Consulting

Broadband Coverage in Europe

Final Report

2008 Survey

Data as of 31 December 2007

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Table of contents

Table of figures

1. Methodological issues

The goal of this report is to deliver the final results of the survey on Broadband coverage and take-up across Europe (29 countries, i.e. EU-27 Member States + Norway and Iceland) at the end of 2007. Averages have been calculated for 4 different country groups:

- EU-15, which covers the 15 Member States of the European Union as it was organised just before 1 April 2004
- EU-15 + 2, which covers the EU-15, plus Norway and Iceland
- EU-25, which covers the 25 Member States of the European Union until December 2006.
- EU-25 + 2, which covers EU-25, plus Norway and Iceland
- EU-27, which covers the 27 Member States of the European Union
- EU-27 + 2, which covers EU-27, plus Norway and Iceland

The data contained in this document were collected by IDATE and its partners, from broadband networks operators, regulators and various sources in each country examined (see methodological report).

All of the principal broadband platforms were taken into consideration: primarily ADSL, cable and FTTx (including VDSL), but also other platforms such as WLL/WLAN, Satellite and PLC. 3G coverage and take-up (measured through the number of 3G SIM cards and 3G PC cards sold) were also examined, but separately from fixed broadband access.

Data refer to the situation as of 31 December 2007

The survey distinguishes **Urban, Suburban and Rural areas**, with the following definitions:

- Urban area: a population density superior to 500 inhabitants/km²,
- Suburban area: a population density between 100 inhabitants/km² and 500 inhabitants/km²,
- Rural area: a population density inferior to 100 inhabitants/km².

In some small countries, e.g. Malta or Iceland, this breakdown does not apply due to their reduced geographical dimensions.

Segmentation by **download rate** (for ADSL lines, Cable modem or FTTx) is as follows:

- from 128 kbps (included) to 512 Kbps included,
- from 512 Kbps excluded to 1 Mbps included,
- from 1 Mbps excluded to 2 Mbps included,
- from 2 Mbps excluded to 8 Mbps included,
- from 8 Mbps excluded to 20 Mbps included,
- more than 20 Mbps.

Regarding the origin of DSL connections, we have split them into 3 categories:

- DSL access sold directly by incumbent carriers through retail offers,
- DSL access sold by third-party ISPs through wholesale offers marketed by the incumbent carrier (simple resale or bitstream)
- DSL access through unbundling offers (shared access or full unbundling).

Throughout the report, “**DSL Coverage**” figures refer to the percentage of the population depending on a Local Exchange equipped with a DSLAM. That is to say in its measurement, coverage includes those people (Households or Businesses Units) that reside too far from these switches to be able to purchase a DSL connection even if they wanted to do so.

The term “**Eligibility**” refers to "the percentage of the population depending on Local Exchanges equipped with a DSLAM and **excluding** those people (Households or Businesses Units) that reside too far from these switches to be able to purchase a DSL connection even if they wanted to do so**.** Furthermore, these eligibility percentages will differ according to available download rates. For instance, eligibility for a downstream rate of 2 Mbps will be lower than eligibility for 512 Kbps.

There are no data on eligibility for all countries, as operators cannot measure exactly the number of local loops which are too long to support DSL. Furthermore, new technical developments can increase eligibility (e.g. introduction of REACH DSL).

In some countries (e.g. Poland and the Czech Republic), where fixed telephone lines are not available to all households, DSL coverage was recalculated to obtain the effective percentage of the population which can be physically equipped with DSL (see detailed calculations in the country monographs).

Throughout the report, the “**Cable modem coverage**” figures refer to the percentage of the population living in households effectively passed for cable. In other words, unlike DSL coverage figures, cable modem coverage also corresponds to Eligibility figures.

Regarding **3G customers**, measurement is based on the number of subscribers using 3G-capable terminals, including 3G datacards or USB modems; however, part of the users of handsets do not actually use 3G services, which means that the number of effective users of 3G services is generally lower. In some countries, broadband mobile services could also be supported by EDGE networks: this is specified in comments regarding each country.

3G coverage is measured as a % of population (according to living locations). We distinguish between 3G and enhanced networks (more specifically HSDPA). When coverage of both technologies is similar (i.e. when the most advanced operator has fully upgraded its 3G network to HSDPA), we use the wording "3G/HSDPA coverage"; in other cases, which still are far more numerous, we give coverage ratios for both technologies separately.

Country-specific data were also used to establish European benchmarks and averages. Averages have been calculated on a weighted basis. Furthermore, as previous surveys covered only Western European countries (EU-15 + Norway and Iceland), we have provided two sets of benchmarks:

- the first comparing and averaging data at year end 2007 only, covering the 29 countries examined in this survey,
- the second one with time series, covering EU-25 + 2.

NB: In the tables and graphs, “na” means that data are not available (while "0" indicates that there are no subscribers) and "nr" is used when categories are not relevant.

2. Executive summary

101.4 million fixed broadband subscribers were registered in the 29 European countries surveyed[1] at the end of 2007, a 24% increase over one year. This represents a 20.3% penetration rate (20.3 subscribers per 100 inhabitants) on average and 22.9% for Western countries only (EU-15 + Norway and Iceland). Country by country, take-up figures range from 4.4% in Romania to 36.8% in the Netherlands.

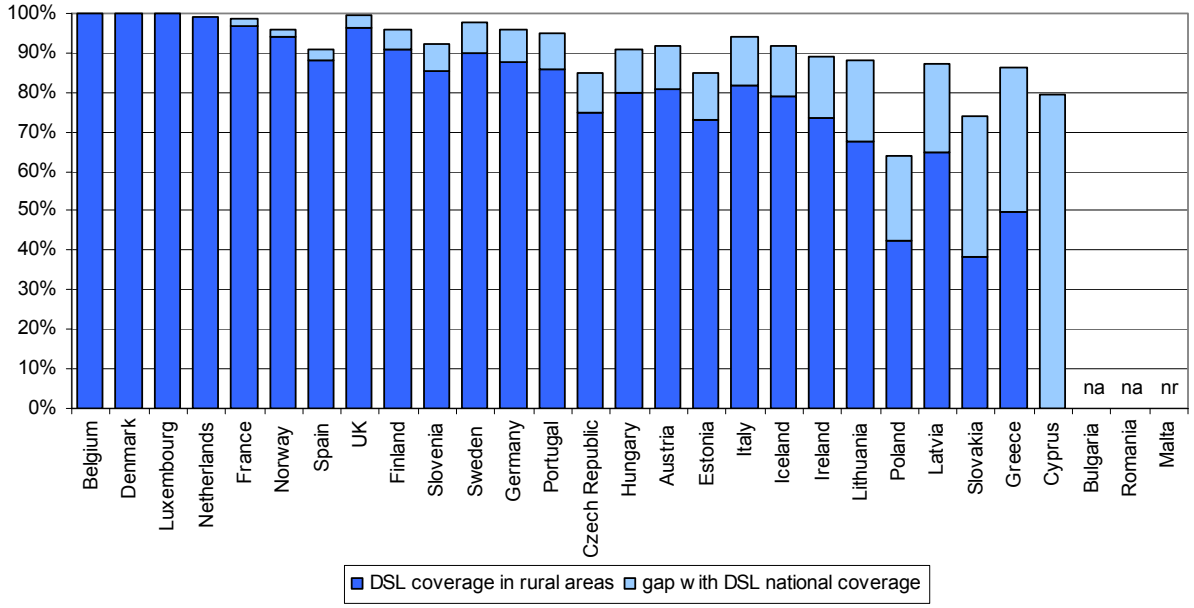
DSL and cable modem are by far the most prominent technologies. With 81.3 million subscribers, DSL accounts for just over 80% of total fixed broadband connections at the end of 2007 while cable modem totals 15.4% of the subscriber base (15.6 million subscribers). The remaining 4.4% are connected chiefly via fixed wireless access and FTTx technologies.

DSL coverage over 90%

One of the reasons why DSL is the dominant access mode is that the POTS network on which DSL technologies operate is very widely available. Average DSL coverage was over 90% at the end of 2007: it reached 92.5% on average in the EU-25+2 (not including Bulgaria and Romania), which is 3.8 points higher than at the end of 2006, and totals 95.9% in Western countries. At the national level, DSL coverage is now over 80% in 25 countries. Only four countries (Poland, Slovakia, Romania and Bulgaria) are still lagging behind this level.

These national figures nevertheless reveal sizeable discrepancies between urban/suburban and rural areas. On average in the EU-27+2, DSL coverage in rural areas was only 70.3% at the end of 2007: it was close to 80% in the EU-25+2, which is 12.6 points below total coverage and 17.7 points lower than in urban areas. Here again, we can observe a variety of situations in the different countries: the gap between coverage in rural areas and the national average is particularly significant in Greece, Slovakia, Latvia, Poland and Lithuania while it is minimal in Benelux countries.

Figure 1: Gaps ranging from 0% to 80% between DSL coverage in rural areas and national DSL coverage



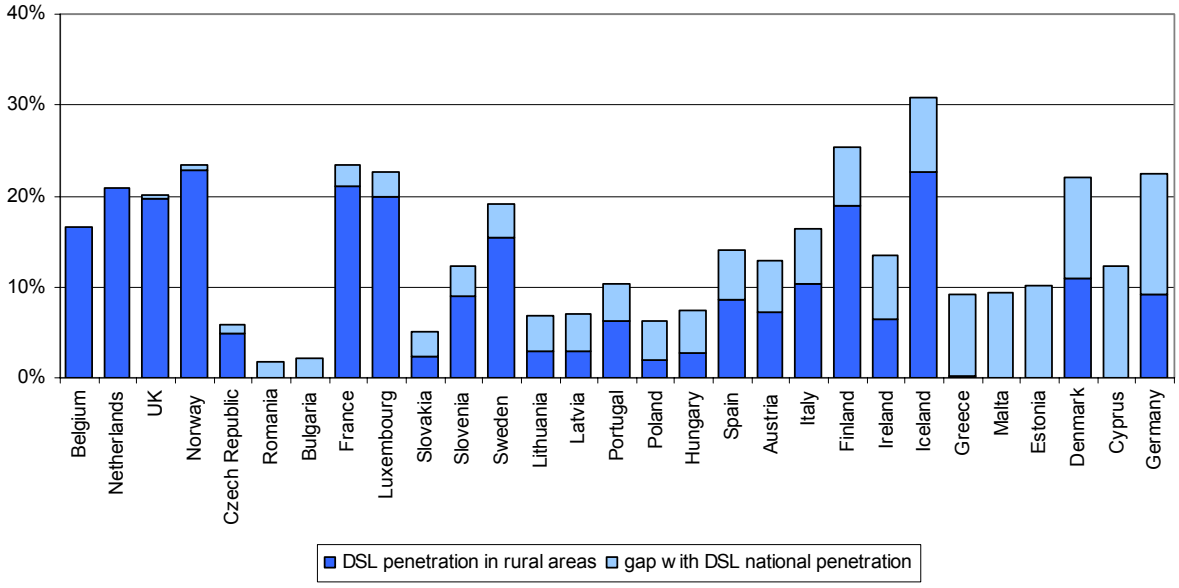
* excluding the Czech Republic and Estonia (figures not available). Definition of rural areas not applicable in Malta

Source: IDATE survey

[1] EU-27 plus Norway and Iceland

As to DSL penetration, national figures range from 1.7% in Romania to 30.8% in Iceland, with a weighted average of 16.3% for the 29 countries (19.1% for Western countries). At the end of 2007, 9 countries were over the 20% mark and two had over 25% penetration (Finland and Norway). We can observe gaps between penetration levels in rural areas and national levels. These gaps are generally bigger, in relative terms, which means that in rural areas, not only does deficient coverage limit penetration, but the late introduction of broadband has created further delays in take-up. The German market stands out here, with a national DSL penetration rate of 22.5% but only 9.2% in rural areas.

Figure 2: Gaps of 0% to 13% between DSL penetration in rural areas and national DSL penetration



* excluding Estonia (figures not available)

Source: IDATE survey

45% of DSL connections with download speeds over 2 Mbps

On the download speed front, close to 45% of DSL users subscribed to offers with speeds of over 2 Mbps and 10.7% over 8 Mbps. Connections with speeds of over 2 Mbps account for 50% or more in 7 countries (Belgium, Denmark, France, the Netherlands, Norway, Portugal and Spain) while they accounted for only 3% in Poland. On average, disparities between the connection rates subscribed nationally and in rural areas are shrinking.

Regarding DSL access origin, 56.1% of DSL connections were supplied directly by incumbent operators to final users at the end of 2007; competitive offers are now mainly based on unbundled lines (27.3%) while resale/bitstream offers account for 16.6%. Unbundling remains lower in rural areas (16.9% of DSL connections compared to 18.9% through resale/bitstream).

Cable modem availability is low compared to DSL: average coverage was only 37.2% at the end of 2007 (39% in EU-25 + 2) and cable is still not available at all in two countries (Italy and Greece). In some large countries (France, UK), cable is available primarily in big cities; coverage in rural areas was only 8.4% on average.

Cable modem penetration was 3.1% at the end of 2007 (15.6 million subscribers in the 29 countries), but only 0.8% in rural areas.

Download speeds are generally higher than for DSL, with close to 60% of users subscribing to offers with rates of over 2 Mbps (54% in rural areas).

In the mobile segment, 3G coverage reached 77% at the end of 2007, with four countries (Austria, Denmark, Malta and Sweden) at or close to 100%. The number of 3G subscribers (3G-terminal users,

see methodological issues) was 81.1 million (+74% over 2006), or 14% of the total cellular subscriber base, with 4 countries (Italy, UK, Germany and Spain) over the 10-million mark and accounting for two thirds of the total base. Some smaller countries are reporting high penetration rates, however: Finland, Norway and Sweden with close or over 25%.

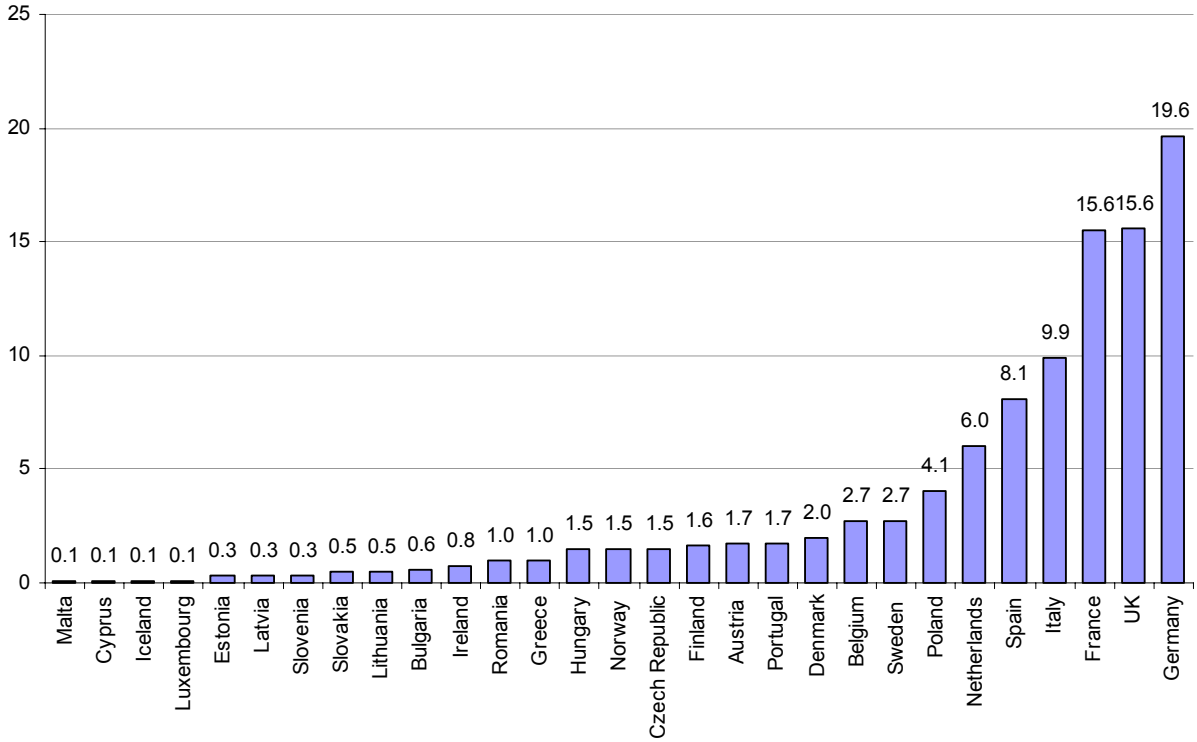
3. European benchmark

3.1. EU-27 + Norway & Iceland at the end of 2007

3.1.1. Broadband subscriber bases and penetration

Subscriber base

Figure 3: Broadband subscriber base at the end of 2007 (in million subscribers)



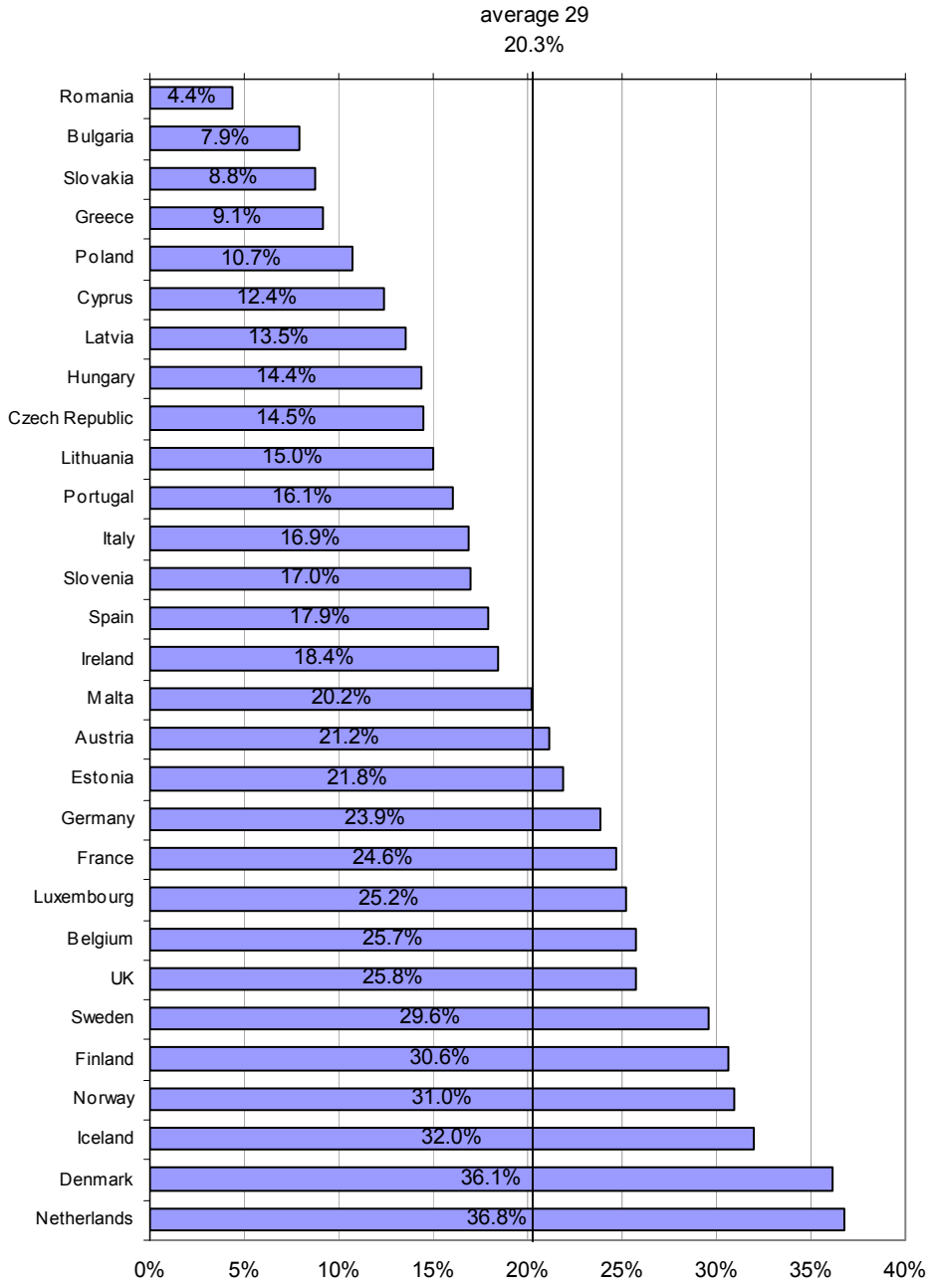
There were 101.4 million broadband subscribers at the end of 2007 in the 29 European countries covered by this report, representing a 24% increase over the past year (81.5 million subscribers at the end of 2006). Germany (19.6 million), the UK and France (15.6 million each) are the largest contributors to this base and together account for half of the broadband subscriber base in the region.

Table 1: Broadband subscriber bases at the end of 2007 (in million subscribers)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
89.133	90.700	98.269	99.835	99.804	101.369

Broadband penetration

Figure 4: Broadband penetration at the end of 2007



In terms of penetration, figures range from 4.4% in Romania to 36.1% in Denmark, with a weighted average for the 29 countries of 20.3%. Scandinavian countries and the Netherlands all report penetration rates close to or over 30%, which are the highest in the world (only South Korea also appears in this range). The five largest Western European countries have penetration rates just below (Italy, Spain) or above (Germany, France and the UK) the regional average: between 16.9% (Italy) and 25.8% (UK). Most new Member States, with the exception of Estonia and Malta have penetration rates below Western European countries, ranging from 4.4% (Romania) to 21.8% (Estonia).

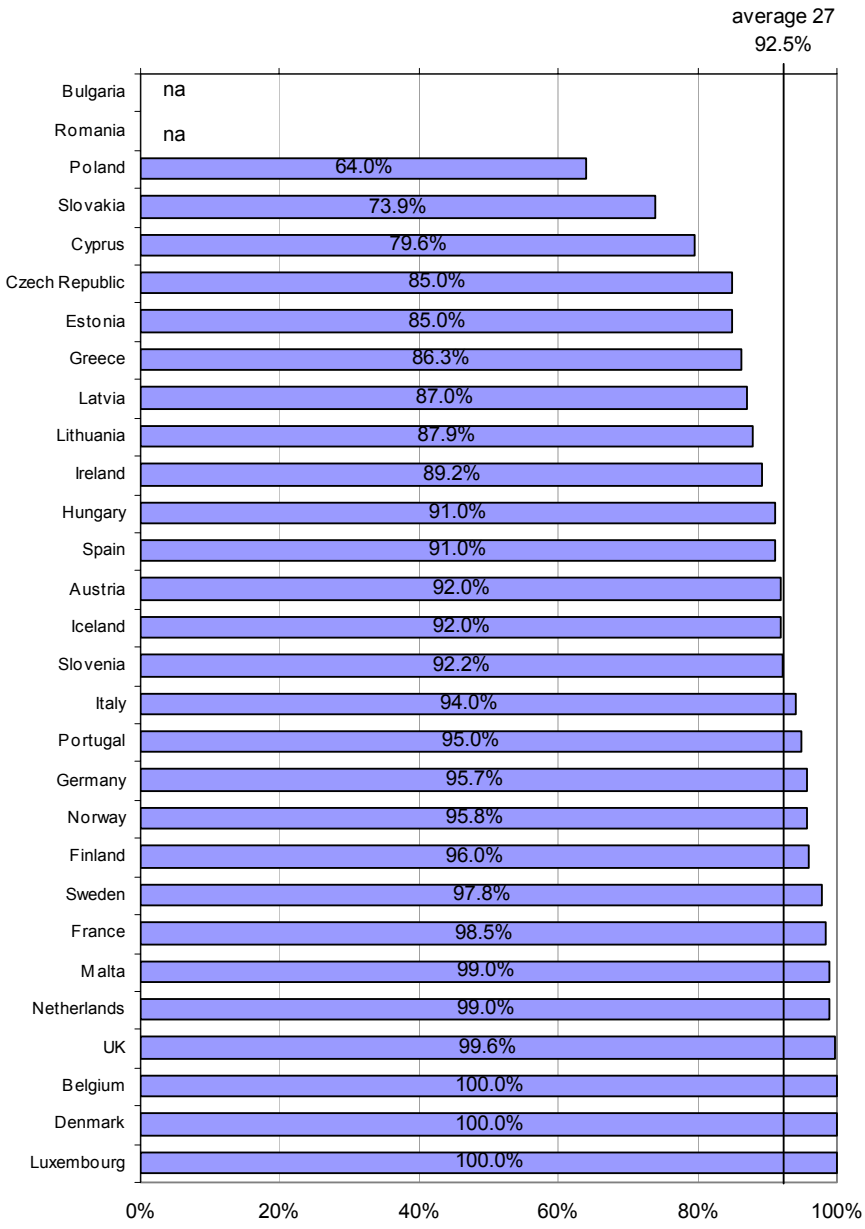
Table 2: Broadband penetration at the end of 2007 (broadband connections as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
22.8%	22.9%	21.1%	21.2%	20.2%	20.3%

3.1.2. DSL coverage and penetration

DSL coverage

Figure 5: National DSL coverage at the end of 2007

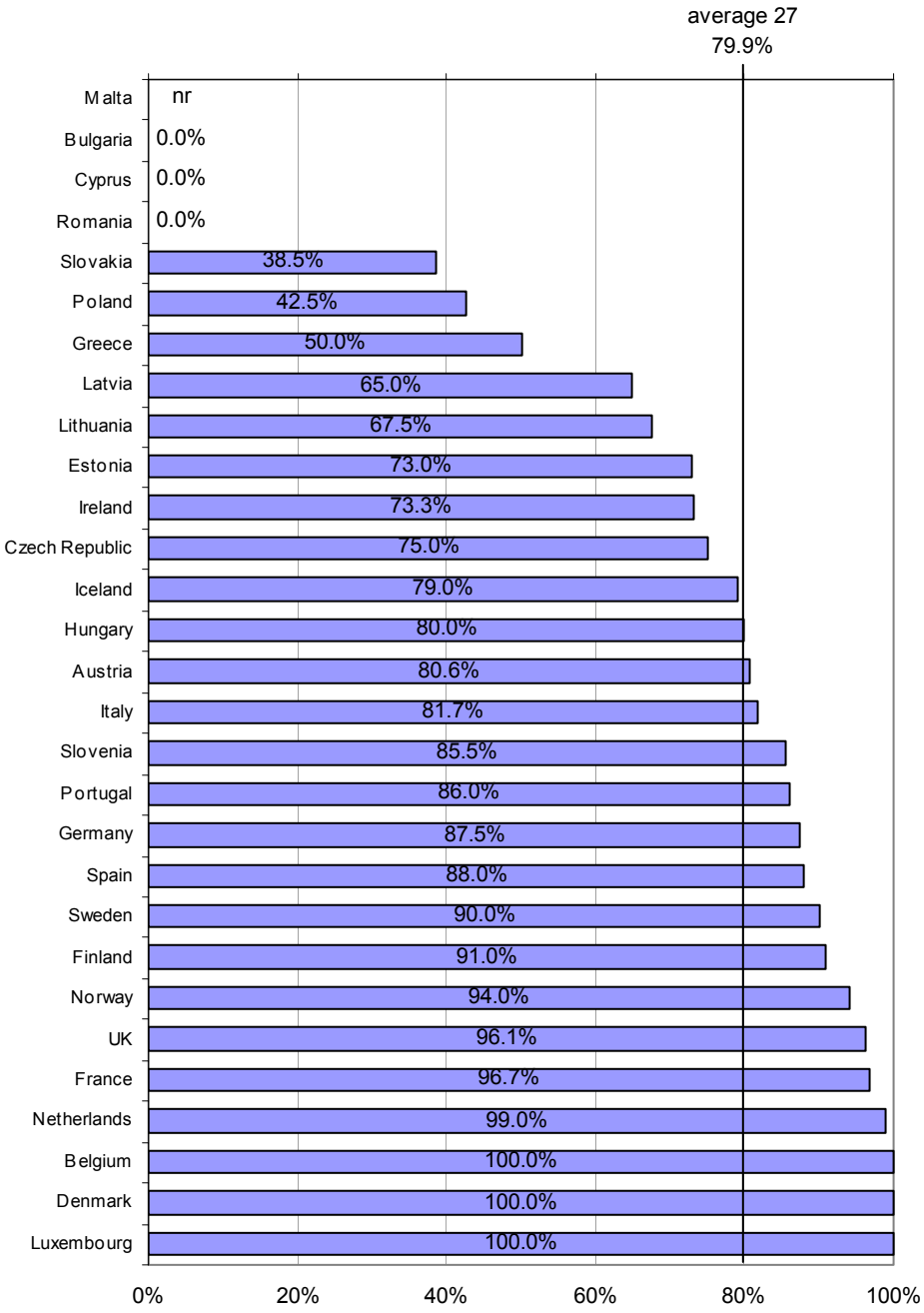


DSL coverage at the national level ranged from 64% (Poland) to 100% (Belgium, Denmark, Luxembourg) at the end of 2007, with a regional weighted average of 92.5% (average excluding Romania and Bulgaria), which is 3 points higher than at the end of 2006. Coverage in most Western European countries (except Greece, Ireland, Spain and Austria) is above this average, and below it in most new Member States (except Malta).

Table 3: DSL coverage at the end of 2007 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
95.9%	95.9%	92.5%	92.5%	na	na

Figure 6: DSL coverage in rural areas at the end of 2007



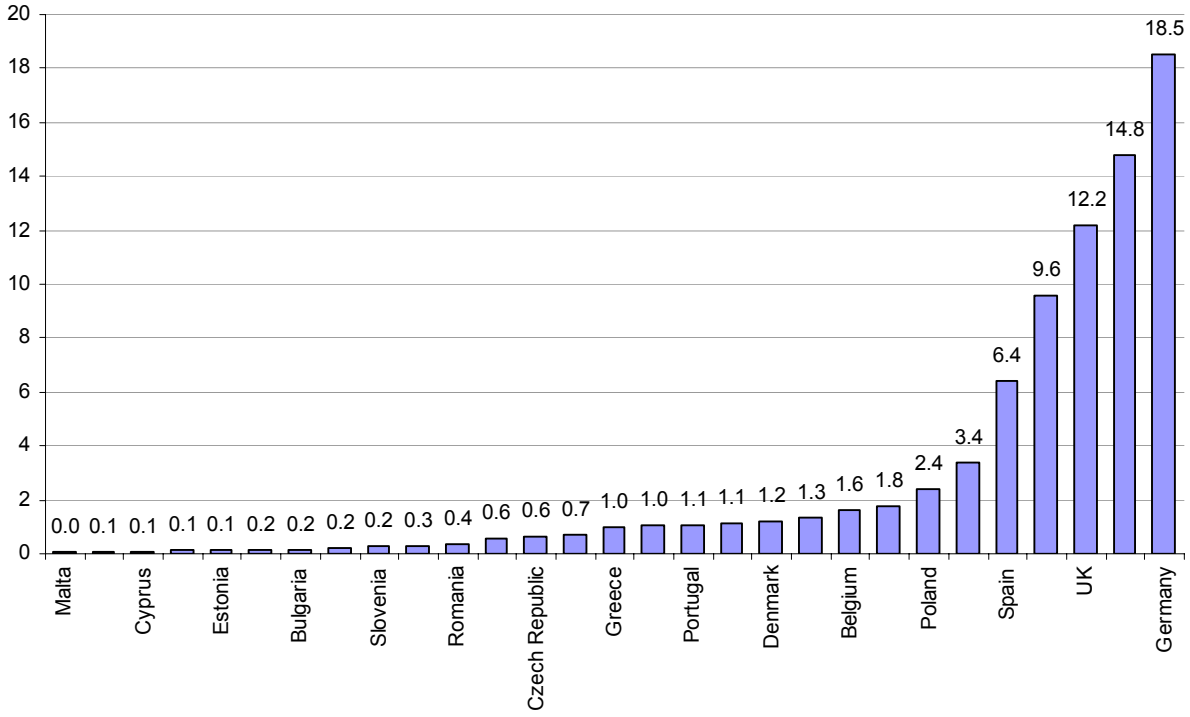
Coverage in rural areas is 79.9% on average (excluding Bulgaria and Romania), representing a 8-point increase compared to the situation at the end of 2006. However, this is still 13 points below the national average, even if the gap has decreased slightly compared to the situation at the end of 2006 (18 points). The gap between rural and national coverage is particularly significant in Cyprus, where DSL was still not available in villages at the end of 2007 but also in Greece where coverage has increased very substantially in 2007 (50% vs. 86%), Slovakia (39% vs. 74%) and, to a lesser extent, in Latvia, Poland and Lithuania.

Table 4: DSL coverage in rural areas at the end of 2007 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
88.2%	91.8%	79.5%	79.9%	69.8%	70.3%

DSL penetration

Figure 7: National DSL subscriber base at the end of 2007 (in million subscribers)

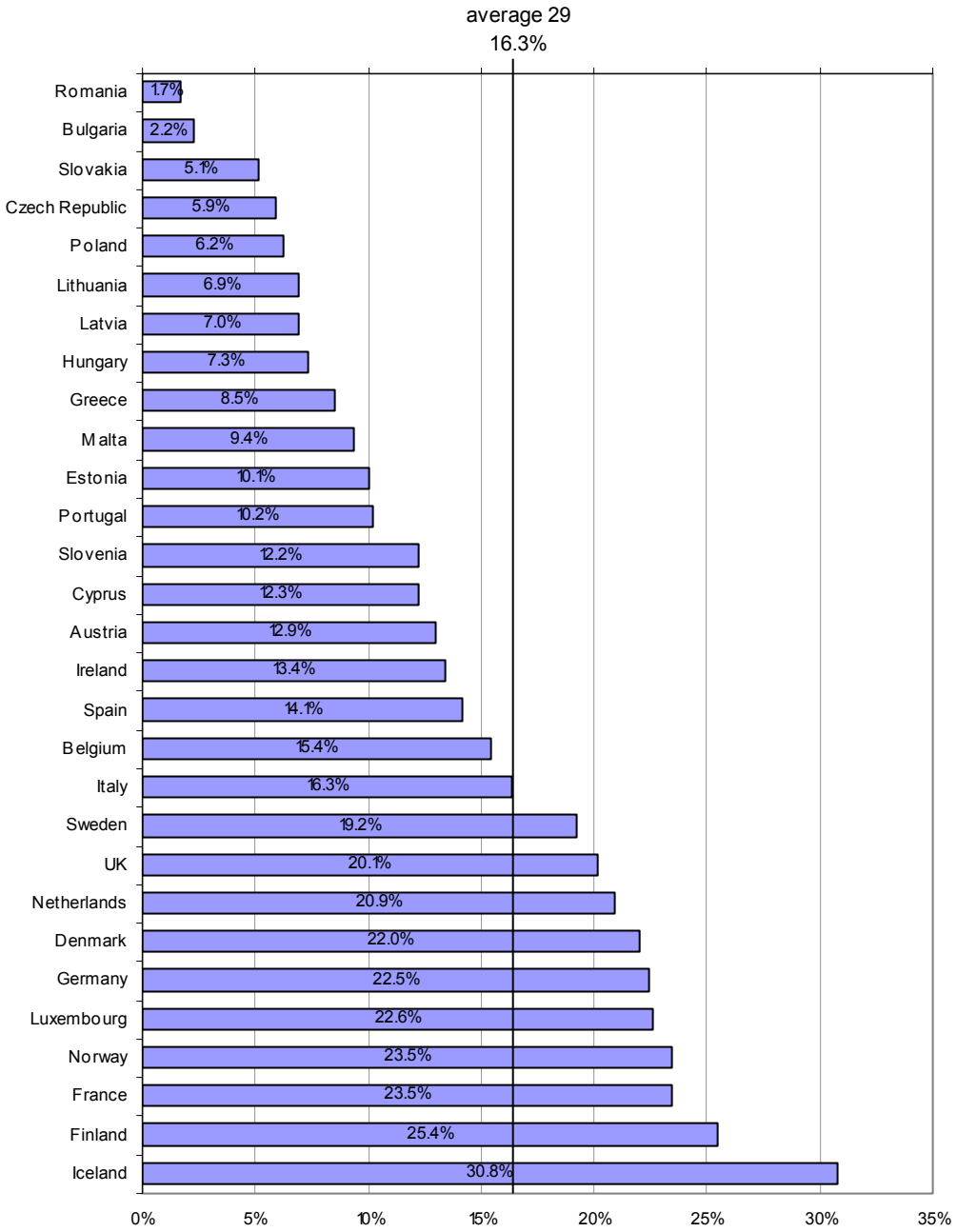


There were 81.2 million DSL subscribers at the end of 2007 in the 29 countries covered, representing a 23% increase in a year. Germany (18.5 million), France (14.8 million), the UK (12.2 million) and Italy (9.6 million) are the largest contributors, and together account for 68% of the regional DSL subscriber base.

Table 5: National DSL subscriber bases at the end of 2007 (in million subscribers)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
74.573	75.778	79.486	80.692	80.014	81.219

Figure 8: National DSL penetration at the end of 2007

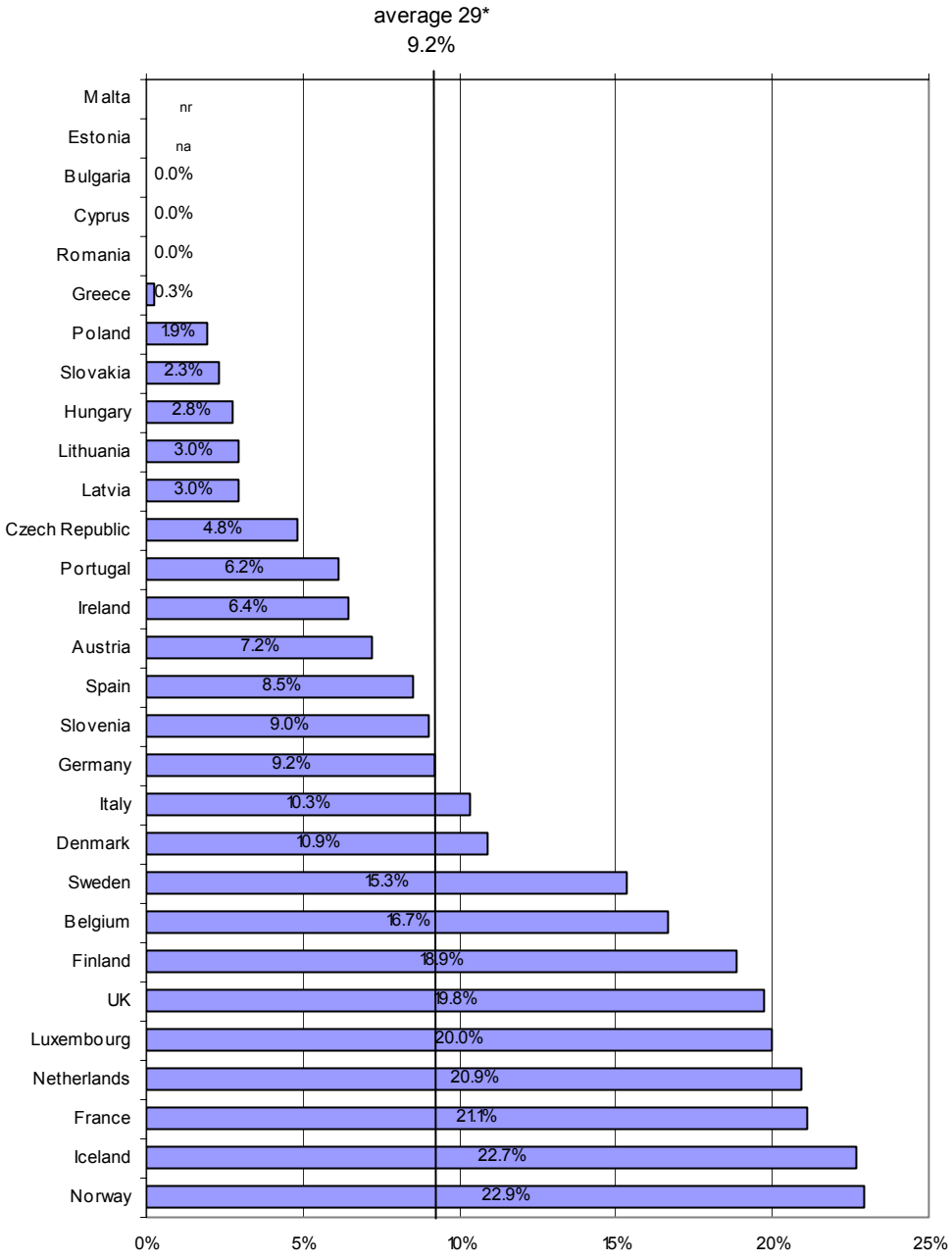


In terms of penetration, figures range from 1.7% in Romania to 31% in Iceland, with a weighted average for the 29 countries of 16%. Besides Nordic countries, France, Germany and the UK are now amongst the leaders here, with penetration rates of 20% and over.

Table 6: National DSL penetration at the end of 2007 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
19.1%	19.1%	17.1%	17.2%	16.2%	16.3%

Figure 9: DSL penetration in rural areas at the end of 2007



DSL penetration in rural areas is well below national levels (9.2% on average vs. 16.3%).

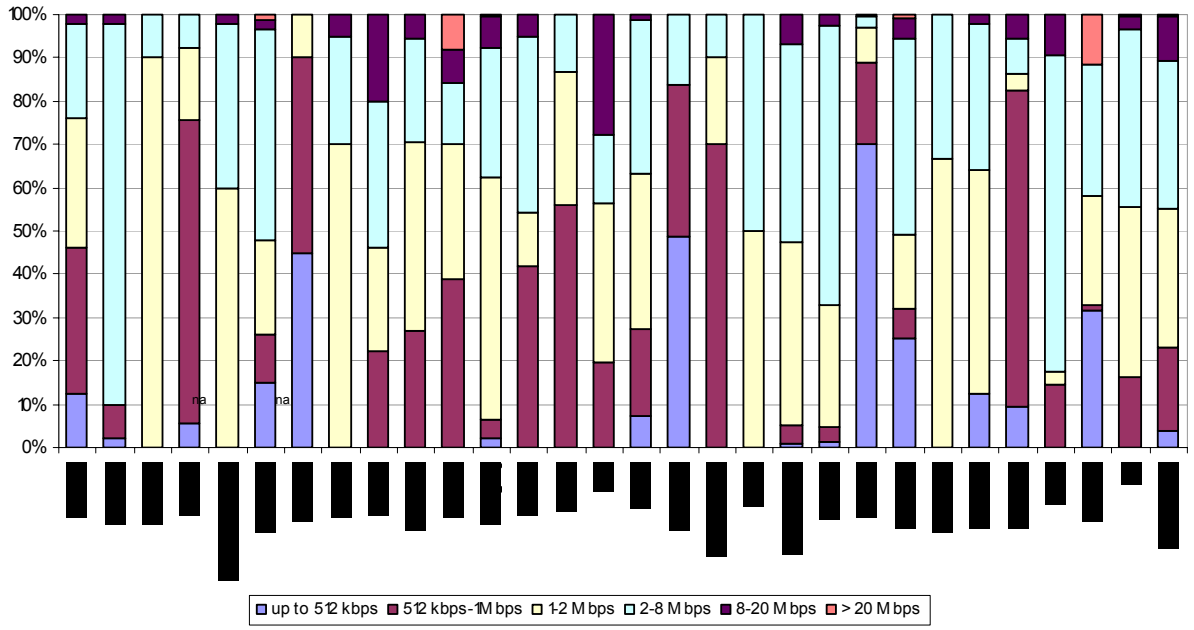
Table 7: DSL penetration in rural areas at the end of 2007 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
12.8%	13.2%	10.1%	10.5%	8.9%	9.2%

* Average calculation excludes countries where figures are not available.

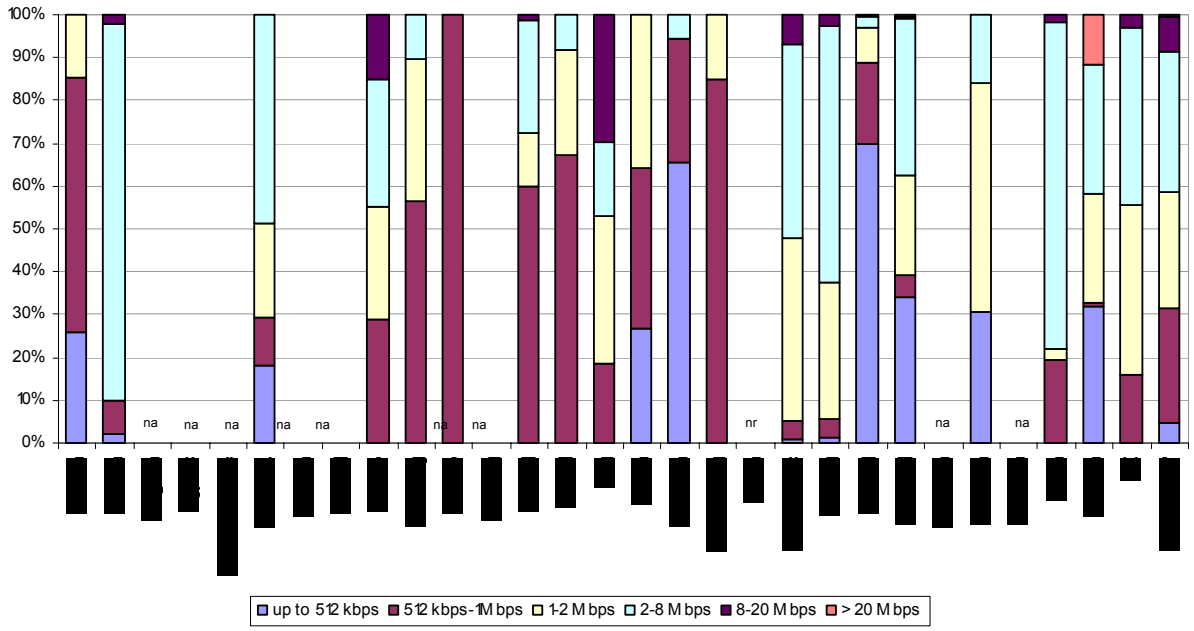
DSL download rate segmentation

Figure 10: DSL subscriber bases broken down by download rates, at the end of 2007



On average, 2 DSL customers out of 3 subscribe to offers with download rates of between 1 Mbps and 8 Mbps, while 11% subscribe to download rates over 8 Mbps (ADSL2+), most of them being in France and in Italy; only 4% subscribe to download rates of up to 512 kbps. In 8 countries (Belgium, Denmark, France, Malta, the Netherlands, Norway, Portugal and Spain), connections with download speeds over 2 Mbps account for 50% or more of total DSL connections. However, in some countries, operators only market very high nominal speeds regardless of the effective speeds that can be achieved. Disparities between the connection rates subscribed nationally and in rural areas are shrinking.

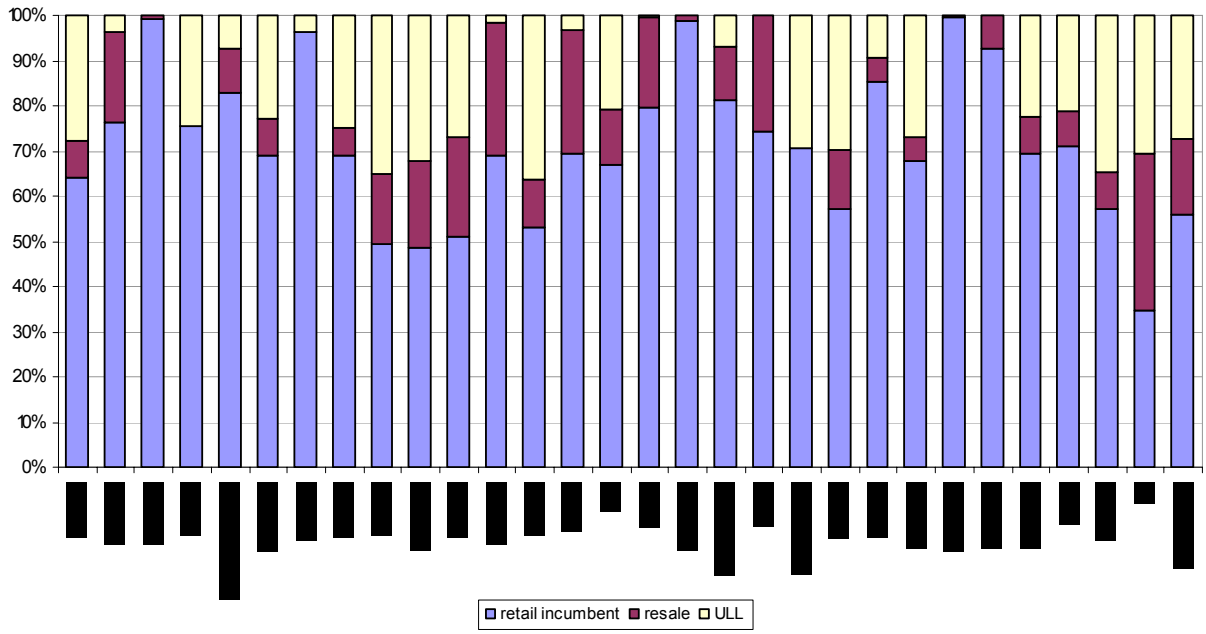
Figure 11: Breakdown of rural DSL subscriber bases by download rate, at the end of 2007



* Average calculation excludes countries where figures are not available.

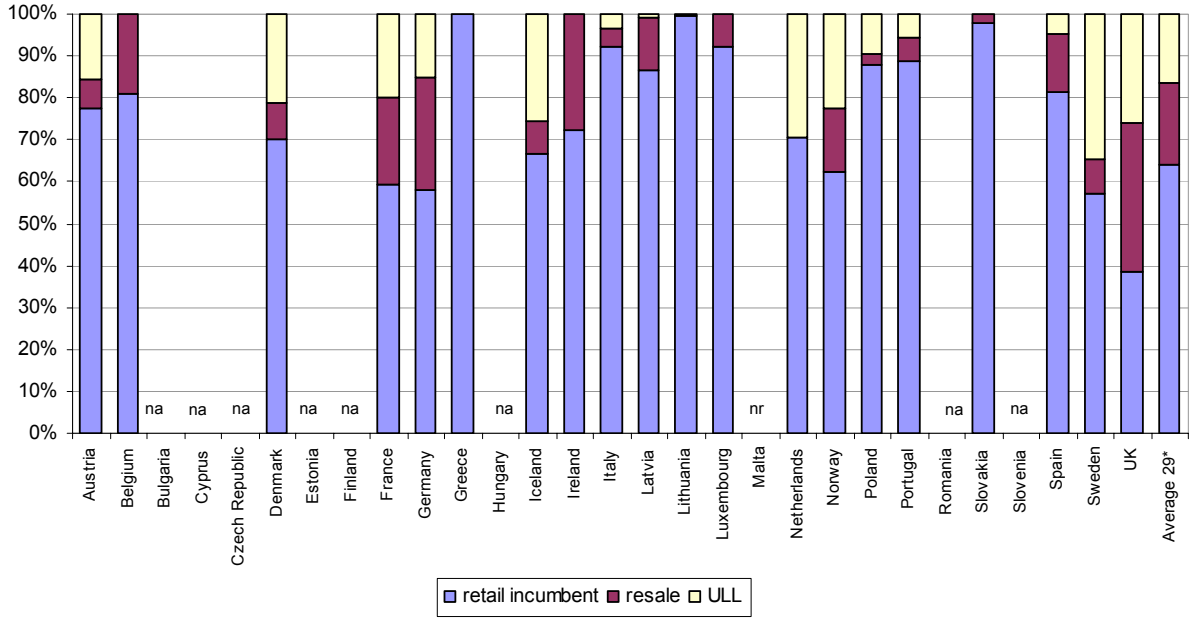
DSL access origin

Figure 12: DSL subscriber bases broken down by access origin, at the end of 2007



On average, 56.1% of DSL connections are supplied directly by incumbent operators, while 16.6% are sold through resale and bitstream offers and 27.3% through unbundling. LLU is particularly well-entrenched in Iceland (36.5% of DSL connections at the end of 2007), in France (35%), in Sweden (34.5%), in Germany (32.4%) and in the UK (30.6%); it is also very close to 30% in Norway and in the Netherlands. Not surprisingly, unbundling is less developed in rural areas (only 16.9% on average) due to the smaller size of local exchanges which makes it less economical for a competitive supplier to install its own DSLAMs; resale offers are a bit more successful (18.9%)

Figure 13: Breakdown of rural DSL subscriber bases by access origin, at the end of 2007

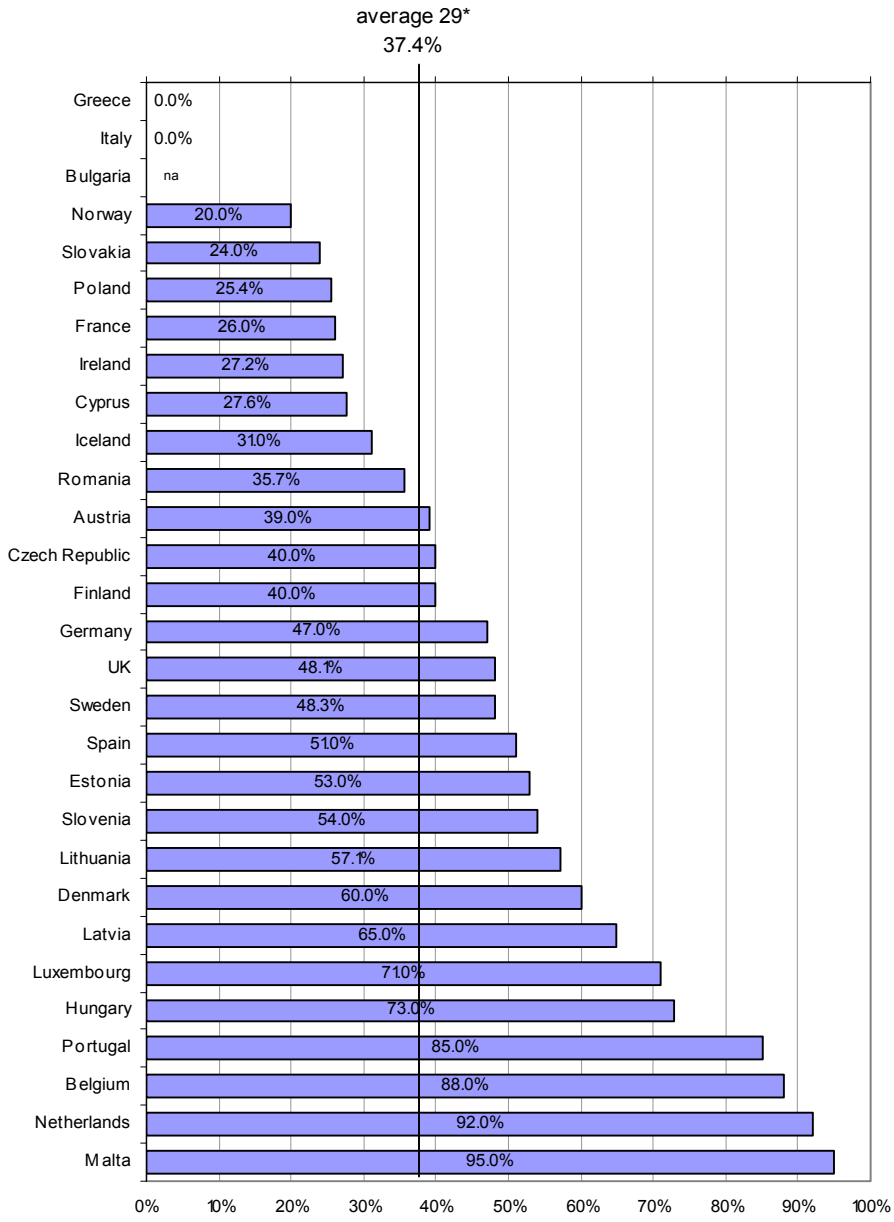


* Average calculation excludes countries where figures are not available.

3.1.3. Cable modem coverage and penetration

Cable modem coverage

Figure 14: National cable modem coverage at the end of 2007



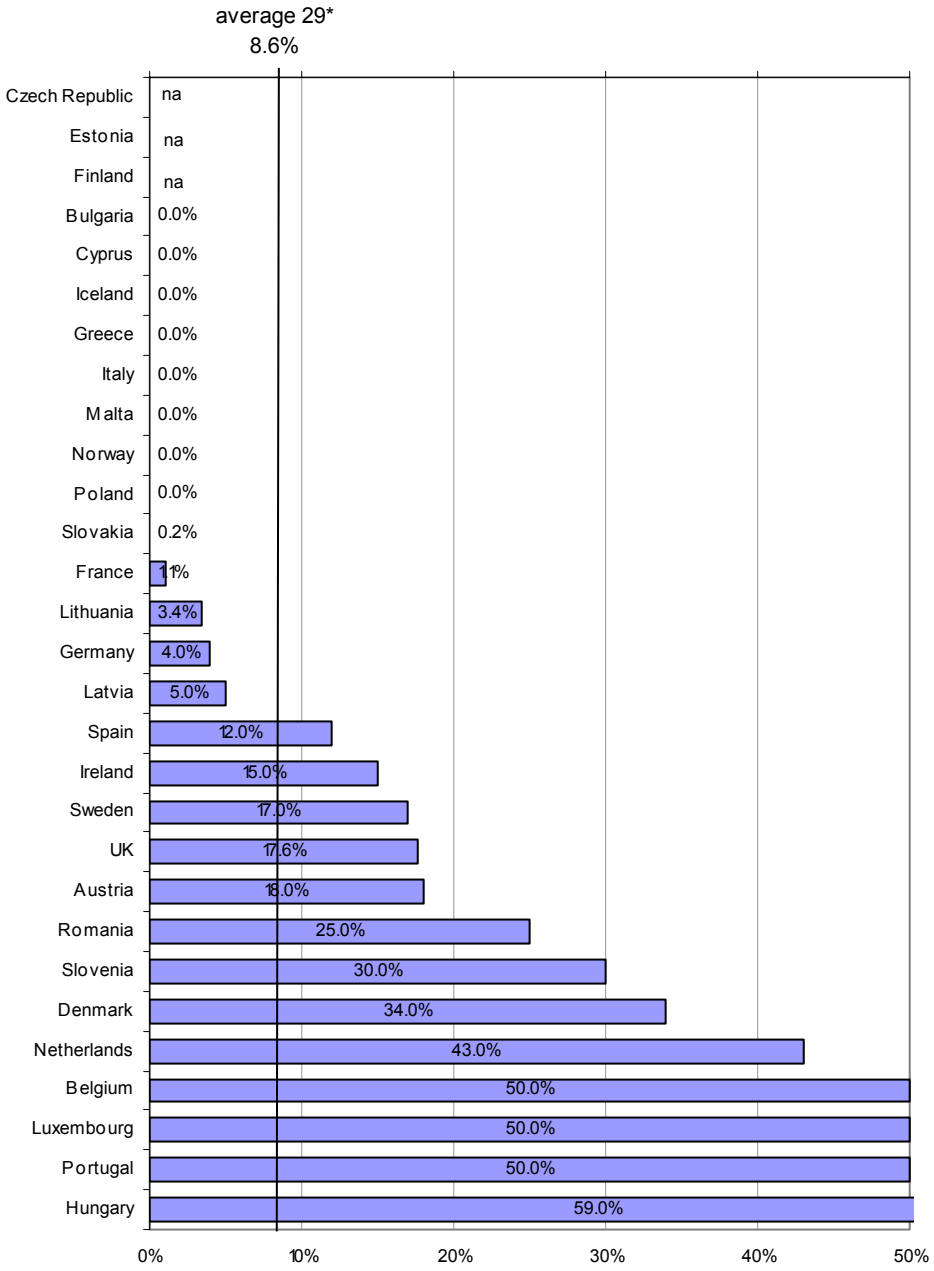
Cable modem coverage at national levels ranged between 0% (Greece and Italy, where it is not at all available) and 95% (Malta) at the end of 2007, with a regional weighted average of 37.4%. And certain new Member States are reporting substantial cable modem coverage, notably Hungary (73%) and Latvia, Lithuania, Slovenia and Estonia with a rate of over 50%.

Table 8: Cable modem coverage at the end of 2007 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
39.6%	39.4%	39.3%	39.1%	37.5%	37.4%

* Average calculation excludes countries where figures are not available.

Figure 15: Cable modem coverage in rural areas at the end of 2007



In rural areas, cable modem coverage has reached 8.6% on average, which is far below coverage at national levels as, in many countries (France, the UK), cable is available primarily in big cities.

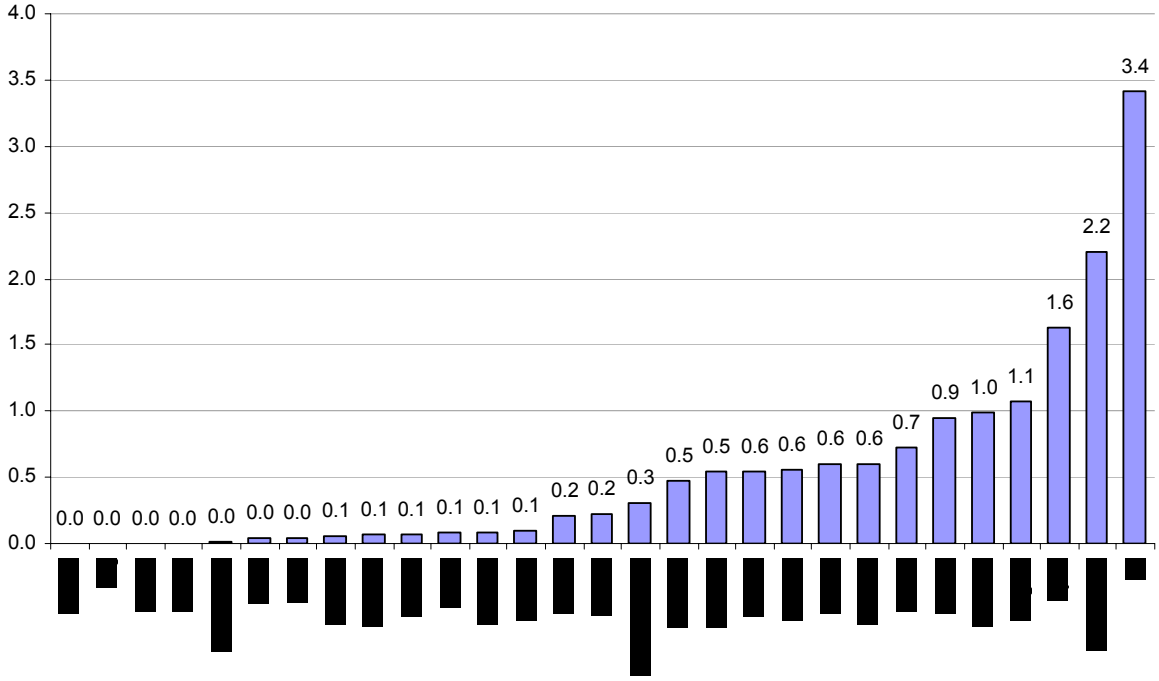
Table 9: Cable modem coverage in rural areas at the end of 2007 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
9.6%	9.2%	9.9%	9.6%	8.6%	8.4%

* Average calculation excludes countries where figures are not available.

Cable modem penetration

Figure 16: National cable modem subscriber bases at the end of 2007 (in million subscribers)

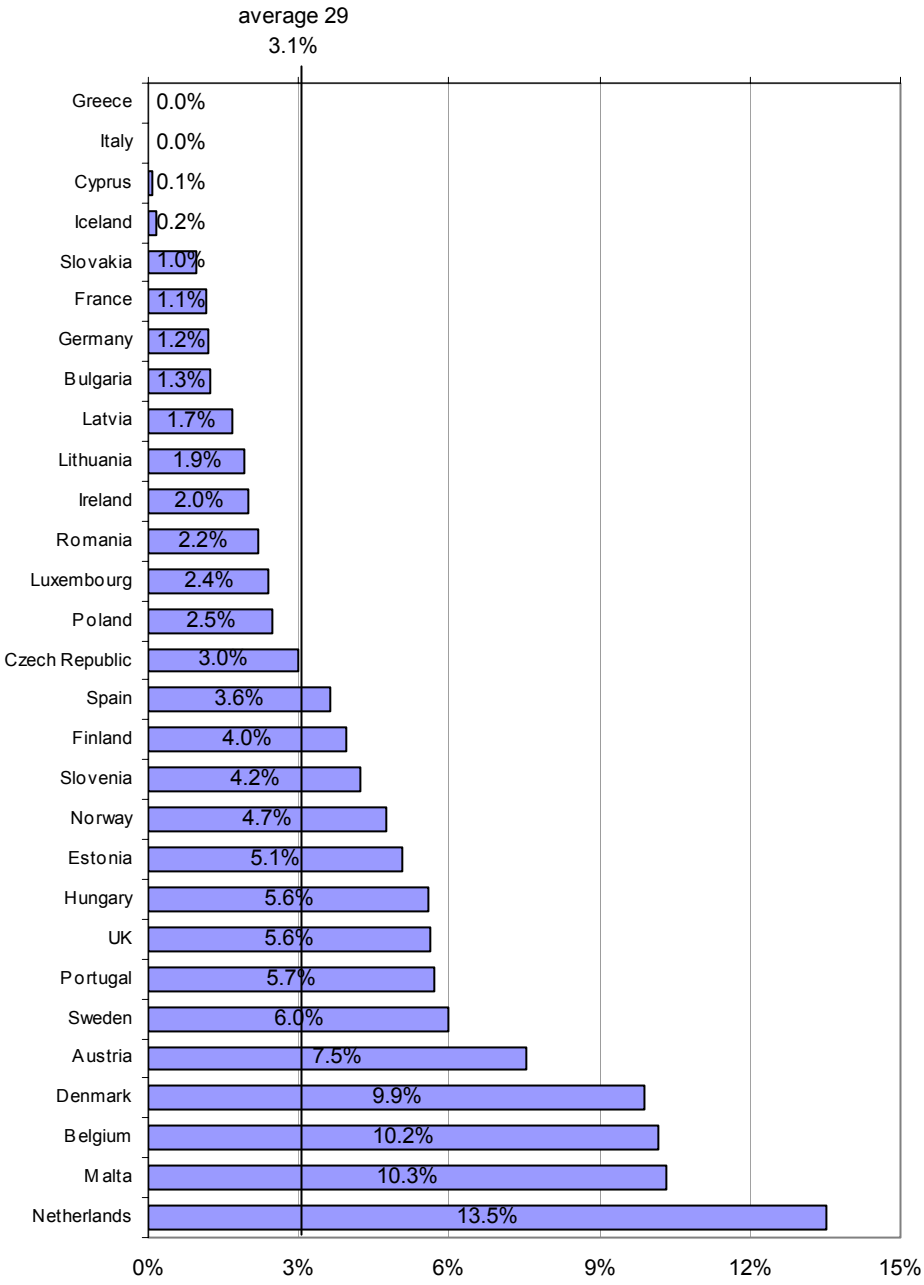


There were 15.6 million cable subscribers at the end of 2007 in the 29 countries covered. The UK leads the way with more 3.4 million subscribers, or 22% of the regional total.

Table 10: National cable modem subscriber bases at the end of 2007 (in million subscribers)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
12.635	12.861	14.805	15.031	15.369	15.594

Figure 17: National cable modem penetration at the end of 2007

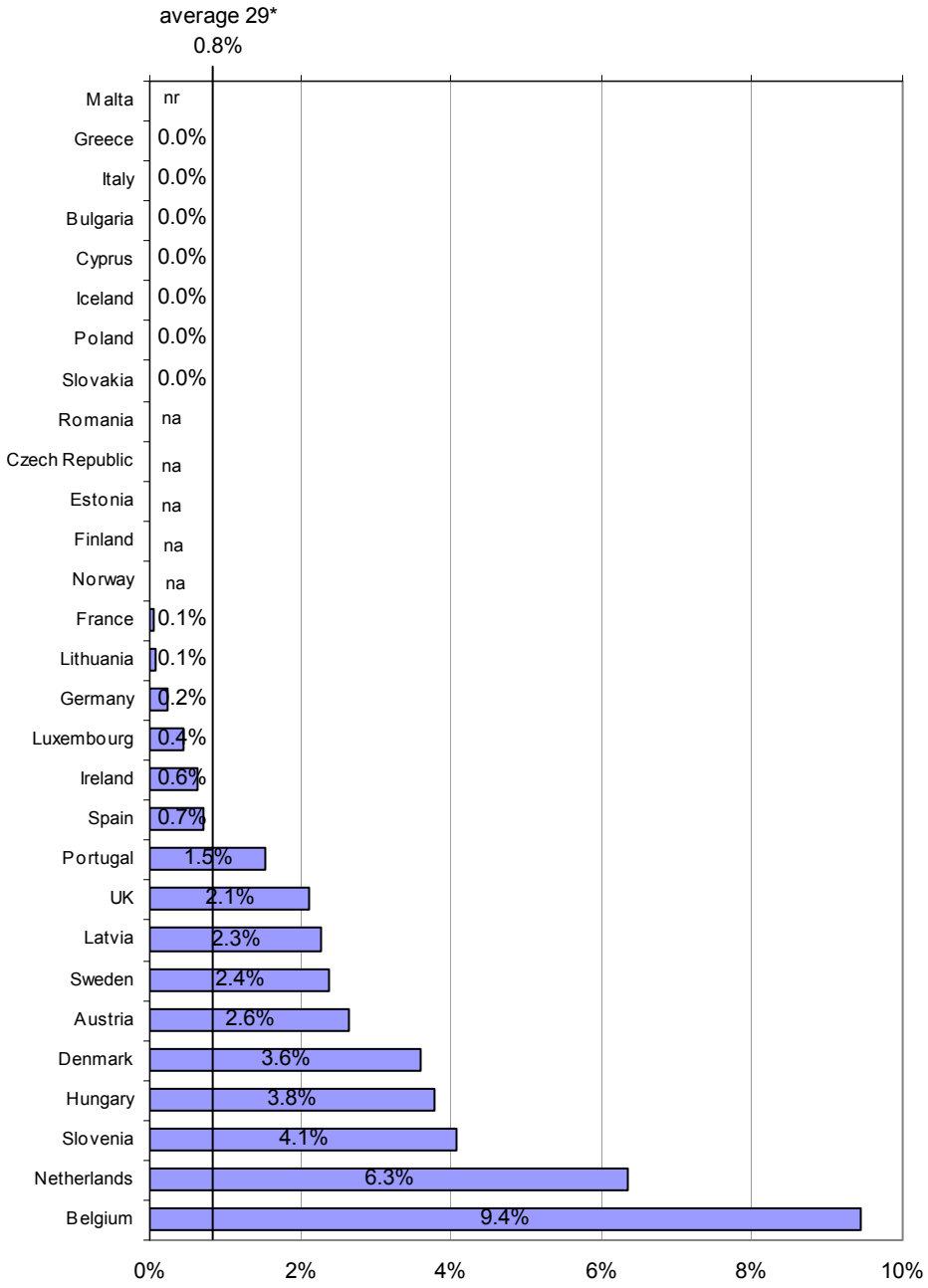


In terms of penetration, figures ranged from 0% in Greece and Italy, where cable is not available, to 13.5% in the Netherlands at the end of 2007, with a weighted average for the 27 countries of 3.1%, i.e. well below DSL penetration rates.

Table 11: National cable modem penetration at the end of 2007 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
3.2%	3.2%	3.2%	3.2%	3.1%	3.1%

Figure 18: Cable modem penetration in rural areas at the end of 2007



Cable modem penetration in rural areas is very low, with a European average of 0.8%, with only Belgium and the Netherlands reporting significant penetration in rural areas.

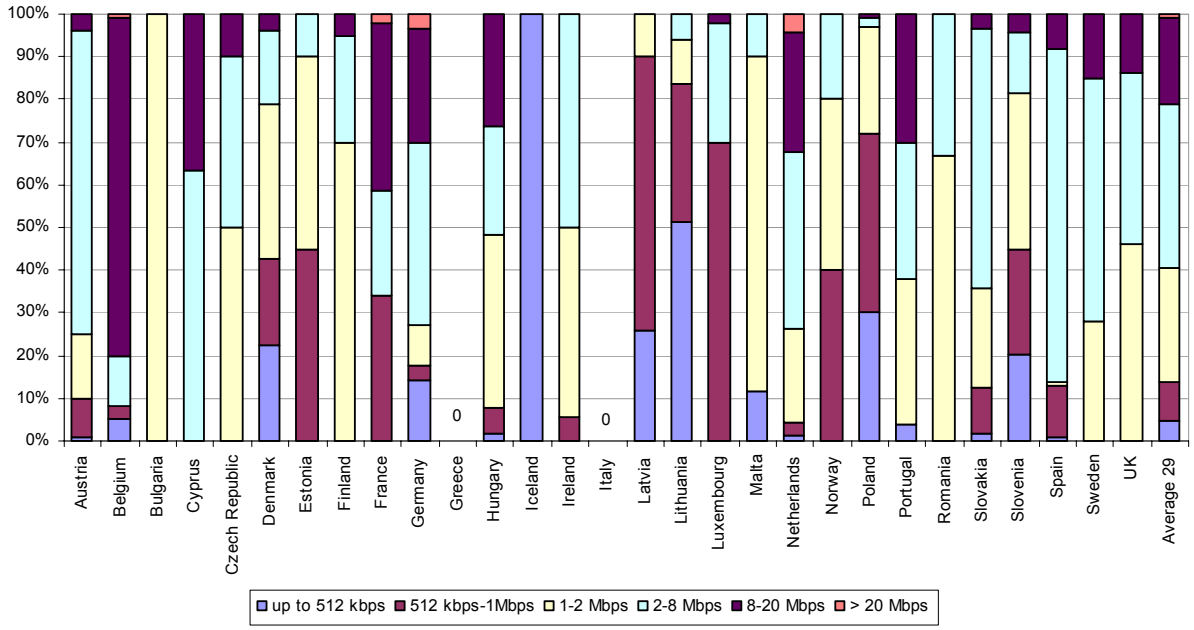
Table 12: Cable modem penetration in rural areas at the end of 2007 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
0.8%	0.8%	0.8%	0.8%	0.8%	0.8%

* Average calculation excludes countries where figures are not available.

