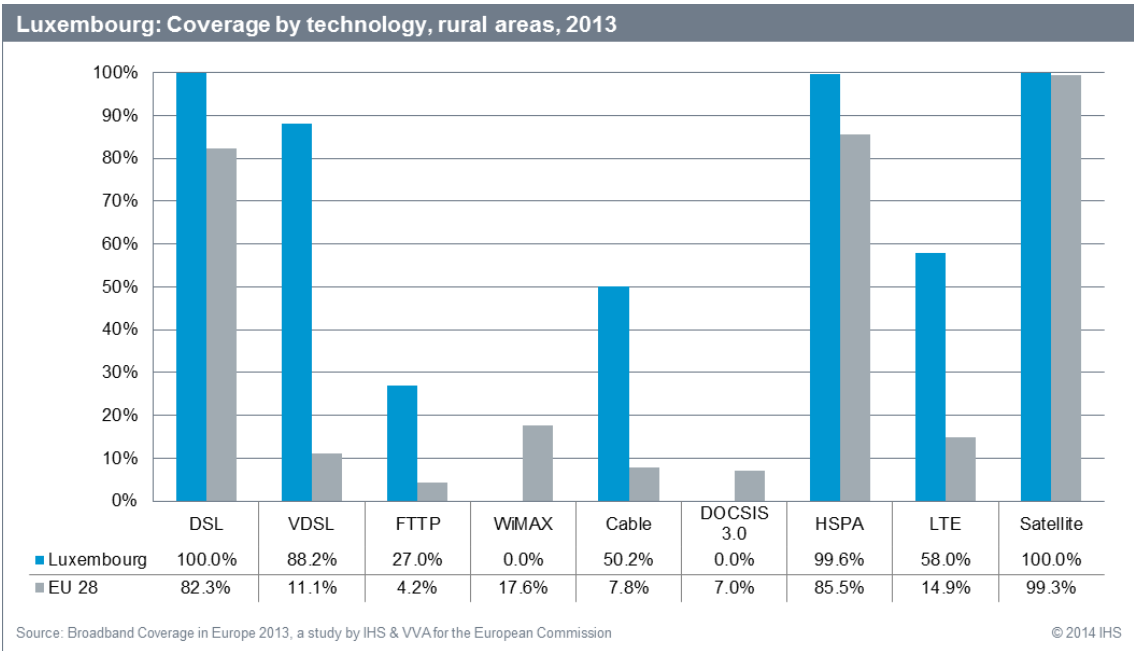
The country is ahead of the European average in all individual technology categories aside from WiMAX which is still not present. Geographically, the country covers a small area in comparison to its neighbours and extending coverage via NGA technologies such as FTTP and DOCSIS 3.0 has thus been a more straightforward exercise.



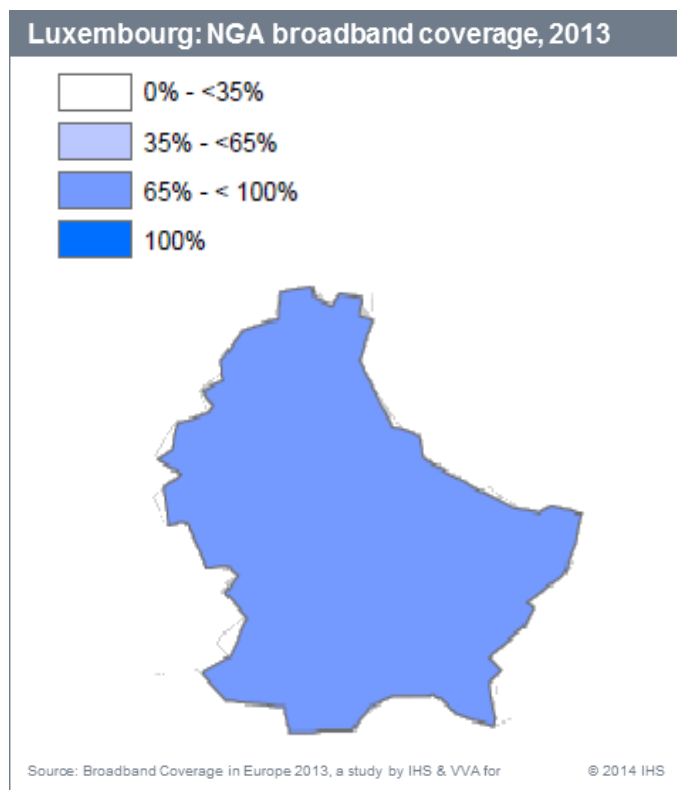
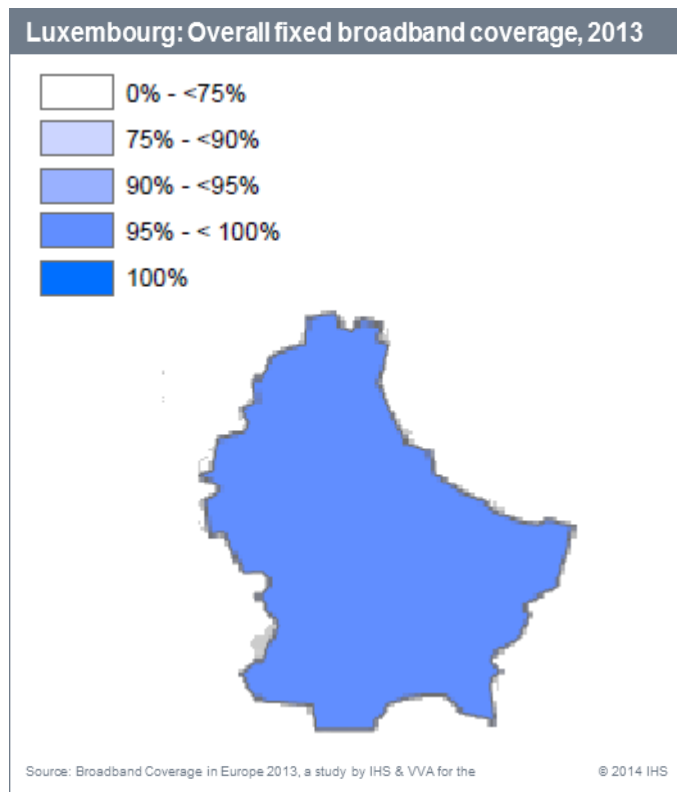
The above-average NGA coverage is largely due to very high VDSL coverage, which at 88.6% by the end of 2013 was more than twice the EU average (31.2% at end 2013). FTTP coverage, at 36%, was more than twice the EU average for FTTP (at 14.5% at year-end). The main driver of FTTP deployment is the government-backed 'National action plan for very high-speed networks'. Furthermore, DOCSIS 3.0 coverage reached 62.7% at the end of 2013, more than 20 percentage points above the EU average for the same period, of 41.6%.

The greatest improvement over the year however, was in LTE coverage, which grew from 64% to almost 80%. Coverage for LTE was almost 20 percentage points above the EU average for 2013. Operators including Orange, POST and Tango have launched LTE services in Luxembourg, from 2012 onwards.

In rural areas, LTE showed the greatest improvement during 2013, up from 0% to 58%. Cable coverage in rural areas was reported as more than 50% in 2013 while in 2012 it was recorded as 0%. This is because cable coverage in rural Luxembourg was not reported by the regulator in the previous report.



5.19.2 Regional coverage by broadband technology



5.19.3 Regulatory and market overview

The “National action plan for very high-speed networks” was published in April 2010 by the Luxembourg government and is valid from 2010 until 2020⁸⁴.

The main objectives include the provision of access for 100% of the population to a minimum service of 100 Mbps downstream and 50 Mbps upstream by 2015. Also, 50% of the population will have access to a minimum 1Gbps downstream speed and 500 Mbps upstream speed by 2015 and 100% will have access to services with these speeds by 2020.

P&T Luxembourg and Tango have been offering FTTP services since 2011⁸⁵, and during 2013 P&T Luxembourg incumbent has been testing the use of vectored VDSL2 as a way of delivering high speed services⁸⁶.

There were a number of significant changes in the LTE market resulting in increased coverage with this type of technology. In July 2012 three LTE licences were issued to P&T, Tango and Orange, and in October 2012 Tango and Orange Luxembourg launched the first LTE services in the country⁸⁷⁸⁸.

Since then, Tango initiated plans to expand its network to 90% and Orange announced increased coverage to 74% in mid-2014⁸⁹.

⁸⁴ <http://ict.investinluxembourg.lu/ict/sites/ict.investinluxembourg.lu/files/High-speed-for-all.pdf>

⁸⁵ <http://www.lightwaveonline.com/articles/2011/08/pt-luxembourg-readies-september-launch-for-luxfibre-ftth-internet-access-127449893.html>

⁸⁶ <http://www.fiercetelecom.com/story/pt-luxembourg-test-drives-alcotel-lucent-vectored-solution/2013-02-28>

⁸⁷ <http://www.wort.lu/en/luxembourg/4g-lte-licences-issued-in-luxembourg-50079f80e4b096b452e29ee0>

⁸⁸ <http://www.totaltele.com/view.aspx?ID=476833>

⁸⁹ <http://www.telegeography.com/products/commsupdate/articles/2014/06/20/orange-achieves-74-lte-coverage/>

5.19.4 Data tables for Luxembourg

Statistic	National
Population	537,039
Persons per household	2.4
Rural proportion	13.7%

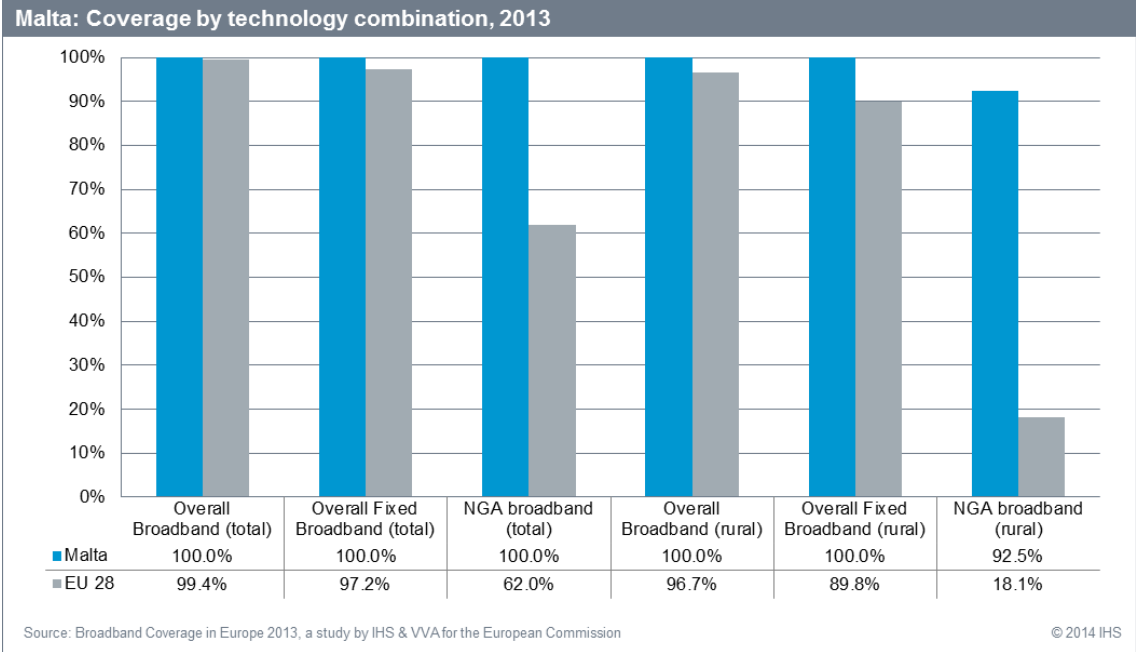
Technology	Luxembourg 2013		Luxembourg 2012		Luxembourg 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	100.0%	100.0%	99.8%	98.1%	99.8%	98.1%	93.5%	82.3%
VDSL	88.6%	88.2%	87.7%	82.5%	80.0%	75.3%	31.2%	11.1%
FTTP	36.0%	27.0%	31.8%	24.2%	23.1%	17.6%	14.5%	4.2%
WiMAX	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	19.7%	17.6%
Cable	68.2%	50.2%	69.6%	0.0%	63.5%	0.0%	43.0%	7.8%
DOCSIS 3.0	62.7%	0.0%	61.0%	0.0%	52.0%	0.0%	41.6%	7.0%
HSPA	99.6%	99.6%	99.6%	96.9%	99.6%	96.9%	97.1%	85.5%
LTE	79.9%	58.0%	64.0%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	100.0%	100.0%	99.9%	99.1%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	100.0%	100.0%	99.9%	99.1%	99.8%	98.1%	97.2%	89.8%
NGA broadband	94.3%	94.1%	93.8%	91.3%	85.2%	84.1%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

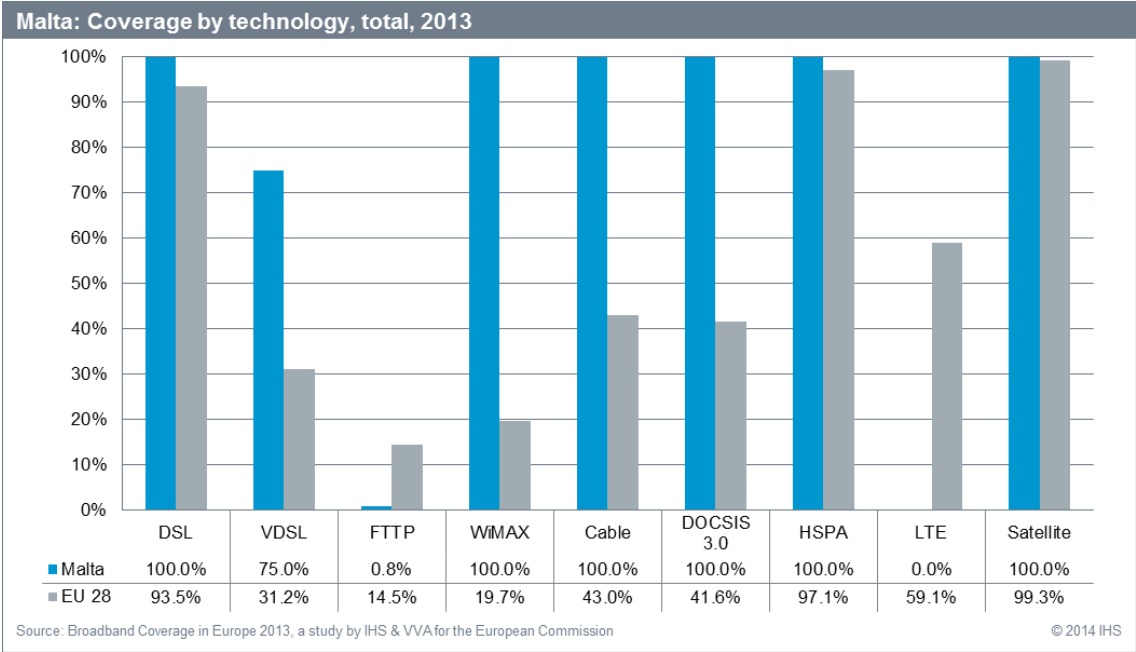
5.20 Malta

5.20.1 National coverage by broadband technology

The geographical nature of Malta as a small island nation helps the country maintain almost complete coverage along all technology combinations, with only NGA in rural areas not at 100% - although Malta's results for rural NGA are in the top three countries in Europe, together with Luxembourg and the Netherlands.

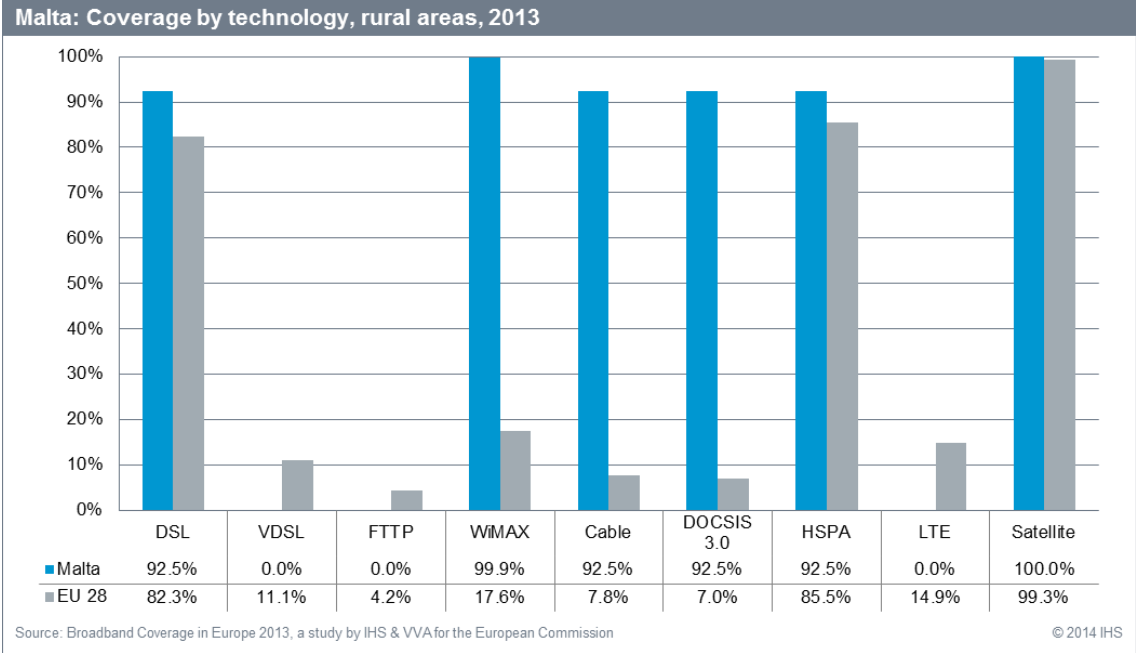


Malta registered strong coverage across categories in the 2012 study, and so no major changes were reported during the 2013 edition. DSL, WiMAX, standard cable, DOCSIS 3.0, HSPA and satellite have full technical coverage of the country. Cable company Melita had previously upgraded its network to provide complete DOCSIS 3.0 coverage – it began the process in 2011.



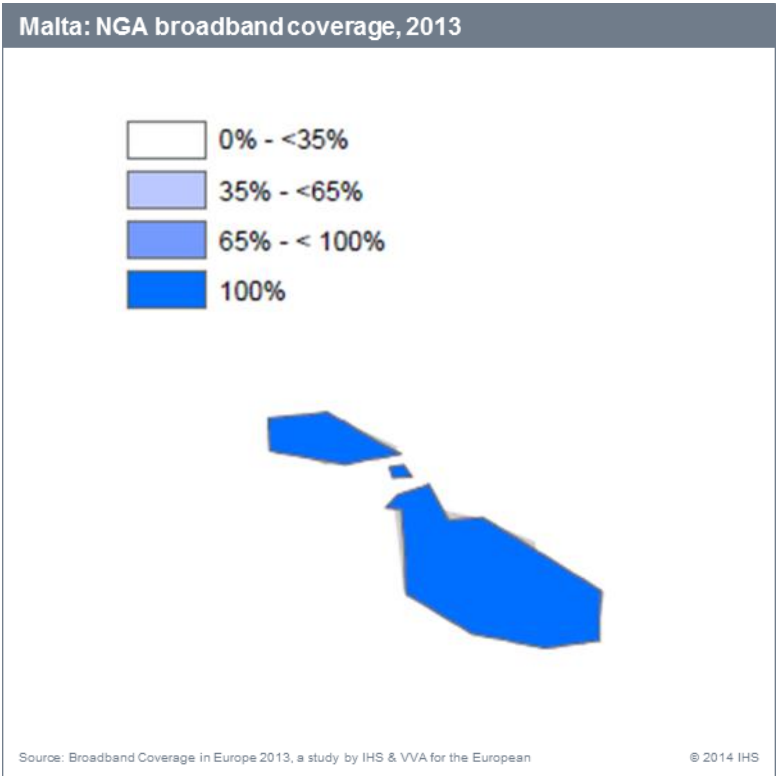
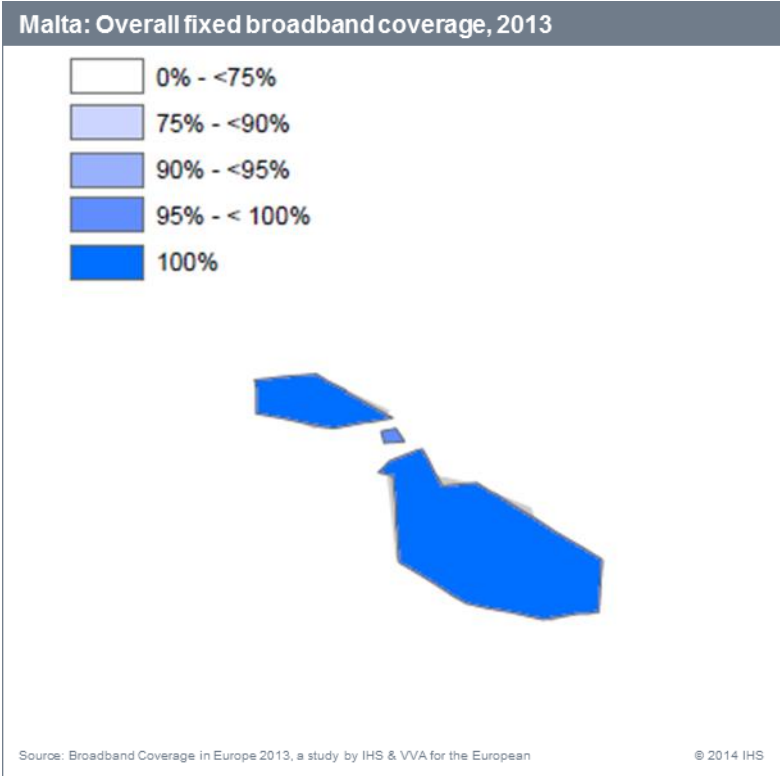
VDSL coverage was largely unchanged compared to 2012, at 75.0%, while data indicated negligible LTE coverage. Mobile operator Vodafone was the first to deploy LTE services, launching commercial trials at the end of 2013.⁹⁰

Only a very small fraction of Maltese households are located in what is defined as a rural area. Furthermore with a small geographical area compared to the average European country, coverage of these rural areas is very high.



⁹⁰ After the data collection was completed, new information was provided by the regulator indicating that LTE coverage reached 30% households in Malta at end 2013 with LTE being commercially launched in October 2013.

5.20.2 Regional coverage by broadband technology



5.20.3 Regulatory and market overview

The Maltese government's objectives are captured in 'Digital Malta' – a strategy designed to run from 2014-2020. Given the already very high coverage with broadband services – both basic fixed and NGA – the objectives of the plan revolve primarily around mechanisms which can be used for encouraging the development of digital literacy and taking advantage of the latest ICT and digital service innovations. The strategy focuses on citizens and businesses, and looks and at skills investment, regulation as well as underlying infrastructure.

Two companies collectively provide the bulk of broadband access coverage in Malta – cable company Melita, and telecoms group Go. Go began to roll out VDSL2 services in 2011, competing with the high speed cable broadband launches in the same year. Cable company Melita launched DOCSIS 3.0 services offering >100Mbps speeds in 2011. Melita also offers 250Mbps packages to customers.

The relatively late launch of LTE compared to many other European markets reflects a number of factors – the strength of fixed technologies and the lack of 4G capable equipment were both cited by Go and Melita as relevant issues in early 2013⁹¹. Melita has begun to invest in WiFi technologies, which it feels are appropriate for delivering out-of-home broadband access in densely populated areas. Vodafone was the first provider to launch LTE services in Malta, announcing its intention to begin services at the end of 2013 in limited areas, with nationwide rollout occurring through 2014 and beyond⁹².

⁹¹ <http://www.timesofmalta.com/articles/view/20130425/technology/Cautious-on-next-generation-LTE-mobile-technology.467017>

⁹² <http://www.totaltele.com/view.aspx?ID=483683>

5.20.4 Data tables for Malta

Statistic	National
Population	422,978
Persons per household	2.7
Rural proportion	1%

Technology	Malta 2013		Malta 2012		Malta 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	100.0%	92.5%	99.9%	89.5%	99.0%	6.9%	93.5%	82.3%
VDSL	75.0%	0.0%	75.0%	0.0%	75.0%	0.0%	31.2%	11.1%
FTTP	0.8%	0.0%	0.9%	0.0%	0.0%	0.0%	14.5%	4.2%
WiMAX	100.0%	99.9%	99.9%	99.9%	99.9%	99.9%	19.7%	17.6%
Cable	100.0%	92.5%	99.9%	89.5%	98.5%	2.9%	43.0%	7.8%
DOCSIS 3.0	100.0%	92.5%	99.9%	89.5%	98.5%	2.9%	41.6%	7.0%
HSPA	100.0%	92.5%	99.9%	89.5%	99.0%	6.9%	97.1%	85.5%
LTE	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	100.0%	100.0%	100.0%	100.0%	-	-	99.4%	96.7%
Overall fixed broadband	100.0%	100.0%	100.0%	100.0%	99.9%	99.9%	97.2%	89.8%
NGA broadband	100.0%	92.5%	99.9%	89.5%	98.8%	2.9%	62.0%	18.1%

Note: The NRA noted that data on FTTP coverage is as at 1st January 2013. Currently, a study of FTTP services is being conducted, and hence no further updates are available.

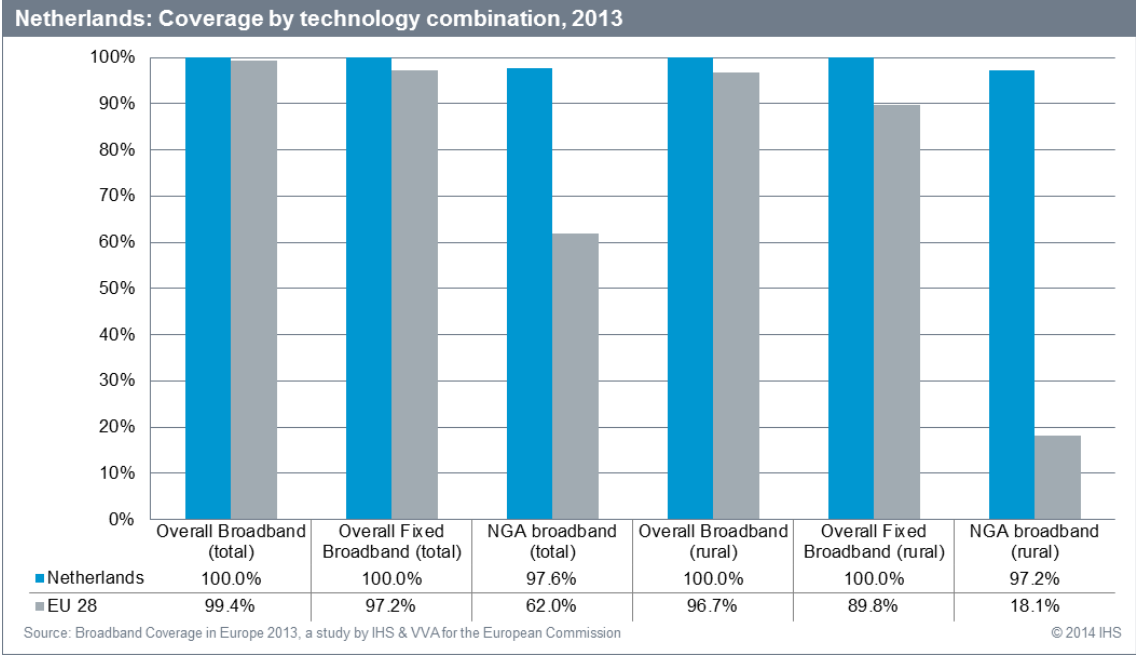
After the data collection was completed, new information was provided by the regulator indicating that LTE coverage reached 30% households in Malta at end 2013 with LTE being commercially launched in October 2013.

The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

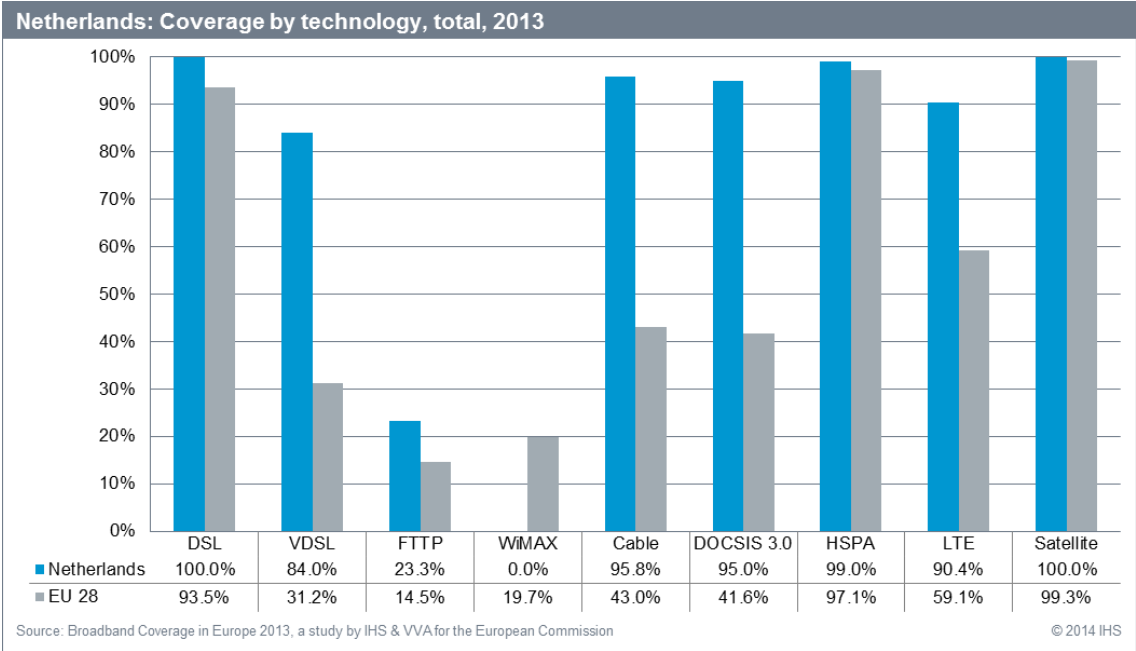
5.21 Netherlands

5.21.1 National coverage by broadband technology

In 2013 the Netherlands confirmed previous results in terms of broadband coverage, with complete coverage recorded for overall broadband and fixed broadband both nationally and in rural areas, while NGA coverage in rural areas increased by 12.7 percentage points, reaching 97.2% and positioning the country in first place in Europe for rural NGA coverage.



In the previous edition of the study, LTE was reported to be absent in the Netherlands, while at the end of 2013 data show coverage of 90.4% of households. Four telecoms groups have launched LTE services, including KPN, T-Mobile Netherlands, Vodafone Netherlands, with cable company and MVNO Ziggo also offering services to Dutch consumers.