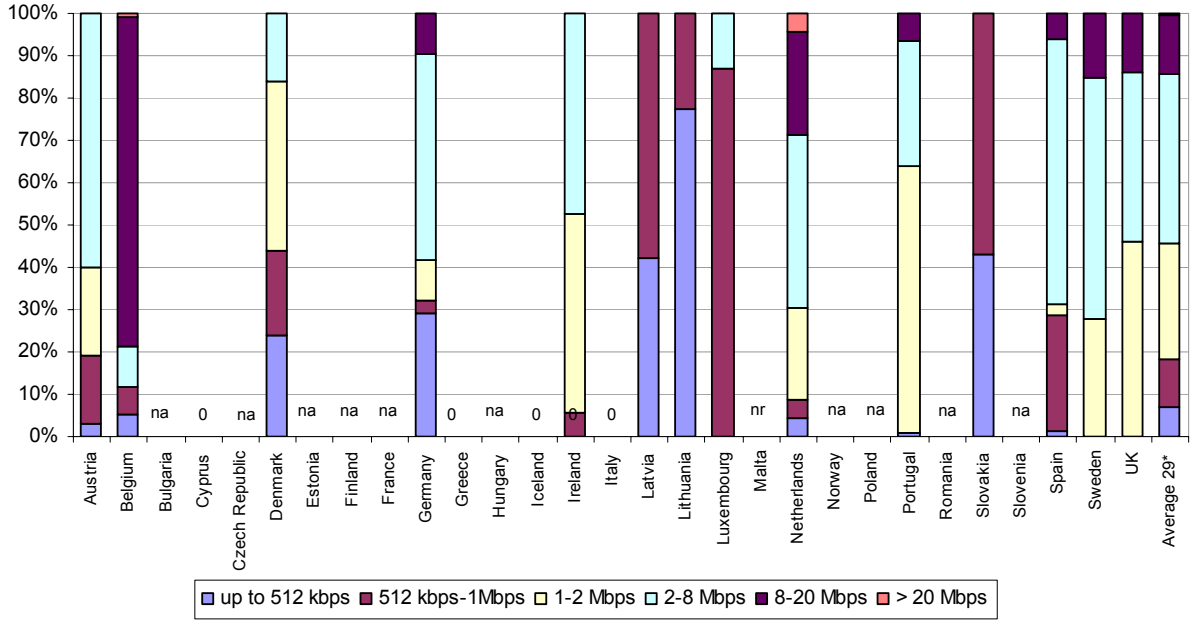
Cable modem download rate segmentation

Figure 19: Breakdown of cable modem subscriber bases by download rates, at the end of 2007



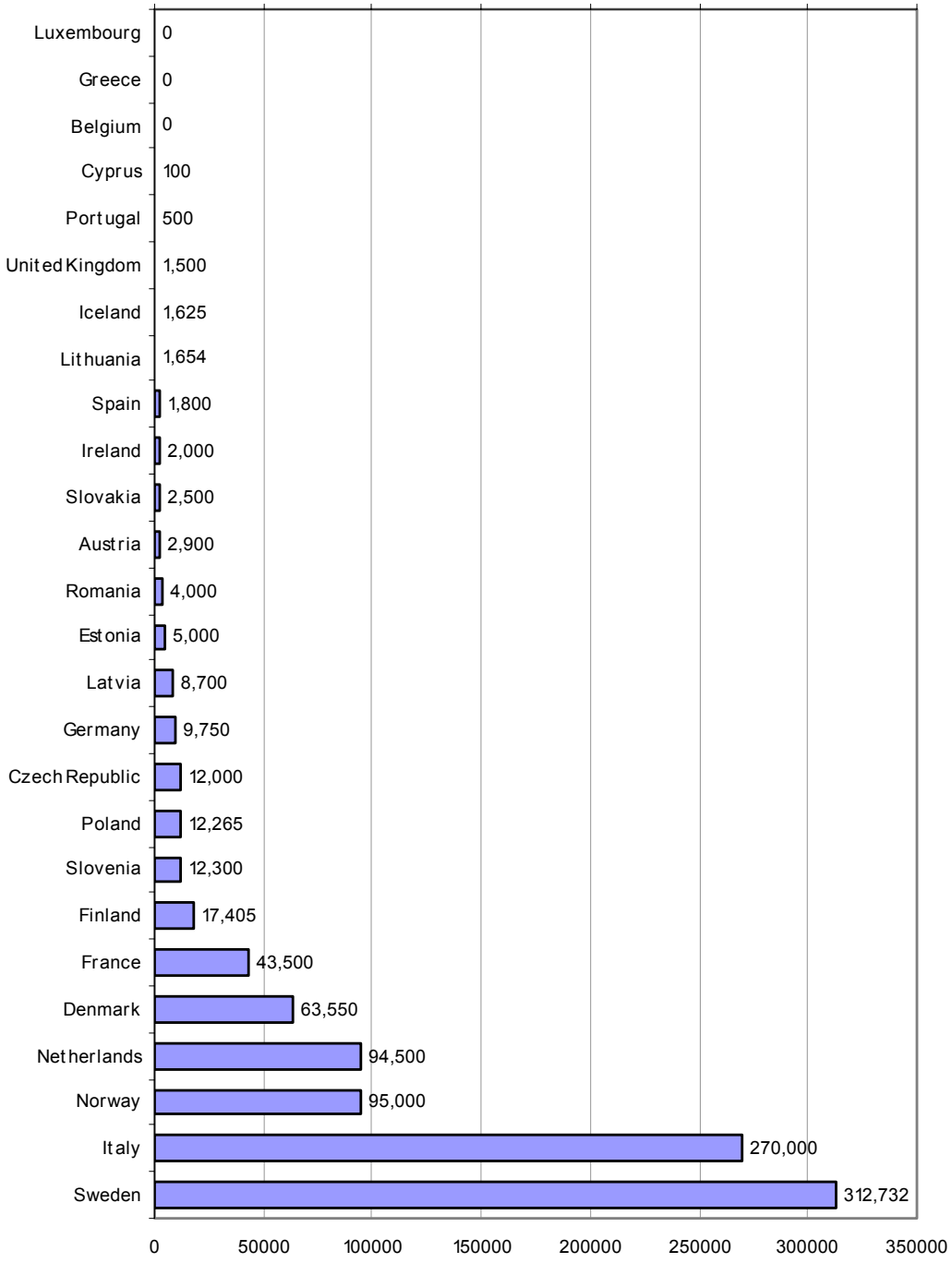
On average, 59.3% of cable modem customers subscribed to offers with download rates of over 2 Mbps, and 21.1% to download rates of over 8 Mbps at the end of 2006, compared to 46.5% and 14.1% for both categories at the end of 2006. In 7 countries (Austria, Belgium, Cyprus, Germany, the Netherlands, Portugal, Spain and Sweden), connections with download speeds over 2 Mbps account for 70% or more of total cable modem connections. On average, in those countries where this information is available, cable modem connections offer slightly higher download rates than DSL, and the disparities between national and rural levels are also shrinking.

Figure 20: Breakdown of rural cable modem subscriber bases by download rates, at end 2007



3.1.4. FTTH subscribers

Figure 21: Number of FTTH/FTTB subscribers, at the end of 2007

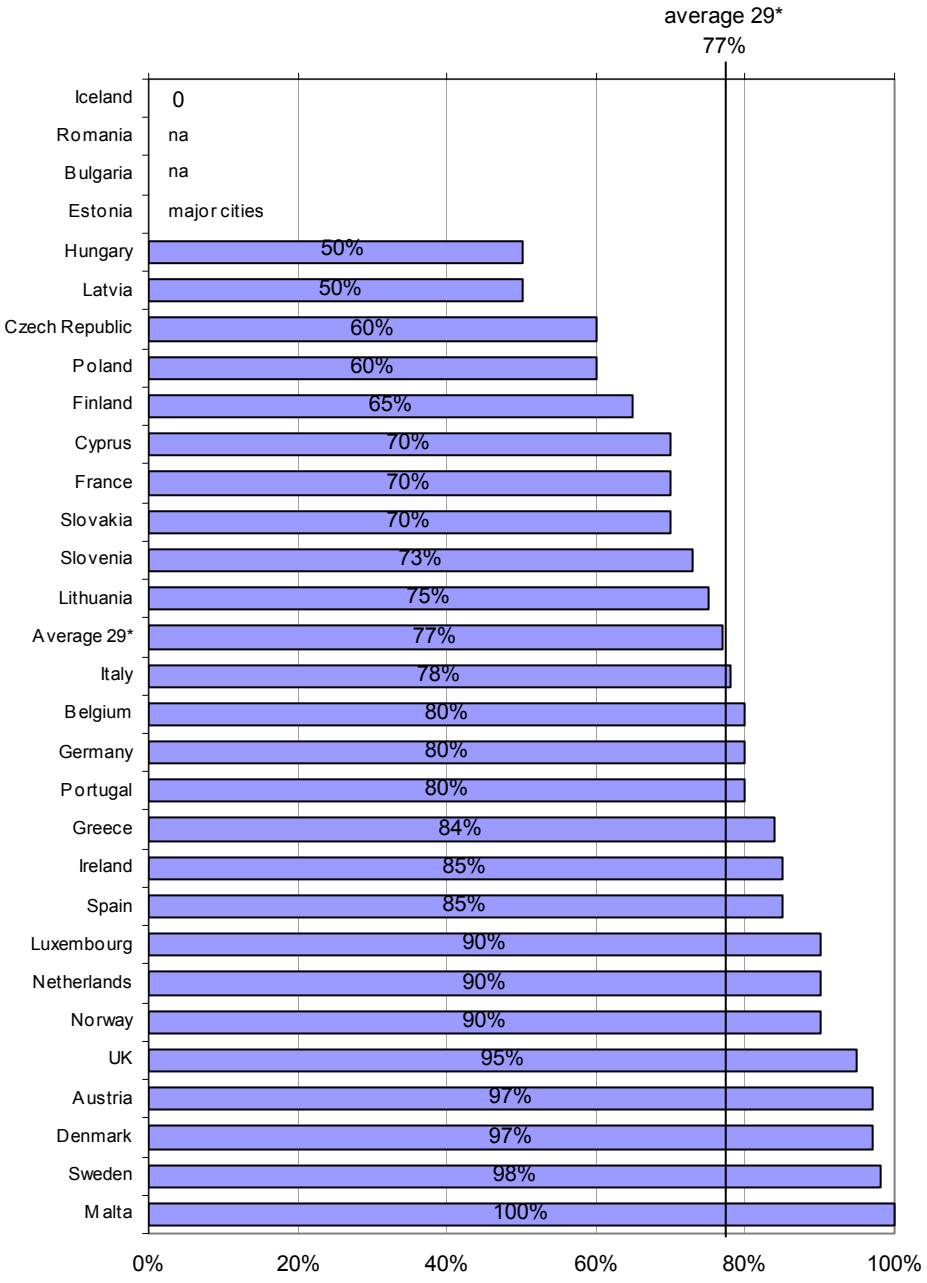


The number of FTTH/FTTB subscribers was close to 1 million at the end of 2007 in the 29 countries covered . 60% of the installed base are concentrated in Sweden and in Italy while 4 more countries (Norway, the Netherlands, Denmark and France) account for another 30%.

3.1.5. 3G coverage and take-up

3G coverage

Figure 22: National 3G coverage at the end of 2007



At the end of 2007, 3G deployment was underway in all countries except Iceland, with a regional weighted average of 77% (not taking into account Bulgaria and Romania). The above figure refers to UMTS coverage with speeds of 384 Kbps and upwards. In numerous countries, operators also upgraded their networkds to 3.5G (HSDPA notably) to offer higher speeds.(1.5 Mbps+)

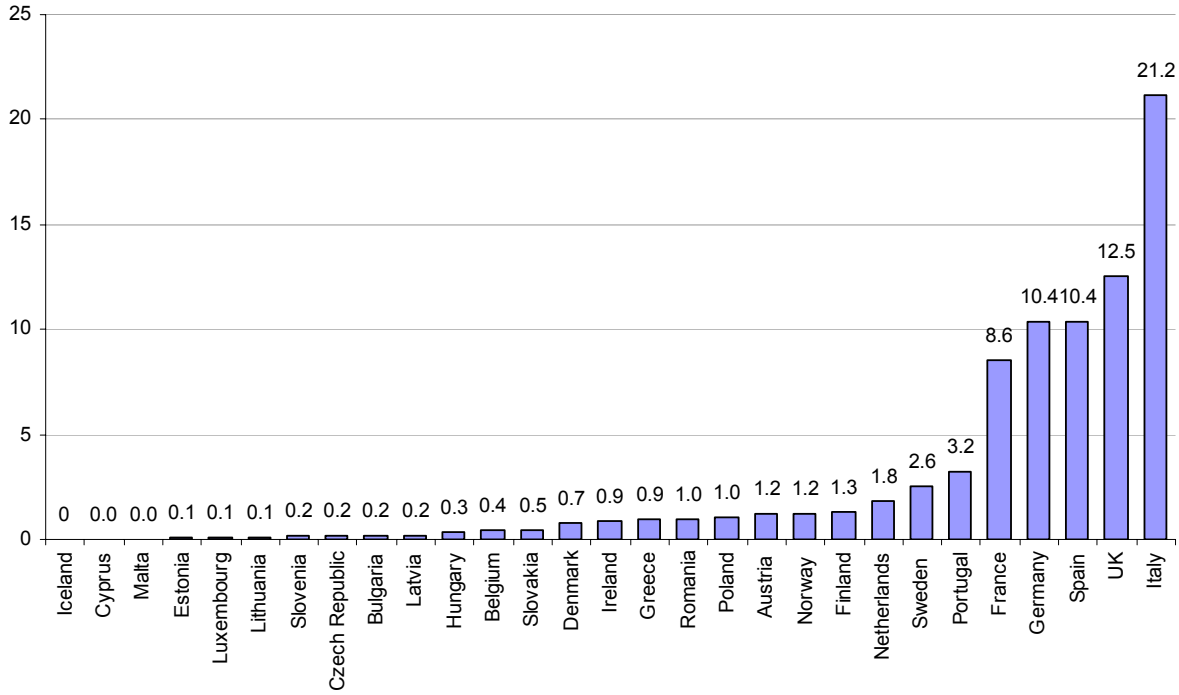
Table 13: 3G coverage at the end of 2007 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
83%	83%	77%	77%	77%	77%

* Average calculation excludes countries where figures are not available.

3G penetration

Figure 23: National 3G subscriber bases at the end of 2007 (in million subscribers)



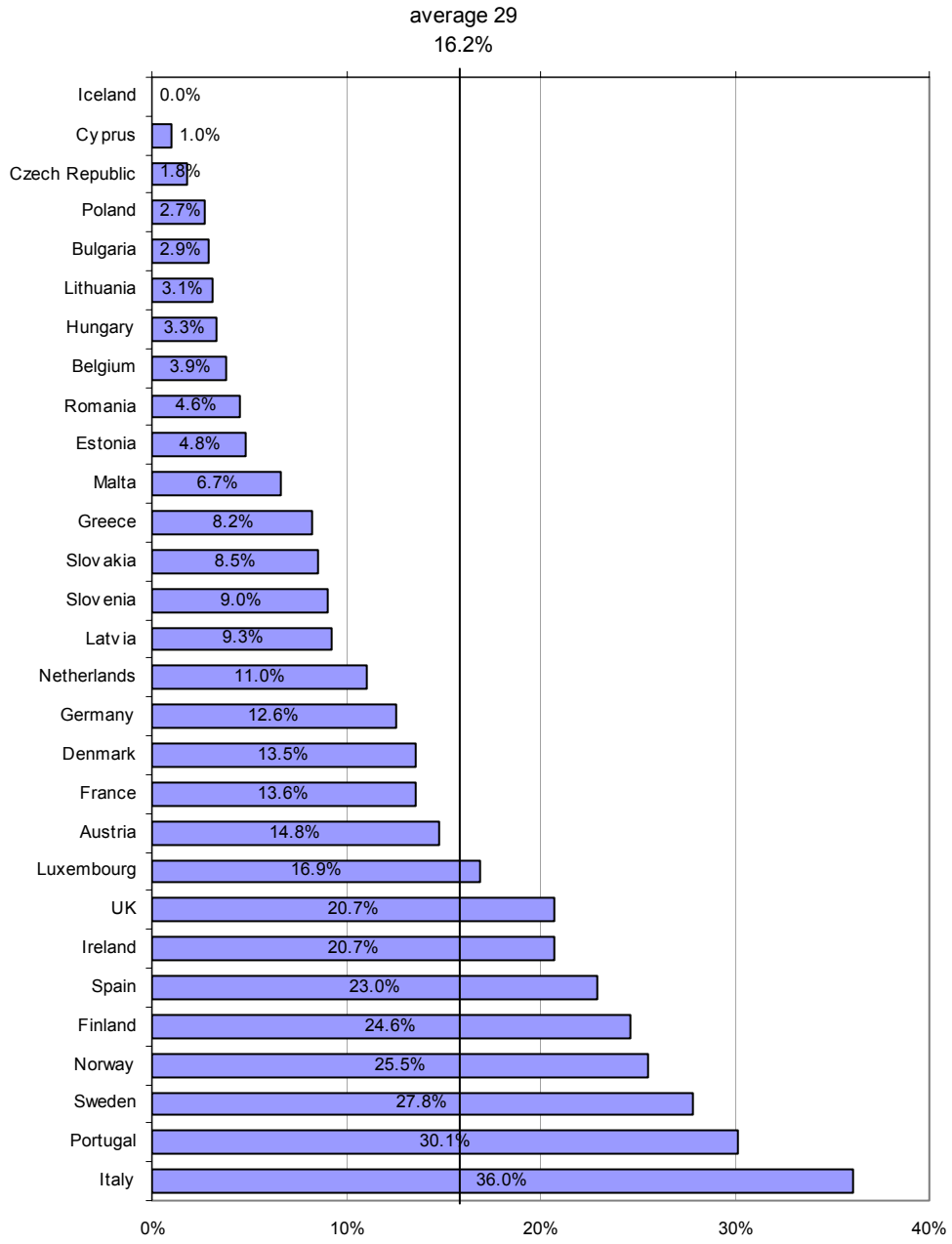
There were 81.1 million 3G subscribers[2] at the end of 2007 in the 29 countries covered, which represents a 74% increase compared to the end of 2006 (46.6 million subscribers). 3G customers are concentrated mainly in the EU-15, with Italy leading the way with 21.2 million subscribers (26% of the regional total), ahead of the United Kingdom with 12.5 million subscribers, and Spain and Germany with 10.4 million subscribers each.

Table 14: National cable modem subscriber bases at the end of 2007 (in million subscribers)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
76.047	77.257	78.651	79.861	79.845	81.055

[2] See methodological issues in the introduction of this report

Figure 24: National 3G penetration at the end of 2007



In terms of 3G penetration, figures range from 0% (Iceland) to 36% in Italy, with a weighted average of 16.2% for the 29 countries.

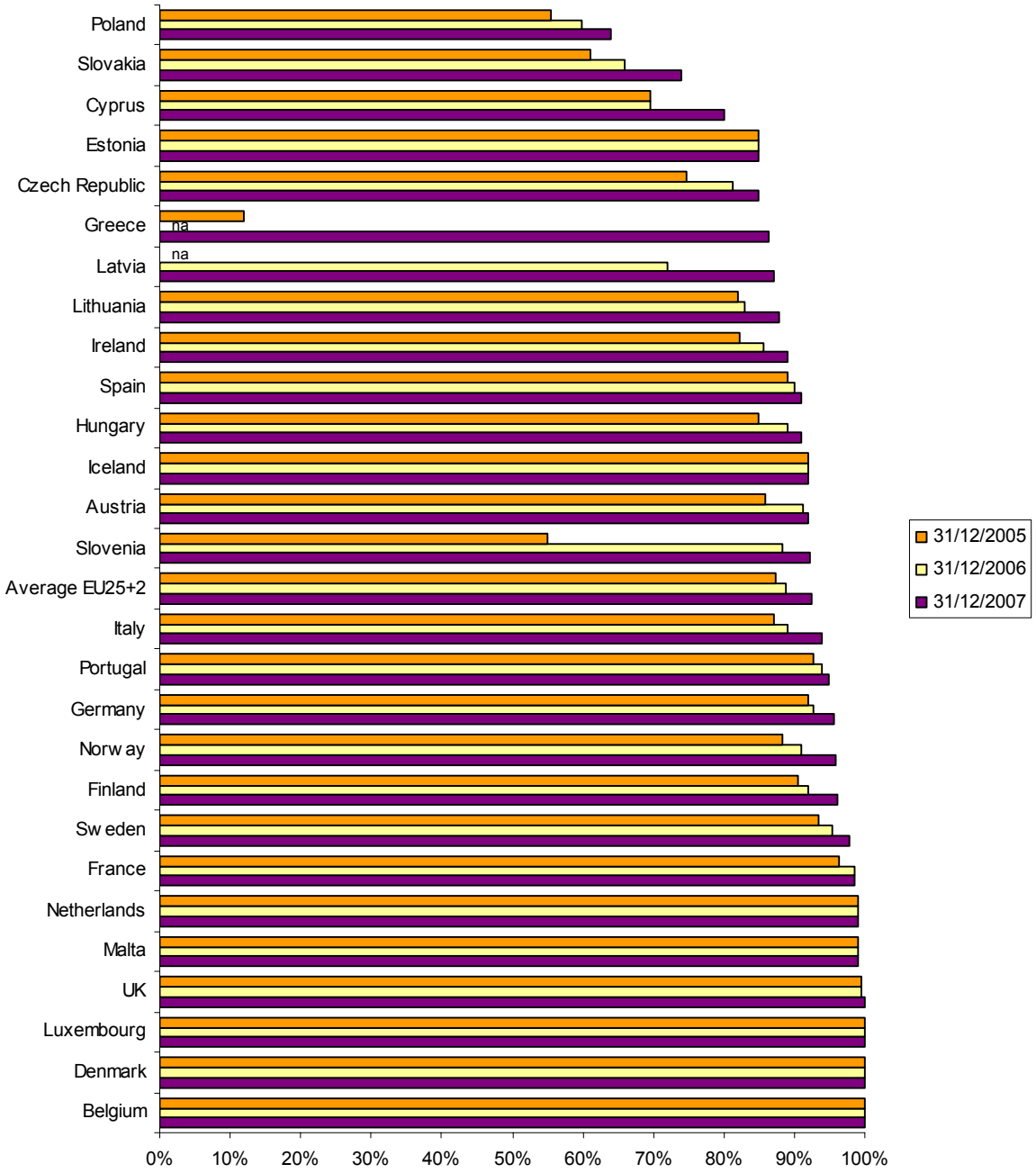
Table 15: National 3G penetration at the end of 2007 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
19.4%	19.5%	16.9%	17.0%	16.2%	16.2%

3.2. EU-25 + Norway & Iceland, from year-end 2005 to year-end 2007

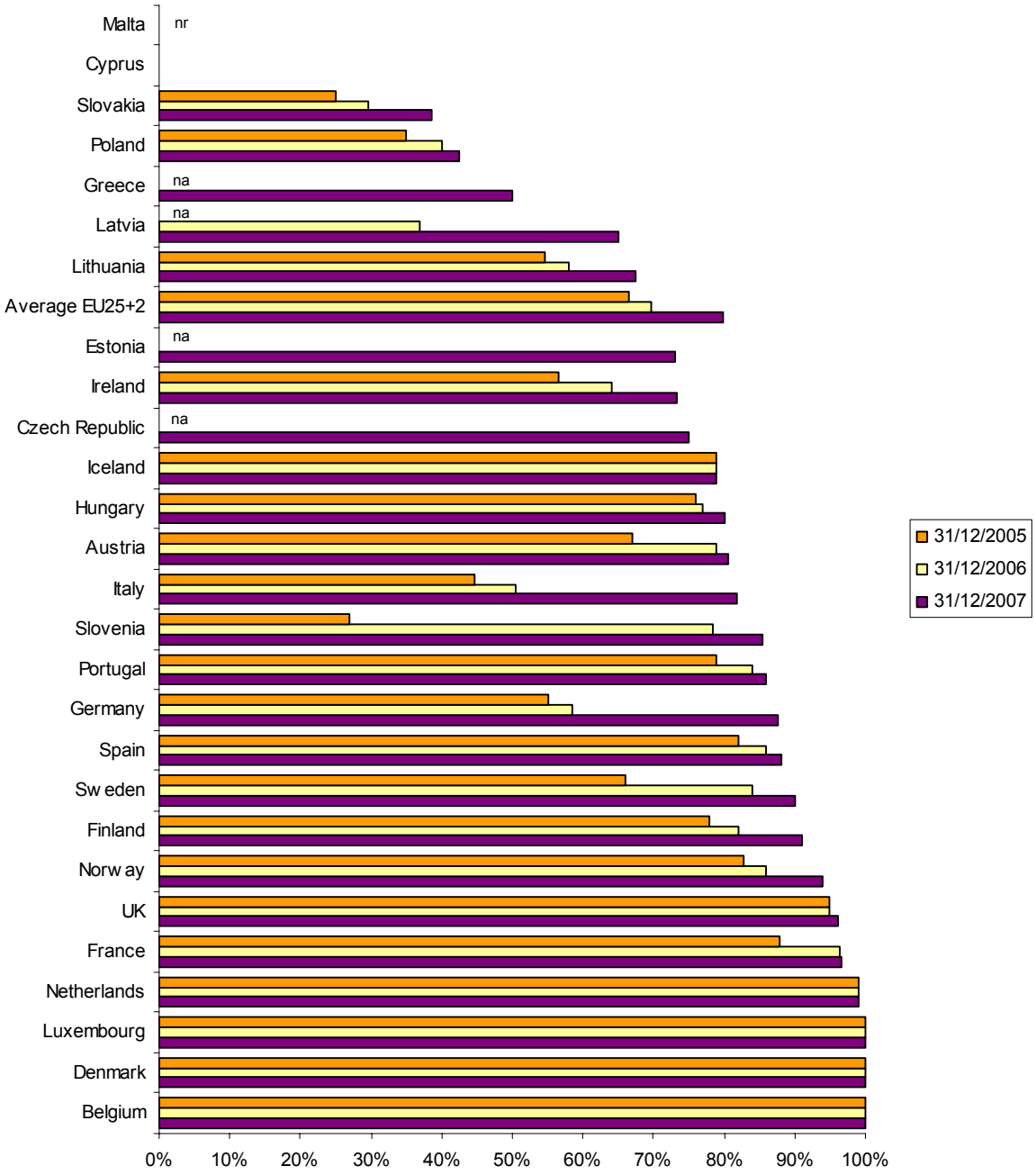
3.2.1. Coverage

Figure 25: National DSL coverage



Average DSL coverage in the EU-25 + 2 was over 92% at the end of 2007. Except in Poland (64%) and Slovakia (74%), national values now exceed 80% in all countries and are very close to 100% in the UK, Luxembourg, Denmark and Belgium. In 2007, DSL coverage has increased substantially in Latvia and, above all, in Greece (from 12% at the end of 2005 to 86% at the end of 2007).

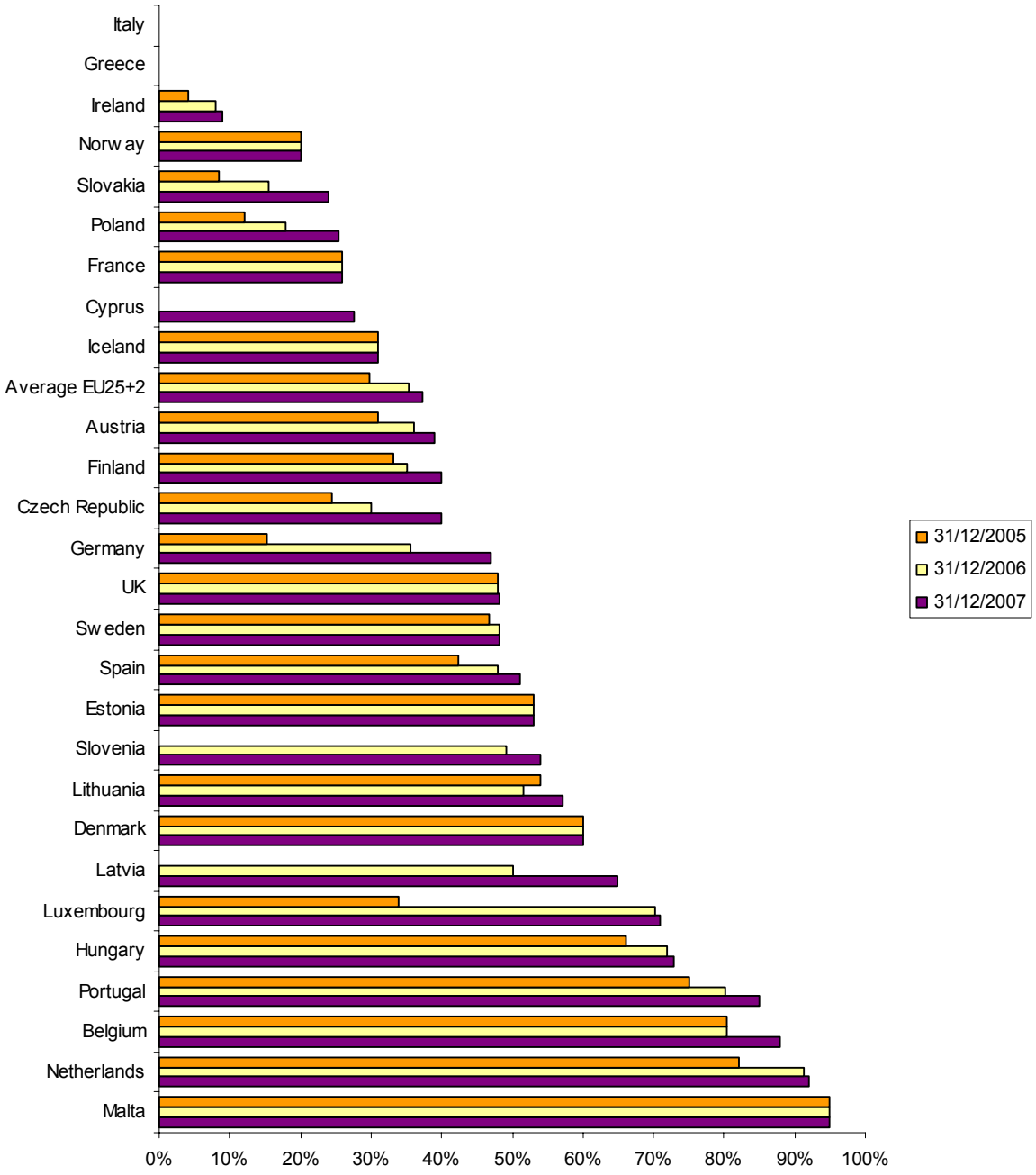
Figure 26: Rural DSL coverage



Regarding DSL coverage in rural areas, significant progress has been made in all countries, even if it is still low in some new Member States and in Greece, a country where nevertheless rural coverage has increased a lot, along with Latvia, Italy and Germany. The average for the EU-25 + 2 stood at 80% at the end of 2007 (+13.5 points compared to the end of 2005) which is nevertheless 13% below national coverage levels. But the increase in 06-07 is much higher than in 05-06.

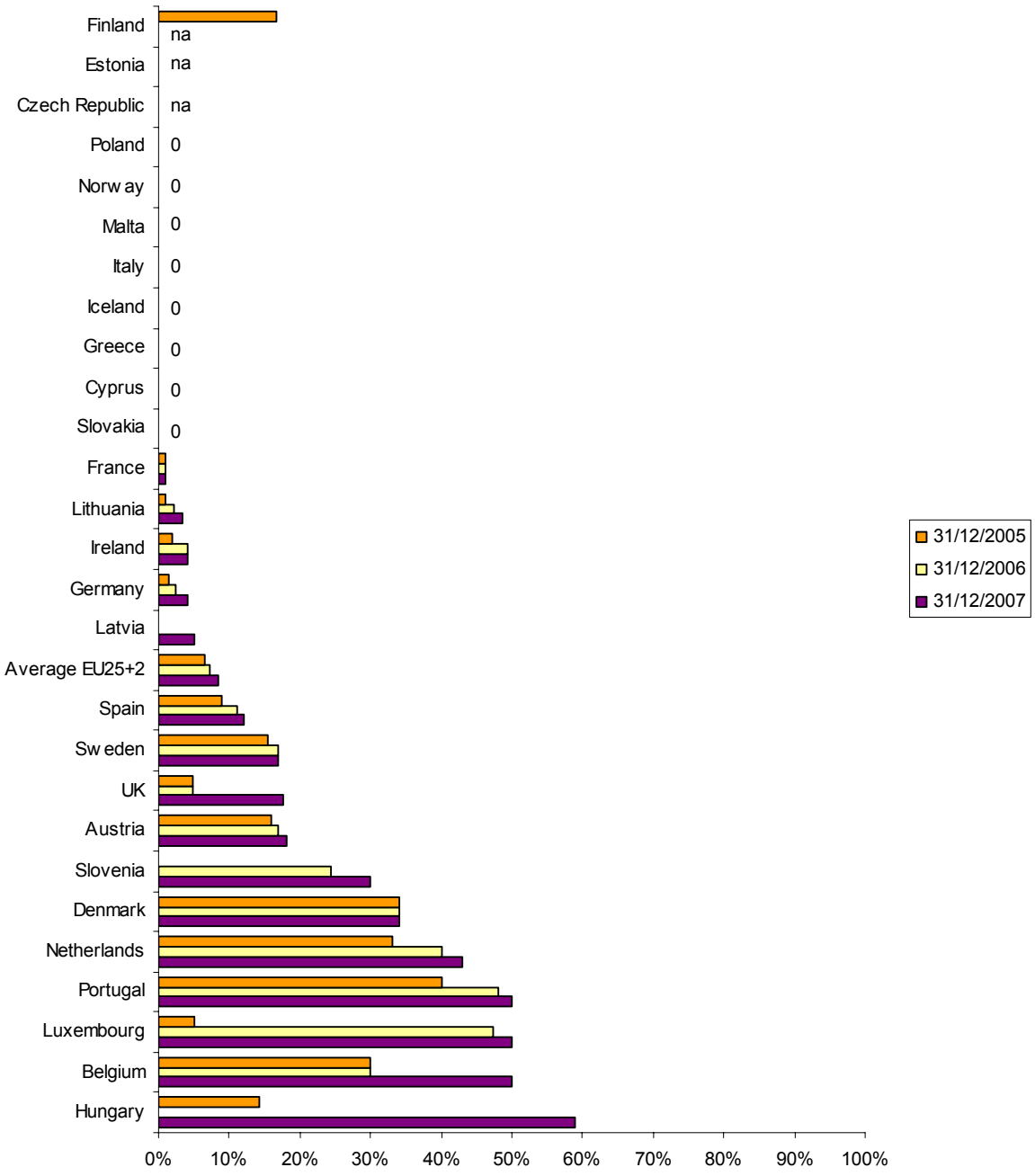
* Average calculation is weighted based on populations living in rural areas in the different countries.

Figure 27: National cable modem coverage



Average cable modem coverage in the EU-25 + 2 was just over 37% at the end of 2007 (to be compared to 93% for DSL at that time). The situation still differs widely from country to country: from Greece and Italy where cable is not available at all, to the Netherlands and Malta where cable modem is now available to over 90% of the population.

Figure 28: Rural cable modem coverage

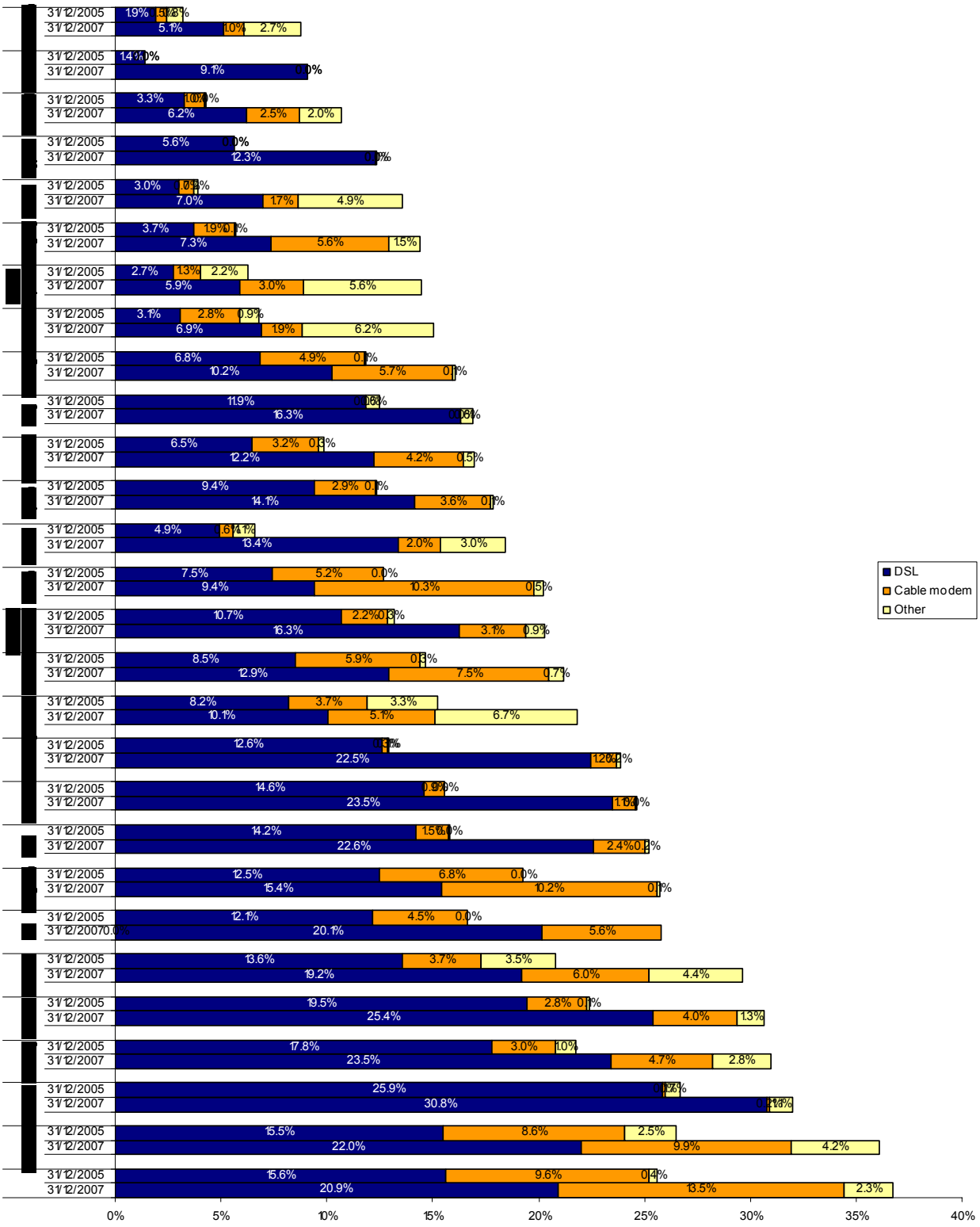


Average cable modem coverage in rural areas is still low compared to national coverage levels (only 8% compared to 37% for national coverage). Even in countries where cable is well developed, such as the Netherlands, Belgium and Portugal, cable modem is only available to between 40% and 50% of the population in rural areas.

* Average calculation is weighted based on population living in rural areas in the different countries.

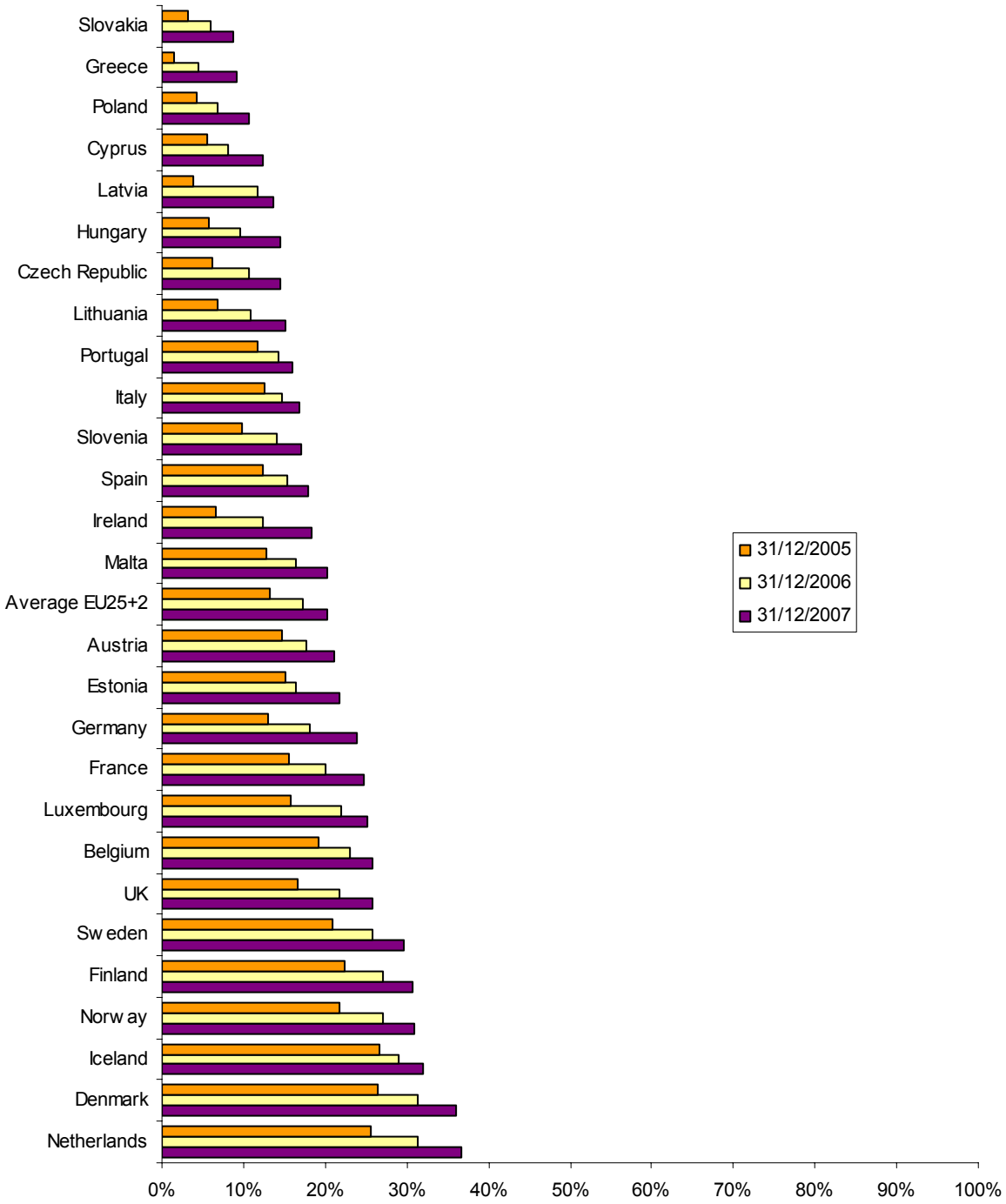
3.2.2. Penetration

Figure 29: Broadband penetration by technology



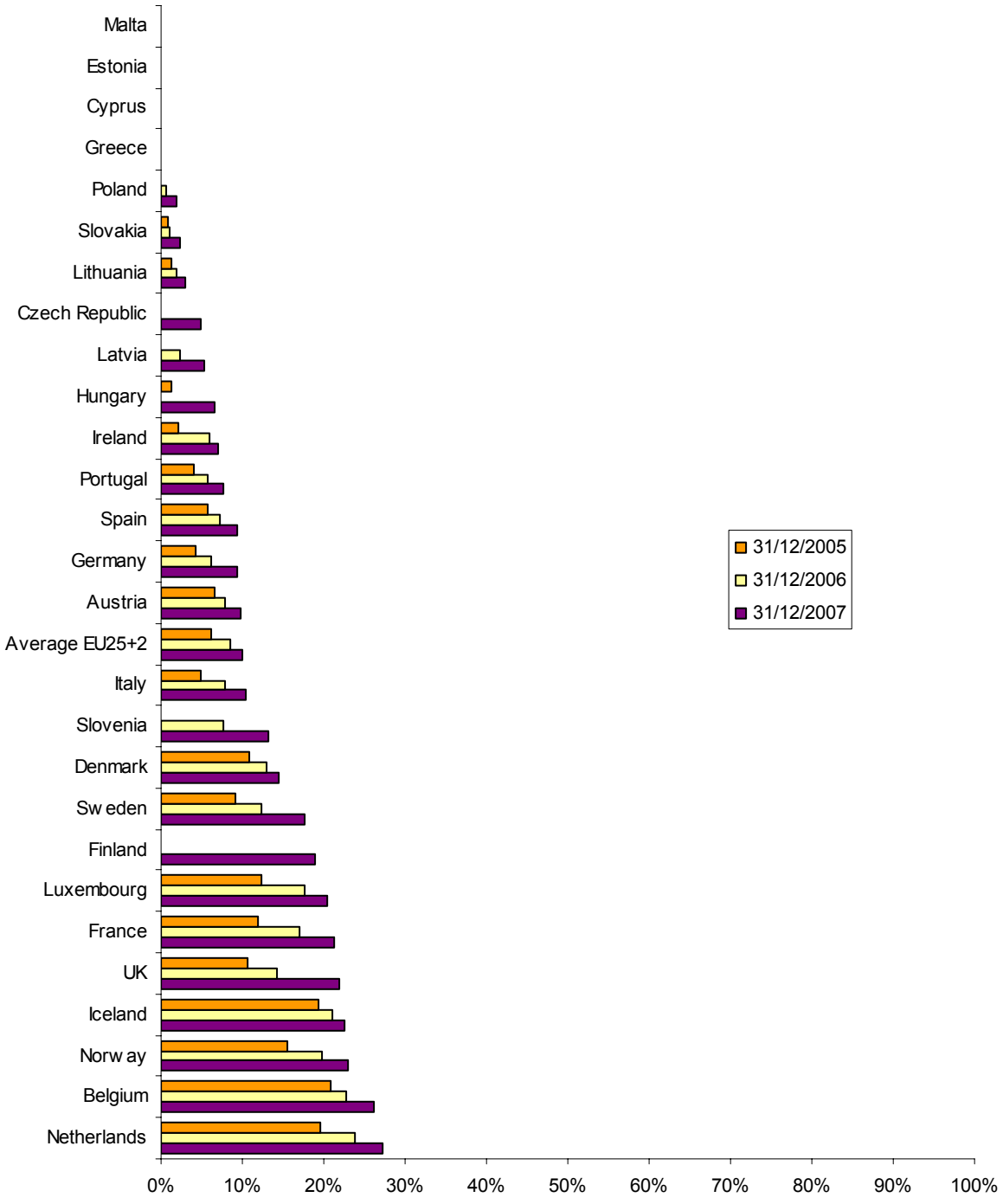
DSL is the dominant technology, accounting for more than 80% of broadband connections, on average, in the EU-25 + 2. It now leads in all countries. In Estonia, Lithuania and in the Czech Republic however, DSL connections account for less than 50% of total broadband connections.

Figure 30: National broadband penetration



The Netherlands and Denmark rank number one overall in terms of broadband penetration in the EU-25 + 2, with a penetration rate over 36% for both at the end of 2007. Slovakia and Greece remain the least advanced countries in the region with a broadband penetration rate of less than 10% at the end of 2007.

Figure 31: Rural broadband penetration (DSL + cable modem)

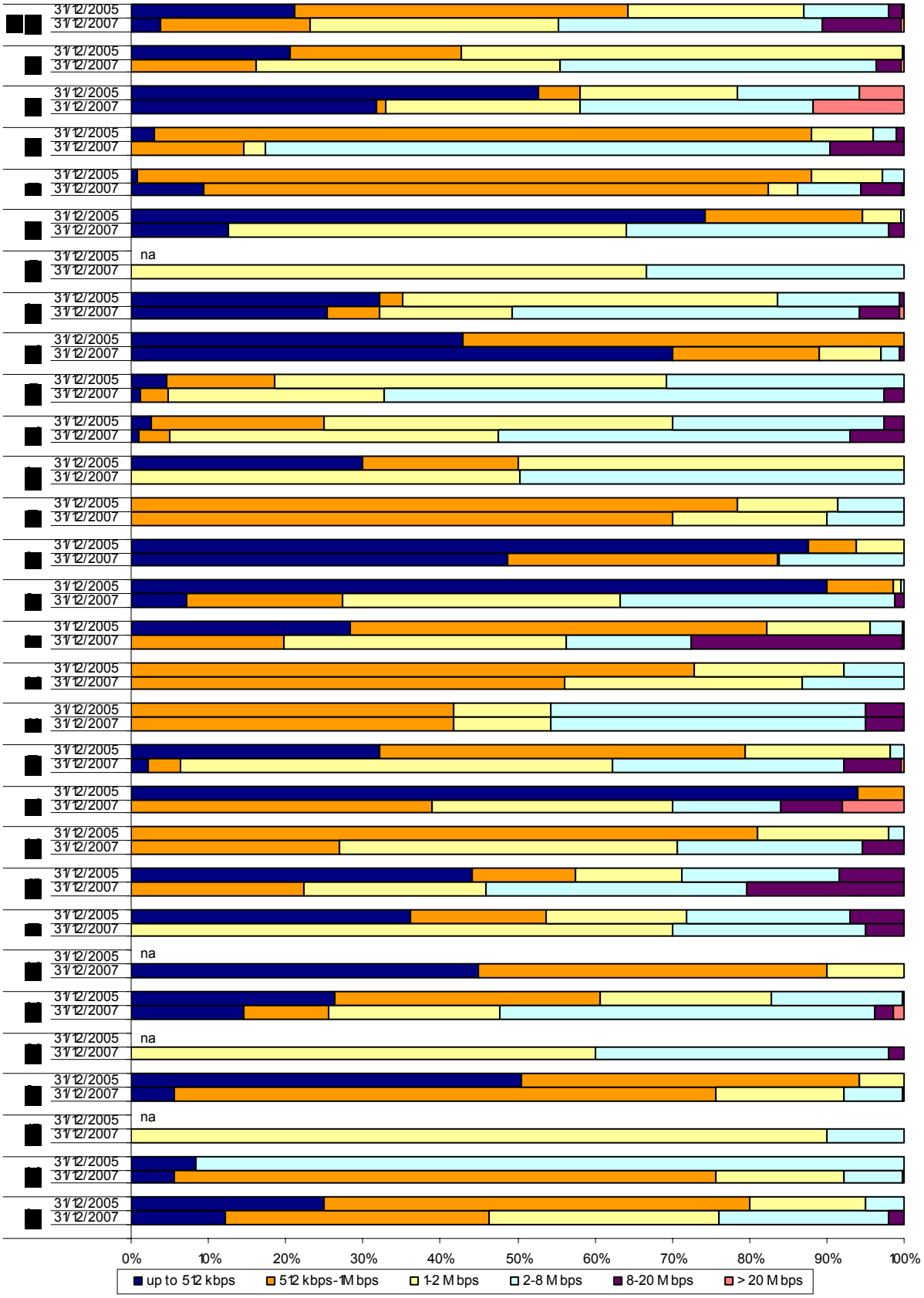


Broadband penetration in rural areas is generally lower than national levels (10% on average in rural areas, compared to more than 20% at national levels), due primarily to lower coverage rates in those areas.

* Average calculation is weighted based on populations living in rural areas in the different countries.

3.2.3. Download rates

Figure 32: National DSL download rate segmentation (Dec. 2005-Dec. 2007)



* calculated on the basis of countries for which detailed information is available

On average, the share of DSL subscribers with download speeds “up to 1 Mbps” decreased by 41 points between the end of 2005 and the end of 2007, from 64% to just over 23%. In the meantime, the share of subscribers with download speeds “over 2 Mbps” grew from 13% to close to 45%.

One could observe a similar trend, at various levels, in all countries except in Slovenia. In that country however, in a similar fashion to other countries, the number of DSL subscribers in the entry category grew less than the next category up: the "up to 512 kbps" range only increased by + 22,283 while the "512k-1 Mbps" range increased by +67,764.

Figure 33: National DSL download rate segmentation (Dec. 2007)

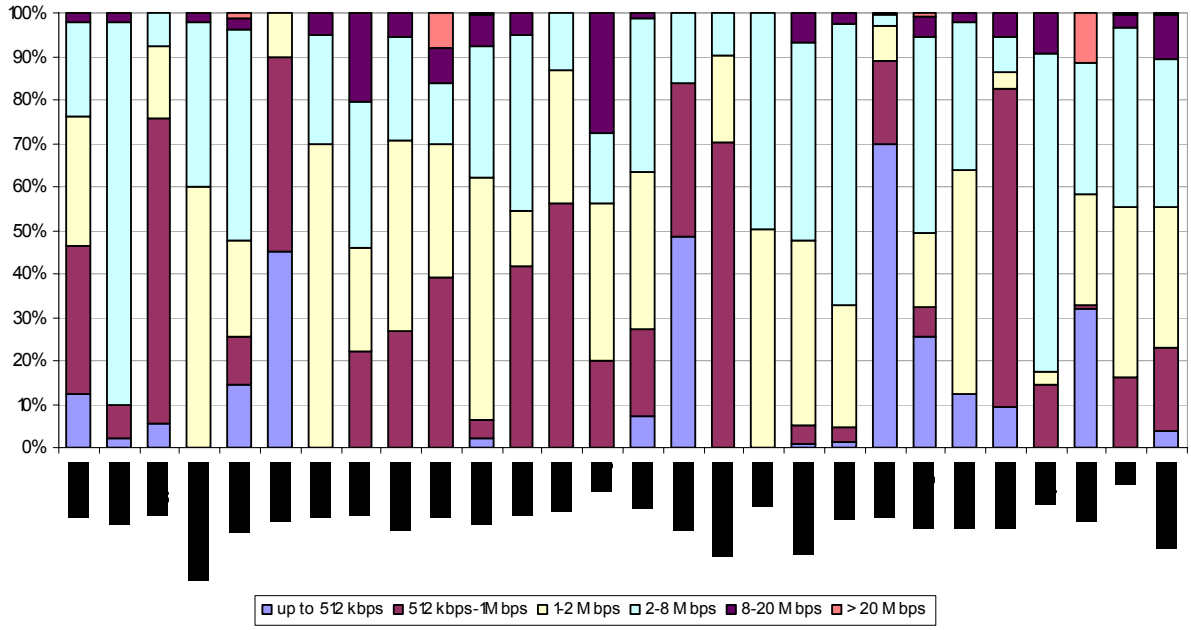
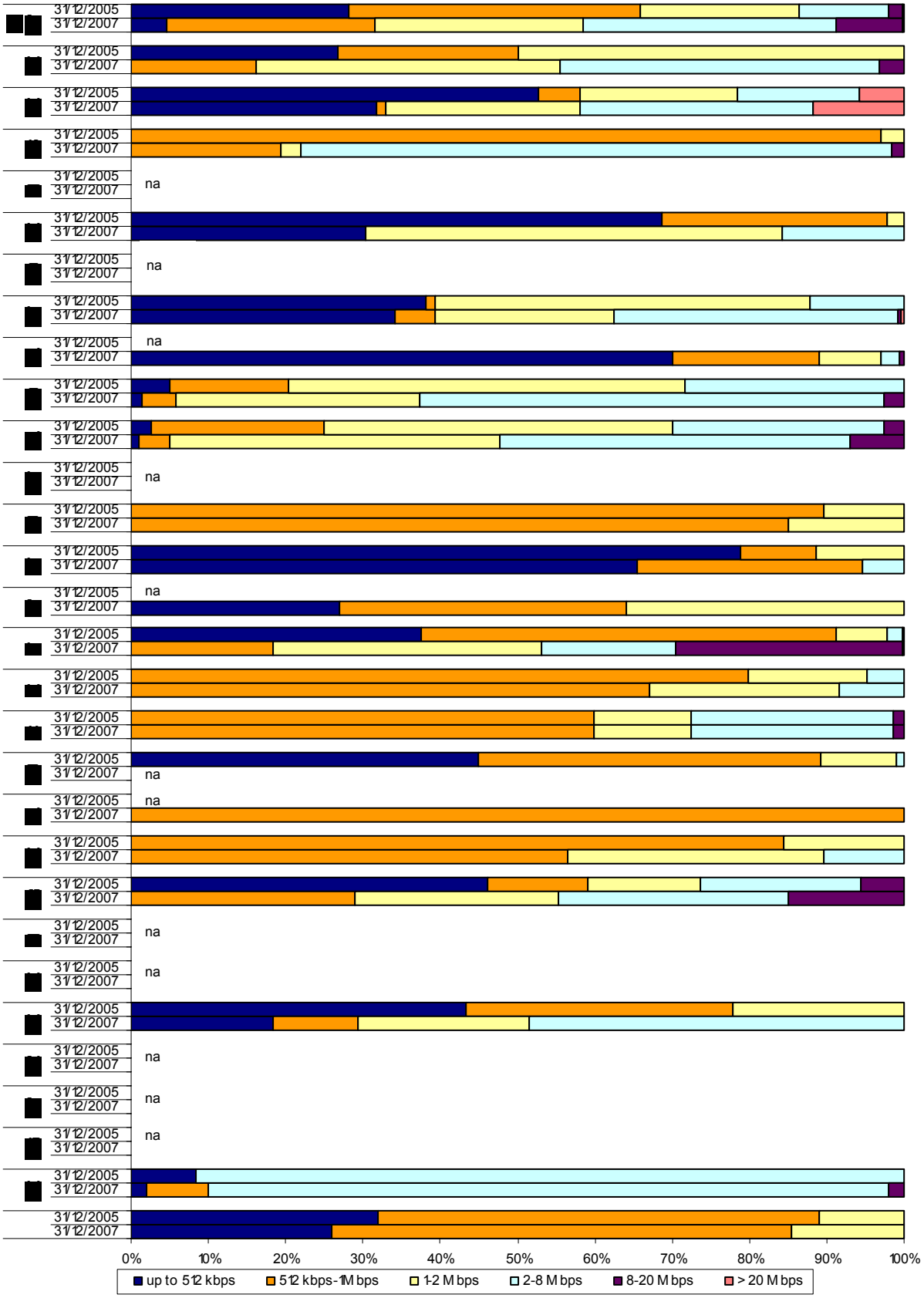


Figure 34: Rural DSL download rate segmentation (Dec. 2005-Dec. 2007)

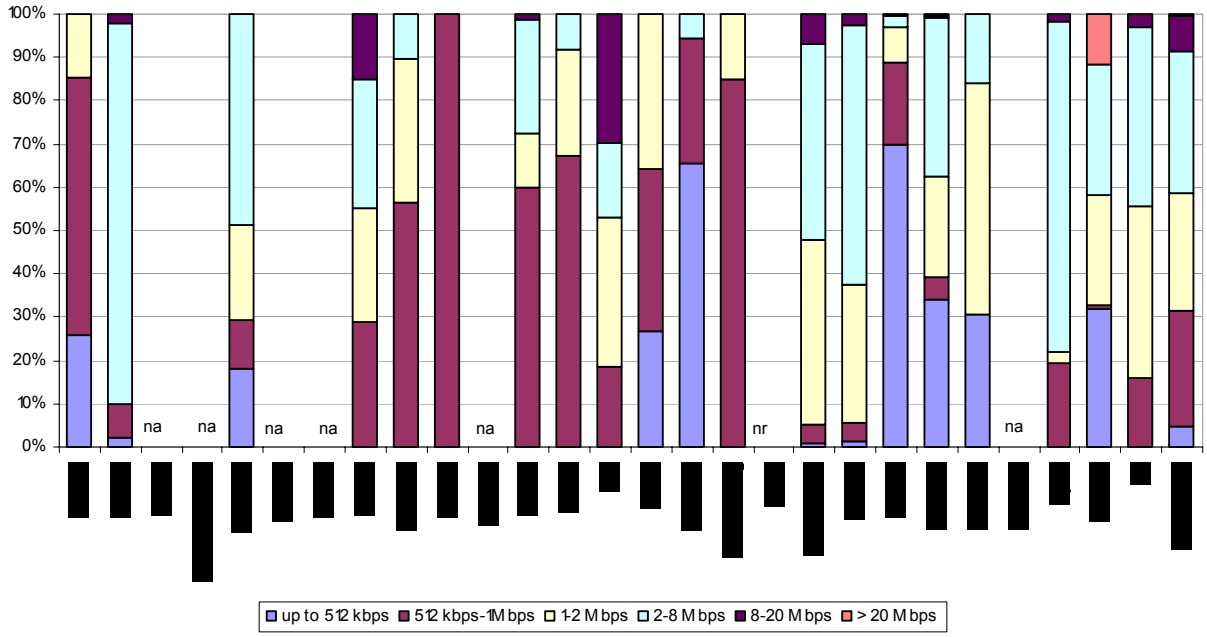


* calculated on the basis of countries for which detailed information is available

On average, the share of DSL subscribers in rural areas with download speeds “up to 1 Mbps” decreased by 34 points between the end of 2005 and the end of 2007, from 66% to just over 32%. In the meantime, the share of subscribers with download speeds “over 2 Mbps” grew from 14% to close to 42%.

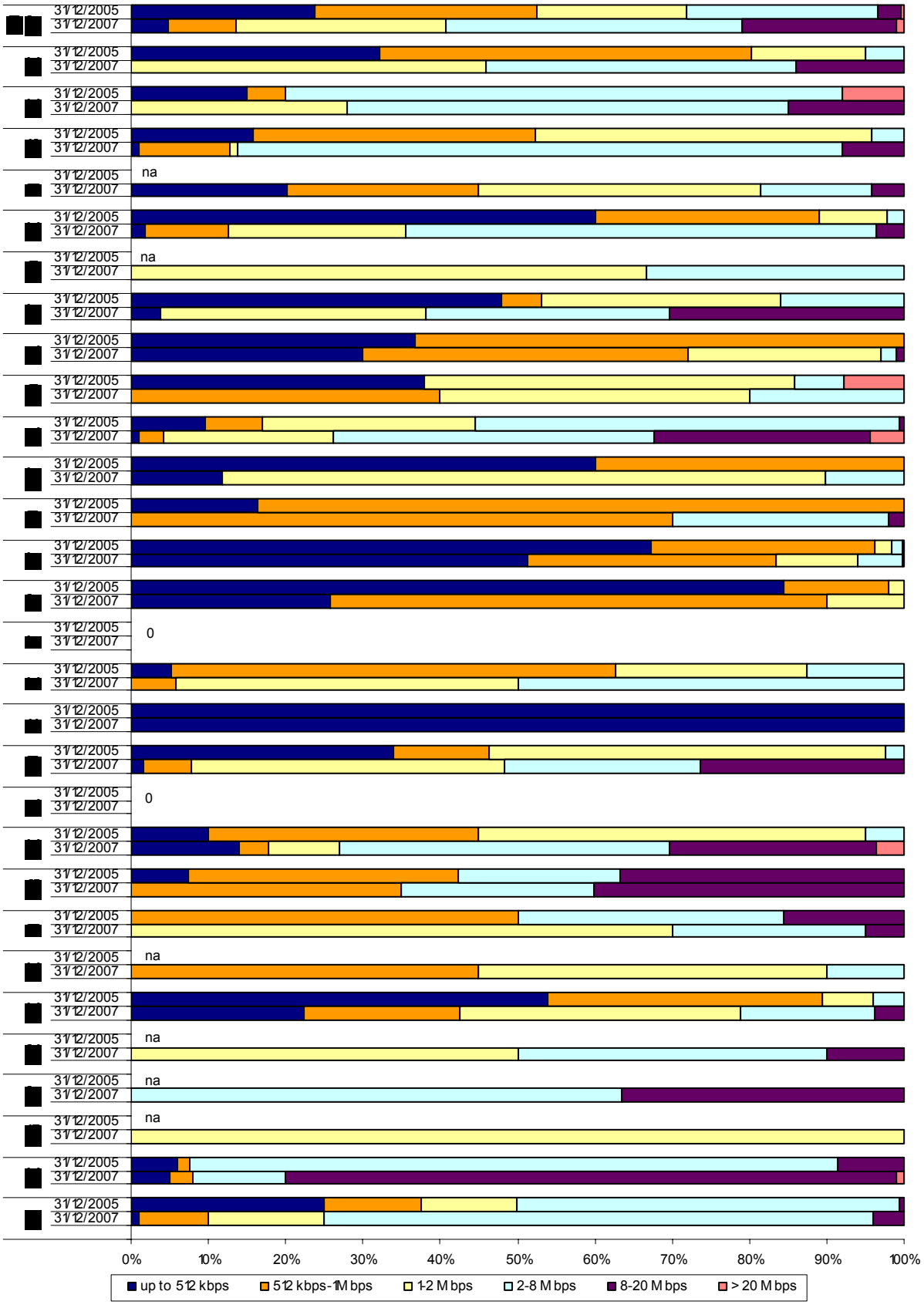
In some countries, such as Italy or Spain, upgrades in download speeds in rural areas have been more significant, with the share of "over 2 Mbps" connections gaining 45 points in the former and climbing from 0 to 78% in the latter[3].

Figure 35: Rural DSL download rate segmentation (Dec. 2007)



[3] However, this refers to marketed speeds (actual speeds can be significantly lower)

Figure 36: National cable modem download rate segmentation (Dec. 2005-Dec. 2007)



* calculated on the basis of countries for which detailed information is available

On average, the share of cable modem subscribers with download speeds “up to 1 Mbps” decreased by 39 points between the end of 2005 and the end of 2007, from 52.5% to below 14%. In the meantime, the share of subscribers with download speeds “over 2 Mbps” grew from 28% to 59%.

At national level upgrade in speeds was particularly remarkable in the UK (download speeds of "over 2 Mbps" climbing from 5% to 54% in the 2-year period), in Belgium and, to a lesser extent, in Spain.

Figure 37: National cable modem download rate segmentation (Dec. 2007)

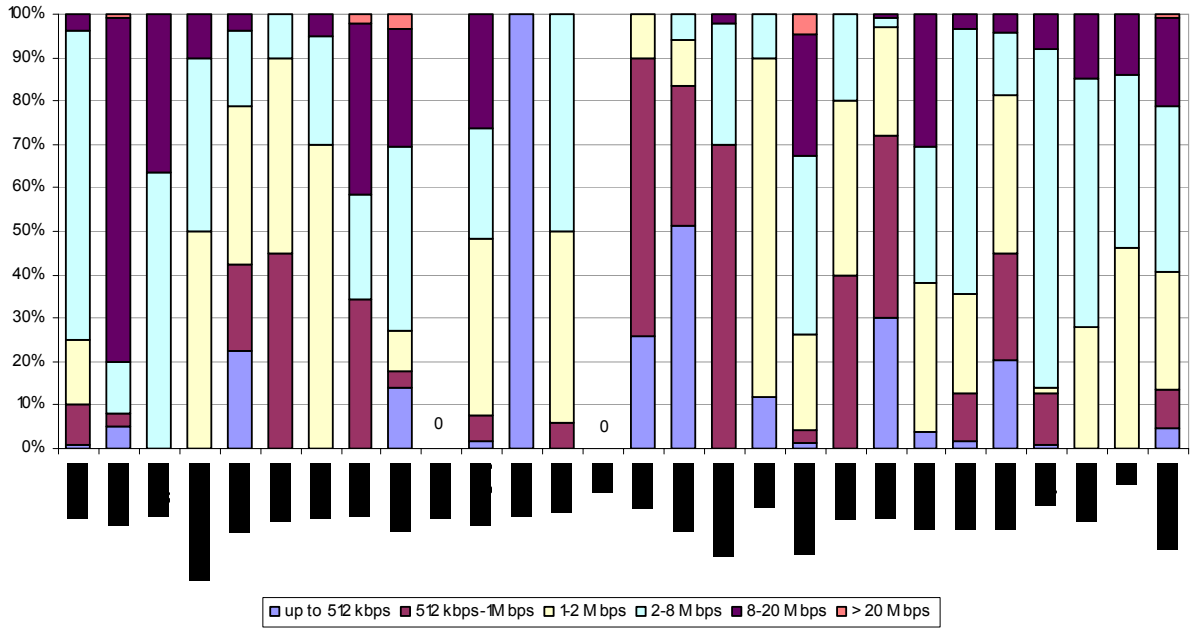
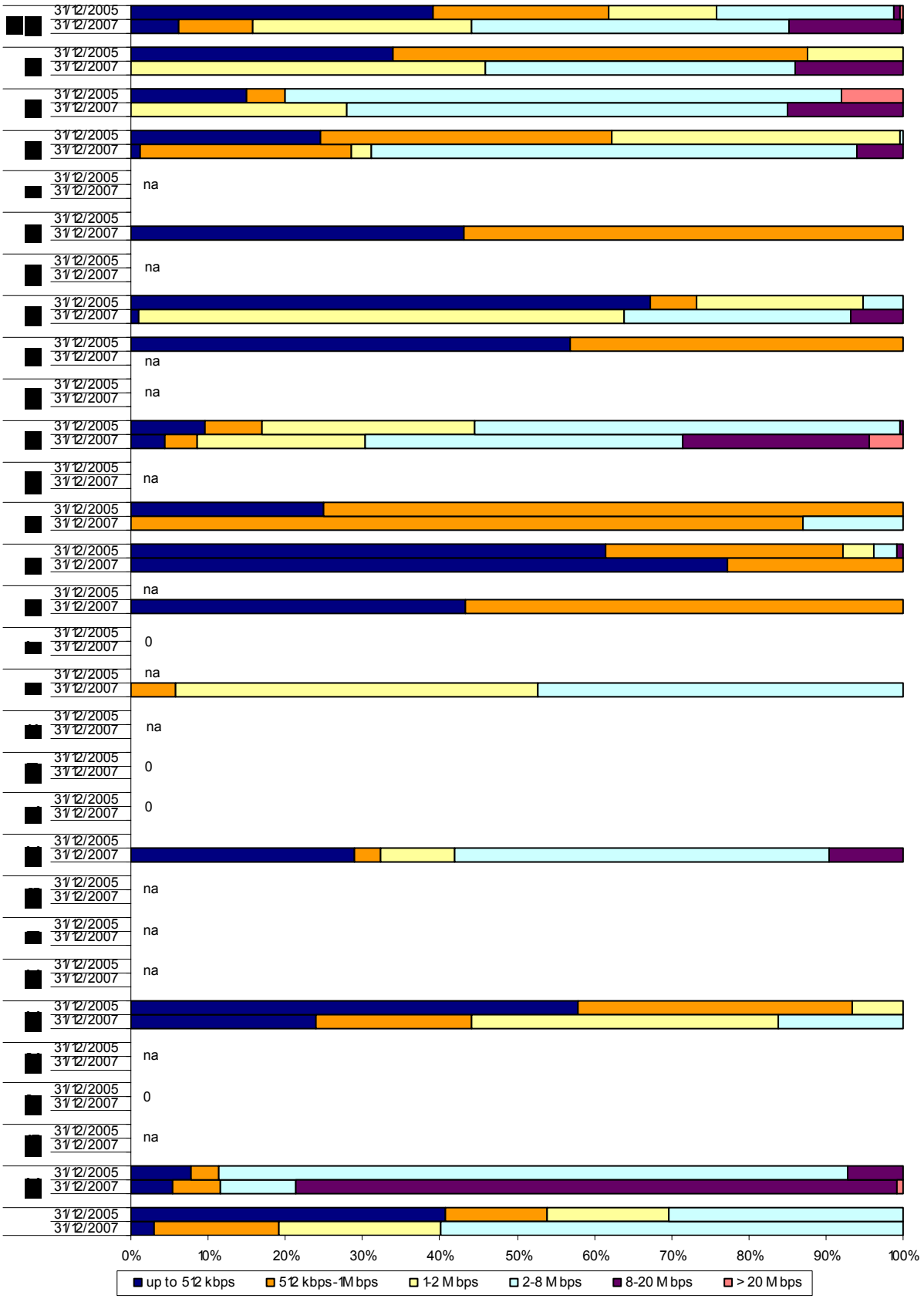


Figure 38: Rural cable modem download rate segmentation (Dec. 2005-Dec. 2007)

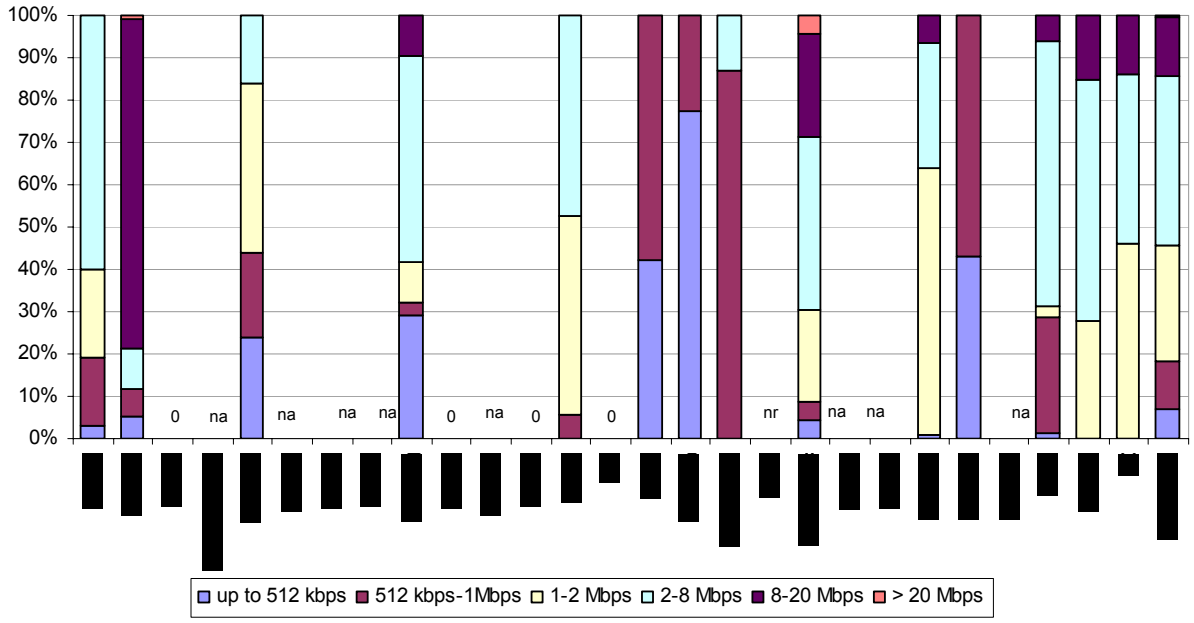


* calculated on the basis of countries for which detailed information is available

On average, the share of cable modem subscribers with download speeds “up to 1 Mbps” decreased by 46 points between the end of 2005 and the end of 2007, from 62% to 16%. In the meantime, the share of subscribers with download speeds “over 2 Mbps” grew from 24% to 56%.

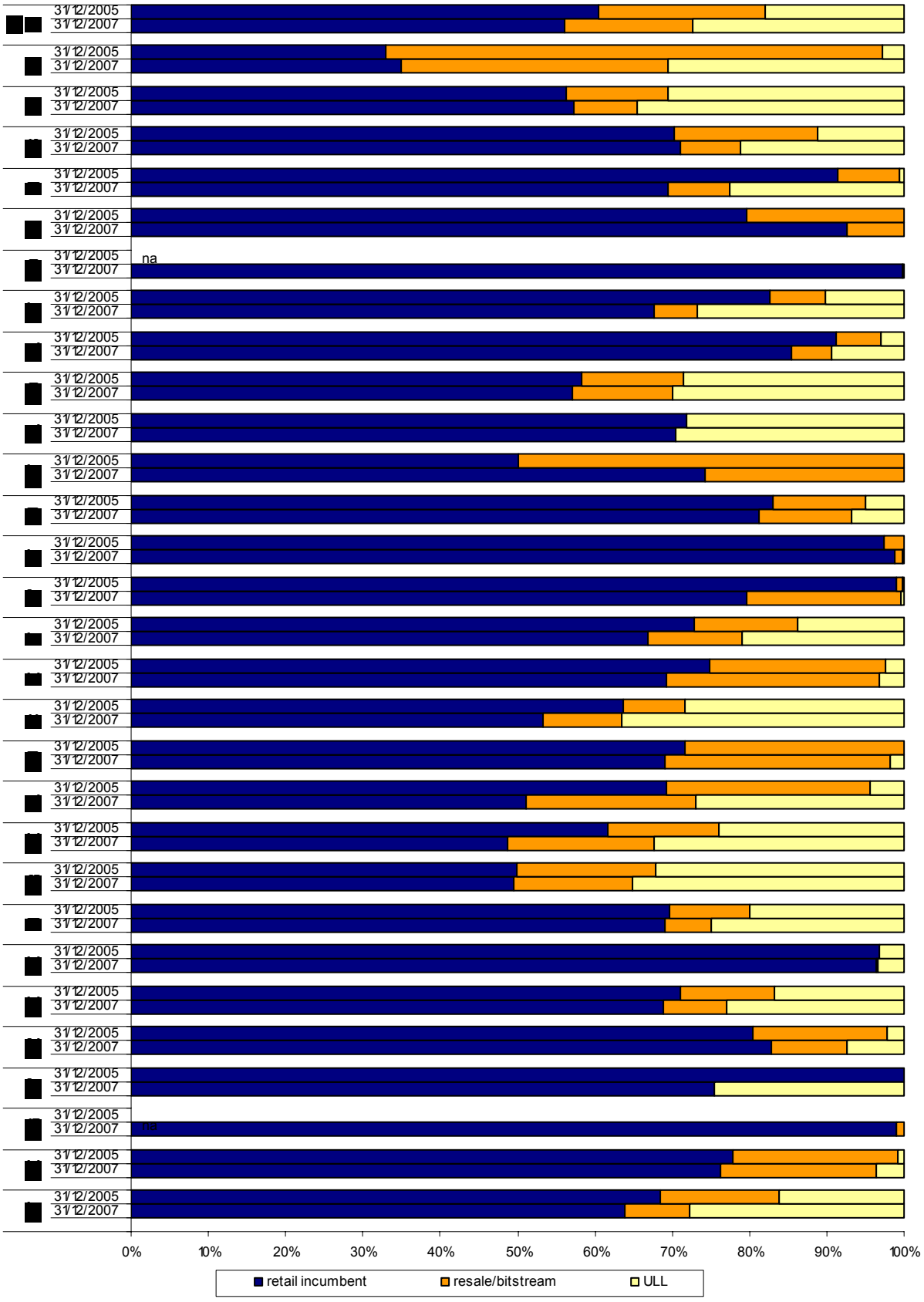
In similar fashion to what was observed at national levels, in the rural areas upgrade was particularly significant in the UK (download speeds of "over 2 Mbps" climbing from 5% to 54% in the 2-year period) and in Belgium.

Figure 39: Rural cable modem download rate segmentation (Dec. 2007)



3.2.4. Origin of DSL connections

Figure 40: National DSL market share (Dec. 31 2005-Dec. 31 2007)



The share of retail DSL lines provided by incumbent operators has generally declined over the past 2-year period: on average, it has decreased from 60% to just over 56%. The decline was particularly significant in Cyprus, in Latvia, in Portugal, in Slovenia as well as in Germany. However an opposite trend took place in the Czech Republic, in Latvia, in Slovakia, in Spain, in Sweden and in the UK where the incumbent operators gained some market shares in the DSL retail market.

LLU (local loop unbundling) increased by close to 10 points (from 18% at the end of 2005) to more than 27% at the end of 2007) in the same period, with spectacular progress in Cyprus, in Slovenia, in the UK, and, to a lesser extent, in Portugal.

Figure 41: National DSL market share as of Dec. 31 2007

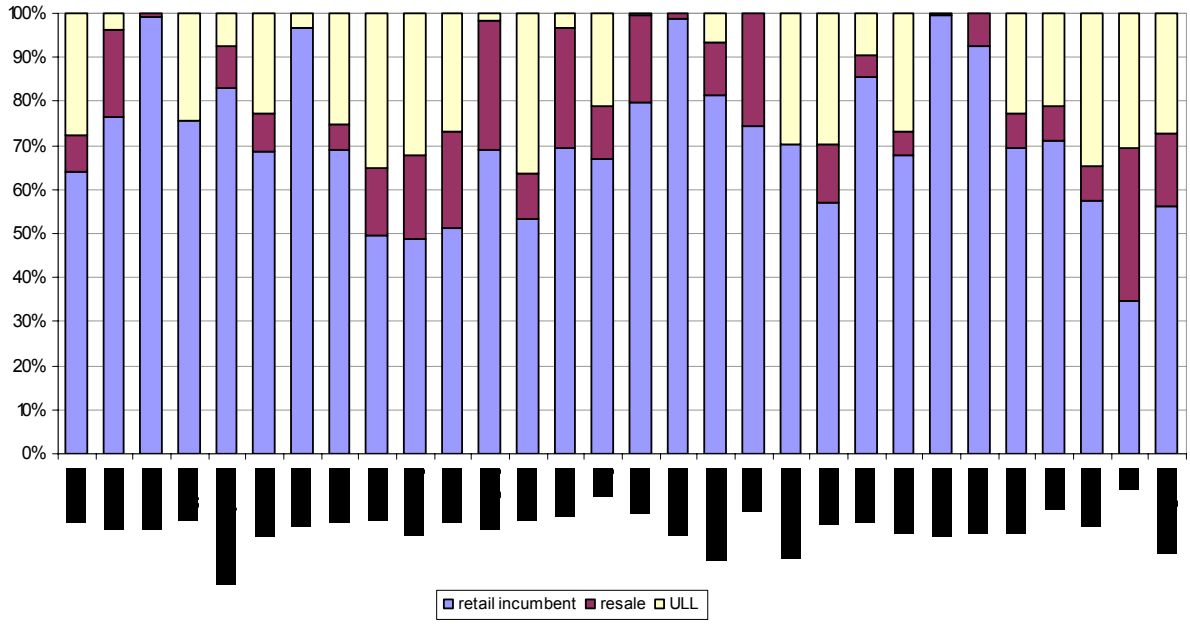
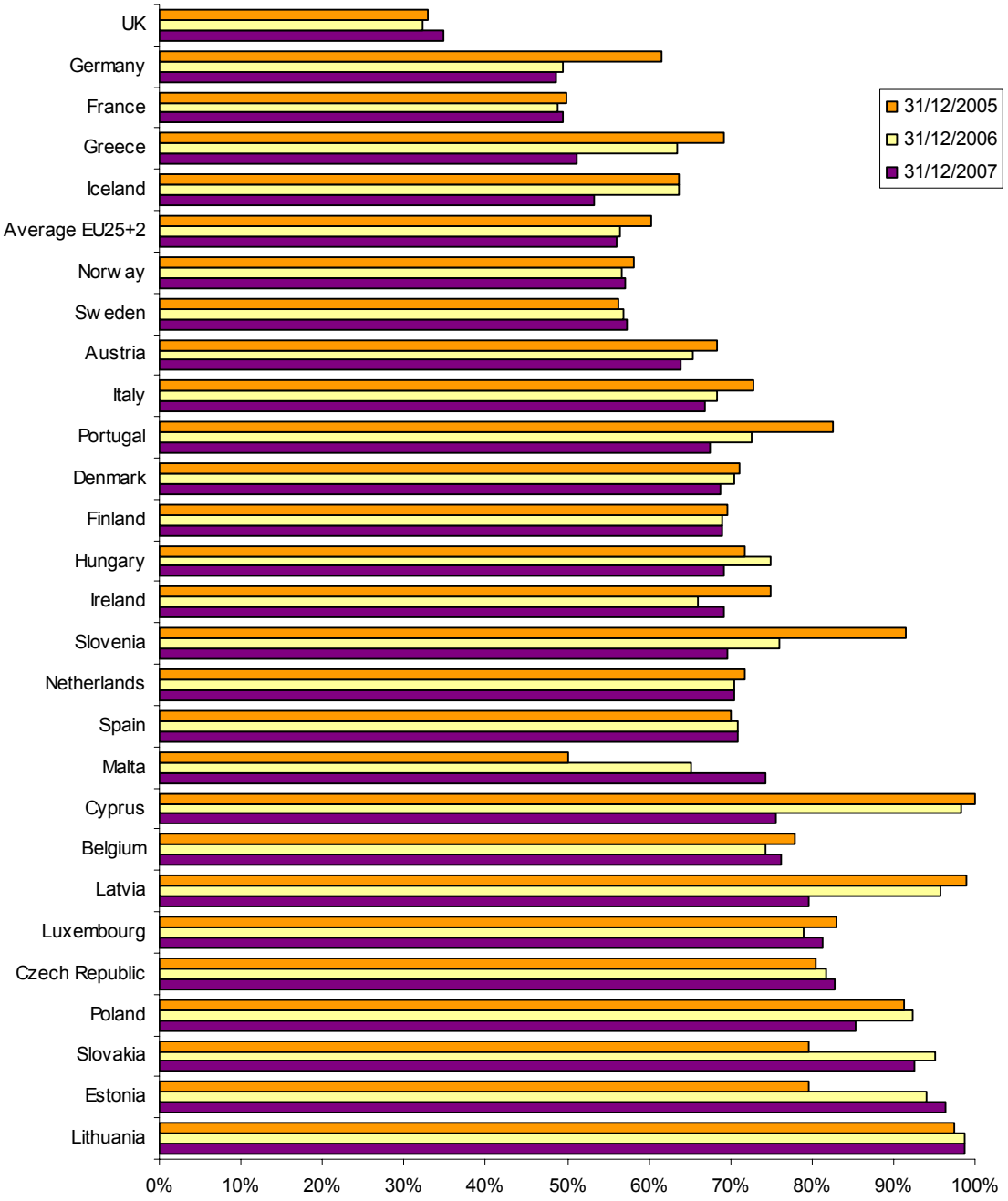


Figure 42: Incumbent carrier national DSL market share



On the whole, incumbent telcos' market share has been declining gradually. In recent times, the trend was particularly pronounced in Germany – dropping from 62% at the end of 2005 (and from 83% at the end of 2004) to 49% at the end of 2007 – in Greece (from 69% to 51%), in Portugal (from 83% to 68%), in Slovenia (from 91% to 70%) and in Cyprus (from 100% to 76%).

In several cases, incumbent telcos have gained market share from one year to the next following their marketing repositioning (new offers, new tariffs, etc.) such as BT in the UK in 2007, TeliaSonera in Sweden in 2006 and 2007, the same trend also appeared in France, Norway, Ireland, Malta, Belgium, Luxembourg, the Czech Republic and Estonia, all of which took place during 2007.

4. Country profiles

4.1. Austria

4.1.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	2 ,787,384	2 ,030,778	3 ,214,764	8 ,032,926
Share of total population	34.7%	25.3%	40.0%	100.0%

4.1.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	86%	86%	86%	91%	92%
DSL subscribers	319,000	442,200	684,600	874,000	1,040,000
DSL penetration (% of population)	3.9%	5.4%	8.3%	10.6%	12.9%
Cable modem coverage (% population)	31%	31%	31%	36%	39%
Cable modem subscribers	327,000	340,000	471,681	565,000	605,000
Cable modem penetration (% population)	4.0%	4.1%	5.7%	6.8%	7.5%
FTTx subscribers	800	1,100	2,200	3,000	5,000
PLC subscribers	1,500	4,200	5,000	5,300	5,800
WLL subscribers	0	7,100	14,900	20,100	45,000
Satellite subscribers	2,000	2,400	3,000	3,000	1,000
Total	650,300	797,000	1,181,381	1,470,400	1,701,800
Total penetration (% population)	8.0%	9.8%	14.7%	17.8%	21.2%

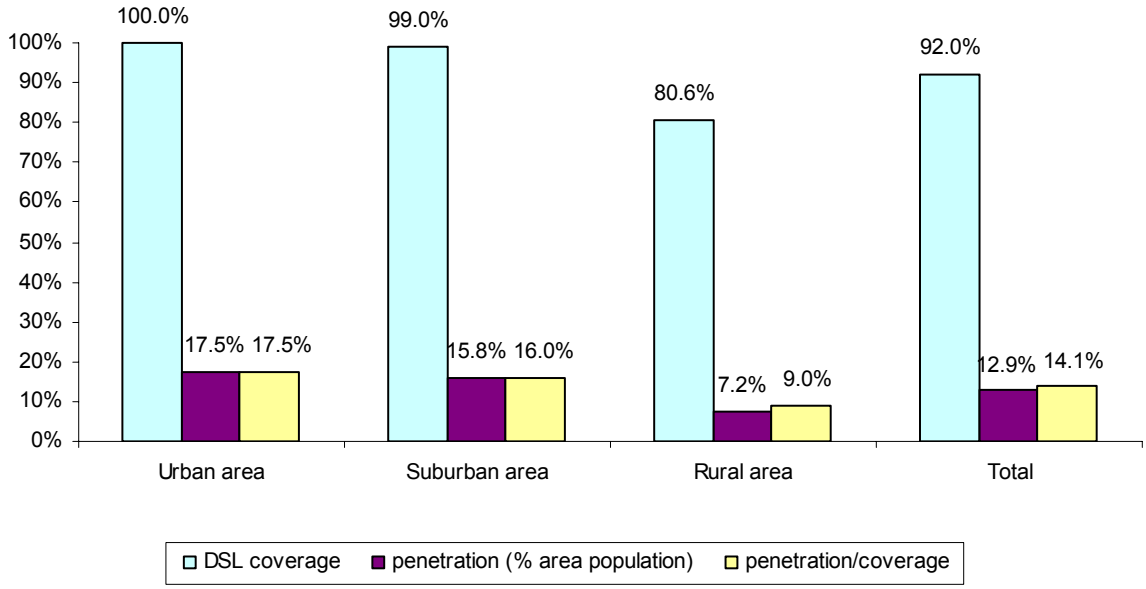
The broadband subscriber base increased by 19% in 2007 and penetration reached 21.2%, which is one point above the EU-27 average.

With 166,000 new DSL subscribers, compared to roughly 40,000 new cable modem subscribers, DSL further increased the lead it established in 2004, 2005 and 2006 in Austria, where cable had been the leading technology until 2003 – with DSL accounting for more than 60% of broadband connections at the end of 2007. Other technologies remain relatively marginal, except for WLL which has a subscriber base of 45,000, either via Wi-Fi or WiMAX. The market for triple play bundles and IPTV services in Austria continues to grow.

The incumbent carrier, Telekom Austria, still retains two thirds of the DSL retail customer base or 39% of the total broadband subscriber base. UPC Telekabel, the leading cable operator, ranks second with a 26% market share.

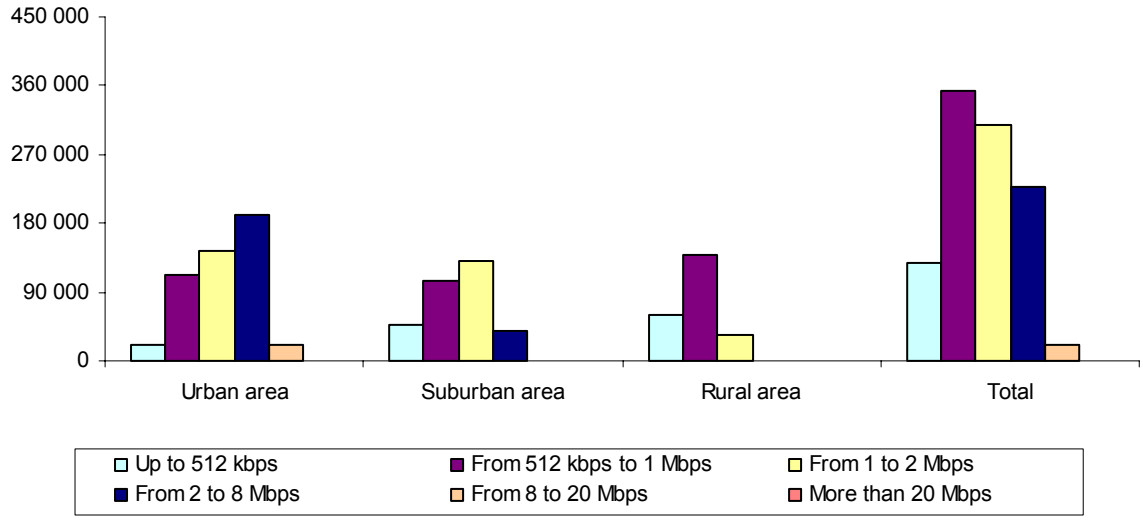
4.1.3. DSL coverage and take-up

Coverage and penetration



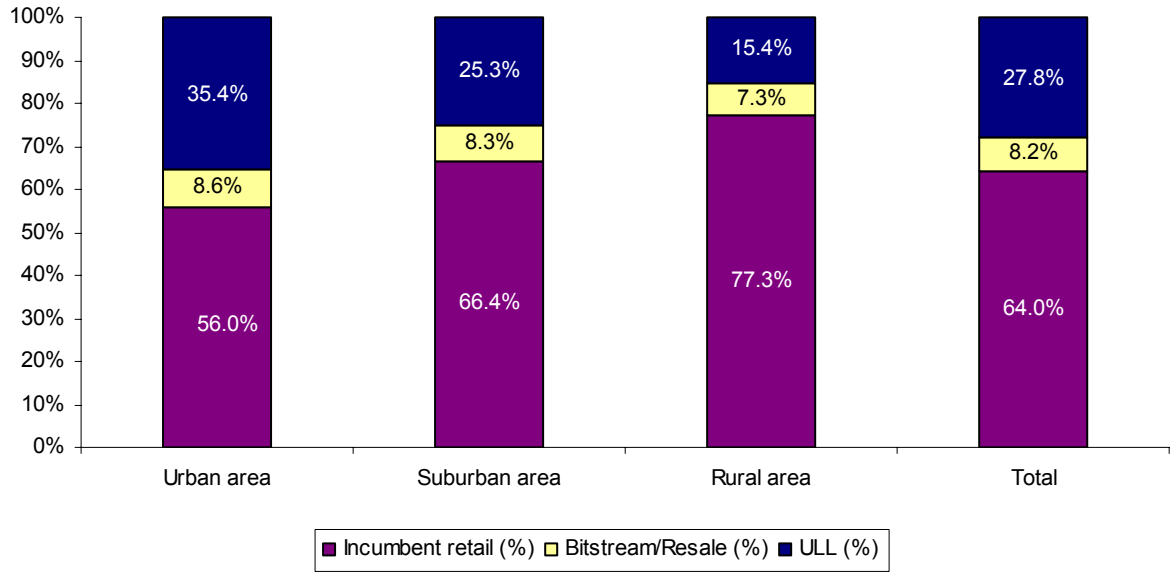
DSL coverage is virtually complete in urban and suburban areas, which is not the case in rural areas which account for 40% of the population. DSL penetration increased from 10.6% to 12.9% in 2007.

Number of DSL connections by download rate



Download rates for DSL services ranging between 512 Kbps and 1 Mbps still make up a significant portion of the base, representing more than a third of DSL connections, while the share of connections up to 512 kbps has decreased and accounted for only 12% of the base at the end of 2007. As a growing number of providers offer faster connections at reasonable prices, more and more customers are upgrading. As a result, connections of over 1 Mbps now account for more than 50% of the market.

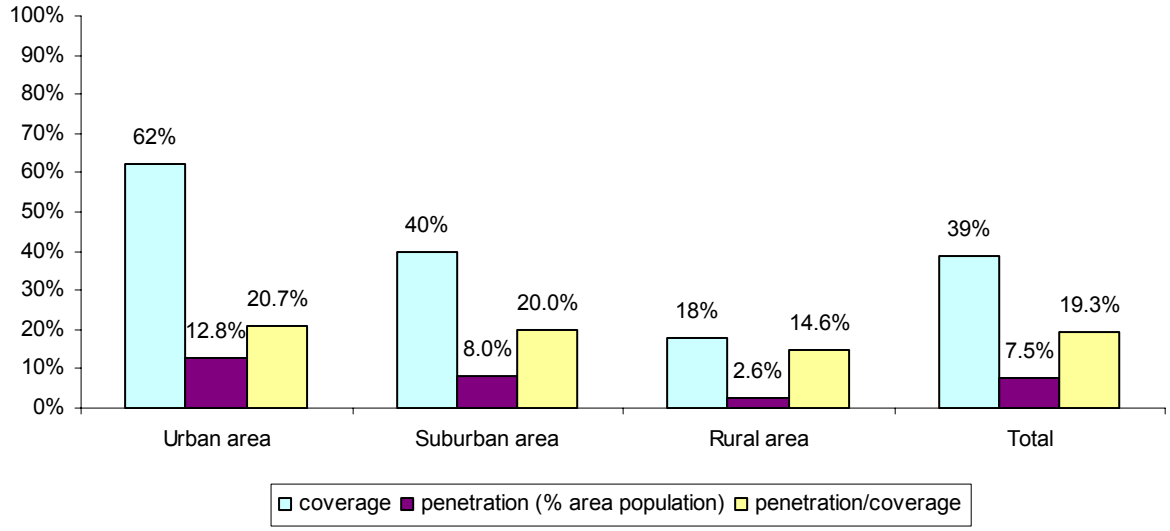
Percentage of DSL connections by type of provider



Unbundled local loop (ULL) connections increased significantly again last year, and now account for more than 27.8% of total DSL connections (2006: 20.7%; 2005: 16.1%). The share of connections based on wholesale offers decreased sharply to 8.2% (from 15.5%). Telekom Austria, Austria's incumbent telco, also lost a portion of its retail market share but still accounts for 64% of DSL connections.

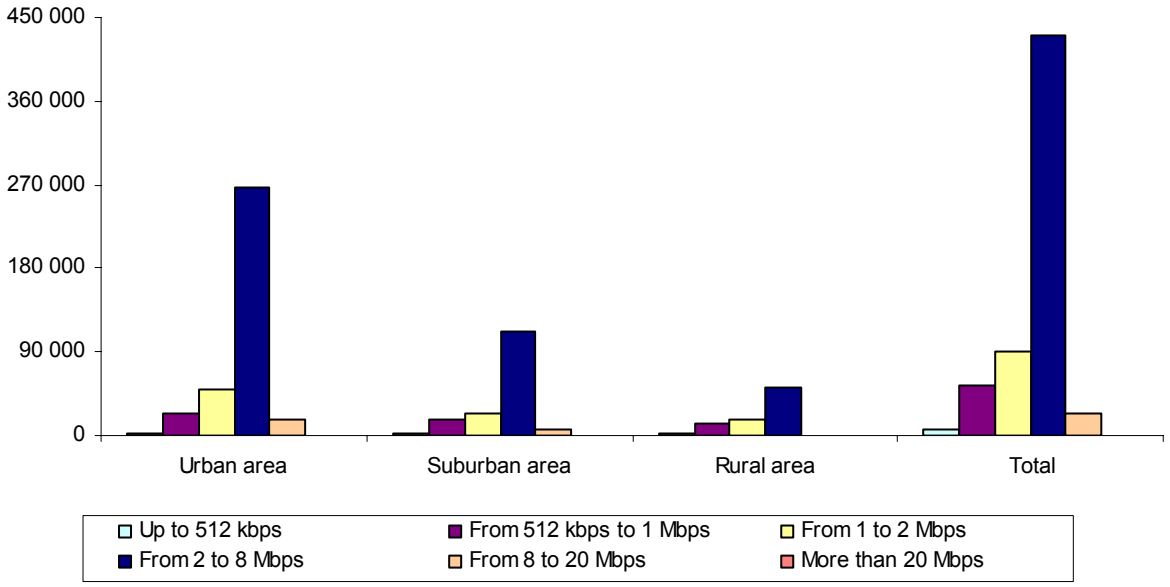
4.1.4. Cable modem coverage and take-up

Coverage and penetration



The decline in cable modem growth continued through 2007. Although DSL growth also tapered off, broadband cable was unable to keep pace with the rise of DSL. Most of Austria's 200+ local cable operators provide broadband Internet access in a market dominated by UPC with an over 66% share.

Number of cable modem connections by download rate



Cable modem services in Austria offer significantly higher download rates than DSL services.

On average, three quarters of cable modem customers subscribe to offers running at 2 Mbps+ (from 60% in rural areas to 80% in urban areas)

4.1.5. Other broadband access technologies

FTTx

In 2006, the city of Vienna announced a very ambitious municipal FTTH rollout. After the first rollout phase, which started in mid-2006, 50,000 homes will be passed by the end of 2009.

Vienna plans to cover all 960,000 households and 70,000 business premises with FTTH ultra-broadband connections over a period of 10 to 15 years. Initially the service will offer download rates of 100 Mbps, and later 1 Gbps. At the end of 2007, around 5,000 households in Austria were using FTTH.

PLC

The only remaining provider of commercial powerline services in Austria is Linz AG, a regional company serving the Linz region. Other operators stopped marketing their PLC services. At the end of 2007 Linz AG had a customer base of roughly 5,800 (2006: 5,300; 2004: 5,000) and covered 70,000 households. Linz AG is Europe's biggest PLC provider and has a leading position in the Open PLC European Alliance (OPERA) which is a PLC research project within the European initiative "Broadband for all" supported by the EU.

Wi-Fi

Official statistics on PWLAN hotspots are not available, nor is any information on the number of users.

However, Austria used to be one of the few European countries with a relatively well-developed public Wi-Fi market.

This could change as ONE, the Austrian mobile operator that used to run more than 600 of the estimated 1,000+ hotspots, announced in 2006 that it would be closing down its hotspots due to low usage and thus low revenue, after it had already announced an end to future deployments in 2005.

WLL/WiMAX

By the end of 2007, 45,000 fixed wireless connections had been set up, compared to 21,000 at the end of 2006 and 14,700 at the end of 2005.

According to Telekom Austria further WiMAX investments have been stopped. UMTS, HSDPA and landlines will be the basis for further technological innovations. Additionally WiMAX has triggered unintended internal competition with its subsidiary Mobilkom Austria AG.

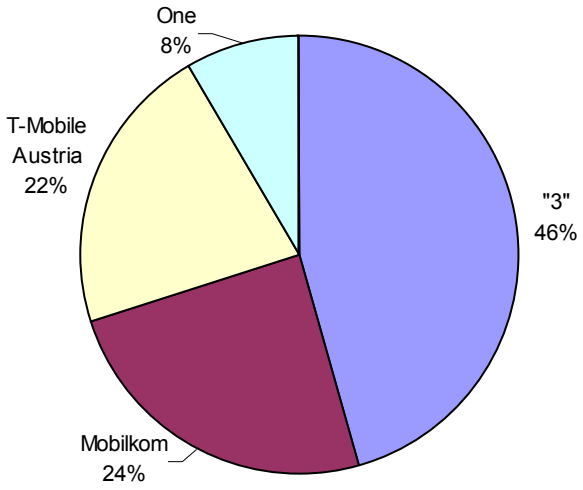
Satellite

Internet via satellite is offered by several players and its footprint extends into neighbouring countries - of which SES Astra is the largest provider in Austria. The total number of satellite subscribers at the end of 2006 was estimated at around 3,000 and decreased in 2007 to approximately 1,000.

Cellular

By the end of 2007 there were 1,190,000 UMTS subscribers in Austria, compared to 950,000 at the end of 2006. 97% of the population is covered with either UMTS or EDGE. In 2006, T-Mobile Austria as well as Austria's biggest 3G provider 3 began offering HSDPA services; the latter reached a 90%-coverage with this technology at the end of 2007.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.2. Belgium

4.2.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	5 ,983 ,045	4 ,018 ,020	510 ,335	10 ,511 ,400
Share of total population	56.9%	38.2%	4.9%	100.0%

4.2.2. General broadband data

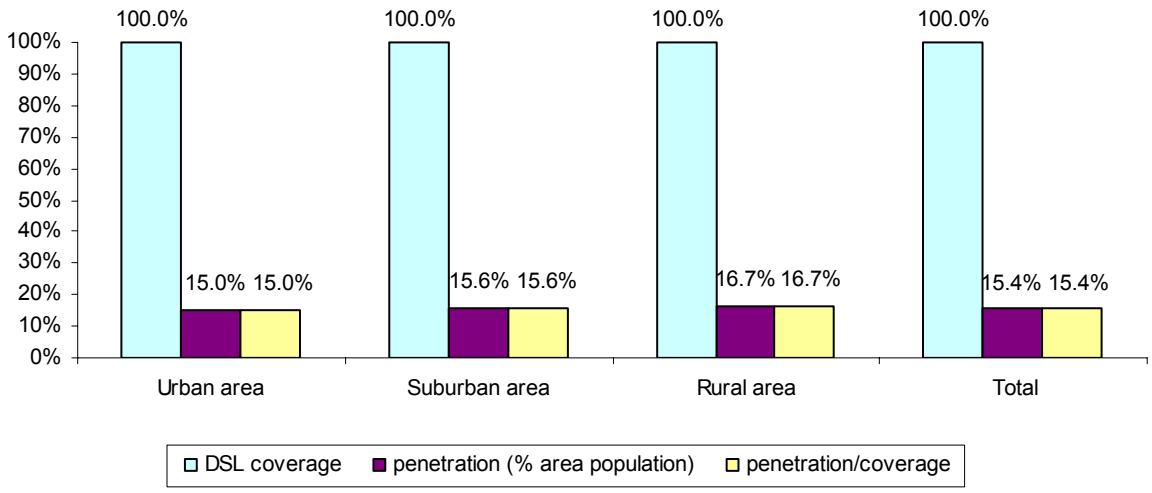
	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	100%	100%	100%	100%	100%
DSL subscribers	782 ,473	1 ,011 ,007	1 ,294 ,362	1 ,516 ,885	1,620,222
DSL penetration (% of population)	7.5%	9.7%	12.4%	14.4%	15.4%
Cable modem coverage (% population)	64%	80%	80%	80%	88%
Cable modem subscribers	481 ,800	690 ,000	699 ,300	900 ,000	1,071,107
Cable modem penetration (% population)	4.6%	6.6%	6.7%	8.6%	10.2%
FTTx subscribers	0	0	0	0	56
PLC subscribers	0	0	0	0	0
WLL subscribers	-	-	3 ,597	5,500	14,313
Satellite subscribers	0	0	0	0	0
Total	1 ,264 ,273	1 ,701 ,007	1 ,997 ,259	2 ,422 ,385	2,705,698
Total penetration (% population)	12.2%	16.3%	19.1%	23.0%	25.7%

Broadband penetration in Belgium increased moderately in 2007 to 25.7%. At the end of the year, it ranked 8th amongst European countries, just below UK and still above France and Germany. Competition between DSL and cable modem is intense and cable gained some market share in 2007. DSL remains the dominant access technology but it accounted for just 60% of the broadband subscriber base at the end of 2007, compared to 62.6% one year before. In the meantime, Belgacom, the incumbent telco, managed to increase its DSL market share to 76.3% while unbundling remains low (3.5% of total DSL lines).

As cable is available in most areas of Belgium, we estimate that 80% of the population have a real choice between at least two alternative broadband access technologies.

4.2.3. DSL coverage and take-up

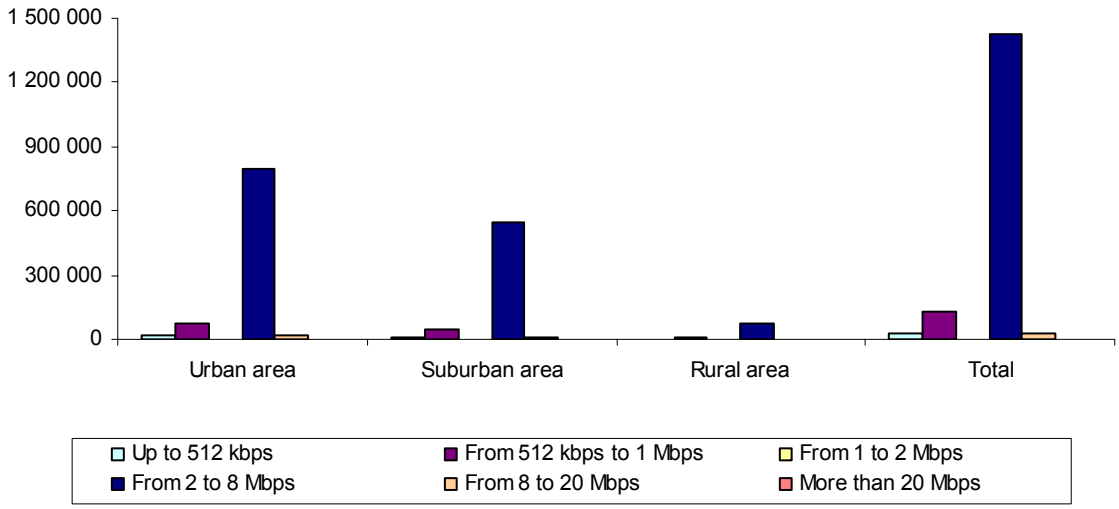
Coverage and penetration



While coverage is very broad, DSL take-up grew at a slow pace in 2007 (+6.8%) gaining only 100,000 new subscribers during the year (compared to close to 300,000 new subscribers in 2005 and 200,000 in 2006).

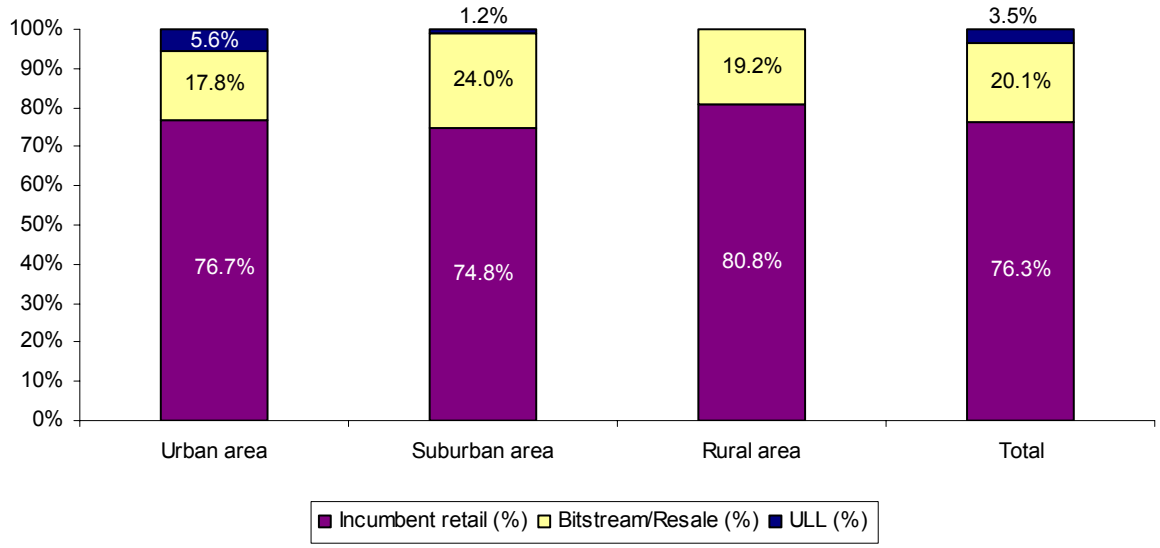
ADSL penetration is still a bit higher in rural areas due to the fact that cable modem is still not available in some (albeit fewer) parts of those territories, especially in Walloon rural areas.

Number of DSL connections by download rate



Most ADSL offers have a downstream speed of 4 Mbps. Some alternative operators launched “light” offers (512 Kbps downstream speed) in early 2004. Belgacom also launched an ADSL Light offer (maximum download speed of 512 Kbps) in May 2004, which became ADSL Time (usage limited to 2 hours per month) when ADSL Light was upgraded to 1 Mbps. These offers enjoyed only limited success, however, as most users subscribe to the 4 Mbps offers (e.g. Belgacom ADSL Go or ADSL Plus) or more, through ADSL2+ and VDSL.

Percentage of DSL connections by type of provider

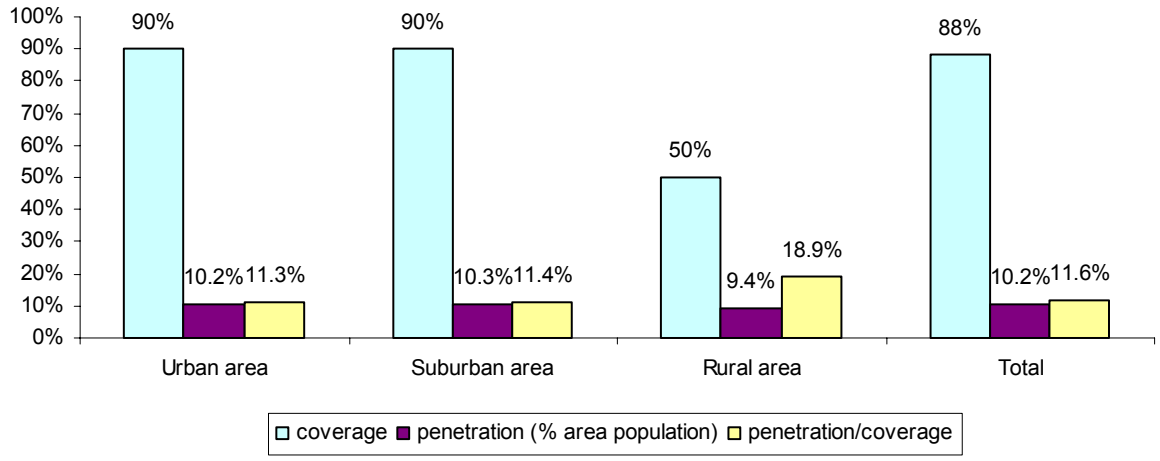


Unbundling remains low in Belgium, accounting for only 3.5% of DSL connections at the end of 2007 (57,517 ULL). The number of DSL connections through bitstream and resale offers decreased by 27,000 during the year (-7.7%)

Meanwhile Belgacom's share of the retail DSL market gained 2 points to 76.3%.

4.2.4. Cable modem coverage and take-up

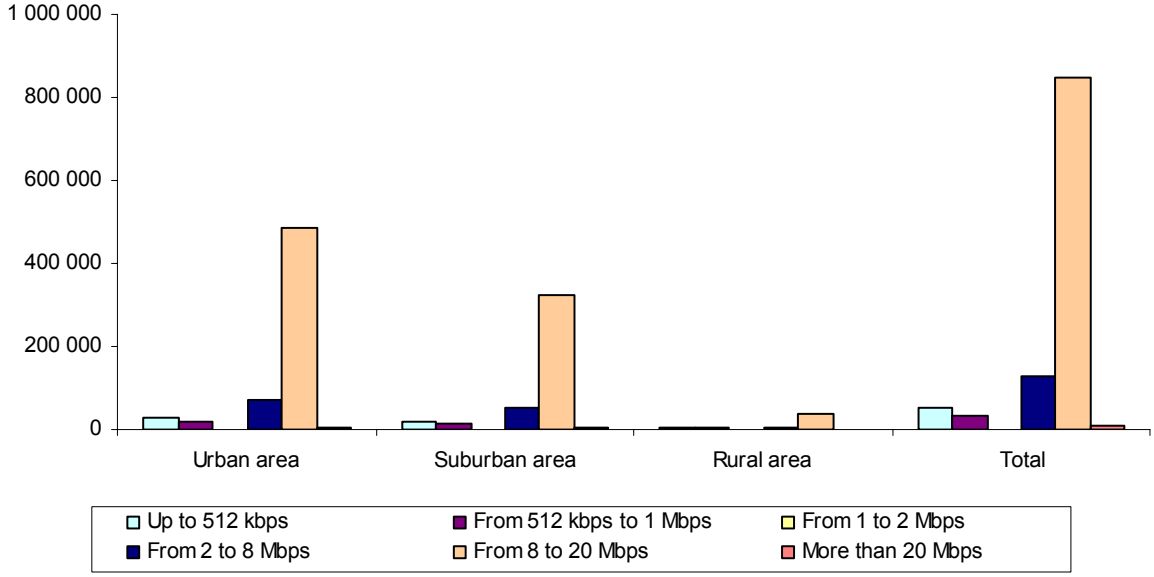
Coverage and penetration



The number of cable modem subscribers grew significantly in 2007 (171,000 new subscribers, +19%), thanks notably to increased coverage in Wallonia.

In late 2006, Telenet merged with UPC Belgium, which were both subsidiaries of Liberty Global. Other major cable operators are Coditel (also operating in Luxembourg) and Brutele.

Number of cable modem connections by download rate



Although "light" offers (with download rates at 1 Mbps) were introduced in the cable market following the launch of DSL "light" offers, most cable modem users subscribe to download rate offers of 10 Mbps to 20 Mbps.

4.2.5. Other broadband access technologies

Wi-Fi

Belgacom provides Wi-Fi services via several hundred hotspots in airports, train stations, hotels, restaurants, museums and parks. Telenet, which took over Sinfilo, signed a deal with Belgian railways and with Mobistar to allow their customers to utilise its Wi-Fi network. It now operates more than 1,000 hotspots across the country.

WLL/WiMAX

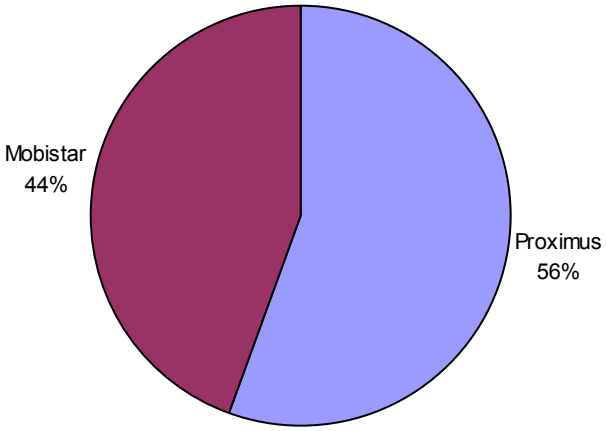
There were over 14,300 WLL subscribers in Belgium at the end of 2007. ClearWire Belgium and Mac Telecom were granted licences in April 2004 to operate in the 3.4-3.6 GHz frequency band; the MET (Walloon region) has a licence to operate in the 24.5-26.5 GHz frequency band (but only in the municipality of Charleroi).

Cellular

The three Belgian cellular operators were awarded 3G licences in 2001 but they all asked for extended timelines to meet their coverage obligations. They began their trials in 2003 and Belgacom/Proximus opened commercial services to business users (data cards for laptops and PDAs) in May 2004, long before offering them to residential users (September 2005). In 2007, Mobistar was very dynamic.

3G/HSDPA coverage reached 80% of population at the end of 2007 and the number of 3G subscribers reached 404,720.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.3. Cyprus

4.3.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	542,900	205,000	37,500	785,400
Share of total population	69.1%	26.1%	4.8%	100.0%

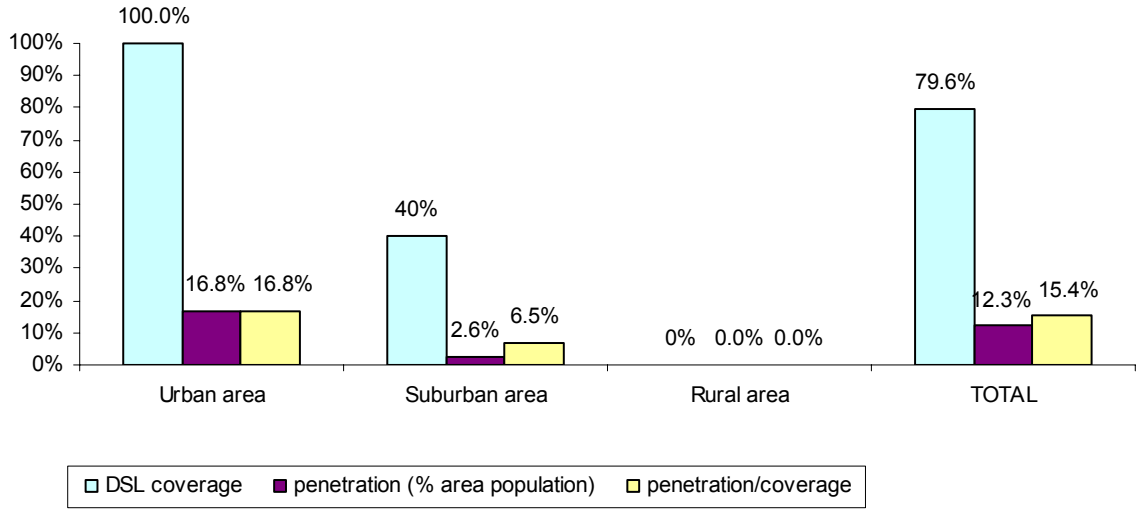
4.3.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	0%	-	70%	70%	80%
DSL subscribers	0	15,760	43,500	60,934	96,335
DSL penetration (% of population)	0.0%	2.0%	5.6%	7.8%	12.3%
Cable modem coverage (% population)	0%	0%	0%	-	28%
Cable modem subscribers	0	0	0	314	718
Cable modem penetration (% population)	0.0%	0.0%	0.0%	0.0%	0.1%
FTTx subscribers	0	0	0	-	100
PLC subscribers	0	0	0	-	-
WLL subscribers	0	0	0	-	-
Satellite subscribers	0	0	0	0	50
Total	0	15,760	43,500	63,702	97,153
Total penetration (% population)	0.0%	2.0%	5.6%	8.1%	12.4%

As we can see from the above tables, the majority of the population in Cyprus is located to urban and suburban areas. Due to the limitations of the network infrastructure, DSL and cable connection services are provided in urban and suburban areas only.

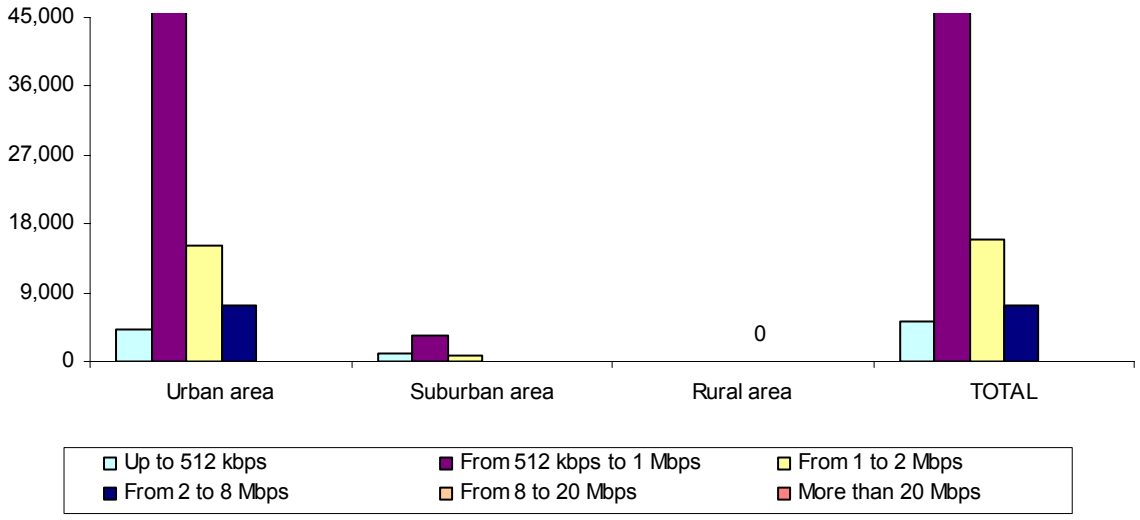
4.3.3. DSL coverage and take-up

Coverage and penetration



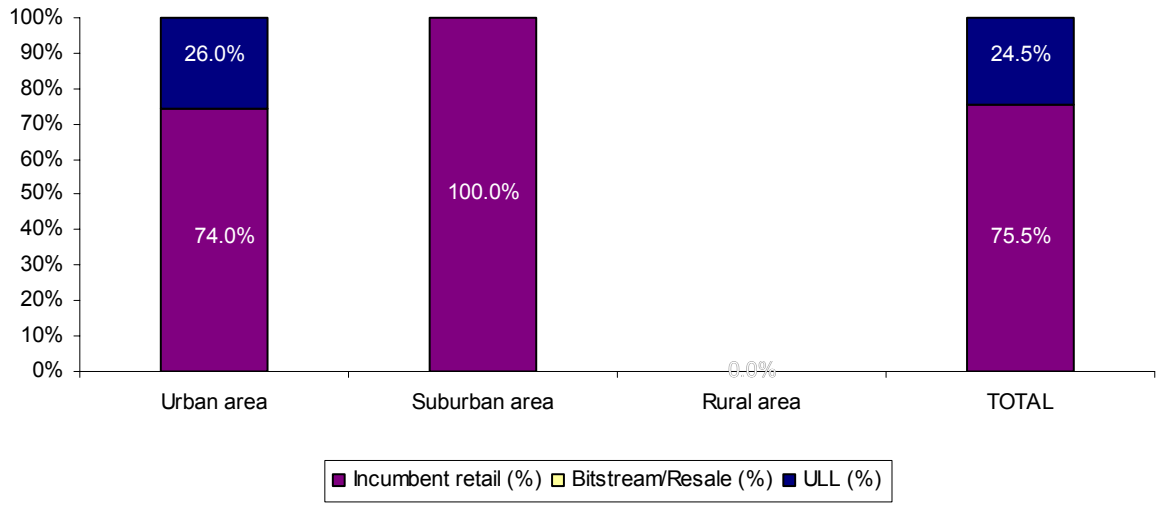
Broadband penetration in Cyprus rose significantly in 2007 (+60% compared to the end of 2006) but remains far below the European average.

Number of DSL connections by download rate



Most residential DSL connections still do not exceed download rates of 1 Mbps and deliver upstream speeds of up to 512 Kbps.

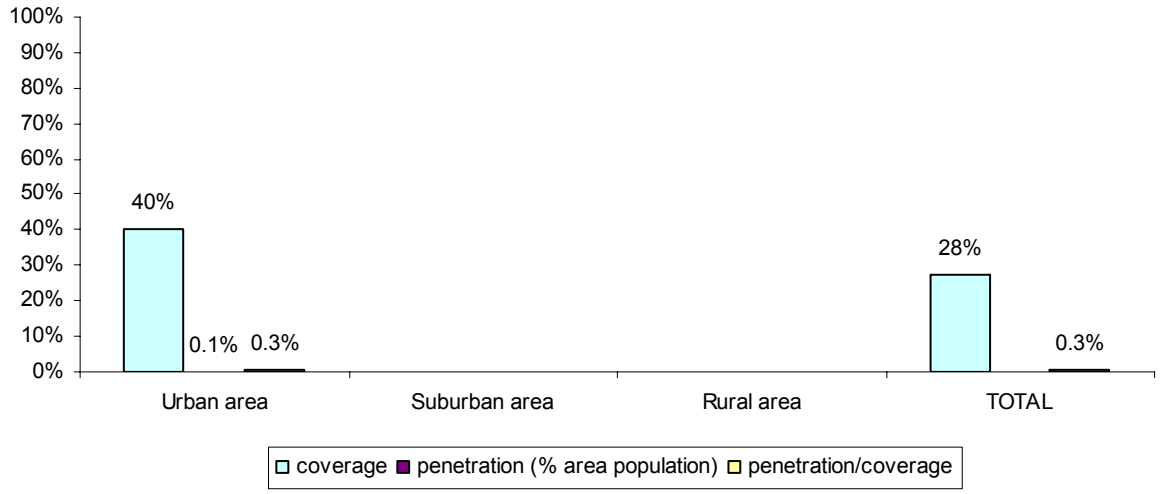
Percentage of DSL connections by type of provider



Unbundling developed significantly in 2007, going from close to nil at the beginning of the year to accounting for a quarter of all DSL connections at the end.

4.3.4. Cable modem coverage and take-up

Coverage and penetration



Cablenet is a new Telephone-Television-Internet provider. The company began operating as a pay-TV provider, using newly built network infrastructure. But the task of deploying this infrastructure made progress slow and confined to only those areas where demand was high (i.e. cities). In 2006, Cablenet launched an Internet access service on some portions of its network. Its customer base is still small but is expected to grow substantially. In 2007, the ISP doubled the speed of its service without increasing prices (the minimum available speed provided to subscribers is 2 Mbps).

4.3.5. Other broadband access technologies

WLL/WiMAX

Hotspots have been deployed in only a few public spaces such as cafes and airports, providing time restricted services to users who can subscribe through their mobile phones, using a texting-based registration procedure. There are no plans for nationwide development. At least five ISPs provide Wi-Fi services: Ayza.net, NetHouse, Rflex, Cytanet and Thunderworx.

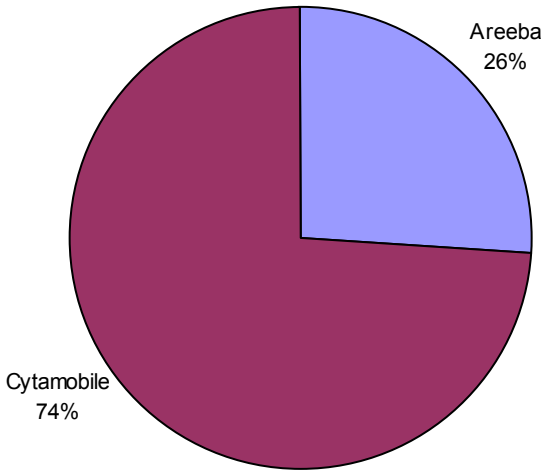
Cellular

Scancom Cyprus (Areeba), a subsidiary of the Lebanese group Investcom Holding, is the most advanced cellular operator in terms of data services, although it was the second to enter the market (the first was Cytamobile-Vodafone). It built up a GSM/GPRS/EDGE network and, on 20 December 2004, launched its first 3G offerings (on a trial basis). In response to Scancom's hasty rollout of next generation services, Cytamobile-Vodafone moved its own 3G rollout plans forward to the first half of 2005 (instead of 2006 as initially planned).

The first 3G services were introduced in 2005. After a very slow start in 2006 (low availability of compatible 3G devices, high price for the service), the 3G market grew significantly in 2007. At the end of the year, the number of 3G customers was close to 7,800.

3G coverage reached 80% at mid-2008, when HSDPA was just introduced.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.4. The Czech Republic

4.4.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	2,211,180	4,972,562	3,197,388	10,381,130
Share of total population	21.3%	47.9%	30.8%	100.0%

4.4.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	-	-	75%	81%	85%
DSL subscribers	7,272	105,000	279,853	494,570	613,200
DSL penetration (% of population)	0.1%	1.0%	2.7%	4.8%	5.9%
Cable modem coverage (% population)	2%	7%	24%	*30%*	*30%*
Cable modem subscribers	18,180	60,000	132,944	216,000	309,000
Cable modem penetration (% population)	0.2%	0.6%	1.3%	2.1%	3.0%
FTTx subscribers	0	0	17,049	24,000	55,000
PLC subscribers	0	0	0	50	200
WLL subscribers	14,948	150,000	208,873	350,000	520,000
Satellite subscribers	-	-	4,000	4,000	4,000
Total	40,400	315,000	642,719	1,088,620	1,501,400
Total penetration (% population)	0.4%	3.1%	6.3%	10.6%	14.5%

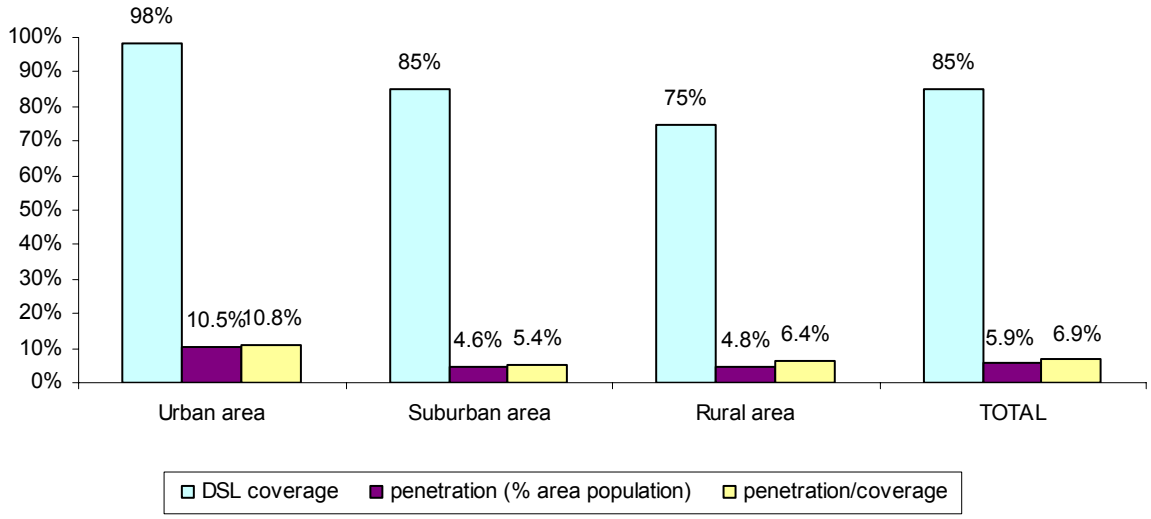
As of 31 December 2007, there were 1,501,400 fixed broadband subscribers in the Czech Republic, or 14.5 subscribers per 100 inhabitants.

A pattern that is clearly visible when analysing the broadband data for the past few years is the decline in the DSL growth rate. While the number of DSL connections more than doubled between 2004 and 2005, in 2007 the number grew by only around 25% over 2006. This trend can be attributed chiefly to the decreasing price of other access technologies, whereas DSL prices have remained largely the same.

In the meantime, WLL enjoyed great success in the Czech Republic. Besides WiFi which is used to provide broadband access in public spaces and institutions and also to offer tourists and business travellers high speed access to the internet, several WiMAX licences were granted in 2004. WiFi is also used as an alternative access mode by competitive operators due to difficulties in implementing LLU.

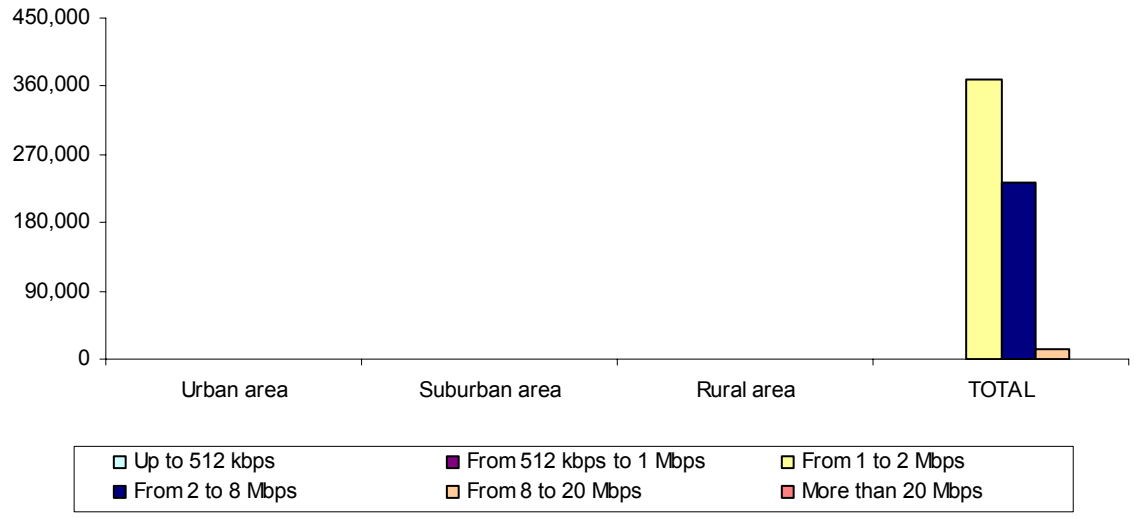
4.4.3. DSL coverage and take-up

Coverage and penetration



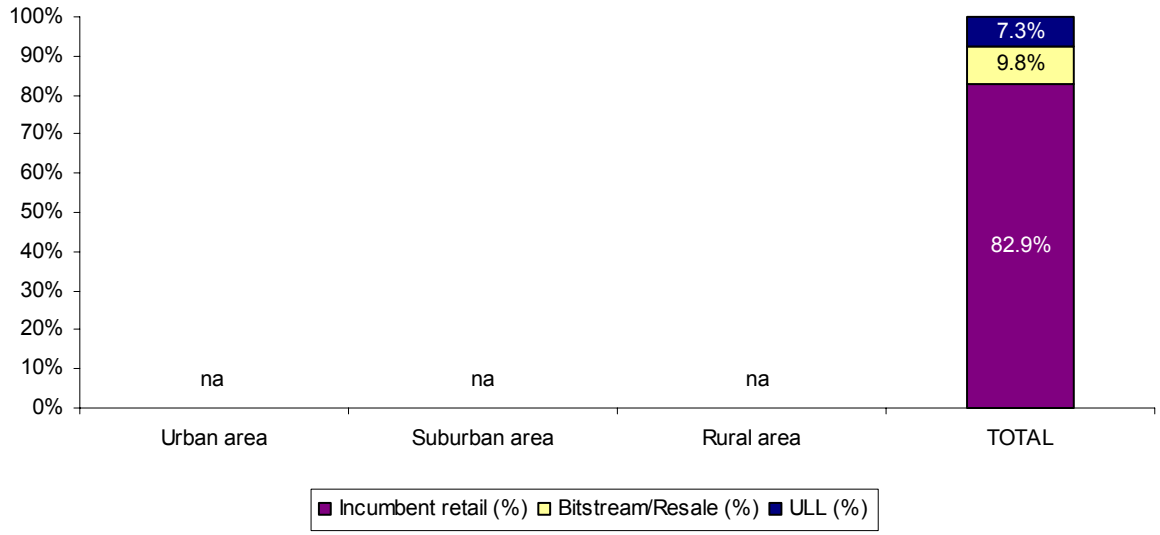
As of 31 December 2007 there were 613,220 subscribers connecting to the Internet via DSL in the Czech Republic – DSL being available on approximately 90% of Telefónica O_2 local exchanges (which can serve 85% of the population).

Number of DSL connections by download rate



As no large operator was able to provide detailed data (see methodological report), the split by connections speeds could not be broken down into geographical sub-segments.

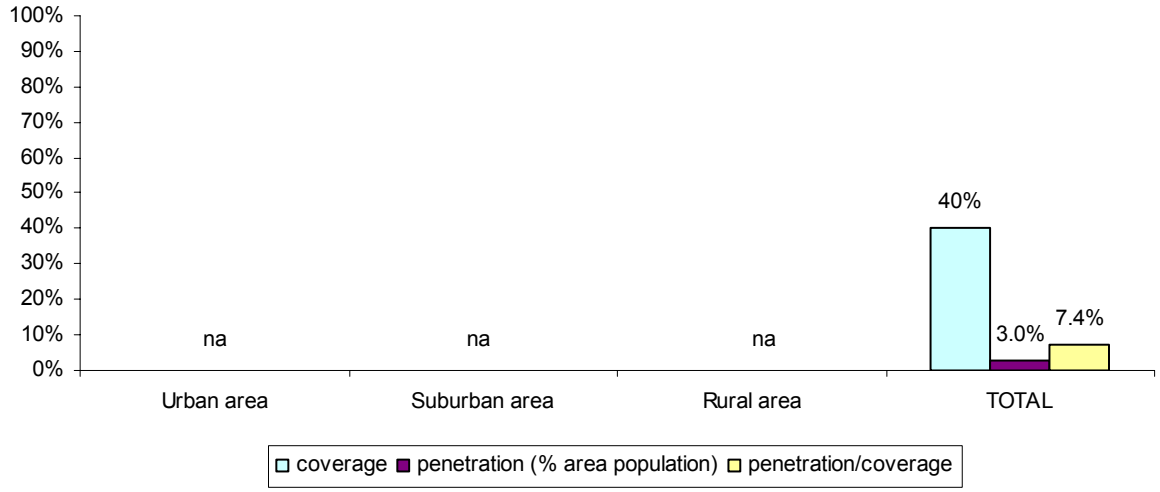
Number of DSL connections by type of provider



Retail DSL connections from Telefónica O_2 represent just over 80% of total DSL connections. Connections through bitstream or resale offers account for more than 9.8% (marketed mainly by regional operators) while ULL accounts for 7.3%. The share of bitstream/resale decreased – contrary to ULL which gained 2 percentage points over the previous year. Three operators use Local Loop Unbundling: GTS Novera, Radiokomunikace and Telekom Austria Czech Republic.

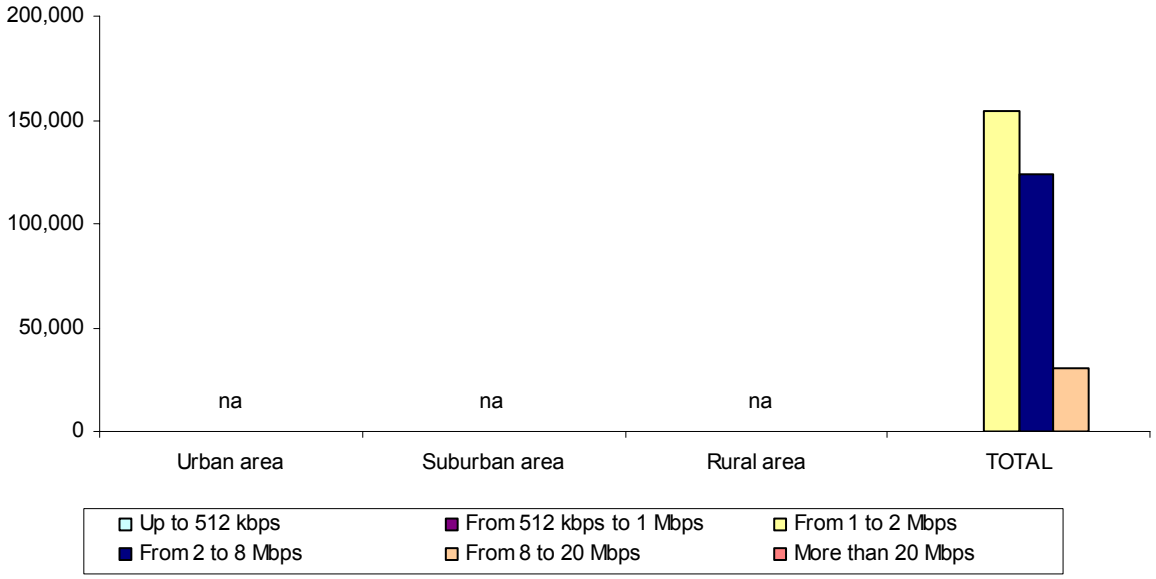
4.4.4. Cable modem coverage and take-up

Coverage and penetration



As of 31 December 2007, there were a total 309,000 cable modem subscribers in the country, having increased by around 93,000 since the previous year. The subscriber base is growing significantly due, in particular, to the ongoing rise in the number of localities with access to cable.

Number of cable modem connections by download rate



As no large operator was able to provide detailed data (see methodological report), the split by connections speeds could not be broken down into geographical sub-segments.

4.4.5. Other broadband access technologies

FTTx

As of 31 December 2007, 55,000 subscribers were accessing the Internet via FTTx technology – the majority of them being businesses; the cost of installing fibre access for residential customers being cost-prohibitive.

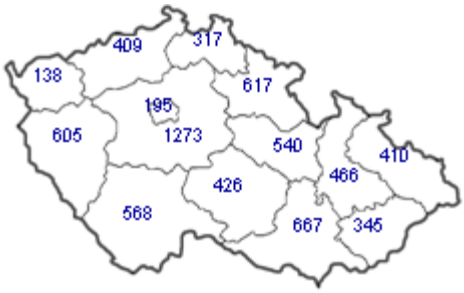
Companies in the market are T-Systems PragoNet, Casablanca INT, ČD Telematika, Dial Telecom or Trioptimum.

Wi-Fi

As of 31 December 2007, there were 520,000 registered Wi-Fi customers in the Czech Republic. Hundreds of providers were registered across the country.

In particular, WiFi is used for high speed internet access on the move in trains, taxis, buses, and competes with UMTS (cheaper than UMTS data services). Competitive operators, such as GTS Novera, offer xDSL-based broadband access but also a number of FWA and WLAN/WiLL options, due to difficulties in implementing LLU.

Number of Wi-Fi providers in the regions



Source: www.Internetprovsechny.cz

WLL/WiMAX

WiMAX technology (in the 3.5 GHz band) is available primarily in mid-size cities (in bigger cities there might be a relative lack of available frequencies, and in small cities WiMAX would not be cost effective), and dedicated to business users.

Satellite

This form of broadband Internet access does not play an important role in the residential market. Because of its high price, it is used primarily by medium-size and big businesses, and by companies in those regions where no other solution is available. As of 31 December 2006 there were 4,000 customers using fixed satellite network technology for their Internet access. Data for 2007 are not available but, considering the low popularity of this technology, no significant change in the numbers is assumed.

Cellular

Mobile broadband Internet access was given a major boost by the August 2004 launch of data services on the CDMA mobile network, operating in the 450 MHz band. This triggered the first wave of broadband Internet broadcasting, which was also enabled in part by the deployment of EDGE technology on the existing GSM network.

As of 31 December 2007, there were 183,456 customers using cellular networks for connecting to broadband Internet. 3G coverage was just over 60% at the end of 2007 and HSDPA networks were only available in Prague.

4.5. Denmark

4.5.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,659,164	2,157,463	1,659,164	5,475,791
Share of total population	30,3%	39,4%	30,3%	100,0%

4.5.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	95%	95%	100%	100%	100%
DSL subscribers	473,481	633,459	836,785	1,063,227	1,207,200
DSL penetration (% of population)	8.8%	11.7%	15.5%	19.5%	22.0%
Cable modem coverage (% population)	50%	60%	60%	60%	60%
Cable modem subscribers	243,602	343,664	462,441	496,227	542,281
Cable modem penetration (% population)	4.5%	6.4%	8.6%	9.1%	9.9%
FTTx subscribers	42,400	85,000	117,028	131,230	205,678*
PLC subscribers	0	0	92	99	96
WLL subscribers	2,332	3,019	15,184	20,124	23,016**
Satellite subscribers	0	0	111	149	5
Total	761,815	1,065,142	1,431,641	1,711,056	1,978,276
Total penetration (% population)	14.1%	19.7%	26.5%	31.4%	36.1%

* including 124,469 LAN subscribers (mainly FTTB + Ethernet)
** including 6,095 WiFi subscribers and 13,109 WiMAX subscribers

With nearly 2 million subscribers and a density of 36.1% at the end of 2007, the Danish broadband market remains one of the most advanced in the world.

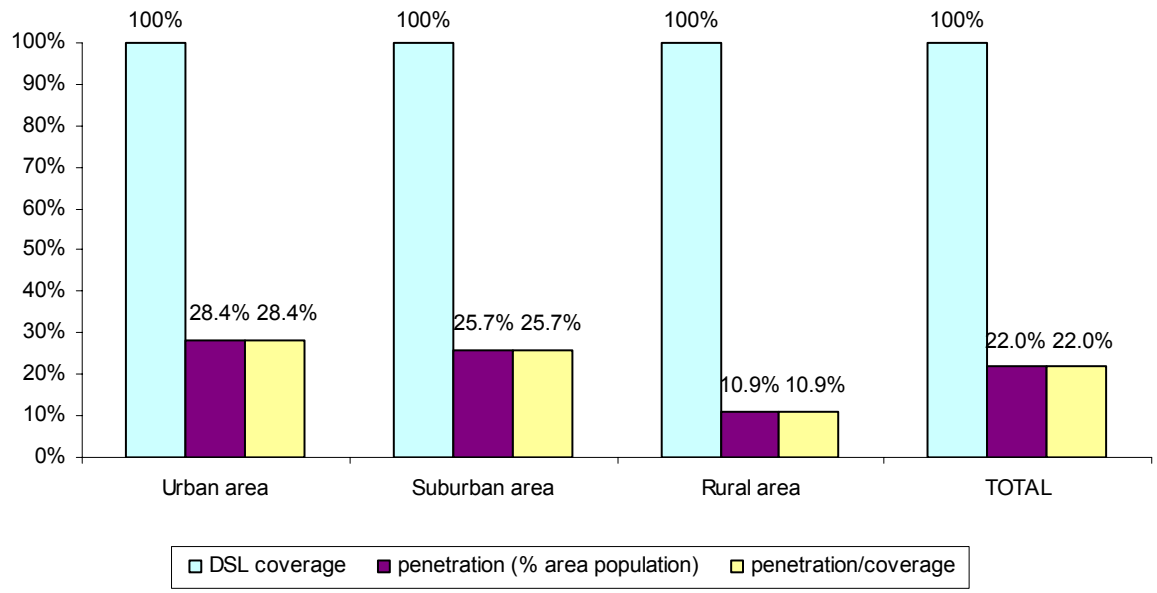
DSL accounts for 61% of broadband connections and the incumbent carrier, TDC, still has a 69% share of this segment. All local exchanges are DSL-equipped, but eligibility is still slightly lower due to technical constraints (distance, quality of the copper pair, etc.). TDC is also active in the cable segment through its subsidiary, TDC Kabel TV.

The largest relative growth has taken place in FTTx, which now accounts for more than 10% of all broadband connections.

TDC's main competitors are Cybercity, Telia Denmark and Tele2 (DSL), Telia Stofa and Arrownet (cable) and several WiMAX operators (Danske Telecom, the mobile operator Sonofon and BulterNetworks).