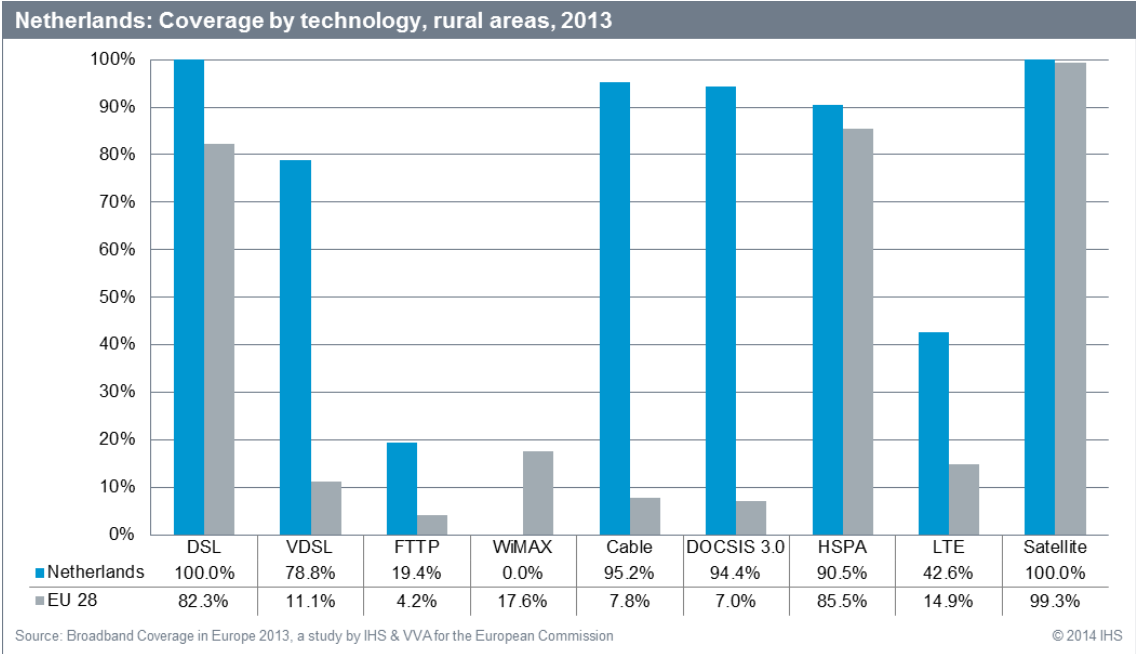


VDSL coverage improved in 2013 as well, increasing by roughly 30 percentage points, reaching 84.0% of homes by the end of 2013 and contributing to the strong overall NGA coverage results. Telecoms group KPN is one of the key proponents of VDSL rollout in the Netherlands, although operates a hybrid approach to FTTP and VDSL – deploying both technologies.

Increases in NGA coverage recorded in 2013 are also the result of an increase in FTTP coverage, which reached 23.3% in 2013, widening the gap with the EU 28 average of 15.5%. Much of the FTTP coverage is a consequence of KPN's access investments – the company claimed approaching 25% coverage in 2013 company communications⁹³.

However, DOCSIS 3.0 remains the most widespread NGA technology in the Netherlands, with nearly all cable broadband connections now upgraded to the technology. DOCSIS 3.0 services covered 95.0% of households at the end of 2013.

The technology breakdown for rural areas indicated increased coverage levels for a number of different technologies during 2013, and in particular across NGA technologies.



VDSL was recorded as expanding significantly in rural areas, with a difference of 50.4 percentage points year-on-year. VDSL reached 78.8% of rural homes by the end of 2013 - substantially above the EU average for the technology.

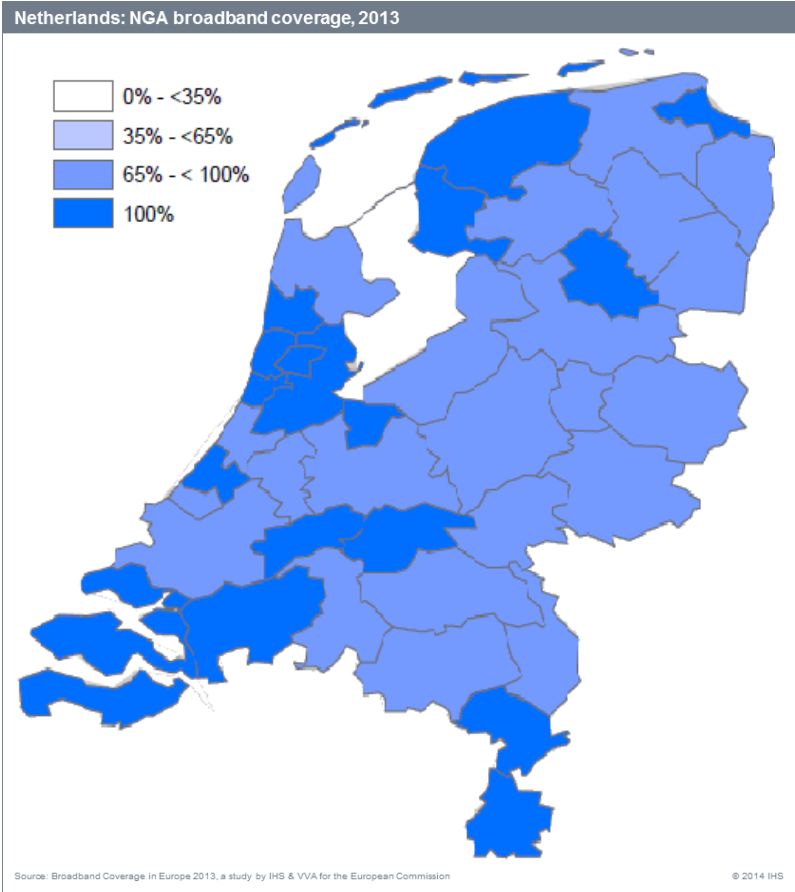
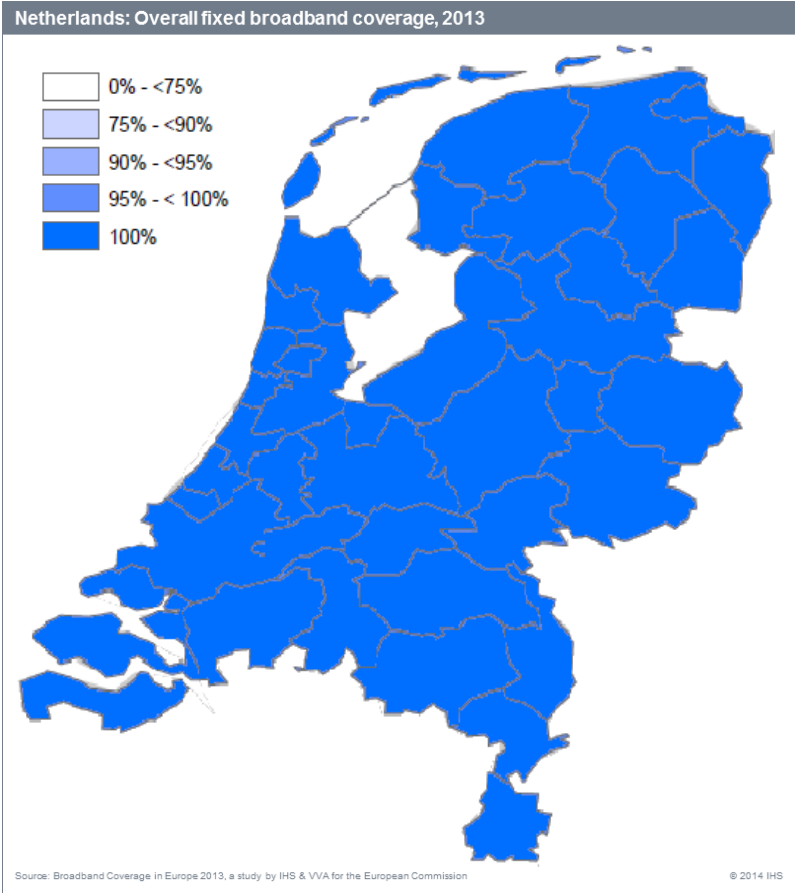
Rural FTTP coverage improved by nearly 11 percentage points, reaching 19.4% of rural households in 2013. DOCSIS 3.0 coverage also increased as cable companies further upgraded their networks, growing by 14.7 percentage points, with coverage in rural areas reaching 94.4%. Cable companies including Ziggo referenced growth of FTTP as a driver for their increased broadband speeds - part of customer retention campaigns⁹⁴.

Rural LTE coverage, in line with national rollout, increased from 0% recorded coverage of rural homes in 2012 to 42.6% in 2013, above the EU 28 average of 14.9%, reflecting the ongoing rollout of services by the core mobile operators.

⁹³ <http://corporate.kpn.com/investor-relations/publications.htm>

⁹⁴ https://www.ziggo.com/resources/documents/Ziggo_Q2_2013_Results_Presentation.pdf

5.21.2 Regional coverage by broadband technology



5.21.3 Regulatory and market overview

The Netherlands' strategy for broadband coverage is outlined in "Digital Agenda for the Netherlands⁹⁵" (launched in 2011, and covering the period to 2015) and focuses on the conditions required to achieve full coverage as per the European Digital Agenda objectives as well as creating a better regulatory framework for improving usage of digital services by businesses and citizens.

To achieve these goals, continued investment in infrastructure improvements are required to meet growing demand for broadband access. NGA networks, with special attention paid to rural areas, play a central role in the strategy to achieve the overall objectives of the document.

With NGA coverage already high, Dutch ISPs are likely to go beyond the strict requirements of the Digital Agenda. Telecoms group KPN intends to work on further network upgrades and is beginning to establish bonded VDSL vectoring in 2014, offering theoretical download speeds in excess of 200 Mbps.

Liberty Global, which operates via UPC Netherlands, and already offers DOCSIS 3.0 services to the vast majority of its footprint⁹⁶, indicated in 2014 that adoption and implementation of DOCSIS 3.1 standards will allow the company to offer speeds of 1Gbps downstream to consumers within the next few years⁹⁷. In mid-2014 cable company Ziggo increased headline speeds for its customers, beginning to offer consumers 180Mbps packages⁹⁸.

⁹⁵ <http://www.rijksoverheid.nl/documenten-en-publicaties/notas/2011/05/17/digitale-agenda-nl-ict-voor-innovatie-en-economische-groei.html>

⁹⁶ <http://www.libertyglobal.com/oo-netherlands.html>

⁹⁷ <http://www.digitaleurope.net/205622/upc-netherlands-doubles-upload-speeds-for-broadband/>

⁹⁸ https://www.ziggo.com/resources/documents/Quarterly_Reports/140717_Ziggo_Q2_2014_Results_Presentation.pdf

5.21.4 Data tables for Netherlands

Statistic	National
Population	16,730,348
Persons per household	2.2
Rural proportion	8.2%

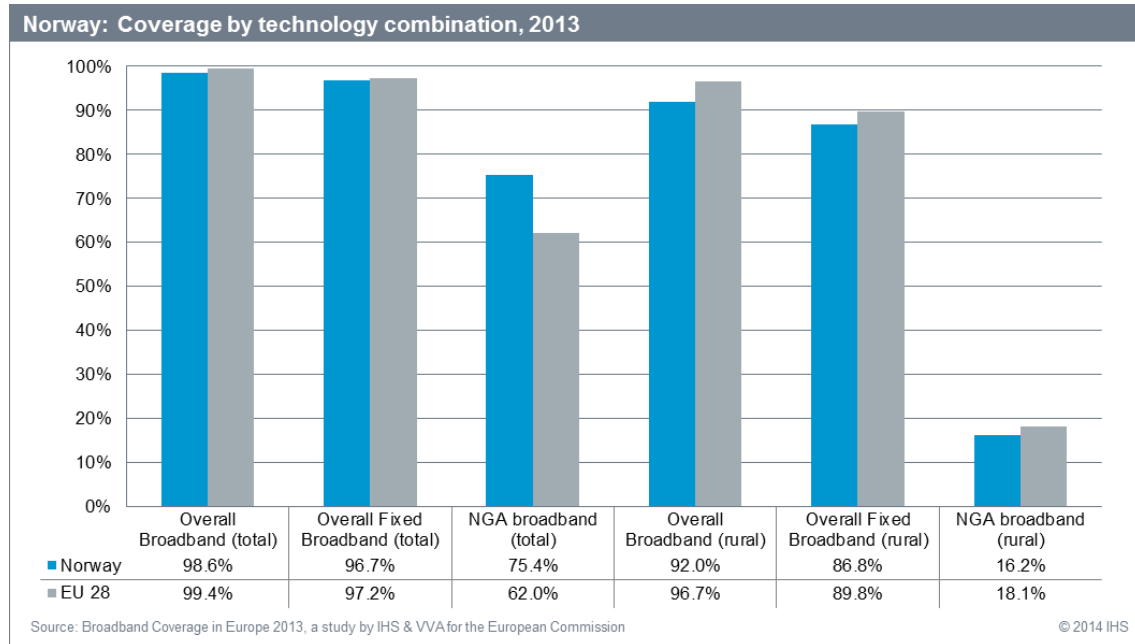
Technology	Netherlands 2013		Netherlands 2012		Netherlands 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	93.5%	82.3%
VDSL	84.0%	78.8%	59.9%	28.4%	47.3%	27.8%	31.2%	11.1%
FTTP	23.3%	19.4%	17.7%	8.5%	12.8%	8.5%	14.5%	4.2%
WiMAX	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	19.7%	17.6%
Cable	95.8%	95.2%	98.8%	86.0%	98.5%	82.9%	43.0%	7.8%
DOCSIS 3.0	95.0%	94.4%	97.5%	79.7%	96.8%	65.5%	41.6%	7.0%
HSPA	99.0%	90.5%	99.0%	88.1%	99.0%	88.4%	97.1%	85.5%
LTE	90.4%	42.6%	0.0%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	100.0%	100.0%	100.0%	100.0%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	97.2%	89.8%
NGA broadband	97.6%	97.2%	98.4%	84.5%	97.1%	72.9%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

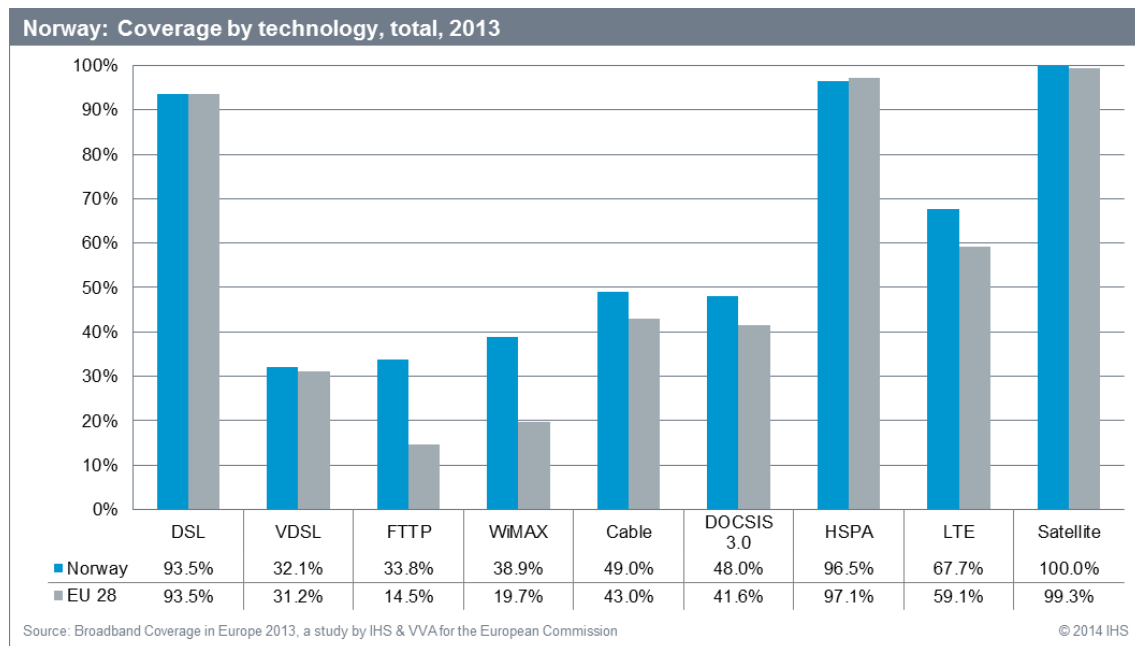
5.22 Norway

5.22.1 National coverage by broadband technology

Very little change in Norwegian broadband coverage was recorded during 2013 when compared to 2012. NGA coverage nationally was above the EU average, ending 2013 at 75.4% of households, in rural areas it is now below the EU average – gains across EU countries have outpaced the modest growth in NGA rural coverage locally in Norway.



As shown in the technology breakdown, coverage of all technologies aside from HSPA was at levels above the EU averages. HSPA coverage in Norway was less than 1% lower than the EU average.

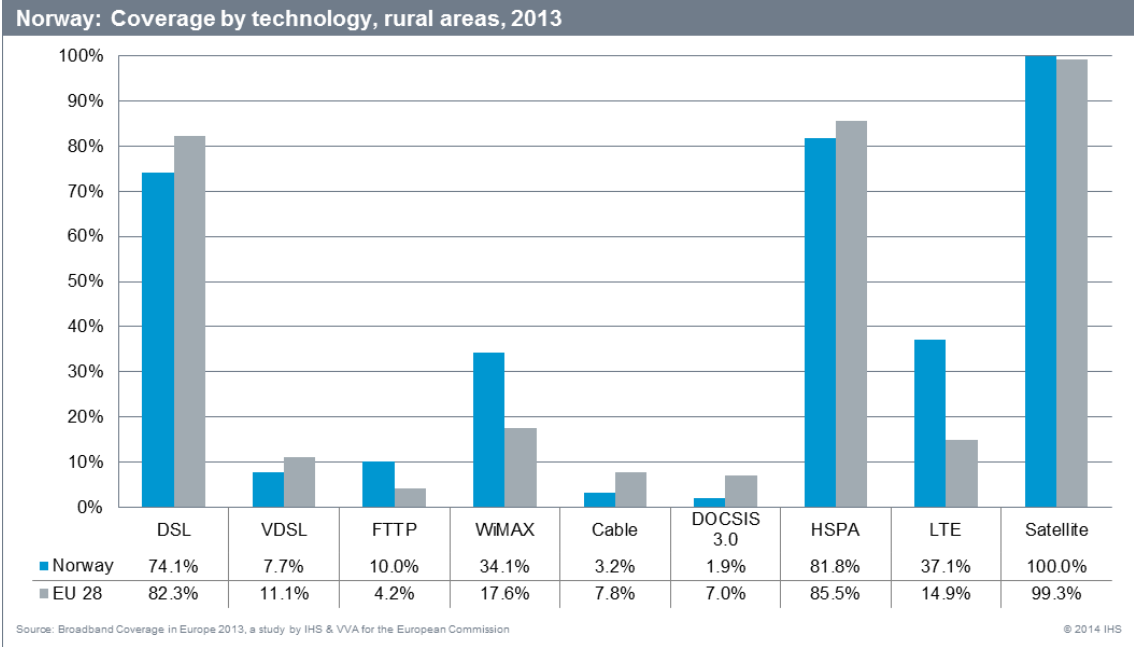


WiMax coverage showed the greatest improvement in the year, up by 20.3 percentage points from 2012 to 38.9%. Coverage is almost twice the EU average, which was 19.7% in 2013. LTE coverage had also increased during 2013, from 60.2% to 67.7%, and FTTP coverage increased from 29.6% to 33.8%.

Cable operator network upgrades to DOCSIS 3.0 are now nearly complete, with national coverage of DOCSIS 3.0 at 48.0%, versus overall cable broadband coverage of 49.0%. Cable companies including Get, which launched 200Mbps products in 2011 and tested 1Gbps speeds in 2013⁹⁹, have been relatively quick to upgrade infrastructure – DOCSIS 3.0 is the fixed NGA technology with widest coverage in Norway at present.

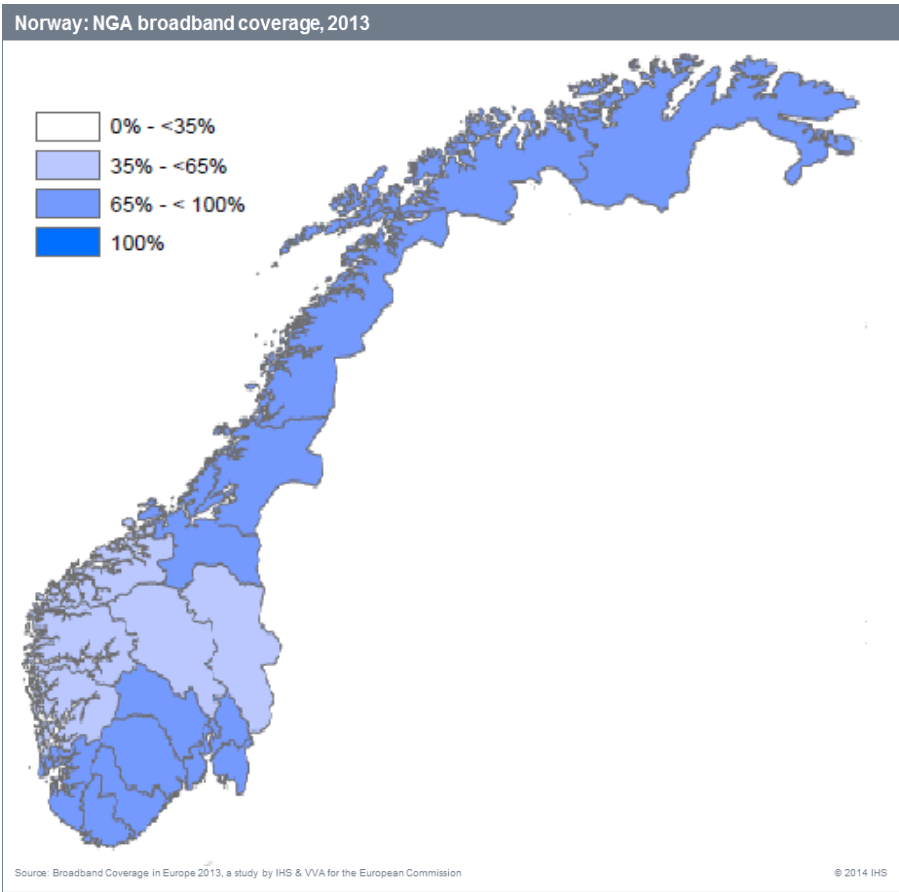
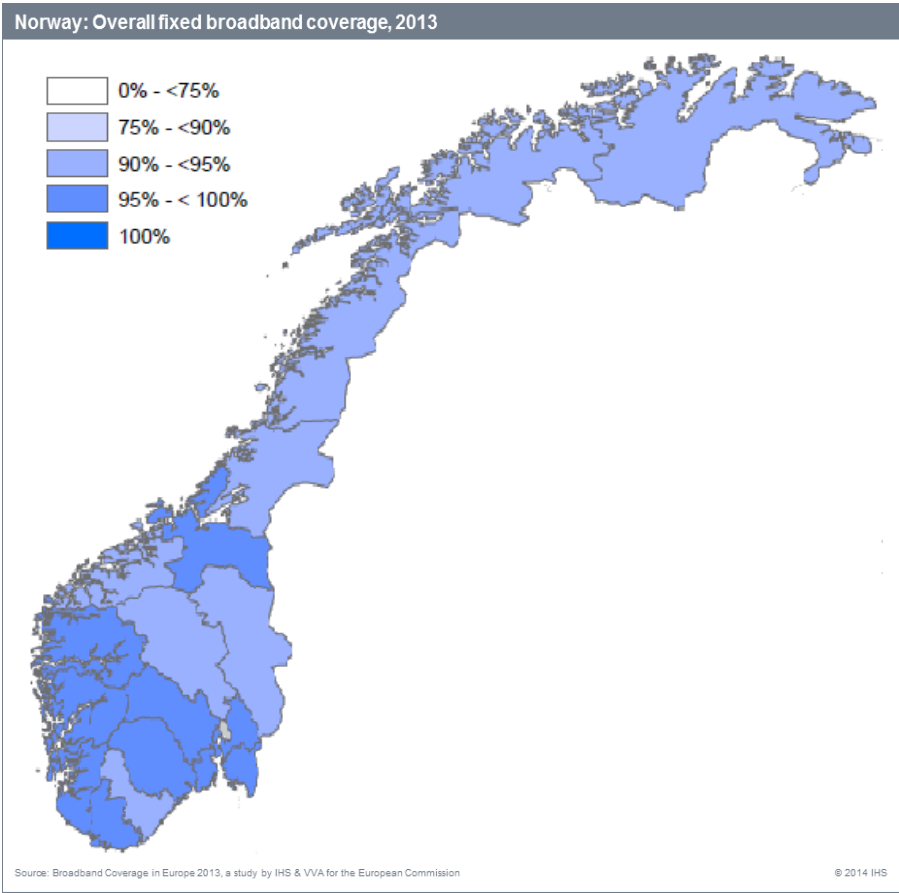
In rural areas, the largest increases were reported for WiMAX and LTE coverage. WiMAX coverage increased by almost 20 percentage points from 14.3% to 34.1%, and LTE coverage increased by more than a third to 37.1% by the end of 2013.

Despite cable’s strength in NGA at national level, networks are more focused on urban areas, with NGA coverage in rural areas stronger for VDSL and FTTP technologies.



⁹⁹ <http://www.get.no/get/about-get>

5.22.2 Regional coverage by broadband technology



5.22.3 Regulatory and market overview

Following parliamentary elections in September 2013, the new coalition government published a statement which outlines their agenda on a number of different issues including broadband access.

The government is aiming for all Norwegian citizens to have access to a 100 Mbps connection, but in order to do this the government recognizes that it needs to take on additional responsibility with respect to funding and administration. Consequently, the new government will establish funding for infrastructure investments. The funding will total EUR 12 billion over 5 years and will also be used for roads, railways and other infrastructure as well as broadband. As part of the policy statement the government will offer grants to ensure the development of broadband in rural areas and will simplify regulations which govern broadband roll-out¹⁰⁰.

Earlier in May 2013, the Norwegian incumbent Telenor announced a NOK 4 billion investment in fibre infrastructure in order to meet the demand for cloud and VoD services in the business sector¹⁰¹. Telenor is particularly keen for the Norwegian government to reform its regulations on the depth of trenches required for the underground installation of fibre cables. Using traditional trenching methods (at 60 – 80cm depth), the laying of cables in the ground can represent as much as 70% of the installation costs, and the implementation of new 'microtrenching' methods (15 – 20cm depth) would result in considerable savings¹⁰².

LTE coverage in Norway has increased following the successful launch of LTE services by the two main operators in Norway. TeliaSonera launched its LTE services via its mobile company NetCom in 2009 and Telenor launched its LTE services in 2012¹⁰³.

The Norwegian government organized a 4G spectrum auction in late December 2013 in order to further increase LTE coverage nationally. Following a two-stage bidding process Telenor, NetCom (TeliaSonera) and new entrant Telco Data all won spectrum, while Tele2 was unsuccessful. The auction raised NOK 1.8 billion¹⁰⁴.

¹⁰⁰ <http://www.zdnet.com/100mbps-broadband-and-easier-fibre-rollouts-norways-new-coalition-sets-out-its-it-priorities-7000021806/>

¹⁰¹ <http://www.businesscloudnews.com/2013/05/30/telenor-to-invest-e500m-in-fibre-broadband/>

¹⁰² <http://www.zdnet.com/fibre-to-the-home-new-builds-and-digging-rules-revamp-see-ftth-climbing-in-norway-7000018297/>

¹⁰³ <http://www.zdnet.com/4g-coverage-on-the-up-in-norway-as-netcom-telenor-boost-lte-networks-7000017449/>

¹⁰⁴ <http://www.zdnet.com/norways-4g-auction-wraps-with-mystery-winner-and-one-big-loser-7000024123/>

5.22.4 Data tables for Norway

Statistic	National
Population	4,985,870
Persons per household	2.1
Rural proportion	21.7%

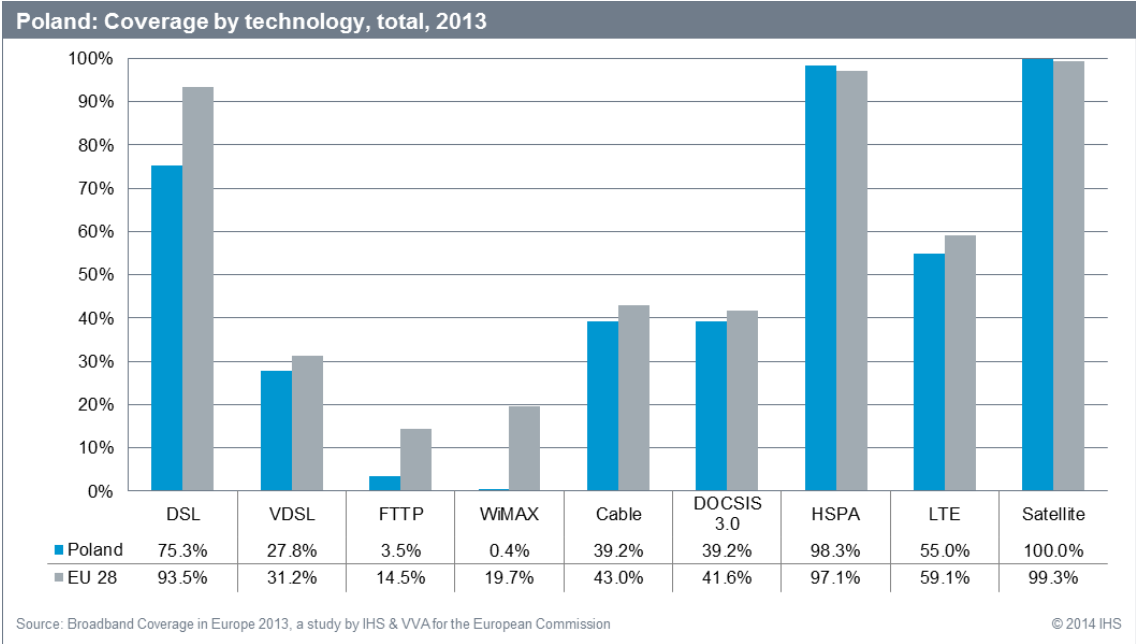
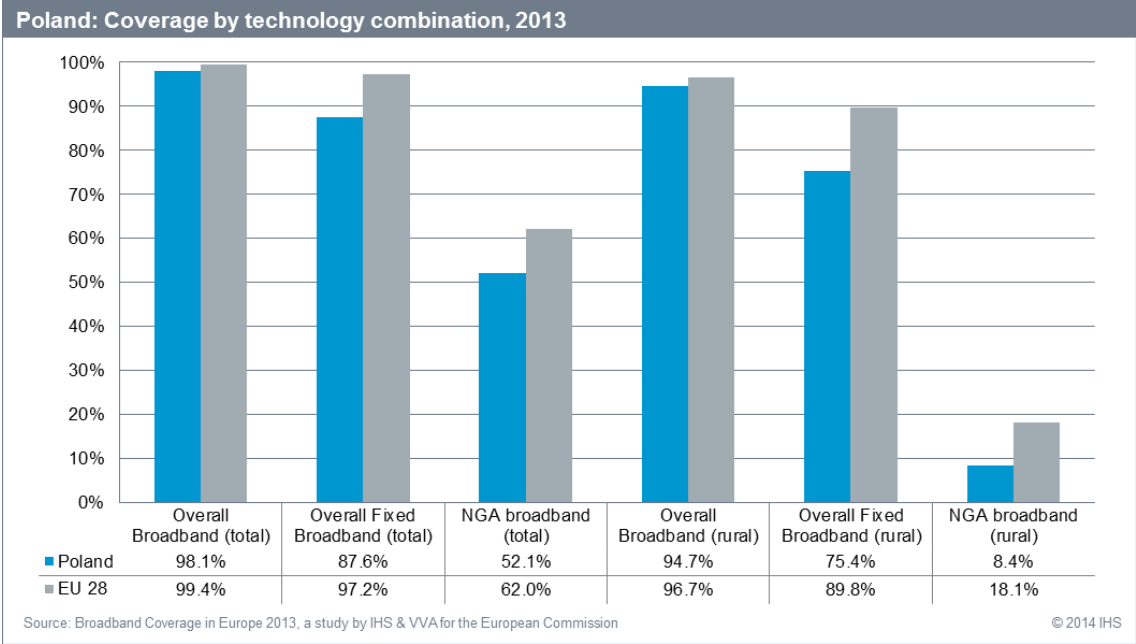
Technology	Norway 2013		Norway 2012		Norway 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	93.5%	74.1%	94.5%	75.8%	93.7%	72.1%	93.5%	82.3%
VDSL	32.1%	7.7%	32.7%	5.5%	26.8%	2.2%	31.2%	11.1%
FTTP	33.8%	10.0%	29.6%	9.3%	24.9%	5.0%	14.5%	4.2%
WiMAX	38.9%	34.1%	18.6%	14.3%	10.0%	10.0%	19.7%	17.6%
Cable	49.0%	3.2%	46.1%	9.4%	45.9%	8.2%	43.0%	7.8%
DOCSIS 3.0	48.0%	1.9%	45.1%	9.2%	43.7%	7.4%	41.6%	7.0%
HSPA	96.5%	81.8%	96.0%	81.9%	91.9%	63.6%	97.1%	85.5%
LTE	67.7%	37.1%	60.2%	3.7%	25.9%	3.6%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	98.6%	92.0%	98.1%	91.4%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	96.7%	86.8%	96.3%	83.7%	95.9%	78.4%	97.2%	89.8%
NGA broadband	75.4%	16.2%	67.3%	19.0%	69.4%	11.5%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

5.23 Poland

5.23.1 National coverage by broadband technology

Coverage in Poland remained below EU average in almost every category in 2013, but has shown significant improvement on the previous year in terms of overall fixed broadband coverage – both nationally and rurally, as well as NGA coverage in rural areas. Overall fixed broadband increased by 18.5 percentage points to 87.6% while overall NGA increased by 7.6 percentage points to 52.1%. In addition, overall NGA in rural areas increased from close to 0% to 8.4%.