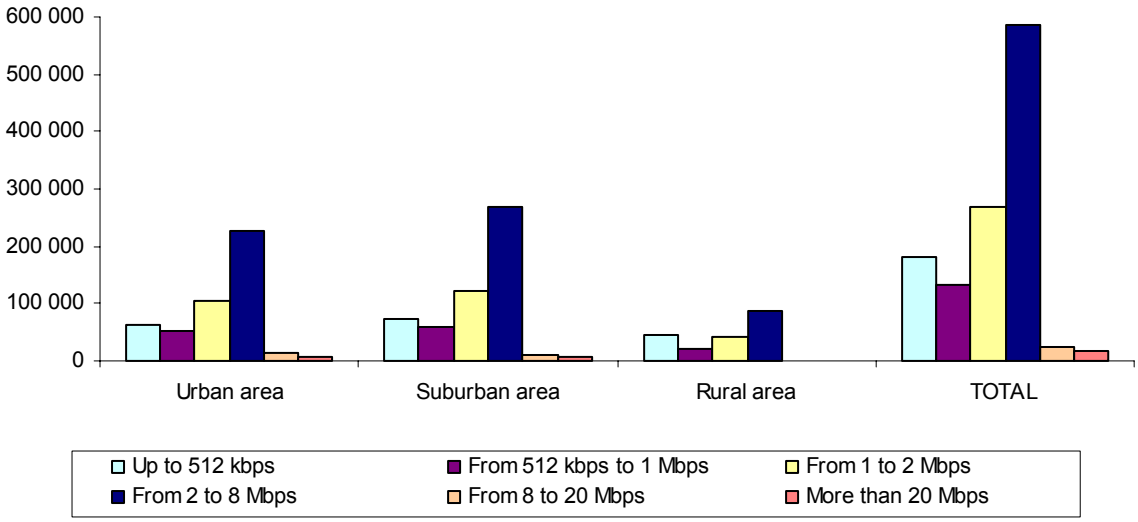
4.5.3. DSL coverage and take-up

Coverage and penetration



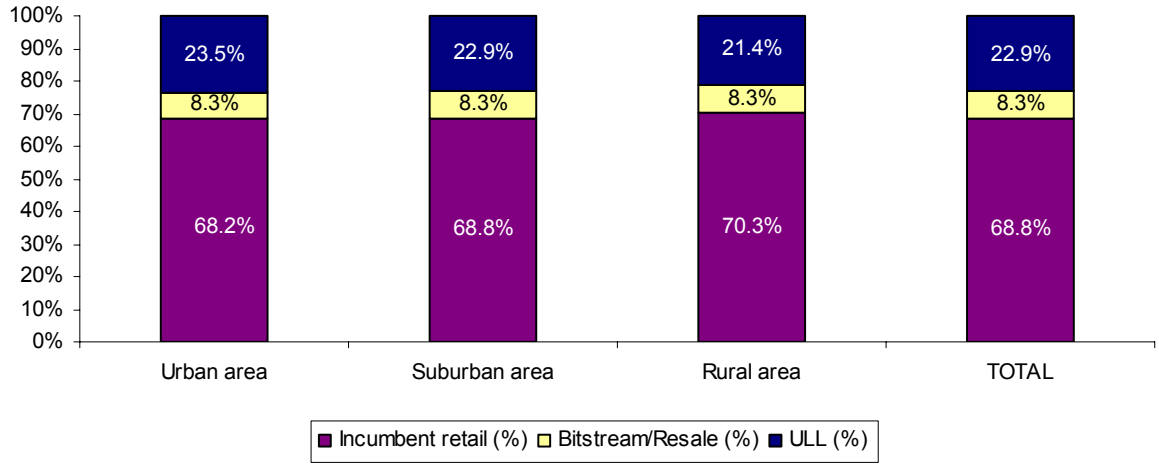
DSL coverage is now deemed complete in all parts of Denmark. All exchanges have been equipped with DSL capability for several years, and only 23,000 subscribers (1% of the population) are ineligible for DSL services. Take-up still remains far higher in urban and suburban areas than in rural areas. The total number of subscribers grew by 13.5% from 2006 to 2007.

Number of DSL connections by download rate



Download speeds have increased considerably and most connections are now in the 2-8 Mbps range.

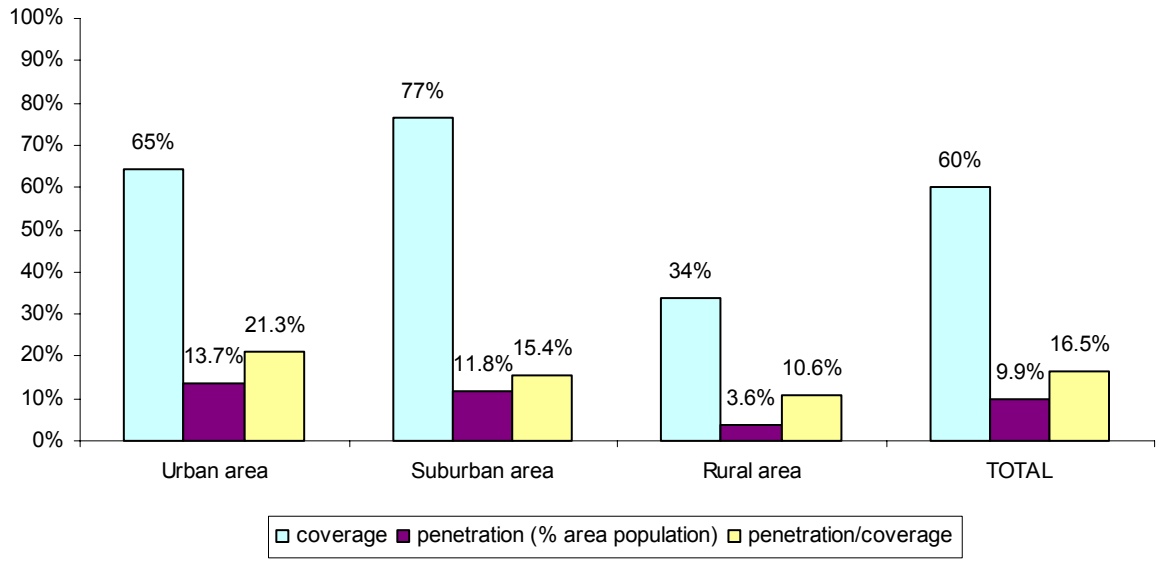
Number of DSL connections by type of provider



The incumbent remains strong, having control of nearly 70% of the DSL subscriptions.

4.5.4. Cable modem coverage and take-up

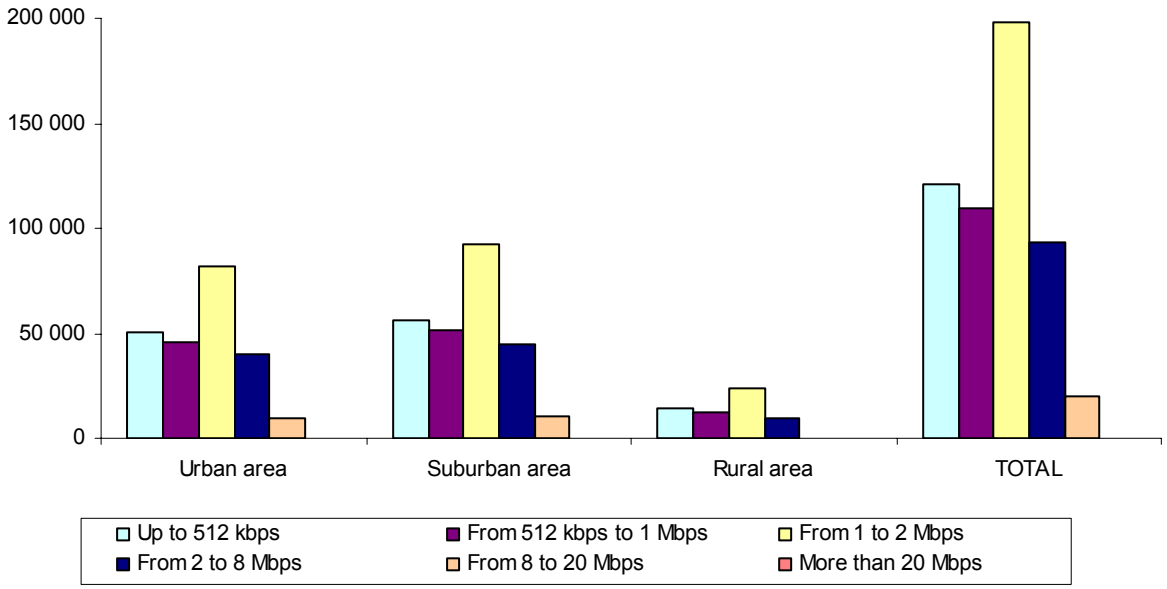
Coverage and penetration



In March 2006, Danish NRA, NITA, announced plans to put forward detailed regulations for opening up (unbundling) cable TV networks to allow third-parties to offer broadband through the incumbent's cable TV network. A draft proposal regarding this issue was put on the table in 2008.

Even though the number of cable broadband subscribers grew by 9.3% from 2006 to 2007, this is far below the growth reported for both DSL (13.5%) and FTTx (56.7%).

Number of cable modem connections by download rate



Connections at speeds up to 512 kbps were still widespread at the end of 2007 as they were historically the core of the cable modem market but their share has been rapidly declining in the recent period, from 52% at the end of 2006 to 42 % at mid-2007 and 22% at the end of 2007.

4.5.5. Other broadband access technologies

FTTx

FTTH and FTTC networks continue to grow rapidly in Denmark, increasing by 56.7% from 2006 to 2007. There were 205,678 FTTX connections at the end of 2007; more than 140,000 are based on VDSL technology (with fibre to the street cabinet). The remaining 53,500 connections are 80% FTTH and 20% FTTB.

	12/02	12/03	12/04	12/05	12/06	12/07
FTTx subscribers	na	42,400	85,000	117,028	131,230	205,678

Wi-Fi

Wi-Fi has been relatively successful in Denmark. In addition to established operators such as TDC, the market is now populated by new entrants such as Danske Telecom. At the end of 2007, the number of Wi-Fi subscribers totalled 6,095, compared to 5,939 end 2006.

WLL/WiMAX

Overall state of WLL/WiMAX in Denmark:

	12/04	12/05	12/06	12/07
WLL coverage *Percentage of the population covered* (3.5 GHz)	close to 90%	close to 90%	close to 90%	close to 90%
WLL subscribers	3,674	3,761	3,761	3,793
WiMAX	-	2,495	12,272	13,109

WiMAX is concentrated in two regions in Jutland. The leading operator is Danske Telecom with a market share of about 90%. A new operator, ELRO, was awarded a licence in June 2007, and already has a 6% share of the market.

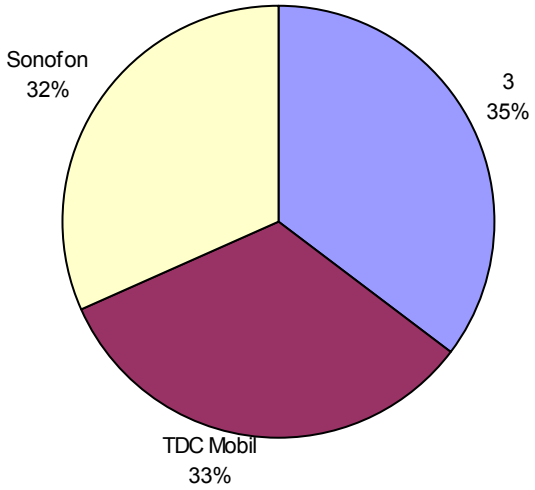
Satellite

The number of satellite subscriptions in Denmark dropped from 149 at the end of 2006 to only 5 at the end of 2007.

Cellular

All four existing mobile operators were awarded 3G licences in September 2001. Hutchison's Hi3G launched the country's first 3G service in October 2003, and was the country's sole provider of 3G services until 7 November 2005, which marked the launch of TDC's 3G voice and data services. Meanwhile, in December 2005, Sonofon won the re-auction of Orange's 3G concession, returned by Telia earlier in the year. Since mid-2006 the development has been encouraging for 3G operators, with two out three new mobile subscribers signing up for 3G and the total number of 3G subscribers increasing by 68% to 326,927. This figure doubled in 2007 to 666,000. 3G coverage has also increased from 50% at the end of 2006 to 97% of the population by the end of 2007. At that time HSDPA coverage (Hi3G) was over 50%.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.6. Estonia

4.6.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	930,936		409,999	1,340,935
Share of total population	69.4%	0.0%	30.6%	100.0%

4.6.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	-	-	-	-	85%
DSL subscribers	-	70,000	85,000	102,000	134,929
DSL penetration (% of population)	-	5.2%	6.3%	7.6%	10.1%
Cable modem coverage (% population)	-	-	53%	*53%*	*53%*
Cable modem subscribers	-	45,000	53,000	63,000	86,023
Cable modem penetration (% population)	-	3.3%	3.9%	4.7%	6.47%
FTTx/LAN subscribers	-	8,000	30,000	40,000	52,000
PLC subscribers	0	0	0	0	0
WLL subscribers	-	4,000	8,000	15,000	20,000
Satellite subscribers	0	0	0	0	0
Total	-	127,000	176,000	220,000	292,952
Total penetration (% population)	-	9.4%	13.1%	16.4%	21.8%

Compared to 2006, the number of broadband users increased by more than 20%, whereas the number of narrowband users decreased by 48%. Some of the most important developments were:

1) a wide-scale CDMA network in the 450 MHz band, named “Kõu”, was opened in mid-June 2007. The network is operated by Televõrk (related to Eesti Energia AS);
2) Elion completed the installation of 11 WiMAX stations in Saaremaa, and service provision started in December 2007;
3) Radiolinja AS and AS Uninet merged into Elisa Eesti AS.

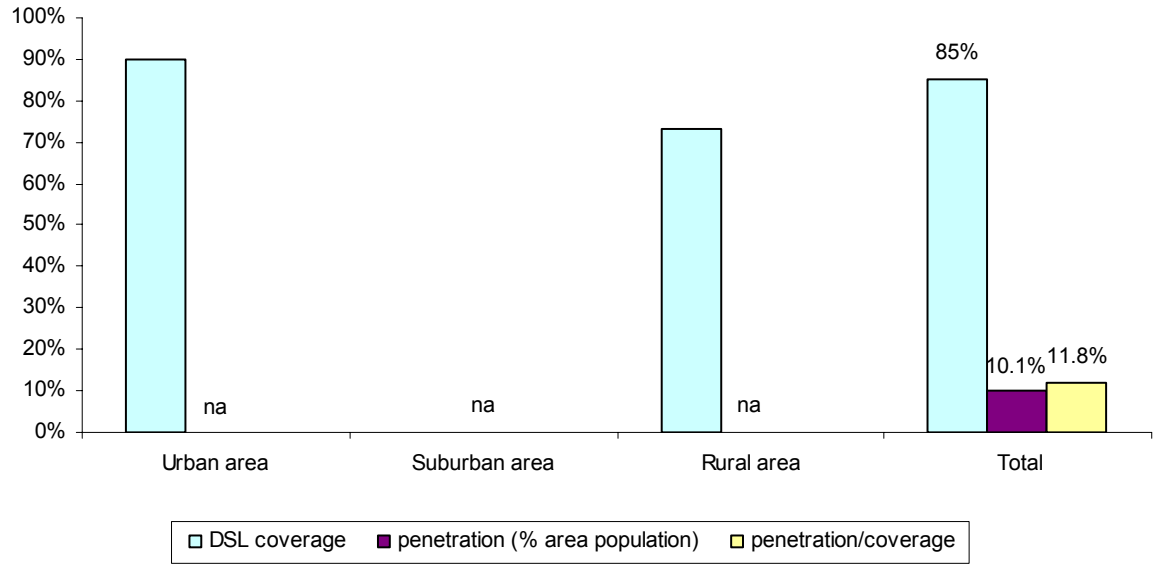
Competition in the broadband market developed chiefly between network owner-operators. Among the major service providers, Elion provides chiefly ADSL services while cable companies, Starman and STV, provide broadband over cable acces. Of the total number of end users, 82% are Elion, Starman or STV customers.

Broadband connections are supplied mainly over the phone and cable networks. Both the ADSL and cable subscriber bases grew by around 15% compared to 2006, while the number of FTTx customers increased by around 27%. The greatest growth was in the number of WLL broadband users, which almost doubled over the course of the year, although still accounting for less than 10% of the user base. By the end of 2007, ADSL, cable and FTTx/LAN customers accounted for over 90% of the country’s broadband base.

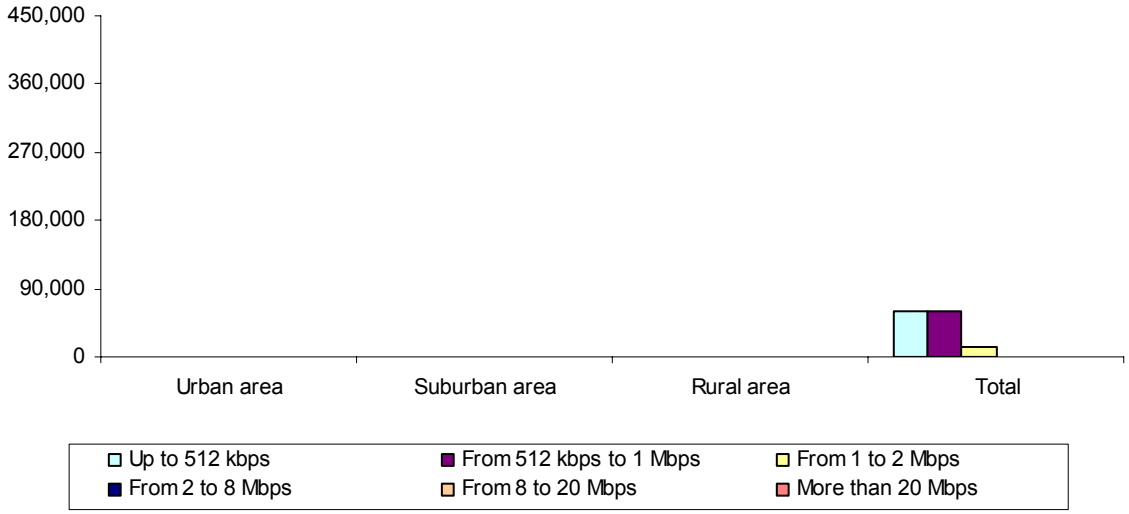
As operators refused to provide detailed data (see methodological report), connection figures were based on national statistics and could not be broken down into geographical sub-segments.

4.6.3. DSL coverage and take-up

Coverage and penetration

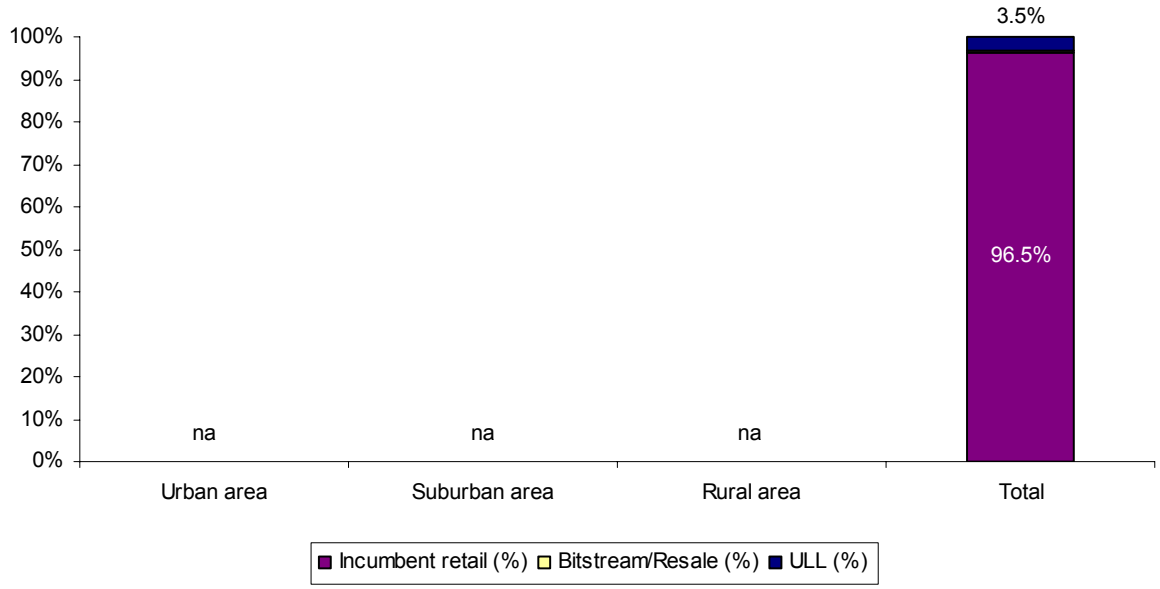


Number of DSL connections by download rate



Offers with connection speeds over 1 Mbps are quite expensive. Furthermore, DSL offers with connection speeds over 2 Mbps were not available the end of 2007,

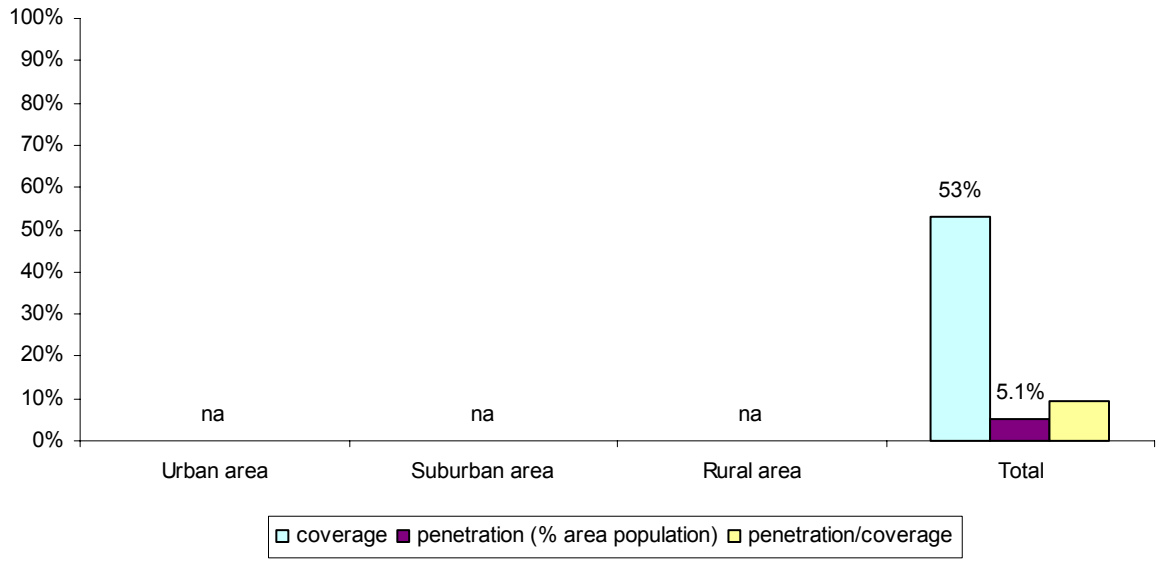
Number of DSL connections by type of provider



Bitstream accesses are close to 0 (only 40 at the end of 2007, i.e. 0.03% of total DSL connections) and LLU remains very low. Alternative operators have logged complaints stating that the incumbent's wholesale pricing structure was unfair and that it makes it almost impossible for them to provide commercial services.

4.6.4. Cable modem coverage and take-up

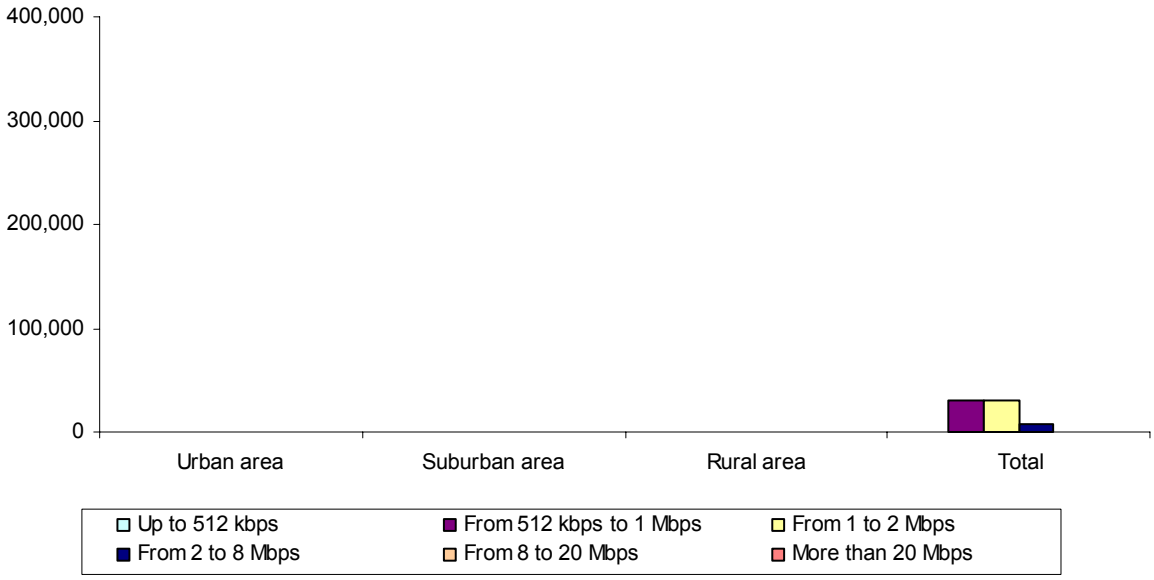
Coverage and penetration



In 2007, there were 27 cable services providers (including IPTV), the largest ones being Starman, STV and Elion. 13 enterprises have notified themselves to the Communications Board as cable service distributors, without yet providing an actual service.

At the end of 2007, 528,000 homes were passed for cable.

Number of cable modem connections by download rate



Connection speeds are generally higher than for DSL. However, maximum speed available at the end of 2007 was 5 Mbps and prices for connections at 4-5 Mbps remain very expensive.

4.6.5. Other broadband access technologies

Wi-Fi

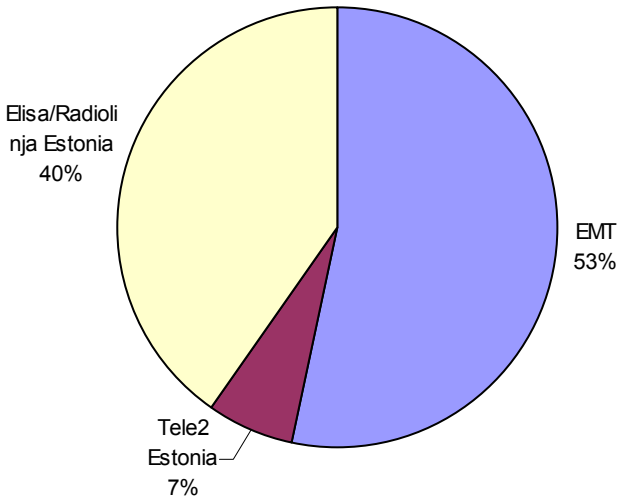
The first Wi-Fi hotspots were launched in Spring 2001. At the end of 2007, there were close to 1,000 Wi-Fi hotspots operating in Estonia, most of them in the Tallinn region.

Much of this access, especially in urban areas, is provided free-of-charge by private businesses such cafés, restaurants or petrol stations as an additional customer service. However, there are a number of wISPs which offer flat-rate access packages to subscribers.

Cellular

EMT, Tele2 and Elisa were awarded ten-year UMTS licences in summer 2003. EMT was the first to test a trial 3G network in September 2003, but waited until late October 2005 to launch commercial 3G services in the Tallinn area. At the end of 2007, there were 64,550 3G subscribers in Estonia. At that time, 3G networks covered all major cities and were fully upgraded to HSDPA.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.7. Finland

4.7.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,848,199	1,664,594	1,787,691	5,300,484
Share of total population	34.9%	31.4%	33.7%	100.0%

4.7.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	88%	89%	90%	92%	96%
DSL subscribers	405,600	658,700	1,018,700	1,232,800	1,348,000
DSL penetration (% of population)	7.8%	12.7%	19.5%	23.4%	25.4%
Cable modem coverage (% population)	30%	32%	33%	*35%*	*40%*
Cable modem subscribers	85,400	112,400	148,900	181,100	210,000
Cable modem penetration (% population)	1.6%	2.2%	2.8%	3.4%	4.0%
FTTx subscribers	100	2,700	2,700	8,400	44,000
PLC subscribers	600	900	800	800	1,000
WLL subscribers	2,600	3,300	3,500	4,900	20,900
Satellite subscribers	90	120	0	0	0
Total	494,390	778,120	1,174,600	1,428,000	1,623,900
Total penetration (% population)	9.5%	14.7%	22.3%	27.1%	30.6%

With 30.6 subscribers per 100 inhabitants, Finland ranks 3rd among the EU-27. In terms of broadband penetration, it is placed after the Netherlands and Denmark (and behind Iceland and Norway outside the EU).

The strong development of broadband in Finland is due chiefly to the early introduction of broadband technologies and competition enablers (xDSL in 1994, unbundling in 1997), along with continuous government monitoring. In early 2004, the Ministry of Transport and Communications (MTC) launched the National Broadband Strategy (NBS), a 59-point action plan concentrating on the issues of competition, new technologies, online business, security and privacy, special measures for regional development and contributions to international development.

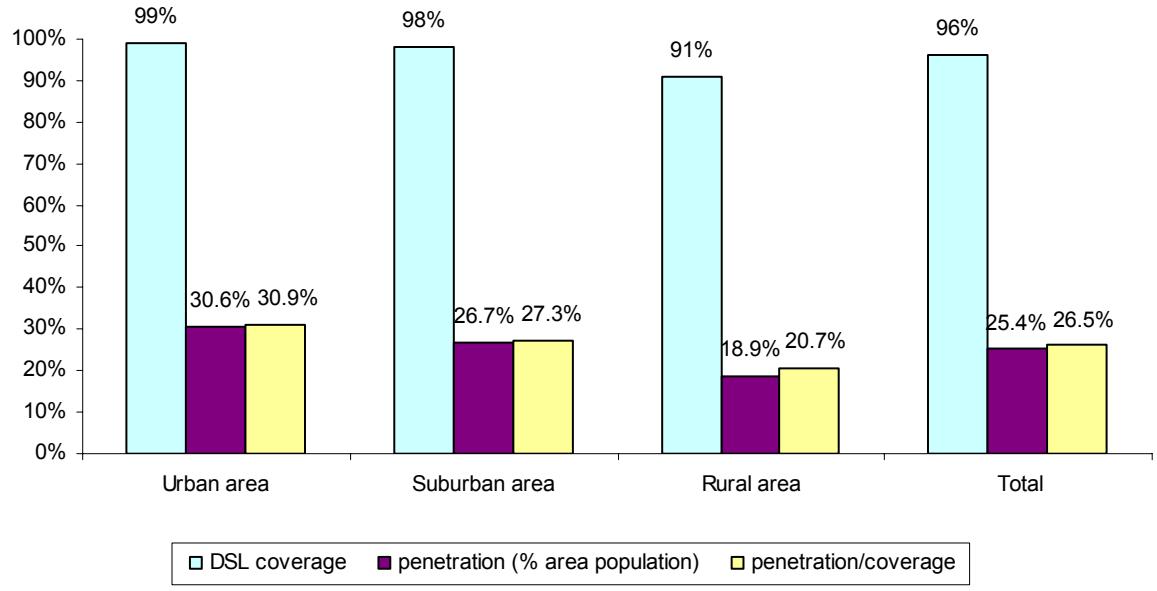
In particular, the National Broadband Strategy set the goal of having above 90% of all Internet connections over broadband by the end of 2007, with average download speeds of 8 Mbps. However, download speeds have remained relatively low: Ficora reports that the average download speed at the end of 2007 was still below 2 Mbps, with the most common connection being 1 Mbps.

The Finnish market continues to be dominated by DSL, which is now available to 96% of the population and accounted for 83% of total broadband connections at the end of 2007, down from 86% last year. Elisa, Finnet and TeliaSonera Finland, the 3 "incumbent" operators, provide DSL services over their own lines but alternative DSL operators controlled more than 30% of the market, despite claims that wholesale offers were too expensive.

Cable modem is far less advanced, though there are numerous cable TV operators in Finland (more than 50 including Telia Sonera and Elisa). To improve competition, the Finnish government has begun encouraging WiMAX initiatives, particularly to cover remote regions.

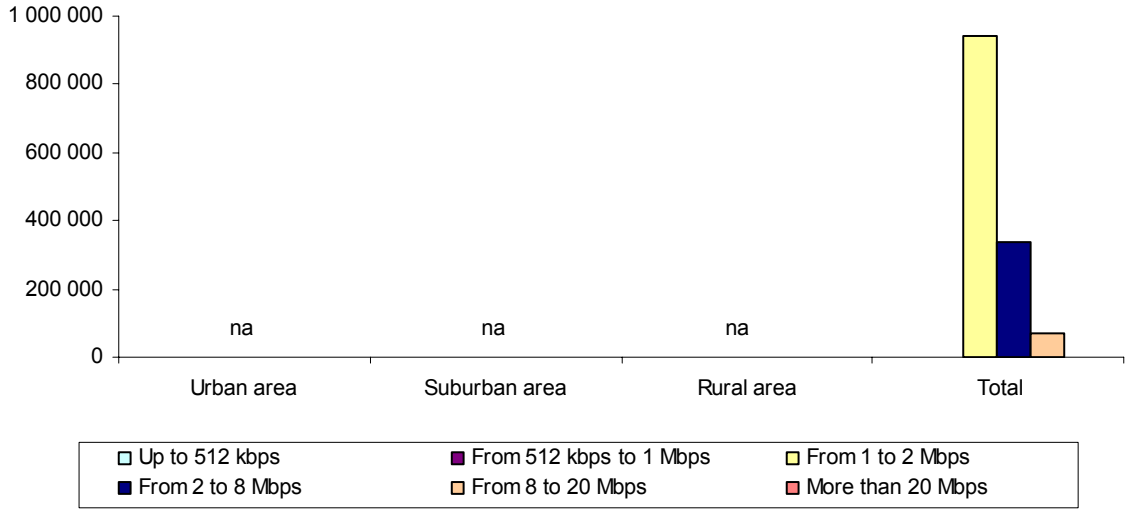
4.7.3. DSL coverage and take-up

Coverage and penetration



DSL coverage in urban areas is close to 100%. Municipalities have provided partial funding to extend the footprint in rural areas, where coverage has now risen above 90%. Nationwide coverage is estimated to be around 96%.

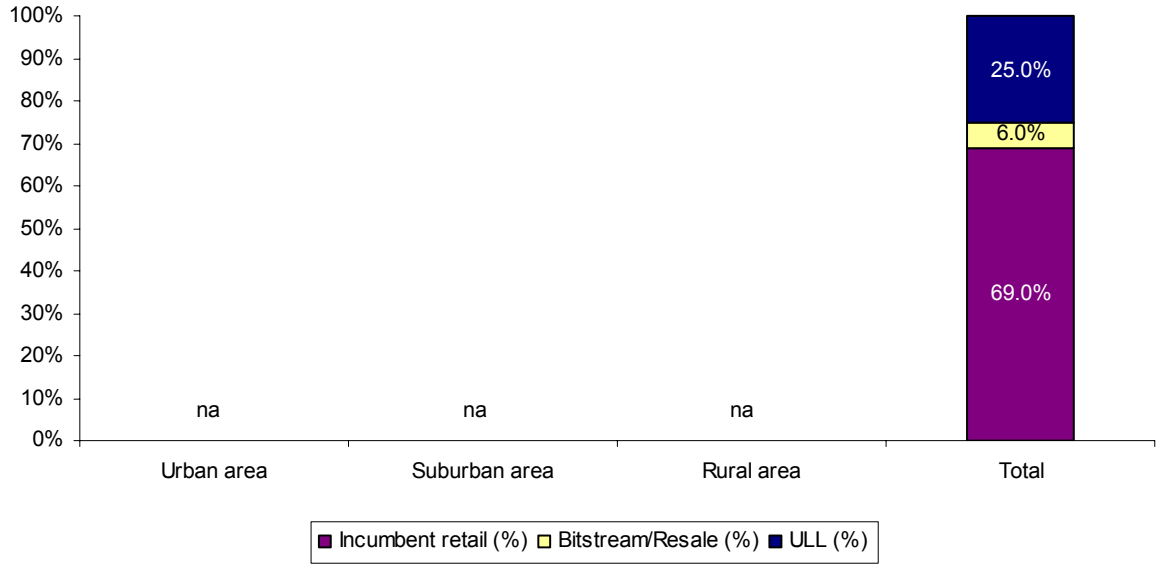
Number of DSL connections by download rate



As no data are available from operators, we have had to rely on figures from Ficora, the national regulatory authority. They report that 30% of all broadband subscriptions (DSL and cable) had a download rate of 2 Mbps or more. According to Ficora, broadband connections of 10 Mbps or higher accounted for less than four percent of all broadband connections.

Since DSL dominates the market, the figures for that technology are probably reasonably accurate.

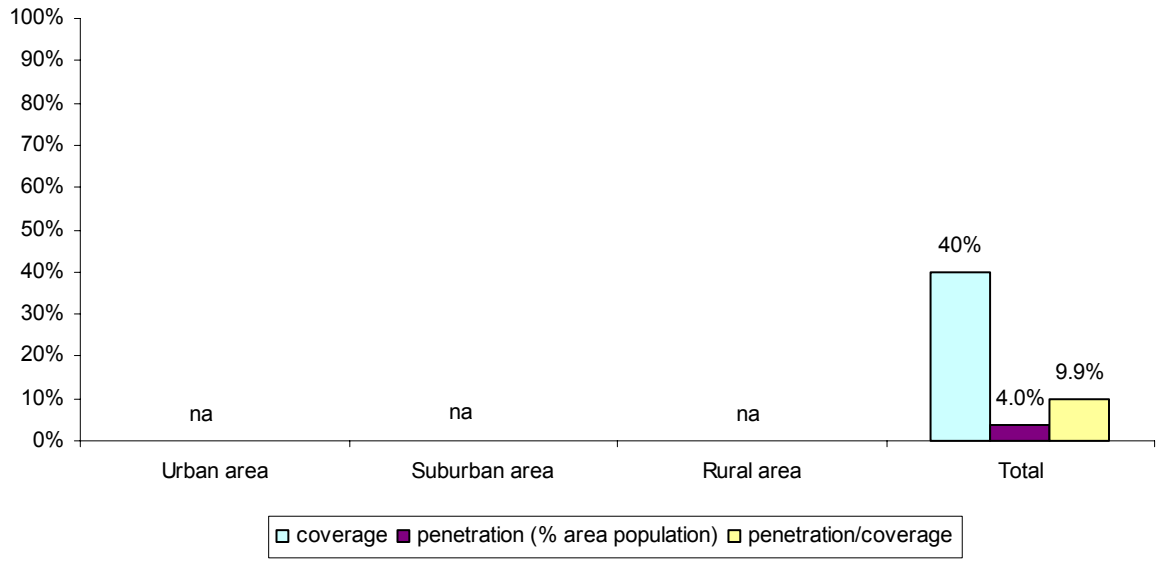
Percentage of DSL connections by type of provider



Because of Finland's specific market structure, three operators are considered as incumbents: Elisa, Finnet and TeliaSonera Finland.

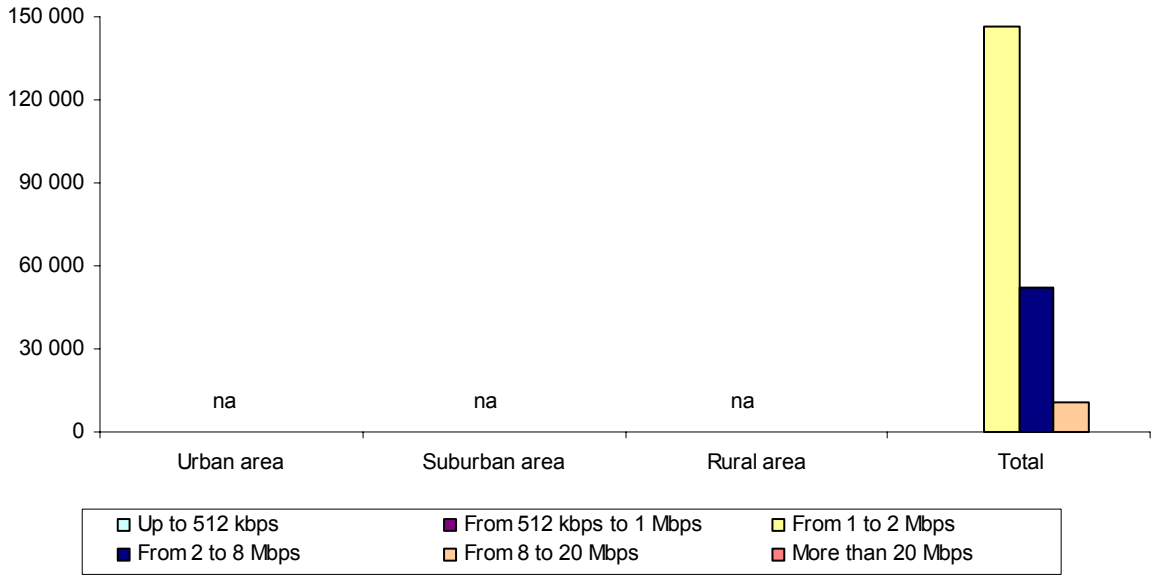
4.7.4. Cable modem coverage and take-up

Coverage and penetration



Approximately 40% of the Finish population can be covered by cable modem. Cable modem is available primarily in urban areas.

Number of cable modem connections by download rate



As no data are available from operators, we have had to rely on national figures from Ficora, the regulation authority (see comments in the DSL section).

4.7.5. Other broadband access technologies

Satellite and PLC

Satellite Internet access and PLC do not play a significant role in the Finnish broadband market.

Wi-Fi

The exact number of hotspots is not known, but the number of WLAN broadband connections was 2,800 at the end of Q1 2007. This includes the hotspots as well as "normal, dedicated" subscriptions using WLAN technology (although these are probably quite rare).

WLL/WiMAX

The WLL market in Finland experienced significant growth in 2007, going from 4,900 at the beginning of the year to 20,900 subscribers at the end.

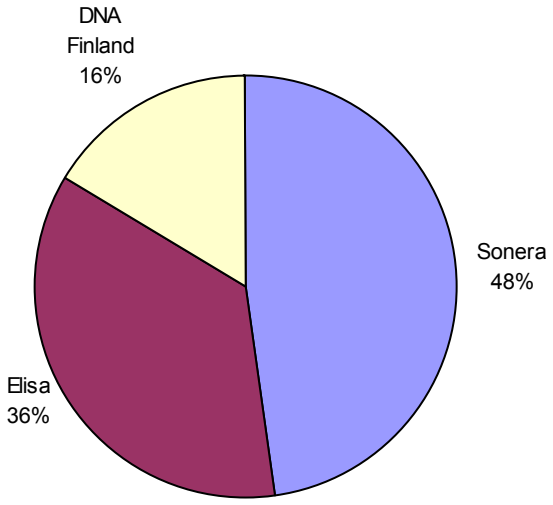
Cellular

While TeliaSonera, Elisa and DNA had either launched commercial services or deployed trial UMTS networks by mid-2005, Tele2 and its Suomen 3G division had failed to build out any 3G infrastructure at all, despite having received a government warning in 2004 that it risked losing its concession if it did not meet minimum rollout requirements. In June 2005 the government followed through on its warning and revoked Suomen 3G's licence. Two months later, Tele2 announced it would leave the Finnish market altogether. DNA launched its 3G network in metropolitan Helsinki, Tampere and Lahti in December 2005, having awarded Ericsson a contract to roll out the first phase of its network in July that year.

3G coverage varies depending on the operator. At the end of 2007, it was around 60%-70% for each of the three MNOs. In most cases, 3G networks were upgraded to HSDPA.

The exact number of 3G subscriptions is not known but, according to a study by the Ministry, there were roughly 1,305,000 3G capable handsets in use in Finland at the end of 2007.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.8. France

4.8.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	33,688,530	15,075,700	14,325,400	63,089,630
Share of total population	53.4%	23.9%	22.7%	100.0%

4.8.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of the population)	79%	91%	96%	98%	99%
DSL subscribers	3,262,800	6,245,795	8,777,215	11,877,557	14,800,000
DSL penetration (% of the population)	5.4%	10.1%	14.1%	18.9%	23.5%
Cable modem coverage (% population)	26%	26%	26%	26%	26%
Cable modem subscribers	393,000	496,568	566,400	700,000	703,500
Cable modem penetration (% population)	0.6%	0.8%	0.9%	1.1%	1.1%
FTTx subscribers	0	500	6,800	14,000	43,500
PLC subscribers	0	0	0	<800	<800
WLL subscribers	610	1,200	1,200	1,200	1,200
Satellite subscribers	650	1,000	1,000	1,000	1,000
Total	3,657,060	6,745,063	9,352,615	12,594,557	15,550,000
Total penetration (% population)	6.0%	11.0%	15.0%	20.0%	24.6%

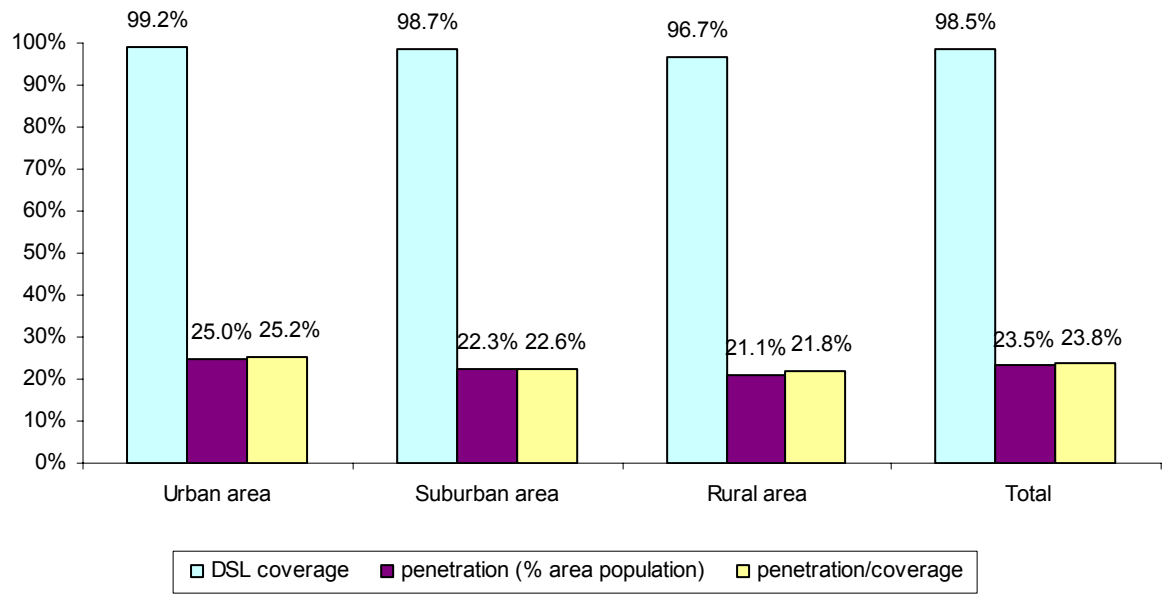
The total number of broadband subscribers in France increased by 23.4% in 2007 (3 million new broadband connections in one year) and penetration was close to 25% at year-end.

DSL is by far the most developed type of broadband access, accounting for 95.2% of total connections (vs. 94.3% at the end of 2006 and 93.8% one year before), with cable modem accounting for the bulk of the balance. ADSL2+ technology is widespread and most users have access to triple play bundles that include IPTV.

The major DSL access providers (France Télécom, Iliad/Free, Neuf Cegetel) are also deploying fibre optics but availability and penetration remains low, with only few areas (some parts of Paris notably) being offered a commercial service.

4.8.3. DSL coverage and take-up

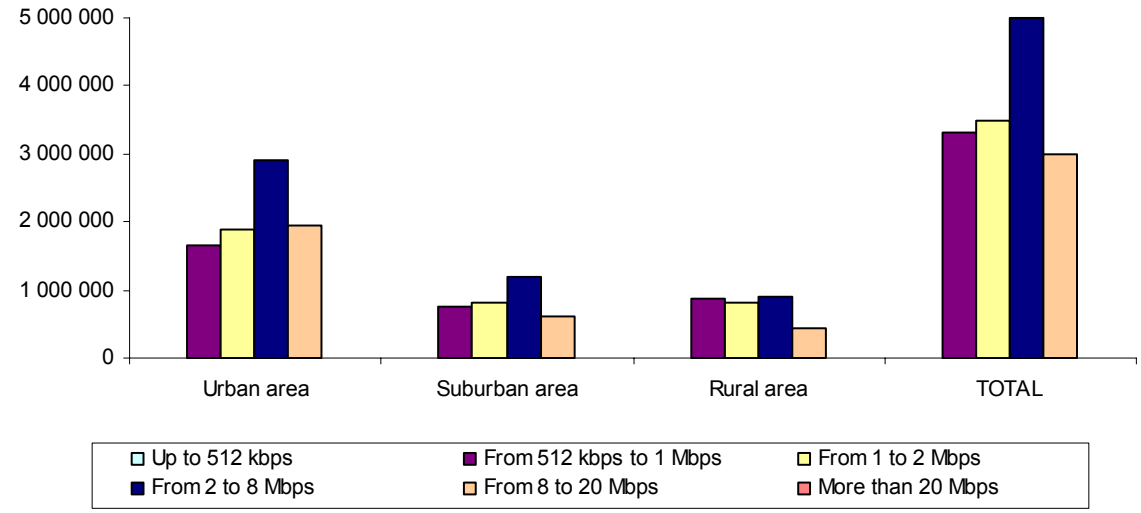
Coverage and penetration



At the end of 2007, all 12,994 France Telecom local exchanges were DSL-equipped (compared to 12,174 at the end of 2006 and 9,731 at the end of 2005). However, FT indicates that, due to technical constraints, ADSL can be delivered only to 99% of units depending on those local exchanges, except in certain big cities (Paris, Lyon and Marseille)

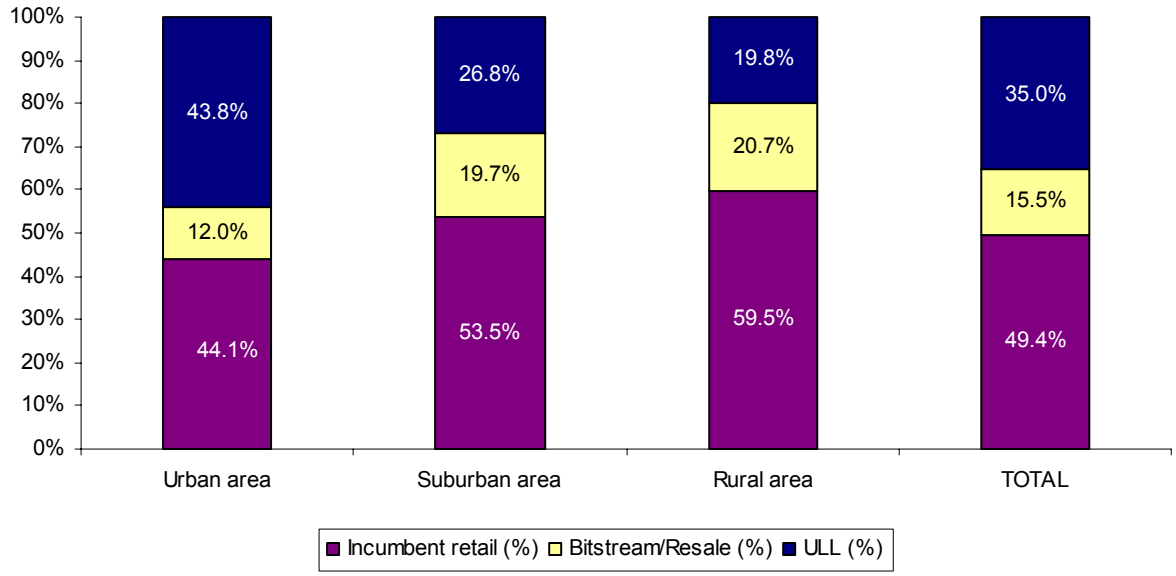
The penetration rate increased to 23.5%.

Number of DSL connections by download rate



The French ADSL market is characterised by a very high proportion of connections with download rates over 8 Mbps, supported by ADSL2+ technology. We estimate that 3 million connections (or 20.3% of total DSL connections) were in this category at the end of 2007.

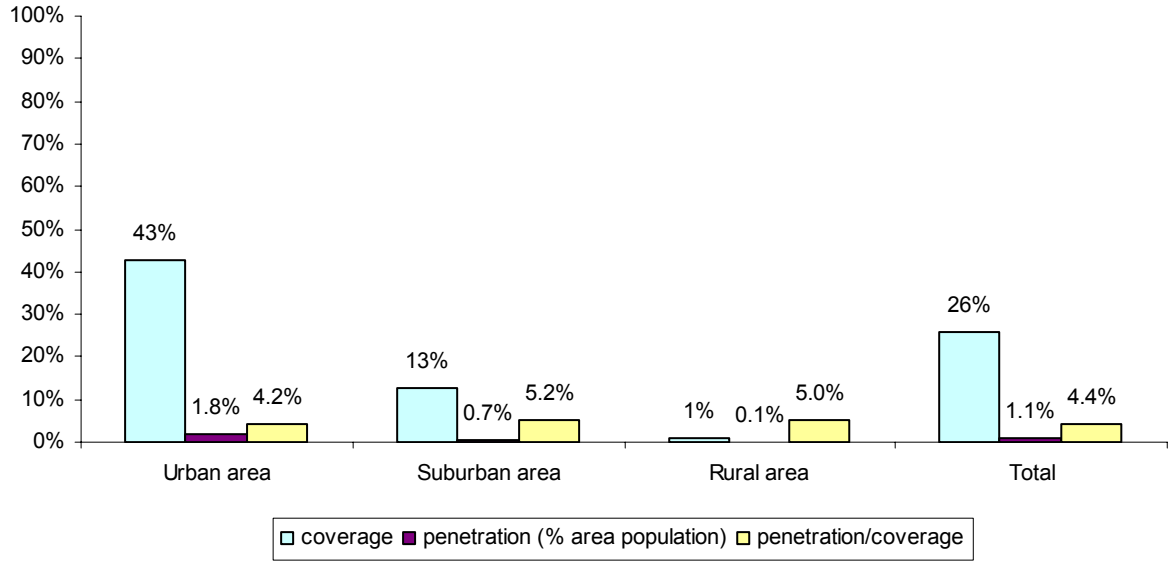
Percentage of DSL connections by type of provider



Nearly half of all DSL connections are marketed directly by Orange (formerly Wanadoo), France Telecom's ISP subsidiary, and 18% are provided by other operators or ISPs through a DSL resale product ("bitstream access"). The percentage of unbundled lines is almost the same as the year before (32.1% at the end of 2005) but the proportion of fully unbundled lines increased dramatically during the period, from 21% (592,000 full unbundled lines out of 2.82 million ULL + shared access) to 54% (2.12 million ULL out of 3.94 million ULL + shared access).

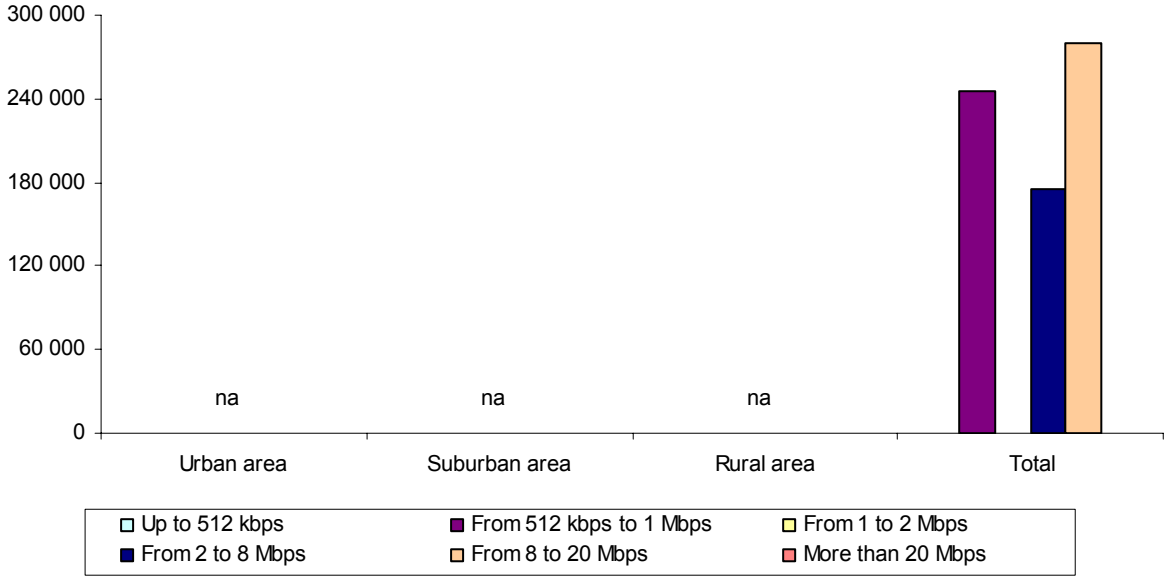
4.8.4. Cable modem coverage and take-up

Coverage and penetration



26% of the French population is covered by cable modem technology: there have been no new deployments in recent times. Cable in general, and cable modem in particular, are available almost exclusively in medium-size and large towns.

Number of cable modem connections by download rate



At the end of 2007, the French cable market was controlled by only one operator, following the merger of Noos/UPC and Numericable in 2006. Around 40% of broadband cable connections in France deliver download rates over 8 Mbps.

4.8.5. Other broadband access technologies

FTTx

In 2004-2005, there were a handful of deployments in specific locations: PBC (Pau Broadband Country) in Pau, a midsize town in south-western France, and in Paris and parts of its suburbs. Early in 2006, France Telecom announced that it would be conducting FTTH trials, while more and more plans for FTTH commercial rollouts were announced in the second half of the year and in early 2007: in September 2006, Iliad-Free unveiled a four-year plan to pass four million households. France Telecom, followed by neuf cegetel also announced large-scale FTTH deployment plans. Citéfibre and Erenis, the first two commercial operators active in Paris, were acquired respectively by Iliad and neuf cegetel.

At the end of 2007, SFR/neuf cegetel and Free have deployed respectively 120,000 and 241,000 homes passed in FTTH, mainly in Paris. France Telecom was counting 146,000 homes passed. But the leader in terms of coverage was Numericable with 2 million homes passed using FTTLA + DOCSIS technology. At the same date, there were 43,500 FTTH/FTTB subscribers.

PLC

In April 2005, PLC access went beyond the experimental stage in France but, for now, its development as an alternative to ADSL is being hampered by EDF, owner of the country's electricity network, which has not been authorised to market Internet access.

The development of indoor powerline carrier systems is allowed, provided they do not create any interference with existing systems.

Sipperec, a public syndication gathering several cities around Paris, is the only public body still involved in deploying PLC for outdoor access in France, through a contract with Mecelec Telecom.

Wi-Fi

Hotspots have been widely deployed in public areas (hotels, airports, railway stations, conference centres, etc.), providing wireless access to the Net for a specific clientele, the bulk of which are travelling business people. There are now close to 40,000 hotspots in France at different levels:

- 3 600 hotspots belonging to public telcos ;
- 30 000 access points for private WLAN, 10,000 of them recorded in directories (public/private use) and 20,000 for closed user groups only
- Some hundreds of hotspots in public locations (cafés-restaurants, tourism offices…).

"Paris WiFi" is the most visible project in France: 450 hotspots are deployed in 260 premises, 50% located in municipal parks and gardens.

WLL/WiMAX

Altitude Telecom sold its nationwide WiMAX licence to Iliad in September 2005.

Regional WiMAX licences were awarded in 2006 (two operators in each region). The main beneficiaries of these licences were Bolloré Telecom, Altitude Wireless and HDRR (a TDF-led consortium). Since then, Bolloré Telecom sold most of its licences (8 out of 11) to HDRR.

Until now network deployments were very limited as operators are awaiting for the new 802.16e standard to be available.

Satellite

Several two-way offers are now available in France, targeting SMEs in rural areas.

One of the most important players is Ouranos Networks (ex-Aramiska) with more than 350 two-way satellite subscribers in France.

Other players are Divona and Sat2way.

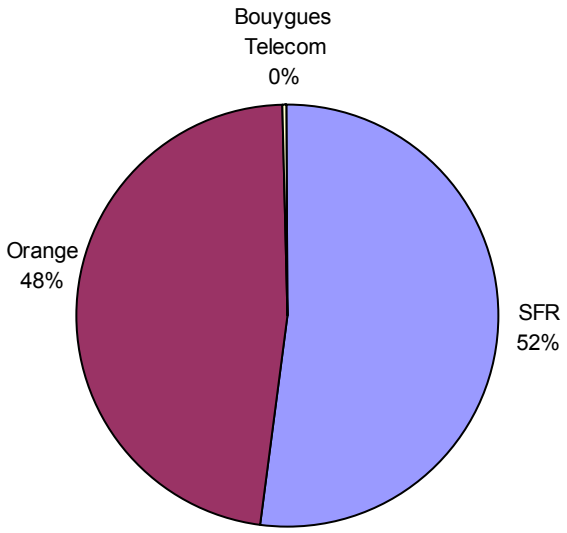
We estimate that there were about 1,000 satellite subscribers in France at the end of 2007.

3G

Orange and SFR launched their 3G services over the course of 2004 while Bouygues Telecom, which was awarded a licence in 2002, does not yet marketed its service and still offers EDGE-based data services.

70% of the population was covered for 3G/HSDPA at the end of 2007, and the user base totalled 8,566,000 – twice as many as the year before.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.9. Germany

4.9.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	40,411,451	29,392.141	12,511,314	82,314,906
Share of total population	49.1%	35.7%	15.2%	100.0%

4.9.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	86%	91%	92%	93%	96%
DSL subscribers	4,500,000	6,720,000	10,380,000	14,300,000	18,500,000
DSL penetration (% of population)	5.4%	8.1%	12.6%	17.3%	22.5%
Cable modem coverage (% population)	8%	10%	15%	36%	47
Cable modem subscribers	87,000	145,000	240,000	600,000	985,000
Cable modem penetration (% population)	0.1%	0.2%	0.3%	0.7%	1.2%
FTTx subscribers	0	150	150	20,000	108,000
PLC subscribers	8,000	9,000	9,600	9,500	9,500
WLL subscribers	4,500	1,000	0	0	0
Satellite subscribers	45,000	41,000	57,000	56,000	36,500
Total	4,644,500	6,916,150	10,686,750	14,985,500	19,639,000
Total penetration (% population)	5.6%	8.4%	13.0%	17.8%	23.9%

Broadband penetration in Germany is now well above the European average (23.9% compared to 20.3%).

ADSL is by far the dominant technology (more than 94% of all broadband connections at the end of 2007). The incumbent carrier, Deutsche Telekom, continued to lose market share and now accounts for 48.6% of all DSL connections (2006: 49.4%). The significance of resale offers has decreased (18.9% after 22.4% in 2006) while ULL now accounts for almost a third of all DSL connections (32.4%).

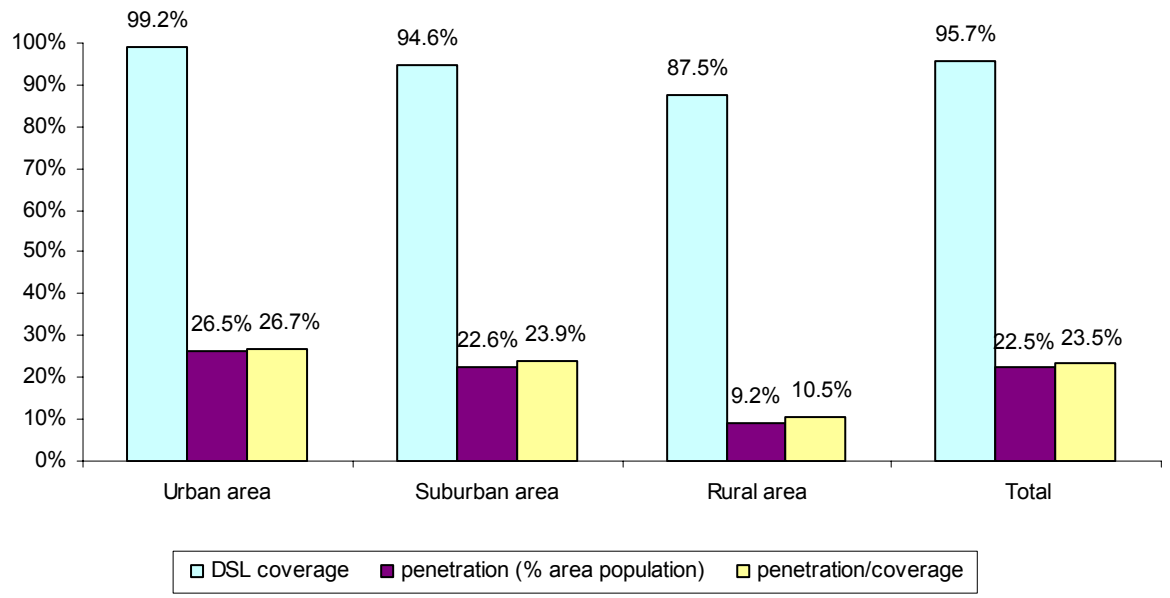
Though broadband cable penetration grew by 65% in 2007, cable modem is still marginal as operators were reluctant to invest in upgrading their networks (most of the infrastructure is built for one-way services only). Furthermore, the fact that the German cable infrastructure is run by large, level 3 (from head-ends to premises or to end-users) and more than 4,000 smaller level 4 operators (in-house cable networks) is hampering the development of the country's cable market.

FTTx – here FTTN+VDSL[4] – made significant progress in 2007 as Deutsche Telekom began to deploy it network in mid-2006, and has continued expanding it throughout various urban areas.

[4] Fibre goes to the street cabinet, copper cables from the street cabinet to the end user

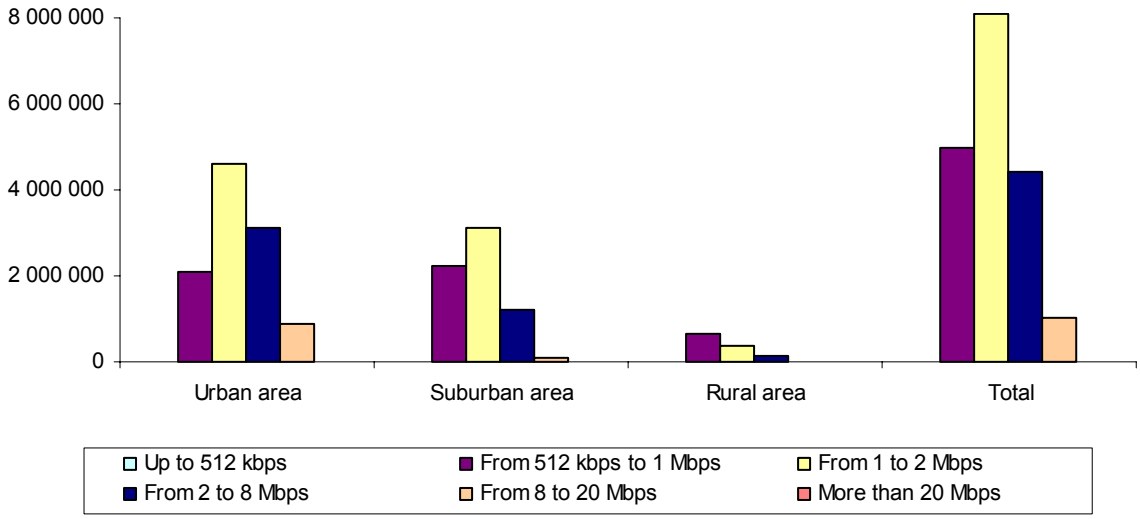
4.9.3. DSL coverage and take-up

Coverage and penetration



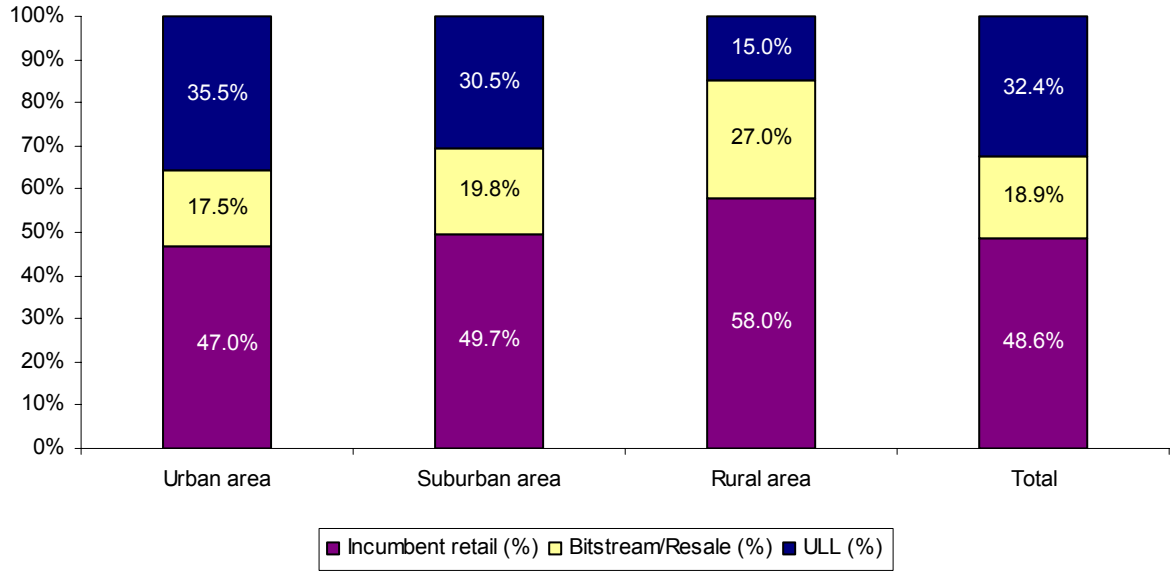
In Germany, most local exchanges are DSL equipped, but DSL coverage is generally higher in urban areas, and significantly lower in Eastern Germany. Total DSL coverage in December 2007 is estimated at close to 96%.

Number of DSL connections by download rate



Download rates for DSL services between 1 and 2 Mbps are predominant, and represent more than 43% of the DSL connections. Nevertheless, in 2007, more and more providers began to market faster connections at prices lower than in 2006. Roughly 30% of all DSL connections are now equipped with download speeds of over 2 Mbps.

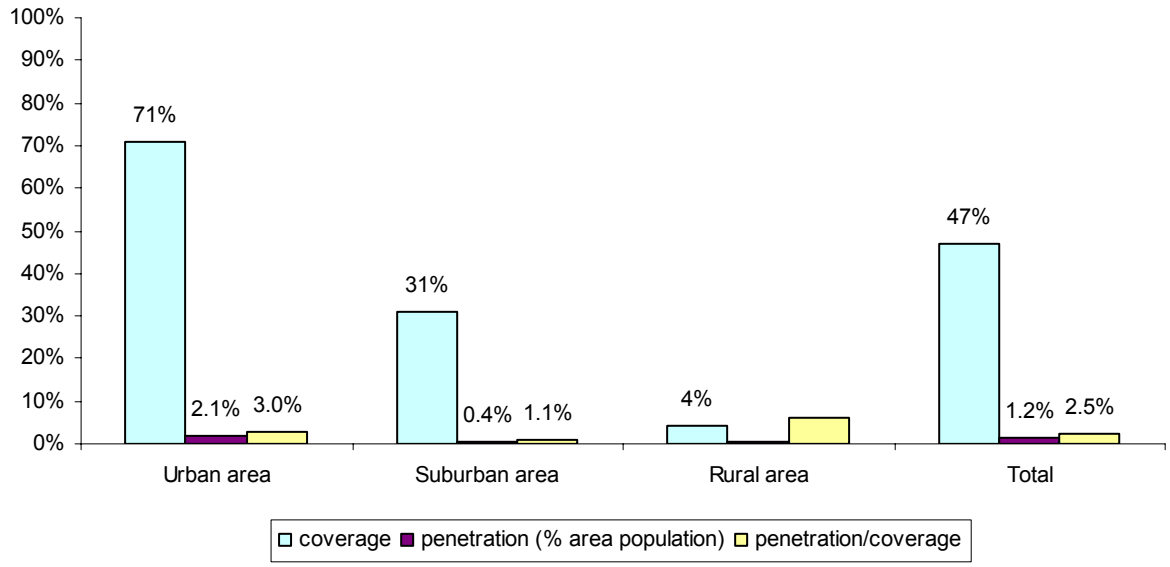
Percentage of DSL connections by type of provider



In 2007, new entrants again grew significantly faster than incumbent Deutsche Telekom. The prominence of resale offers has decreased (18.9% vs. 22.4% in 2006) while ULL is now the fastest growing segment – accounting for almost a third of all DSL connections (32.4%).

4.9.4. Cable modem coverage and take-up

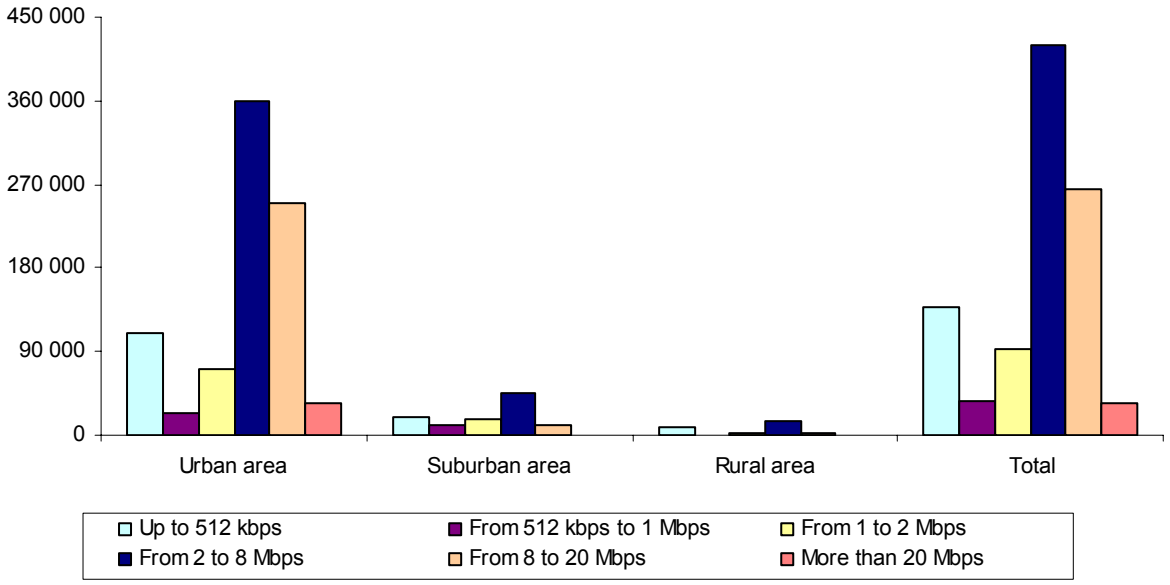
Coverage and penetration



The penetration rate for cable modem services in Germany is still very low (1.2%), despite considerable growth in 2007. Though cable operators made substantial progress in 2007, most of the cable infrastructure needs to be upgraded for interactive services and, as it stands, most of it is unable to deliver broadband Internet. Upgrades to the cable network have been primarily in urban and suburban areas, and only in selected rural areas close to large cities.

In most regions that are covered by cable – mostly urban areas – DSL was available long before cable modem services were launched, which has contributed widely to low broadband cable penetration rates.

Number of cable modem connections by download rate



Cable modem customers subscribe to higher download rates than their DSL counterparts. More than half of the cable modem users were subscribing to offers with download speeds over 2 Mbps. Nevertheless, the number of customers for slower connections, running at up to 512 kbps, grew significantly in 2007 as former narrowband users upgraded their service.

4.9.5. Other broadband access technologies

FTTx

Incumbent carrier, Deutsche Telekom, has been rolling out its FTTN+VDSL network in the major German cities since October 2006. At the end of 2007, 27 of the country's largest cities, and 8.3 million households were covered. Deutsche Telekom offers download rates of 25 or 50 Mbps. However, FTTN+VDSL broadband access is only marketed in a bundle together with Deutsche Telekom's IPTV service.

The first provider to deploy FTTH in Germany was NetCologne, a city carrier based in Cologne. The operator began to connect the first households in the centre of Cologne in December 2006, offering a service running at up to 100 Mbps. Thanks to companies like NetCologne, M-Net and Martens, competition in the FTTx market is growing and symmetrical bitrates of up to 300Mbps are available. Telecom Italia's subsidiary Alice is planning to build its own FTTH network starting in Q3 2008, covering up to 130,000 households in Hamburg. There were a total of 108,000 FTTx subscribers in Germany by the end of 2007.

PLC

The development of PLC in Germany is meagre and stagnating. According to Germany's NRA, the "Bundesnetzagentur", there were 9,500 PLC-based Internet subscribers in Germany at the end of 2007, which is the same number as in 2006.

Wi-Fi

In 2007, the number of PWLAN hotspots rose to over 10,000.

Most commercial (there are also a few non-commercial) PWLAN hotspots are located in urban areas, especially in hotels, cafés, airports and on university campuses.

WLL/WiMAX

Up until now, there have only been field trials for WiMAX in Germany, as frequencies were not allocated until December 2006. In December 2006 five companies, including Clearwire, Deutscher Breitband Dienst GmbH and Inquam were awarded broadband wireless access licenses at auction, with each required to have covered at least 15% of its region by the end of 2009.

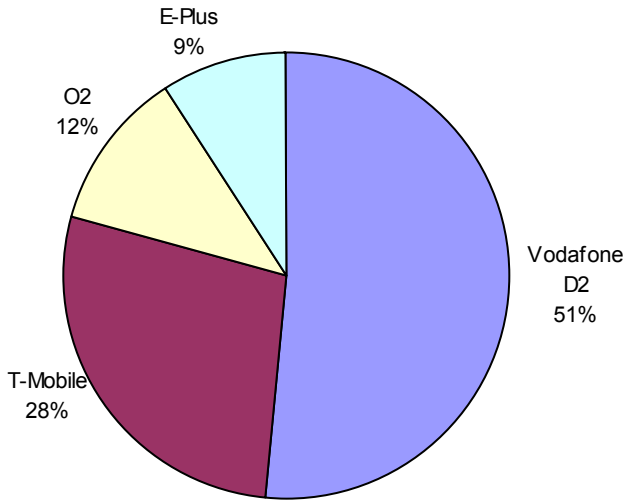
Satellite

Satellite Internet subscribers totalled an estimated 36,500 at the end of 2007 compared to 56,000 the year before. In spite of the high costs, the number of two-way satellite subscribers has increased significantly: from under 1,000 in 2006 up to 9,000 in 2007.

Cellular

By the end of 2007, UMTS subscribers in Germany had nearly doubled to 10.4 million, from 5.5 million at the end of 2006. Depending on the provider, 3G coverage ranged at year-end from 55% to over 80% (highest for Vodafone Germany). HSDPA coverage was estimated at 70%.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.10. Greece

4.10.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	6,814,761	1,899,196	2,457,783	11,171,740
Share of total population	61.0%	17.0%	22.0%	100.0%

4.10.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	2%	9%	12%	18%*	86%
DSL subscribers	8,183	46,547	158,000	485,793	1,016,076
DSL penetration (% of population)	0.1%	0.4%	1.4%	4.4%	9.1%
Cable modem coverage (% population)	0%	0%	0%	0%	0%
Cable modem subscribers	0	0	0	0	0
Cable modem penetration (% population)	0.0%	0.0%	0.0%	0.0%	0.0%
FTTx subscribers	0	0	220	474	594
PLC subscribers	0	0	0	0	0
WLL subscribers	0	0	419	648	1,231
Satellite subscribers	0	0	0	*350*	520
Total	8,183	48,547	158,639	487,265	1,018,421
Total penetration (% population)	0.1%	0.4%	1.5%	4.4%	9.1%

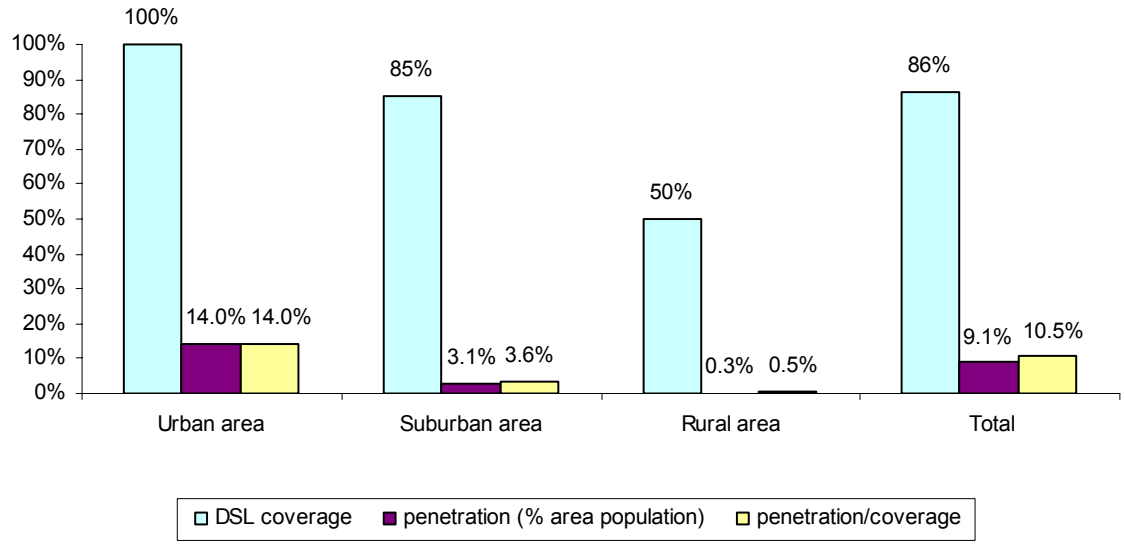
* installed capacity (ADSL ports) as a % of total fixed lines

At the end of 2007, the number of broadband connections exceeded the one million mark – having increased by 109% over the course of the year, with a penetration rate reaching 9.1% by year-end. Although DSL coverage figures for 2006 and 2007 are not directly comparable (see comment above), very significant progress has been made in 2007. However, Greece is still lagging behind most EU Member States, however – ranking among the bottom four in terms of broadband penetration.

The urban/rural disparities are expected to shrink over the coming years, as construction has begun on at least 75 optical fibre metropolitan networks and 140 wireless networks – expanding broadband coverage across Greece. At the same time, the development of digital services for citizens, such as e-healthcare and e-government (by municipalities, such as Trikala in central Greece), the convergence between fixed and mobile telephony and the provision of increasingly competitive broadband service packages by fixed and mobile telephony providers (double-play and triple-play bundles) indicate that Greece is now home to the same services as any other EU Member State.

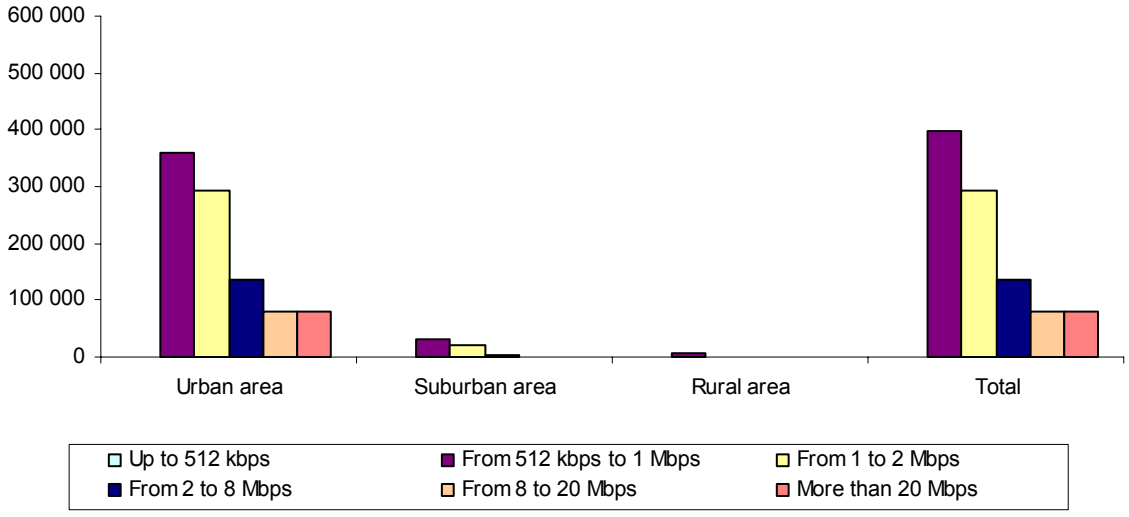
4.10.3. DSL coverage and take-up

Coverage and penetration



There were more than 1 million DSL connections in Greece at the end of 2007, most of them in urban areas where incumbent carrier, OTE, and alternative operators have concentrated their investments. Penetration in suburban areas and rural areas remains low as service has only been introduced recently.

Number of DSL connections by download rate

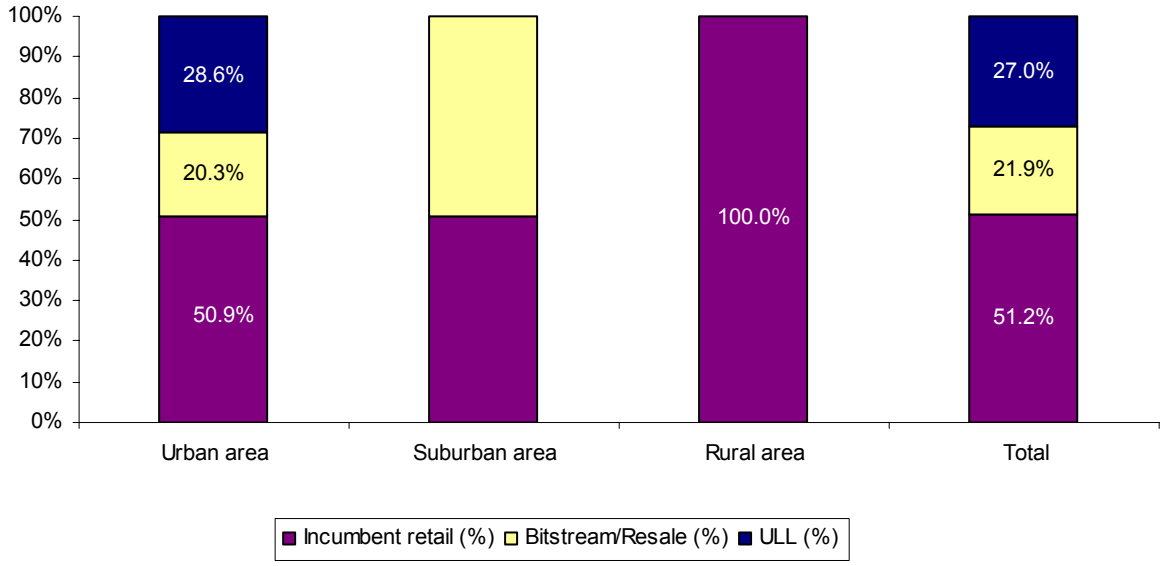


As revealed in the above chart, the majority of the broadband lines (70.2%) offers access speeds of up to 1 Mbps (download). In particular, the majority of the ARYS lines (ADSL lines delivered by OTE, either to retail subscribers or to resellers) deliver services running at 768 Kbps and 1024 Kbps (download), with a significant percentage providing faster connections (2048 Kbps download). The average speed is around 1 Mbps.

But very encouraging is the fact that a rather large percentage (8%) of the higher speed broadband lines deliver a connection rate of over 20 Mbps, which seems to indicate a shift in the alternative offers to very high speed.

This increase in connection rates would seem to imply an improvement in the services being provided and, by extension, higher broadband penetration in the coming years.

Percentage of DSL connections by type of provider



The percentage of DSL operated by the incumbent or its ISP subsidiary is just over 50%. For the first time ever, the number of LLU lines exceeded DSL connections resold from OTE.

At the end of December of 2007, OTE was operating 119 local exchanges in Greece providing physical collocation. The rise in the use of collocation, which began in the second half of 2006, is due chiefly to the growing use of LLU (only in urban areas at the end of 2007), allowing the country's other operators to provide more than 60% of customers with an alternative to the incumbent's offer.

ADSL access through ARYS OTE lines accounts for one third of broadband connections, or 32.9% of the market (OTENET and Cosmote included). Excluding OTE subsidiaries, it represents just over a fifth of the market.

4.10.4. Other broadband access technologies

Other fixed broadband technologies represent only 0.7% of total broadband connections – revealing of the lack of facilities-based competition in Greece.

Cable

Cable modem is not available in Greece.

FTTx

There were a total 594 FTTx connections at the end of 2007, a 25% increase over 2006. The construction of new metropolitan networks is expected to spur a substantial increase in the near future.

Wi-Fi

Hotspots have not been widely deployed in Greece.

WLL/WiMAX

FWA licenses were granted to three operators in 2005 and the fourth one was awarded in mid-2006, hence allowing the development of WiMAX technology. There is still no data available for this technology.

Satellite

There were 520 satellite customers at the end of 2007, broken down by access speed as follows:

Download speed	512 kbps	1 Mbps	1 Mbps	2 Mbps
Upload speed	256 kbps	256 kbps	512 kbps	512 kbps
Subscribers	360	98	36	26

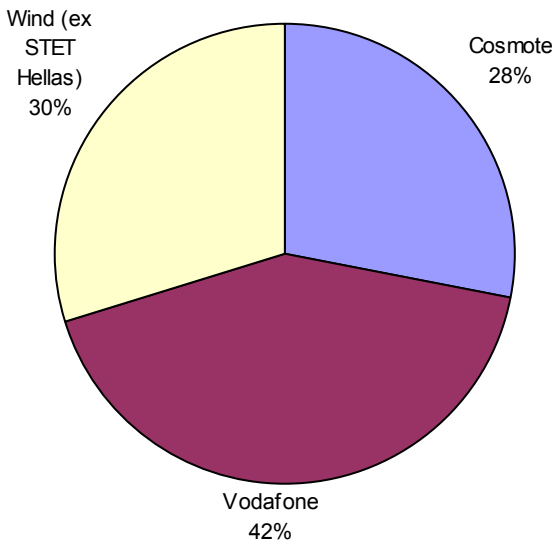
Cellular

The mobile operators in Greece are: Cosmote, Vodafone and Wind.

At the end of 2007, Cosmote was providing UMTS coverage in all major cities in Greece, with speeds up to 3.6 Mbps/384 kbps (upgrade to HSDPA) and 1.8 Mbps/384 kbps in rural areas, covering 84% of the population; however, HSDPA coverage was still less than 40%. Vodafone is reporting 63% coverage of the population, with around 570,000 3G subscribers and around 20,000 3G Internet connections.

The total number of 3G subscribers is around 1.3 million, with the breakdown by operator provided in the following chart.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.11. Hungary

4.11.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	3,381,995	3,513,298	3,170, 790	10,066,083
Share of total population	33.6%	34.9%	31.5%	100.0%

4.11.2. General broadband data

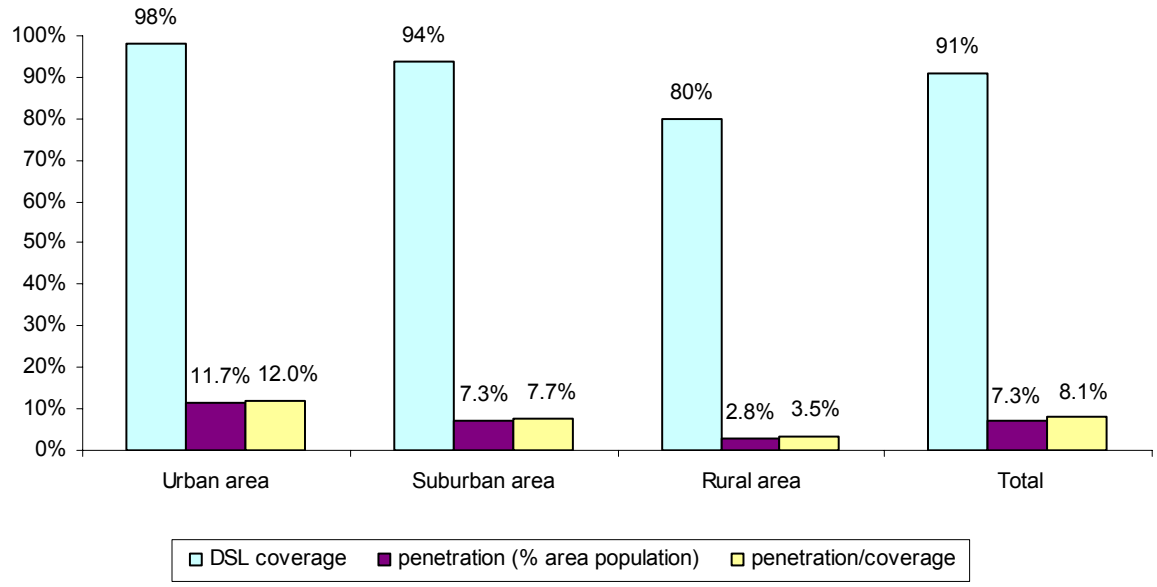
	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	58%	70%	85%	89%	91%
DSL subscribers	114,813	235,969	372,523	613,000	739,028
DSL penetration (% of population)	1.1%	2.3%	3.7%	6.1%	7.3%
Cable modem coverage (% population)	-	-	66%	72%	73%
Cable modem subscribers	77,189	135,803	191,997	293,000	563,593
Cable modem penetration (% population)	0.8%	1.3%	1.9%	2.9%	5.6%
FTTx subscribers	-	-	1,000	1,000	23,000
PLC subscribers	0	0	0	0	0
WLL subscribers	-	-	10,200	64,964	125,000
Satellite subscribers	-	-	-	-	8
Total	192,002	371,772	575,720	971,964	1,450,629
Total penetration (% population)	1.9%	3.7%	5.7%	9.6%	14;4%

Competition in Hungary's broadband market was fierce in 2007, with 984 service providers competing, including 30 with a substantial market share.

The Hungarian market had some specificities. The number of DSL subscribers was growing significantly in 2007, but the gap between xDSL and cable modem penetration become narrower. The development of xDSL service in the first phase was concentrated on the largest cities, and in the second phase (from the 2nd half of 2006) the newly connected settlements dominated by small towns and villages with significantly smaller local markets. The huge amount of new cable modem subscribers were concentrated in the small and medium sized towns, where the cable networks were modernised under the law of unified communication services (2003). The topography of networks and their capacity in data communication increased dramatically. In Hungary about 52% of flats were connected into cable networks in 2007, so the double-pay service (cable TV and broadband internet connection) and the new triple pay service (the first two with cable phone service) opened a new segment of the broadband market, particularly in small and medium sized cities. This competition had positive effect on prices, as well in the 2005-2007 period (with price reductions of more than 40%).

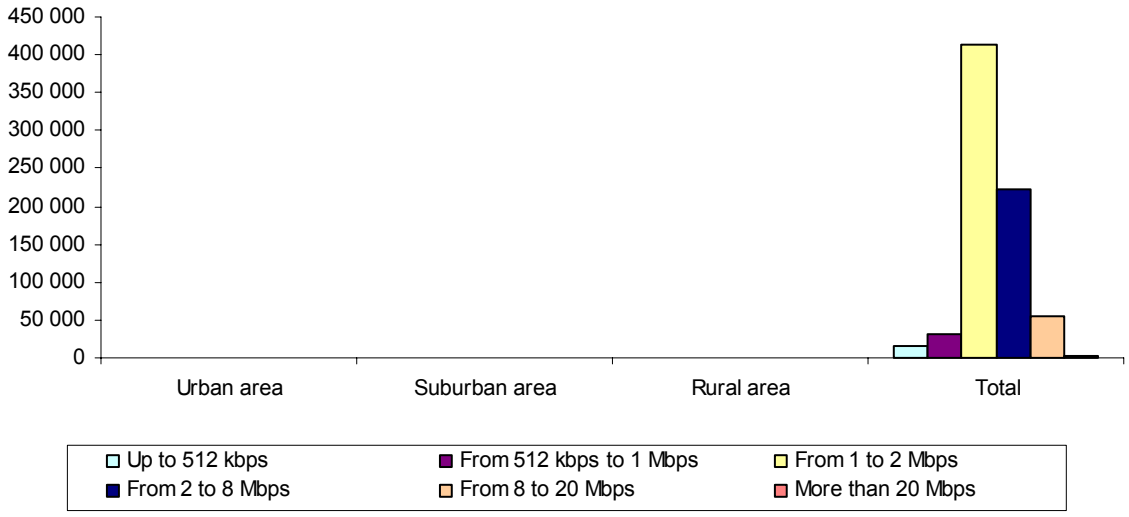
4.11.3. DSL coverage and take-up

Coverage and penetration



DSL coverage is improving, rising from 89% at the end of 2006 to 91% by the end of the 2007. This increase includes newfound coverage for over 100 more towns, with a dead zone now of only 300 small villages – most of which are in four NUTS2 regions (Nyugat-Dunántúl, Dél-Dunántúl, Észak-Magyarország and Észak-Alföld). The reason for the lack of coverage is the particular structure of these areas which are composed of a great many villages and hamlets of fewer than 500 and, in some cases, fewer than 100 inhabitants. Demand for DSL is limited in these areas, so provides little incentives for operators to deploy. There are nevertheless government-led programmes for helping fund rollouts in these areas, and so helping to eradicate the digital divide.

Number of DSL connections by download rate



There were no available data showing the download rates in urban-suburban-rural areas. The legal constraints do not give the National Communication Authority the opportunity to publish this data

without the agreement of all market actors. These companies were opposed the publication for market security reasons.

The breakdown of the subscriber base by connection speed changed considerably during the year. The portion of customers subscribing to the slowest services (up to 512 kbps) shrank dramatically from 208,000 in 2006 to 15,600 by the end of the year, with that segment now accounting for only 2.3% in the total DSL market (33.9% in 2006). The same trend occurred in the next category up, whose subscriber base plummeted from 263,000 in 2006 to 28,000 at the end of 2007, its market share dropping to 4.3% (42.9% in 2006).

The dominant download speed is now the 1 to 2 Mbps category, accounting for over 380,000 customers at the end of 2007 (versus just under 120,000 in 2006) – the market share for this category rising from 19.5% in 2006 to 55.8%.

The second largest download category is 2 to 8 Mbps, accounting for 30% of subscribers at the end of 2007 (3.6% in 2006), or close to 205,000 customers (vs. 22,000 in 2006).

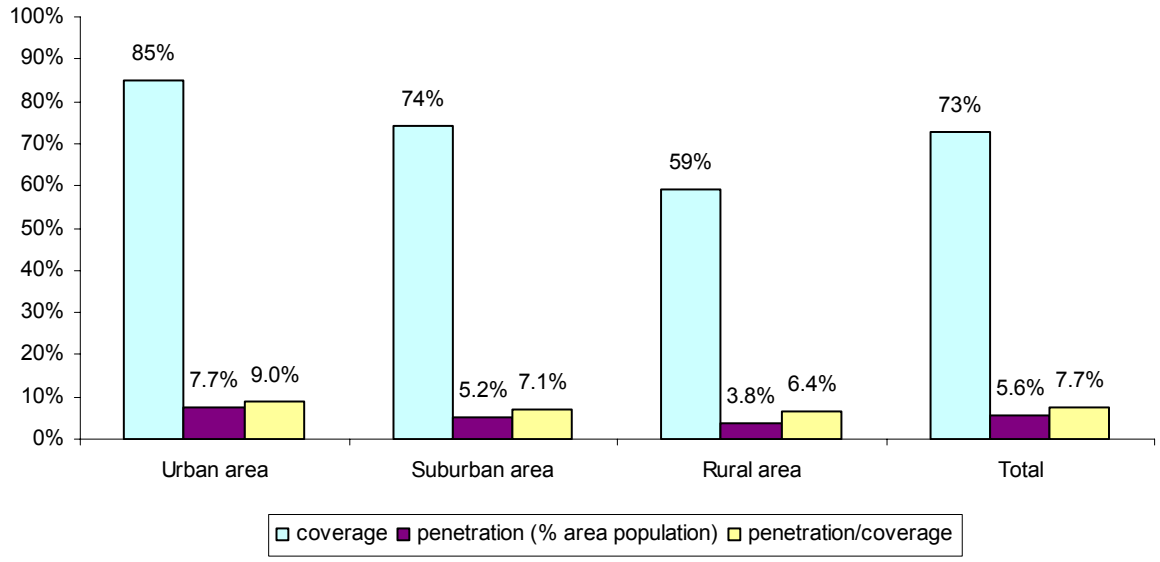
Services running at 8 to 20 Mbps were a new addition to the Hungarian DSL market in 2007, attracting close to 50,000 clients, or 7.3% of the market. And, finally, there were 3,300 subscribers to the fastest solutions (running at over 20 Mbps) at the end of 2007, representing a minimal market share (0.5%). But, as technologies develop and costs decrease, higher end solutions are becoming increasingly popular and providing a response to customers' needs.

Percentage of DSL connections by type of provider

The incumbent carrier enjoys solid dominance of the retail DSL market, supplying 75% of all subscriptions directly, with the remaining 25% being provided by alternative ISPs via bitstream or, more generally, resale offers. Competition is highest in the country's urban and rural areas where alternative operators have a 26.8% and 30.2% market share, respectively. In suburban areas, just over 20% of DSL are supplied via wholesale offers (resale/bitstream or ULL). Unbundling is not prominent in Hungary, accounting for only 24 lines in 2006 and no data have been released for 2007 as ULL continues to be a marginal solution.

4.11.4. Cable modem coverage and take-up

Coverage and penetration

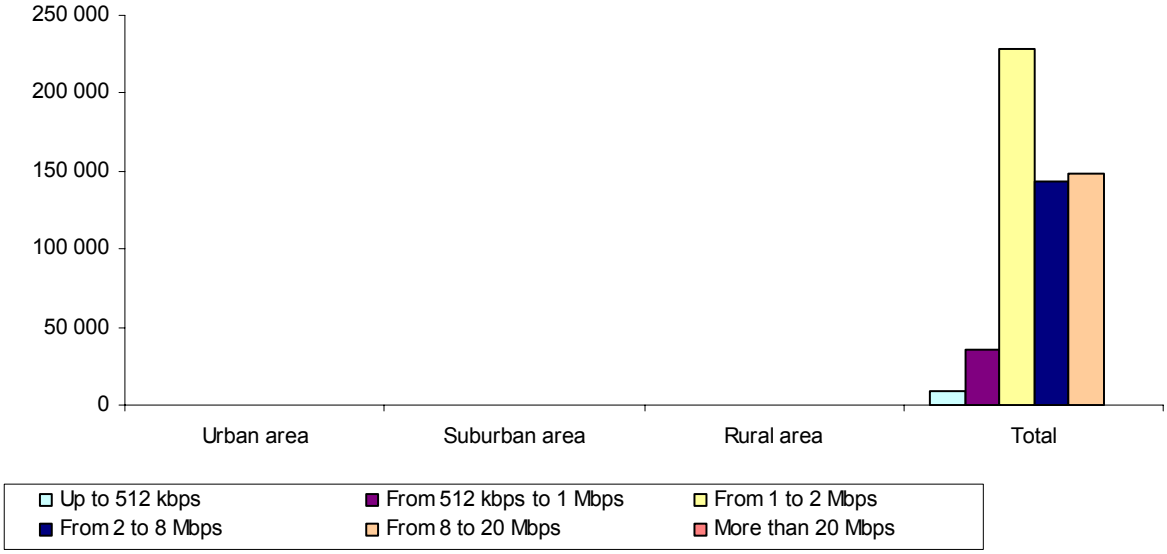


There was approximately 410 cable modem operators in Hungary at the end of 2007, but only six of them operate a large-scale network. The vast majority of service providers operate a small or medium sized network in a given area (mainly in villages and small towns), and so only a tiny share of the total market.

Figures for cable modem coverage reveal deeper regional inequalities than for DSL coverage, partly because of the smaller footprint of existing networks. A breakdown of the total nationwide coverage figure of 73% indicates that coverage in urban areas is 16% higher than in the country as a whole, with coverage in suburban areas being around the national average of 73%, and much lower in rural areas.

The location breakdown differs only somewhat from the segmentation of the DSL base, with roughly 46% of cable modem customers (or 260,000) located in urban areas, compared to 71% or 136,500 at the end of 2005. Subscriber increases were largely in suburban and especially rural zones where the customer base grew from 48,000 to 183,600 (from 25% of customers to almost 33%). In 2005, rural areas accounted for fewer than 4% of the total base (or 7,500 customers), but rose to over 21%, or 120,000 users, by the end of 2007. These figures are reflective of operators' changing development strategies – shifting their focus from major towns with large housing estates where rollout and operational costs are lower, to smaller markets where competing technologies (especially DSL) have an only tiny market share. As a result, the gap is closing between urban and suburban coverage and take-up levels, and even between urban and rural areas.

Number of cable modem connections by download rate



There were no available data showing the download rates in urban-suburban-rural areas. The legal constraints do not give the National Communication Authority the opportunity to publish this data without the agreement of all market actors. These companies were opposed the publication for market security reasons.

The changes in the most popular download rates are similar to what we find with DSL customers, in other words a move away from the slowest services (up to 512 kbps), whose customer base shrank from 106,000 to 7,600 and their market share from 36.2% to 1.5%. These figures are revealing of the impact of the technological strides the sector has made since 2003.

The second slowest category lost market share as well. The number of users decreased moderately (from 36,000 to 31,000), but as the total number of broadband customers rose nationwide, its share of the market dropped from 12.2% to 6.3%.

The most popular categories are now solutions running at 1 to 2 Mbps, accounting for almost 200,000 subscribers (compared to 43,000 the year before) or 40.5% of the total market (14.8% in 2006). The next category (from 2 to 8 Mbps) also underwent a shift, going from 36.8% of customers (108,000) in 2006 to 125,000 in 2007, but its market share dropped to 25.3%. The third most popular category was services running at 8 to 20 Mbps, accounting for 130,000 users or 26.4% of the cable modem subscriber base at the end of 2007. These solutions were not even available the year before, and their take-up is a sign of the demand for higher speeds. There were no customers for services running at over 20 Mbps at the end of 2007, but the current development phase focused on delivering IPTV services over cable is expected to spur a swift increase in the clientele for these high-end solutions, starting in 2008.

4.11.5. Other broadband access technologies

FTTH

There is some FTTH activity in the country in the business segment, but it is not substantial as yet and does not seem to be making any significant strides.

Wi-Fi

Wi-Fi has enjoyed a rapid growth in Hungary, due notably to the free usage of the 2.4GHz frequency band which can be employed for business applications.

WLL/WiMAX

The WLL market is growing rapidly. The number of subscribers doubled in 2007, with 125,000 customers at the end of 2007, representing 8.7% of total broadband connections at the end of 2007.

Cellular

3G, UMTS, HSDPA and HSUPA geographical coverage has increased substantially over the last two years, going from 1% in 2005 to 5% in 2006 and up to 11% by the end of 2007 and, in terms of the population, from 17% to 34% and, finally to 55% in 2007. The number of towns covered is lower, however (1%, 4% and 8%) which underscores the players' strategies of focusing chiefly on the major markets (urban and suburban areas).

In 2007, the dominant technology in broadband mobile communication was UMTS, with a maximum download speed of 384 Kbit/s. Two of the three service operators began a new phase of development, particularly in and around the capital city Budapest, to increase the download speed up to 1,5 Mbit/s. By the end of 2007, the covered area was less than 5% of the country, however it affected at least one-third of the mobile broadband market. We have no proper data about the two different types of mobile broadband subscribers but we approximate to 25% the share of the market subscribing to HSDPA.

The number of subscribers has grown swiftly over the last two years: from fewer than 1,000 in 2005, to 50,000 at the end of 2006 and then to between 310,000 (number of active SIM-cards) and 350,000 (official number of subscribers) at the end of 2007 – which means a mobile penetration rate that rose from 0.5% to 3.1-3.5% in a single year.

The main reason for the boom in mobile subscriptions can be traced back to operators' new packages that offer lower costs, more stable download rates and download speed upgrades – available mainly to customers in the largest cities.

4.12. Iceland

4.12.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	190,706	-	116,966	307,672
Share of total population	62.8%	0.0%	37.2%	100.0%

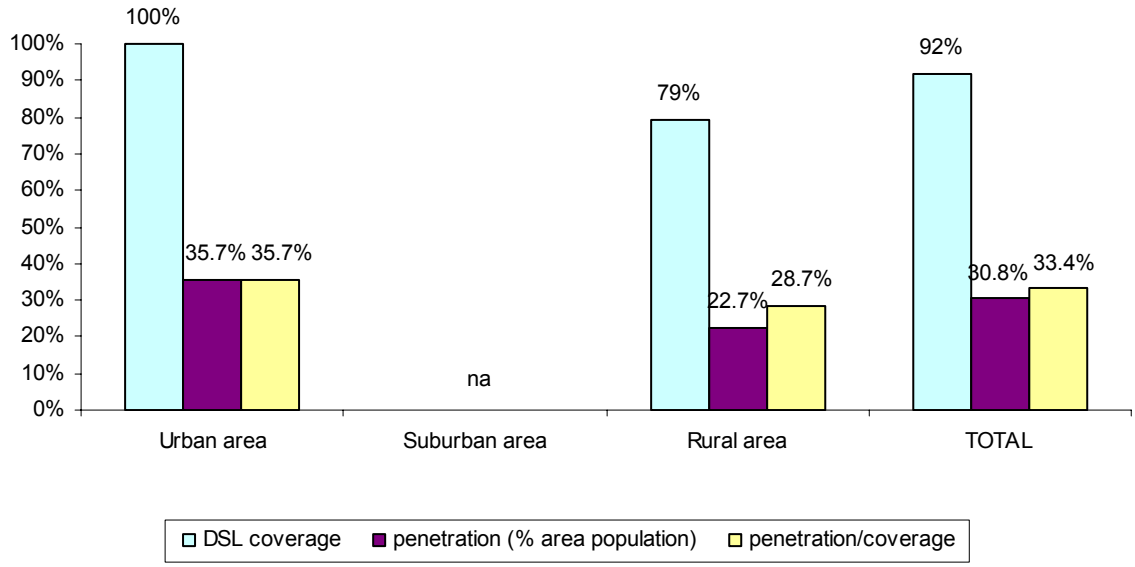
4.12.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	90%	92%	92%	92%	92%
DSL subscribers	40,419	50,612	75,897	84,350	94,630
DSL penetration (% of population)	13.8%	17.2%	25.9%	28.1%	30.8%
Cable modem coverage (% population)	31%	31%	31%	31%	31%
Cable modem subscribers	700	670	432	500	500
Cable modem penetration (% population)	0,2%	0,2%	0,1%	0.2%	0.2%
FTTx subscribers	-	92	204	500	1,218
PLC subscribers	700	1,020	-	-	-
WLL subscribers	700	795	1,380	1,500	2,017
Satellite subscribers	,	75	104	150	72
Total	41,819	53,264	78,017	87,000	98,437
Total penetration (% population)	14.3%	18.1%	26.6%	29.0%	21.0%

Broadband penetration is very high in Iceland, due chiefly to the increase in DSL take-up, with cable modem becoming marginal. The penetration rate (32% at the end of 2007) places Iceland in 3rd place in Europe and 6th place in the world. This is due to the fact that Iceland is geographically isolated and that broadband access is an economical way (even if tariffs are high compared to other European countries) for communicating with people overseas, especially for business users.

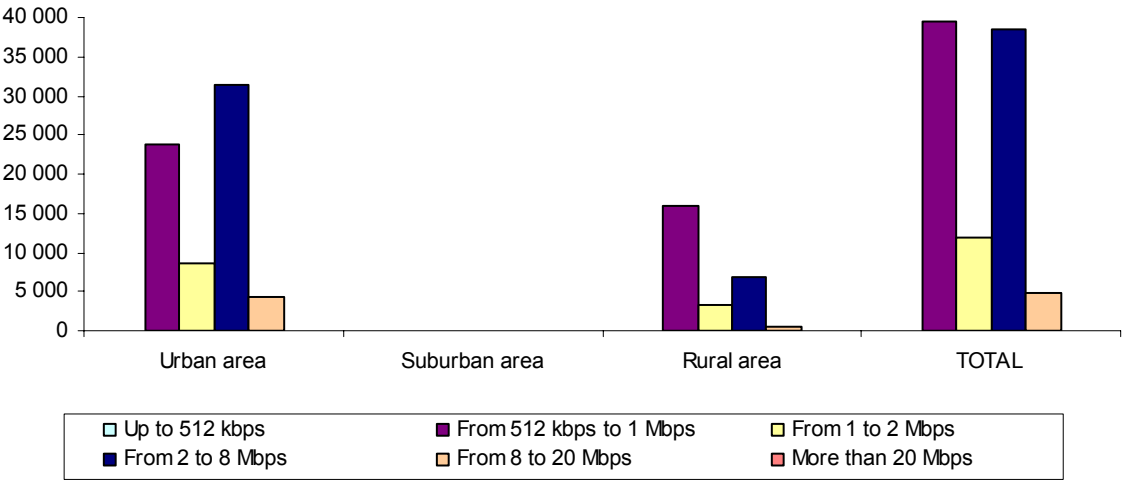
4.12.3. DSL coverage and take-up

Coverage and penetration



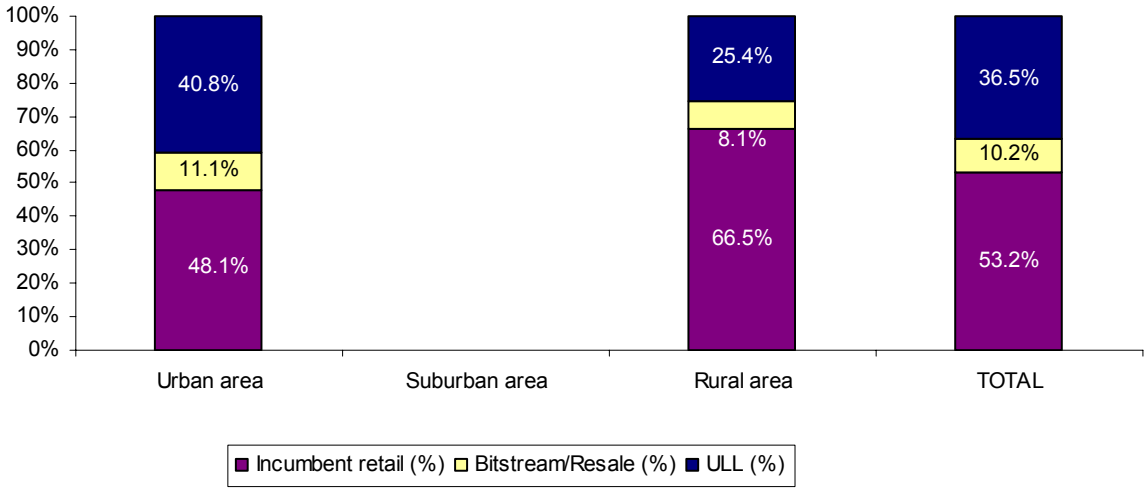
The coverage in Reykjavik is 100%. In the rest of the country (rural), average coverage is 79% of the population.

Number of DSL connections by download rate



Just over half of DSL users subscribed to offers with download rates of over 2 Mbps.

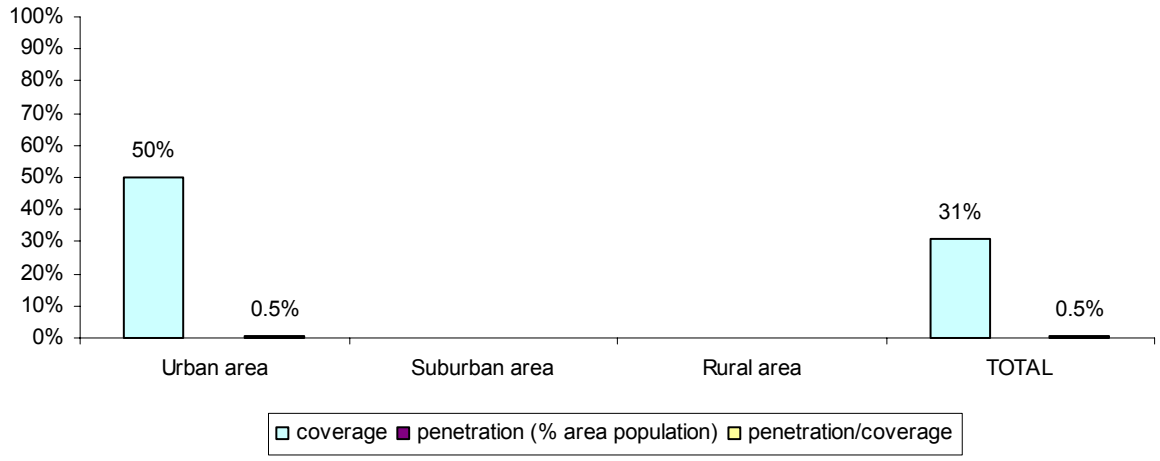
Percentage of DSL connections by type of provider



Unbundling is well developed in Iceland, notably in urban areas where customer density is high.

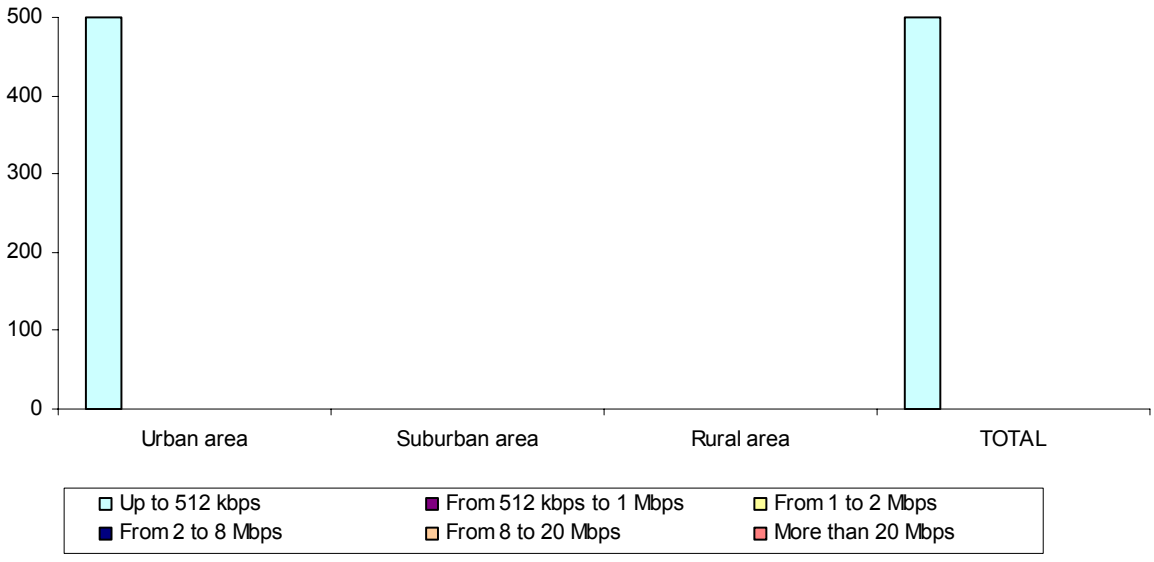
4.12.4. Cable modem coverage and take-up

Coverage and penetration



Cable modem services are provided only by the incumbent, Siminn, and mainly in the Reykjavik area. The number of subscriptions remains very low.

Number of cable modem connections by download rate



The number of cable modem subscribers has not changed significantly over the past five years, and now amount to less than 1% of broadband connections. None of the connections supply download rates exceeding 512 Kbps.

4.12.5. Other broadband access technologies

FTTx

A subsidiary of Reykjavik Energy, Lina.net, markets FTTH services, with incumbent telco, Siminn, and og Vodafone also offering optical fibre access (only FFTB or FTTC for Siminn). The number of connections increased more than 140% in 2007, but remains relatively low at 1,218 subscribers (only 1.2% of the market).

PLC

PLC services are offered by Reykjavik Energy, which has the capability to provide broadband access (coverage) to roughly 30,000 of the approximately 70,000 households in Reykjavik. There were 1,020 subscribers at the end of 2004, but since then the trial has not been expanded and the number of PLC users has not developed.

Wi-Fi

Siminn, og Vodafone and a few small operators offer Wi-Fi access at different hotspots.

Cellular

At the end of 2007, there were no 3G subscribers in Iceland.

4.13. Ireland

4.13.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,770,507	743,945	1,641,667	4,156,119
Share of total population	42.6%	17.9%	39.5%	100.0%

4.13.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	61%	71%	82%	86%	89%
DSL subscribers	23,824	115,583	202,246	389,245	555,727
DSL penetration (% of population)	0.5%	2.7%	4.9%	9.2%	13.4%
Cable modem coverage (% population)	-	5%	11%	*18%*	27%
Cable modem subscribers	4,900	8,045	25,000	55,320	82,500
Cable modem penetration (% population)	0.0%	0.0%	0.6%	1.3%	2.0%
FTTx subscribers	0	0	450	*4,600*	3,967
PLC subscribers	-	-	-	-	-
WLL subscribers	7,603	11,000	40,000	*75,000*	118,400
Satellite subscribers	-	-	2,950	*4,000*	4,247
Total	36,327	134,628	270,646	528,165	764,841
Total penetration (% population)	0.9%	3.3%	6.6%	12.5%	18.4%

Nota: figures in *italics* are estimates.

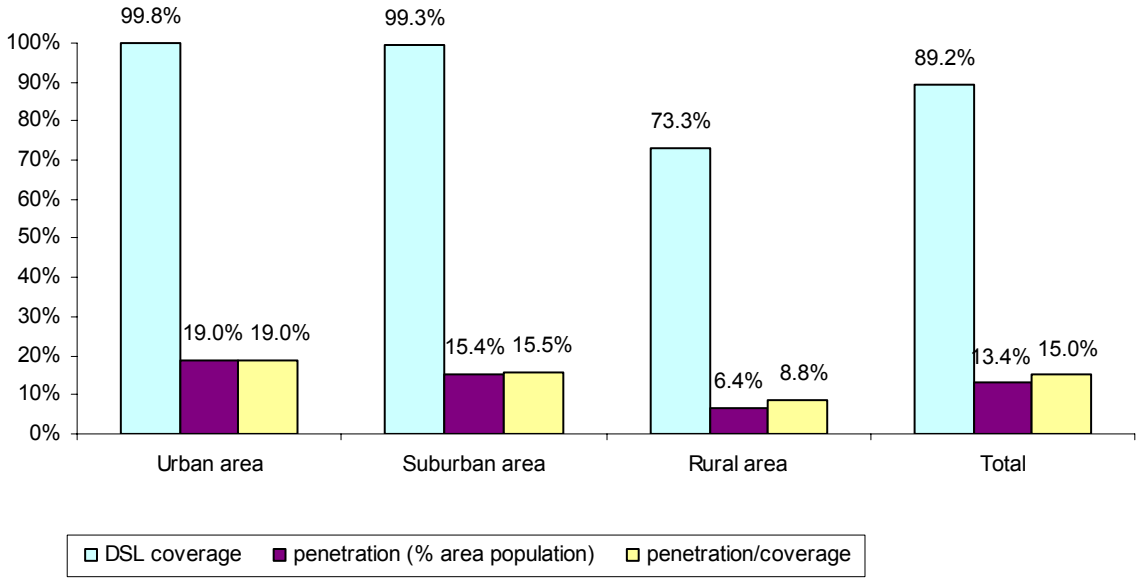
Broadband provision via DSL has increased substantially: totalling 13.4% in 2007 with over ½ a million subscribers. Delivering services nationwide nevertheless remains a challenge due to the disbursement of the population, with a substantial portion living in rural areas.

One of the approaches being taken by the industry to tackle the issue of low rural penetration has been to use mobile and wireless broadband. To this end, the Department of Communications, Energy and Natural Resources launched the procurement stage of the National Broadband Scheme (NBS) in May 2007. The programme will unfold in 2008 with the purpose of overcoming the lack of connectivity for residential and business users in certain parts of the country. The scheme provides support for the deployment of broadband in areas where commercial viability is uncertain.

The most noticeable growth in 2007 was in wireless access whose base more than doubled from the year before to 118,400 subscribers.

4.13.3. DSL coverage and take-up

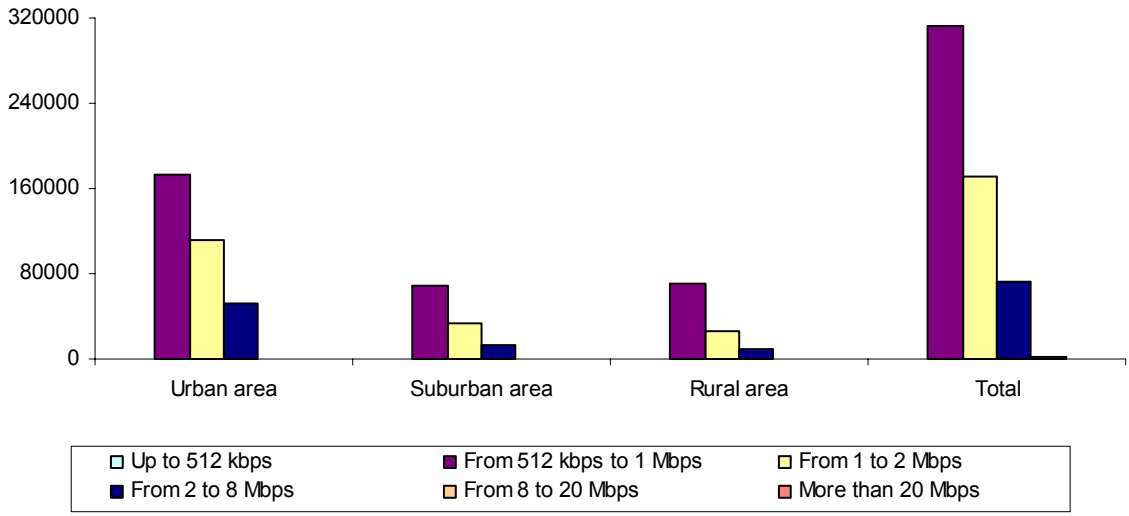
Coverage and penetration



Eircom's DSL customer base increased by 48% compared to 2006, reaching 534,000, of which 72% are retails customers. The incumbent continues its broadband deployment with 569 exchanges broadband equipped at the end of year.

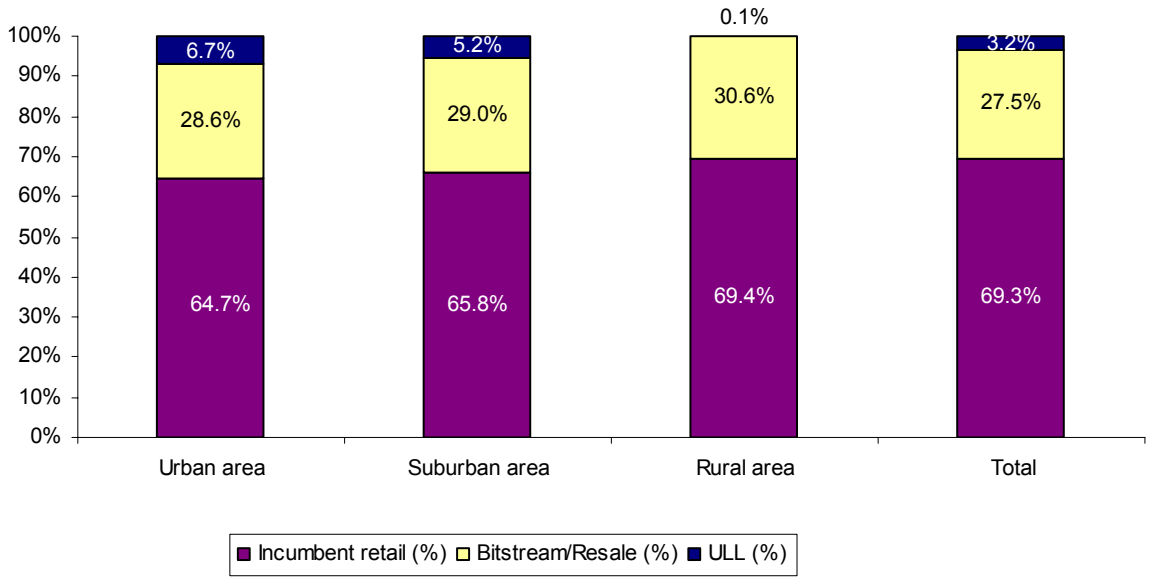
Eircom increased broadband availability by 4.3%, with nearly 90% of the country now covered with DSL. Coverage in rural areas, the most economically challenging, reached 73.3% at the end of 2007.

Number of DSL connections by download rate



Over half (56%) of the connections deliver a service running at between 512 kbps and 1 Mbps, nearly a third at 1 to 2 Mbps, while the rest (13.1%) provide a solution running at between 2 and 8 Mbps.

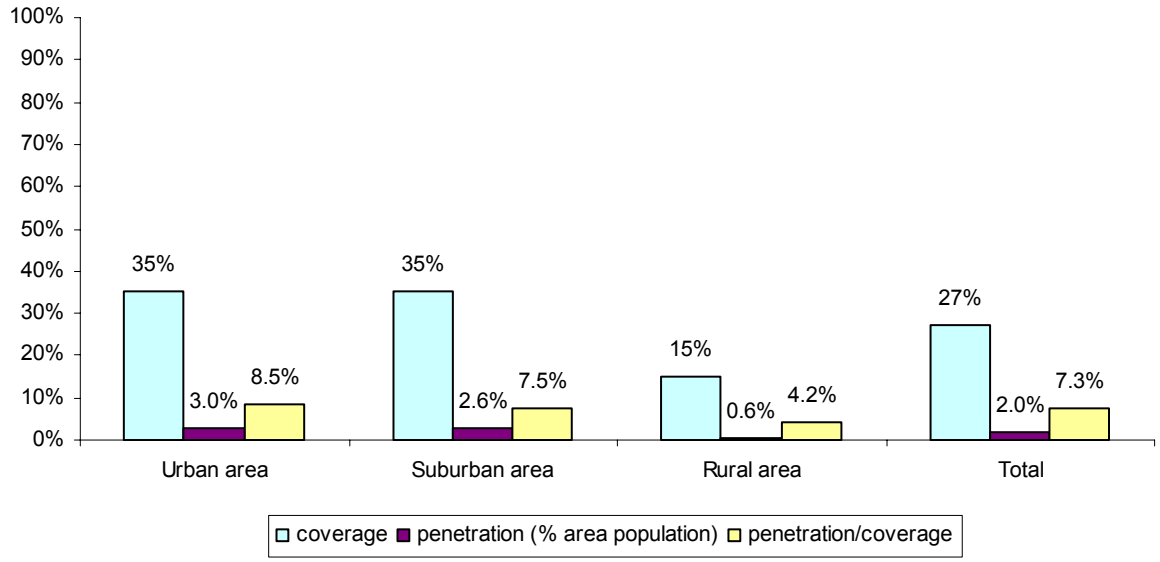
Percentage of DSL connections by type of provider



The vast majority of lines are provided by Eircom, either directly to retail customers (69.3%) or indirectly via a bitstream offer (27.5%). Unbundling represents less that 3.2% of the total base, but is nevertheless up from 2.5% in 2006.

4.13.4. Cable modem coverage and take-up

Coverage and penetration

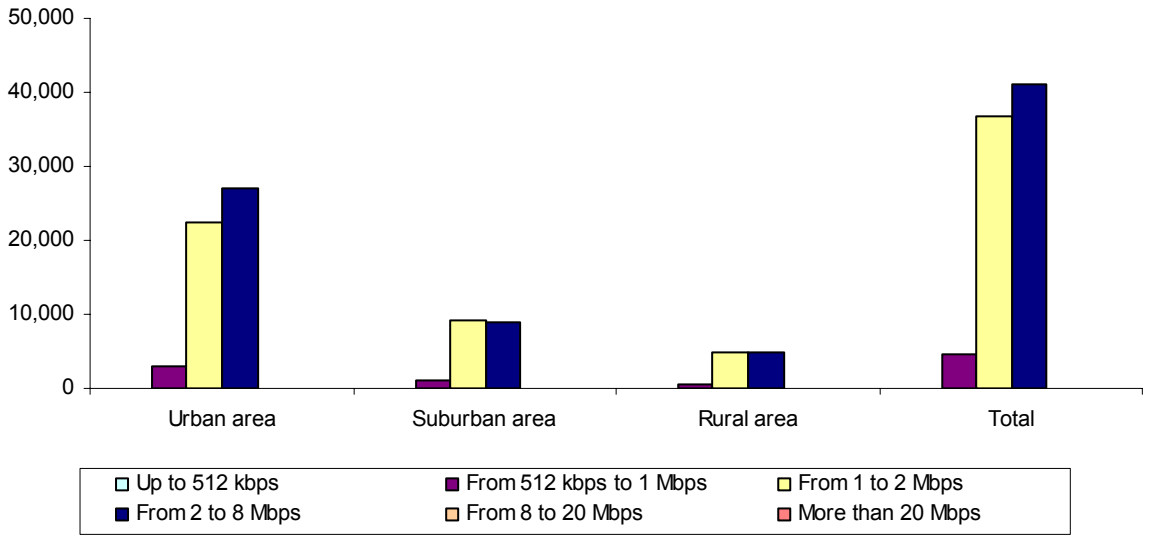


Liberty Global is the leading cable company in Ireland. A breakdown of by location and access speeds is not available. The data have thus been extrapolated based on estimates from other operators and trends in Ireland.

Other players, such as Freedom Broadband and WestNet, are local operators with limited footprints, and also use wireless technologies to serve their customers.

With a base of under 82,500 subscribers, broadband cable services still account for approximately 11% of the country's total broadband connections.

Number of cable modem connections by download rate



4.13.5. Other broadband access technologies

WLL/WiMAX

Wireless broadband increased significantly in 2007 and more than doubled compared to 2006, to reach over 118,000 subscriptions. The technology is used extensively to decrease the digital divide in Ireland, providing connectivity in rural areas. The National Broadband Scheme launched at the end of 2007 and expected to roll out in 2008 will increase further its coverage.

There are also 1,254 Wi-Fi hotspots in the country, operated chiefly by Bitbuzz, Eircom and BT Ireland.

Satellite

There are numerous satellite broadband providers in Ireland, but the monthly subscription remains very expensive when compared to traditional DSL technologies. The download speeds available match entry level DSL solutions, running at around 512 Kbps.

FTTx

Optical fibre and satellite combined account for 8,300 internet subscriptions at the end of 2007.

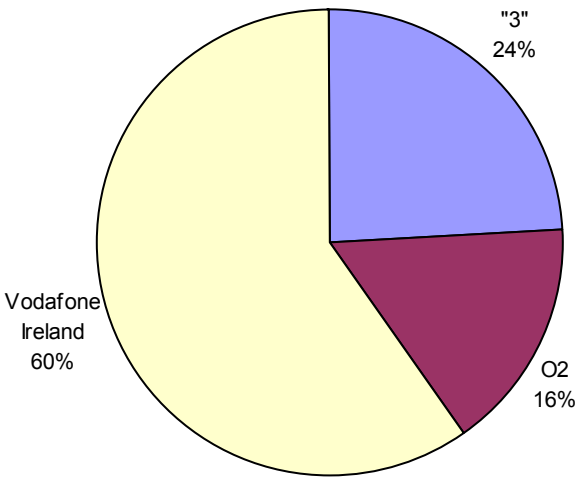
The National Development Plan Agency is financing a Metropolitan Area Network (MAN) that will span across 90 towns that do not have an existing DSL broadband network. The project is not complete and is being reviewed to assess its cost-effectiveness before undertaking the subsequent phases.

Cellular

Recent developments allow mobile operators to compete with fixed broadband as a mean of addressing the lack of coverage in some areas. Comreg reports that approximately 20% of Irish consumers access the Internet from their mobile. Mobile Internet offerings are available from three operators (3Ireland, O_2 and Vodafone) which represented 128,000 subscriptions at the end of 2007, offering speeds of up to 3.6 Mbps.

3G/HSDPA coverage was close to 85% at the end of 2007, with 3Ireland at the forefront.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.14. Italy

4.14.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	29,307,685	21,967,861	7,476,165	58,751,711
Share of total population	49.9%	37.4%	12.7%	100.0%

4.14.2. General broadband data

	12/03	12/04	12/05	12/06	12/06
DSL coverage (% of population)	82%	85%	87%	89%	94%
DSL subscribers	2,280,000	4,434,745	6,673,900	8,250,000	9,600,000
DSL penetration (% of population)	4.0%	7.7%	11.5%	14.7%	16.3%
Cable modem coverage (% population)	0%	0%	0%	0%	0%
Cable modem subscribers	0	0	0	0	0
Cable modem penetration (% population)	0.0%	0.0%	0.0%	0.0%	0.0%
FTTx subscribers	160,100	198,920	233,000	260,000	270,000
PLC subscribers	0.0%	0	0	0	0
WLL subscribers	300	600	830	1,000	1,250
Satellite subscribers	65,000	110,000	128,400	101,000	60,000
Total	2,505,400	4,744,265	7,036,130	8,612,000	9,931,250
Total penetration (% population)	4.4%	8.2%	12.1%	14.7%	16.9%

Total broadband Internet connections in Italy are close to 10 million lines at the end of 2007, a 15% increase over the previous year. As cable networks are non existent and FTTH has a limited coverage, DSL has been by far the main broadband access technology.

Market growth is driven by:

- significantly improved xDSL coverage in rural areas (from 51% to 82% in the last year)
- the steady decrease of xDSL prices, most being a monthly flat rate;
- healthy market competition with alternative operators using unbundling solutions in particular (even though Telecom Italia controlled 67% of the DSL market at the end of 2007), and all players providing advanced services.

Bundling of complementary services (Voice over IP + Internet access) is increasing when based on xDSL network. FTTH subscriber numbers had a little increase: only 4% mainly due to the fact that no new great network implementation was planned.

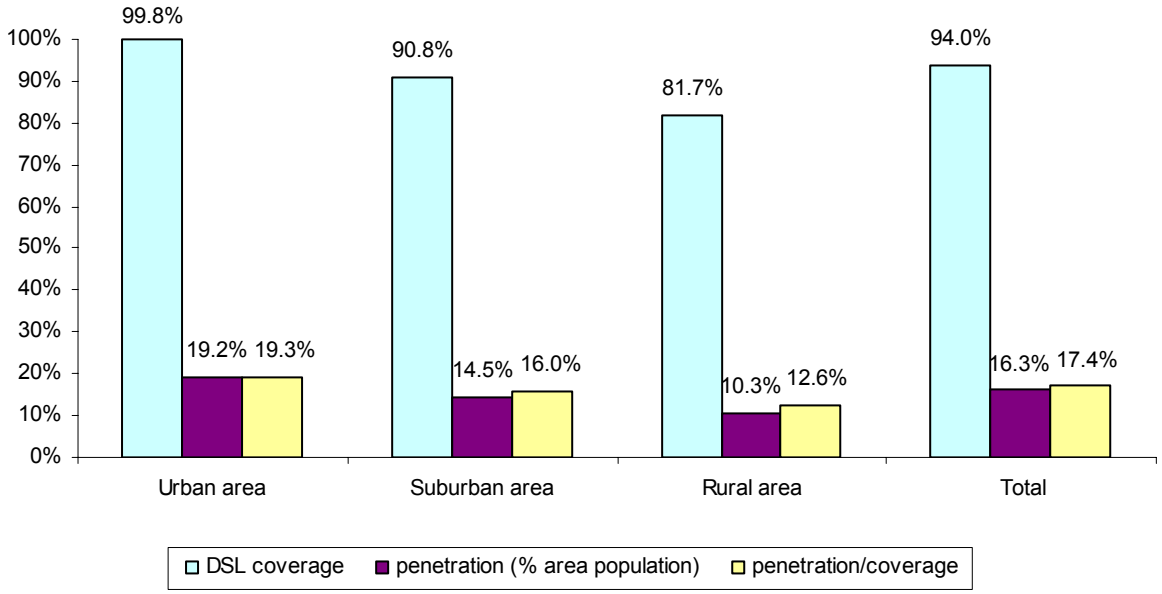
At the end of 2007 there were three IPTV providers in Italy: FastWeb, Telecom Italia and Tiscali, with a customer base of around 300,000, of which 170,000 for FastWeb TV, 125,000 for Alice Home TV (Telecom Italia) and 15,000 for Tiscali TV.

FastWeb was the first supplier in Italy to launch IPTV back in 2001. The service is now available to all of its customers connected via FTTH or ADSL Unbundled, but not to those connected to ADSL via bitstream/resale solutions.

Telecom Italia began trials in 2004-2005. Its IPTV service was launched in 2006 with coverage in 258 cities (836 local exchanges). In 2007, the coverage grew to 464 cities (1,019 local exchanges).

4.14.3. DSL coverage and take-up

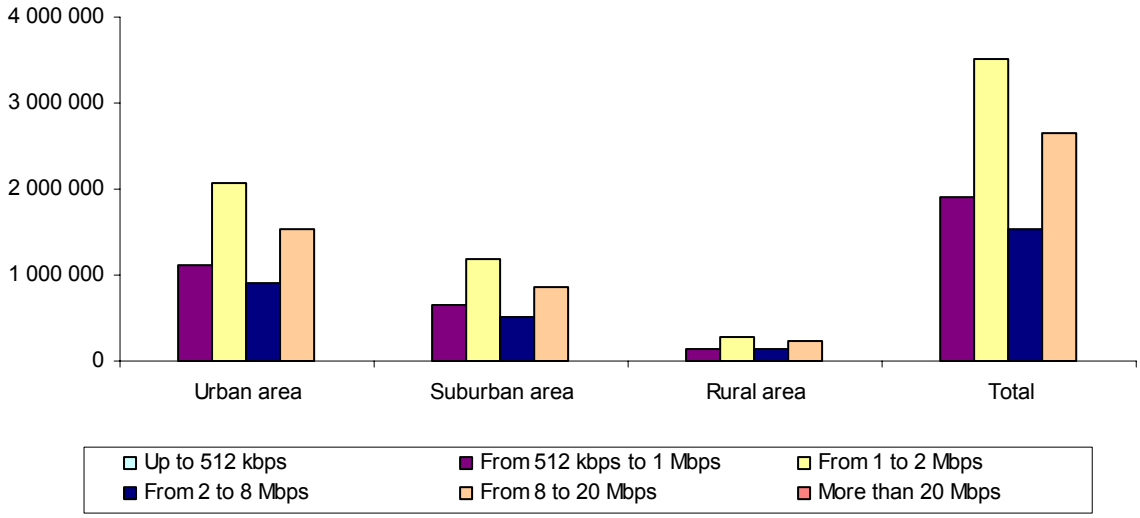
Coverage and penetration



According to Telecom Italia, at the end of 2007, there were 7,586, central offices equipped with DSLAM, covering 94.1% of the total population.

Coverage in rural areas rose by more than 30 points in 2007 (from 50.5% at the end of 2006), and total coverage by five points (89% at the end of 2006).

Number of DSL connections by download rate



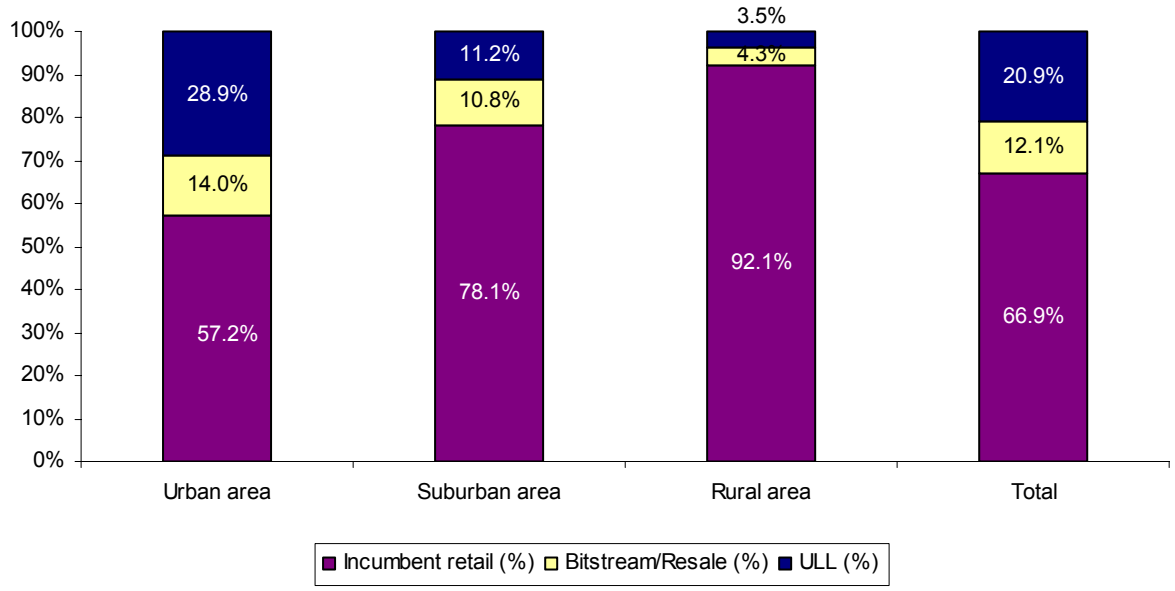
At the end of 2007, 37% of active connections were running at a download rate of between 1 and 2 Mbps and 28% between 8 and 20 Mbps.

In the last year, all the Italian telecom carriers improved their ADSL2 and ADSL2+ offerings with various downstream rates (from 7 Mbps to 20 Mbps) with very little increase in prices.

The leading market players are:

- the incumbent, Telecom Italia, offering 7 Mbps and 20 Mbps services. Telecom Italia reports 413,000 active customers subscribing to services running at over 10 Mbps at the end of 2007;
- FastWeb (4th largest telco in the fixed telecommunications market) has an FTTH offer at 20 Mbps and an ADSL offer at 10 Mbps;
- Infostrada (Wind) offering 7 and 20 Mbps services.

Percentage of DSL connections by type of provider



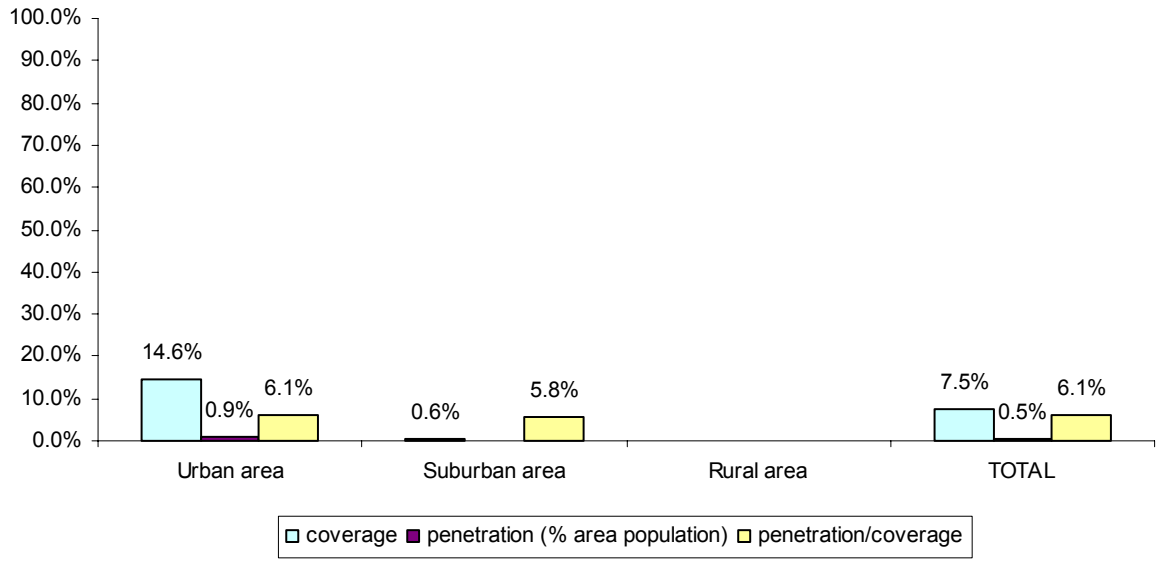
At the end of December 2007, with 6.4 million ADSL, Telecom Italia controlled 67% of the DSL market directly – a share that has decreased only less than two points in the last year (68.4%). The growth rate (of Telecom Italia's retail subscriber base), year to year, was around 14%, slightly less than the total 16% DSL market growth.

With a growth rate of 36%, ULL and shared access lines are the fastest growing markets: with 2,010,000 units, their share increased from 18% to 21% in the last year.

The third component in the xDSL market, i.e. xDSL resold by OLO/ISPs, is decreasing in importance – going from 13.7% at the end of 2006 to 12.1% at the end of 2007, for a base of 1.16 million active customers, only 32,000 more than the previous year.

4.14.4. FTTH coverage and take-up

Coverage and penetration

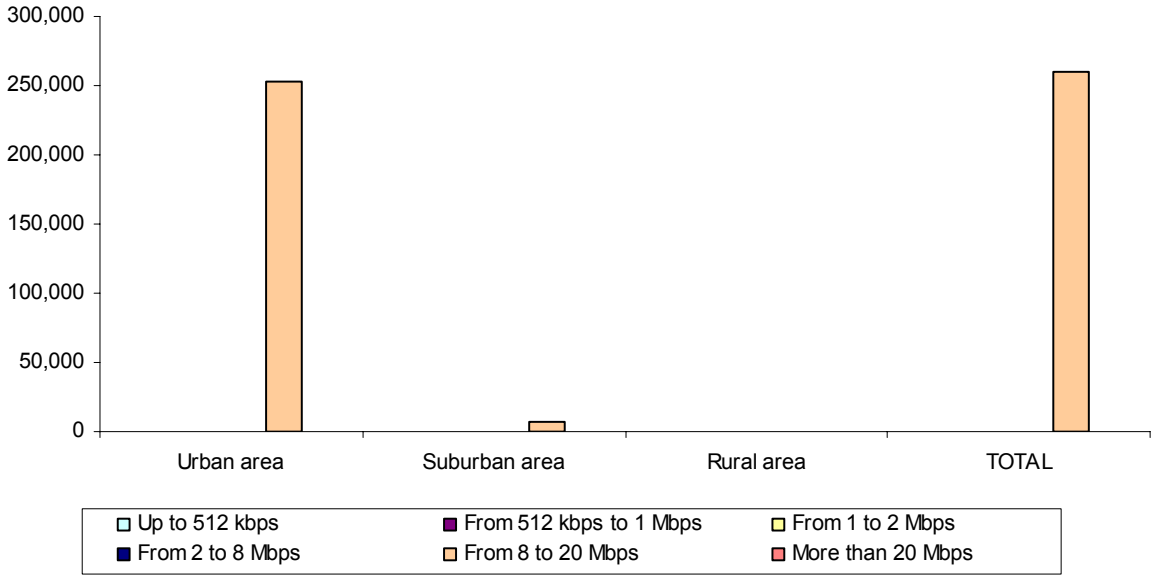


Coverage refers to the percentage of the population covered by the FTTH network.

FastWeb markets FTTH services chiefly to businesses and households, while Colt Telecom, BT Albacom, Wind and Telecom Italia market their services to a very small group of businesses and corporate customers.

FastWeb reports that FTTH is available in 38 municipalities: primarily in Rome (and in three suburbs), Milan (and in 17 outlying towns), Naples, Turin, Geneva, Bologna (and 6 outlying towns), Venice and Bari.

Number of FTTH connections by download rate



All FTTH access services sold in the last year can reach a speed of at least 10 Mbps.