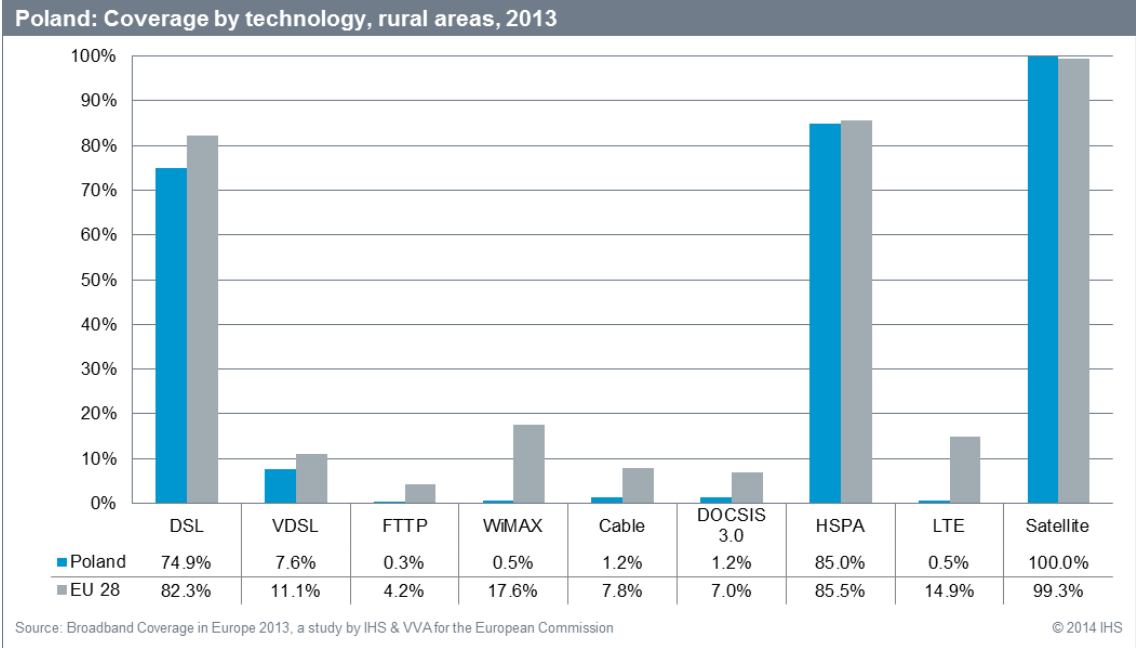


HSPA coverage was above the EU average in 2013, but it was DSL coverage experienced the greatest improvement, increasing by 14.8 percentage points to 75.3% in 2013. DOCSIS 3.0 also showed improvement, with coverage increasing by almost 9 percentage points to

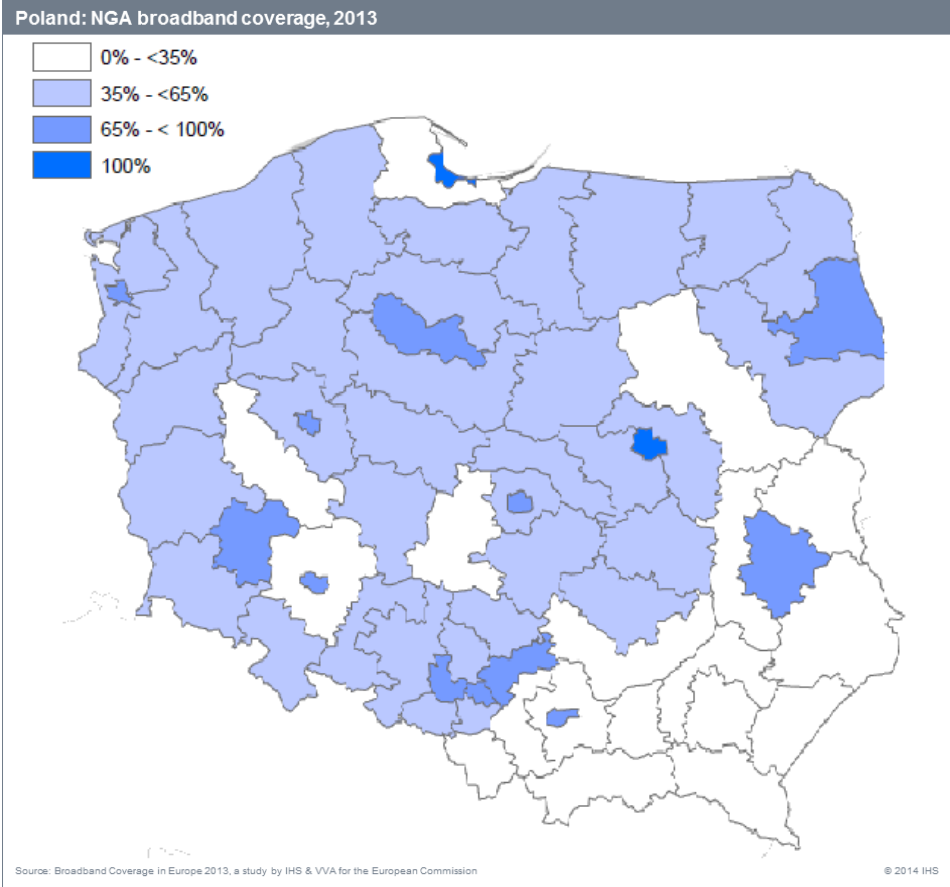
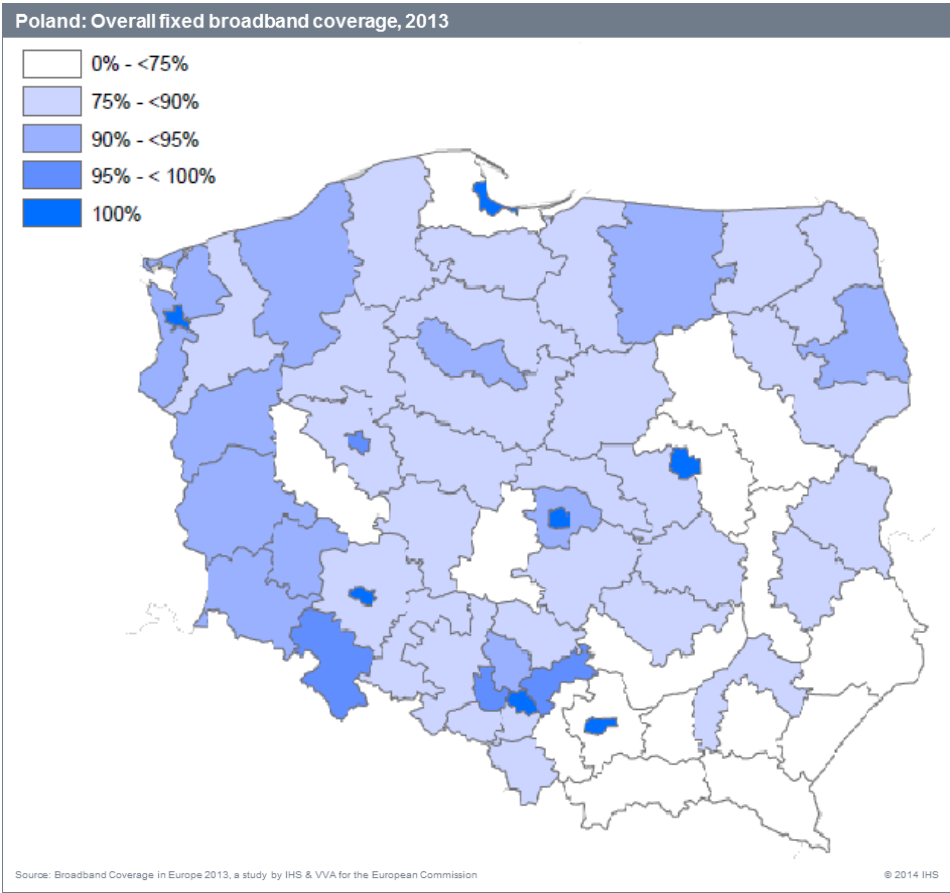
39.2% - in line with overall cable broadband coverage as the Polish cable operators upgraded their infrastructure.

Coverage in rural areas is low in comparison with national coverage, particularly with respect to NGA technologies - FTTP, VDSL and DOCSIS 3.0 all registered at less than 10% in 2013.

Rural areas are mainly serviced by satellite (with 100% coverage), HSPA with 85% coverage and DSL with close to 75% coverage. VDSL covers more rural areas than a year ago, up from 0% to 7.6% by end 2013.



5.23.2 Regional coverage by broadband technology



5.23.3 Regulatory and market overview

The Polish regulatory strategy was published in 2012 and is valid until 2015¹⁰⁵. According to the strategy there are three indicators used to evaluate the progress of the digital agenda. They are: 85% coverage at 2 Mbps by mid-2014, 30% coverage at 30 Mbps by end-2015 and 100% coverage at 30 Mbps by end 2020.

The Polish government launched the Polish Eastern Broadband Network Programme which has run from 2007 – 2013¹⁰⁶. Part of the programme includes the construction of a regional broadband network covering the 5 administrative regions (voivodeships) in Eastern Poland. In May 2014 the Polish government announced the deployment of a fibre-optic network in the voivodeship of Swietokrzyskie as part of the programme¹⁰⁷. The government initiated similar projects in the Podlaskie, Lublin and Waarmian-Masurian voivodeships and will be launching a project in the Podkarpackie province. The project is worth PLN 1.2 billion and is being funded by the Polish government and the EU.

Existing high-speed services are supplied by operators mainly using Docsis 3, VDSL and LTE technologies.

UPC is one of the main cable operators offering high speed broadband services in Poland. In May 2013 UPC Poland launched services with speeds up to 250 Mbps and in April 2014 it announced the trial of a 500 Mbps broadband service in Krakow, Luk, Lodz, Pultusk, Zakopane and Warsaw. Orange Poland (formerly Telekomunikacja Polska) launched VDSL services in June 2011 with speeds up to 80 Mbps, and By December 2013 its VDSL network comprised 3,160 sites¹⁰⁸¹⁰⁹.

¹⁰⁵ http://www.en.uke.gov.pl/files/?id_plik=12164

¹⁰⁶ <http://www.polskawschodnia.gov.pl/english/Strony/Introduction.aspx>

¹⁰⁷ <http://www.telegeography.com/products/commsupdate/articles/2014/05/14/eastern-poland-to-benefit-from-fibre-broadband-project/>

¹⁰⁸ <http://www.orange.com/en/about/Group/global-footprint/Orange/countries/Group-s-activities-in-Poland>

¹⁰⁹ <http://www.orange.com/en/about/Group/global-footprint/Orange/countries/Group-s-activities-in-Poland>

5.23.4 Data tables for Poland

Statistic	National
Population	38,538,447
Persons per household	2.8
Rural proportion	20.8%

Technology	Poland 2013		Poland 2012		Poland 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	75.3%	74.9%	60.5%	37.3%	60.4%	37.0%	93.5%	82.3%
VDSL	27.8%	7.6%	25.7%	0.0%	11.7%	0.0%	31.2%	11.1%
FTTP	3.5%	0.3%	2.9%	0.0%	2.2%	0.0%	14.5%	4.2%
WiMAX	0.4%	0.5%	0.3%	0.3%	0.3%	0.3%	19.7%	17.6%
Cable	39.2%	1.2%	32.4%	0.7%	30.2%	0.6%	43.0%	7.8%
DOCSIS 3.0	39.2%	1.2%	30.5%	0.7%	30.2%	0.6%	41.6%	7.0%
HSPA	98.3%	85.0%	96.5%	83.1%	90.0%	51.9%	97.1%	85.5%
LTE	55.0%	0.5%	50.0%	0.2%	25.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	98.1%	94.7%	98.4%	92.3%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	87.6%	75.4%	69.1%	37.7%	65.4%	37.5%	97.2%	89.8%
NGA broadband	52.1%	8.4%	44.5%	0.7%	36.8%	0.6%	62.0%	18.1%

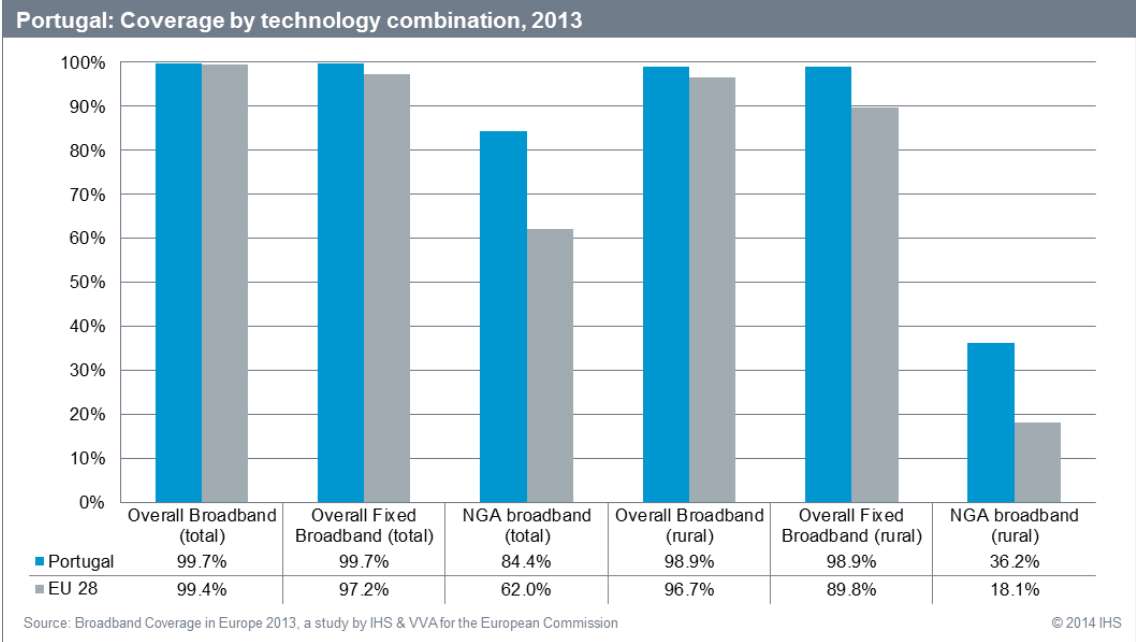
Note: Due to the fact that the research team received data from the Polish NRA only after the final deadline, it was not possible to implement the regulator provided data in the dataset submitted to DG Connect prior to publication of the Digital Agenda Scoreboard. For this reason, figures published in the Digital Agenda Scoreboard in May 2013 differ slightly from data published in this report.

The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

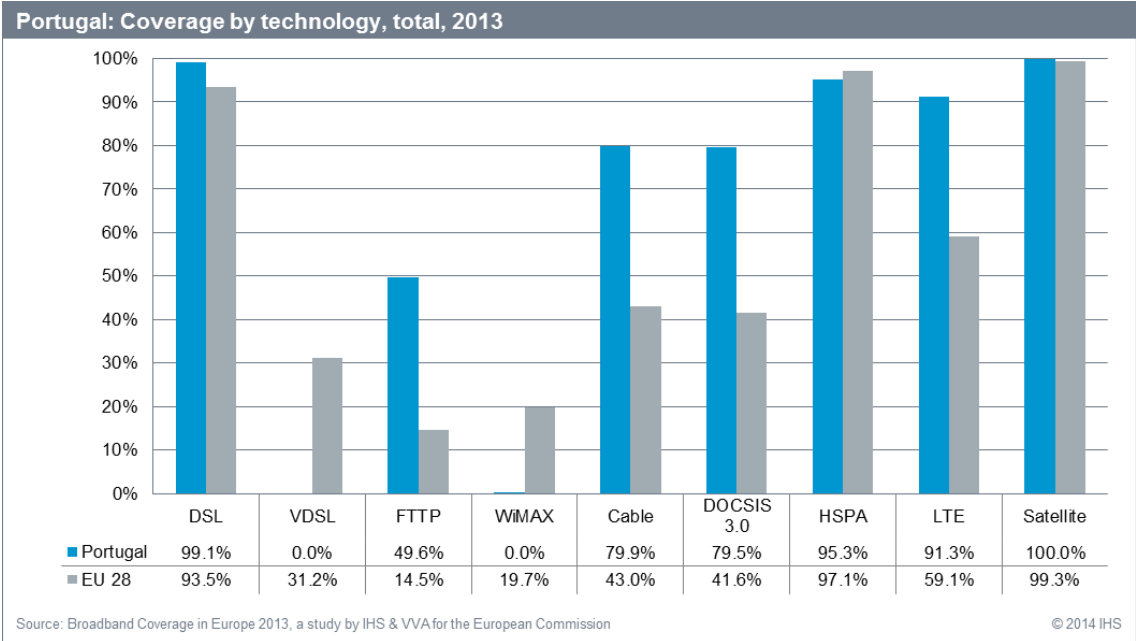
5.24 Portugal

5.24.1 National coverage by broadband technology

Broadband coverage in Portugal is greater than the European average, both nationally and in rural areas. The Portuguese National Broadband Strategy runs from end 2012 until 2020 and during 2013 there have been some major improvements in NGA coverage. Overall NGA coverage increased in rural areas by 4.4 percentage points to 36.2% and nationally by 6.6 percentage points to 84.4%

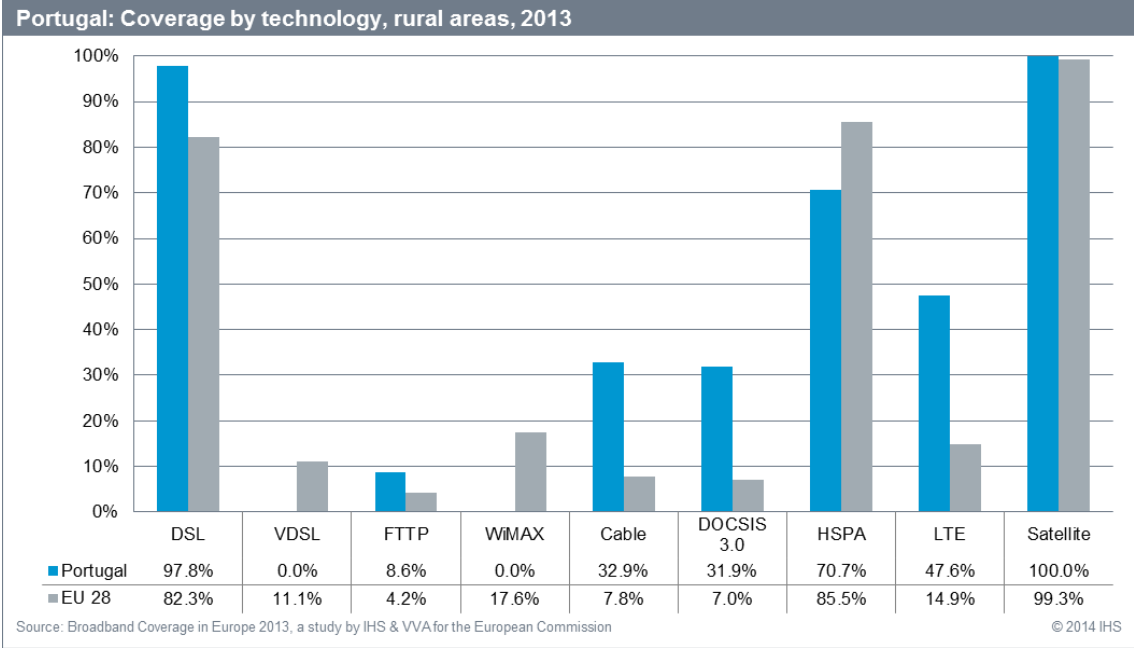


The breakdown by technology shows the absence of significant numbers of VDSL and WiMAX connections. The lack of VDSL reflects the strategy adopted by telecoms group Portugal Telecom, which has focused primarily on FTTP build out. HSPA also exhibited coverage lower than the European average, although the difference between HSPA in Portugal and the European average was less than 2%.



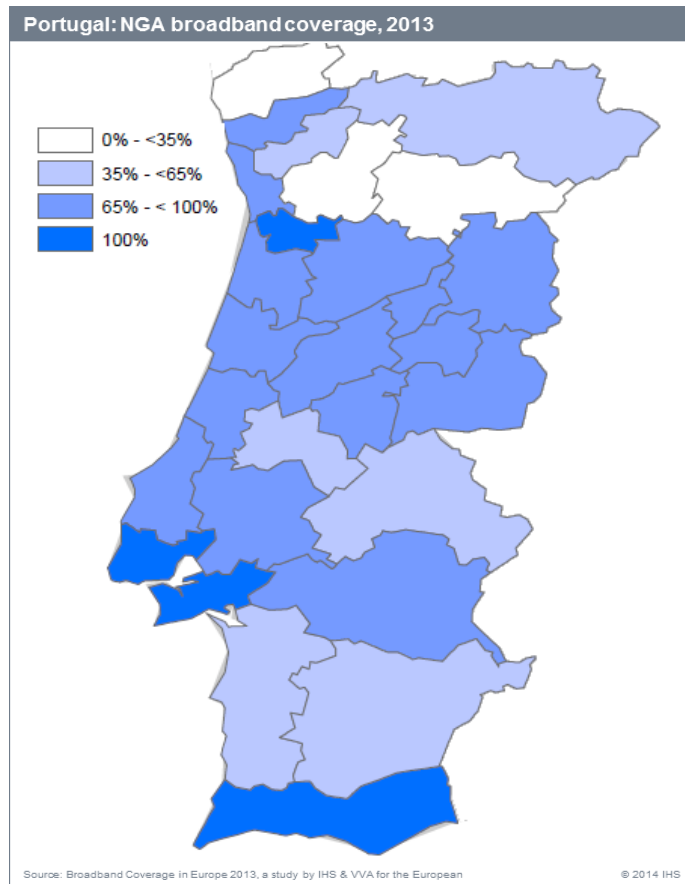
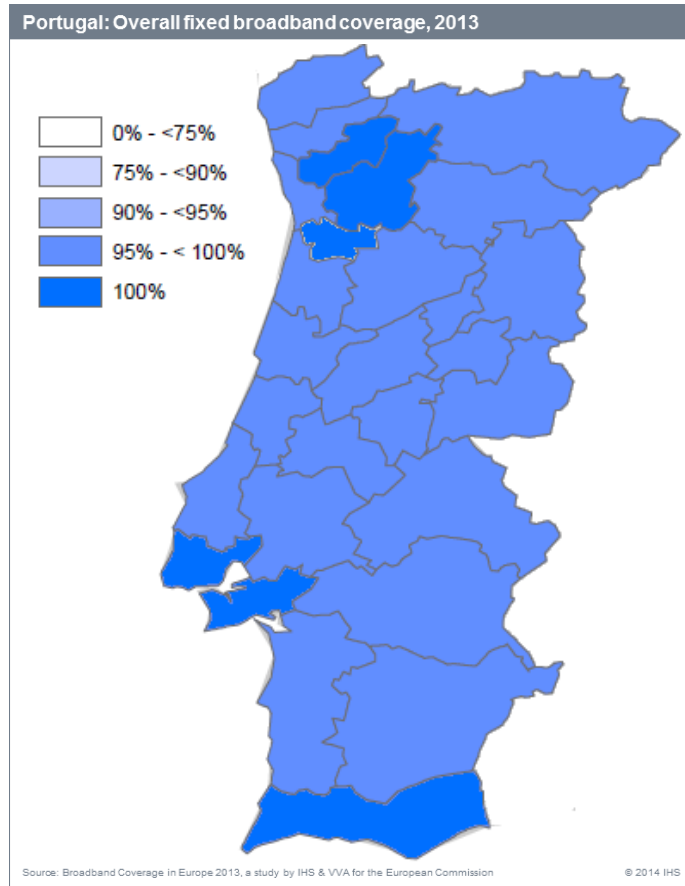
FTTP is favoured over VDSL as evidenced by the lack of VDSL coverage in comparison with FTTP coverage. In Portugal, operators are not subjected to the high costs of FTTP installation experienced by operators in other European countries. Reasons for this include lower labour costs and the existence of an underground duct system installed over 30 years ago. This system considerably reduces the cost of installation - with some estimates indicating a reduction in cost of more than 50%¹¹⁰.

In rural areas there were small improvements in FTTP, standard cable, DOCSIS 3.0 and LTE coverage in 2013.



¹¹⁰ <http://www.analysismason.com/About-Us/News/Insight/Portugal-Telecom-fibre-infrastructure-Nov2012/>

5.24.2 Regional coverage by broadband technology



5.24.3 Regulatory and market overview

The Portuguese National Broadband strategy includes a short term and long term goal¹¹¹. By the end of 2014 the Portuguese government intends for 50% of the population in rural municipalities to have access to broadband services with download speeds of at least 40 Mbps. By 2020 it would like every inhabitant to have access to a fixed broadband connection with a speed of at least 30 Mbps.

In 2008, government reached an agreement with three of the country's main telecoms operators, Portugal Telecom, Sonaecom and Oni Communications, which defined a protocol for fibre deployment. A year later, the Portuguese government announced a line of credit to be used for the construction and expansion of new fibre networks in co-operation with operators active in the market¹¹².

At the same time the Portuguese regulator, ANACOM, clarified and refined some key issues regarding fibre regulation including access to the underground ducts formerly monopolized by the incumbent Portugal Telecom¹¹³.

In 2010, Vodafone Portugal and Sonaecom signed an agreement for the sharing deployment and management of a fibre-optic network in Lisbon and Porto. They launched high-speed services a year later in 2011¹¹⁴.

In 2014, Vodafone Portugal also announced a fibre sharing deal with Portugal Telecom. Both parties will deploy and share fibre networks reaching 900,000 homes in Portugal and the deal will run for 25 years from December 2014¹¹⁵.