4.14.5. Other broadband access technologies

Wi-Fi

In June 2008, there were 3,927 active Wi-Fi hotspots in Italy (40% more in one year), of which 1,535 deployed directly by Telecom Italia.

The best-equipped region was Lombardy with 1,153 hotspots, followed by Lazio (539), Emilia-Romagna (388) and Tuscany (350).

WLL/WiMAX

WLL services are based on the 24.5 GHz and 27.5-29.5 GHz frequencies, also known as LMDS in Italy. These services were liberalised in 2002 via Ministry of Communications tender. Licences were awarded to 13 network operators.

At the end of 2007, Databank estimates that the situation is about the same as at the end of 2006 with a base of roughly 1,000 WLL business customers in north-eastern Italy (Infracom: 950).

In October 2007 the Ministry of Communications launched the public sale of 35 licenses for the WiMAX frequencies in the 3.4-3.6 GHz frequency bands.

At the end of February 2008 the call was closed and the licenses were awarded for 21 regions and 14 macro-regions to 11 operators, four of them are “big” telcos with a national presence and 7 are local operators. All these companies are required to develop significant local coverage, especially in digital divide areas.

As of mid-2008 several trials were underway with a few hundred WiMAX service users.

Satellite

Two-way satellite Internet access in Italy is supplied primarily by ISP Netsystem.com (also in partnership with Telecom Italia).

According to Ecta, at end of September 2007, there were 71,235 satellite Internet subscribers in Italy. Databank estimates at the end of the year there were about 60,000 active customers (-40% compared to end 2006). The reason for this decrease is mainly the availability of better broadband offers in a greater percentage of the country.

Cellular

At the end of 2007, there were 89.3 million cellular subscribers in Italy. The penetration rate is roughly 125%, also taking account of “Machine to Machine” lines which are estimated to total 2.5 million, along with 13.6 million inactive SIM cards.

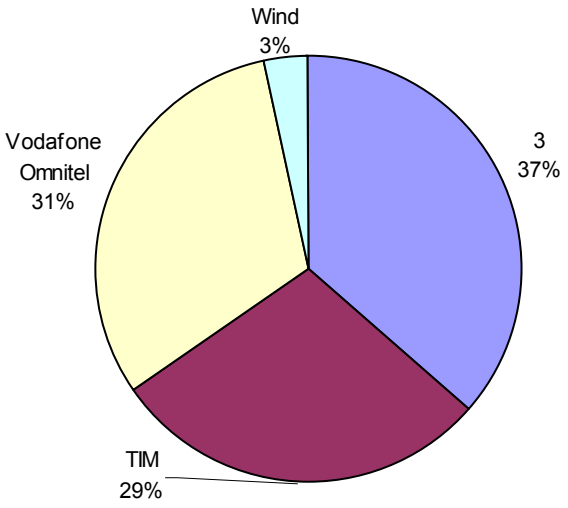
At the end of the year, there were 21.2 million active UMTS lines (which have effectively used 3G access radio), a 20% increase from the 17.6 million lines at the end of 2006, but much lower than the 80% growth reported from 2005 to 2006. At end 2007, UMTS lines accounted for 24% of total mobile lines.

Four operators share control of the mobile market in Italy:

- TIM (Telecom Italia) with 36.3 million customers, of which 6.1 million UMTS;
- Vodafone Italia, with 29.7 million customers, of which more than 6.6 million had signed up for UMTS services at the end of 2007;
- Wind, with 15.6 million mobile customers, of which Databank 0.7 million over UMTS;
- H3G with near 7.7 million UMTS customers.

At the end of December 2007, the UMTS network covered about 78% of the population (70% for HSDPA), while 99.8% were covered by GPRS and EDGE.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.15. Latvia

4.15.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,460,000	62,000	750,000	2,272,000
Share of total population	64.3%	2.7%	33.0%	100.0%

4.15.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	-	-	-	72%	87%
DSL subscribers	18,713	*43,740*	68,569	120,000	158,000
DSL penetration (% of population)	0.8%	1.9%	3.0%	5.3%	7.0%
Cable modem coverage (% population)	-	-	-	50%	65%
Cable modem subscribers	6,238	6,480	16,000	*27,000*	38,000
Cable modem penetration (% population)	0.3%	0.3%	0.7%	1.2%	1.7%
FTTx subscribers	0	0	1,000	1,200	8,700
PLC subscribers	0	0	44	60	60
WLL subscribers	-	*1,000*	54,623	92,000	109,798*
Satellite subscribers	-	-	-	60	80
Total	24,950	51,220	140,236	240,320	314,638
Total penetration (% population)	1.1%	2.2%	6.1%	10.6%	13.8%

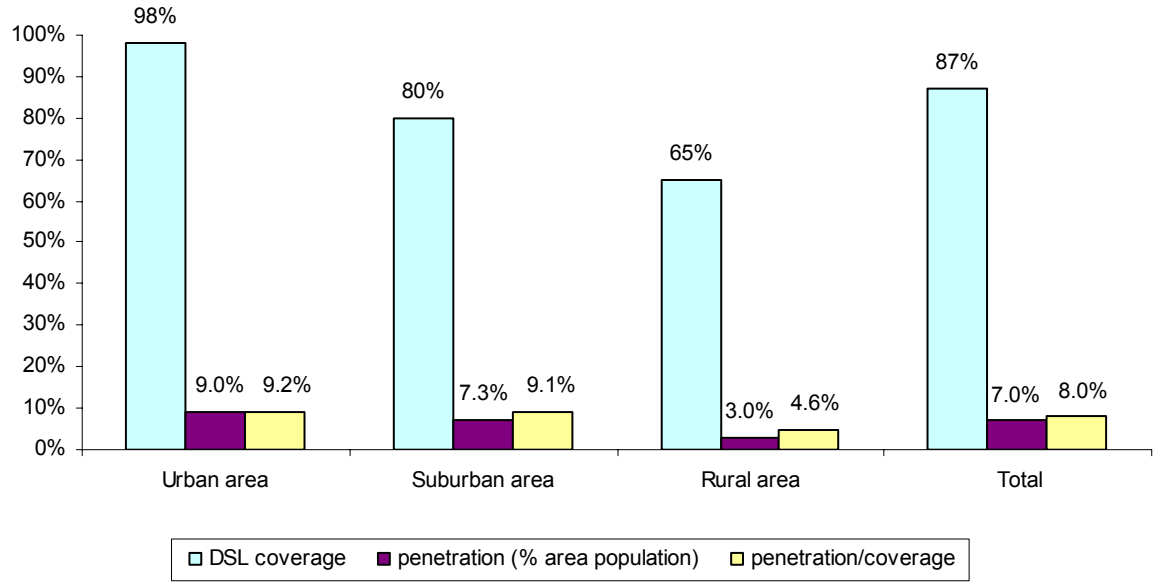
* including 93,000 CDMA-based FWA connections

The state of Internet connection in Latvia has evolved swiftly over the past three years. At the end of 2007, 98 ISPs were providing Internet access. The main types of connection are ADSL, FTTx and cable. The priority for the current year is to improve public Wi-Fi connections quality and to provide public access to Wi-Fi networks in Latvia's major cities.

Broadband penetration reached 13.8% at the end of 2007. In 2007, the number of broadband subscribers totalled 314,638, with growth depending on the service, price and quality provided by the main network operators. Subscription prices have been almost halved since 2005.

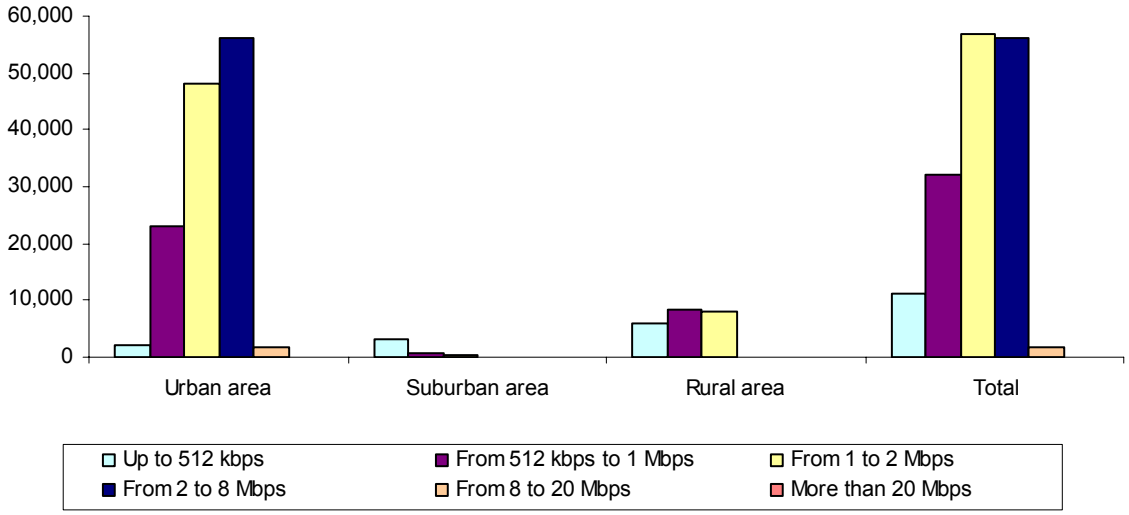
4.15.3. DSL coverage and take-up

Coverage and penetration



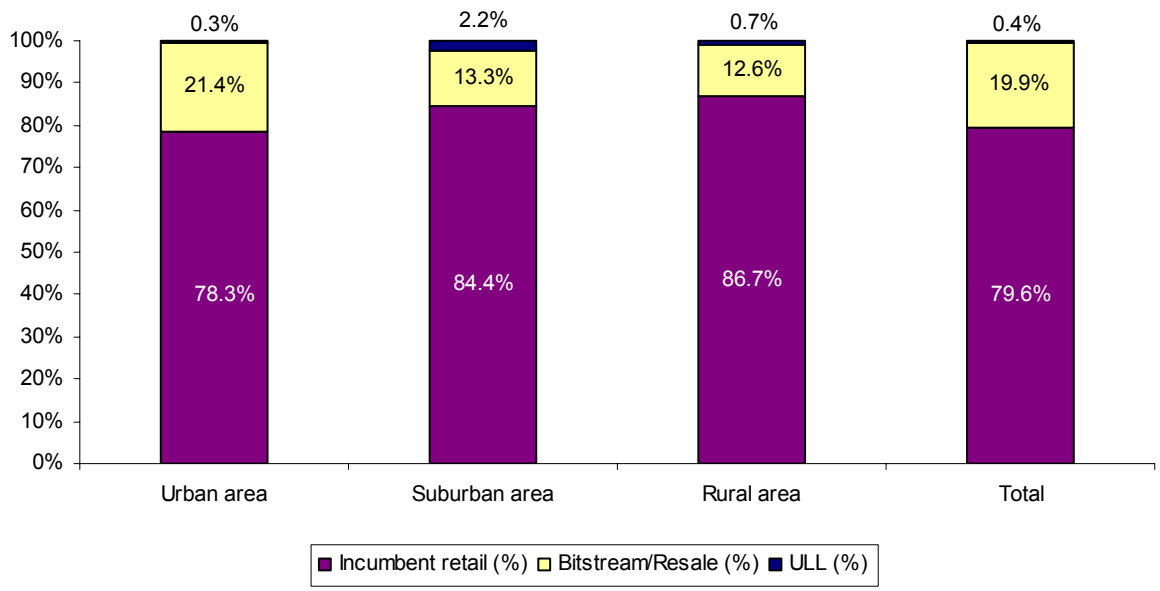
DSL is the most popular broadband connection technology in Latvia, reporting a growing number of subscribers. Around 94% of local exchanges are equipped with DSL, with coverage of the population now totalling 87%. In 2007, growth of DSL take-up declined but remains impressive at over 30%. DSL accounts for more than half of the total broadband connections in Latvia.

Number of DSL connections by download rate



In 2007, the major DSL operators offered three different plans with speeds of 512 kbps, 2 Mbps and 2 Mbps+. The most popular services were those providing access at 1-2 Mbps, used chiefly by consumers, and 2-8 Mbps, used primarily by businesses in urban areas. The lack of demand in suburban and rural areas for more expensive subscriber packages has led ISPs to concentrate their technological developments to urban centres. There was a notable drop in the number of consumers subscribing to services providing access at less than 1 Mbps.

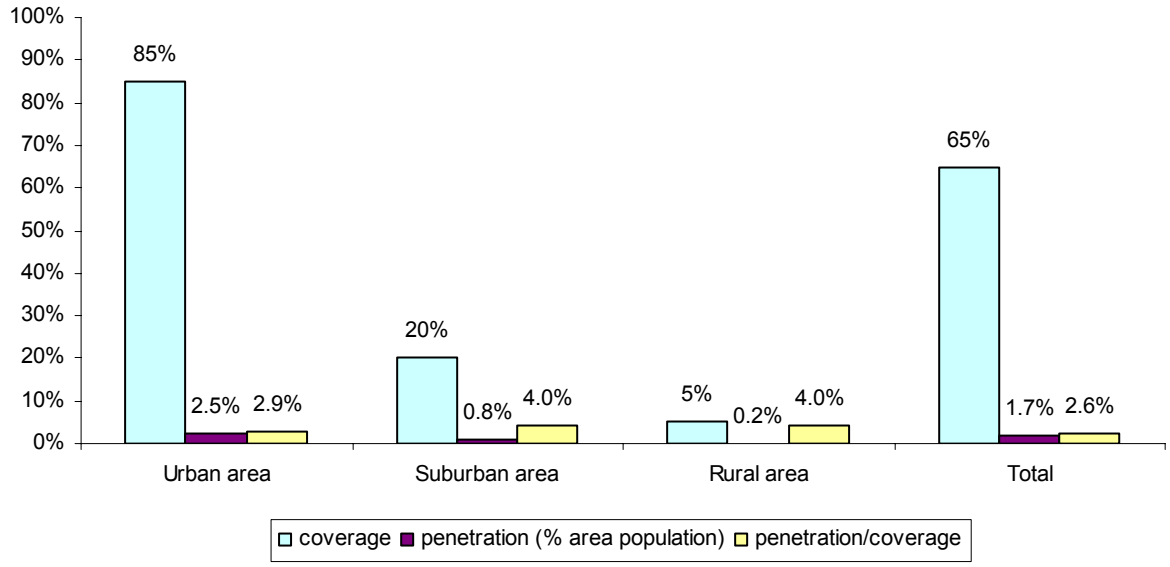
Percentage of DSL connections by type of provider



Alternative DSL providers' market share increased significantly in 2007 to more than 20% at year-end. Competition increased in urban areas in the DSL resale market in particular. The number of and market share for unbundled lines was still marginal in 2007, however.

4.15.4. Cable modem coverage and take-up

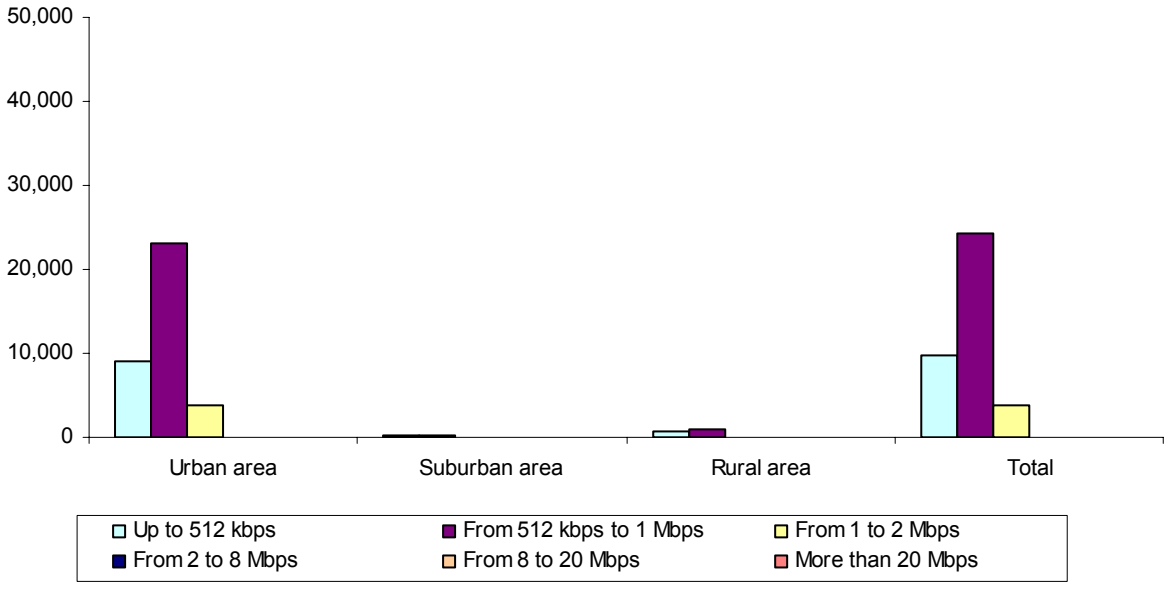
Coverage and penetration



In 2007, 27 operators were providing broadband over cable in Latvia, but subscriber numbers are not growing as swiftly as they are for DSL. The country was home to 38,000 cable modem subscribers at the end of 2007. Around 65% of cable TV subscribers are equipped with a cable modem connection.

There was still a significant gap between urban and other areas in terms of cable modem coverage in 2007. Coverage in urban areas (85%) is high, as major suppliers (Baltcom TV and Izzi) have first upgraded their network and launched triple-play services in the capital Riga and in some smaller cities (Salaspils, Rezekne), while coverage in suburban and rural areas remains very low, at 20% and 5%, respectively. These disparities are preventing competition between last mile technologies in Latvia's non-urban zones.

Number of cable modem connections by download rate



Cable modem connection speeds remain low in Latvia (up to 2 Mbps only for most of them).

4.15.5. Other broadband access technologies

Wi-Fi

Public Wi-Fi hotspots in Latvia are provided by the country's largest telecom carrier, Lattelekom (450 WiFi access points installed at the end of 2007).

WLL/WiMAX

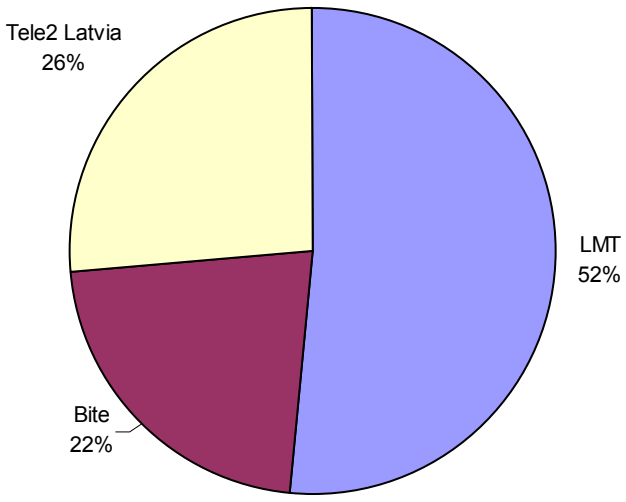
Triatel launched CDMA-based fixed wireless access (FWA) services using 450MHz frequencies formerly used by LMT. It introduced CDMA2000 1x data services in late 2004 and upgraded the network to 1xEV-DO one year later. Triatel offers FWA internet access at theoretical downstream speeds of 2.4 Mbps. The operator's CDMA network comprised 110 base stations as of mid- 2007, and national coverage reached 87%.

Cellular

There are four major mobile operators in Latvia providing access to the mobile internet: LMT, Tele2, Bite, Triatel. The number of subscribers to GPRS, EDGE and UMTS mobile services rose in 2007, but it is still difficult to say how many actually use mobile data services as they are a standard part of all mobile packages. It appears that more than 80% access the Internet over their mobile phone at least once a month.

3G coverage has increased significantly over the past few years, totalling close to 50% at the end of 2007, with upgrades to HSDPA in Riga and some other major cities. The number of UMTS users reached 109,800, marking a seven-fold increase since 2006.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.16. Lithuania

4.16.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,949,594	245,875	1,170,731	3,366,200
Share of total population	57.9%	7.3%	34.8%	100.0%

4.16.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	0%	-	82%	83%	88%
DSL subscribers	0	*50,074*	104,798	178,302	231,951
DSL penetration (% of population)	0.0%	1.5%	3.1%	5.3%	6.9%
Cable modem coverage (% population)	0%	-	-	52%	57%
Cable modem subscribers	19,983	32,227	49,631	*59,000*	64,995
Cable modem penetration (% population)	0.0%	0.9%	1.4%	1.9%	1.9%
FTTx subscribers	13,881	35,748	60,260	89,171	145,178*
PLC subscribers	0	0	0	0	0
WLL subscribers	4,753	9,019	17,937	33,618	64,084**
Satellite subscribers	0	0	0	0	210
Total	65,863	127,682	232,626	366,849	506,418
Total penetration (% population)	0.0%	3.7%	6.8%	10.8%	15.0%

* including LAN subscribers
** including WLAN connections

Facilities-based competition remained intense in 2007, with 115 ISPs providing Internet access at the end of 2007. The main broadband access technologies in the country are ADSL, FTTx, cable and wireless.

Broadband penetration totalled 15% by year-end, with a subscriber base of 506,418, marking a 37.7% increase over 2006. The chief growth drivers have been ADSL and FTTX. At the end of 2007, DSL connections accounted for 45.6% of total broadband connections. Compared to other technologies, xDSL's market share dropped during the year as rival technologies enjoyed substantial growth. The largest increase in the broadband market was achieved by FTTx and wireless connections.

LANs are well developed in Lithuania. At the end of 2007, the national regulatory authority (RRT) reported that 12.4% of broadband subscribers were connected to the internet via UTP cable[5].

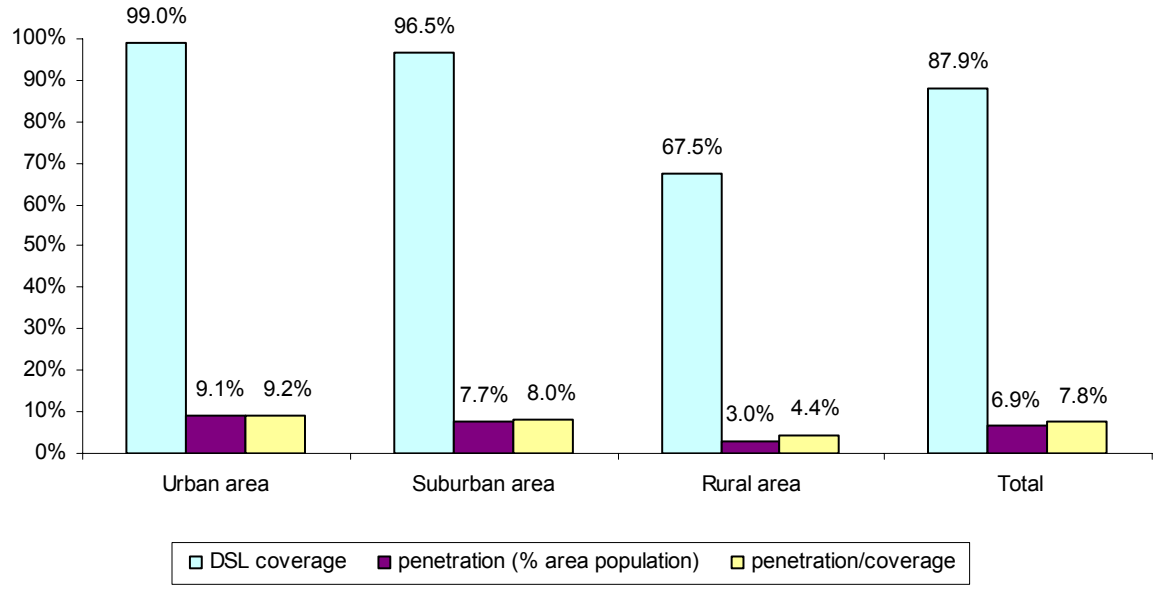
In 2007, two operators were providing IPTV services: AB "TEO LT" and UAB "Penkių kontinentų komunikacijos centras". During the year, the number of IPTV subscribers increased by 260% to reach 17,570. Incumbent provider AB "TEO LT" was reporting 17,450 subscribers at the end of 2007.

Mobile internet and 3G services also become increasingly popular in 2007, while broadband via satellite is showing promise.

[5] We assumed 80% of LAN subscribers depend on FTTx networks and 20% on WLL (wireless backbone).

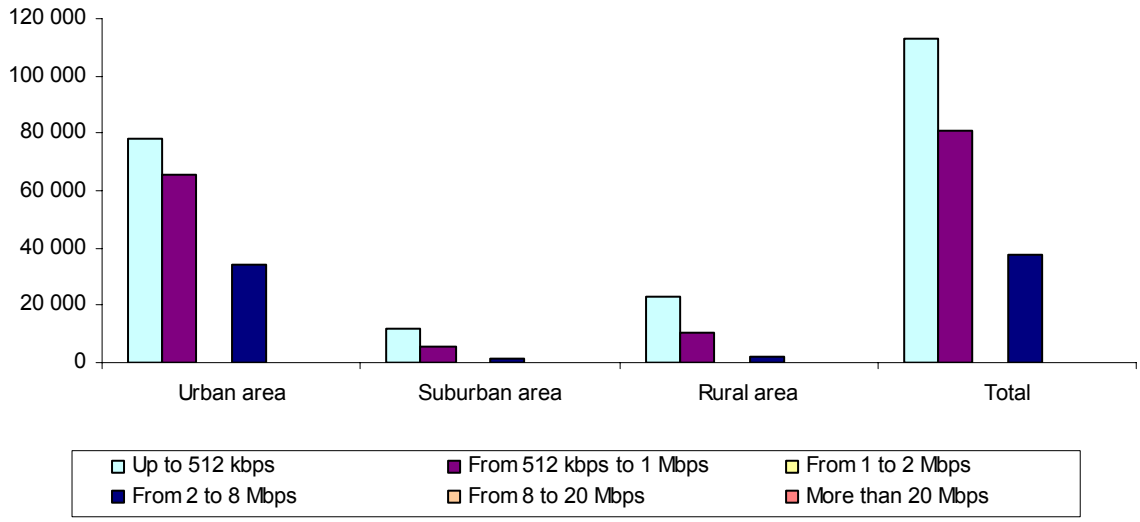
4.16.3. DSL coverage and take-up

Coverage and penetration



DSL is the most popular form of broadband connection in Lithuania. Although its market share decreased, the number of DSL subscribers grew by 29.5% during the year. About 94% of local exchanges are equipped with DSL. The incumbent carried activated 78,000 new DSL in 1,014 localities over the course of the year, with total DSL coverage in Lithuania estimated at 87.9%. DSL coverage in rural and suburban areas increased by 1.5% in 2007.

Number of DSL connections by download rate

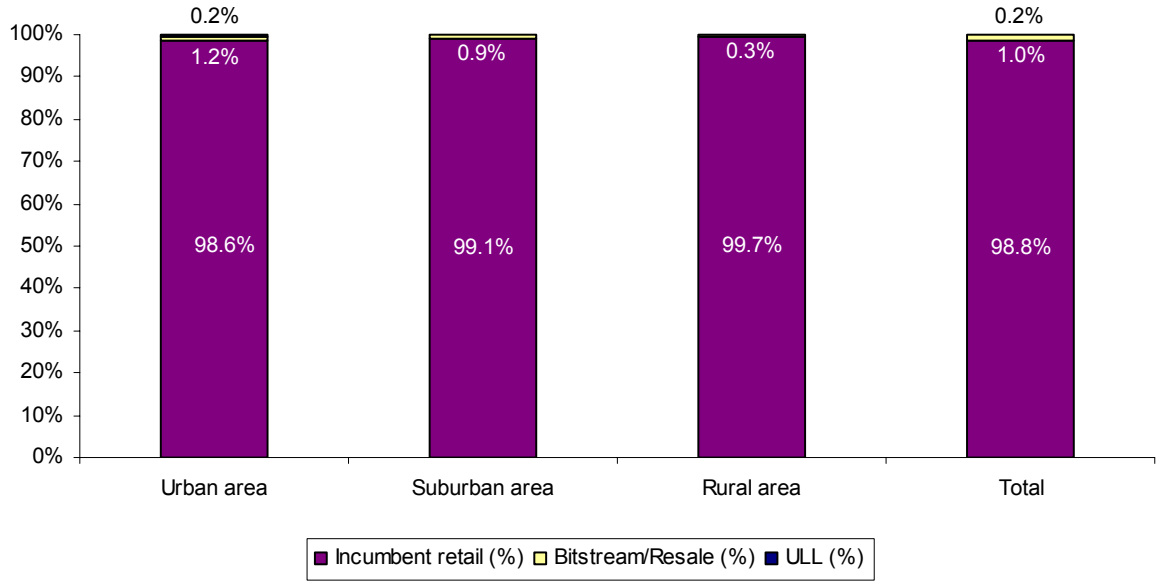


In 2007, the incumbent carrier offered three different plans with download rates of 512 kbps, 1024 kbps and 4 Mbps. 2 Mbps rate was offered only by other providers and mainly in urban areas.

Most DSL users were connected to the Internet via 512 kbps access. But, compared to the year before, the number of subscribers to services running at less than 512 kbps decreased from 55% to 48.7% of the total base. The number of subscribers with connection rate ranging from 512 kbps to 1 Mbps has increased significantly.

65.5% of DSL subscribers in rural areas and 62% in suburban areas chose connection services running at up to 512 kbps, about twice as many as the number subscribing to access at 1 Mbps. Services delivering access at 4 Mbps is offered chiefly in urban centres.

Percentage of DSL connections by type of provider



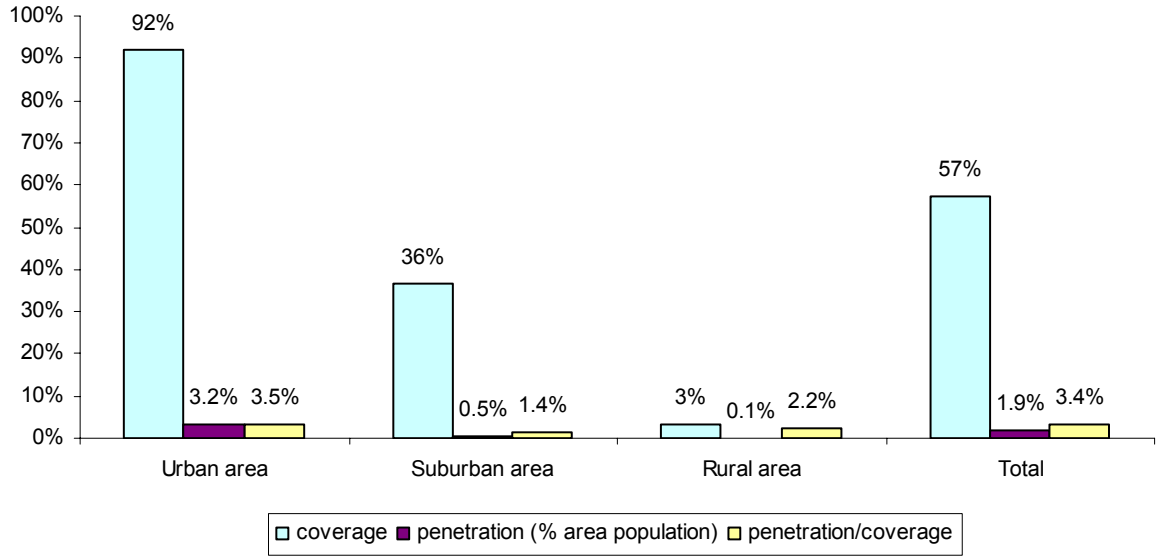
The incumbent carrier, TEO, is the country's leading broadband access providers, with 176,160 xDSL subscribers at the end of 2007. 2,363 lines, i.e. only 1%, are delivered via bitstream. At the end of 2007, there were 15 providers offering broadband internet via xDSL.

According to data collected by RRT, there were 443 fully unbundled lines operating in Lithuania in 2007.

4.16.4. Cable modem coverage and take-up

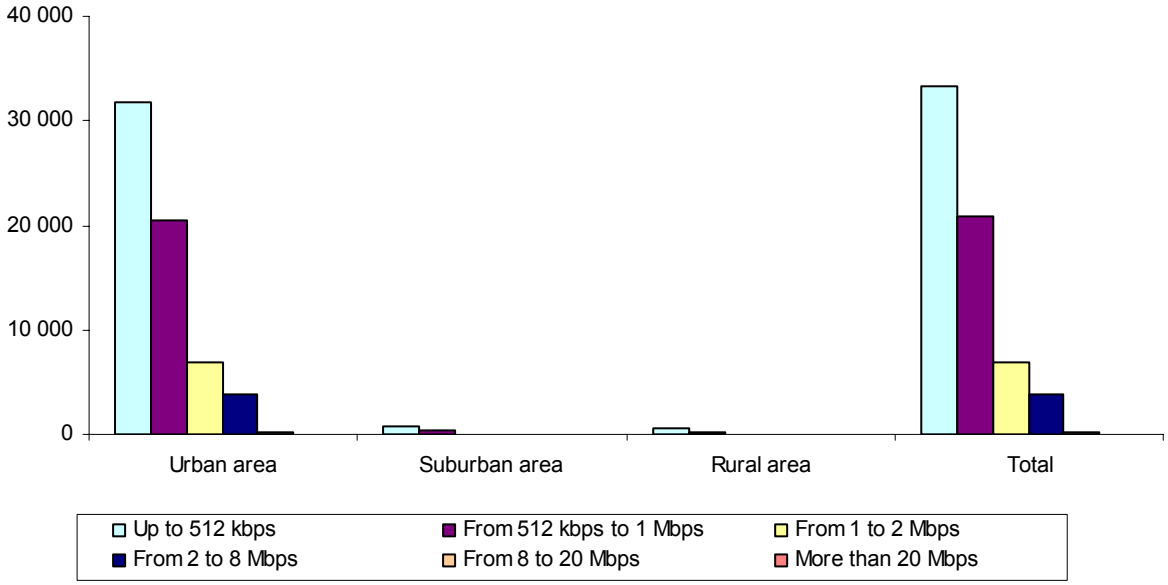
In 2007, 38 operators provided broadband over cable TV networks in Lithuania, even though it is far less advanced than other access technologies. Lithuanian cable providers reported a total base of around 65,000 broadband subscribers, with most of them operating a network in a single city.

Coverage and penetration



Cable TV networks are concentrated in urban areas and cover large groups of households in densely populated areas. Almost 92% urban and only 3.4 % rural areas are covered by cable TV networks.

Number of cable modem connections by download rate



Broadband access at 512 Kbps is the most popular connection delivered by cable TV networks, due to the reasonable price of the service. Prices of cable modem service for upper speeds are in general higher than those of ADSL service. In rural areas, only 195 subscribers were connected to the internet at a speed higher than 512 Kbps.

4.16.5. Other broadband access technologies

FTTx

The need for greater bandwidth has spurred the growth of FTTx connections. At the end of 2007, there were 145,200 optical fibre subscribers in the country (including 50,480 LAN subscribers).

	12/05	12/06	12/07
FTTx subscribers	12,945	89,171	145,178

At first, fibre optic connections were available only in urban and some suburban areas but, thanks to the RAIN project (Rural Area Information Technology Broadband Network, aiming at building fibre-optics based broadband internet bus network channels to all 410 local administrations in the territories of rural local administration centres that do not have broadband internet connectivity) rollouts extended to rural areas as well. By the end of 2007, FTTx networks covered most of the cities of Lithuania.

FTTx networks are growing rapidly thanks to ISP investments. The main players in the FTTx market are:

- Meganet,
- 5 - continents,
- KIS,
- TEO.

Most of the fibre connections are FTTC or FTTB, while TEO began providing FTTH access in 2007, delivering connections speeds of up to 100 Mbps.

Satellite

210 subscribers were connected to broadband via satellite at the end of 2007. Satellite access provider Erksa supplies connections with downlink speeds ranging from 512 kbps to 2048 kbps.

Wi-Fi

At the end of 2007, there were around 3,457 hotspots operating in the country (+250% in one year). The largest operator by far is AB “TEO” with a base of more than 3,182 hotspots. Other Wi-Fi providers are:

- Baltnetos Komunikacijos,
- Omnitel,
- Bite Lietuva,
- Penkių kontinentų komunikacijos centras.

At the end of 2007, AB “TEO” increased the bitrates delivered at hotspots to 10 Mbps, and was reporting 19,612 regular users (5 times more than year before). In March 2007, AB “TEO” began charging for the use of its hotspots and, by the end of the year, only 169 were available for free.

WLL/WiMAX

In 2007, three operators were providing wireless broadband access services over the 3.5 GHz radio frequency band, two operators over 10.5 GHz frequency band, four operators over the 26 GHz band and one operator using the 28 GHz band.

At the end of 2007, three operators were granted a license to use radio spectrum at the 3.410-3.600 GHz frequency band for public wireless communication access networks. They must launch wireless

broadband networks in three cities of Lithuania within two years, and make it accessible to at least 50% of population. WiMAX must be available in almost all areas of Lithuania within five years.

There are also a large number of providers offering access to the Internet via WLL in unlicensed frequencies. The country had a base 64,100 WLL subscribers at the end of 2007.

	12/07
WLL coverage	70 %
WLL subscribers	64 084

In 2007, the total number of wireless broadband access base stations grew to 133, covering approximately 70% of the country. The main WLL access provider is Lithuanian Radio and Television Centre (LRTC).

The largest percentage of WLL subscribers (81.5%) are private users and most of them live in rural areas, where use of cable is limited.

Cellular

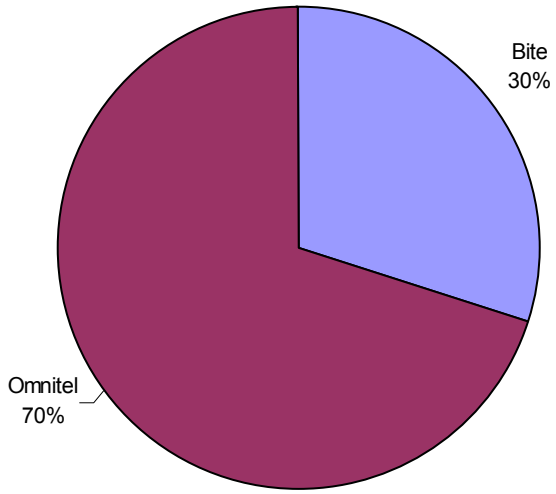
There are three main mobile operators providing mobile Internet access in Lithuania: UAB Omnitel, UAB Bite and UAB Tele2. In 2007, the number of subscribers using GPRS, EDGE or UMTS packet data communication services grew by 32.8%. The total number of subscribers that used either GPRS, EDGE or UMTS services totalled 1,532,100.

In 2007, GPRS covered almost the whole of Lithuania and offered access at 85.6 kbps. EDGE services were available in more than 200 cities and small towns and covered approximately 80% of the population. EDGE connections were provided with a download rate of up to 236.8 kbps.

3G services were available in 167 cities and small towns in Lithuania and their surrounding area. At the end of 2007, there were 522 base stations equipped with UMTS (+530% in one year), covering 75% of the population (same coverage for HSDPA). The number of active public mobile telephone communication subscribers who use UMTS services reached 152,900 by the end of the year, with operators reporting services running at up to 7.2 Mbps.

According to data from the national regulatory authority, at the end of 2007 there were 68,455 subscribers connected to the Internet (on their computer) through the mobile public telephone network using fixed rate plans.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.17. Luxembourg

4.17.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	212,604	184,351	83,267	444,050
Share of total population	44.3%	38.4%	17.3%	100.0%

4.17.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	100%	100%	100%	100%	100%
DSL subscribers	13,097	31,243	63,132	87,275	108,621
DSL penetration (% of population)	2.9%	7.0%	14.2%	19.7%	22.6%
Cable modem coverage (% population)	21%	34%	*50%*	*70%*	*71%*
Cable modem subscribers	2,000	4,081	6,877	*9,566*	*11,531*
Cable modem penetration (% population)	0.5%	0.9%	1.5%	2.2%	2.4%
FTTx subscribers	-	-	150	*300*	*650*
PLC subscribers	0	0	0	0	0
WLL subscribers	-	-	69	*120*	*140*
Satellite subscribers	0	0	0	0	0
Total	15,097	35,324	70,228	97,261	120,942
Total penetration (% population)	3.4%	8.0%	15.8%	21.9%	25.2%

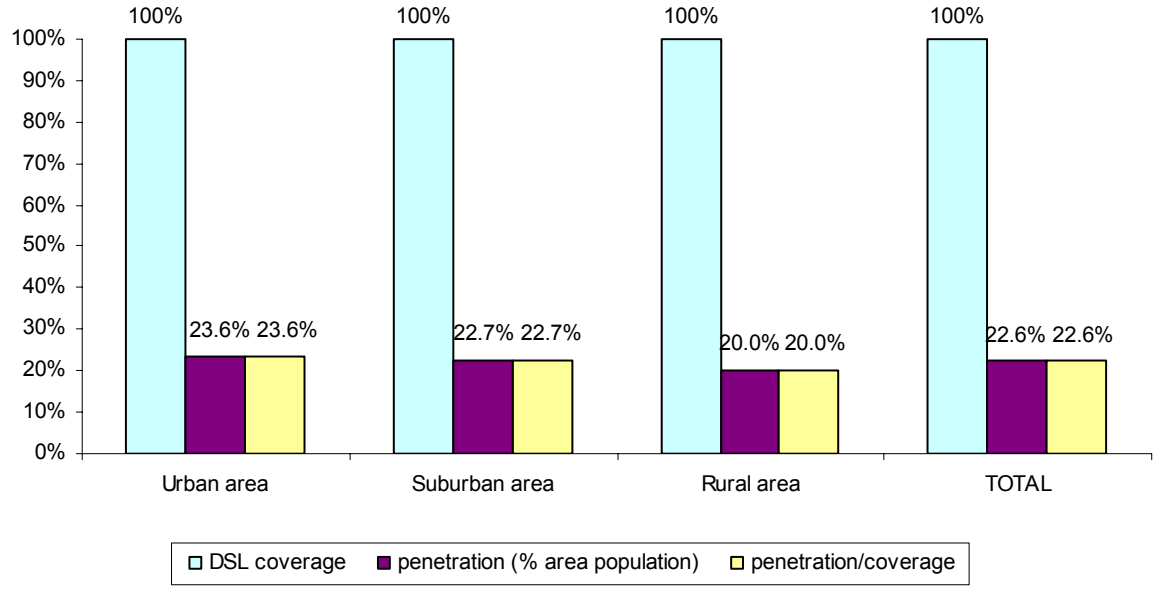
With over 120,000 broadband subscribers at the end of 2007, penetration reached 25.2% – just ahead of France and Germany but below the other two Benelux countries, the UK and Scandinavia.

DSL is dominant (90% of all broadband connections) and more than 80% of retail lines are still provided by the incumbent operator, PT Luxembourg. All local exchanges are DSL equipped.

Although cable modem coverage is over 70%, the subscriber base has remained relatively small, in particular compared with the situation in Belgium and the Netherlands. Cable operators were slow to upgrade their networks, which gave DSL the chance to take a strong lead.

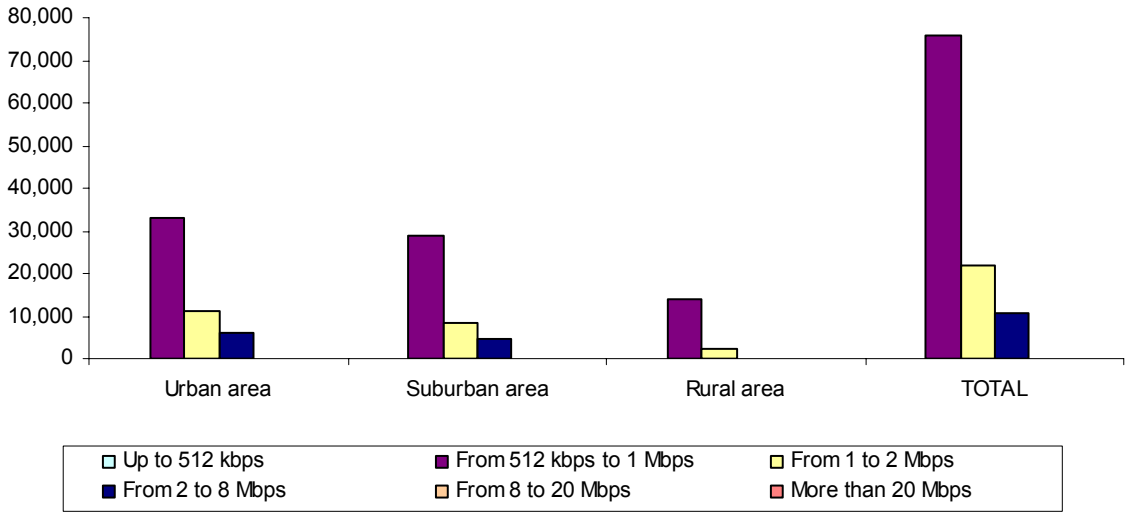
4.17.3. DSL coverage and take-up

Coverage and penetration



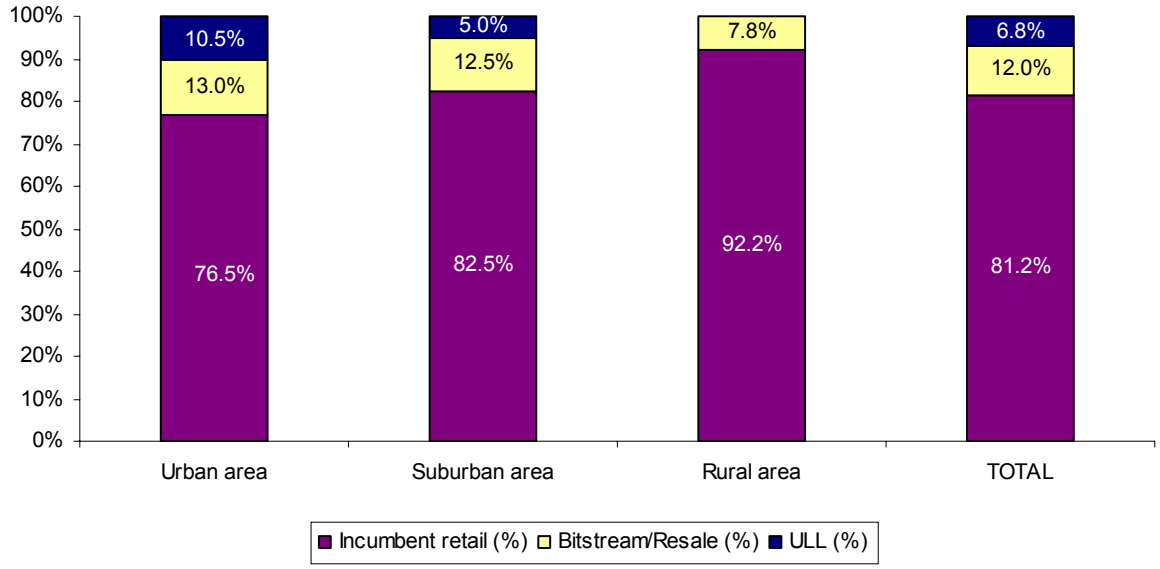
The number of DSL subscribers increased by 24.5% in 2007 to 108,621 and the penetration rate at the end of 2007 (22.6%) is just ahead of Germany's and below that of France.

Number of DSL connections by download rate



ADSL operators provide services with download speeds of 1, 2 and 3 Mbps. Up to 1 Mbps is the predominant speed.

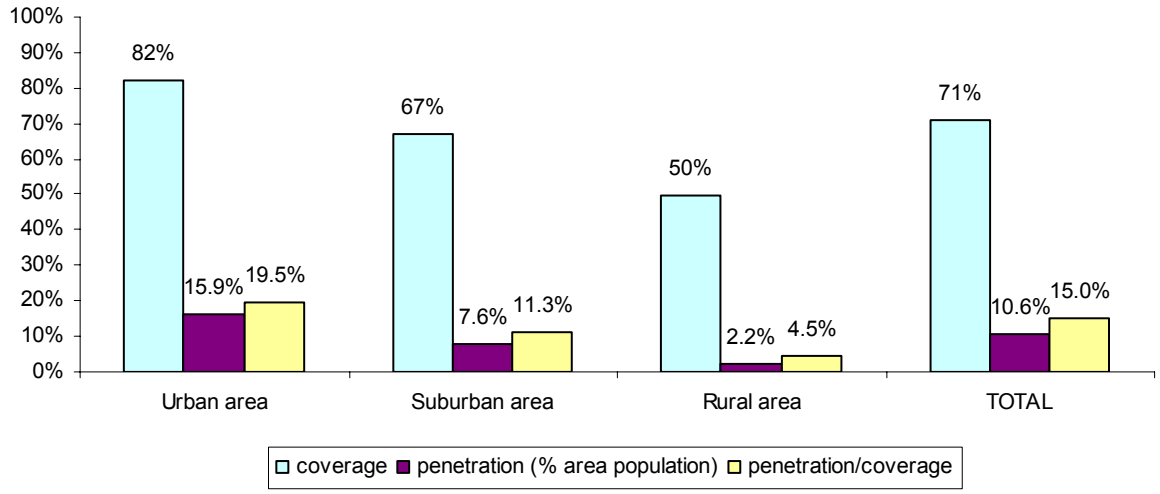
Percentage of DSL connections by type of provider



PT Luxembourg has an 81% share of the DSL retail market, a 2-point increase from the year before.

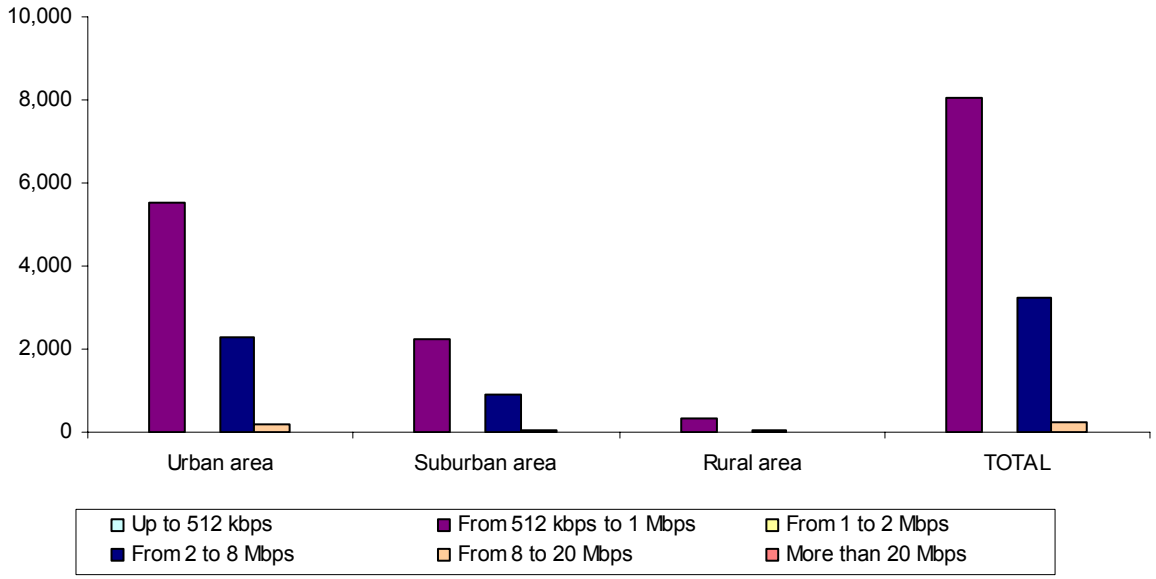
4.17.4. Cable modem coverage and take-up

Coverage and penetration



Cable modem take-up in Luxembourg remains low, despite significant coverage.

Number of cable modem connections by download rate



At the end of 2007, most connection speeds did not exceed 1 Mbps because of the high prices for upper speeds.

Other broadband access technologies

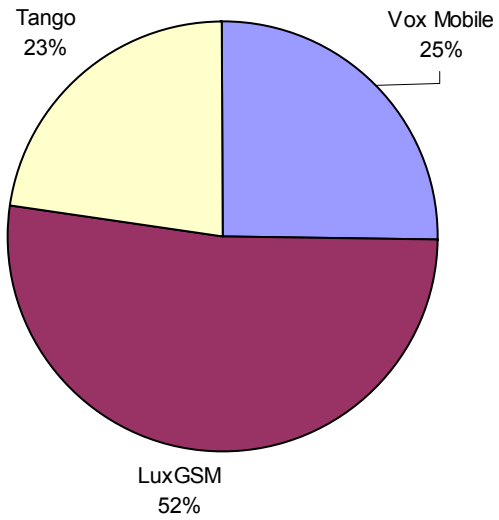
There were only a few FTTH (650) and WLL (140) subscribers in Luxembourg at the end of 2007.

Cellular

The three GSM operators (LuxGSM, Tele2 Luxembourg and LuXcommunications) were awarded UMTS licences in 2002 and 2003. LuxGSM, a subsidiary of P&T Luxembourg, was the first to launch a 3G commercial service in the country in mid-2003.

At the end of 2007, UMTS coverage was over 90% of population (no indication on HSDPA upgrade) and there were 81,000 subscribers.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.18. Malta

4.18.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	407,810	not relevant	not relevant	407,810
Share of total population	100.0%	not relevant	not relevant	100.0%

4.18.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	95%	95%	99%	99%	99%
DSL subscribers	12,000	21,000	30,000	35,704	38,334
DSL penetration (% of population)	3.0%	5.2%	7.5%	8.8%	9.4%
Cable modem coverage (% population)	81%	81%	95%	95%	95%
Cable modem subscribers	10,000	16,000	21,000	30,629	42,185
Cable modem penetration (% population)	2.5%	4.0%	5.2%	7.6%	10.3%
FTTx subscribers	0	0	0	0	0
PLC subscribers	0	0	0	0	0
WLL subscribers	0	50	100*	-	1,876**
Satellite subscribers	12	12	12	15	-
Total	22,012	37,062	51,112	66,348	82,395
Total penetration (% population)	5.4%	9.2%	12.7%	16.4%	20.2%

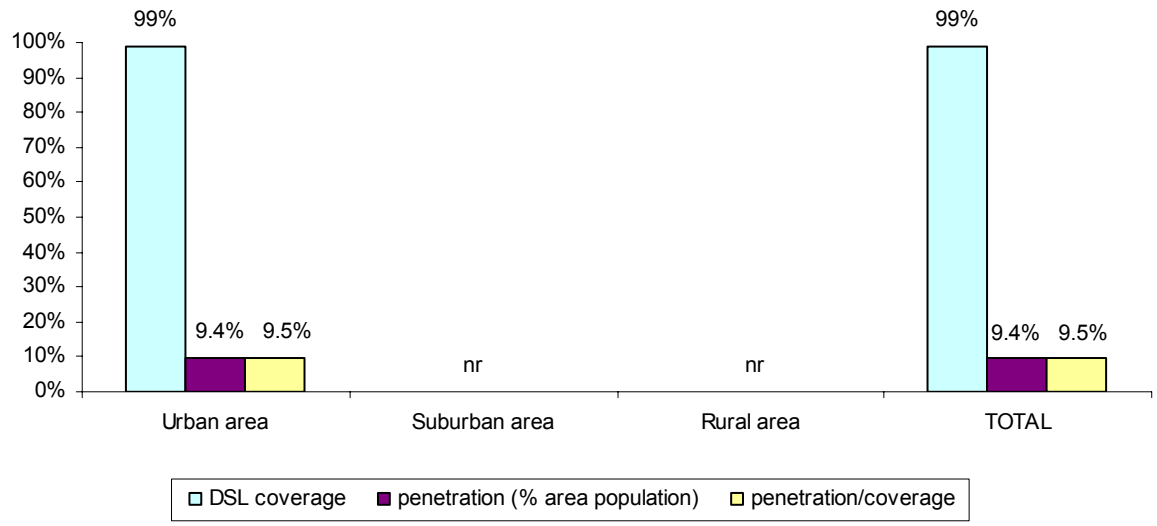
Wi-Fi subscribers
** WiMAX subscribers

Broadband in Malta is accessible through DSL, cable modem and also through the recently launched WiMAX service. As of December 2007, 46.5% of broadband connections were DSL, 51.2% were cable modem connections and the remaining 2.3% were WiMAX connections. Total broadband penetration stood at 20.2% of the population, with a 9.4% DSL penetration rate, 10.3% cable penetration and 0.45% WiMAX penetration rate.

DSL is available in 99% of the national territory through the incumbent carrier, GO (previously Maltacom). Cable broadband is accessed via cable modem and is available in more than 95% of the country through a bidirectional hybrid fibre coaxial cable network owned by Melita Cable. The first WiMAX network deployed in Malta by Vodafone had coverage of more than 70% of the country by the end of 2007.

4.18.3. DSL coverage and take-up

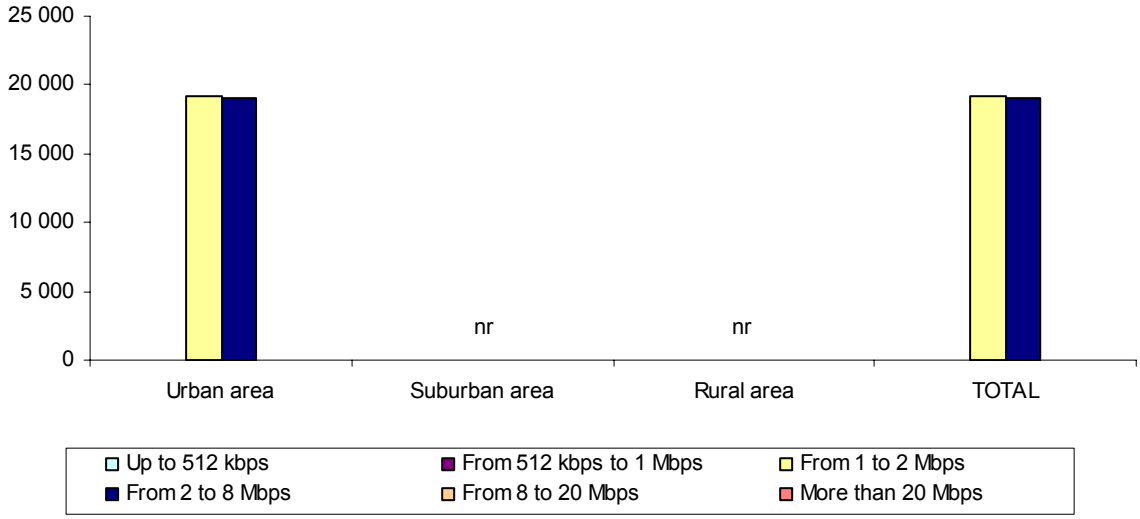
Coverage and penetration



Nota: data for suburban areas and rural areas are not relevant as the whole Maltese territory was considered an urban area.

In 2007, DSL broadband subscriptions continued to experience an increase and DSL penetration stood at 9.4%, whilst penetration per coverage stood at 9.5%. The increase continued to be attributed to products aimed at low-end users, as well as continued reductions in prices, coupled with increases in download limits and speeds. In 2007, the price-quality ratio of broadband products continued to improve, thus attracting new customers and also encouraging more users to upgrade from dial-up connections to broadband.

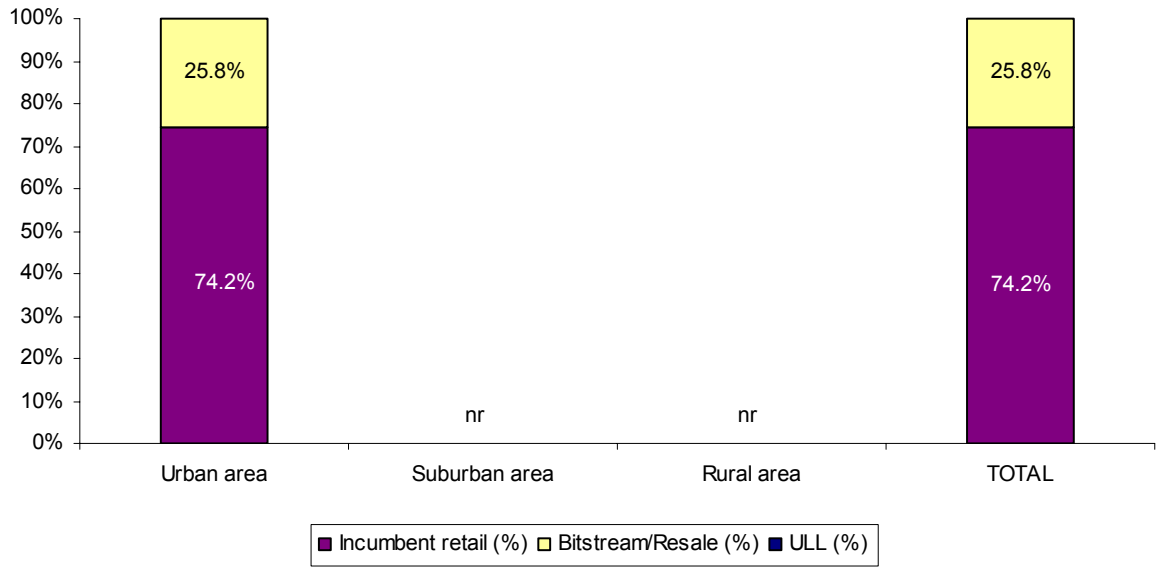
Number of DSL connections by download rate



Over the course of 2007, the DSL incumbent upgraded its entire product line-up and doubled the speed of nearly all its connections, together with large increases in download limits. At the end of 2007, it was marketing 2 Mbps, 4 Mbps and 6 Mbps solutions, each with different download limits and prices. These increases in speeds and download limits were made at no extra cost for the customer.

A number of independent ISPs also offer DSL services and all offer the same broadband packages as the incumbent, albeit at slightly higher prices.

Percentage of DSL connections by type of provider

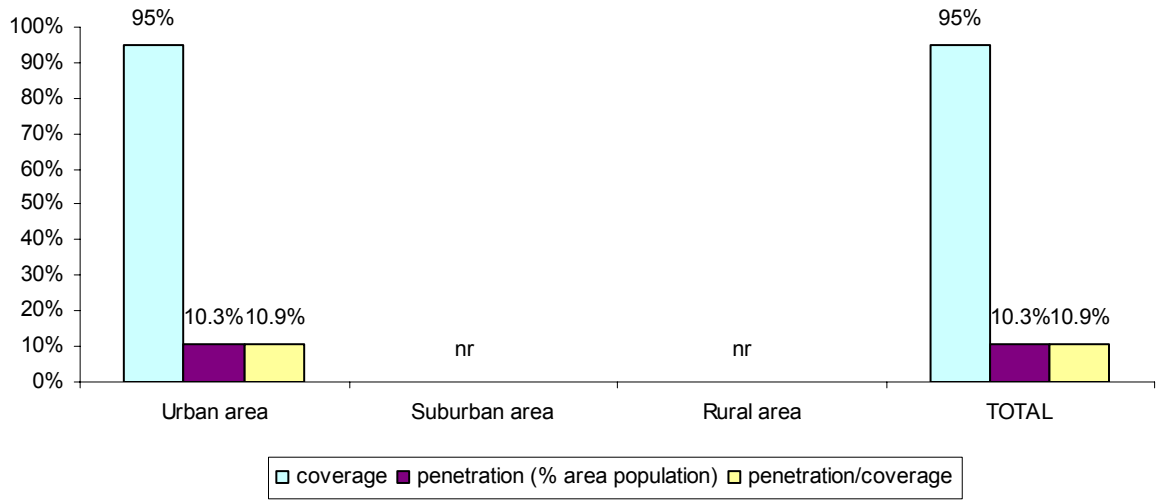


As at the end of 2007, DSL in Malta was provided by 13 ISPs. In 2006, a number of alternative ISPs exited the market while others merged their operations. In 2007, alternative ISPs continued to experience decreasing market share whilst the incumbent's retail arm enjoyed strong growth. As at the end of 2007, the incumbent's retail division had an 74.2% share of the DSL market, the remaining 25.8% being shared by the country's alternative providers.

Alternative operators have not yet adopted GO's reference unbundling offer, which was first published in 2005.

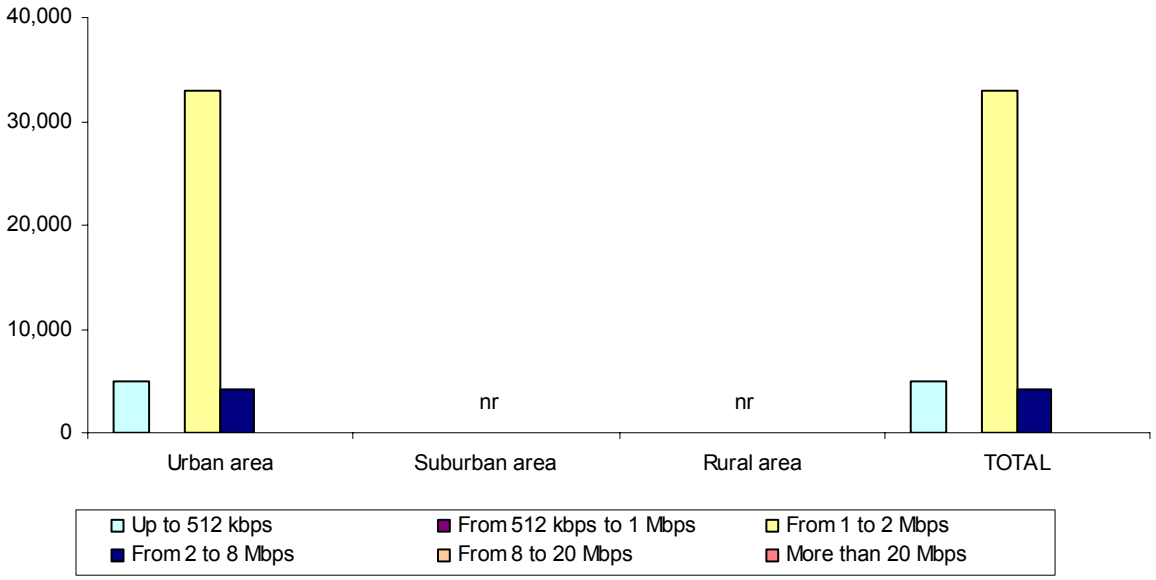
4.18.4. Cable modem coverage and take-up

Coverage and penetration



Cable broadband in Malta is supplied only by Vol, which is a subsidiary of the cable network operator, Melita Cable plc. Cable network coverage in the country amounts to more than 95%. Broadband cable penetration totals 10.3% in terms of population and 10.9% in terms of coverage.

Number of cable modem connections by download rate



As of December 2007, there were 42,185 broadband cable subscribers, accounting for 51.2% of the total broadband subscriber base. Of these, 11.7% (4,939 subscribers) access the Internet at a downstream speed up to 512 Kbps, 78.2% - at a speed between 1 to 2 Mbps, and the remaining 10.1% (4,266 subscribers) have connections capable of speeds of 2 to 8 Mbps downstream. In 2007, cable operator also increased their download limits and speeds significantly at no extra cost for customers.

4.18.5. Other broadband access technologies

Other fixed access technologies

Up to 2007, there were no FTTH, PLC or WLL subscribers in Malta. Broadband access is supplied primarily through a fibre to the curb (FTTC) infrastructure, however, direct fibre connections are available to the island's largest businesses and institutions.

The national power company, Enemalta Corporation has expressed interest in powerline communications (PLC) as a means of implementing automated meter readings and to set up a broadband delivery platform, but PLC has not yet gone beyond the planning stage.

Wi-Fi

Wireless LAN technology is becoming increasingly popular, thanks to its ability to serve roaming users. Both public and private entities have adopted the technology to provide access in a number of buildings around Malta. Wi-Fi is being installed by a number of operators in public access points (hotspots), providing high-speed access to the Internet. The two mobile operators Go Mobile and Vodafone, operate a number of hotspots in public places, mostly in tourist and business areas. Take-up of this service is difficult to monitor since it would be on a post-paid basis and for a limited time period.

WLL/WiMAX

In October 2005, the Malta Communications Authority (MCA) assigned frequencies for setting up nationwide BWA networks in the 3.5GHz band. Licences were awarded to Cellcom Ltd, Vodafone and Go Mobile. Rollout extensions were granted to all operators in June 2006. In June 2007, Vodafone launched the first WiMAX service (fixed standard) on the island and, by the end of the year, had achieved more than 70% coverage of the country and around 1,900 subscribers. The other two licensees have not yet started network deployment and the MCA is currently imposing fines on these operators for not abiding with their licence conditions.

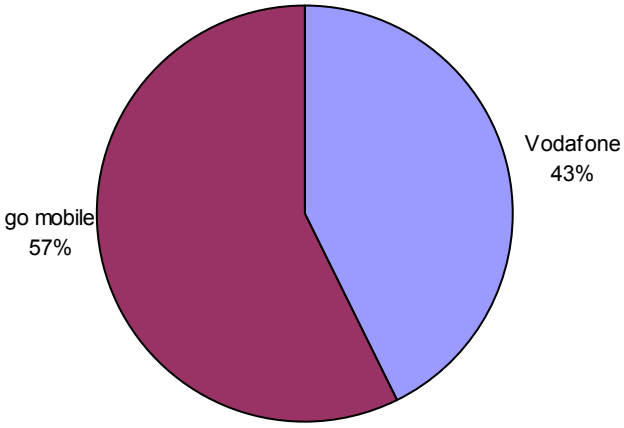
Satellite

Satellite access is only used by a very small number of large commercial institutions for backup interconnectivity and data transfer.

Cellular

In the second quarter of 2005, the MCA issued a call for submissions from entities interested in obtaining rights of use to radio frequencies in the IMT-2000 band, for the development and implementation of third generation (3G) mobile telephony networks in Malta. Vodafone and Go Mobile were granted 3G frequencies in August 2005. The two operators have completed their nationwide network roll-out and both companies have launched 3G commercial services in 2006. During 2007, take-up of 3G broadband has increased, especially following the launching of new data packages with lower prices and increased speeds and download limits. 3G telephony subscribers stood at 27,183 as at end 2007, whilst HSDPA connections stood at around 1,000 connections. 3G/HSDPA are now available nationwide.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.19. The Netherlands

4.19.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	10,729,646	5,212,094	363,786	16,305,526
Share of total population	65.8%	32.0%	2.2%	100.0%

4.19.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	94%	99%	99%	99%	99%
DSL subscribers	944,000	1,841,333	2,551,052	*3,028,000*	3,410,000
DSL penetration (% of population)	5.8%	11.3%	15.6%	18.5%	20.9%
Cable modem coverage (% population)	82%	82%	82%	90%	92%
Cable modem subscribers	969,000	1,297,303	1,562,521	*1,970,000*	*2,207,000*
Cable modem penetration (% population)	5.9%	8.0%	9.6%	12.1%	13.5%
FTTx subscribers*	-	50,000	60,000	*111,000*	*377,000*
PLC subscribers	-	-	-	-	-
WLL subscribers	-	-	-	-	-
Satellite subscribers	1,000	1,000	1,000	*1,000*	*1,000*
Total	1,914,000	3,139,636	4,173,573	5,110,000	5,995,000
Total penetration (% population)	11.7%	19.3%	25.6%	31.1%	36.8%

* Fibre to the Dormitory (connecting students rooms) also included

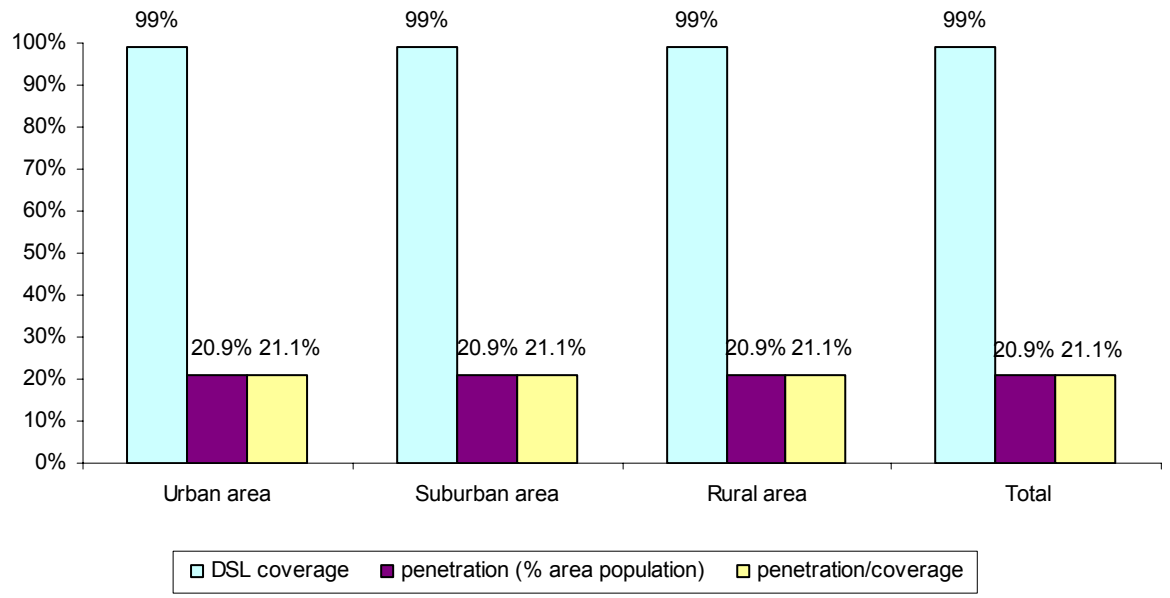
Overall broadband penetration in the Netherlands is one of the highest in the world: totalling 36.8% at the end of 2007, it ranks first in Europe.

DSL coverage in the Netherlands totalled approximately 99% at the end of 2007 and remains the dominant access technology (57% of all broadband connections) despite strong pressure from cable and significant growth of FTTH networks in 2007.

In 2007, the relative growth of the cable modem subscribers and DSL connections was comparable (both between 12 and 13%), although in absolute terms growth of DSL was higher. Competitive pressure is also coming from unbundling, which has gained momentum (30% of DSL connections are supplied by alternative operators through unbundled lines).