¹¹¹ <https://ec.europa.eu/digital-agenda/en/news/portugal-national-broadband-strategy>

¹¹² <http://www.samknows.com/news/portuguese-prime-minister-promises-fibre-for-everyone-10476.html>

¹¹³

<http://www.telecom.pt/InternetResource/PTSite/UK/Canais/Media/NoticiasPT/Nacionais/rngagreementgovernmenttelecom.htm>

¹¹⁴ <http://press.vodafone.pt/en/2009/12/21/sonaecom-and-vodafone-sign-cooperation-agreement-on-ngn/>

¹¹⁵ <http://www.vodafone.com/content/index/media/vodafone-group-releases/2014/vodafone-portugal-fibre-sharing.html>

5.24.4 Data tables for Portugal

Statistic	National
Population	10,487,289
Persons per household	2.6
Rural proportion	17.7%

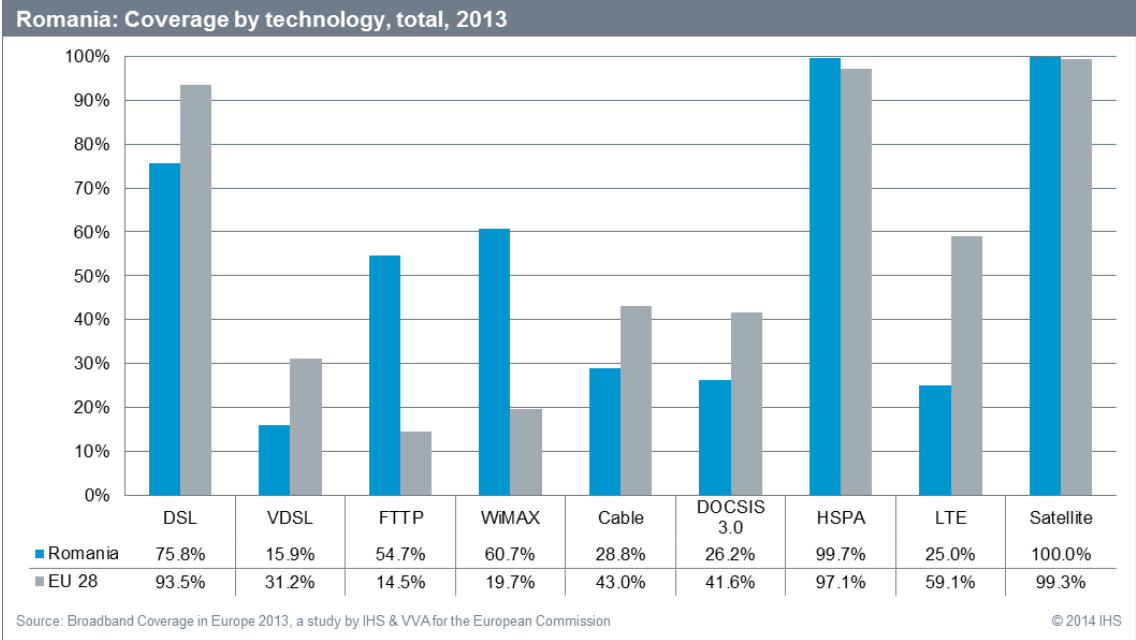
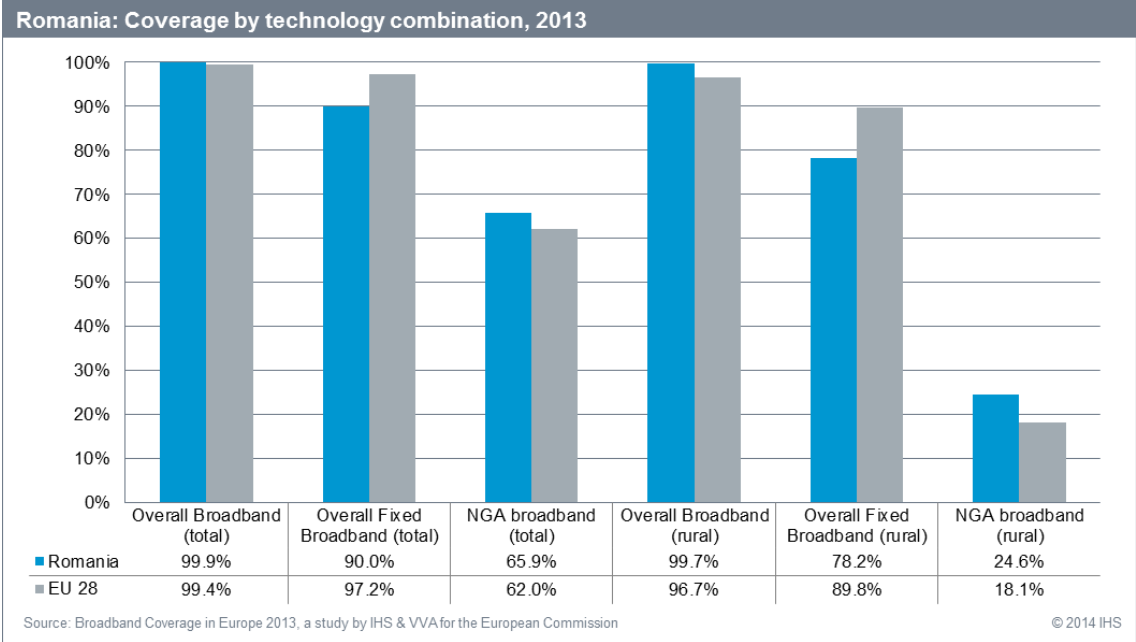
Technology	Portugal 2013		Portugal 2012		Portugal 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	99.1%	97.8%	99.0%	94.6%	99.0%	94.6%	93.5%	82.3%
VDSL	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	31.2%	11.1%
FTTP	49.6%	8.6%	46.1%	6.0%	41.2%	5.1%	14.5%	4.2%
WiMAX	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	19.7%	17.6%
Cable	79.9%	32.9%	77.4%	30.8%	75.9%	30.1%	43.0%	7.8%
DOCSIS 3.0	79.5%	31.9%	76.0%	29.8%	73.7%	29.1%	41.6%	7.0%
HSPA	95.3%	70.7%	94.4%	68.6%	92.2%	61.1%	97.1%	85.5%
LTE	91.3%	47.6%	89.7%	45.8%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.7%	98.9%	99.7%	98.4%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	99.7%	98.9%	99.6%	97.5%	99.5%	97.4%	97.2%	89.8%
NGA broadband	84.4%	36.2%	77.8%	31.8%	74.5%	30.7%	62.0%	18.1%

Note: The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

5.25 Romania

5.25.1 National coverage by broadband technology

There were no significant changes during 2013 compared with the previous year. Both nationally and rurally, overall broadband ended the year higher than the EU average although fixed broadband registered at below average for the same period – 90% nationally, against 97.2% EU-wide. NGA coverage nationally and in rural areas was greater than average however.



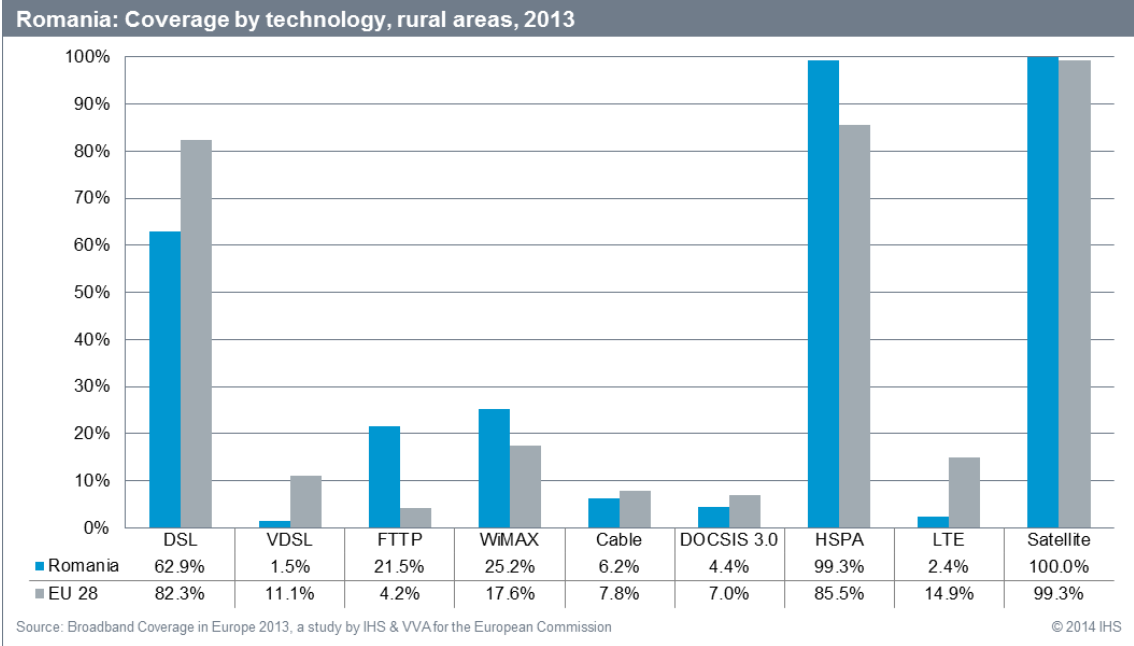
Analysis of coverage by technology indicates that overall NGA coverage ended 2013 above average – partly due to strong FTTP coverage, which at almost 55%, was nearly four times higher than the EU average of 14.5%. DOCSIS 3 and VDSL coverage was also notable, at 26% and 15.9% respectively - although both are below the EU averages reported for the

same period (41.6% for DOCSIS 3.0 and 31.2% for VDSL). The majority of cable broadband infrastructure has now been upgraded to DOCSIS 3.0 – with 91% of cable homes passed now capable of delivering DOCSIS 3.0 speeds.

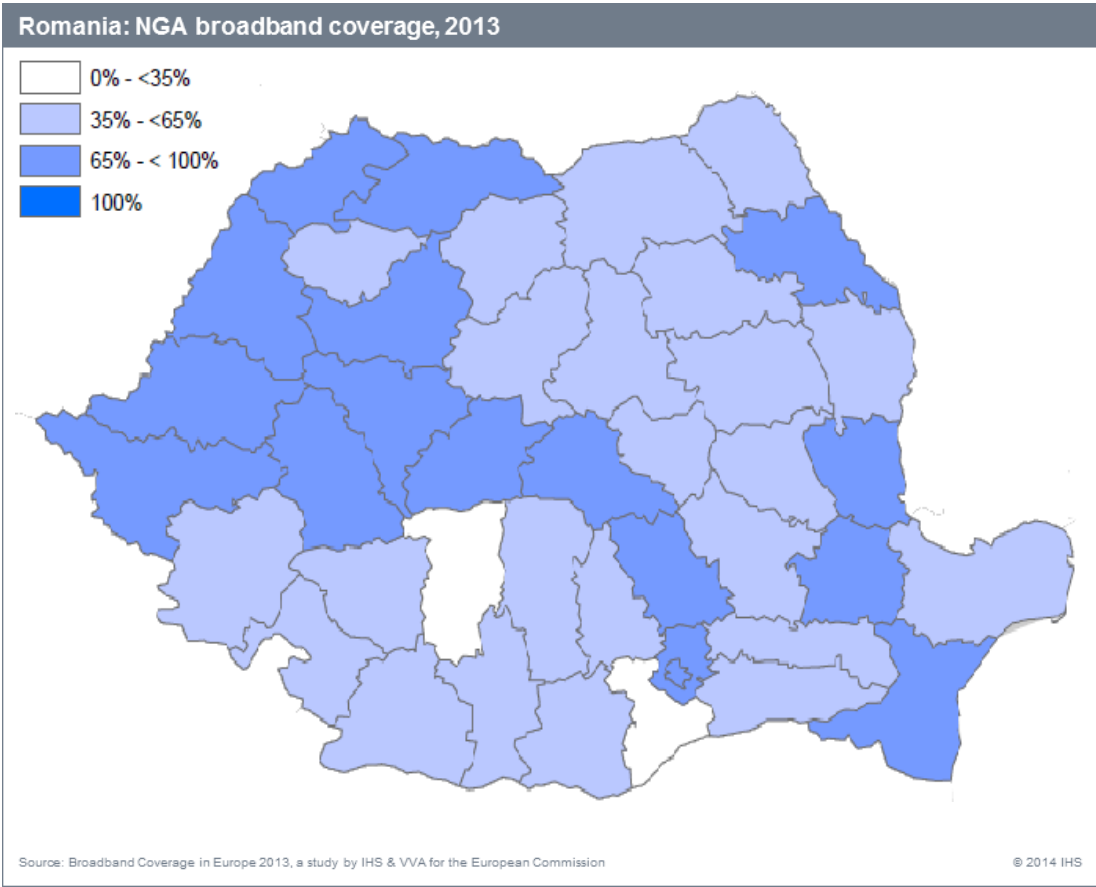
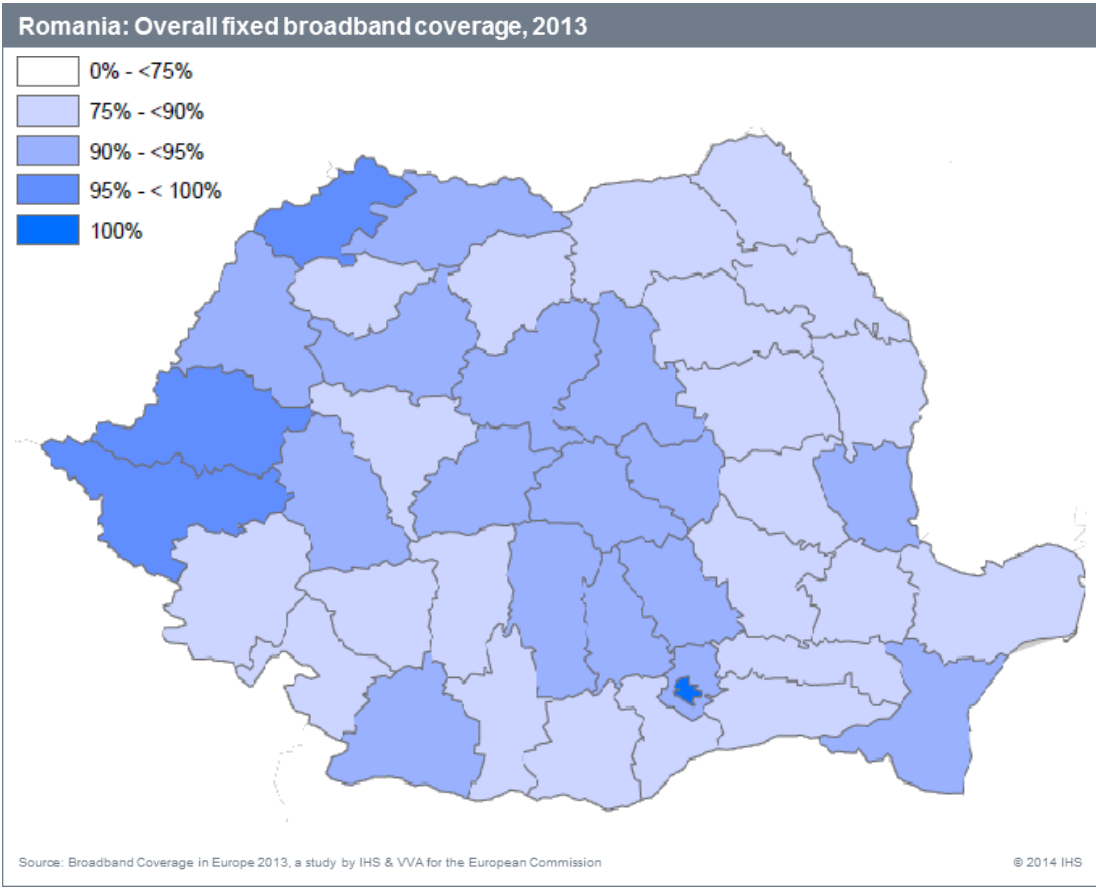
LTE coverage, at 25%, registered at below the EU average of over 59%. Operators including Vodafone, Orange and Cosmote have launched commercial LTE services.

In rural Romania, the above-average NGA coverage was primarily due to FTTP availability which stood at 21.5% of homes, ending 2013 at roughly five times the EU average of 4.2% and above DOCSIS 3 at 4.4% and VDSL at 1.5%.

Rural coverage of DSL remained substantially below that of the EU as a whole, and ended 2013 on 62.9% of rural dwellings. Similarly rural LTE coverage was lower than average at 2.4%, versus 14.9% EU-wide.



5.25.2 Regional coverage by broadband technology



5.25.3 Regulatory and market overview

The “Government Strategy for the development of electronic broadband communications in Romania for the period 2009 – 2015” is a report published by the Romanian government and describes the strategy for the expansion of broadband infrastructure nationally. The following are the main objectives in the report:

- Growth of household broadband penetration to 40% by 2010 and 80% by 2015;
- By the end of 2015, 100% of the population should have access to broadband services.
- By 2010, 10% of the population should use the internet for interacting with public authorities, rising to 50%.

LTE has been used to increase high-speed broadband coverage throughout the country, and three operators have launched services since November 2012. Vodafone Romania launched commercial LTE services in November 2012 with speeds up to 75 Mbps. Vodafone initially offered services in 10 cities including Bucharest, Arad, Bacau, Brasov and Constanta¹¹⁶. Orange Romania was next in December 2012 when it launched LTE services in Bucharest, Prahova Valley, Bran-Moieciu and Poiana Brasov with speeds up to 75 Mbps¹¹⁷. The most recent launch was in April 2013 by Cosmote Romania in areas including Bucharest, Otopeni, Ploiesti and Cluj¹¹⁸.

The Romanian government is keen to encourage the spread of broadband to areas that are not commercially viable, and with this in mind awarded a contract worth RON 365.8 million to Romtelecom and Cosmote Romania in 2014¹¹⁹. The network, known as the Ro-Net telecommunications network will cover disadvantaged areas in 35 counties. The two operator concession will run for 18 years after which both operators will be able to purchase the network.

¹¹⁶ <http://www.telegeography.com/products/commsupdate/articles/2012/11/22/vodafone-romania-launches-commercial-lte-services-in-ten-cities/>

¹¹⁷ <http://www.telegeography.com/products/commsupdate/articles/2012/12/13/orange-romania-launches-lte-in-bucharest/>

¹¹⁸ <http://www.cellular-news.com/story/Operators/59748.php>

¹¹⁹ <http://www.telegeography.com/products/commsupdate/articles/2014/08/07/ronet-rural-broadband-venture-kicks-off/>

5.25.4 Data tables for Romania

Statistic	National
Population	20,121,680
Persons per household	2.7
Rural proportion	21.0%

Technology	Romania 2013		Romania 2012		Romania 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	75.8%	62.9%	<i>69.5%</i>	<i>48.7%</i>	n/a	n/a	93.5%	82.3%
VDSL	15.9%	1.5%	<i>12.0%</i>	<i>1.0%</i>	n/a	n/a	31.2%	11.1%
FTTP	54.7%	21.5%	<i>51.9%</i>	<i>21.1%</i>	n/a	n/a	14.5%	4.2%
WiMAX	60.7%	25.2%	<i>53.9%</i>	<i>24.2%</i>	n/a	n/a	19.7%	17.6%
Cable	28.8%	6.2%	<i>25.4%</i>	<i>3.7%</i>	n/a	n/a	43.0%	7.8%
DOCSIS 3.0	26.2%	4.4%	<i>24.7%</i>	<i>2.3%</i>	n/a	n/a	41.6%	7.0%
HSPA	99.7%	99.3%	<i>99.8%</i>	<i>99.6%</i>	n/a	n/a	97.1%	85.5%
LTE	25.0%	2.4%	<i>23.9%</i>	<i>1.9%</i>	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	<i>100.0%</i>	<i>100%</i>	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.9%	99.7%	<i>99.9%</i>	<i>99.8%</i>	n/a	n/a	99.4%	96.7%
Overall fixed broadband	90.0%	78.2%	<i>86.0%</i>	<i>68.6%</i>	n/a	n/a	97.2%	89.8%
NGA broadband	65.9%	24.6%	<i>62.9%</i>	<i>22.8%</i>	n/a	n/a	62.0%	18.1%

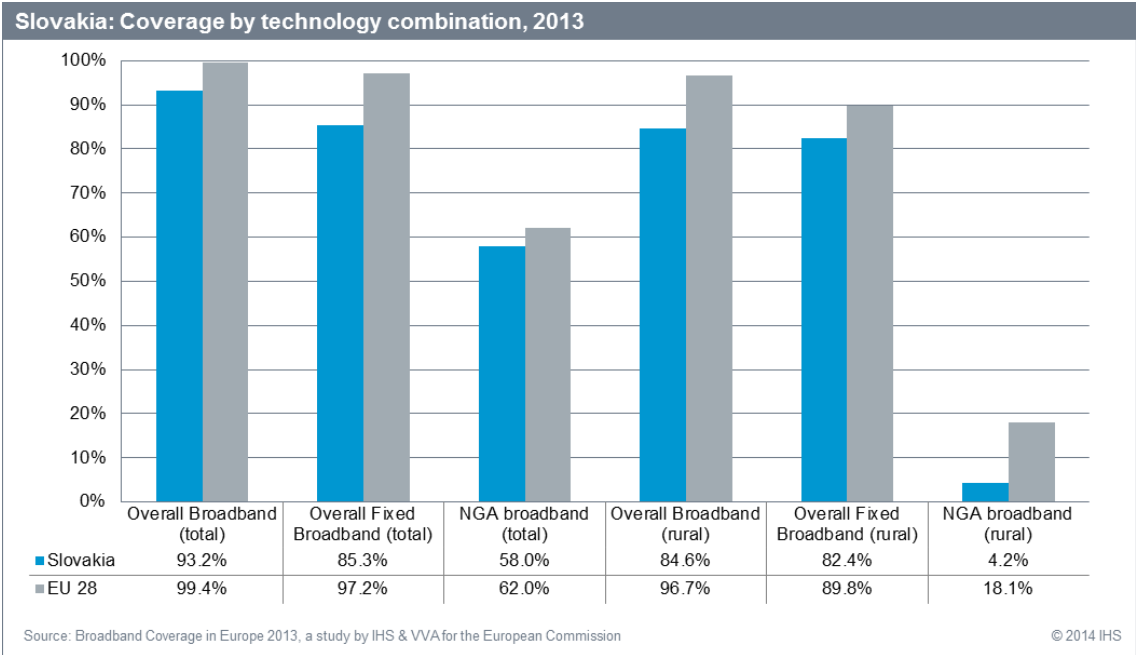
Note: In 2013, new demographic data (most recent population and household figures) became available from the National Institute of Statistics and was used by the Romanian NRA for analysis of operator level data. As a result of the more accurate 2013 data, it was necessary to restate 2012 coverage figures (highlighted in italics) to reflect the real developments in the Romanian broadband market. In light of the newly available figures, it is not possible to make direct comparisons with previously published data for 2011 coverage. After a consultation with the NRA, the research team decided the best approach to be not to include 2011 figures in this report.

5.26 Slovakia

5.26.1 National coverage by broadband technology

In 2013, Slovakia lagged behind the EU average in all coverage combination categories at both national as well as rural levels.

Slovakia was one of the study countries for which additional and more accurate data was available in 2013 compared to previous years, leading to a necessary restatement of 2012 data. This data concerns primarily rural areas for which very limited coverage was reported last year. All restated figures were determined in accordance and after a consultation with the Slovakian NRA and can be found in the data tables at the end of this chapter.



Individual technology profiles provide an explanation for Slovakia being behind the EU average in total fixed coverage. DSL coverage in Slovakia is on a very low level reaching less than half (47%) of households, compared to 94% of EU households.¹²⁰ And while the gap in coverage is offset by WiMAX coverage in certain areas it is not enough to reach the EU average.

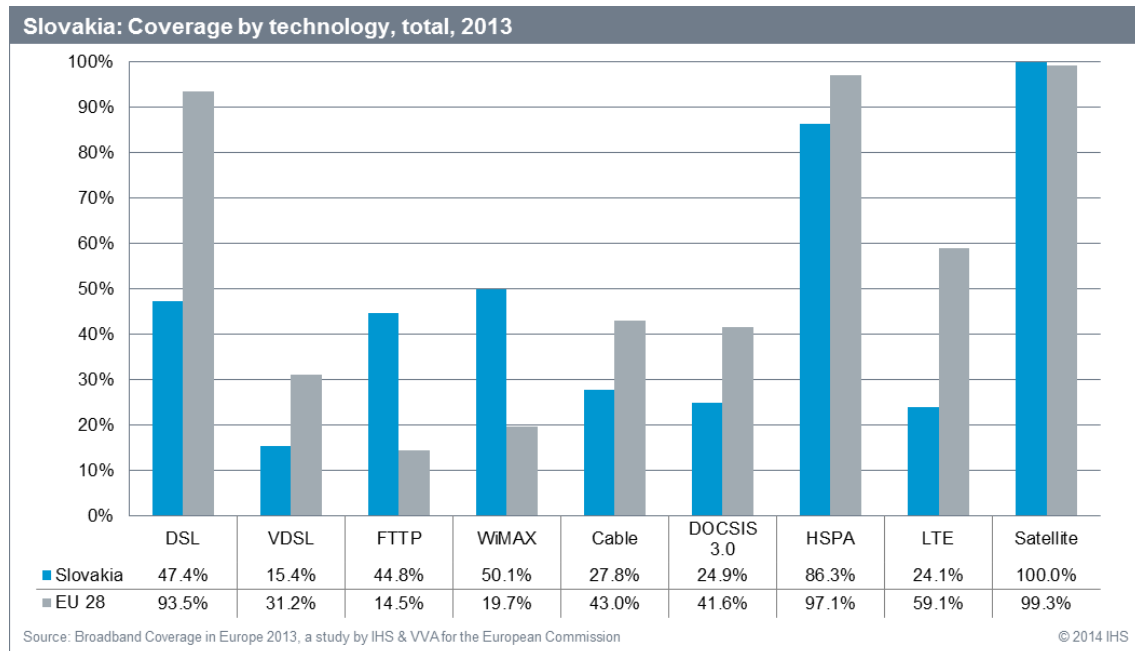
VDSL rollout carried out by the incumbent, Slovak Telekom, in the second half of 2013 resulted in VDSL coverage being recorded for the first time in Slovakia reaching over 15% of households. FTTP coverage also increased in 2013 passing nearly 45% of Slovak homes compared to 39% in 2012. Progress in coverage of both of these technologies then contributed to a 6.5 percentage point increase in total NGA coverage.

Cable broadband is available in Slovakia passing 28% of homes with most networks upgraded to DOCSIS 3.0 (25% coverage). However, cable operators face fierce competition from both Slovak Telekom as well as Orange Slovakia, which have focused extensively on

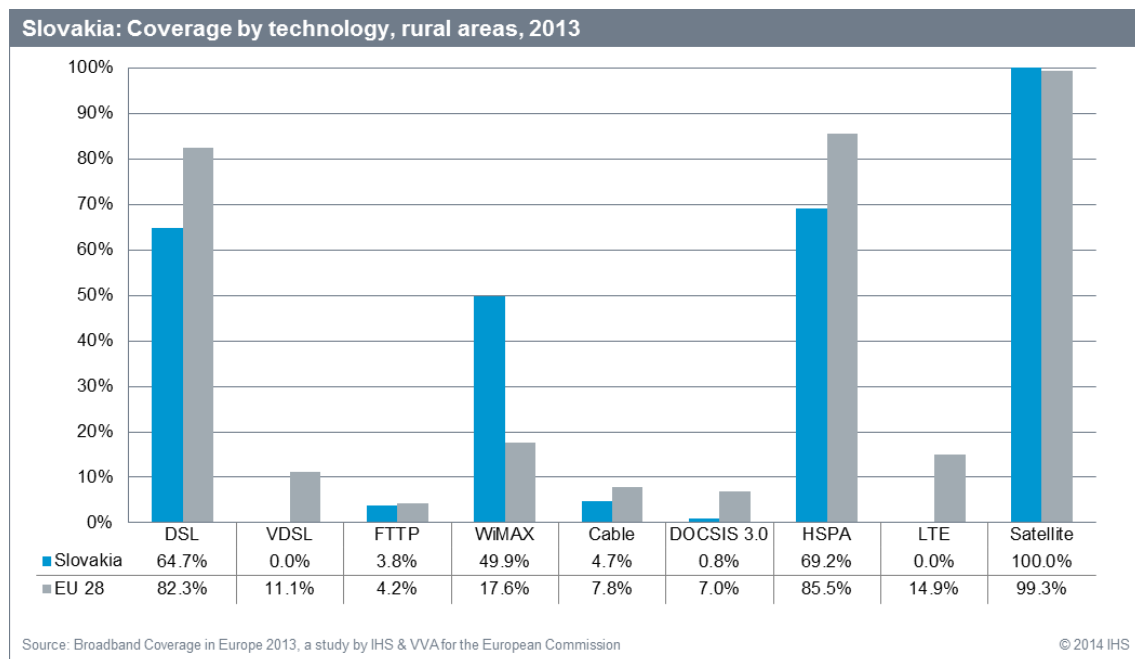
¹²⁰ Throughout the course of the study, Slovak NRA adopted new methodology for capturing DSL coverage of the incumbent network operator as a service coverage (all households within the reach of a DSL network), rather than the previously reported technical coverage (including only households realistically able to receive DSL services of advertised quality taking into account crosstalk on copper lines). When service coverage is reported, DSL coverage in Slovakia reached 72% of households at the end of 2013.

FTTP deployments in recent years, thus limiting cable networks expansion and constraining cable operators to the most profitable urban areas.

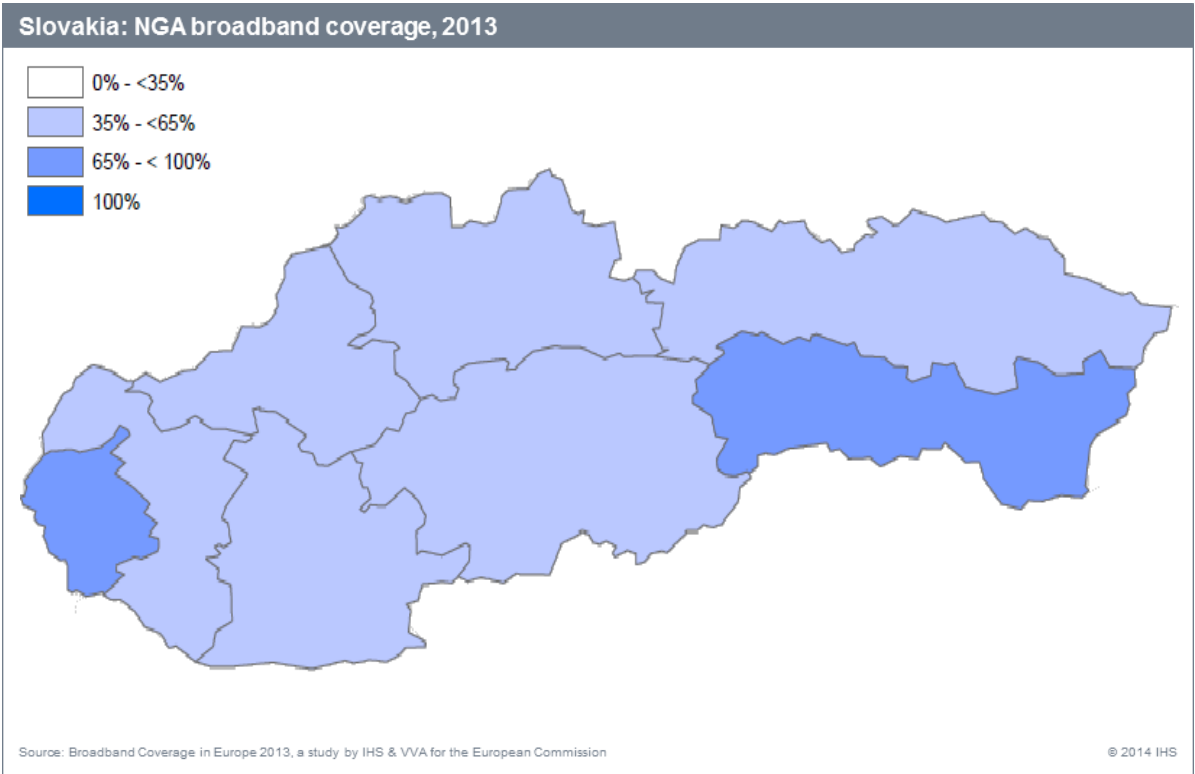
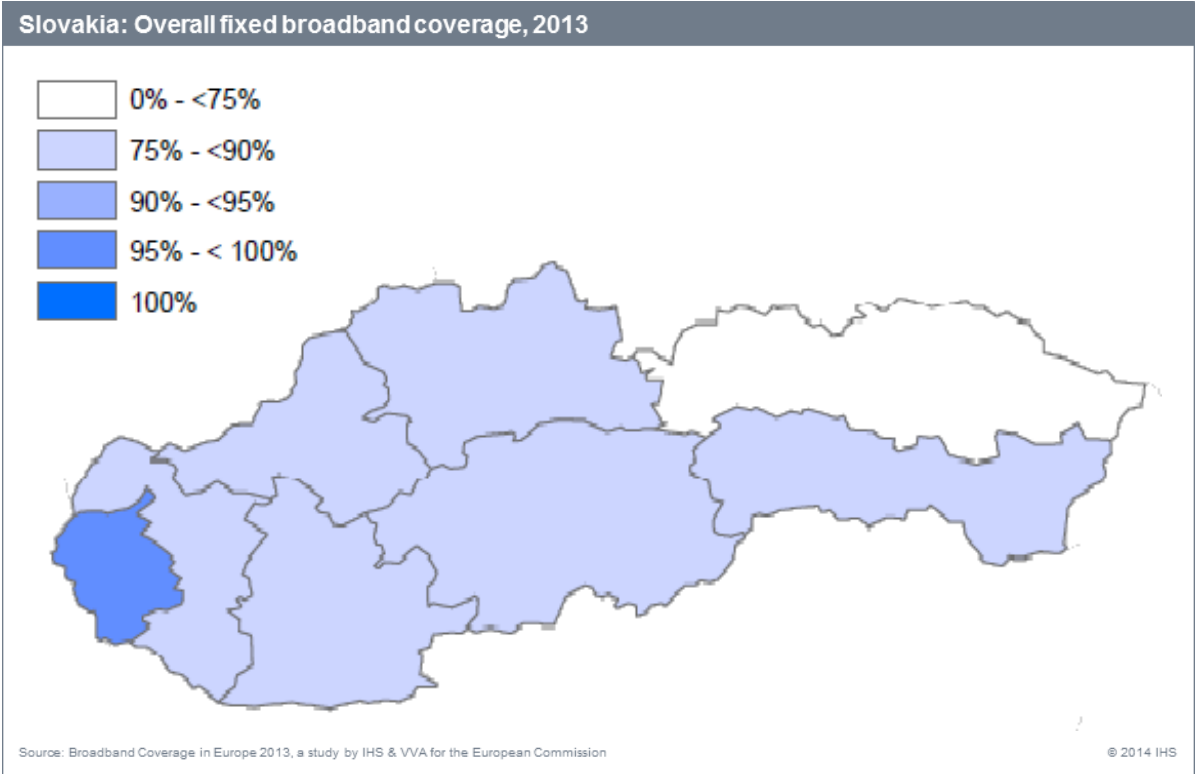
In terms of mobile broadband coverage, there were no major developments in HSPA network roll outs compared to 2012, but 2013 saw a large-scale commercial launch of LTE networks in Slovakia by Telefonica O2 and Slovak Telekom. By the end of the year, 24% of Slovak households were passed by an LTE network from at least one operator.



Rural broadband coverage is challenging in Slovakia with all technologies recording coverage well below the EU average. Rural availability of NGA technologies is particularly low, at 4.2% of homes, less than a quarter the EU average.



5.26.2 Regional coverage by broadband technology



5.26.3 Regulatory and market overview

Slovakia's national broadband strategy objectives were asserted in the "Strategic Document for Digital Growth and Next Generation Access Infrastructure (2014 – 2020)" issued in 2011. The main goal of the strategy is to meet a Digital Agenda target of 100% coverage of 30 Mbit/s high-speed broadband and the preparation for meeting the target concerning coverage of high-speed broadband above 100 Mbit/s.

The incumbent, Slovak Telekom, made a decision to focus on FTTP network deployment already in 2007 with an initial goal of countrywide coverage. By 2013, Slovak Telekom's fibre network was available to 362 thousand households. Moreover, the company also decided to invest into upgrades of its legacy copper network and in September 2013 began to offer VDSL services of up to 50 Mbps download speeds, passing 300 households by the end of the year.¹²¹

Orange Slovakia has been also investing in rolling out its FTTP network across Slovakia since 2007 and was present in more than 17 cities covering 323 thousand homes at the end of 2013.¹²²

Given the early start of FTTP roll out, cable network operators in Slovakia were forced to react to this intense competition by upgrading their networks to DOCSIS 3.0. UPC, a leader among Slovak cable providers has been upgrading its network since 2011. In 2013, in an attempt to provide competitive service to that of Orange and Slovak Telekom, UPC increased the maximum connection speed on its network to 250 Mbps compared to the previous 150 Mbps downstream connection speeds.¹²³

In November 2013, Slovak Telekom launched LTE broadband services in five Slovak cities - Trnava, Nitra, Zilina, Banska Bystrica and Presov – with other cities in western, central and eastern Slovakia scheduled to follow. Telefonica O2 was also offering LTE services in 2013, albeit only in small area in western part of the country.¹²⁴ Orange Slovakia was set to launch its LTE network in the first half of 2014.

¹²¹ http://www.telekom.sk/swift_data/source/ST_SK/Slovak%20Telekom%20Annual%20Report%202013.pdf. p.32

¹²² http://www.orange.sk/fileadmin/orange/user_uploads/dokumenty/onas/tlacove-centrum/vyrocne-spravy/vyrocna-sprava-2013.swf, p. 37

¹²³ <http://www.telegeography.com/products/commsupdate/articles/2013/11/27/upc-slovakia-expands-digital-triple-play-coverage/>

¹²⁴ <http://www.telegeography.com/products/commsupdate/articles/2013/11/18/slovak-telekom-launches-lte-in-five-cities/>

5.26.4 Data tables for Slovakia

Statistic	National
Population	5,404,322
Persons per household	2.8
Rural proportion	14.9%

Technology	Slovakia 2013		Slovakia 2012		Slovakia 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	47.4%	64.7%	45.6%	61.7%	43.9%	0.0%	93.5%	82.3%
VDSL	15.4%	0.0%	0.3%	0.0%	0.0%	0.0%	31.2%	11.1%
FTTP	44.8%	3.8%	39.4%	0.9%	38.9%	0.0%	14.5%	4.2%
WiMAX	50.1%	49.9%	50.0%	48.7%	50.0%	50.0%	19.7%	17.6%
Cable	27.8%	4.7%	28.3%	2.3%	21.5%	0.0%	43.0%	7.8%
DOCSIS 3.0	24.9%	0.8%	24.0%	0.0%	16.6%	0.0%	41.6%	7.0%
HSPA	86.3%	69.2%	85.5%	64.7%	85.5%	7.6%	97.1%	85.5%
LTE	24.1%	0.0%	0.2%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	93.2%	84.6%	92.8%	82.3%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	85.3%	82.4%	75.2%	80.9%	75.0%	50.0%	97.2%	89.8%
NGA broadband	58.0%	4.2%	51.1%	1%	47.2%	0.0%	62.0%	18.1%

Note: Additional and more accurate data was available in 2013 compared to previous years leading to a restatement of 2012 rural data highlighted in italics.

Throughout the course of the study, Slovak NRA adopted new methodology for capturing DSL coverage of the incumbent network operator as a service coverage (all households within the reach of a DSL network), rather than the previously reported technical coverage (including only households realistically able to receive DSL services of advertised quality taking into account crosstalk on copper lines). When service coverage definition is applied, DSL coverage in Slovakia reached 72% of households at the end of 2013 and 66% households in 2012.

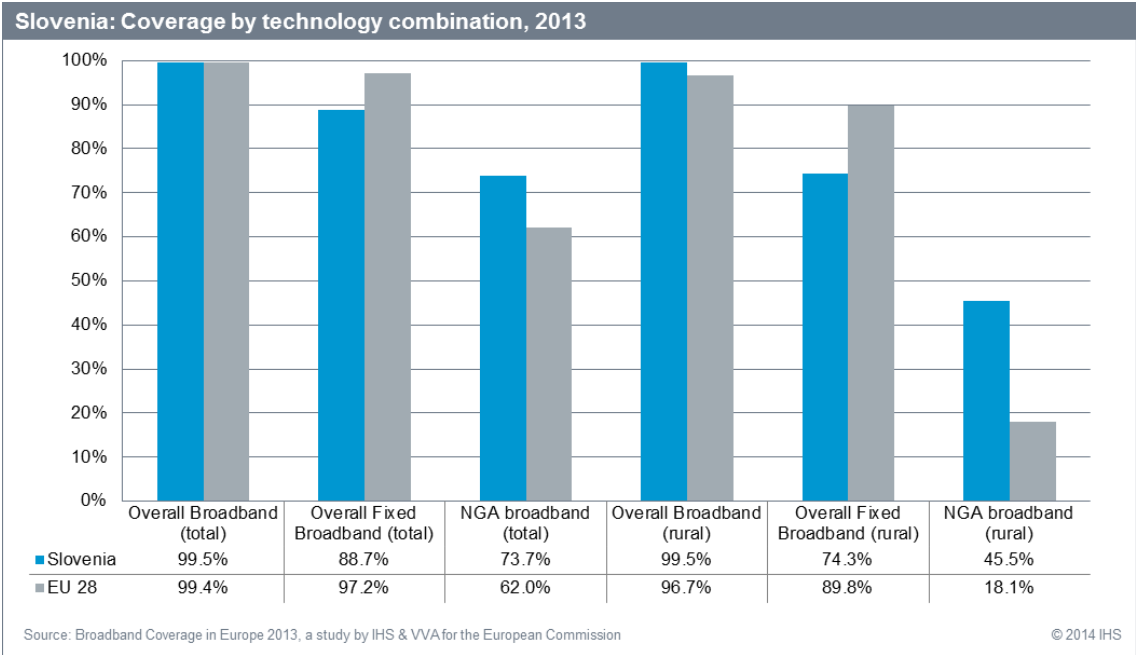
Unless restated, the 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

5.27 Slovenia

5.27.1 National coverage by broadband technology

In 2013, Slovenia reported higher than the EU average levels of overall broadband coverage and NGA coverage at both national and rural levels. However, in terms of fixed broadband coverage Slovenia fell below the EU average.

As was the case with Slovakia and Romania, more accurate data became available during the 2013 data collection in Slovenia, warranting a restatement of the 2012 coverage figures. In particular, figures for total FTTP, cable, DOCSIS 3.0 and all three combination categories as well as all rural indicators were restated after a consultation and approval from the regulator.



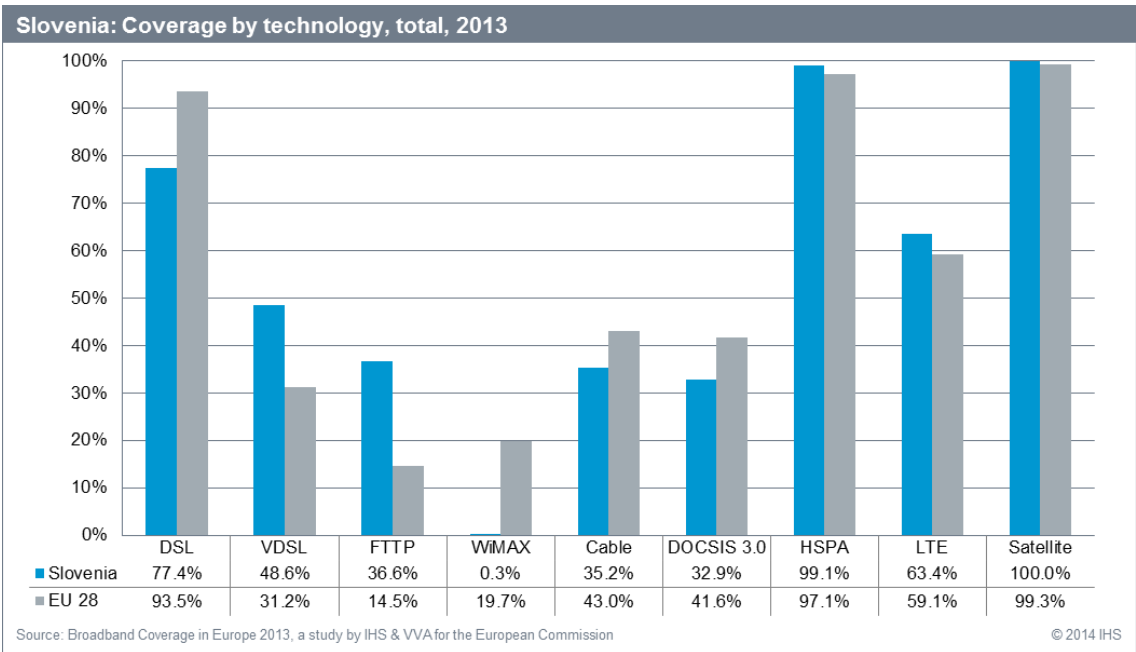
The breakdown by technology shows that the reason for Slovenia’s underperformance (compared to the EU average) in fixed broadband is largely due to the fact that its DSL network is not as widely spread as DSL is across the remainder of the EU. The DSL network in Slovenia reached 77% of households in 2013 compared to the nearly 94% of EU households. In addition, cable coverage is also lower than the EU average (35% vs 43%) and WiMAX coverage very limited¹²⁵ making it challenging for Slovenia to reach above-EU average fixed broadband coverage levels.

On the other hand, Slovenia recorded much higher coverage of both VDSL (reaching nearly 49% of households) and FTTP (which passed close to 37% of Slovenian homes) at the end of 2013. Moreover, on rural level there is virtually no overlap between these networks, resulting in a 27.4 percentage point difference between Slovenia’s rural NGA coverage and the EU average.

In terms of mobile broadband coverage, HSPA provides nearly universal service covering 99% of all households and due to the incumbent, Telekom Slovenije, launching LTE services

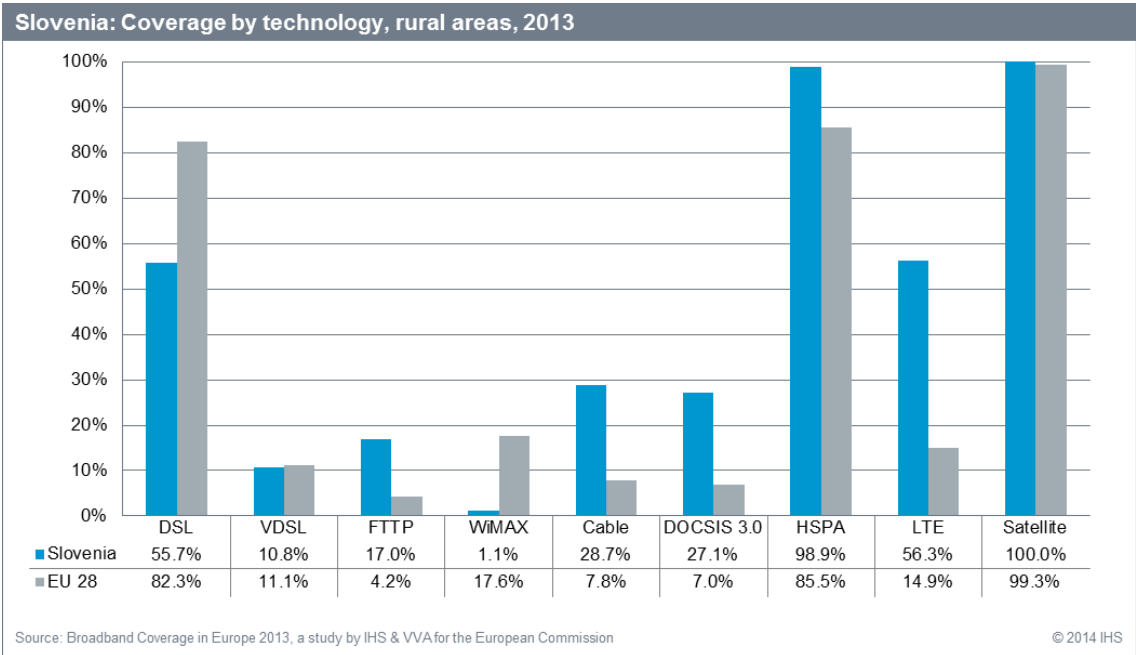
¹²⁵ There is no national WiMAX provider present in Slovenia and WIMAX technology is only used in small, mostly rural areas as part of an Open Access Network initiative aimed at increasing coverage of white spot areas.

in March 2013, more than two-thirds (63%) of Slovenian households had access to an LTE network by the end of 2013.

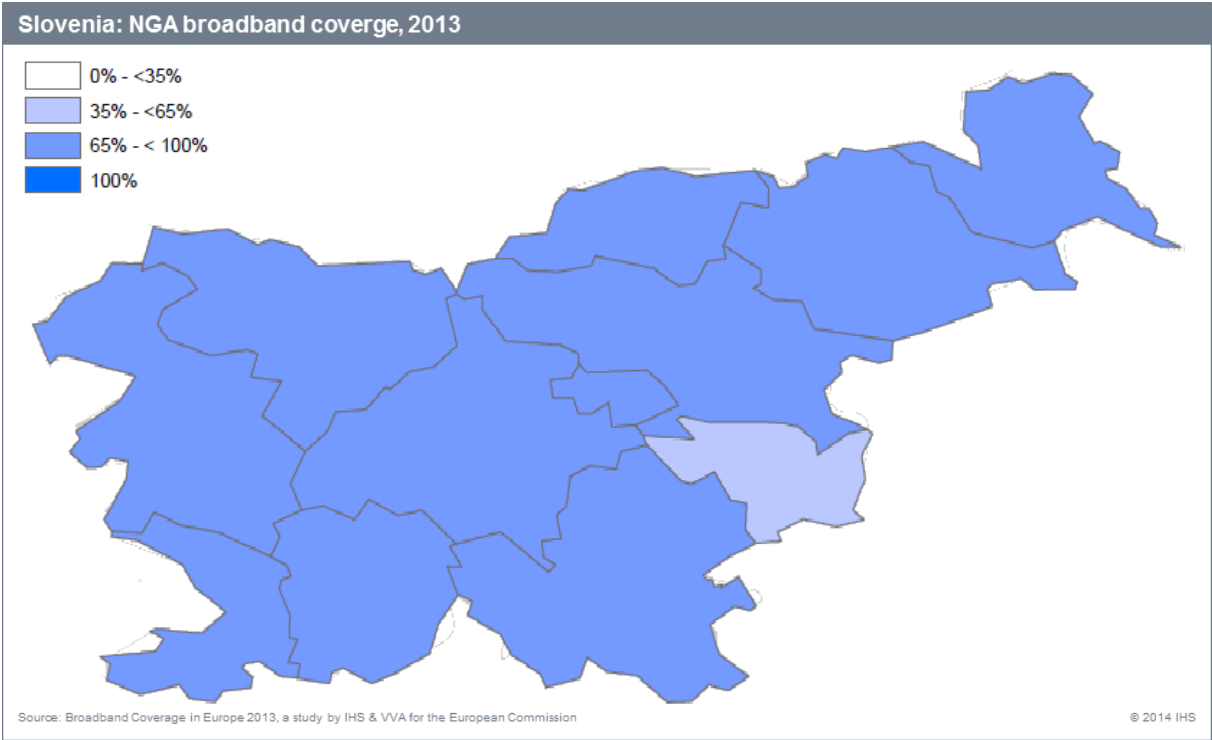
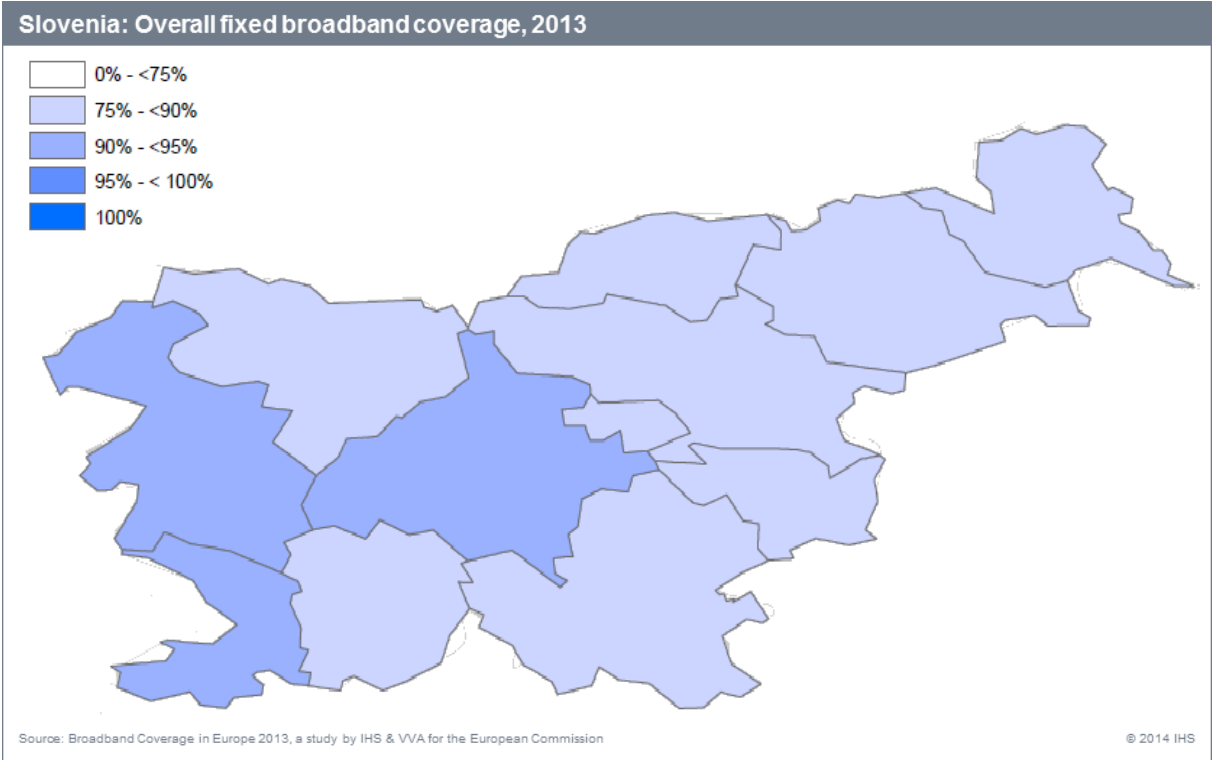


Rural coverage in Slovenia is behind the EU average in terms of DSL coverage, but this is offset with rather high cable presence in rural areas. In 2013, over 28% of rural households in Slovenia had access to cable broadband. With almost all cable networks being upgraded to DOCSIS 3.0, it also means that more than 27% of rural households is passed by DOCSIS 3.0, which together with FTTP coverage (17% of rural households) contributes to the overall high rural NGA coverage in Slovenia.

Revision of methodology for analysis of rural areas in Slovenia, with cooperation with the regulator led to a restatement of 2012 rural figures and some total coverage figures.



5.27.2 Regional coverage by broadband technology



5.27.3 Regulatory and market overview

The “Broadband Network Development Strategy in the Republic of Slovenia” was published in 2008 and is scheduled to run until 2020. The main objectives of the strategy include:

- Development of broadband infrastructure and services for citizens:
 - Broadband infrastructure has to enable coverage of 90% of the population with access to triple-play services and at least 20Mbit/s connection speed by 2015.
 - Broadband infrastructure has to enable coverage of 90% of the population with fibre to the home (FTTH) or comparable broadband connections of greater capacity by 2020.

The incumbent, Telekom Slovenije, utilizes both FTTP as well VDSL technologies in its network infrastructure and has been rolling out these NGA networks since 2007.¹²⁶

Telekom Slovenije is facing competition from fibre provider T-2 and cable operator Telemach. Telemach started with DOCSIS 3.0 upgrades on its network in 2009, while T-2 has been deploying its FTTP and VDSL network since 2006. T-2 offers connections of up to 1Gbps symmetrical speeds that are provided on its FTTH networks.¹²⁷

In the mobile broadband market, Telekom Slovenije launched LTE services in March 2013 and reached 86 Slovenian towns and cities by the end of the year.¹²⁸

¹²⁶ <http://www.telekom.si/en/company/history>

¹²⁷ http://www.comverse.com/news_media/press-releases/t-2-slovenia-chooses-comverse-to-expand-and-a

¹²⁸ <http://www.telegeography.com/products/commsupdate/articles/2013/12/18/telekom-slovenije-expands-lte-range-coverage-devices/>

5.27.4 Data tables for Slovenia

Statistic	National
Population	2,055,496
Persons per household	2.5
Rural proportion	25.6%

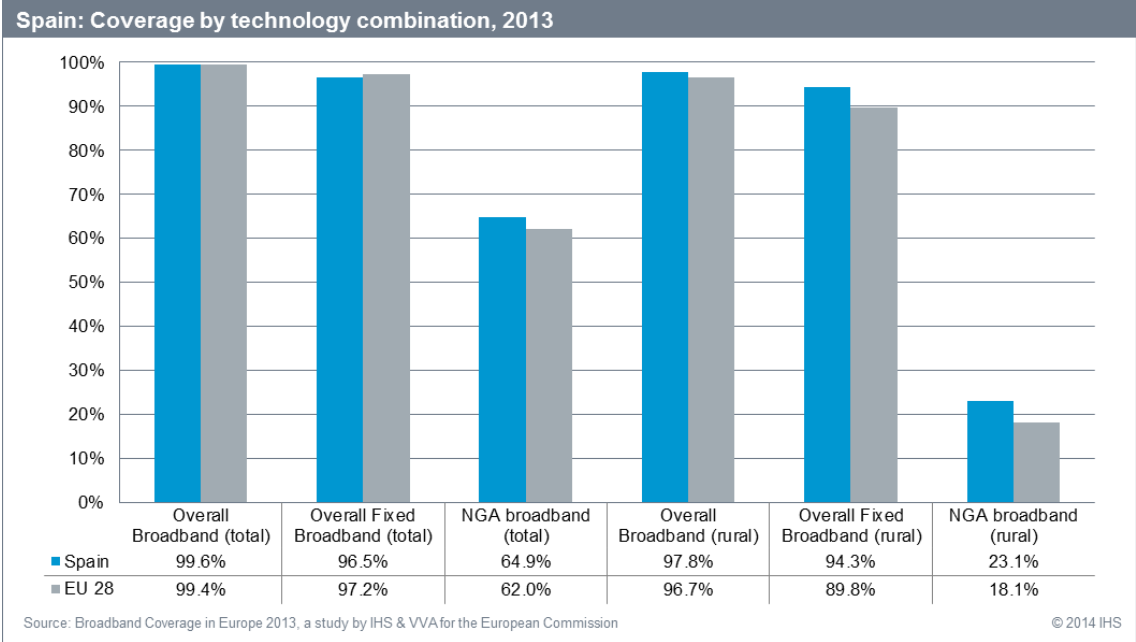
Technology	Slovenia 2013		Slovenia 2012		Slovenia 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	77.4%	55.7%	68.6%	55.6%	n/a	n/a	93.5%	82.3%
VDSL	48.6%	10.8%	42.9%	10.1%	n/a	n/a	31.2%	11.1%
FTTP	36.6%	17.0%	31.3%	14.0%	n/a	n/a	14.5%	4.2%
WiMAX	0.3%	1.1%	0.0%	0.0%	n/a	n/a	19.7%	17.6%
Cable	35.2%	28.7%	30.3%	23.7%	n/a	n/a	43.0%	7.8%
DOCSIS 3.0	32.9%	27.1%	29.1%	23.7%	n/a	n/a	41.6%	7.0%
HSPA	99.1%	98.9%	96.2%	85.2%	n/a	n/a	97.1%	85.5%
LTE	63.4%	56.3%	12.8%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.5%	99.5%	98.1%	92.6%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	88.7%	74.3%	84.3%	64.4%	n/a	n/a	97.2%	89.8%
NGA broadband	73.7%	45.5%	71.4%	35.8%	n/a	n/a	62.0%	18.1%

Note: In 2013, the research team in cooperation with the Slovenian NRA developed an improved methodology for analysis of operator level data. As a result some 2012 figures (highlighted in italics) were subsequently restated to reflect the new information. In light of the newly available figures, it is not possible to make direct comparisons with previously published data for 2011 coverage. After a consultation with the NRA, the research team decided the best approach to be not to include 2011 figures in this report.

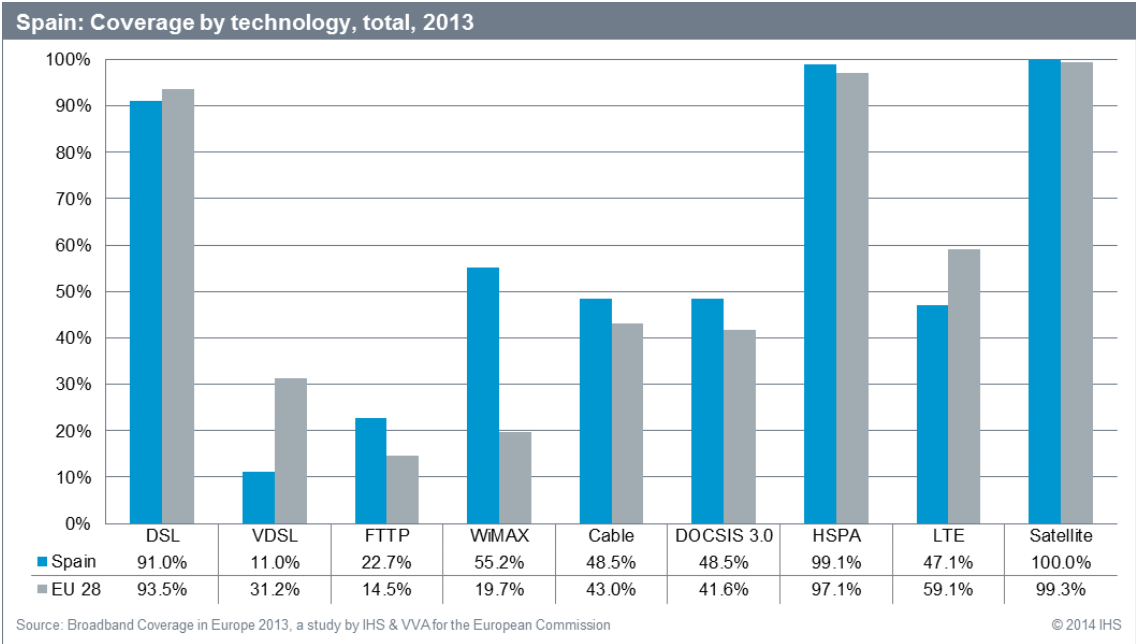
5.28 Spain

5.28.1 National coverage by broadband technology

Fixed and wireless broadband coverage in Spain is almost complete, and it was above the European Average with respect to overall broadband (rural), overall fixed broadband (rural) and overall NGA (rural and total) as shown below.



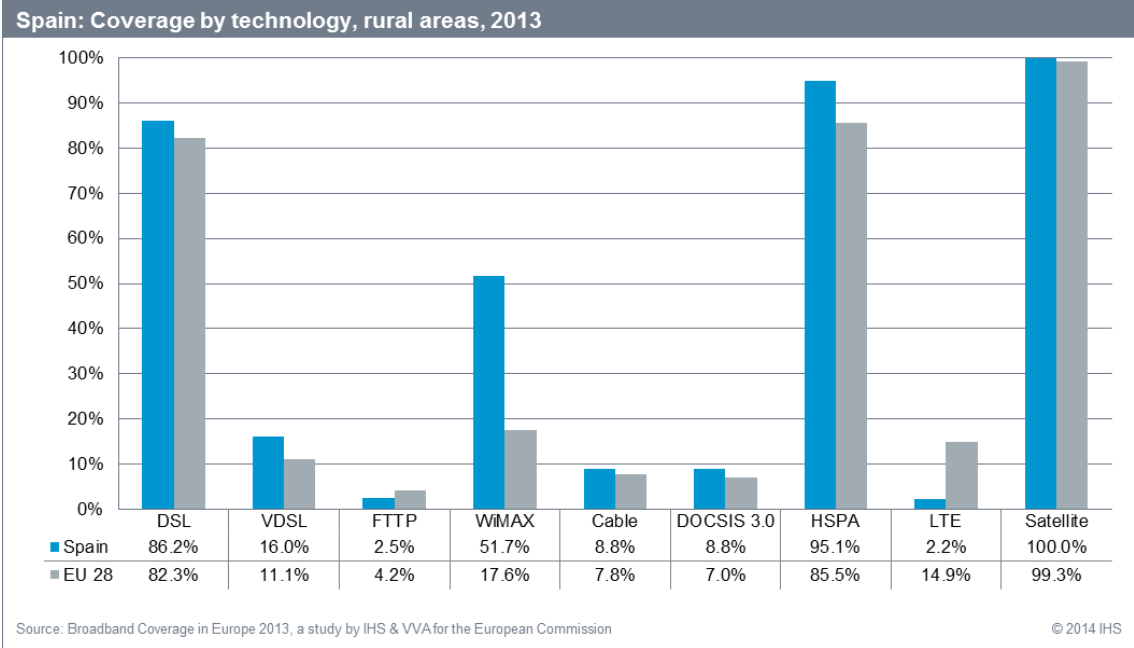
When looking at the technology breakdown, the most significant change year-on-year was in LTE coverage. LTE services were first deployed in 2013 and therefore coverage increased from 0% in 2012 to 47.1% by the end of 2013.¹²⁹ LTE coverage remained below the EU average at 59.1% but FTTP, WiMAX, cable, DOCSIS 3.0 and HSPA coverage were all above the EU28 average.