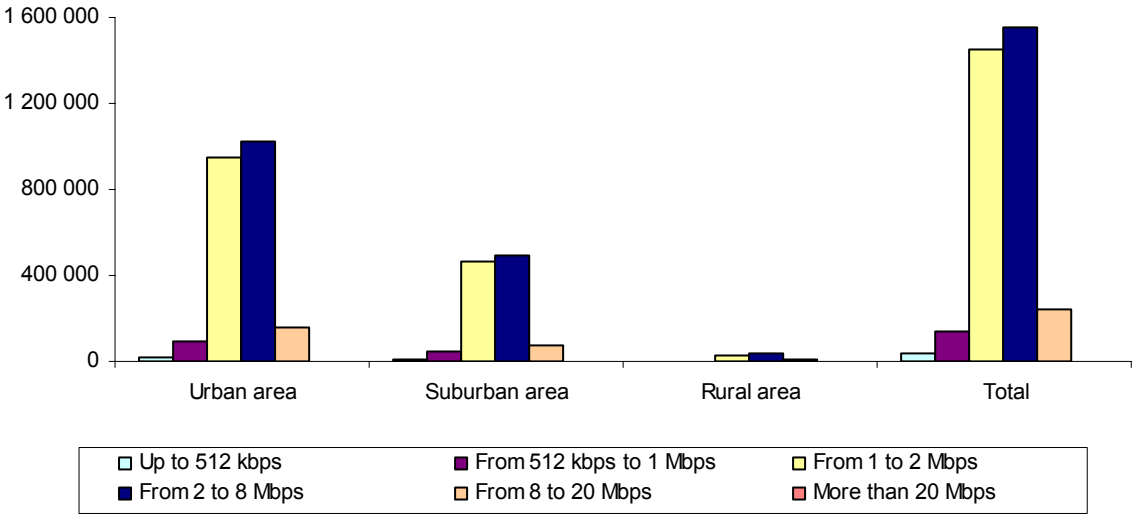
4.19.3. DSL coverage and take-up

Coverage and penetration



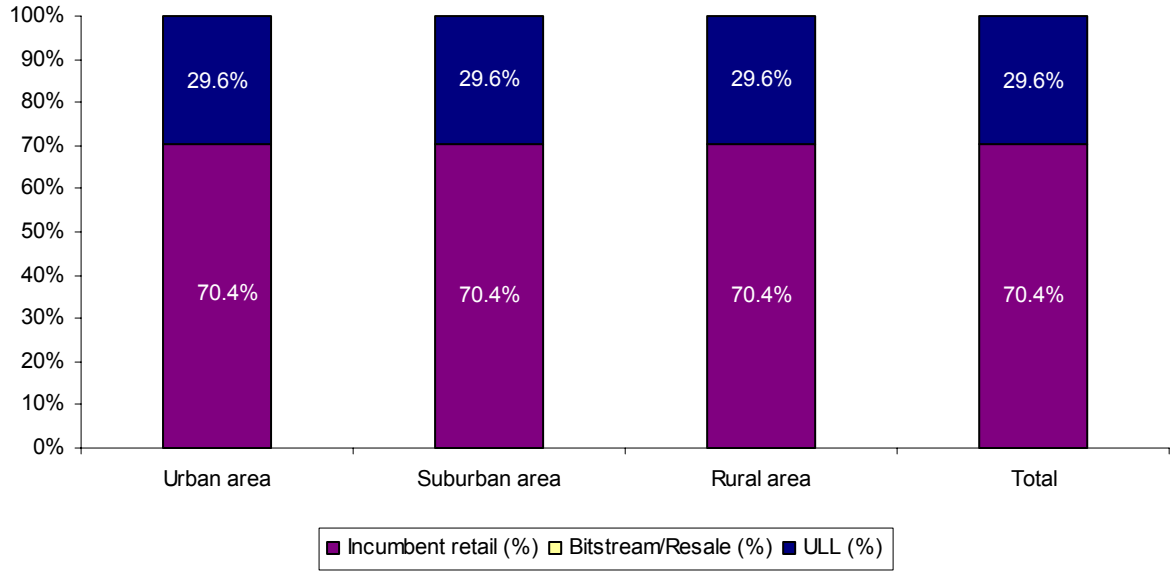
DSL coverage is very high in the Netherlands, with the average penetration rate reaching 20.9% at the end of 2007 (+24% compared to the end of 2006), with a presumption that rates are the same in all parts of the country (due to the geographical organisation of the country).

Number of DSL connections by download rate



At the end of 2007, more than half of DSL connections (52.5% up from 44%) were supplying speeds of over 2 Mbps (including 7% with more than 8 Mbps, and corresponding to ADSL2+ offers), which means that average DSL download rates have increased since the previous year.

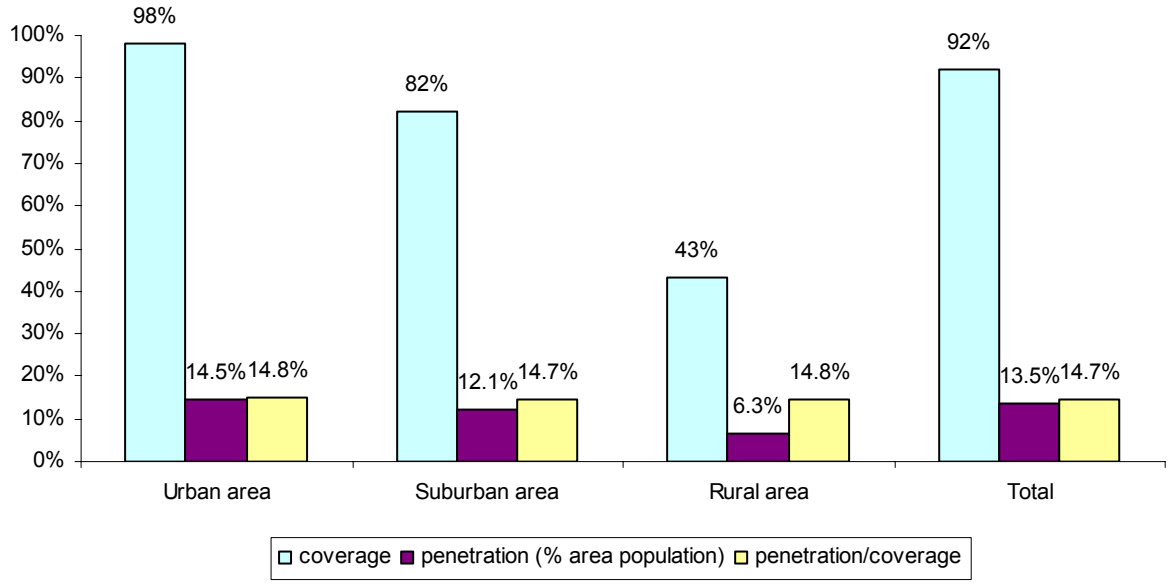
Percentage of DSL connections by type of provider



At the end of 2007, KPN was still retailing 70.4% of DSL directly (KPN Direct) or through its ISP subsidiaries (Planet Internet, XS4ALL, Het Net), compared to 70.5% one year before and 72% two years before. ULL now accounts for nearly 30% of DSL connections, with most unbundled lines being shared access lines.

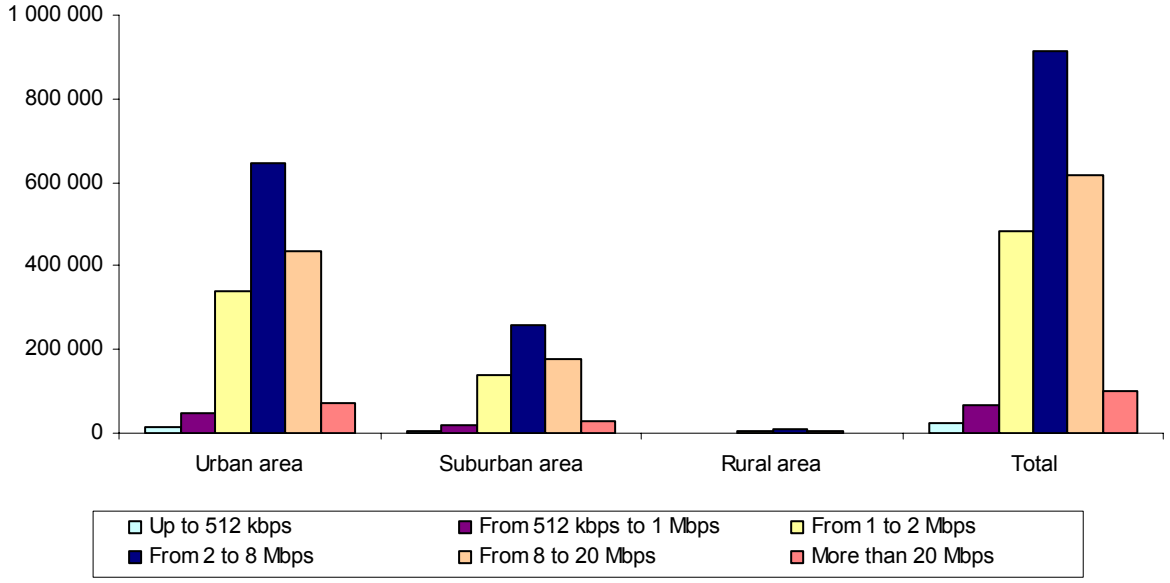
4.19.4. Cable modem coverage and take-up

Coverage and penetration



Broadband cable coverage is now at 92% and still rising. Most of the areas not covered are rural. Though already high, cable modem penetration grew from 12.1% to 13.5% (+12%).

Number of cable modem connections by download rate



On average, cable modem connections in the Netherlands are faster than DSL solutions, with most ranging from 2 to 8 Mbps, although services running at 8 and 20 Mbps already account for more than a quarter (27.9%) of cable connections (compared to 7% of DSL connections).

4.19.5. Other broadband access technologies

FTTH

FTTH in the Netherlands began being deployed in 2004. In 2007 the number of FTTH connected households has more than tripled from the 111,000 subscribers the year before. Enabled through contracts with housing corporations and city-projects, the Netherlands reached a total of app. 377,000 FTTH lines. Although KPN and the major cable operators have very limited FTTH deployments more than 570,000 households are forecasted to be connected by 2009.

Very recently there were also some VDSL deployments in the Netherlands but the number of subscribers at the end of 2007 was still very low (50), increasing rapidly thereafter (150 000 at mid 2008).

Wi-Fi

Wi-Fi services are available in some urban areas, mostly in cafés, hotels and airports and, in most cases, are used on an *ad hoc* basis as complement to fixed access technologies.

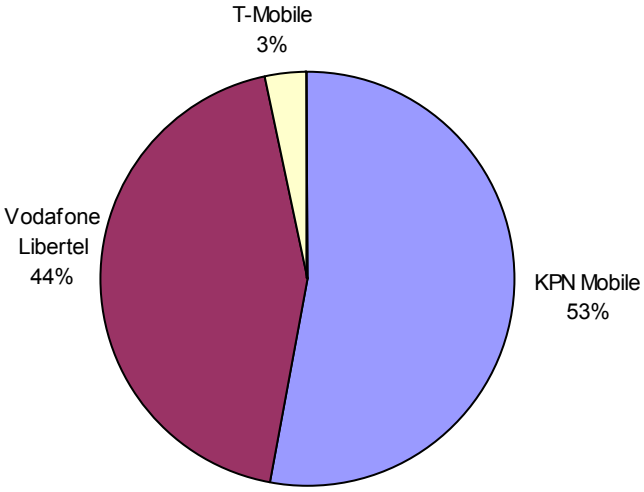
Satellite

Broadband satellite Internet access is not widely used in the Netherlands, accounting for roughly 1,000 subscribers in 2007. The subscriber base has been stagnating since 2003.

Cellular

The 3G subscriber base in the Netherlands grew significantly in 2007. Subscribers more than doubled to about 1,800,000 by the end of the year (2006: 807,600). UMTS coverage in this densely populated country was over 90%. HSDPA was first introduced by T-Mobile in April 2006, with Vodafone following suit in October 2006 and KPN in December 2006. HSDPA coverage was just over 80% at the end of 2007.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.20. Norway

4.20.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,181,890	1,244,072	2,311,209	4,737,171
Share of total population	24.9%	26.3%	48.8%	100.0%

4.20.2. General broadband data

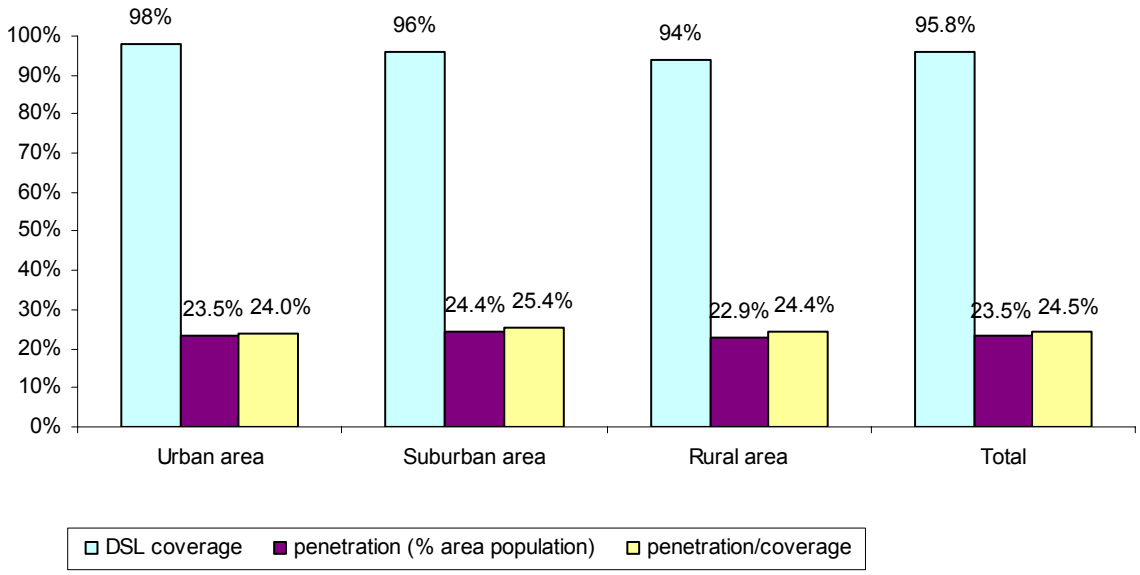
	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	68%	82%	88%	91%	96%
DSL subscribers	310,499	548,125	801,988	997,140	1,110,914
DSL penetration (% of population)	6.6%	11.7%	17.1%	21.3%	23.5%
Cable modem coverage (% population)	20%	20%	20%	*20%*	*20%*
Cable modem subscribers	69,587	91,833	136,706	177,104	225,000
Cable modem penetration (% population)	1.5%	2.0%	2.9%	3.8%	4.7%
FTTx subscribers	9,157	17,875	38,823	70,303	95,000
PLC subscribers	0	0	0	0	0
WLL subscribers	6,683	12,859	13,215	26,900	36,800
Satellite subscribers	0	0	0	0	0
Total	395,926	670,692	990,732	1,271,447	1,467,714
Total penetration (% population)	8.5%	14.3%	21.2%	27.2%	31.0%

With a penetration rate of 31.0%, Norway ranks among the most advanced countries in terms of broadband.

76% of broadband subscribers are connected through DSL (down from 78% last year). The incumbent operator, Telenor, is active both in DSL (with 57% market share, up from 56% last year) and in cable through its subsidiary, Canal Digital. It still retains more than half of the broadband subscriber base despite strong pressure from competition, especially through unbundling.

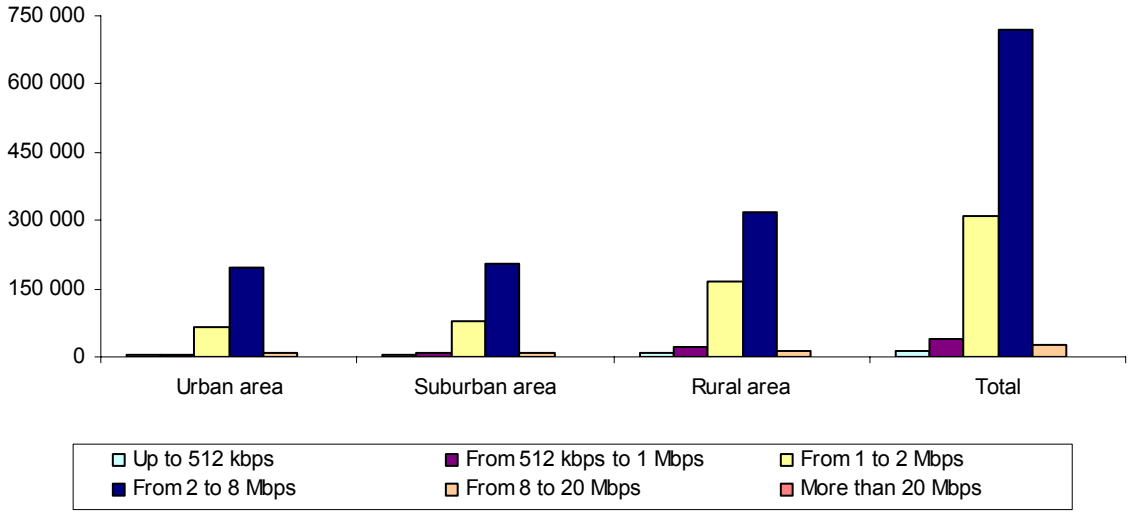
4.20.3. DSL coverage and take-up

Coverage and penetration



Coverage improved in all areas in 2007, and now stands at 96% nationally (up from 91% last year).

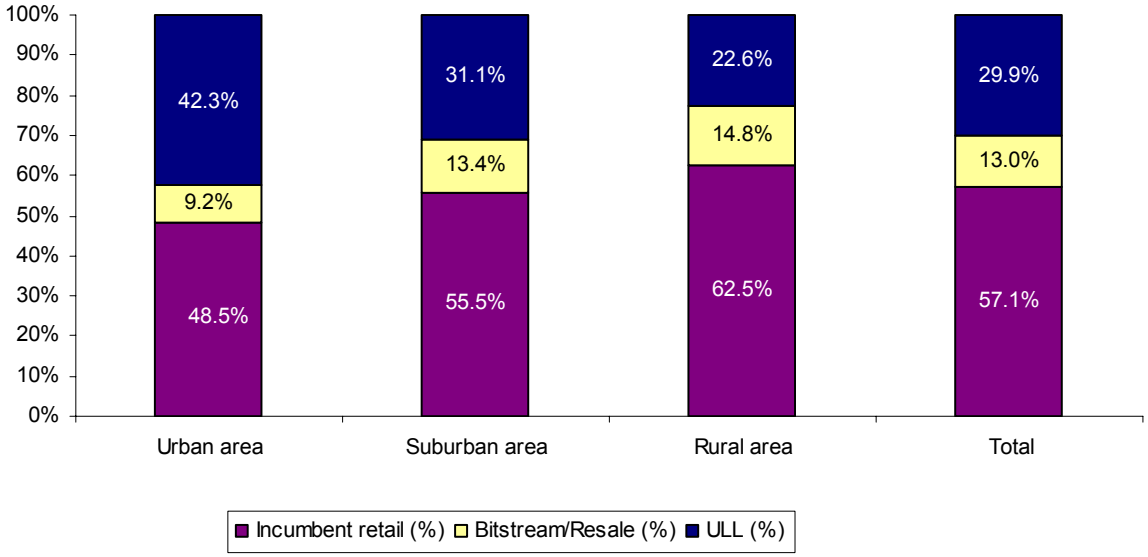
Number of DSL connections by download rate



The number of DSL subscriptions grew by 11% in 2007. Download speeds below 1 Mbps now account for less than 5% of all connections. The majority of connections have moved from the 1-2 Mbps range to the 2-8 Mbps range. The latter now accounts for nearly two thirds of all connections.

The number of very high speed connections, i.e. higher than 8 Mbps, grew by a factor of 44 in 2007, but the total number of subscriptions remains relatively low (2.5% of the DSL market).

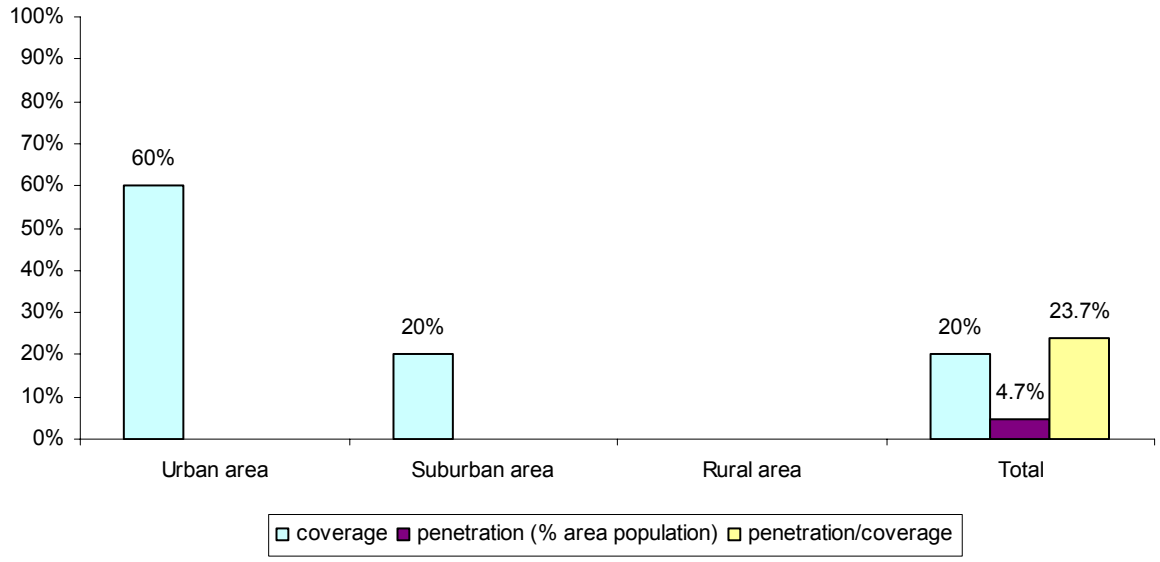
Number of DSL connections by type of provider



These numbers changed only moderately in 2007, with the incumbent largely holding its ground. All categories grew in absolute terms in 2007.

4.20.4. Cable modem coverage and take-up

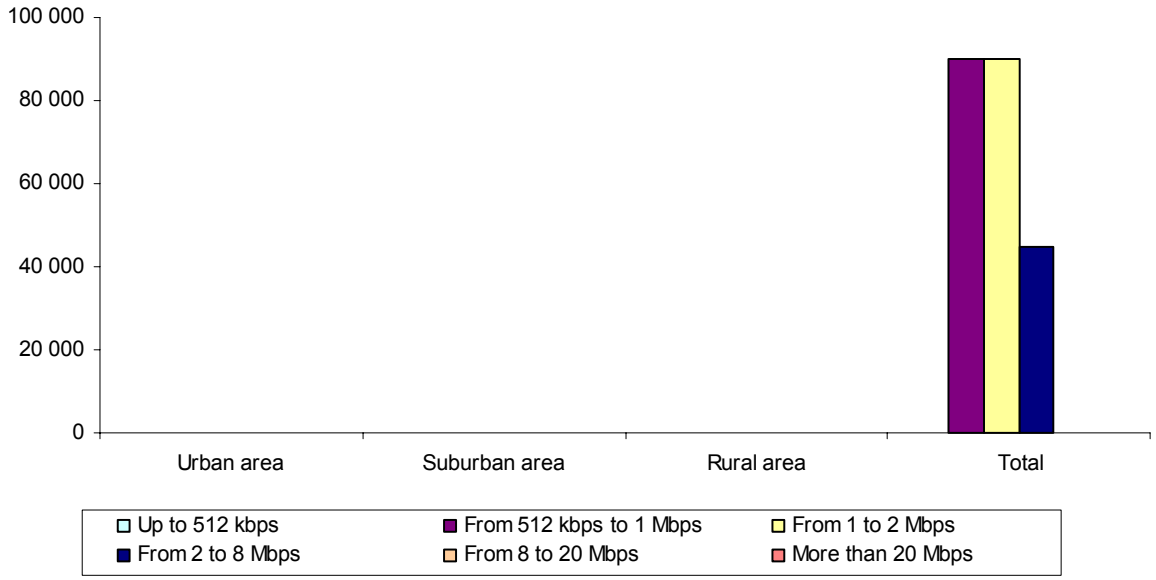
Coverage and penetration



Cable modem subscriptions experienced strong growth in 2007, increasing by 27%. Both major operators, Telenor (Canal Digital) and Get (formerly UPC) have aggressively marketed broadband connections and VoIP alongside their Digital TV (and lately HDTV) offers.

Estimated coverage remained unchanged in 2007, while penetration increased from 3.8% to 4.7%.

Number of cable modem connections by download rate



Previously assumed to be similar to DSL download rates, revised methodology this year suggests that cable download rates are somewhat lower than DSL, with the majority of connections lying in the 1-2 Mbps range.

4.20.5. Other broadband access technologies

Wi-Fi

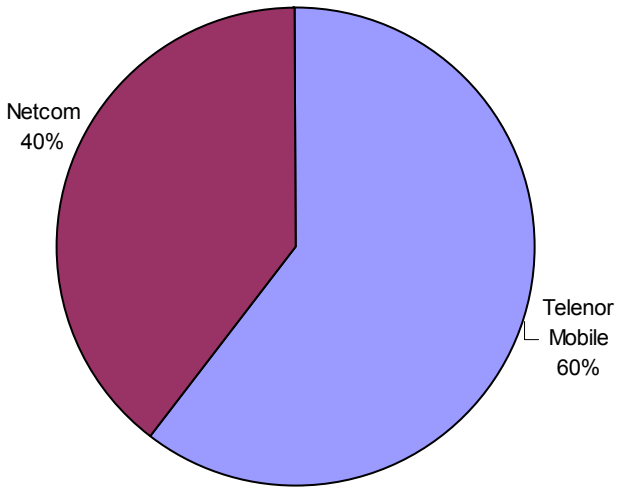
Telenor is by far the largest Wi-Fi operator in Norway, with an almost ubiquitous presence in hotels, restaurants, airports, Statoil petrol stations and other public places throughout the country.

Cellular

Telenor was the first to introduce commercial UMTS services in December 2004, with NetCom following suit in late February 2005. Both initially launched data card services for laptop users, with 3G handsets following shortly afterwards.

By the end of 2007, 90%+ of the population was covered by UMTS. HSDPA was available in the 4 largest cities (Oslo, Trondheim, Bergen et Stavanger). An estimated 1,210,000 active handsets have 3G capabilities.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.21. Poland

4.21.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	18,650,194	7,150,661	12,391,046	38,191,901
Share of total population	48.8%	18.7%	32.4%	100.0%

4.21.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	-	55%*	62%*	67%	64%
DSL subscribers	270,332	668,000	1,254,029	1,855,000	2,376,629
DSL penetration (% of population)	0.4%	1.7%	3.3%	4.9%	4.9%
Cable modem coverage (% of population)	-	-	12%	18%	25%
Cable modem subscribers	85,368	202,000	371,000	721,000	946,500
Cable modem penetration (% of population)	0.2%	0.5%	1.0%	1.9%	2.5%
FTTx subscribers	-	4,000	4,500	*5,500*	*180,000*
PLC subscribers	-	-	0	0	0
WLL subscribers	-	-	7,486	*14,500*	*575,000*
Satellite subscribers	-	-	93	*100*	*1,000*
Total	355,700	874,000	,1,637,108	2,596,100	4,079,129
Total penetration (% of population)	0.4%	2.3%	4.3%	6.8%	10.7%

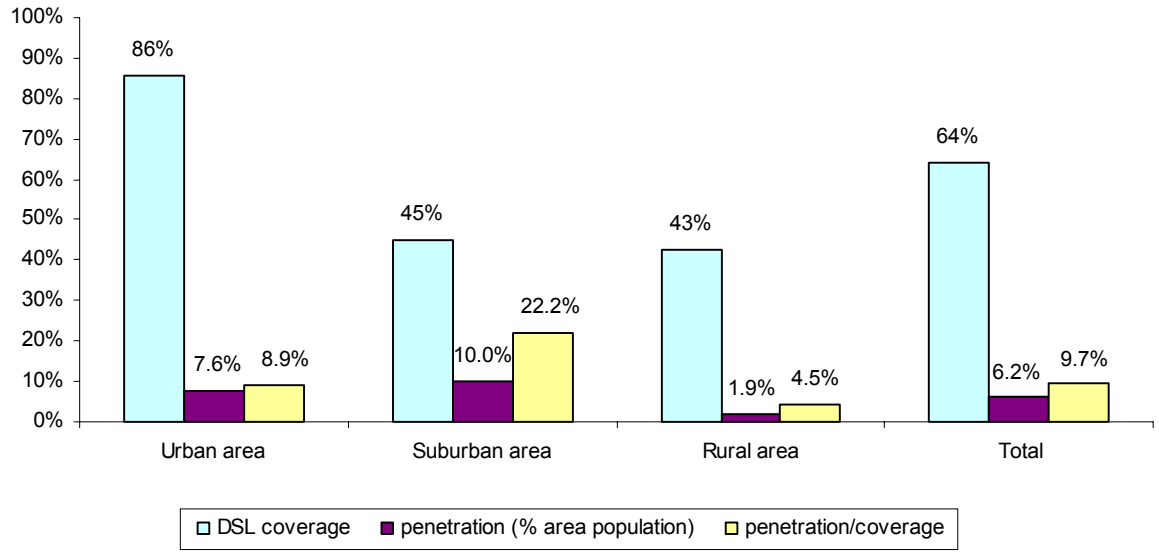
Nota: figures in *italics* are estimates.

There were over four million broadband subscribers in Poland at the end of 2007, out of which 2.028 million were supplied by incumbent carrier, Telekomunikacja Polska (TP), via DSL (largely ADSL) on analogue copper lines (TP has approx. 8.9 million fixed lines). The highest speed was 6 Mbps in consumer offers and 15 Mbps for the SME sector. Alternative telecom operators have a slight technical advantage over the incumbent as their technical infrastructure (copper lines on last mile, local exchanges, architecture of networks) is far more modern. As full unbundling was not introduced until late 2007, according to the reports from the Polish regulatory authority, UKE (the Office of Electronic Communications), only 76 lines were fully unbundled as of 31 December 2007.

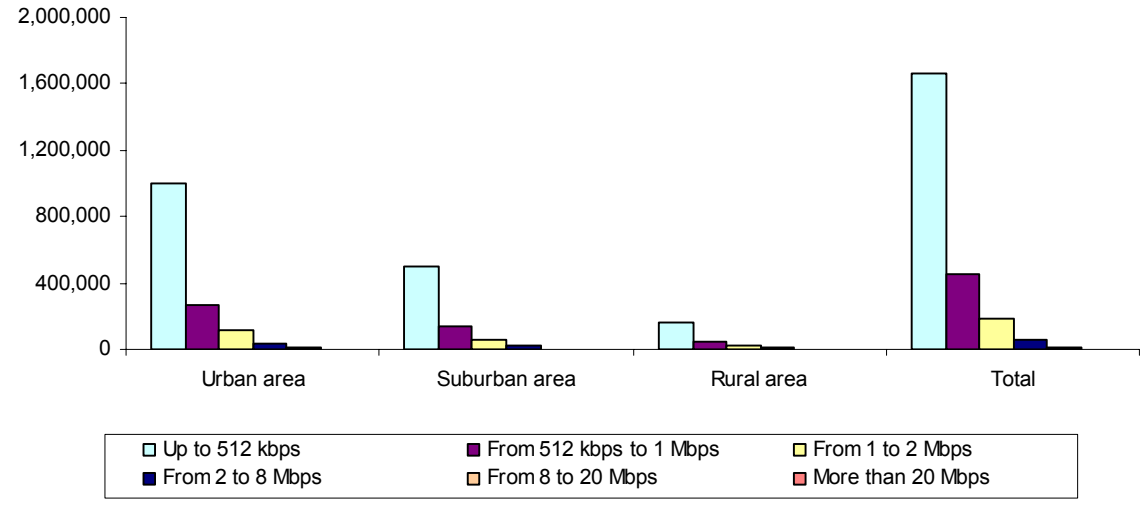
Although reporting an 88% share of the fixed telephony market, in number of lines, and an 85% share of the DSL market, incumbent PT's share of the total broadband retail market at the end of 2007 was below 50%, as cable accounts for 23% of broadband connections, thanks to networks covering close to 6 million households.

4.21.3. DSL coverage and take-up

Coverage and penetration

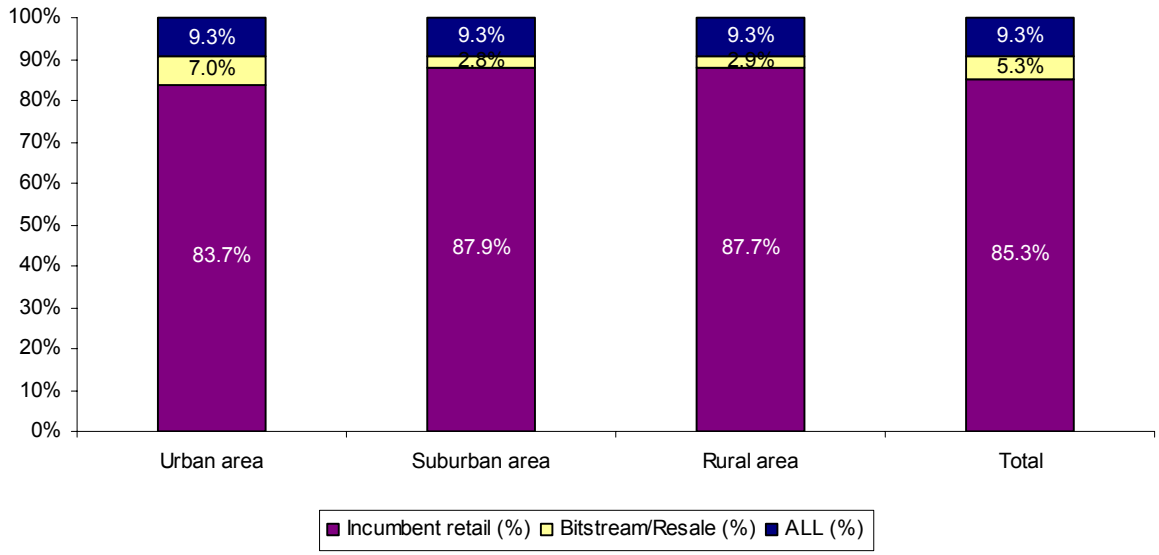


Number of DSL connections by download rate



Despite the fact that access speeds under 256 kbps were gradually withdrawn from ISPs offers in 2007, and new customers were being offered services at 512 kbps minimum, more than 70% of consumers access the Internet at speeds below 512 kbps. The highest speed offered to residential users, by both TP and alternative providers (both on their own and unbundled lines) was 6 Mbps. Higher speed ADSL solutions (8 and 15 Mbps) were available only for TP's business customers in 2007. There was no VDSL technology available commercially.

Percentage of DSL connections by type of provider

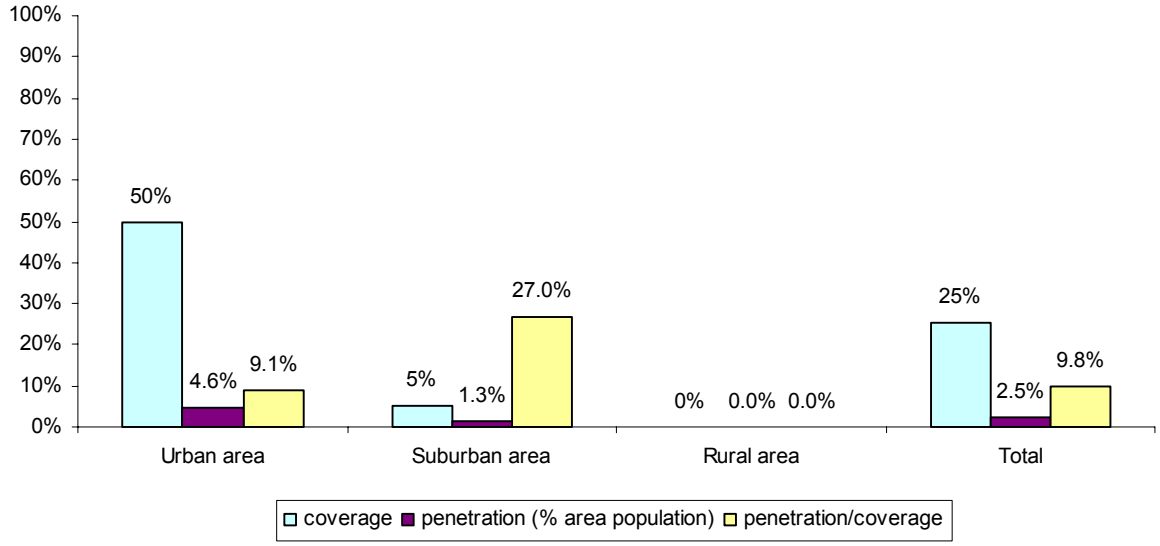


In 2007, alternative operators offers – both those supplied on their own lines and unbundled/BSA – were very closely following the offers being marketed by incumbent TP. The main reason being a marketing issue: it was easier to compare the price of access supplied by an alternative operator with that of the incumbent, if parameters (speed, duration of contract, etc.) are very similar. In the case of BSA, the reason was more technical – alternative operators using bitstream access has very little room to differentiate their offer from the incumbent's.

There is also a difference between the DSL offers that PT delivers over its own network, and those marketed by alternative ISPs: TP provides ADSL over analogue lines only as its equipment is incapable of delivering DSL-over-ISDN (this is one of the main reasons for TP loosing ISDN customers in the SME segment), as opposed to Dialog and Netia which are supplying ADSL on their ISDN lines as well.

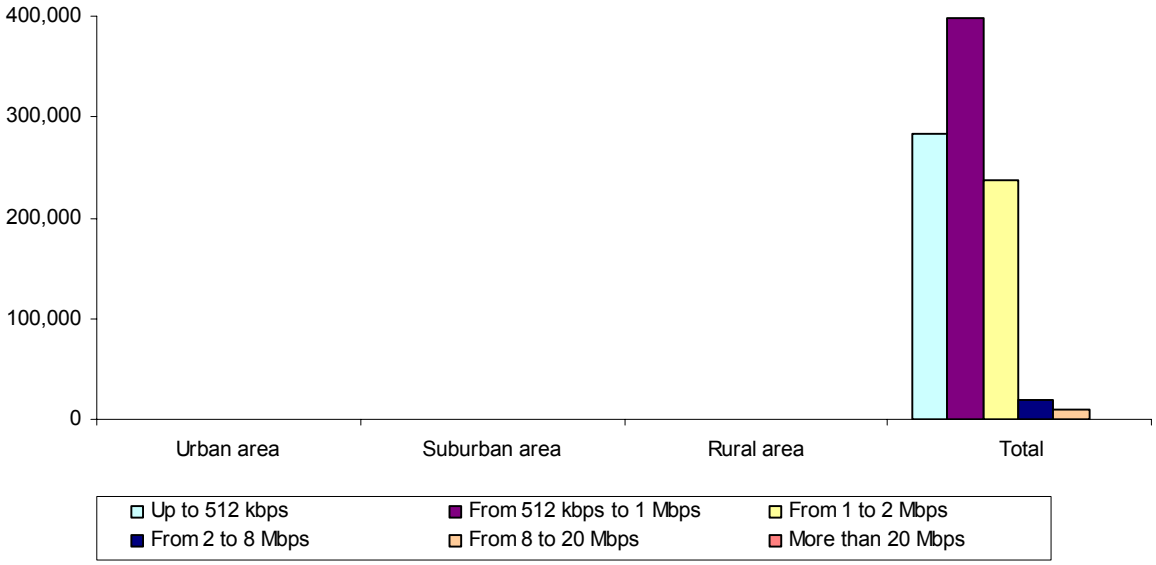
4.21.4. Cable modem coverage and take-up

Coverage and penetration



PIKE (Polish Chamber for Electronic Communication), composed of the country's 130 largest cable TV operators, reports 946,500 broadband cable customers in Poland at the end of 2007. It can be estimated that members of PIKE account for close to 100% the country's broadband cable providers, despite the fact that they serve around 75% of cable TV customers nationwide. At least the "Top Ten" CATV operators (with a 70% share of CATV services and a 97% share of broadband access) are technically and financially capable of full deployment of HFC technology, what is reflected in the substantial increase in the number of customers using Internet access via cable.

Number of cable modem connections by download rate



The maximum speed available in 2007 was 20 Mbps (UPC Poland), while other leading operators (Aster, Vectra, Toya, TKP/Inea) followed with speeds of up to 10 Mbps. Most offers include double the download speed at night for customers of lower-end packages (up to 1 Mbps).

The majority of the largest cable operators offer fixed telephony over their networks as well. At the end of 2007, the number of fixed cable telephony users was estimated at 150,000-180,000. Some CATV operators even declared their intention of marketing mobile telephony services as MVNOs (e.g. Aster, which started the service as SP in 2008).

According to, PIKE 40-45% of subscribers in 2007 chose an Internet access speed of 1 Mbps, up to 25% – from 1 to 2 Mbps and only 2-3% – higher than 2 Mbps. The remaining one third was satisfied with a speed of up to 512 kbps – mostly because of the limited technical availability of higher speeds or users' limited needs. The prices of the highest speed options are not prohibitive, usually only 2-3 times higher than slowest service, offering 10-20 times the speed.

4.21.5. Other broadband access technologies

FTTH

The range and coverage of FTTH in Poland has been underestimated as there is no reliable data for a large number of city networks and suburban networks deployed since the late 1990s. Historically, the majority of these networks were established by local groups of end-users (amateur networks in big housing estates) as a way of providing cheap Internet access sharing fixed data-transmission links provided mainly by the incumbent. During the last 10 years, many of these former amateur networks have transformed into small (or even large) ISPs. The predominant architecture of these networks today is FTTH: high-speed data link (mainly fibre-optics) to the premises (or to cabinet near a group of buildings) and Ethernet/FastEthernet LAN to end-user premises/apartments. The largest of such networks have up to 3,000-4,000 customers – a good example are local networks acquired by Netia in the years 2007-2008 in towns of Lower Silesia. By such means Netia gathered more than 32,000 customers of FTTH.

WLL/WiMAX

After cancelling the 2006 tender for 3.6–3.8 GHz (pre-WiMAX) frequencies, UKE (the Office of Electronic Communications) has defined a new concept for 60 areas (at NUTS 3 level) for point-multipoint wireless systems which may be used for fixed wireless Internet access at 3.4-3.6 and 3.6-3.6 GHz frequencies. At the end of September 2007, there was a first call for the first area (the tender was won by a local community). The calls for other areas have been published for 2008 – with mixed results, so tenders for some areas may be repeated or revised for a procedure in 2009. According to the frequency management strategy published by UKE in April 2007, the use of other bands (i.e. 2.2–2.3 GHz/2.3–2.4 GHz, 10.15–10.30/10.50–10.65 GHz) is also considered for WLL/point-multipoint systems.

WLL access services are provided by several ISPs and telecom operators (including Crowley Data Poland, Exatel, GTS Energis, Netia, NASK, SferaNet) using mainly the 3.5 and 5.9 GHz frequency-bands, alongside other wireless technologies (e.g. LMDS). As the prices of equipment for these frequencies is still high, the offers are aimed mainly at business users, especially mid-size and large companies. As 2007 was the year when wholesale offers were launched by the incumbent, the plans formulated by Netia and Exatel, which launched their commercial WiMAX services in Q4 2006 or early 2007, were reconsidered and limited to a few thousand business customers.

The vast majority of WLL accesses, which are estimated to total around 600,000 are small and mid-size local networks serviced by smaller ISPs using various fixed and wireless technologies (WiMAX, LMDS) in the “next to last mile”, and providing access for their customers (consumers and small businesses) using Ethernet LAN (see FTTH below) or the unlicensed WLAN 2.4 MHz band (Wi-Fi).

Cellular

The nominal mobile density has reached 100% in June 2007. At the end of 2007 the density was in the range of 109% which in reality means approximately 34-35 million active users. There are four MNOs providing mobile telephony services:

- Polkomtel (brand names: Plus GSM, Simplus Team, Sami Swoi),
- PTK Centertel (brand names Orange, Orange Go),
- PTC (Era, Era TAK TAK and Era BIZNES, Heyah)
- P4 (Play).

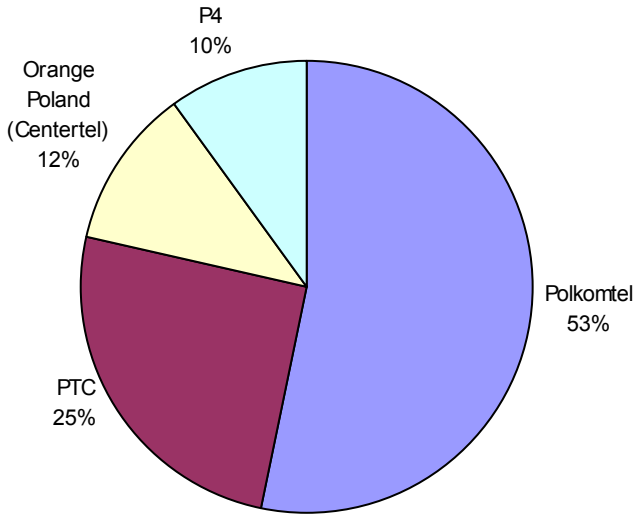
In 2007, the newest MNO, P4 (owned originally by Netia fixed line operator together with private equity firms Tollerton Investments and Novator Telecom; in 2008 Netia sold its share) has built its customer base up to 1 million. P4 supplies 3G services under the Play brand on its own network and 2.5G services on the basis of an internal roaming agreement with Polkomtel.

The “Big Three” – Polkomtel, PTK Centertel and PTC – provide 3G/UMTS services and mobile Internet access over 2.5 and 3G technology, including HSDPA which launched at the end of 2006. At the end of 2007, coverage for 2.5G data transmission (GPRS/EDGE) was more or less at 80-90%, compared to 20-25% for 3G/UMTS in terms of geographical coverage and 60% in terms of population coverage. HSDPA coverage is very limited, however, despite the fact that all three MNOs are supplying their customers with data cards capable of 7.2 Mbps. In practice, coverage delivering speeds of 1.8-3.6 Mbps was limited to the citycentre of several of the main cities. In 2007, P4 used the facilities of Polkomtel in the main cities as its own 3G network rollout was being delayed by environmental protection issues. P4 is expecting to run a massive launch of its mobile Internet in 2008.

As result of tender for the remaining 1800 MHz frequencies, two newcomers (CenterNet owned by Polish private investor) and Mobyland (joint venture between a Polish investment fund and an Italian ISP) were granted licenses in November 2007. Both new MNOs are expected to build their networks at the beginning of 2009 in the country’s largest cities only. In order to fulfil the coverage obligations they will have to rely on internal roaming agreements with the “Big Three”. No plans for mobile Internet of these “semi-MNOs” have been revealed yet.

At the end of the 2007, five MVNOs were present in the market with their services. All five are SPs (Service Providers) relying fully on OSS/BSS systems of their suppliers of radio infrastructure. The total number of users was estimated by industry analysts and by the Office of Electronic Communications in the range of 59 thousand. Other MVNOs were in various stages of preparation, some have commenced their services in 2008 (i.e. Carrefour Mova, Mobilking). The start of the most advanced project of Polsat Cyfrowy (digital satellite TV provider) – full MVNO, with its own billing and customer-care systems, previously announced in 2007, has been delayed until second half of 2008. Nevertheless none of MVNOs provides Internet access services and no such plans were announced.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.22. Portugal

4.22.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	4,884,085	3,408,242	2,325,248	10,617,575
Share of total population	46.0%	32.1%	21.9%	100.0%

4.22.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	84%	92%	93%	94%	95%
DSL subscribers	184,344	420,625	672,800	883,746	1,087,725
DSL penetration (% of population)	1.7%	4.0%	6.3%	8.3%	10.2%
Cable modem coverage (% population)	*65%*	71%	75%	80%	85%
Cable modem subscribers	314,479	414,916	489,892	537,552	605,887
Cable modem penetration (% population)	3.0%	3.9%	4.6%	5.1%	5.7%
FTTx subscribers	3,530	3,282	3,218	4,180	6,700
PLC subscribers	0	0	1,600	0	0
WLL/WiMAX subscribers	-	-	1,700	3,700	8,200
Satellite subscribers	-	-	-	-	-
Total	502,353	838,823	1,169,210	1,429,178	1,708,512
Total penetration (% population)	4.7%	7.9%	11.0%	13.5%	16.1%

At the end of 2007 the rate of broadband penetration stood at 16.1%.

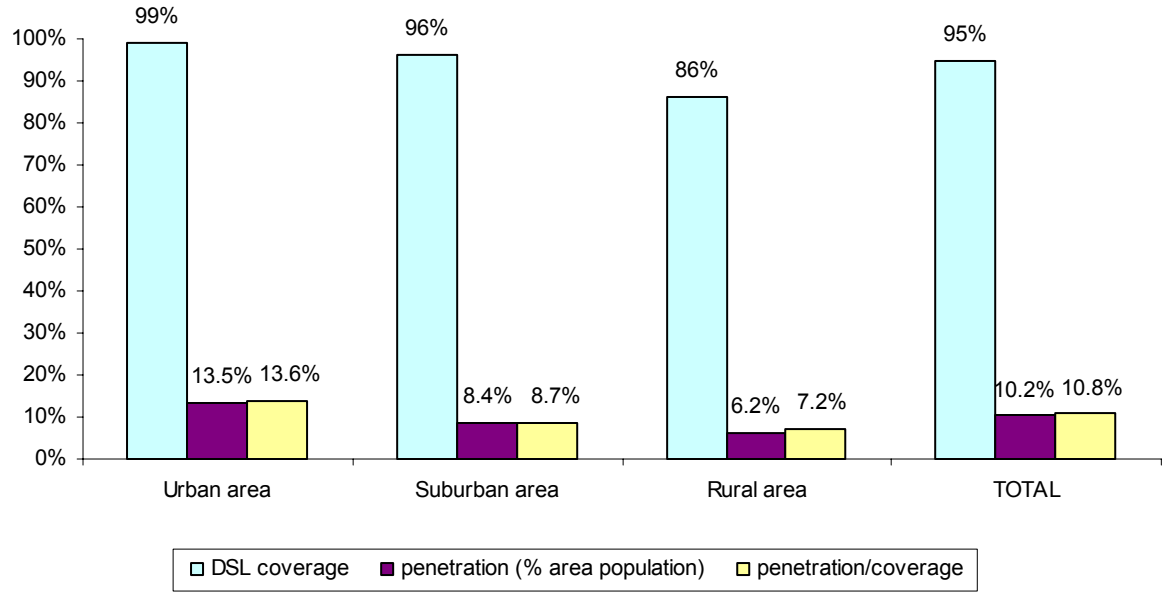
Total broadband lines increased by 211,000 in 2007, boosted by the high level of net additions of ULL and cable modem lines, which totalled around 95,000 and 68,000 respectively in the last period. These figures point to the strengthening of ADSL's predominance over cable, already accounting for the majority of broadband connections (64%).

Broadband customers now make up the vast majority of internet access customers (94.5% of a total of 1.808 million customers).

Of the 1,808 million internet access customers, 1,562 million were residential customers, a rise of 4% compared to the end of 2006. Of these, near 1.5 million used broadband.

4.22.3. DSL coverage and take-up

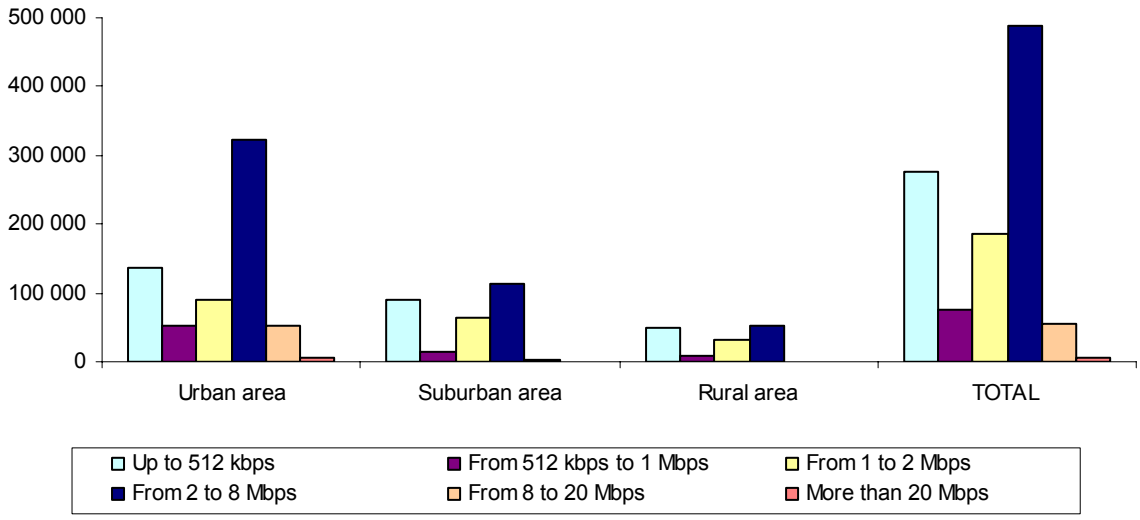
Coverage and penetration



In urban areas, DSL coverage totals 99%, while in rural areas the coverage is around 86%.

The rate of DSL penetration rose to 10.2% in 2007, from 8.3% in 2006.

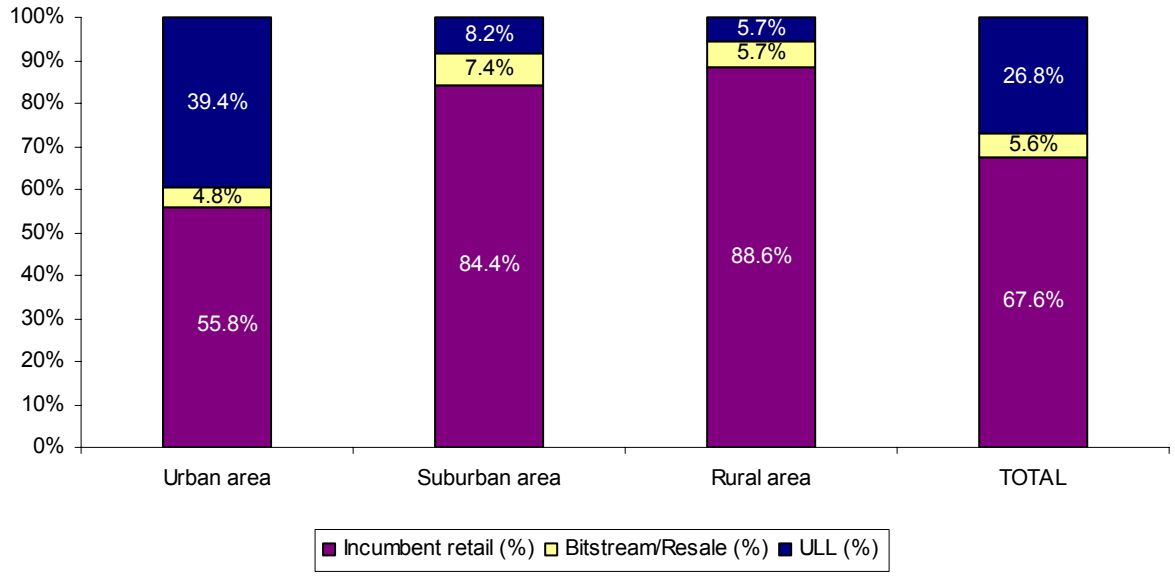
Number of DSL connections by download rate



New entrants have been able to launch competitive offers, based on local loop unbundling. In parallel, data speeds have increased quite significantly, and, although the 512 kbps base is still significant, solutions running at between 2 Mbps and 8 Mbps are the most popular in Portugal.

Higher download rates are offered in urban areas than in suburban and rural ones.

Percentage of DSL connections by type of provider



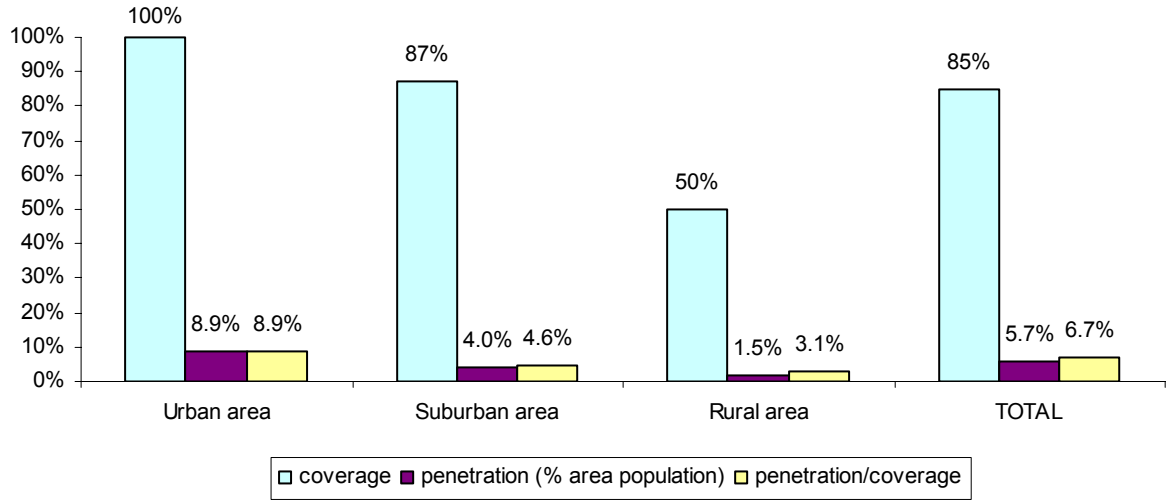
PT Group's share of broadband customers in the last quarter of 2007 fell to 67.6%, down 5 percentage points compared to the same quarter of the previous year.

The rise of the alternative operators' share of broadband costumers is based on ULL lines, and reflects the best conditions of the new Reference Unbundling Offer (RUO). Until 2004, the number of unbundled lines in Portugal was insignificant but, in 2007, a high number of local loops were unbundled (+95,421), showing the sizeable investments being made by alternative carriers, in a bid to gain more direct access to customers and offering more flexible retail services.

In December 2007, there were 291,175 LLU customers in the country.

4.22.4. Cable modem coverage and take-up

Coverage and penetration

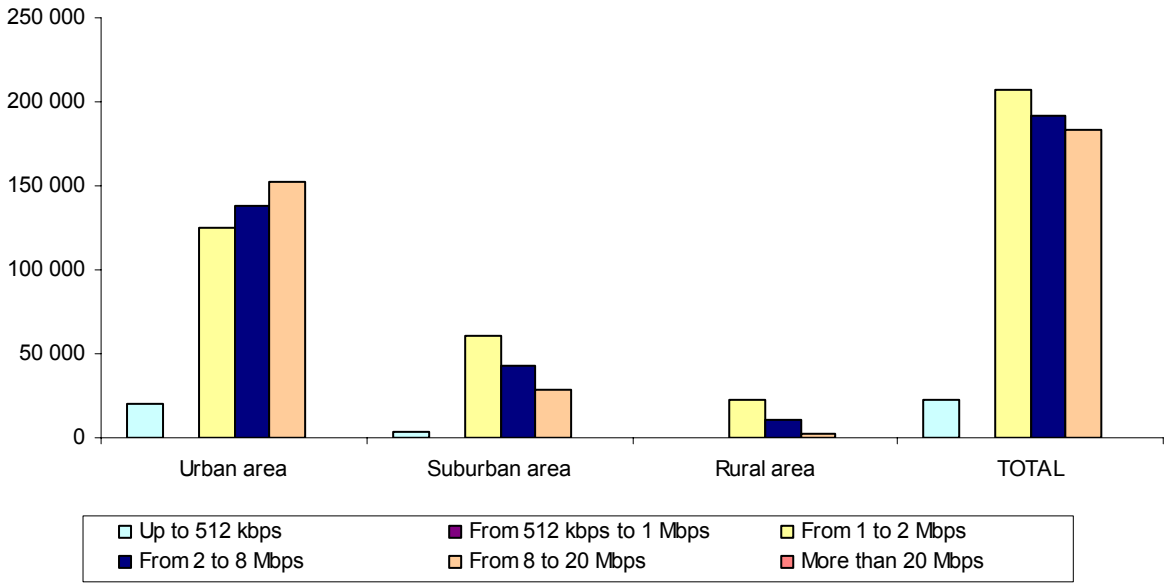


More than 4 million households or 80% of total households were passed for cable at the end of 2007, relatively unchanged from the previous year. Cable modem is available primarily in urban areas, where coverage is total.

Lisbon continues to account for the largest percentage of homes passed for cable (44% of the total), followed by the North (30%) and the Centre (14%) of the country.

The rate of cable penetration rose to 5.7% in 2007 from 5.1% the previous year.

Number of cable modem connections by download rate



Internet services with a download rate over 2 Mbps are dominant in the cable modem market (62% of total).

In 2007, TV Cabo (until then cable modem PT Group´s operator) was part of a spin-off which was finalised in November.

4.22.5. Other broadband access technologies

PLC

All PLC projects in Portugal (trials) have stopped and, at the end of the year 2007, there were no active clients any more.

Wi-Fi

There are around 1,600 hotspots in Portugal, most of them belong to PT.

The government's campaign to deploy hotspots around the country, particularly in public areas and educational centres, has contributed to this increase. Nevertheless, the main users are the hotels and airports.

WiMAX

During 2006, Anacom, the telecommunications regulator in Portugal, released a proposal for the allocation of 3.4-3.8 GHz spectrum. Following an initial public consultation, which received 19 responses in 2007, Anacom published a final consultation with the expectation of allocating frequencies in 2008.

Anacom said that the spectrum would be auctioned on the basis of technology neutrality, which would allow the use of WiMAX type systems.

IPTV

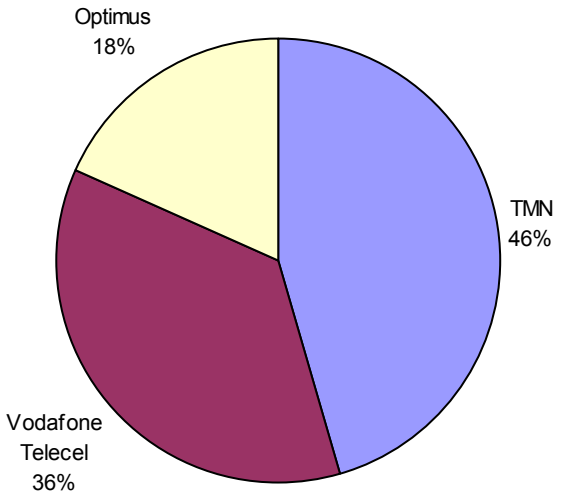
At the end of 2007 the number of IPTV clients in Portugal was close to 21,000.

Cellular

In 2007, the three mobile operators launched several broadband Internet access offers, based on 3G and GPRS technologies. These offers typically include mobile connect cards with specific tariffs, which enable laptops to connect to Internet.

In December of 2007, there were around 3.2 million 3G subscribers in Portugal. Over 80% of the population is covered by UMTS, while about 78% (Optimus network) is covered by HSDPA.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.23. Slovakia

4.23.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,871,631	1,925,045	1,604,322	5,393,637
Share of total population	34.7%	35.6%	29.7%	100.0%

4.23.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	*18%*	*44%*	61%	66%	74%
DSL subscribers	*4,210*	*38,334*	104,899	182,391	277,832
DSL penetration (% of population)	*0.1%*	*0.7%*	1.9%	3.4%	5.1%%
Cable modem coverage (% population)	*2%*	*4%*	8%	15%	24%
Cable modem subscribers	3,498	10,854	26,083	36,701	51,405
Cable modem penetration (% population)	*0.1%*	*0.2%*	0.5%	0.7%	1.0%
FTTx subscribers	400	2,000	17,819	30,875	52,421
PLC subscribers	0	0	0	0	0
WLL subscribers	3,300	11,000	24,518	69,629	92,356*
Satellite subscribers	150	400	420	317	130
Total	11,558	62,588	173,739	319,913	474,144
Total penetration (% population)	*0.2%*	*1.2%*	3.2%	5.9%	8.8%

* of which 71,799 Wi-Fi subscribers, 10,841 WiMAX subscribers and 9,716 WLL subscribers

Broadband Internet connections in the Slovakian market total 474,000 lines, with an estimated net gain of around 154,000 connections in 2007 (+48.2 %).

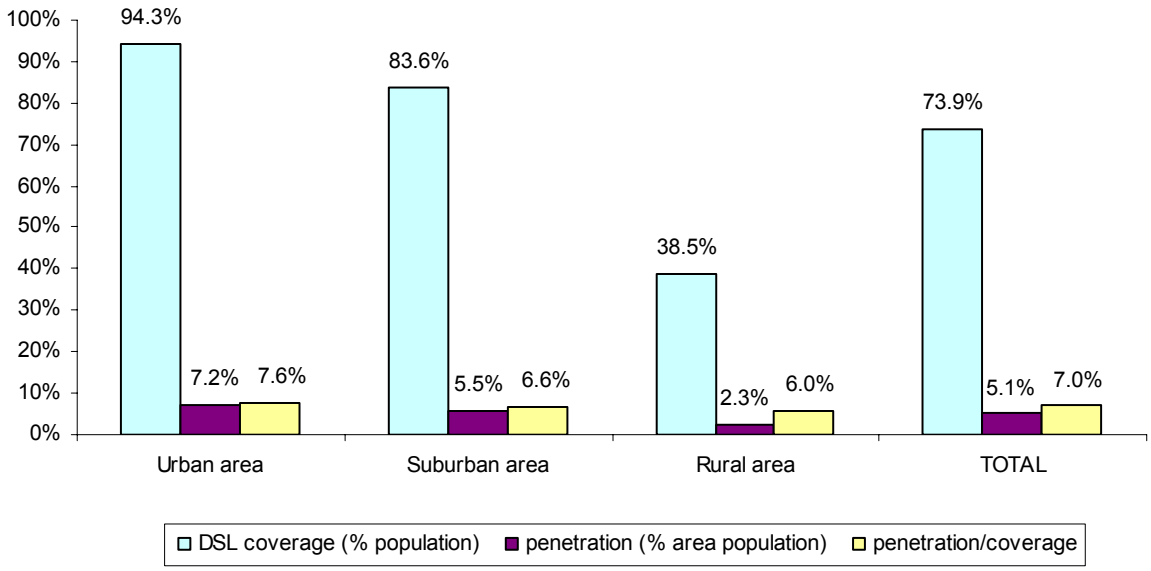
In the DSL segment, Slovak Telekom still retains a very strong position as bitstream/resale offers only account for 7.4 % of connections and, unbundling regime was never practically implemented as yet. Cable modem penetration is still low, due chiefly to coverage constraints.

The market development is influenced by:

- practically monopoly position of the incumbent operator – Slovak Telekom in fixed telephone network infrastructure,
- an increase of xDSL services coverage from the incumbent operator (for 8 % of population),
- a gradual increase of coverage from alternative fixed infrastructures at local level with internet via CATV networks only available in 36 municipalities (increasing for 16 municipalities during 2007), but total CATV households penetration is relative high (35.3%)
- generally rapid development of commercial and municipal wireless broadband (WiFi, FWBA/Wimax and WLL (FWA) networks),
- gradual development of mobile internet access via UMTS with services launched in January / February 2006 by only two mobile operators and via FLASH-OFDM also called FLARION, which enables mobile internet access up to 5.3 Mbps (Slovakia was the first country in the world to launch commercial operations with this technology in September 2005)
- rapid increase of commercial usage of existing national and new regional fibre optic backbone from alternative operators that are also able to offer FTTx.

4.23.3. DSL coverage and take-up

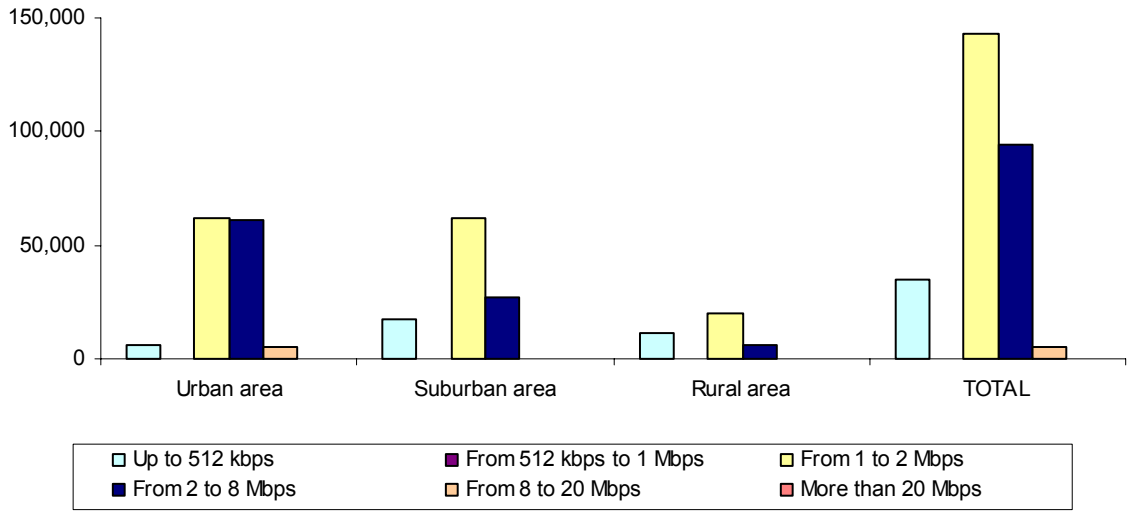
Coverage and penetration



In 2007, ADSL services were available in 884 municipalities (including 17 municipalities within Bratislava-City and 22 municipalities within Kosice-City), which represents 30.2% of 2,928 total municipalities and near 74% of total population (3.991 million inhabitants).

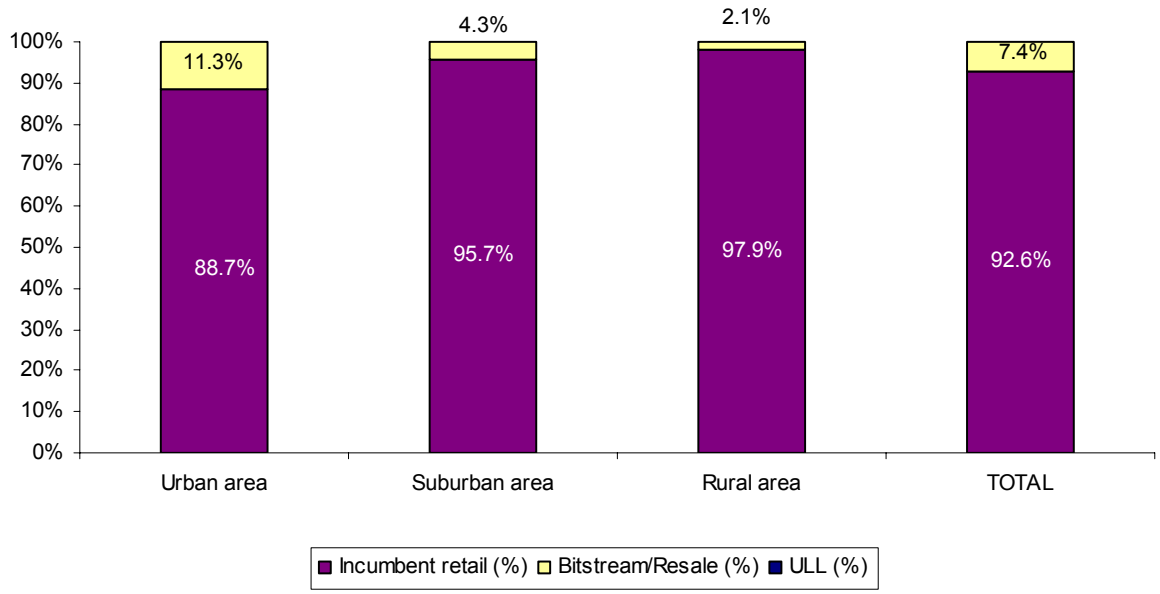
Real xDSL coverage is limited because not all PSTN lines are capable of delivering xDSL, mainly due to distance constraints.

Number of DSL connections by download rate



ADSL2+ services were introduced at the end 2006. Most xDSL services (67.9%) were provided at a speed of 1-2 Mbps downstream/384 kbps upstream. During 2007, approx. 2 % of customers used the highest available rate of 12 Mbps (512 Kbps upstream), while the slowest download rate of 512 kbps (128 kbps upstream) was used by 12.5% of xDSL customers. Some of these benefited from a special discount rate under a government programme (2005-2008) dedicated to increasing broadband access amongst the country's youth (aged 15 to 25).

Percentage of DSL connections by type of provider



With 236,800 lines, Slovak Telekom delivers 92.6% of all xDSL lines directly. The remaining 7.4% cover bitstream/resale offers, as no unbundling agreements have been signed yet.

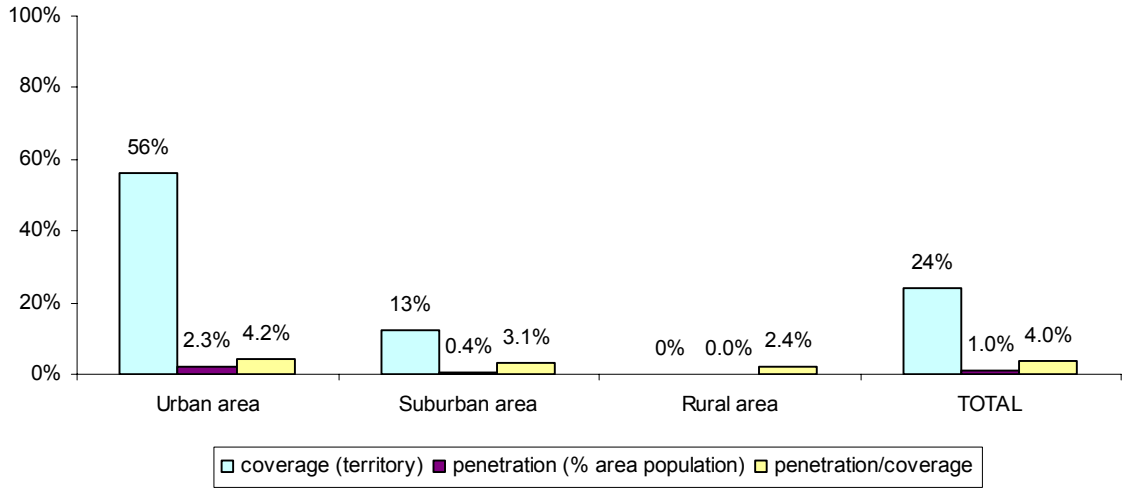
The prices for ULL are amongst the highest in the EU-27. Wholesale model for ADSL service was introduced in March 2006 only.

The main ADSL service providers with higher level of customers are the following:

- Slovak Telekom (92.6% of total xDSL end-users),
- Slovanet (5.5% of total xDSL end-users),
- GTS Nextra group (3.7% of total ADSL end-users).