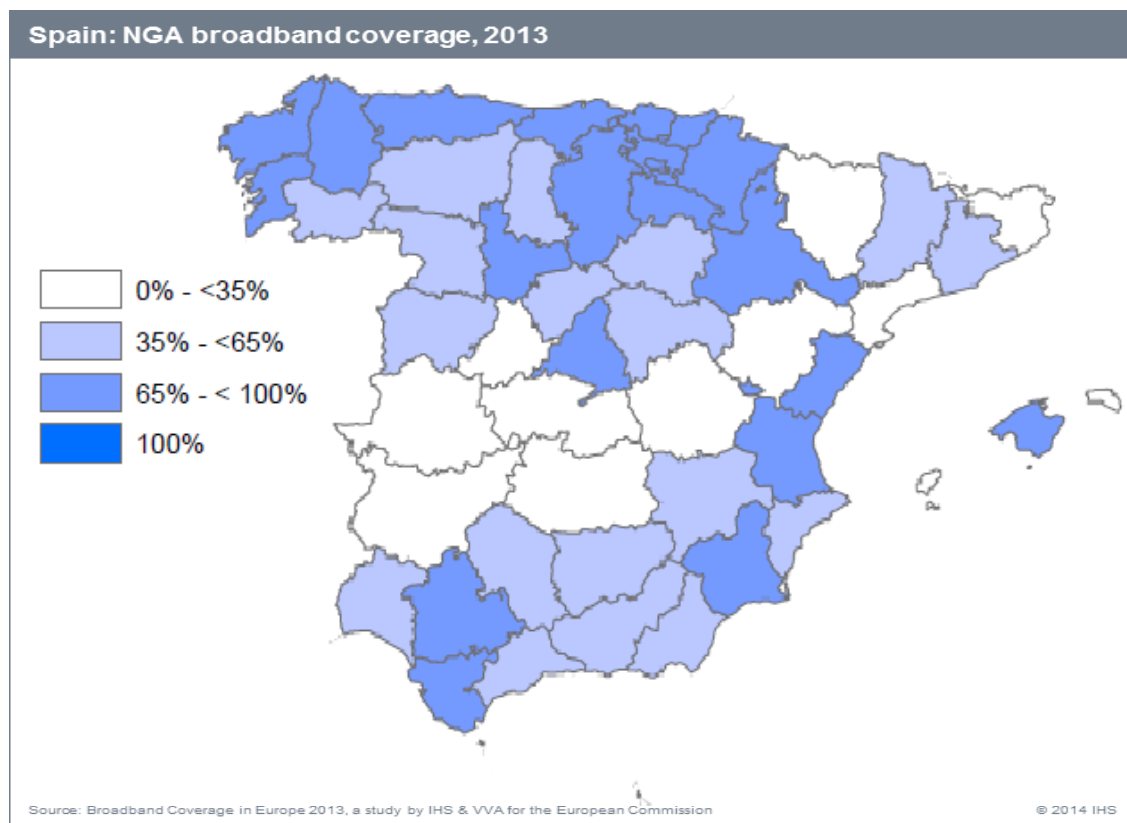
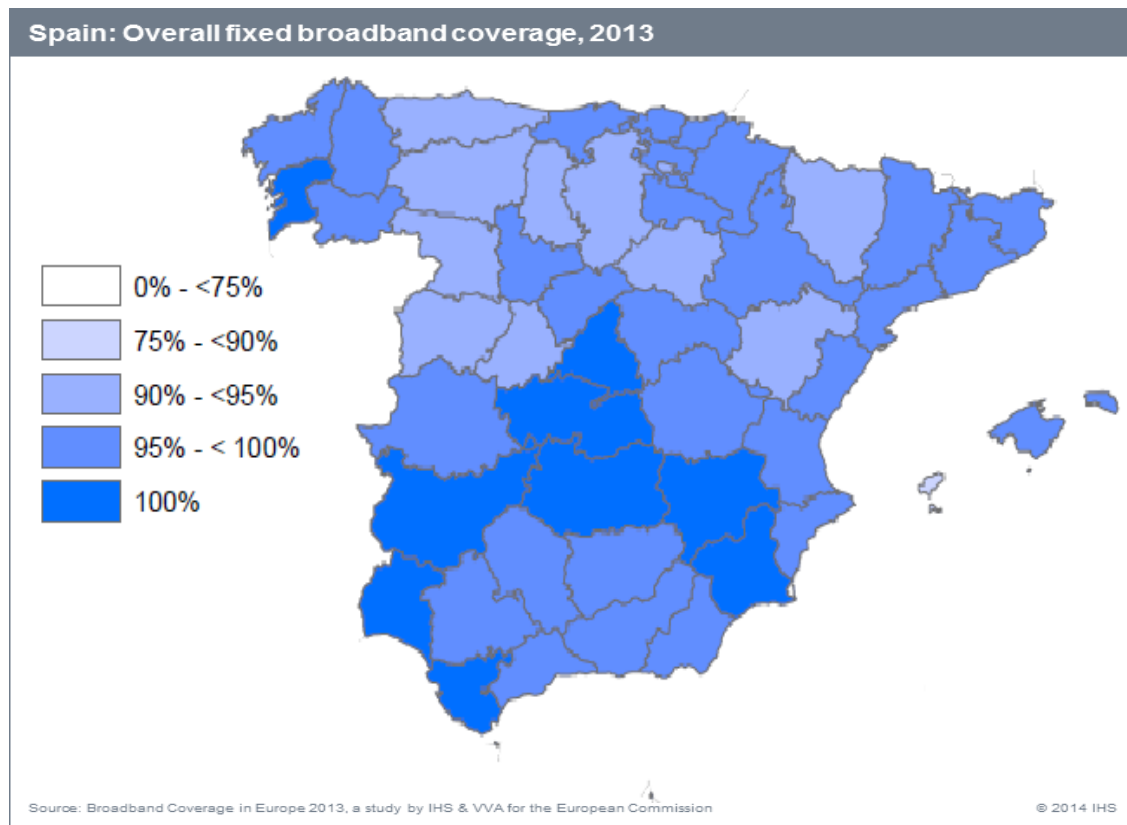
¹²⁹ Mobile network operators have started deploying LTE in the 1800 MHz band in 2013. From January 2015, it is planned the 800 MHz blocks that were auctioned in 2011 will be freed to allow a broader deployment of LTE network.

FTTP coverage increased from 17.9% to 22.7% at end 2013, illustrating the fact that operators such as the incumbent Telefonica España, Vodafone Spain, Orange Spain and Jazztel are committed to offering high-speed broadband services using FTTP networks. According to the information provided by the Spanish regulator, the incumbent, Telefonica, and the main network operators (Vodafone & Orange) have adopted a network strategy on NGA deployment focused largely on FTTH. Due to this strategy, VDSL network not only has been frozen but also there aren't plans to upgrading the existing copper infrastructure neither to VDSL nor to VDSL2 vectoring.

There was an increase in coverage in rural areas using DSL, VDSL, FTTP and LTE technologies. The most significant increases were seen with DSL (up by almost 7 percentage points).



5.28.2 Regional coverage by broadband technology



5.28.3 Regulatory and market overview

The “Digital Agenda for Spain” was published in 2013 and it sets out the objectives and strategy to guarantee a wide broadband access in line with the goals of the Digital Agenda for Europe¹³⁰.

The Digital Agenda for Spain comprises 9 specific plans, including a Telecommunications and Ultra-fast Networks plan. Part of the plan includes measures for the provision of ultrafast fixed access and mobile access networks.

Within the plan, there are three specific lines of action. The first involves the implementation of a new General Telecommunications Act in 2013. This act will help encourage methods that will facilitate the expansion of next generation networks. This includes easy access to civil works infrastructure and network sharing. The second line of action focuses on the simplification of legislation and management procedures. This will help to simplify the administrative processes and reduce costs. The third line of action is aimed at assisting the operators with obtaining funds from the EAFRD for the rollout plan of the NGA coverage in unserved areas.

Operators in Spain recognize that the massive investment involved in network expansion and deployment is a high risk strategy in a market which has seen consumers reduce their outgoings, and with this in mind they are actively seeking value-for-money solutions. During 2013, operators in the Spanish broadband market secured a number of agreements. These agreements serve to develop their plans for the expansion of next generation services while at the same time reduce costs and time-to-market.

In March 2013, Vodafone signed an agreement with Orange Spain to form a joint venture for the construction of a national FTTH network. According to the terms of the agreement, both parties will also deploy individual fibre networks in complementary areas and will facilitate mutual infrastructure access¹³¹. Months later in mid-2013 a network sharing agreement was signed between the Vodafone/Orange joint venture and Telefonica Espana¹³². This agreement allows the Vodafone/Orange entity access to fibre infrastructure within multiple dwelling buildings such as tower blocks (vertical fibre infrastructure) owned by the Spanish incumbent for at least 20 years. Telefonica will have access to Vodafone/Orange’s network where it has no coverage.

Following its EUR 7.2 billion acquisition of cable operator ONO¹³³, Vodafone curtailed its agreement with Orange in terms of coverage targets¹³⁴. In an announcement made in June 2014, Vodafone stated that it would work with Orange on a network that will service 2 million homes and will offer Orange wholesale access to the ONO cable network for a further 1 million properties.

Jazztel announced the expansion of its fibre optic network in July 2014 and announced its connection target of 3 million homes by the end of 2014¹³⁵. Telefonica plans to connect 10 million homes by end 2014 and Vodafone already connections 7 million homes following the acquisition of ONO.

¹³⁰ <http://www.agendadigital.gob.es/digital-agenda/Documents/digital-agenda-for-spain.pdf>

¹³¹ <https://technology.ihs.com/484420/vodafone-launching-joint-fibre-service-in-spanish-market>

¹³² <http://www.reuters.com/article/2013/07/02/us-spain-fibre-optic-idUSBRE9610ZW20130702>

¹³³ <http://www.bbc.co.uk/news/business-26608062>

¹³⁴ <http://www.vodafone.com/content/index/media/vodafone-group-releases/2014/vodafone-spain-orange-spain-fibre-sharing-agreement.html>

¹³⁵ <http://uk.reuters.com/article/2014/07/24/jazztel-network-idUKL6N0PZ2W820140724>

5.28.4 Data tables for Spain

Statistic	National
Population	46,799,022
Persons per household	2.6
Rural proportion	18.8%

Technology	Spain 2013		Spain 2012		Spain 2011		EU28	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	91.0%	86.2%	94.8%	79.6%	93.3%	68.9%	93.5%	82.3%
VDSL	11.0%	16.0%	10.9%	0.0%	10.9%	0.0%	31.2%	11.1%
FTTP	22.7%	2.5%	17.9%	0.0%	9.7%	0.0%	14.5%	4.2%
WiMAX	55.2%	51.7%	51.3%	53.0%	47.6%	49.1%	19.7%	17.6%
Cable	48.5%	8.8%	51.3%	8.3%	46.9%	7.5%	43.0%	7.8%
DOCSIS 3.0	48.5%	8.8%	50.3%	8.3%	46.0%	6.6%	41.6%	7.0%
HSPA	99.1%	95.1%	98.6%	92.3%	97.1%	83.8%	97.1%	85.5%
LTE	47.1%	2.2%	0.0%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.6%	97.8%	99.4%	96.6%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	96.5%	94.3%	97.6%	90.3%	96.4%	84.1%	97.2%	89.8%
NGA broadband	64.9%	23.1%	63.9%	13.0%	56.0%	6.6%	62.0%	18.1%

Note: In 2013, Spanish NRA changed methodology applied to collection of coverage data by increasing the minimum speed requirement for DSL coverage from 1 Mbps used in previous studies to 2 Mbps. Therefore it is not possible to compare DSL coverage data year-on-year. In addition, rural cable and DOCSIS 3.0 coverage data for 2012 was restated.

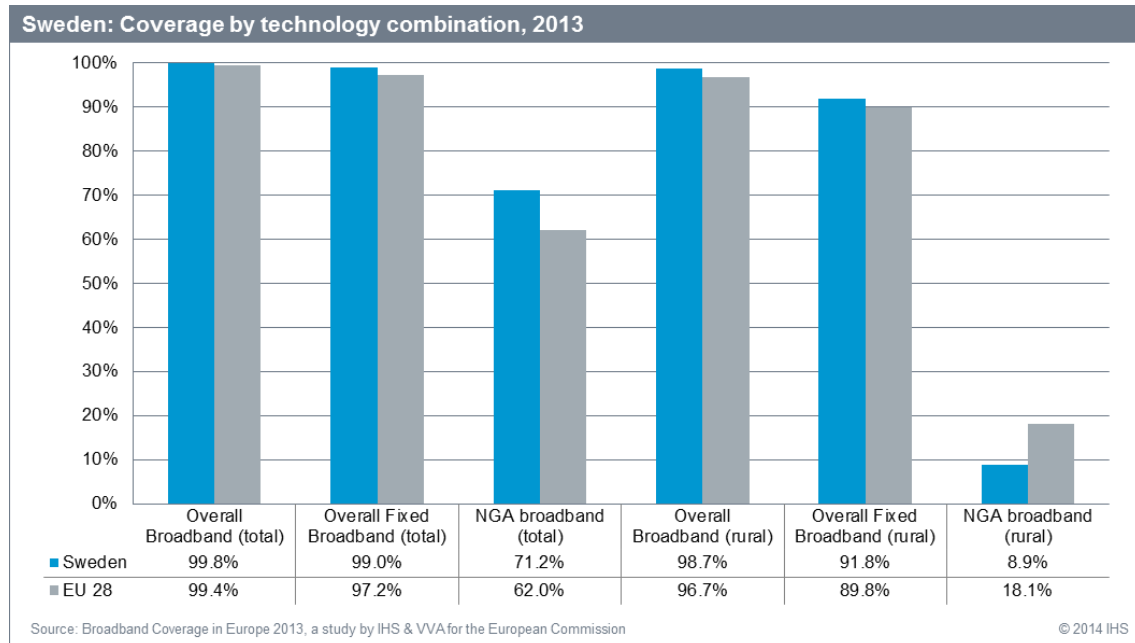
Moreover, 2013 rural VDSL coverage should not be directly compared to the 2012 rural VDSL coverage figure as some discrepancy in methodology might have occurred as Point Topic did not include rural VDSL coverage figures reported by the regulator in its 2012 estimates. According to the NRA, VDSL coverage in 2012 was similar to coverage in 2013.

The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

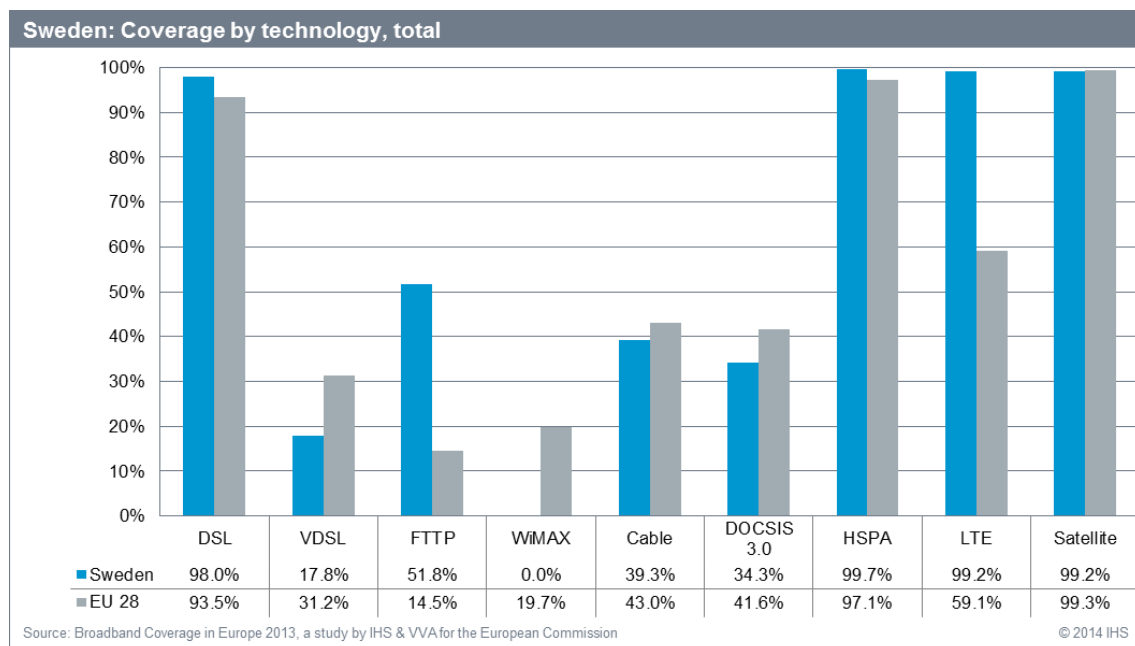
5.29 Sweden

5.29.1 National coverage by broadband technology

Sweden registered at above the EU28 average across all broadband coverage categories aside from rural NGA in 2013. At 8.9% however, rural NGA coverage was up on the previous year (6.3%). Overall country-wide NGA coverage showed the largest increase, up by almost 15 percentage points year-on-year to 71.2%.

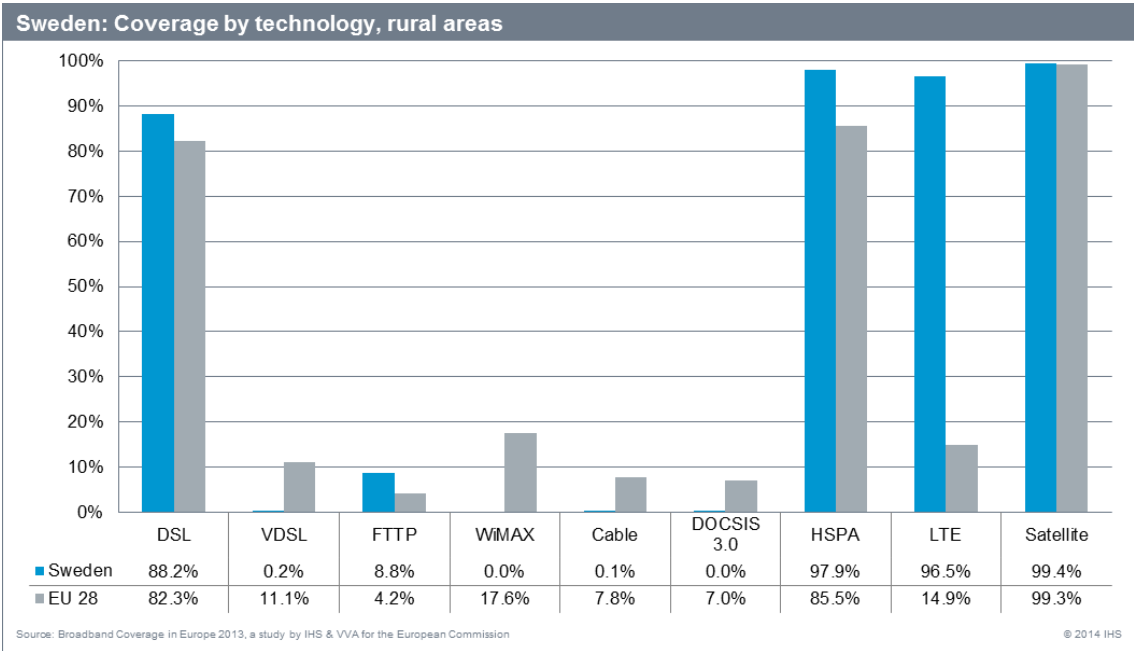


DSL remains the dominant fixed broadband technology in Sweden, but FTTP coverage is growing, up by 5.6 percentage points on the previous year to 51.8%. FTTP has been earmarked by most Swedish operators as a key next generation network technology, and this is reflected in the high FTTP coverage¹³⁶.

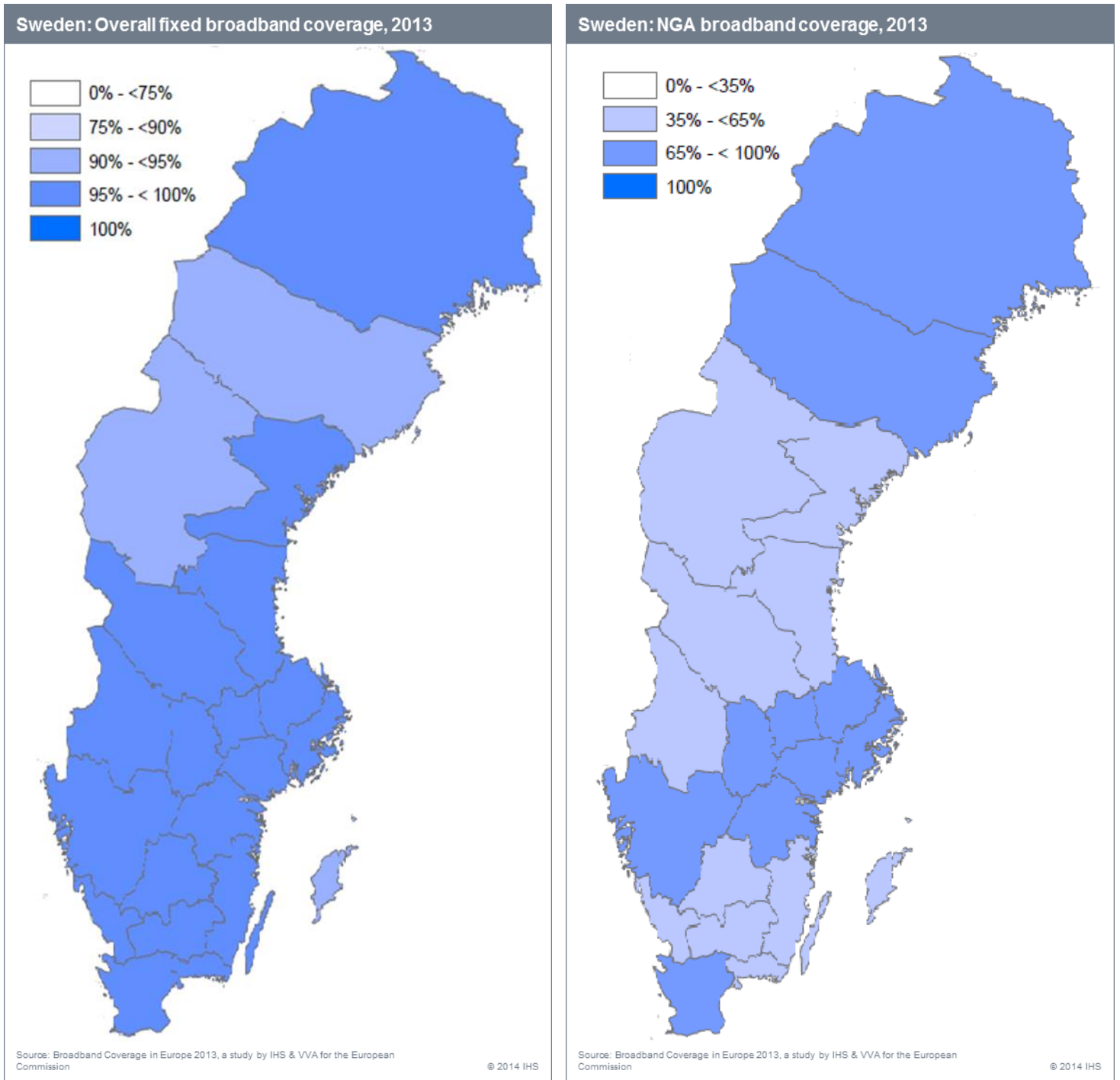


¹³⁶ http://www.ftthcouncil.eu/documents/Opinions/2013/Nordic_Innovation_Final.pdf

Rural areas remain more dependent on wireless technologies with respect to coverage - HSPA, LTE and Satellite offer coverage at 97.9%, 96.5% and 99.4% respectively. LTE coverage in rural Sweden is more than six times the EU28 average of 14.9%.



5.29.2 Regional coverage by broadband technology



5.29.3 Regulatory and market overview

The 'Broadband Strategy for Sweden' was published in 2009 and clarifies the Swedish policy on broadband expansion through until 2020. According to the key targets of the strategy, 40% of all households and businesses should have access to services with a minimum speed of 100 Mbps by 2015 and 90% of all households and businesses should have access to services with a minimum speed of 100 Mbps by 2020¹³⁷.

The Swedish FTTP market is thriving, but some operators are also in the process of improving their networks to support other NGA technologies such as DOCSIS 3.0 and VDSL.

In 2011, Swedish incumbent TeliaSonera announced plans to upgrade 800,000 connections to VDSL2 technology via a scheme of works due for completion by end 2013¹³⁸. At the same time TeliaSonera also unveiled a SEK 5 billion investment in the expansion of its fibre network, with the aim of connecting 1 million homes to this network by 2014¹³⁹.

Swedish cable operators face stiff competition from the FTTP market and as such are under pressure to keep up with the high-speed services offered by competitors such as Telenor and TeliaSonera. In September 2013 Com Hem launched a new broadband service capable of achieving downstream speeds up to 500 Mbps supported using Docsis 3.0. The service was initially available to over 1 million households¹⁴⁰.

In the wireless market, LTE is very well established in Sweden as reflected by its coverage which is well above the EU average. TeliaSonera was the first Swedish operator to launch LTE services in December 2009¹⁴¹. More than 2 years later in May 2012, TeliaSonera reported that it had 140,000 LTE subscribers which was line with the expansion of its network¹⁴².

In mid-November 2010, Tele2 and Telenor launched LTE mobile broadband services using their joint venture Net4Mobility. Services were originally launched in Stockholm, Gothenburg, Malmo and Karlskrona and typical data connections speeds are in the 20 – 40 Mbps range¹⁴³.

Hi3G originally launched its LTE network back in 2011 in collaboration with ZTE. The original areas covered were Stockholm, Gothenburg and Malmo¹⁴⁴.

¹³⁷ <http://www.government.se/content/1/c6/13/49/80/112394be.pdf>

¹³⁸ <http://www.tvtechnology.com/news/0086/teliasonera-passes-million-tv-subs/237524>

¹³⁹ <http://www.telegeography.com/products/commsupdate/articles/2011/06/15/telia-to-cover-2-3m-fibre-homes-including-1m-swedish/>

¹⁴⁰ <http://www.multichannel.com/news/distribution/com-hem-revs-500-meg-broadband-tier/261362>

¹⁴¹ <http://www.totaltele.com/view.aspx?ID=451548>

¹⁴² <http://www.telegeography.com/products/commsupdate/articles/2012/05/30/telia-reaches-140000-lte-subscribers-in-sweden-working-on-a-skype-beater/>

¹⁴³ <http://www.telegeography.com/products/commsupdate/articles/2010/11/15/tele2-and-telenor-sweden-launch-lte/>

¹⁴⁴ <http://www.fiercewireless.com/tech/story/swedens-hi3g-announces-first-fddtd-lte-network/2011-12-19>

5.29.4 Data tables for Sweden

Statistic	National
Population	9,555,893
Persons per household	2.1
Rural proportion	16.9%

Technology	Sweden 2013		Sweden 2012		Sweden 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	98.0%	88.2%	98.0%	88.4%	98.0%	88.3%	93.5%	82.3%
VDSL	17.8%	0.2%	16.6%	0.2%	16.7%	0.2%	31.2%	11.1%
FTTP	51.8%	8.8%	46.2%	6.2%	46.2%	4.7%	14.5%	4.2%
WiMAX	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	19.7%	17.6%
Cable	39.3%	0.1%	40.6%	0.1%	36.8%	0.1%	43.0%	7.8%
DOCSIS 3.0	34.3%	0.0%	34.7%	0.1%	31.0%	0.1%	41.6%	7.0%
HSPA	99.7%	97.9%	99.7%	98.2%	99.6%	97.9%	97.1%	85.5%
LTE	99.2%	96.5%	93.3%	70.6%	48.1%	7.2%	59.1%	14.9%
Satellite	99.2%	99.4%	100.0%	100.0%	0.0%	0.0%	99.3%	99.3%
Overall broadband	99.8%	98.7%	99.8%	99.1%	n/a	n/a	99.4%	96.7%
Overall fixed broadband	99.0%	91.8%	98.5%	91.4%	98.1%	91.0%	97.2%	89.8%
NGA broadband	71.2%	8.9%	56.6%	6.3%	53.4%	4.9%	62.0%	18.1%

Note: While the Swedish NRA provided the research team with aggregated technology coverage data for individual NUTS 3 regions, data reported in the BCE 2013 study differs slightly from the data published by the regulator in the national study. This is due to a different base of population coverage being reported by the regulator and household coverage reported in the BCE study.

The 2012 and 2011 figures reflect data reported by Point Topic in previous years of the study.

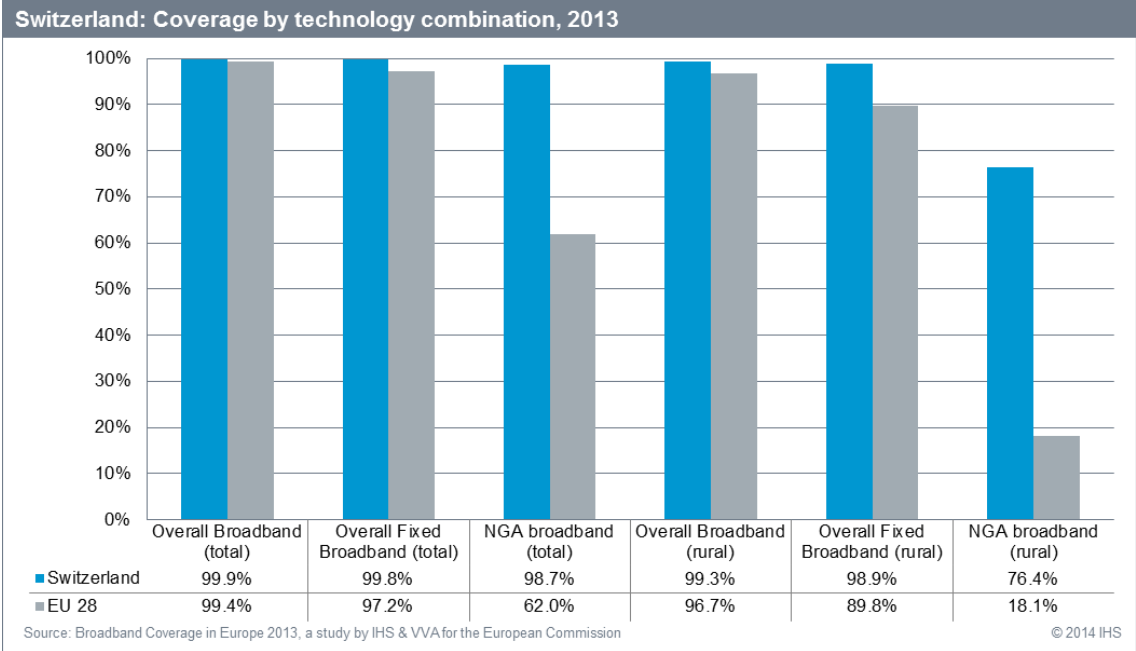
5.30 Switzerland

5.30.1 National coverage by broadband technology

As in 2012, research on broadband coverage in Switzerland was added in the BCE study thanks to additional funding provided Glasfasernetz Schweiz, a Swiss fibre optic industry association.

Switzerland has one of the most advanced broadband network infrastructures among all study countries. It was ahead of the EU average in all broadband coverage combination categories, most notably in total and rural NGA coverage and rural fixed broadband coverage.

In 2013, Switzerland recorded an increase in NGA coverage at both national and rural levels. Total NGA coverage increased by 4.3 percentage points with NGA technologies reaching over 98% of Swiss households. An even more significant increase was reported for rural NGA coverage, which grew from nearly 65% of rural households in 2012 to more than 76% at the end of 2013.

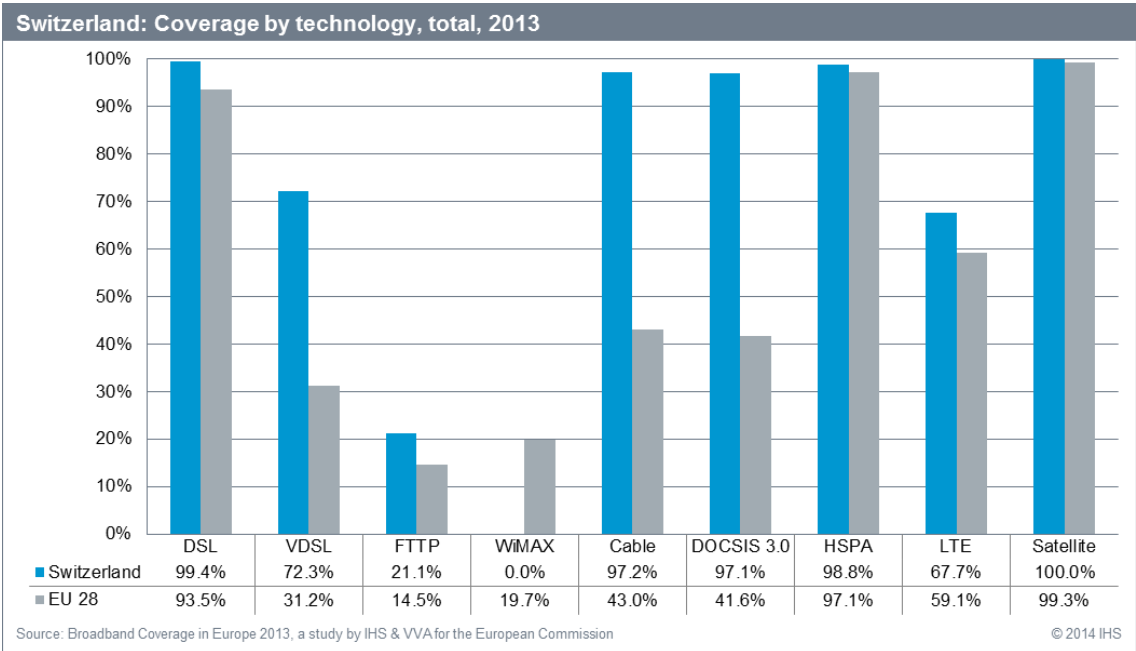


A closer look at coverage levels of the individual broadband technologies reveals that Switzerland is ahead of the EU average in each category with the exception of WiMAX, which is not present in Switzerland.

Switzerland’s extensive NGA coverage can be explained by the nearly widespread DOCSIS 3.0 coverage reaching nearly 99% of Swiss households. Rapidly increasing VDSL coverage, a result of a large-scale roll out by the incumbent, Swisscom, in recent years, also contributes to the high NGA coverage level. VDSL coverage increased by 19 percentage points year-on-year and passed nearly two-thirds (72%) of Swiss homes by the end of 2013.

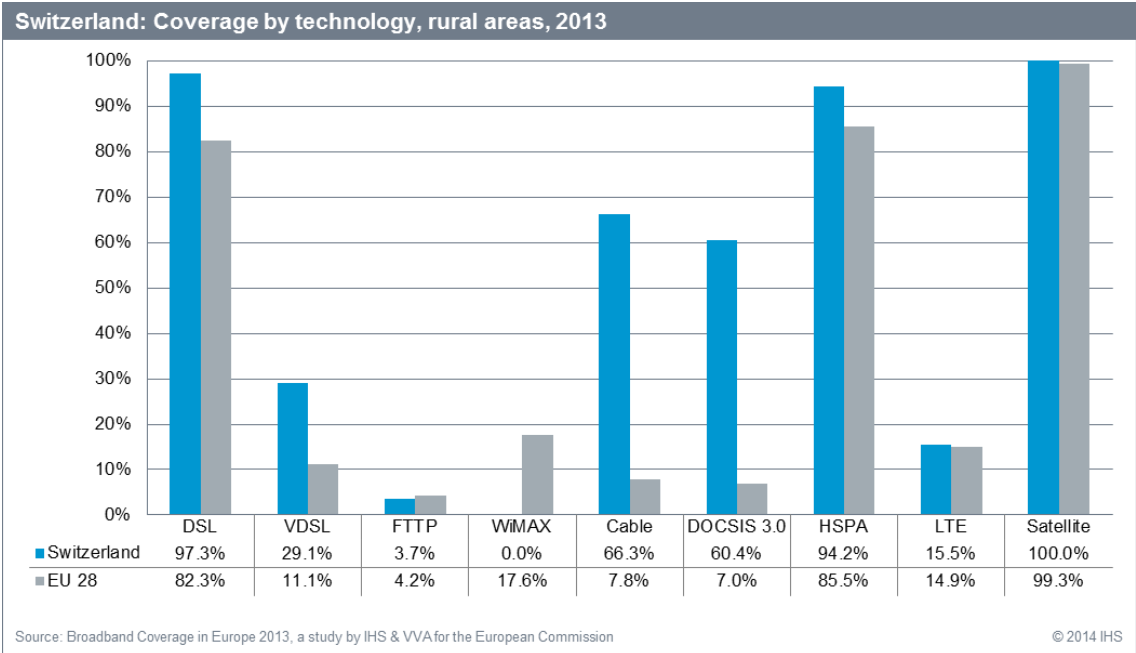
In response to competition from cable operators, the incumbent is also investing heavily in FTTP network deployments across the country. At the end of 2013, high-speed FTTP services were available to more than 21% of Swiss households, a 4.4 percentage point increase compared to the previous year.

In terms of mobile broadband coverage, a 1.4 percentage point increase in HSPA coverage was reported in 2013, reaching nearly 99% of households. LTE services were commercially launched at the end of 2012 and registered significant progress in coverage throughout 2013, rising from 20% to nearly 68% of Swiss households.

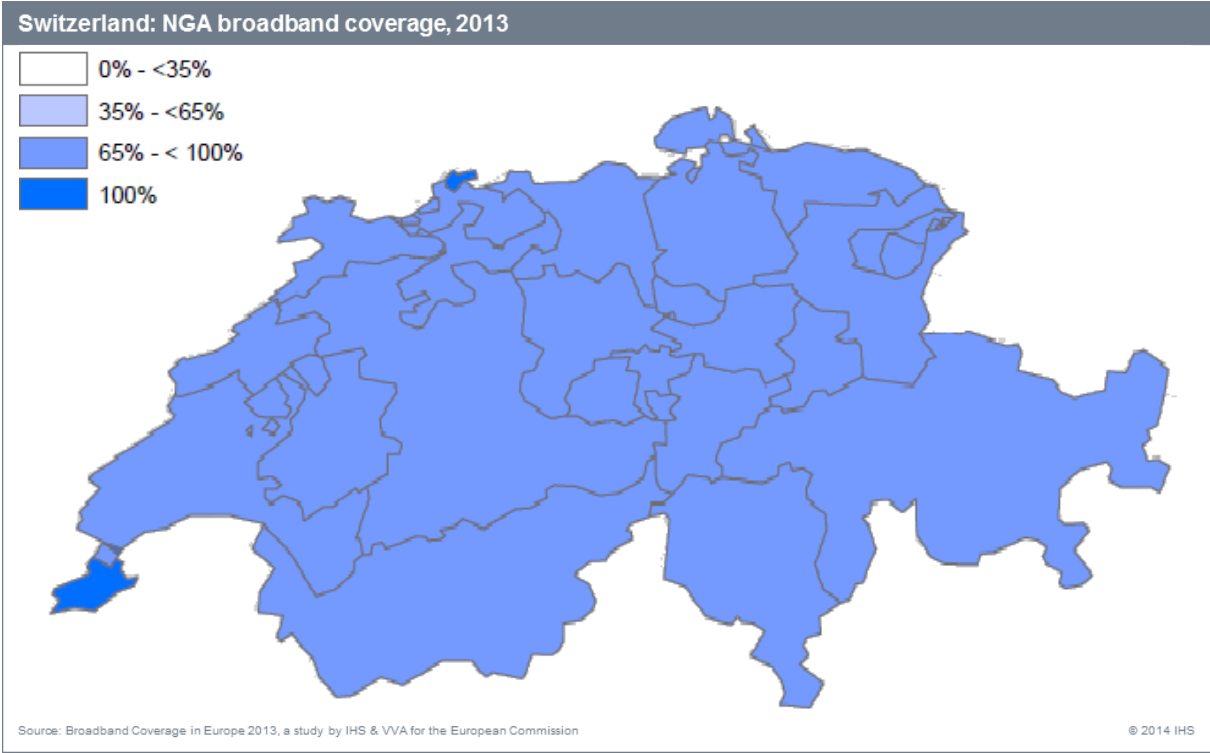
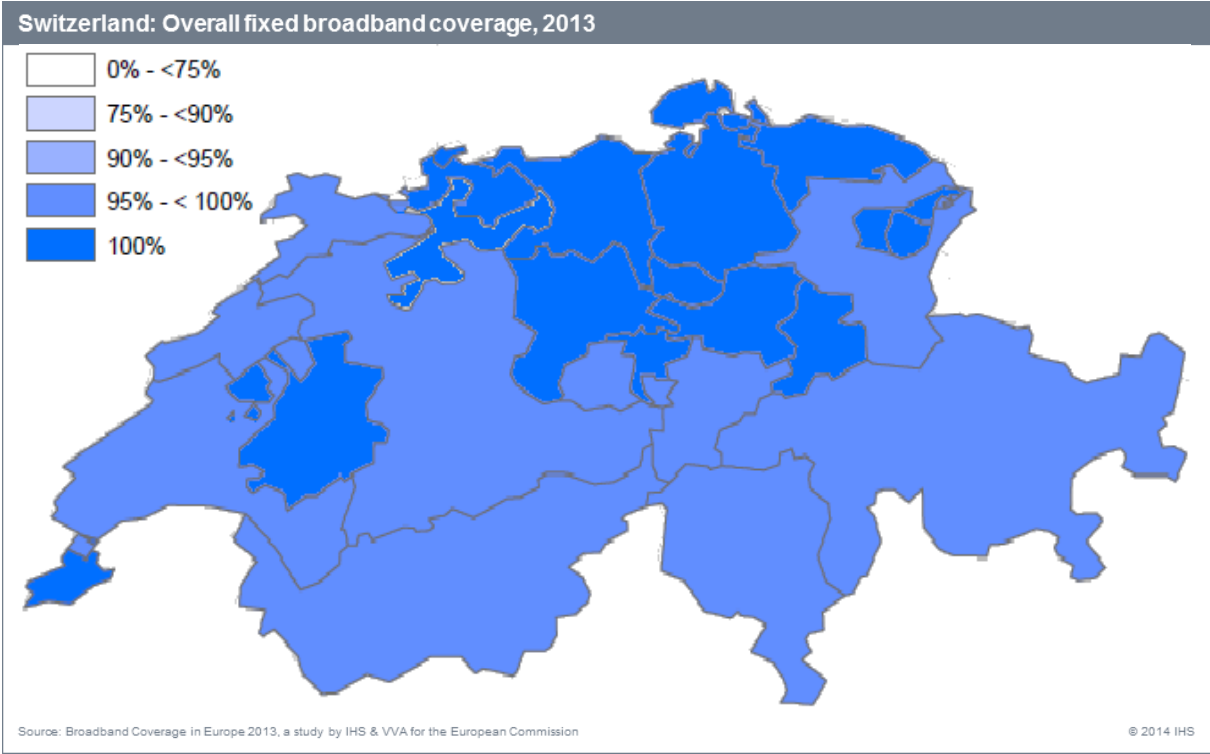


Rural coverage in Switzerland is generally much higher than the EU average, and especially in the case of cable coverage and DOCSIS 3.0 coverage, which both reach coverage levels that are approx. 50 percentage points higher than the EU average. Such high rural DOCSIS 3.0 coverage is the main reason behind the high rural NGA coverage, although VDSL is also becoming an important contributor to rural NGA coverage.

In 2013, rural VDSL coverage increased more than two-fold from nearly 13% of rural households to over 29% of rural households covered by the technology.



5.30.2 Regional coverage by broadband technology



5.30.3 Regulatory and market overview

The Swiss broadband market is characterised by heavy infrastructure-based competition between cable operators and the incumbent, Swisscom with a number of smaller FTTP providers active on a regional and local level.

Swiss cable operators, led by Liberty-Global backed Cablecom, have been investing heavily in network upgrades since 2006 and by 2013 nearly all cable networks were upgraded to the DOCSIS 3.0 standard and offering up to 250 Mbps downstream broadband connections.¹⁴⁵

Swisscom has adopted a varied approach to its network upgrade, starting with VDSL trials in 2006 and announcing a FTTP network deployment plan in 2008.¹⁴⁶ By the end of 2013, Swisscom's FTTP network passed approx. 750 thousand homes across Switzerland capable of up to 1Gbps downstream speeds.¹⁴⁷ The company aims to roll out ultra-fast broadband technologies to over 2.3 million homes and businesses by the end of 2015 and to more than 4.6 million by 2020

Swisscom also rolled out the first LTE network at the end of 2012 and in 2013, both Orange and Sunrise, the other two mobile operators active in Switzerland, followed by the launch of their respective LTE services¹⁴⁸

¹⁴⁵ <http://www.upc-cablecom.ch/en/internet/products/>

¹⁴⁶ http://www.swisscom.ch/en/about/medien/press-releases/2008/12/20081209_01_Mit_fibre_suisse_in_die_Glasfaserzukunft.html

¹⁴⁷ <http://www.swisscom.ch/content/dam/swisscom/de/about/investoren/documents/2014/2013-annual-results.pdf.res/2013-annual-results.pdf>, p. 9

¹⁴⁸ <http://www.zdnet.com/sunrise-joins-switzerlands-4g-crowd-with-lte-launch-in-26-towns-7000017004/>

5.30.4 Data tables for the Switzerland

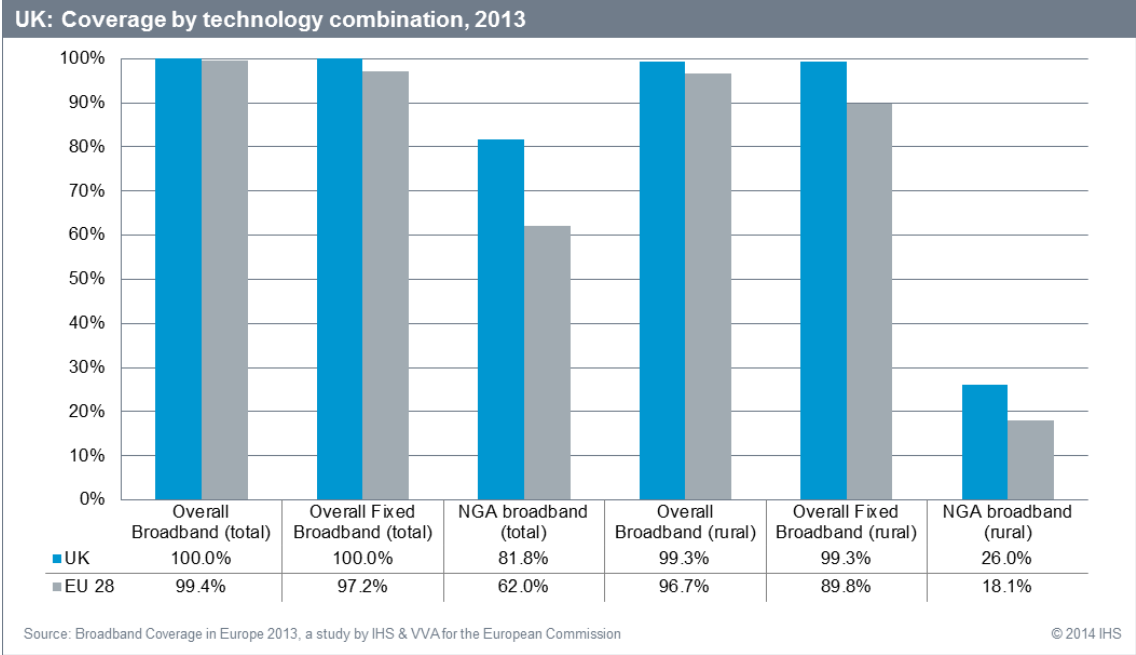
Statistic	National
Population	7,954,662
Persons per household	2.2
Rural proportion	14.8%

Technology	Switzerland 2013		Switzerland 2012		Switzerland 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	99.4%	97.3%	99.4%	97.0%	99.4%	96.6%	93.5%	82.3%
VDSL	72.3%	29.1%	53.4%	12.7%	43.6%	6.9%	31.2%	11.1%
FTTP	21.1%	3.7%	16.7%	2.9%	12.2%	0.0%	14.5%	4.2%
WiMAX	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	19.7%	17.6%
Cable	97.2%	66.3%	95.0%	65.7%	91.7%	64.4%	43.0%	7.8%
DOCSIS 3.0	97.1%	60.4%	93.1%	58.8%	88.6%	55.6%	41.6%	7.0%
HSPA	98.8%	94.2%	97.4%	88.9%	97.4%	88.9%	97.1%	85.5%
LTE	67.7%	15.5%	20.2%	0.5%	0.0%	0.0%	59.1%	14.9%
Satellite	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	99.9%	99.3%	99.9%	99.0%	99.7%	98.5%	99.4%	96.7%
Overall fixed broadband	99.8%	98.9%	99.8%	98.8%	99.7%	98.3%	97.2%	89.8%
NGA broadband	98.7%	76.4%	94.4%	64.8%	92.7%	41.2%	62.0%	18.1%

5.31 United Kingdom

5.31.1 National coverage by broadband technology

The United Kingdom saw significant improvements in NGA access in 2013, both nationally and in rural areas. Nationally NGA coverage increased by 11.5 percentage points to 81.8% of households, while in rural areas, NGA access increased by 7.8 percentage points to 26% of homes. With near-100% high overall fixed and mobile broadband access, the UK is ahead of the EU 28 average across all technology combinations.



In terms of individual technologies, significant improvements in 2013 were seen for VDSL and LTE in particular. Growth in VDSL coverage relates primarily to investments made by telecommunications groups including BT – which plans to cover nearly 20 million homes with its next-generation access infrastructure by the end of 2014. Other groups including BSKyB and Talk Talk have more recently announced¹⁴⁹ plans to develop next-generation infrastructure across a range of primarily urban areas.

The UK performs above the European average in all major technology categories, aside from FTTP, which has very low coverage – reflecting BT’s decision to invest in VDSL – and WIMAX, which covers just 4% of homes.

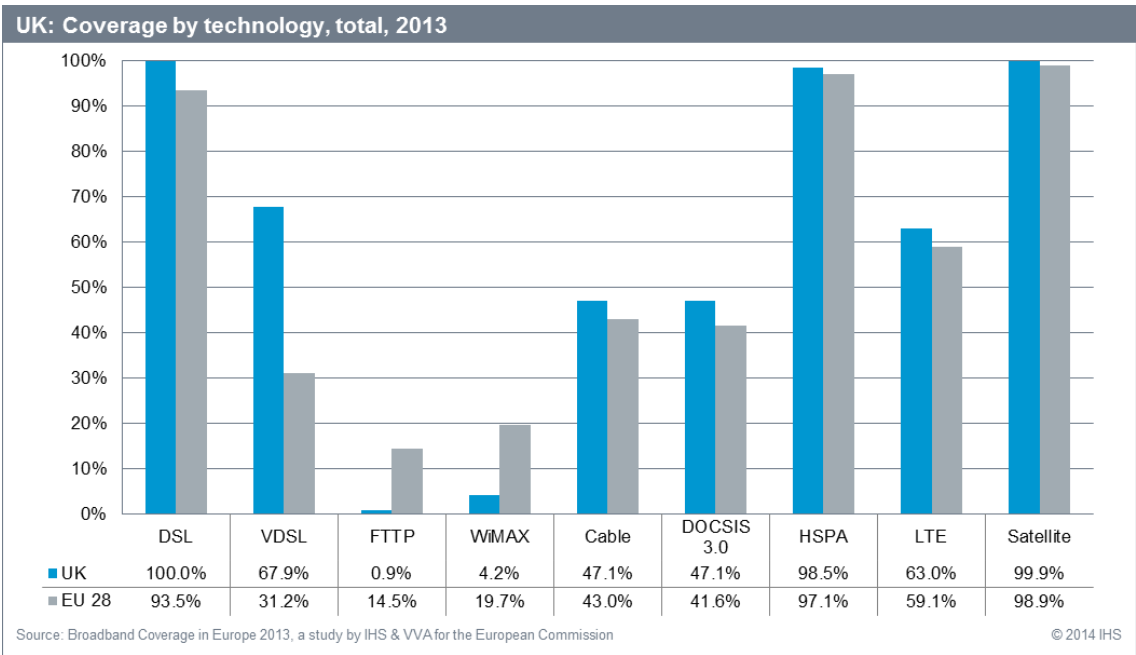
VDSL coverage in the previous edition of the study was reported to be 46,9%, with the increase to 67,9% recorded in 2013 the primary driver for the national NGA coverage gains. Cable company Virgin Media had previously upgraded its cable network to DOCSIS 3.0, so only marginal increases in coverage for DOCSIS 3.0 were recorded in 2013. Virgin Media has since indicated it plans to expand its network in additional areas¹⁵⁰.

LTE coverage in 2012 in the UK was low and behind the European average, but further operator deployments in 2013 of LTE services resulted in a significant improvement of service availability, with coverage reaching 63% by year-end. Operator Everything

¹⁴⁹ <http://www.theguardian.com/technology/2014/apr/15/sky-talktalk-cityfibre-ultra-fast-network-york>

¹⁵⁰ <http://about.virginmedia.com/press-release/9444/virgin-media-takes-superfast-broadband-to-east-london>

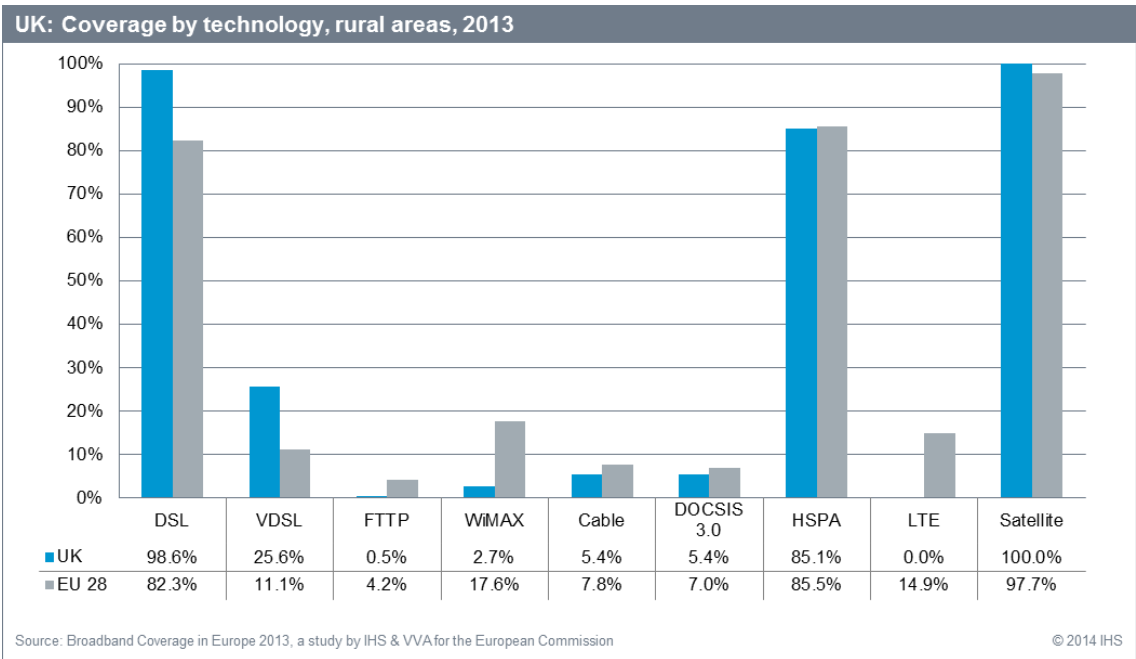
Everywhere had deployed LTE services in the UK in 2012 and was followed in 2013 by providers including 3, O2 and Vodafone.



In rural areas the situation is significantly different to the national picture. The country's performance is ahead of the EU28 average only for DSL and VDSL categories.

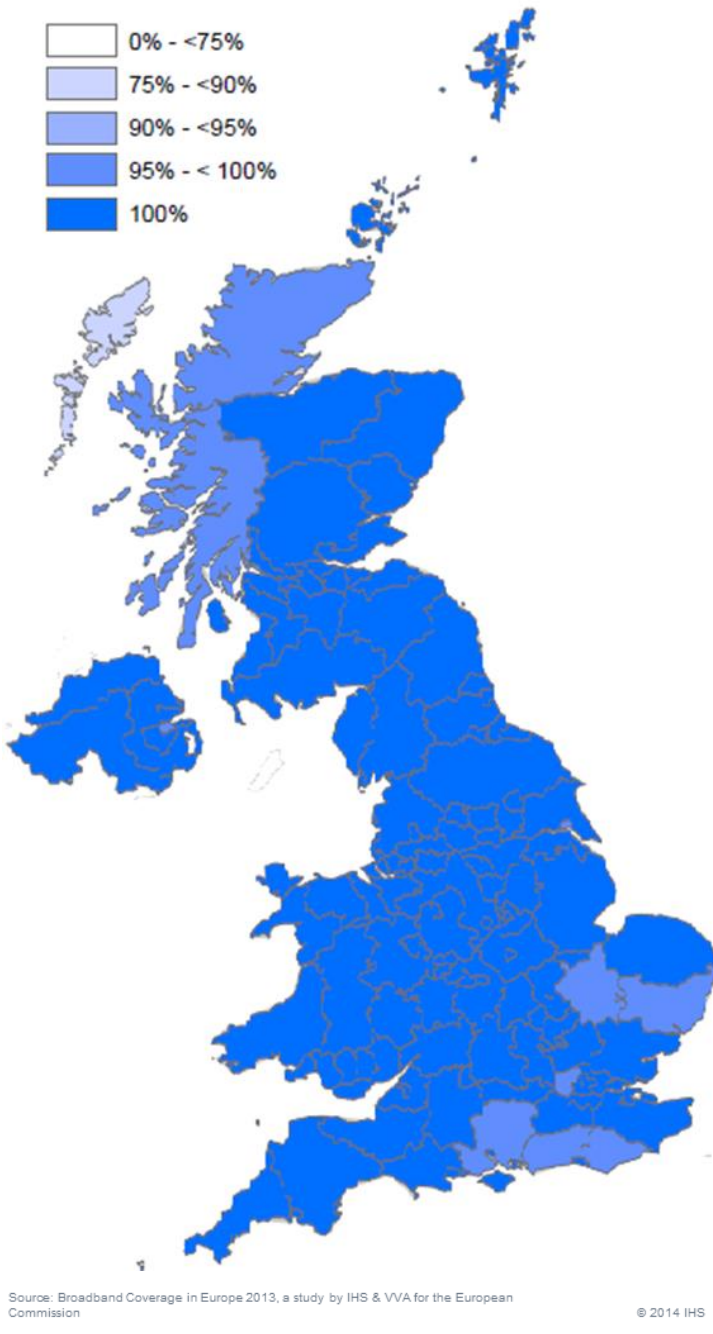
VDSL coverage increases were the primary reason behind the improvement in the provision of NGA services in rural areas. Since the last edition of the study, VDSL increased its coverage by 11 percentage points, reaching 25,6% of households in British rural areas – as at national level, this primarily reflects BT's investments in VDSL access deployments.

By contrast, FTTP and LTE were reported to be still nearly completely absent (with LTE rollouts from mobile operators focused on more densely-populated urban areas), while WiMAX, standard cable and DOCSIS 3.0 coverage remained low and below the European average.