4.23.4. Cable modem coverage and take-up

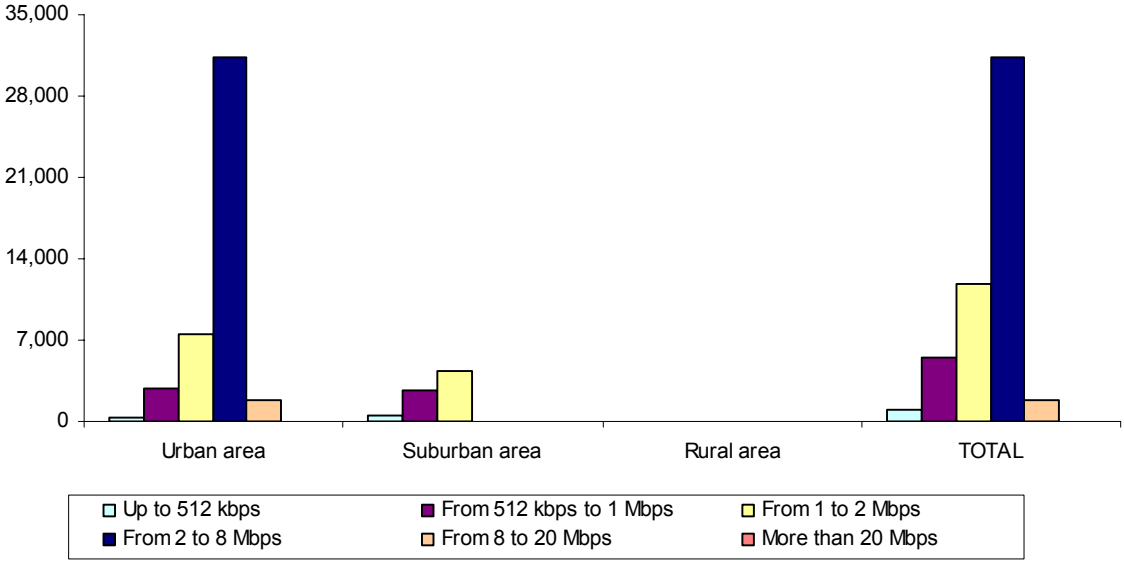
Coverage and penetration



CATV households penetration in Slovakia is relatively high (35.3%). Cable modem was available in 45 municipalities (including several municipalities within Bratislava-City and Kosice-City), which represents 1.54% of the 2,928 total municipalities and close to 24% of the total population (1.296 million inhabitants).

During 2007, cable modem services were available mainly in urban areas (24 towns or majority Bratislava-City´s and several Kosice-City´s municipalities), then in suburban areas (18 municipalities) while such services were available only in 3 municipalities located in rural areas.

Number of cable modem connections by download rate



Internet cable modem services were introduced in Slovakia during 2003 as the first broadband service in Slovakia. In 2007 about half of connections (51.4%) were provided at a speed of 1 - 2 Mbps downstream/384 kbps upstream. During 2007, approx. 3.6 % of customers used the highest available rate, higher than 10 or 15 Mbps (1 Mbps upstream), while the slowest download rate of 512 kbps (128 kbps upstream) was used by 1.8% of cable modem customers mainly in rural and suburban areas.

4.23.5. Other broadband access technologies

FTTH

FTTx services (fibre optic infrastructure to the home, then coax. connection to PC) were provided by several national operators as well as by a few local alternative operators in 32 towns and several municipalities within Bratislava-City and Kosice-City. FTTx services are only available in urban areas. The total number of FTTx customers reached 52,421, increasing by 69.8 % during 2007.

The leading FTTH operators were Orange, Antik, NITRANET, Micronet and GAYA / W-COM. Several local and regional operators were very active in building infrastructure and started to provide local FTTx services.

FTTB services were provided by a few national alternative operators/providers and one academic network operator (SANET). The total number of FTTB customers reached more than 1,400 (increasing over 48% during 2007). At national level the main FTTB providers are Energotel, Zeleznicne telekomunikacie/Railways Telecom, Orange and SANET. At local level they are Orange, Micronet and Antik. Commercial FTTB services were mainly available in urban and suburban areas, but also in some of rural areas within close proximity of energy distribution buildings and railway stations.

In Slovakia, since 2007, several TriplePlay services are available. At year-end the number of TriplePlay customers reached 22,300. Services were provided in 40 towns and municipalities within Bratislava-City and Kosice-City. According to announcements by operators, TriplePlay coverage would reach a total of 560,000 households. However, a more realistic estimate would be around 250,000, as several operators' geographic coverage overlap, which generates double counting. During 2007 the leading players were UPC Broadband Slovakia, Slovak Telekom, Orange Slovakia and Slovanet.

The download rate available in 2007 from FTTx services is 15 Mbps and above. The rate from FTTB services is between 10 and 100 Mbps.

PLC

A testing scheme of powerline Internet access was announced by a small number of private companies in co-operation with electric distribution companies.

Wi-Fi

First pilot projects based on WiFi standard (802.11b) were launched in Slovakia in 2003.

The following wireless technologies are available for use in Slovakia: RLAN (2400 - 2483,5 MHz), HIPERLAN (5150 – 5350 MHz only indoor) and HIPERLAN (5470 – 5725 MHz outdoor). There is a general authorisation regime which encompasses a registration obligation. At the end 2006, 72 operators were registered.

The public WiFi hot spot rapidly grew from 2003 to 2006, with an estimated availability of 3,500 units at the end 2007. Data for private wireless LAN based on WiFi standard are not available.

Slovak Telekom does not provide WiFi hot spots under its own brand but only via T-Mobile Slovakia which it fully owns. It operates 56 hotspots in 24 cities and villages. T-Mobile also enables the usage of its WiFi hot spots to its own EDGE/UMTS/FLASH-OFDM customers and without additional payments.

Since 2007, several municipalities provide non-commercial public hotspots services free of charge – mainly in urban and suburban areas.

At the end 2007, the number of WiFi customers was around 72,000. WiFi technology covered more than 1,300 municipalities (including municipalities in Bratislava-Ciy and Kosice-City) thanks to 181 WiFi networks. WiFi technology covers 59 towns and municipalities in urban areas, 472 municipalities in suburban areas and 792 municipalities in rural areas – which encompass a territory of 3.9 million inhabitants (72.2% of total population).

WLL/WiMAX

A tender for FWA 3.5 GHz was opened in August 2005 and four licences were granted to Amtel Slovensko, GlobalTel, Telenor Networks and WiMax Telecom Slovakia. Three operators have started commercial services before end 2005. All operators are using WiMax technology.

In December 2007, the total number of FWBA customers was 10.841. FWBA services are provided mainly in urban and suburban areas. The leading operator in 2007 was WiMax Telecom Slovakia.

During 2007 and 2008, several new permissions for different types of new FWBA services were issued by the national regulator (Telecommunication Office).

The WLL services are based on the frequency of 26 GHz, also known as FWA. Tender for FWA 26 GHz services was opened in 2001 by the Telecommunication Office (national regulator). In July 2001 three licences were granted (later one of them was withdrew). There are two operators – Telenor Networks and SWAN.

In December 2007, the number of WLL customers was 9,716. WLL services are provided mainly in 8 regional centres. In 2007, the leading operator was Telenor Networks operating mainly on wholesale regime for other internet providers.

Satellite

A two-way satellite Internet access is offered in Slovakia, mainly by the GiTy and Sitel VSAT. Other companies also re-sale foreign satellite internet access services.

At 2007 year-end, there were 130,317satellite Internet subscribers. The main end-users are gas stations, betting shops, banks (cash dispensers), gas distribution and infrastructure centres, mountain hotels, domestic companies with foreign investors, etc.

Cellular

At the end of 2007, the total number of mobile lines reached 6,318,000 (with a penetration rate of 117%).

Since October 2005, T-Mobile in Slovakia has launched FLARION services – based on broadband technology FLASH-OFDM (real average download rate 5,3 Mbps and 500 kbps upload rate) operating in 450 MHz bandwidth. FLARION coverage reached 75% of population.

In December 2007, GSM coverage spread to 96% of national territory and to 99,3% of population. UMTS coverage was 56.1% of the population. During 2007, UMTS and 2,5G services (GPRS, EDGE) were offered by two mobile operators – Orange and T-Mobile. Commercial UMTS services with download rate up to 3.6 Mbps are available since March 2006. At the end of 2007, 3G/HSDPA coverage was close to 70% for both operators.

In December 2007, the total number of mobile broadband customers was near 192,000 (excluding single EDGE customers). In 2007, the leading mobile internet operator was Orange (with more than 58,000. customers for UMTS) followed by the T-Mobile (52,000 mobile internet subscribers). T-Mobile operates mobile broadband services for its own customers with EDGE/UMTS/FLASH-OFDM technology, and Orange is offering a mobile internet service on its own 3G network.

Tender for a third mobile operator was opened in May 2006 – the winner was Telefonica O_2. It started to provide 2G/3G services since February 2007.

4.24. Slovenia

4.24.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	444,246	803,910	777,710	2,025,866
Share of total population	21.9%	39.7%	38.4%	100.0%

4.24.2. General broadband data

	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	-	-	55%	88%	92%
DSL subscribers	36,960	73,730	130,602	194,250	247,195
DSL penetration (% of population)	1.8%	3.7%	6.5%	9.7%	12.2%
Cable modem coverage (% population)	-	-	-	-	54%
Cable modem subscribers	28,698	38,836	46,822	81,446	85,502
Cable modem penetration (% population)	1.4%	1.9%	2.3%	4.0%	4.2%
FTTx subscribers	-	-	1,188	2,876	10,022
PLC subscribers	0	0	0	0	0
WLL subscribers	,	2,503	2,645	*3,273*	921
Satellite subscribers	-	-	15	0	7
Total	65,658	115,069	181,272	281,845	343,640
Total penetration (% population)	3.3%	5.7%	9.0%	14.0%	17.0%

xDSL technology provides the majority of available Internet access in Slovenia. Operators provide xDSL services either via unbundled local loops or via Telekom Slovenia's (Telekom Slovenia is wholesale provider of Internet access in Slovenia).

2007 was marked by significant increases in market share for alternative operators. The increase in market competition and alternative operators' share of customers is also reflected in the broadband penetration rate that totalled 17% at the end of 2007.

The development of broadband services has been influenced by:

- Declining market share for narrowband access in favour of broadband access, most often via xDSL and cable modem, but also via other technologies such as FTTx. In 2007, the number of PSTN and ISDN connections decreased, as did the number of telephone calls over PSTN and ISDN connections. PSTN and ISDN telephone lines are gradually being replaced by IP telephony. This is also reflected in the decrease of number of narrowband connections. Broadband access to Internet is dominated by DSL and cable networks[6].
- In 2007, Telekom Slovenia took control of its subsidiary, SiOL, which provided 53% of all broadband connections at the end of 2006. This has strengthened Telekom Slovenia's dominance in the market, but could not prevent a slide in its xDSL market share from 76% to 69.6%.

[6] According to APEK's Report on the development of the electronic communications market, Q4 2007 (Poročilo o razvoju trga elektronskih komunikacij za četrto četrtletje 2007), page 11.

As in the previous year, the trend of media convergence continued throughout 2007. Triple play bundles, which combine fixed telephony, broadband access to Internet and IPTV, finally took off in the Slovenian market. Since convergence results in the upgrades of current services and the introduction of new ones, it is expected that users will start to switch to operators marketing these new convergence services, which are expected to be more competitive, as they are able to offer a broader range of technologically advanced services[7].

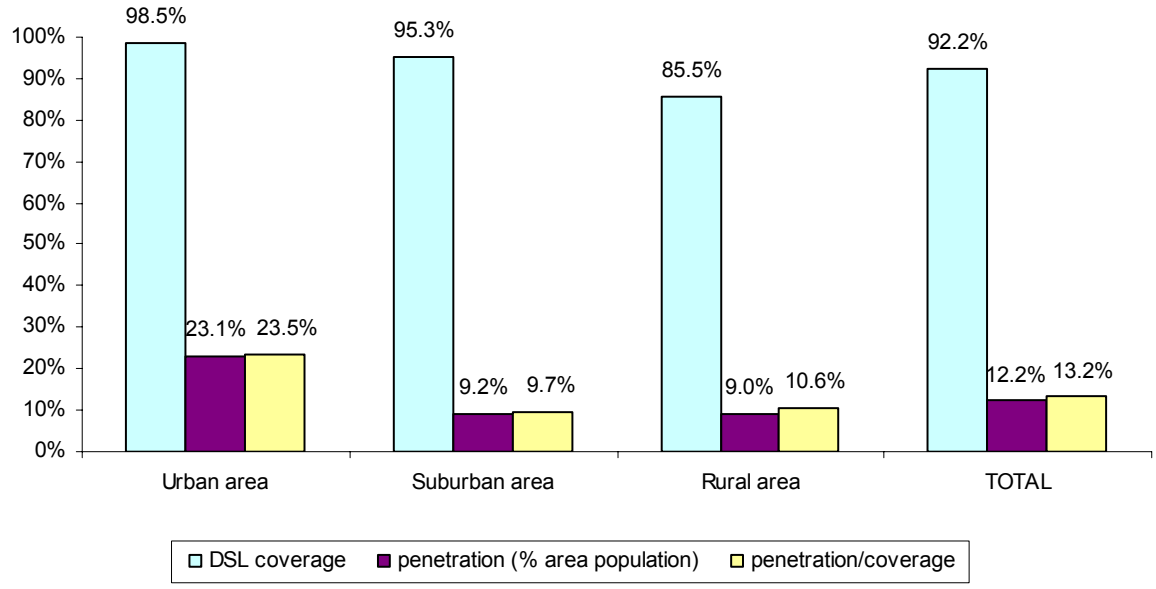
2007 was also marked by a major expansion of FTTx networks by Telekom Slovenia and T-2. This is significant as FTTx enables much faster solutions, suitable for all current and future electronic services such as broadband access, IP telephony, IPTV and audio video on demand (AVOD)[8].

[7] According to APEK's Report on the development of the electronic communications market, Q4 2007 (Poročilo o razvoju trga elektronskih komunikacij za četrto četrtletje 2007), page 11.

[8] According to APEK's Report on the development of the electronic communications market, Q4 2007 (Poročilo o razvoju trga elektronskih komunikacij za četrto četrtletje 2007), page 11.

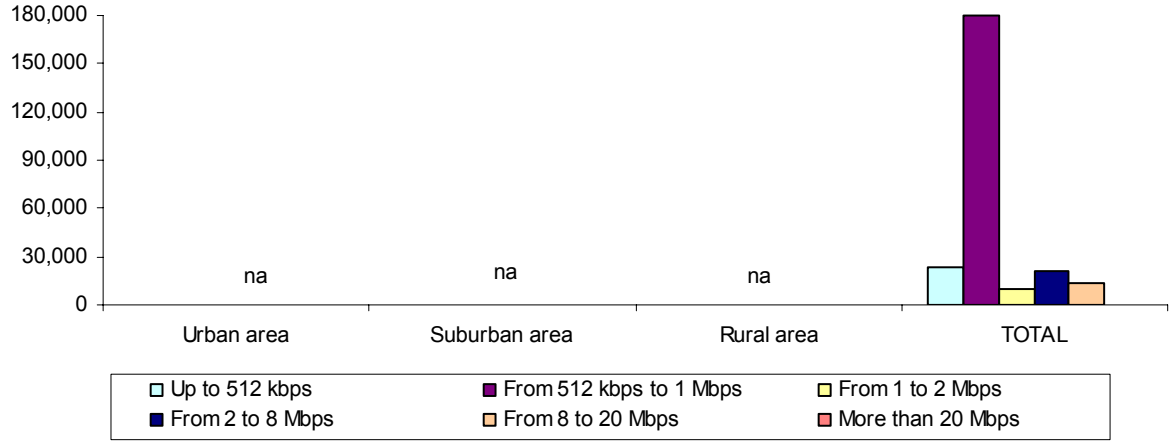
4.24.3. DSL coverage and take-up

Coverage and penetration



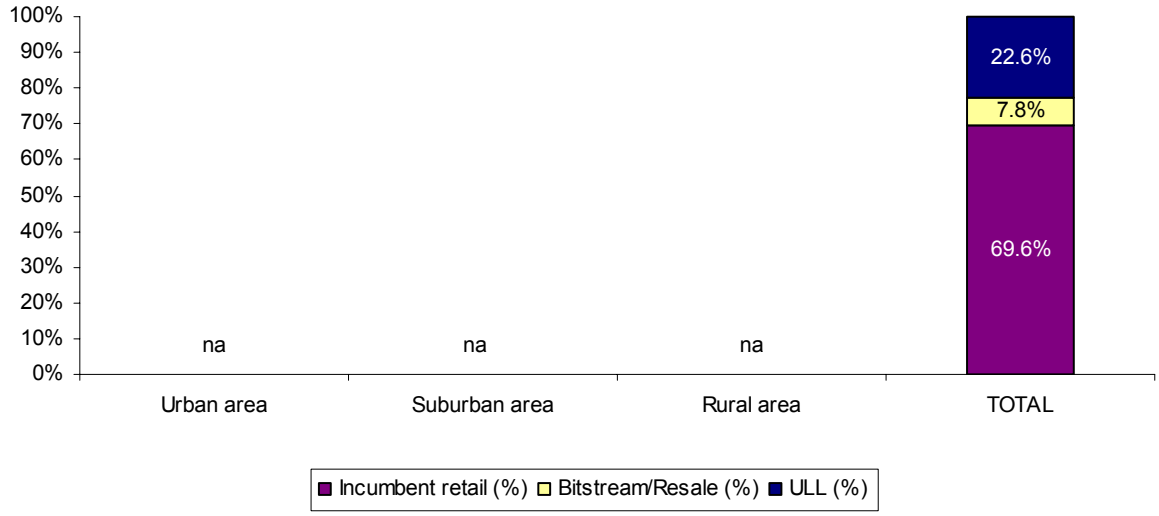
The above chart illustrates xDSL coverage in Slovenia, based upon all 210 municipalities, which were divided into urban, suburban and rural areas based upon survey methodology. In all, 92.2% of the Slovenian population lives in municipalities with xDSL coverage.

Number of DSL connections by download rate



Due to failure in obtaining detailed data from any major operator (see methodological report), we were not able to split connections by speed into the geographical sub-categories.

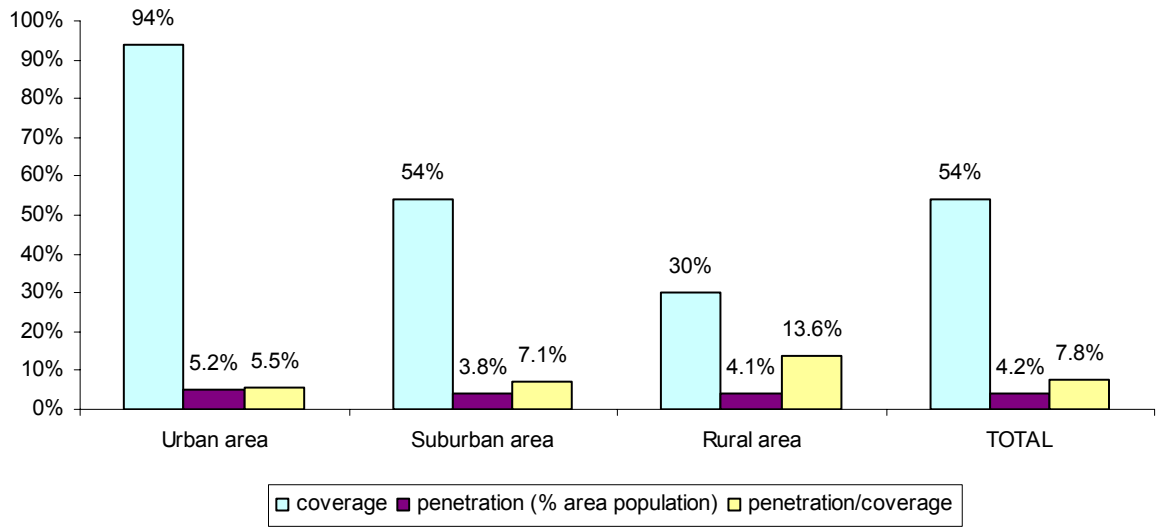
Percentage of DSL connections by type of provider



The majority (69.6%) of xDSL connections are delivered directly by the incumbent – Telekom Slovenije, although its share decreased by 6.4 percentage points compared to 2006. Bitstream and resale account for 7.8% of the base – down 4.2 percentage points from the end of 2006, while the unbundled lines account for 22.6% of the base, a 10.6% increase over 2006.

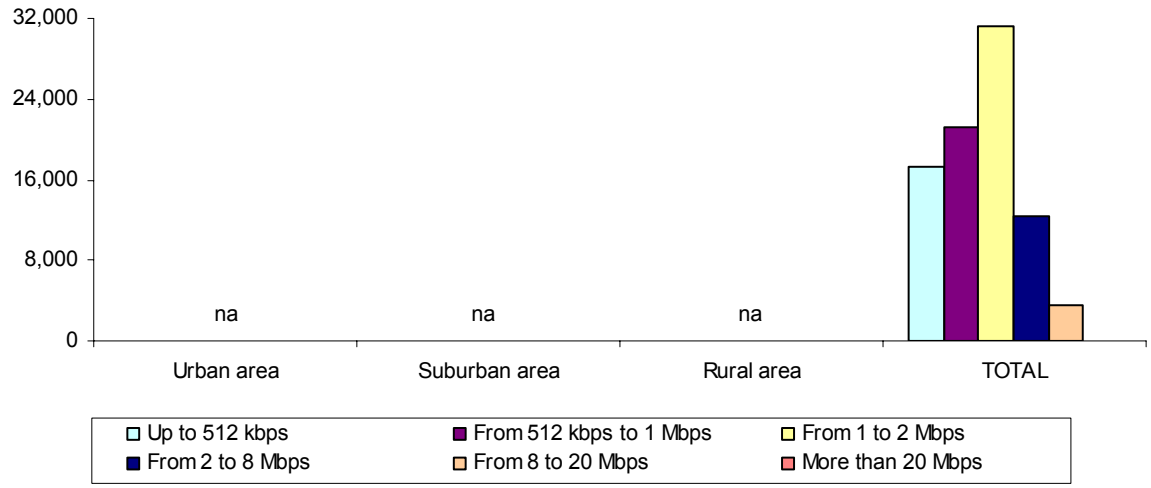
4.24.4. Cable modem coverage and take-up

Coverage and penetration



Cable modem access can be provided to 93.9% of the urban population, to 53.9% of the suburban population, and 30.0% of the rural population. Cable modem subscribers represent 5.2% of the urban population, 3.8% of the suburban population and 4.1% of the rural population. Nationwide, only 4.2% of the population actually subscribe to cable modem access.

Number of cable modem connections by download rate



Due to failure in obtaining detailed data from any major operator (see methodological report), we were not able to split connections by speed into the geographical sub-categories.

4.24.5. Other broadband access technologies

FTTH, WLL and satellite represent only 3.2% of all broadband connections. PLC does not exist in Slovenia. In 2006, Telekom Slovenije and Tok Telekomunikacije acquired wireless frequencies for WIMAX. WIMAX was first introduced on a trial basis in early 2007[9].

FTTx

According to APEK data, the majority of FTTx connections are provided by T2. Telekom Slovenije is also becoming a major player, having begun construction of its own FTTx network in early 2007. FTTx is provided mainly in urban and suburban areas. Another operator with significant market share is UPC Telemach which is also developing an FTTN network. The number of FTTx connections has increased by a massive by 281.8% since 2006, to over 10 000 connections at the end of 2007.

[9] SloDivX (2007): Telekom Slovenija connects the first subscriber to WIMAX network, http://www.slodivx.net/modules.php?name=News&file=article&sid=3553 (9.6.2007)

Wi-Fi

Mobitel and Softnet did not expand their network of hotspots in Slovenia in 2007, as a result of which the country's WLAN infrastructure has remained relatively unchanged since the end of 2006.

	Urban area	Suburban area	Rural area	TOTAL
Number of hotspots in the area	39	22	11	72
% of hotspots in the area	54,2%	30,6%	15,3%	100,0%

Mobitel, Siol and Softnet operate a combined total of 72 hotspots. The majority of them (53%) are located in urban areas. Both networks are IEEE 802.11b standard, and can deliver speeds of up to 11 Mbps.

Cellular

At the end of 2006, Slovenia had two mobile network operators and two MVNOs, with a third operator, Tušmobil, entering the market in late 2007.

In 2007, the mobile phone market was influenced by the changes in technology and the entrance of a new operator. In September 2007, the second largest Slovenian mobile operator, Si.Mobil, began building its own UMTS network which is being upgraded with HSDPA technology. The country's largest mobile operator, Mobitel, has also continued upgrading its UMTS network with HSDPA: UMTS/HSDPA coverage reached 73% in September 2007. At the end of October 2007, a third mobile operater Tušmobil began marketing its mobile phone services. Tušmobil is putting a great deal of effort into building its GSM network, while also providing coverage as a host for Mobitel's network[10].

Mobile penetration reached 96% in 2007, while the survey conducted by APEK in 2007 reveals that a growing number of customers are using their mobile to access the Internet. As revealed by the survey, among the reasons for this are lower prices, higher transfer speeds and better offers[11].

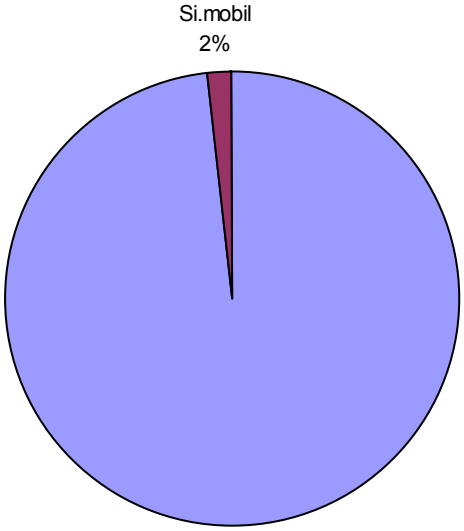
In 2007, the redistribution of market share among mobile phone operators and providers continued, indicating that alternative operators can successfully compete against the incumbent, Mobitel, if they have a good strategy. Mobitel's market share dropped by 5% during the year, while all other cellular operators and service providers managed to increase their share of the market[12].

[10] According to APEK's Report on the development of the development of electronic communications market for 4th quarter of 2007 (Poročilo o razvoju trga elektronskih komunikacij za četrto četrtletje 2007), page 27.

[11] According to APEK's Report Report on the development of the electronic communications market, Q4 2007 (Poročilo o razvoju trga elektronskih komunikacij za četrto četrtletje 2007), page 27.

[12] According to APEK's Report Report on the development of the electronic communications market, Q4 2007 (Poročilo o razvoju trga elektronskih komunikacij za četrto četrtletje 2007), page 28.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.25. Spain

4.25.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	25,443,350	10,632,005	9,125,382	45,200,737
Share of total population	56.3%	23.5%	20.2%	100.0%

4.25.2. General broadband data

	12/03	12/04	12/05	12/06	12/06
DSL coverage (% of population)	85%	87%	89%	90%	91%
DSL subscribers	1,676,466	2,604,067	3,876,360	5,243,094	6,393,952
DSL penetration (% of population)	4.0%	6.1%	9.0%	12.0%	14.1%
Cable modem coverage (% population)	38%	42%	42%	48%	51%
Cable modem subscribers	593,745	839,635	1,176,064	1,417,340	1,633,489
Cable modem penetration (% population)	1.4%	2.0%	2.7%	3.2%	3.6%
FTTx subscribers	1,590	1,670	1,700	1,700	1,800
PLC subscribers	-	2,300	3,650	2,780	2,200
WLL/WiMAX subscribers	5,500	9,400	12,500	30,000	36,600
Satellite subscribers	850	1,850	4,450	7,000	9,500
Total	2,278,151	3,458,922	5,074,724	6,701,914	8,077,541
Total penetration (% population)	5.5%	8.2%	11.8%	15.3%	17.9%

There were a total of over 8 million broadband subscribers in Spain at the end of 2007, with a net gain of around 1.4 million connections during the year. The aggressive stance taken by the incumbent and the country's alternative operators was a decisive factor in this growth. Competition in the broadband market was reflected chiefly in: (1) increase in transmission speeds, (2) new rate-setting structures for the end customer, (3) bundling strategies (voice, broadband and in some cases TV) and (4) greater marketing efforts when launching new offers and promotions.

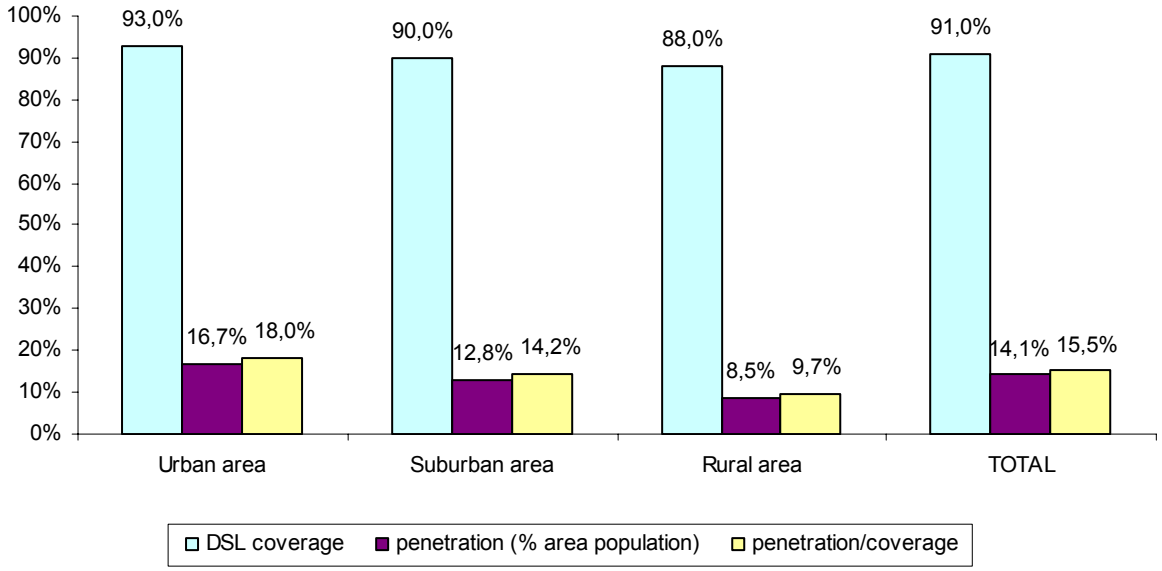
As in the majority of the EU countries, ADSL is the dominant broadband access mode in Spain (79%).

Broadband cable customers represented 20% of the total base, although this national total masks the fact that cablecos have not deployed their networks across the country, remaining confined to only certain cities. At the regional level then, in the cities where cable is deployed, its competitive impact is higher than that observed at the national level.

On the other hand, very few users access the internet via alternative technologies (PLC, WLL, satellite, FTTH).

4.25.3. DSL coverage and take-up

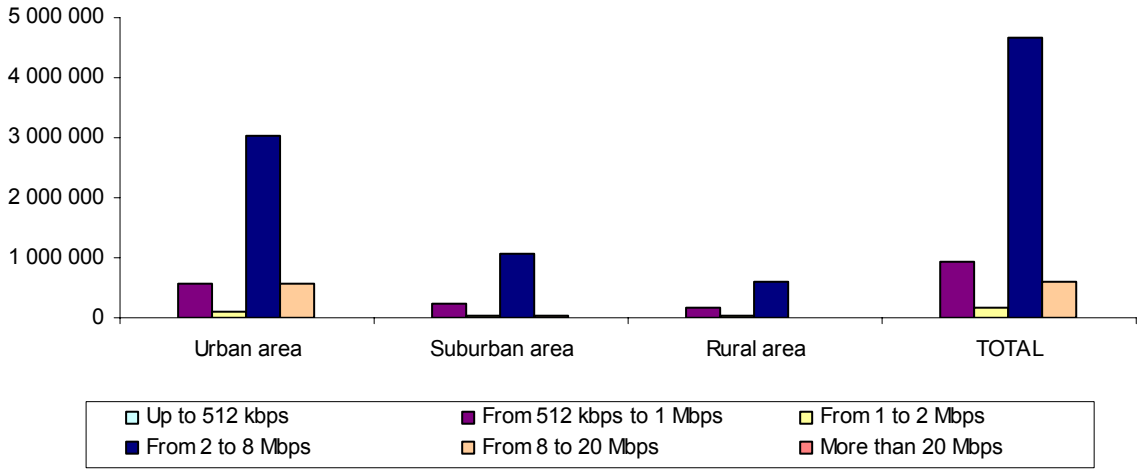
Coverage and penetration



There is ADSL coverage in over 5,600 municipalities, which represents near 70% of 8,110 total national municipalities and 99% of the total population.

However, total coverage is only at 91% since ADSL is not available to all residents in these municipalities.

Number of DSL connections by download rate



Telefónica de España provides the same DSL services nationwide, in terms of prices and bandwidth. Alternative operators' offerings differ given that unbundling is available only at certain local exchanges.

The bitrates on offer increased in 2007, and new price structures provided incentives for new consumer segments to sign on for Internet access.

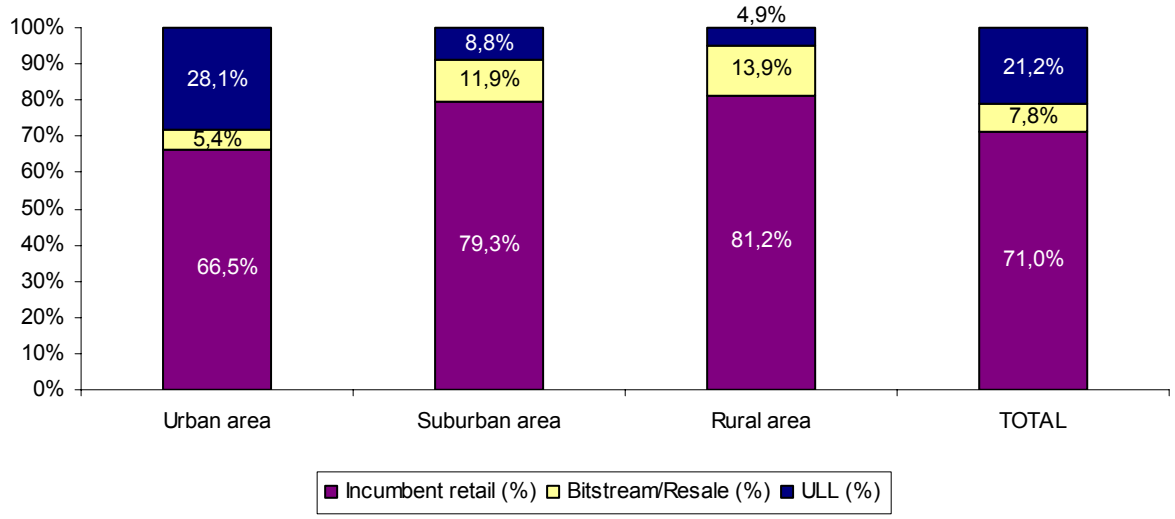
The CMT reduced ADSL wholesale prices in December of 2006 and again in November of 2007. This reduction ranges from 22% to 54%, depending on the system used, for the GigADSL service, and from 24% to 61% for the ADSL-IP service.

Telefónica migrated close to two million of its customers from a 1 Mbps to a 3 Mbps service in 2007, without charge, and with no change to their monthly invoice.

In December 2007, fewer than a million DSL connections were running at speeds of under 1 Mbps.

Services delivering between 2 Mbps and 8 Mbps are the most popular in Spain, accounting for around 73% of total DSL connections.

Percentage of DSL connections by type of provider



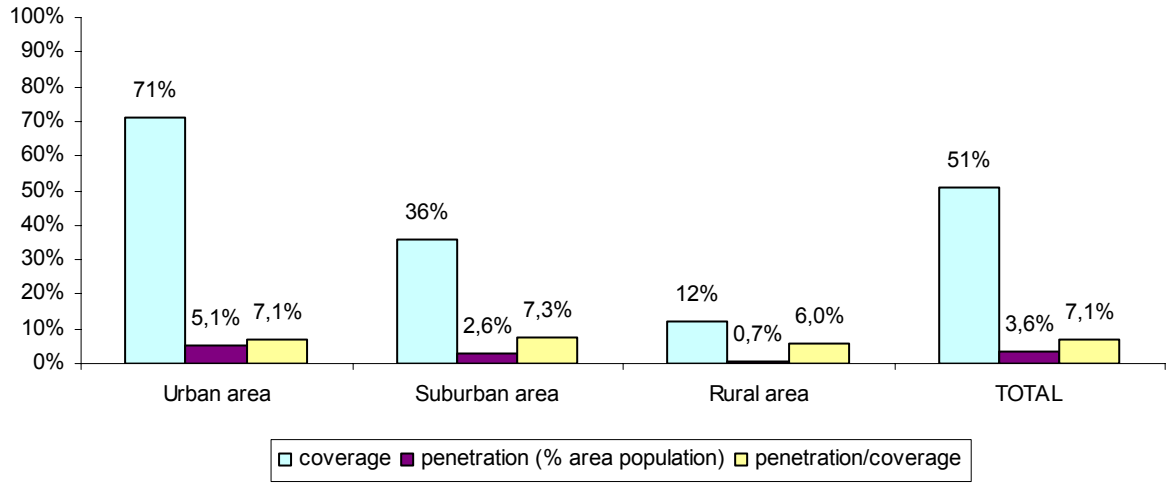
With 4.54 million lines, Telefónica de España has a 71% share of the DSL market, the same as the year before.

ADSL wholesale services are being affected by the migration to unbundled loops – resulting in a net decrease of 87,000 wholesale lines, down to 499,263 by year-end.

There were 415,000 newly unbundled lines in 2007, reaching a total 1,353,948 (939,009 lines at the end of 2006), and accounting for around 17% of all broadband connections, and 21.2% of total ADSL connections. Of these unbundled loops, 785,663, or 58%, were shared access loops.

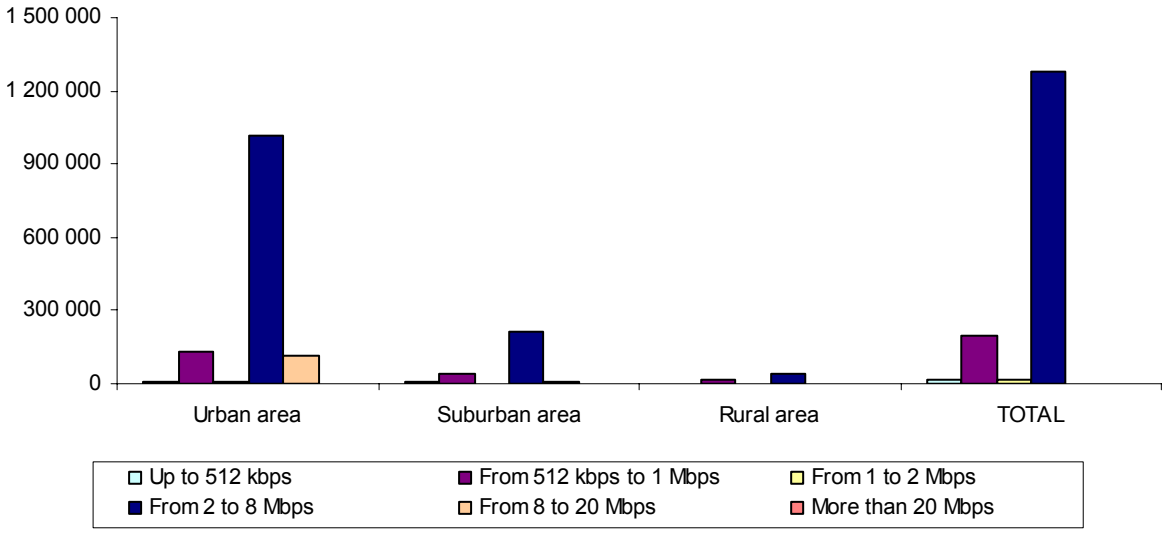
4.25.4. Cable modem coverage and take-up

Coverage and penetration



Total cable coverage rose from 48% in 2006 to 51% in 2007. Cable modem is available in every Nuts II area except Extremadura.

Number of cable modem connections by download rate



Internet services with a download rate between 2 and 8 Mbps are dominant in the cable modem market. Access at 4 Mbps access is the popular in Spain, accounting for more than 70% of total cable modem connections.

4.25.5. Other broadband access technologies

PLC

In December 2007, there were 2,200 PLC subscribers in Spain (3,650 in December 2005), with Epresa leading the market.

Epresa (joint venture between Endesa and Ayuntamiento de Puerto Real) began marketing access services in August 2005.

Wi-Fi

In December 2007, around 3,300 hotspots were in operation in Spain.

Private operators, Kubi Wireless, Swisscom and AWA are Telefónica de España´s main competitors in this market, with hotspots in the country's major cities, chiefly Madrid and Barcelona.

WLL/WiMAX

Two companies currently operate in Spain's WLL market: Iberbanda and Neo-Sky. There were around 36,600 WLL customers in Spain in December 2007.

Satellite

At the end of 2007 there were around 9,500 dishes deployed in Spain (7,000 at the end of 2006).

Telefónica de España and BT, both with government contracts, are the market's leaders, while Hispasat, Satconxion, Ya.com, Overon, Neo-Sky and Divona have a significant number of antennas.

In 2007, Telefónica began marketing its "Servicio de Banda Ancha Rural Inalámbrico" (rural broadband wireless access) for customers in rural and isolated zones with no ADSL coverage. Thanks to this initiative, an additional 6,500 villages and more than 100,000 users will be covered.

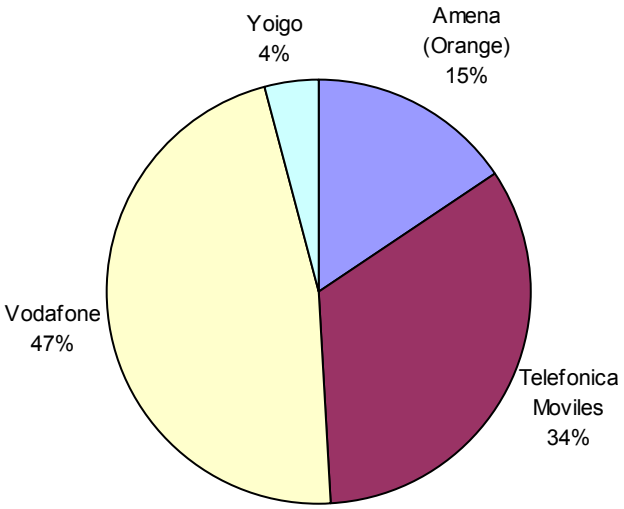
The new service based on LMDS/WiMAX and satellite technology will expand broadband coverage, providing services running at up to 2 Mbps to users in uncovered areas where deploying ADSL is not cost-effective.

Cellular

Operators continued to roll out their UMTS networks in 2007, and to invest in increasing their network capacities to meet the sharp increase in demand.

There were a total of 10.4 million 3G subscribers in December 2007, around 6.5 million more than the previous year (3.8 million). Total 3G coverage rose to 85% (fully upgraded to HSDPA for Vodafone Spain).

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.26. Sweden

4.26.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	4,098,075	3,933,880	1,150,972	9,182,927
Share of total population	44.6%	42.8%	12.5%	100.0%

4.26.2. General broadband data

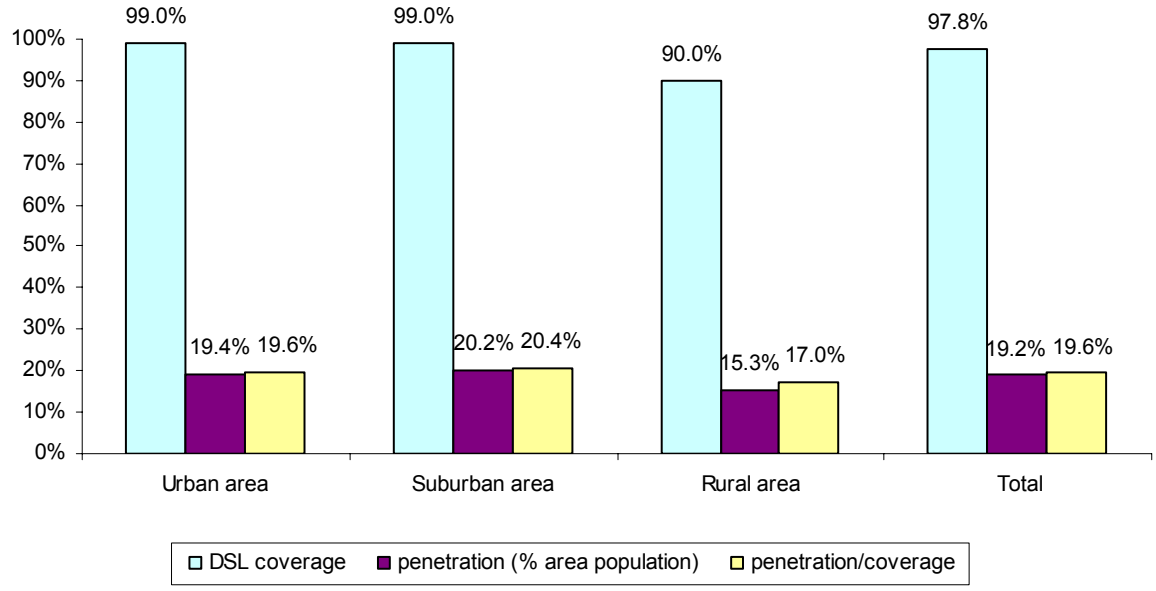
	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	-	91%	93%	95%	98%
DSL subscribers	581,194	845,939	1,207,146	1,531,277	1,764,000
DSL penetration (% of population)	6.4%	9.3%	13.2%	16.8%	19.2%
Cable modem coverage (% population)	45%	45%	47%	48%	48%
Cable modem subscribers	211,516	243,438	354,699	454,291	550,000
Cable modem penetration (% population)	2.3%	2.7%	3.9%	5.0%	6.0%
FTTx subscribers	194,321	241,089	289,199	356,558	400,000
PLC subscribers	410	100	100	0	0
WLL subscribers	3,400	3,400	3,400	6,578	6,578
Satellite subscribers	690	775	1,039	704	704
Total	991,531	1,334,741	1,855,583	2,349,408	2,721,282
Total penetration (% population)	10.9%	14.6%	20.4%	25.8%	29.6%

The Swedish broadband market is characterised by healthy facilities-based competition. In particular, the launch of FTTH services in 1999 by new entrant Bredbandsbolaget (B2) contributed to fuelling competition as it offered high bandwidth at low prices. Sweden's broadband penetration rate was 29.6% at the end of 2007. This places Sweden among the highest in Europe, but last among the Nordic countries.

DSL continues to be the dominant technology, with cable and FTTH vying for second place.

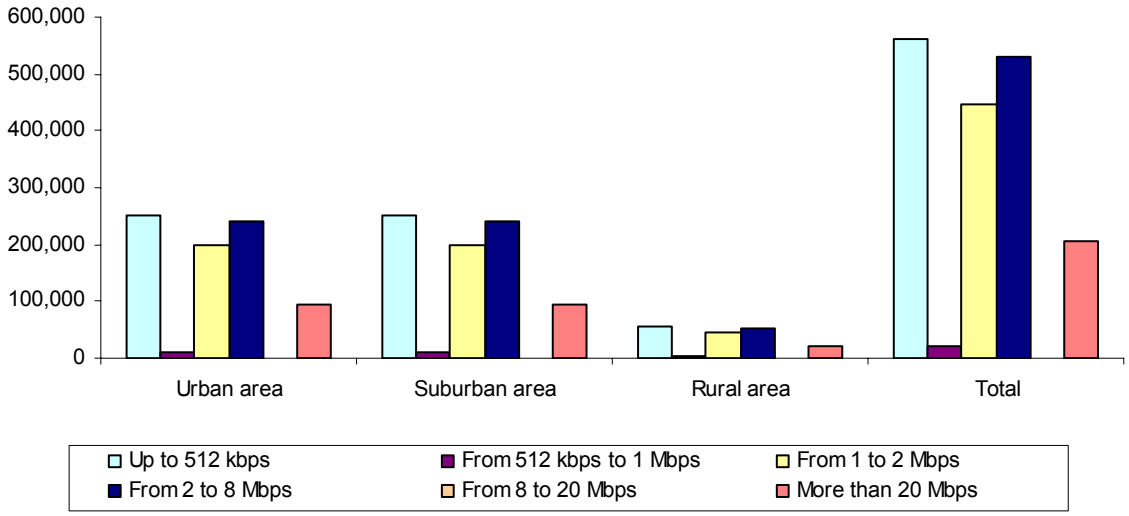
4.26.3. DSL coverage and take-up

Coverage and penetration



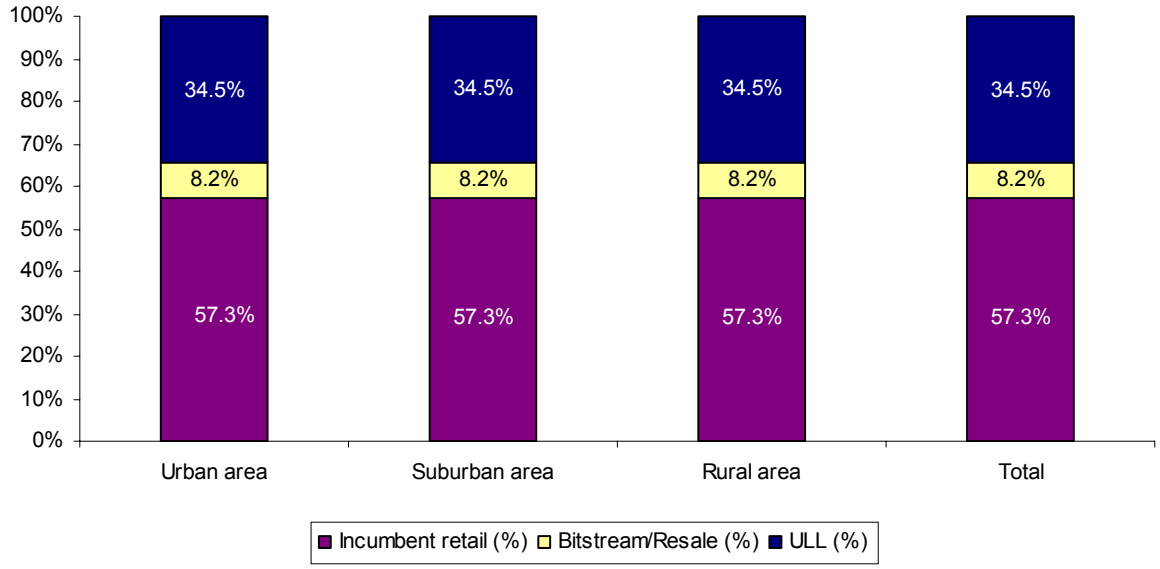
DSL leads the way in Sweden's broadband market, in terms of both coverage (98%) and penetration (19%, or 65% of all broadband subscriptions). At the end of 2006, 98% of the population was covered for DSL.

Number of DSL connections by download rate



A relatively large number of DSL subscriptions (31%) still have rates below 512 kbps, but more than half of all subscriptions (55%) are in the range from 1 to 8 Mbps.

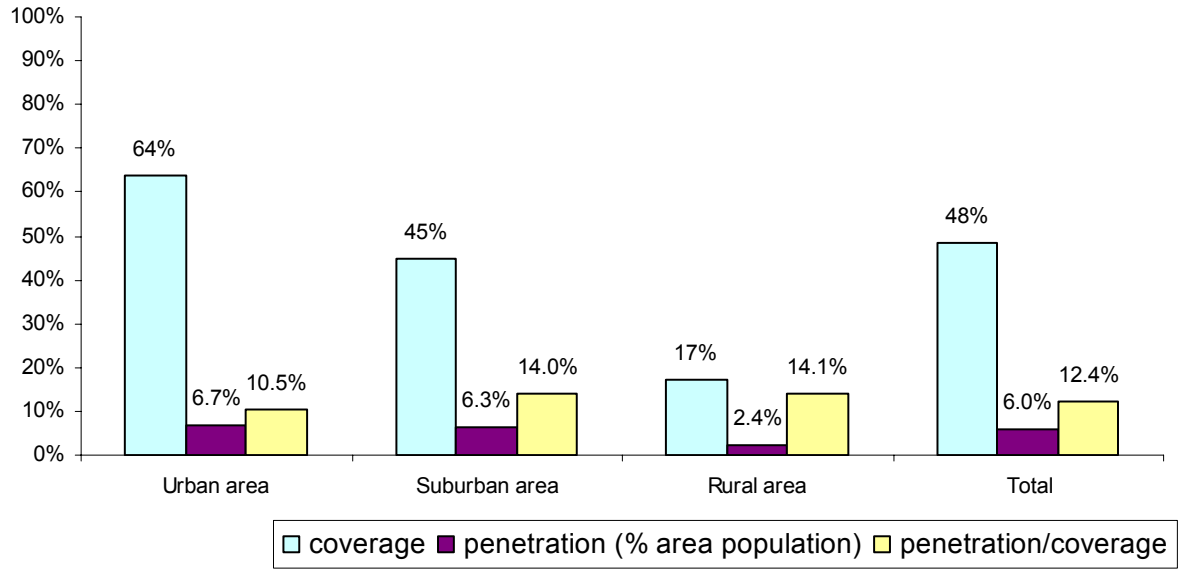
Percentage of DSL connections by type of provider



Local loop unbundling is being used more and more to provide competitive DSL services. At the national level, ULL's market share continues to grow slightly: from 30.5% at the end of 2005, to 33.4% at the end of 2006, and now to 34.5% at the end of 2007.

4.26.4. Cable modem coverage and take-up

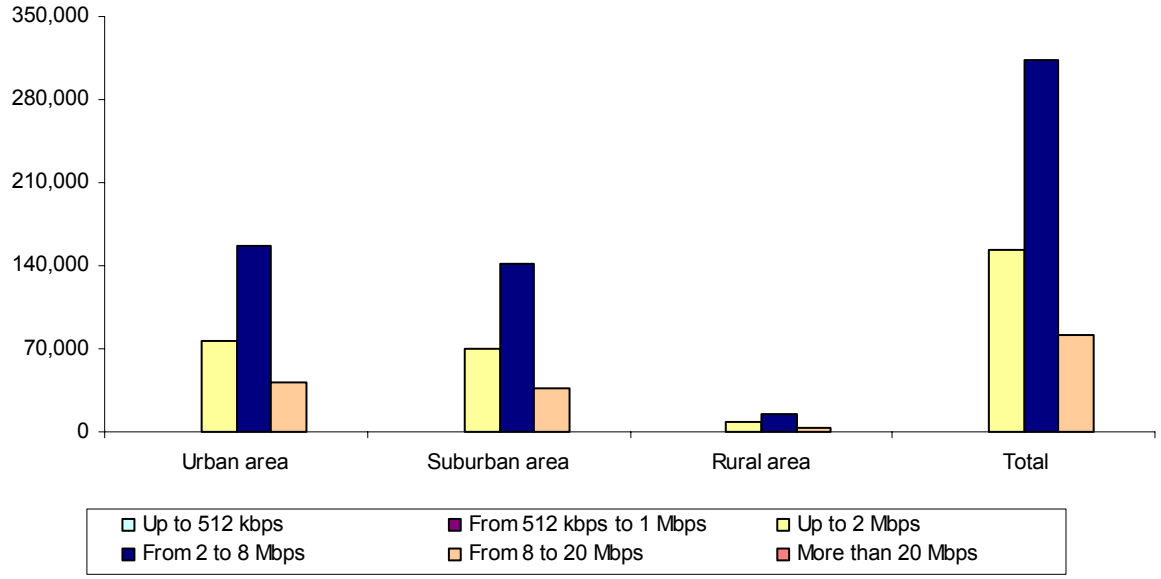
Coverage and penetration



Cable operators were comparatively late in upgrading their infrastructure for broadband Internet. Upgraded cable infrastructures covers roughly 48% of the Swedish population, and are available to 64% of the inhabitants in urban areas.

Cable modem penetration reported the highest rate of growth in 2007 (as in 2006), with the subscriber base increasing by 21%.

Number of cable modem connections by download rate



Because competition came from FTTx and DSL (in some areas, DSL connections can deliver download speeds of up to 24 Mbps!), cablecos have been forced to upgrade their networks. A major upgrade was performed in the second half of 2004.

By the end of 2006, more than 70% of broadband cable subscribers had speeds above 2 Mbps.

4.26.5. Other broadband access technologies

FTTH

FTTH continues to play a major role in the Swedish broadband market. It is deployed primarily by Bredbandsbolaget. Also referred to as fibre LAN or Ethernet LAN, it targets chiefly large apartment buildings or multi-dwelling units.

Broadband Internet access via fibre offers download rates of well over 2 Mbps, and Bredbandsbolaget is continuously upgrading existing customers to 100 Mbps.

In 2004, FTTH had almost as many subscribers as cable, but the gap has widened since then. The technology experienced lower relative growths than DSL and Cable in both 2006 and 2007.

Wi-Fi

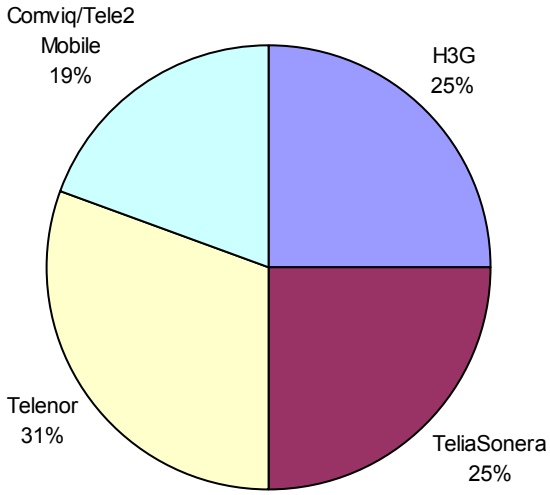
There are no official numbers on the number of hotspots.

Cellular

In October 2003, new entrant Hi3G Access became the first player to market UMTS services, under the brand name 3. TeliaSonera began running 3G trials with 500 customers on 1 December 2003, then launched a 3G service in June 2004, covering 75% of the population and 96% of municipalities. Tele2 followed suit on 2 June 2004.

At the end of 2007, approximately 98% of the population was covered by UMTS (2.55 million subscriptions), while HSDPA coverage was over 70% (Hi3G being the most advanced operator on this).

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets

4.27. The United Kingdom

4.27.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	37,104,541	17,160,499	6,242,685	60,507,725
Share of total population	61.3%	28.4%	10.3%	100.0%

4.27.2. General broadband data

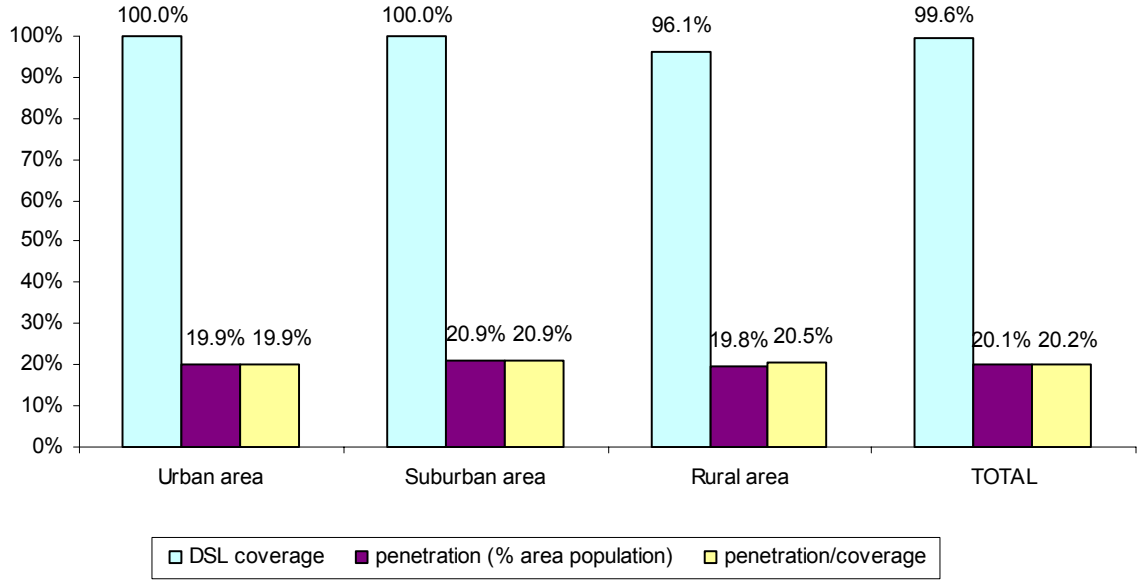
	12/03	12/04	12/05	12/06	12/07
DSL coverage (% of population)	85%	95%	99%	99%	100%
DSL subscribers	1,860,555	4,263,969	7,194,913	9,974,000	12,186,000
DSL penetration (% of population)	3.1%	7.2%	12.1%	16.6%	20.1%
Cable modem coverage (% population)	42%	*48%*	*48%*	*48%*	*48%*
Cable modem subscribers	1,366,043	1,937,320	2,663,388	3,058,500	3,401,000
Cable modem penetration (% population)	2.3%	3.3%	4.5%	5.1%	5.6%
FTTx subscribers	0	0	0	0	1,500
PLC subscribers	-	-	-	-	-
WLL subscribers	2,500	2,500	2,500	2,500	*2,500*
Satellite subscribers	6,000	6,000	6,000	6,000	*6,000*
Total	3,226,598	6,201,289	9,866,801	13,041,000	15,597,000
Total penetration (% population)	5.4%	10.5%	16.7%	21.7%	25.8%

Broadband penetration continues to grow with more than half of households now connected. Cable modem subscriptions increased by 12%; the incumbent BT remains the largest provider of DSL and still delivers over a quarter (26%) of all broadband connections. A fair share of BT growth in market share comes from its acquisition of two smaller ISPs.

The biggest change in the UK's broadband landscape is the growth of Local Loop Unbundling which accounted for nearly 3.7 million subscriptions at the end of the year, as LLU operators moved away from BT's wholesale offerings.

4.27.3. DSL coverage and take-up

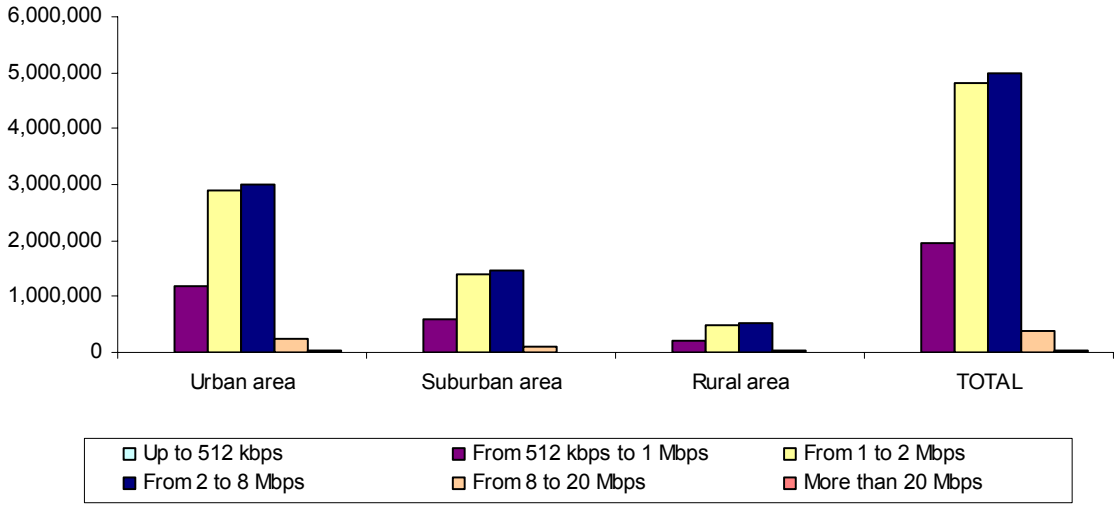
Coverage and penetration



In theory, DSL broadband coverage is nearly complete, with only 0.4% of the population not covered – chiefly in rural areas. Urban and suburban areas are now said to be entirely covered and all households able to subscribe to a broadband service should they wish to do so.

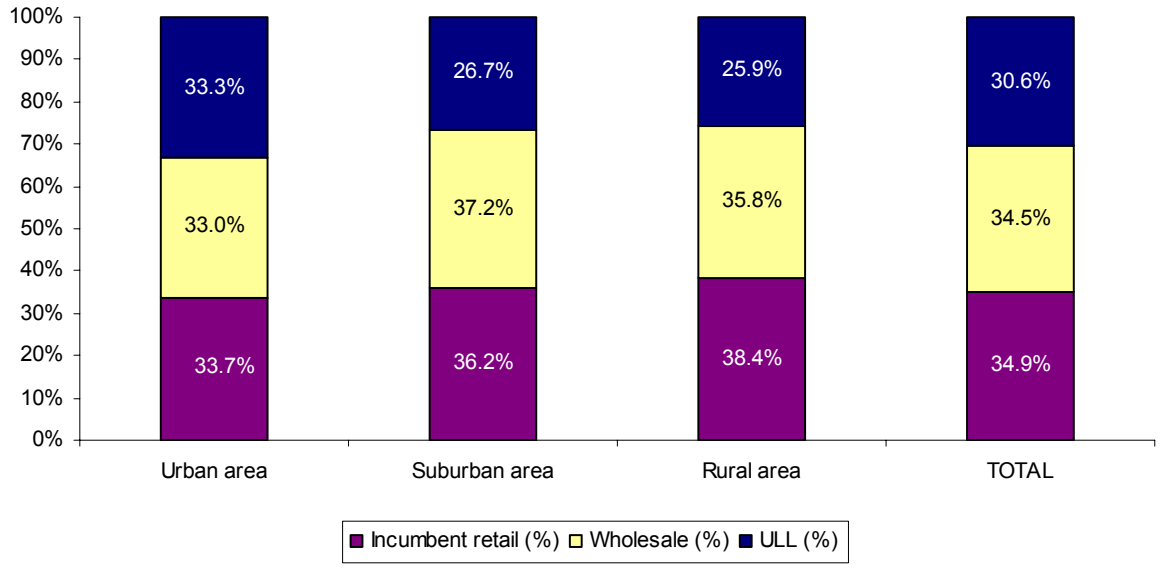
DSL penetration in 2007 increased from 16.5% to 20.1%. This translates into more than half of households in the UK subscribing to a broadband service.

Number of DSL connections by download rate



In 2007 one of the major market developments was deployment of faster broadband solutions. BT no longer segments its broadband product portfolio for home users based on speed but rather on volume of use and additional features (wireless, download allowance…) although it does affect the current market landscape, there have been several announcements of investment in next generation access (NGA), but only pilot schemes are currently being considered.

Percentage of DSL connections by type of provider

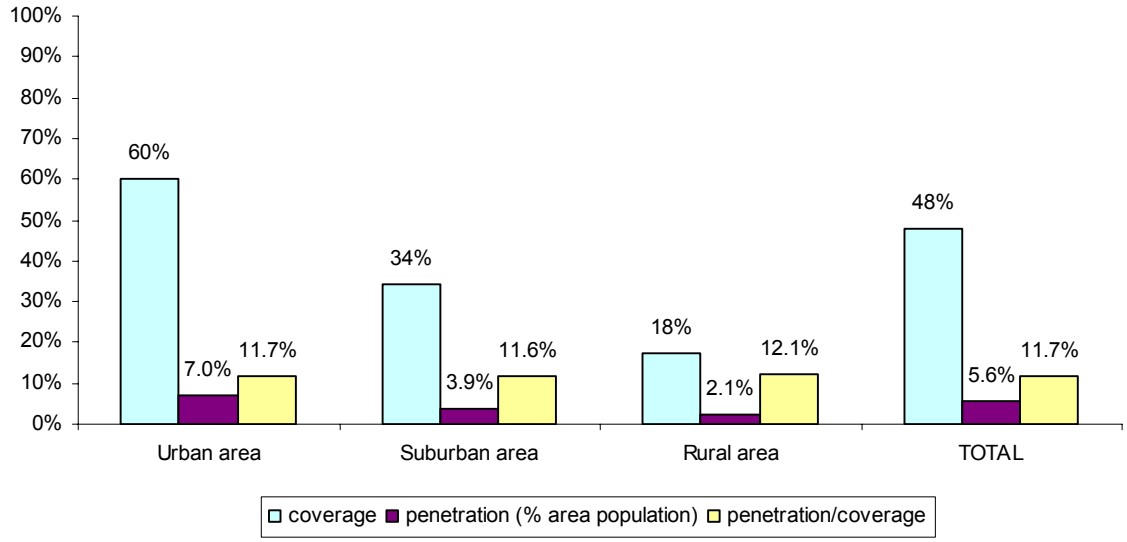


The rise of local loop unbundling was the greatest change in the UK marketplace in 2007, with the number of lines increasing from 1.3 million in 2006 to 3.7 million in 2007, as operators are moving their customers to their own network and away from BT wholesale offerings. Ofcom estimates that two thirds of customers can access an unbundled exchange.

Despite the substantial growth of LLU offers (30% of the DSL market) in absolute and relative terms, the incumbent still managed to maintain and even slightly increased its share of total broadband connections. The overall perception is that the growth of LLU leads the market to consolidation, allowing players to generate economies of scale at the exchange level. Several mergers took place in 2007, including Carphone Warehouse's takeover of AOL's UK operations. Tiscali took control of Bulldog which had earlier acquired Pipex. In the meantime, BSkyB expanded its operations, further consolidating its position since entering the market via the acquisition of Easynet in late 2006.

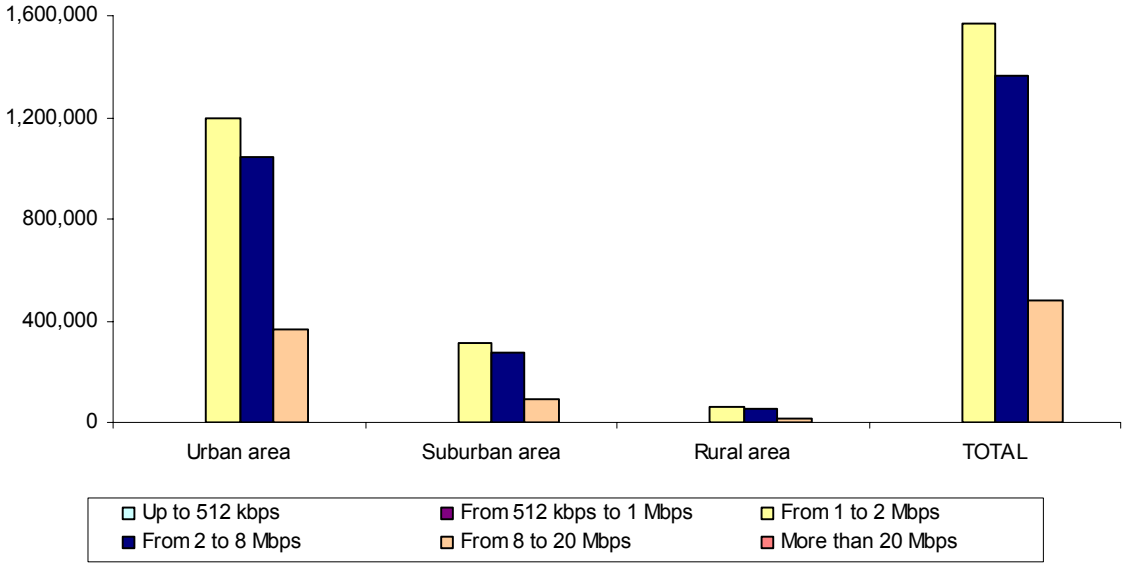
4.27.4. Cable modem coverage and take-up

Coverage and penetration



Virgin Media announced the rollout of ultra-fast broadband over the course of 2008 and has started to promote the benefits of cable and optical fibre over ADSL. Its current offer is still segmented by download speed and volume of usage (from 2 Mbps to 20 Mbps) and is frequently offered as part of a bundle with other services such as TV, fixed or mobile telephony services. The cable provider has also announced plan to deploy NGA running at over 30 Mbps, in the coming year.

Number of cable modem connections by download rate



Whereas ADSL technology providers can no longer use speed as a promotional tool, as it is no longer a significant differentiator, cable companies have been touting the technical capabilities of cable and fibre in recent campaign aimed at educating the market. The campaign stressed that, with cable, the distance between the subscriber's home and the local exchange is not an issue as it is with ASDL. In what was a probably related consequence, the rollout of faster services (8 to 20 Mbps) has stepped up since the previous year.

4.27.5. Other broadband access technologies

FTTx

BT have announced pilot schemes in the area of Ebbfleet in Kent, covering 10,000 households in the coming years, but no wide-scale rollout has yet taken place.

Wi-Fi

Fixed-mobile convergence is emerging, and Ofcom estimates that up to nearly a third of broadband subscribers either regularly or occasionally use a free public wireless or Wi-Fi network, and nearly a quarter use a public wireless or Wi-Fi connection they pay for. Estimating the number of hotspots is difficult as the technology is not licensed and networks overlaps, but there are at least 11,000 hotspots in the UK.

The two leading hotspots operators in the UK are BT Openzone and The Cloud – the latter being also present across Europe. In 2007, The Cloud launched the City of London Network and signed an agreement with McDonald's and with O_2 for Apple's iPhone. Also noteworthy is that BT Openzone and The Cloud have a roaming agreement for some of their pricing plans. BT Openzone has also forged agreements with T-Mobile UK, IBhan (hotspots in Marriott, Hilton, Intercontinental and Best Western hotels), some cafés (Caffé Nero), restaurants (RoadChef) and hotels chains (Thistle, Hilton, Welcome Break…) and with all British airports.

WLL/WiMAX

There are very few WiMAX providers in the UK, and few deployments are wide scale for the time being. One company, Urban Wimax Ltd, is promoting the service although targeting only businesses. It is also being deployed as complement to Wi-Fi for delivering access on trains.

Satellite

Satellite broadband usage remains marginal, and not actively marketed to consumers. It remains a niche product for very remote areas where broadband via ASDL or cable is not available, which is less and less the case, as ADSL broadband coverage has expanded. Satellite access remains much more expensive than the leading access technologies.

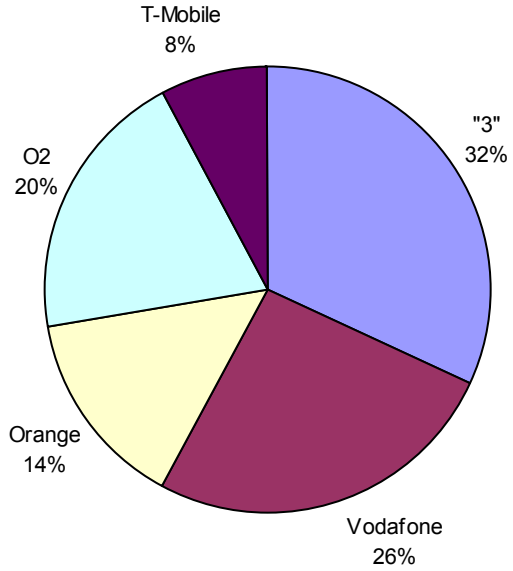
Cellular

The number of 3G mobile subscriptions increased substantially, although coverage remained unchanged. This is due to operators' migration from 2G to 3G networks. The number of 3G subscribers (12.5 million at the end of 2007) represents 17% of total mobile customers. The rise in subscriptions can also be attributed to the introduction of 3G data solutions for mobile broadband.

Hutchison 3G remains the leading provider of 3G, with 33% share of the market. Its leading position has been under increasing pressure as other operators are migrating their 2G users to 3G networks, although their current offerings do not promote the network's 3G capabilities specifically. Their marketing is focused more on the features of the devices: video, camera, smartphone with email, Internet access, etc.

At the end of 2007, UMTS coverage (with reference to Hutschison 3G UK network) reached 95% while HSDPA coverage stood at 87%.

Breakdown of the 3G subscriber base* by operator (December 2007)



* Users with 3G handsets