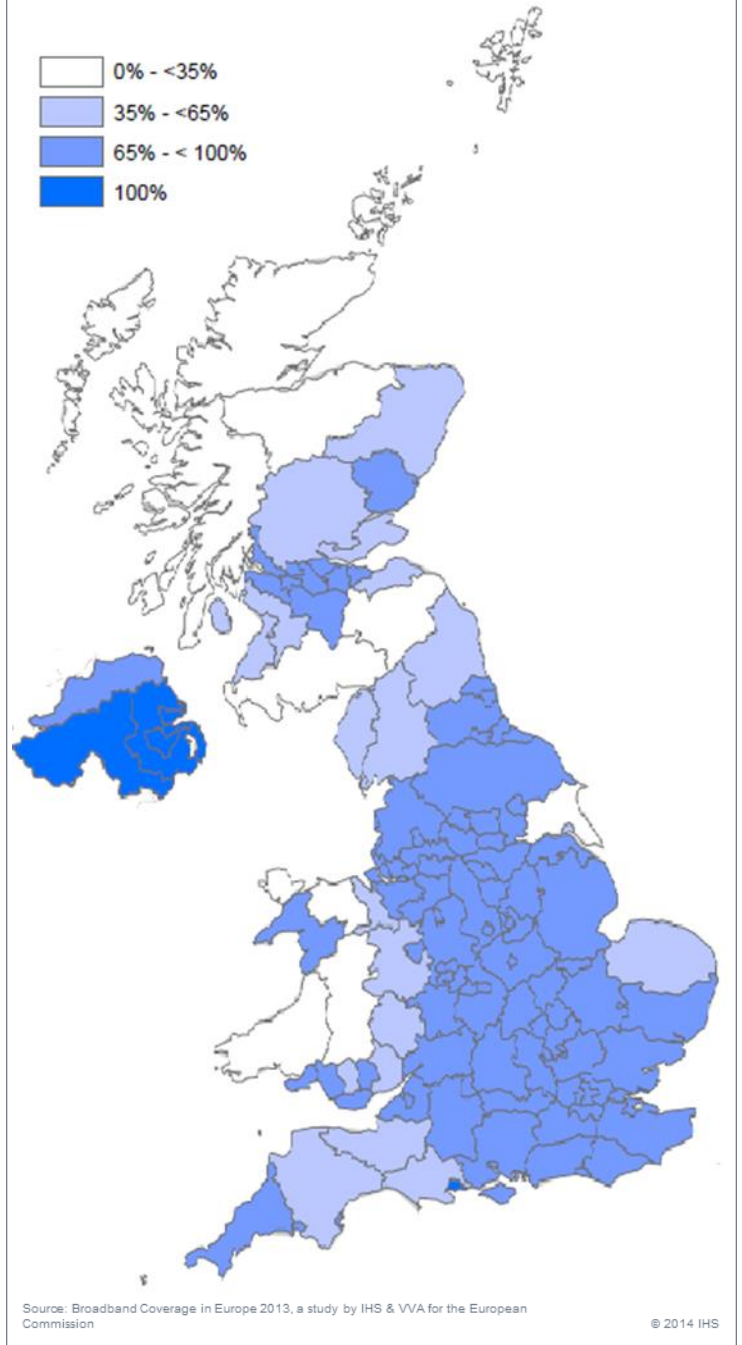


5.31.2 Regional coverage by broadband technology

UK: Overall fixed broadband coverage, 2013



UK: NGA broadband coverage, 2013



5.31.3 Regulatory and market overview

The original UK strategy for next-generation broadband was set out in “Britain’s Superfast Broadband Future”, developed in 2010 and to run until 2017, with its objectives in line with those of the Digital Agenda for Europe. In June 2013, the UK Government announced that 95 per cent superfast broadband coverage by 2017 should be the new target.

Communications services formed a core part of the UK government’s National Infrastructure Plan – outlined in 2013. Committed investment includes £790m in central government funding for superfast broadband (in addition to an existing £530m dedicated to improving rural coverage), plus £300m split between the creation of super-connected cities and improvement of mobile voice quality and coverage. A £10m competitive fund was also put in place, aiming at encouraging firms to develop solutions to deliver superfast broadband to the most difficult-to-reach areas of the UK.

For improving rural coverage, a specialist unit belonging to the UK’s Department for Media, Culture & Sport (DCMS), ‘Broadband Delivery UK’, was put in place, able to grant funding to local authorities or other bodies to assist in the procurement of next-generation broadband services. Nine companies aiming to participate in supplying broadband infrastructure services qualified for tender submission, although only two suppliers were granted a qualifying status – BT and Fujitsu.

According to the UK’s National Audit Office’s report on the status of the rural broadband programme¹⁵¹, by June 2013, 26 of the 44 local bodies involved has signed contracts to procure broadband, with all 26 selecting telecoms group BT as the supplier.

The UK’s National Audit Office indicated that due to delays in the process for rolling out rural broadband initiatives, the original target set for completing the rural broadband programme (May 2015) should be revised, and the DCMS set a new target of December 2016 for completion.

All of the major fixed operators in the UK now offer commercial NGA services. Services are primarily provided through BT’s VDSL network (with wholesale access to other providers) and Virgin Media’s DOCSIS 3.0 network. Operators Sky and Talk Talk created a joint venture in 2014, in conjunction with network owner CityFibre, with the intention of building out their own access infrastructure in a number of locations across the UK¹⁵².

¹⁵¹ http://www.nao.org.uk/wp-content/uploads/2013/07/10177-001-Rural-Broadband_HC-535.pdf

¹⁵² http://corporate.sky.com/media/press_releases/2014/sky_talktalk_partner_with_cityfibre

5.31.4 Data tables for the United Kingdom

Statistic	National
Population	63,256,144
Persons per household	2.4
Rural proportion	8.7%

Technology	UK 2013		UK 2012		UK 2011		EU28 2013	
	Total	Rural	Total	Rural	Total	Rural	Total	Rural
DSL	100.0%	98.6%	99.6%	99.6%	99.2%	92.9%	93.5%	82.3%
VDSL	67.9%	25.6%	46.9%	14.3%	26.1%	3.8%	31.2%	11.1%
FTTP	0.9%	0.5%	0.7%	0.1%	0.2%	0.0%	14.5%	4.2%
WiMAX	4.2%	2.7%	4.1%	2.7%	4.0%	2.7%	19.7%	17.6%
Cable	47.1%	5.4%	48.0%	5.0%	46.5%	0.0%	43.0%	7.8%
DOCSIS 3.0	47.1%	5.4%	48.0%	5.0%	46.1%	0.0%	41.6%	7.0%
HSPA	98.5%	85.1%	98.4%	84.8%	98.8%	86.5%	97.1%	85.5%
LTE	63.0%	0.0%	17.3%	0.0%	0.0%	0.0%	59.1%	14.9%
Satellite	99.9%	100.0%	100.0%	100.0%	100.0%	100.0%	99.3%	99.3%
Overall broadband	100.0%	99.3%	100.0%	99.9%	-	-	99.4%	96.7%
Overall fixed broadband	100.0%	99.3%	99.8%	99.8%	99.6%	93.2%	97.2%	89.8%
NGA broadband	81.8%	26.0%	70.3%	18.2%	58.3%	3.8%	62.0%	18.1%

6.0 Appendices

6.1 Broadband coverage by speed categories

In addition to individual technology coverage and combination technology coverage, DG Connect required coverage by download speed to be included in the study in 2013. The following speed categories were thus added among the research metrics:

- Coverage by broadband network/s capable of at least 2 Mbps download speed
- Coverage by broadband network/s capable of at least 30 Mbps download speed
- Coverage by broadband network/s capable of at least 100 Mbps download speed

By including the additional metric, it is possible to obtain an additional analytical layer to evaluate the study countries' progress towards the Digital Agenda goals. However, since this was a new metric, the quality of received data varied quite substantially across participant responses. For this reason and with approval from DG Connect, the research team decided to include information on speed categories in the form of an Appendix of this report, with the hope that the metric will become a standard component of the report in future iterations.

6.1.1 Methodology for determining coverage by speed categories

The research team needed to develop a suitable methodology and clear definition to determine coverage by realistically achievable speeds as required by DG Connect. Thus, the following speed categories were added among the research metrics and questions regarding these categories were included in the survey questionnaire:

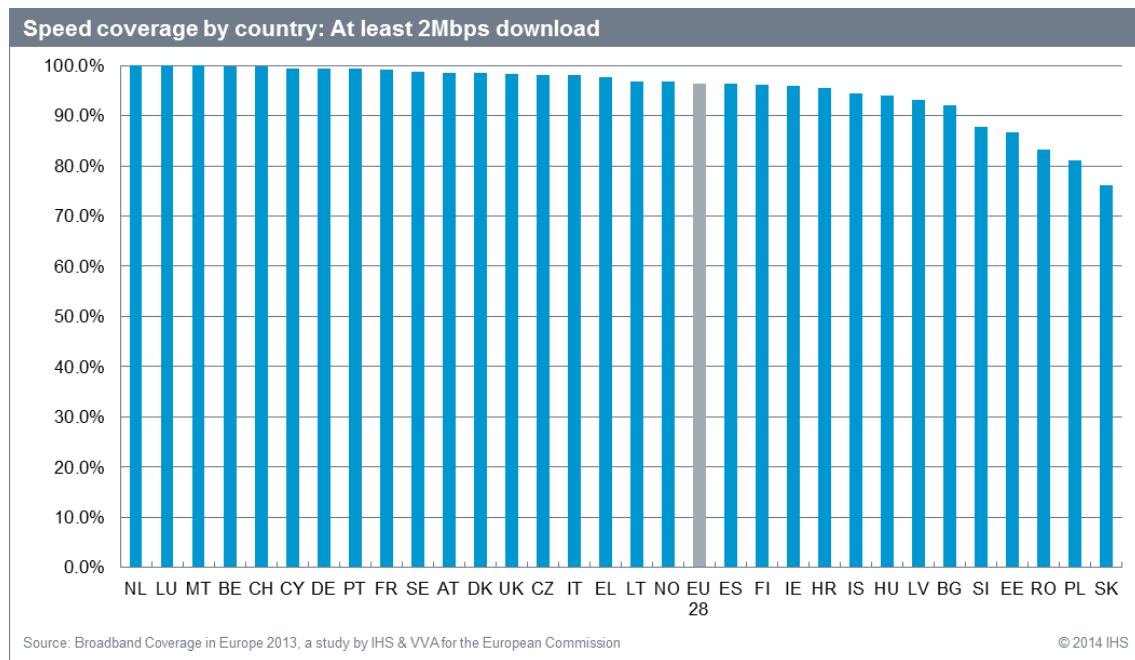
- Coverage by broadband network/s capable of realistically achieving actual download speeds of at least 2 Mbps. This category encompassed DSL (including VDSL), FTTP, WiMAX, standard cable (including DOCSIS 3.0 cable), HSPA and LTE broadband access technologies. However, as not all DSL connections are capable of download speeds of 2Mbps and higher, respondents were asked to exclude those connections which did not meet the criteria from their answers.
- Coverage by broadband network/s capable of realistically achieving actual download speeds of at least 30 Mbps. This category encompassed VDSL, FTTP, and DOCSIS 3.0 cable broadband access technologies. However, as not all connections utilizing these technologies can achieve 30 Mbps and higher actual download speeds (for example, VDSL connections with distance from the exchange point higher than 500m see radical decrease in actual speeds), respondents were asked to exclude those connections which did not meet the criteria from their answers.
- Coverage by broadband network/s capable of realistically achieving actual download speeds of at least 100 Mbps. This category encompassed FTTP and DOCSIS 3.0 cable broadband access technologies. In cases where vectoring is applied to VDSL2 technology and speeds reach 100 Mbps and higher download speeds, VDSL with vectoring was asked to be included in this category. However, as not all connections utilizing these technologies can achieve 100 Mbps actual download speeds (for example, in the case of FTTB – fibre-to-the-building – connections included in the FTTP category in-building wiring can pose significant constraints on achievable end-

user broadband speeds), respondents were asked to exclude those connections from their answers.

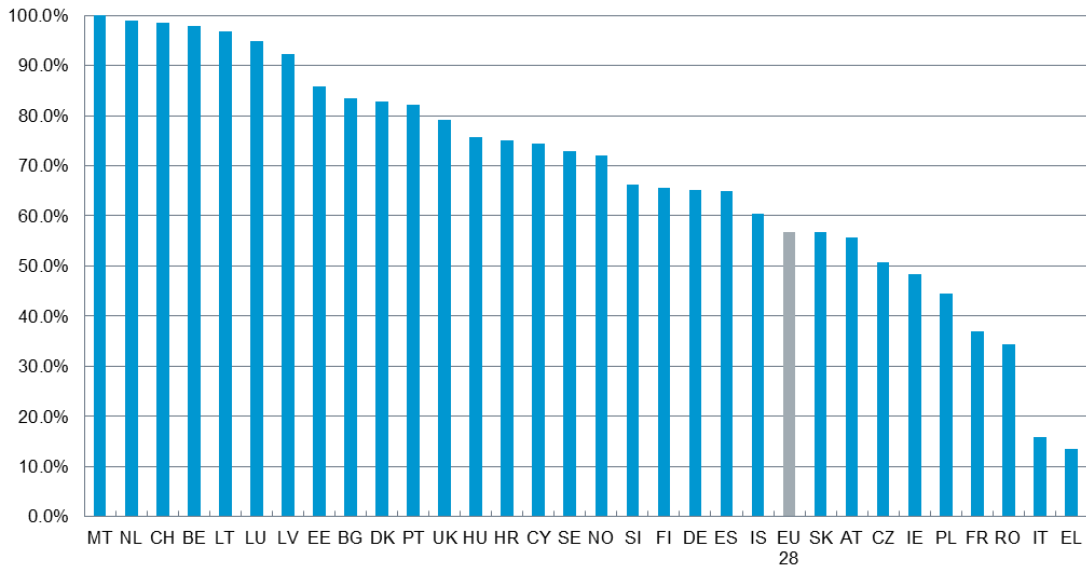
The coverage of these speed categories was then defined as a household having technical access to one or more networks supporting at least 2, 30, or 100 Mbps downstream speed connections if the connection’s broadband speed was capable of achieving a minimum of 2, 30, or 100 Mbps downstream speed (respectively) for the majority of the time. ‘Majority of time’ was understood to mean actual download speeds achieved by a household for at least 75% of the time.

As this was a new metric, and speed information can be generally hard to decode, even for the NRAs and ISPs themselves, the IHS & VVA team also relied in addition to the collected survey data, on sector knowledge regarding deployments to make informed estimates of achievable speeds to gain complete picture of coverage by the speed categories. Note that unlike the technology coverage, the speed metric categories have been determined on a country level only, as gathering information on rural and regional NUTS 3 level would not have been feasible within the scope of the study – although we hope that NRAs and ISPs will consider collecting and making available such information at future points in time.

6.1.2 Broadband coverage by speed categories results



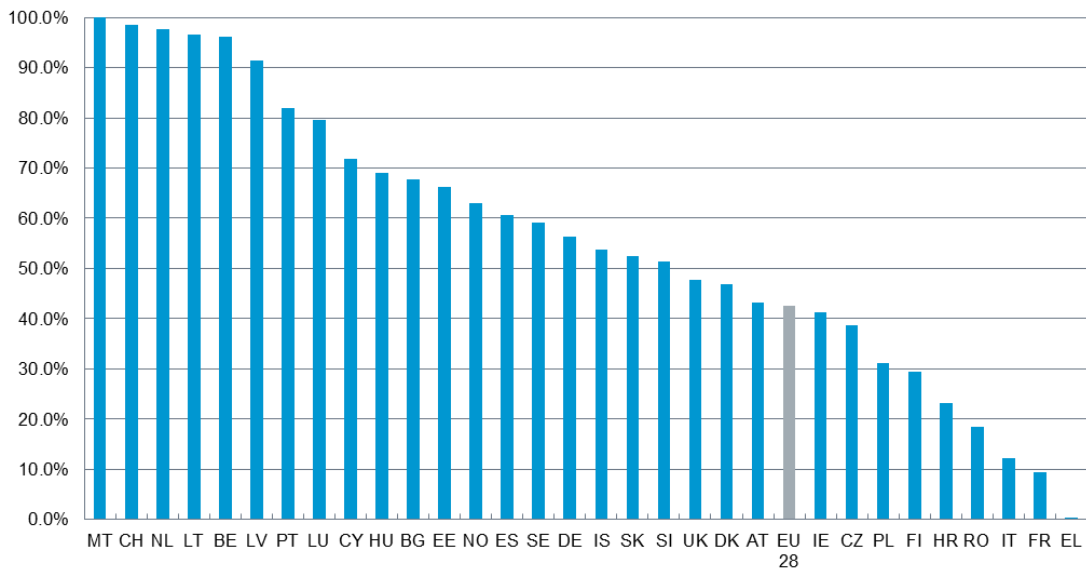
Speed coverage by country: At least 30Mbps download



Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

© 2014 IHS

Speed coverage by country: At least 100Mbps download



Source: Broadband Coverage in Europe 2013, a study by IHS & VVA for the European Commission

© 2014 IHS

Broadband coverage by speed data table

	Broadband coverage (>2Mbps)	Broadband coverage (>30Mbps)	Broadband coverage (>100Mbps)
AT	98.6%	55.6%	43.2%
BE	99.9%	97.9%	96.1%
BG	92.1%	83.3%	67.7%
HR	95.4%	75.0%	23.1%
CY	99.5%	74.3%	71.8%
CZ	98.0%	50.6%	38.6%
DK	98.6%	82.8%	46.8%
EE	86.7%	85.7%	66.2%
FI	96.2%	65.6%	29.4%
FR	99.0%	37.0%	26.6%
DE	99.4%	65.2%	56.4%
EL	97.6%	13.5%	0.4%
HU	93.9%	75.6%	68.9%
IS	94.4%	60.5%	53.7%
IE	95.9%	48.4%	41.2%
IT	98.0%	15.9%	12.2%
LT	96.8%	96.8%	96.6%
LV	93.1%	92.3%	91.5%
LU	100.0%	94.8%	79.6%
MT	100.0%	100.0%	100.0%
NL	100.0%	99.0%	97.6%
NO	96.7%	71.9%	63.0%
PL	81.0%	44.4%	31.2%
PT	99.4%	82.2%	81.9%
RO	83.2%	34.5%	18.4%
SK	76.1%	56.7%	52.4%
SI	87.8%	66.1%	51.4%
ES	96.3%	64.9%	60.6%
SE	98.7%	72.8%	59.1%
CH	99.7%	98.6%	98.5%
UK	98.4%	79.1%	47.7%
EU 28	96.3%	56.9%	44.8%

6.2 Broadband coverage definitions

6.2.1 Technology definitions

The table below indicates the definitions of the individual broadband access technologies studied by this project. These definitions were included in the survey questionnaire.

Please note that the definitions are not designed to be rigorous definitions from an engineering point of view, but rather are intended to reflect practical definitions used by NRAs and ISPs.

Technology	Technology definition
DSL	DSL (for Digital Subscriber Line) is the basic technology used to provide broadband over conventional telephone lines. The types of DSL used for standard fixed broadband (mainly ADSL or ADSL2+) deliver download speeds of at least 2 Mbps. Not all DSL connections are capable of download speeds of 2Mbps and higher, these connections should not be reported in the survey, but we ask you to note this fact in STEP 4 - Technology definitions of the survey.
VDSL	VDSL (also called FTTC+VDSL for example) is a "Very-high-speed" version of DSL. VDSL is usually provisioned from a street cabinet which has fibre backhaul or directly from the telephone exchange in areas which are close to the exchange. Actual VDSL download speeds can vary and we ask you to note the typical VDSL connection speeds in STEP 4 - Technology definitions of the survey. This definition does not include implementations where fibre is provisioned to a large building, such as a block of flats, and the final connections are provided by VDSL within the building, which are defined as FTTP.
FTTP	FTTP (fibre-to-the-premises) is broadband provided over fibre optic cables going all the way to the home or business premises. This definition also includes "FTTB", where fibre terminates at a large building and broadband distribution within the building, to different flats for example, is by a different non-fibre technology such as VDSL.
WiMAX	WiMAX is a wireless service using one of the IEEE standards 802.16d, for fixed users and 802.16e for mobile.
Cable Modem	Cable Modem broadband is delivered over a fixed cable TV network using coaxial cable according to the earlier cable broadband standards such as DOCSIS 1, usually providing download speeds up to about 20Mbps.
DOCSIS 3	DOCSIS 3 broadband is delivered over a fixed cable TV network using coaxial cable according to the DOCSIS 3 standard, providing download speeds of 30Mbps and above.
HSPA	HSPA (High Speed Packet Access) is the upgraded version of 3G mobile networks capable of providing mobile broadband at a maximum download speed of at least 21.1Mbps.
LTE	LTE (Long Term Evolution) is the next-generation mobile service standardised by the 3rd Generation Partnership Project which requires separate spectrum from 3G mobile and which supports maximum downstream speeds up to at least 100Mbps.

6.2.2 Coverage definitions

The definitions included in the table below were used to determine whether households are within the coverage reach of the individual broadband technologies. These definitions were included in the survey questionnaire.

Please note that the definitions are not designed to be rigorous definitions from an engineering point of view, but rather are intended to reflect practical definitions used by NRAs and ISPs.

Technology	Coverage definition
DSL	A household has DSL coverage if it is a telephone exchange area fully enabled for DSL.
VDSL	A household has VDSL coverage if it is close enough to a VDSL-enabled cabinet or exchange to get a high-speed broadband signal.
FTTP	A household has FTTP coverage if it can be connected now to a fibre service without requiring the construction of new fibre infrastructure.
WiMAX	A household has WiMAX coverage for broadband if it can receive at least 2Mbps downstream from an existing service without requiring the construction of new WiMAX infrastructure.
Cable Modem	A household has cable modem coverage if it can be connected now to a broadband service without requiring the construction of new cable TV network infrastructure.
DOCSIS 3	A household has DOCSIS 3 coverage if it can be connected now to a DOCSIS 3.0 service without requiring the construction of new cable TV network infrastructure.
HSPA	A household has HSPA coverage if it is in the stated coverage area for at least one HSPA-upgraded 3G mobile network.
LTE	A household has LTE coverage if it is in the stated coverage area for at least one LTE mobile network.

6.3 Broadband coverage data tables

6.3.1 Total and rural coverage by combination categories for each country

	TOTAL			RURAL		
	Overall broadband coverage	Overall fixed broadband coverage*	Overall NGA coverage**	Overall broadband coverage	Overall fixed broadband coverage*	Overall NGA coverage**
AT	99.2%	99.1%	70.2%	95.5%	95.5%	15.5%
BE	99.9%	99.9%	98.3%	99.6%	99.6%	74.9%
BG	99.8%	92.5%	67.7%	99.3%	59.8%	0.2%
HR	97.6%	97.1%	33.3%	87.2%	76.8%	0.0%
CY	100.0%	100.0%	77.0%	100.0%	100.0%	45.0%
CZ	98.9%	98.5%	63.7%	91.2%	91.2%	4.0%
DK	99.7%	99.1%	82.6%	97.0%	91.3%	13.1%
EE	100.0%	87.3%	73.9%	99.8%	87.2%	58.3%
FI	99.8%	96.7%	72.1%	98.6%	63.5%	7.0%
FR	99.9%	99.7%	40.9%	99.2%	97.1%	16.2%
DE	99.9%	97.5%	74.8%	98.8%	94.9%	21.3%
EL	99.9%	99.6%	26.9%	98.8%	97.8%	0.0%
HU	98.5%	94.4%	75.7%	95.0%	84.2%	17.9%
IS	98.7%	96.6%	60.5%	96.5%	84.6%	0.0%
IE	97.6%	96.3%	54.0%	93.1%	92.7%	5.7%
IT	98.6%	98.5%	20.8%	88.3%	87.7%	0.0%
LT	98.6%	97.1%	96.7%	95.5%	91.0%	55.3%
LV	99.6%	93.1%	92.0%	97.9%	44.1%	29.1%
LU	100.0%	100.0%	94.3%	100.0%	100.0%	94.1%
MT	100.0%	100.0%	100.0%	100.0%	100.0%	92.5%
NL	100.0%	100.0%	97.6%	100.0%	100.0%	97.2%
NO	98.6%	96.7%	75.4%	92.0%	86.8%	16.2%
PL	98.1%	87.6%	52.1%	94.7%	75.4%	8.4%
PT	99.7%	99.7%	84.4%	98.9%	98.9%	36.2%
RO	99.9%	90.0%	65.9%	99.7%	78.2%	24.6%
SK	93.2%	85.3%	58.0%	84.6%	82.4%	4.2%
SI	99.5%	88.7%	73.7%	99.5%	74.3%	45.5%
ES	99.6%	96.5%	64.9%	97.8%	94.3%	23.1%
SE	99.8%	99.0%	71.2%	98.7%	91.8%	8.9%
CH	99.9%	99.8%	98.7%	99.3%	98.9%	76.4%
UK	100.0%	100.0%	81.8%	99.3%	99.3%	26.0%
EU 28	99.4%	97.2%	62.0%	96.7%	89.8%	18.1%

6.3.2 Total coverage by technology for each country

	DSL ***	VDSL	FTTP	WiMAX	Cable***	DOCSIS 3.0	HSPA	LTE	Satellite
AT	98.3%	51.2%	7.1%	17.2%	39.1%	39.1%	97.9%	35.0%	100.0%
BE	99.9%	88.5%	0.4%	15.2%	95.9%	95.9%	98.8%	45.6%	100.0%
BG	85.0%	0.0%	22.9%	64.6%	62.5%	57.7%	99.6%	0.0%	100.0%
HR	94.3%	16.8%	6.9%	0.1%	28.4%	19.0%	94.1%	24.4%	100.0%
CY	100.0%	54.0%	48.7%	0.0%	46.2%	46.2%	99.0%	0.0%	100.0%
CZ	97.0%	41.0%	13.4%	70.6%	33.0%	31.5%	94.9%	12.0%	100.0%
DK	98.2%	21.7%	46.8%	0.0%	63.6%	61.7%	99.1%	73.7%	100.0%
EE	36.4%	1.4%	66.2%	40.6%	73.5%	52.6%	99.9%	85.0%	75.4%
FI	93.4%	46.0%	29.4%	2.2%	42.5%	42.5%	99.5%	85.5%	100.0%
FR	99.4%	13.4%	10.5%	0.0%	30.3%	30.3%	99.8%	68.0%	100.0%
DE	94.9%	33.5%	4.4%	12.8%	59.5%	55.8%	92.2%	81.0%	100.0%
EL	99.2%	26.7%	0.4%	0.0%	0.0%	0.0%	99.5%	54.8%	100.0%
HU	88.7%	24.0%	19.8%	0.0%	63.5%	59.7%	97.0%	39.1%	100.0%
IS	93.2%	46.6%	53.7%	4.0%	0.0%	0.0%	97.3%	47.8%	0.0%
IE	92.5%	33.2%	1.7%	26.6%	42.4%	40.6%	94.8%	35.2%	100.0%
IT	97.1%	14.7%	12.2%	48.0%	0.0%	0.0%	97.0%	39.3%	100.0%
LT	69.1%	0.0%	93.7%	85.0%	53.3%	42.8%	95.2%	29.3%	50.0%
LV	48.2%	14.3%	86.2%	44.5%	45.3%	38.9%	99.0%	27.5%	20.3%
LU	100.0%	88.6%	36.0%	0.0%	68.2%	62.7%	99.6%	79.9%	100.0%
MT	100.0%	75.0%	0.8%	100.0%	100.0%	100.0%	100.0%	0.0%	100.0%
NL	100.0%	84.0%	23.3%	0.0%	95.8%	95.0%	99.0%	90.4%	100.0%
NO	93.5%	32.1%	33.8%	38.9%	49.0%	48.0%	96.5%	67.7%	100.0%
PL	75.3%	27.8%	3.5%	0.4%	39.2%	39.2%	98.3%	55.0%	100.0%
PT	99.1%	0.0%	49.6%	0.0%	79.9%	79.5%	95.3%	91.3%	100.0%
RO	75.8%	15.9%	54.7%	60.7%	28.8%	26.2%	99.7%	25.0%	100.0%
SK	47.4%	15.4%	44.8%	50.1%	27.8%	24.9%	86.3%	24.1%	100.0%
SI	77.4%	48.6%	36.6%	0.3%	35.2%	32.9%	99.1%	63.4%	100.0%
ES	91.0%	11.0%	22.7%	55.2%	48.5%	48.5%	99.1%	47.1%	100.0%
SE	98.0%	17.8%	51.8%	0.0%	39.3%	34.3%	99.7%	99.2%	99.2%
CH	99.4%	72.3%	21.1%	0.0%	97.2%	97.1%	98.8%	67.7%	100.0%
UK	100.0%	67.9%	0.9%	4.2%	47.1%	47.1%	98.5%	63.0%	99.9%
EU 28	93.5%	31.2%	14.5%	19.7%	43.0%	41.6%	97.1%	59.1%	99.3%

6.3.3 Rural coverage by technology for each country

	DSL ***	VDSL	FTTP	WiMAX	Cable***	DOCSIS 3.0	HSPA	LTE	Satellite
AT	90.6%	1.3%	2.2%	17.9%	17.5%	17.5%	85.0%	0.3%	100.0%
BE	98.9%	57.8%	0.0%	3.3%	59.8%	59.8%	75.8%	3.9%	100.0%
BG	53.5%	0.0%	0.2%	12.3%	0.0%	0.0%	98.5%	0.0%	100.0%
HR	74.3%	0.0%	0.0%	0.2%	4.6%	0.0%	69.9%	5.3%	100.0%
CY	100.0%	45.0%	0.0%	0.0%	0.0%	0.0%	99.0%	0.0%	100.0%
CZ	82.3%	2.5%	2.5%	70.6%	1.8%	0.5%	55.0%	0.0%	100.0%
DK	89.2%	11.0%	4.2%	0.0%	0.0%	0.0%	94.0%	10.0%	100.0%
EE	35.9%	0.0%	58.3%	38.7%	16.4%	0.0%	99.6%	84.8%	64.0%
FI	60.0%	0.0%	7.0%	0.1%	0.0%	0.0%	97.2%	8.0%	100.0%
FR	96.9%	14.6%	1.3%	0.0%	0.6%	0.6%	98.5%	0.0%	100%
DE	82.4%	16.7%	0.5%	13.0%	11.5%	8.7%	59.9%	65.9%	100.0%
EL	97.7%	0.0%	0.0%	0.2%	0.0%	0.0%	96.5%	11.8%	100.0%
HU	73.5%	0.0%	3.9%	0.0%	17.5%	15.9%	90.0%	9.9%	100.0%
IS	81.3%	0.0%	0.0%	6.6%	0.0%	0.0%	93.0%	0.0%	0.0%
IE	85.4%	4.9%	0.0%	20.4%	1.6%	1.6%	86.2%	2.5%	100.0%
IT	75.4%	0.0%	0.0%	48.0%	0.0%	0.0%	76.5%	0.7%	100.0%
LT	15.2%	0.0%	55.3%	82.0%	0.5%	0.0%	91.0%	0.0%	145.8%
LV	10.0%	0.0%	29.1%	18.6%	0.0%	0.0%	96.5%	0.0%	72.0%
LU	100.0%	88.2%	27.0%	0.0%	50.2%	0.0%	99.6%	58.0%	100.0%
MT	92.5%	0.0%	0.0%	99.9%	92.5%	92.5%	92.5%	0.0%	100.0%
NL	100.0%	78.8%	19.4%	0.0%	95.2%	94.4%	90.5%	42.6%	100.0%
NO	74.1%	7.7%	10.0%	34.1%	3.2%	1.9%	81.8%	37.1%	100.0%
PL	74.9%	7.6%	0.3%	0.5%	1.2%	1.2%	85.0%	0.5%	100.0%
PT	97.8%	0.0%	8.6%	0.0%	32.9%	31.9%	70.7%	47.6%	100.0%
RO	62.9%	1.5%	21.5%	25.2%	6.2%	4.4%	99.3%	2.4%	100.0%
SK	64.7%	0.0%	3.8%	49.9%	4.7%	0.8%	69.2%	0.0%	100.0%
SI	55.7%	10.8%	17.0%	1.1%	28.7%	27.1%	98.9%	56.3%	100.0%
ES	86.2%	16.0%	2.5%	51.7%	8.8%	8.8%	95.1%	2.2%	100.0%
SE	88.2%	0.2%	8.8%	0.0%	0.1%	0.0%	97.9%	96.5%	99.4%
CH	97.3%	29.1%	3.7%	0.0%	66.3%	60.4%	94.2%	15.5%	100.0%
UK	98.6%	25.6%	0.5%	2.7%	5.4%	5.4%	85.1%	0.0%	100.0%
EU 28	82.3%	11.1%	4.2%	17.6%	7.8%	7.0%	85.5%	14.9%	100.3%

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