Consulting

Broadband Coverage in Europe

Final Report
2010 Survey
Data as of 31 December 2009

Information Society

IDATE
Consulting & Research

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1. Methodological notes

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 2009. Averages have been calculated for 6 different country groups:

- EU-15, which covers the 15 Member States of the European Union as it was organised just before 1st 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 the EU-25, plus Norway and Iceland;
- EU-27, which covers the 27 Member States of the European Union at present;
- EU-27 + 2, which covers the EU-27, plus Norway and Iceland.

The data contained in this document was 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 by the number of 3G SIM cards and 3G PC cards sold) were also examined, but separately from fixed broadband access.

Data refers to the situation as of 31 December 2009

The survey distinguishes **Urban, Suburban and Rural areas**, with the following definitions:
- Urban area: a population density superior to 500 people/km²;
- Suburban area: a population density between 100 people/km² and 500 people/km²;
- Rural area: a population density below 100 people/km².

In some countries, such as Malta or Iceland, this breakdown does not apply because of their small size.

Segmentation by **download rate** (for ADSL and cable modem) is as follows:
- less than 256 kbps (bottom limit for being classified as broadband according to the Commission),
- from 256 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 30 Mbps included,
- more than 30 Mbps.

Download rate classes for FTTx are limited to the upper 4 categories, the first one covering up to 2 Mbps connections.

We have split the provenance of DSL connections 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 that depends on a Local Exchange equipped with a DSLAM. In other words, coverage measurement includes those people (Households or Businesses Units) who 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 that depends on Local Exchanges equipped with a DSLAM and **excluding** those people (Households or Businesses Units) who 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 for the available download rates. For instance, eligibility for a downstream rate of 2 Mbps will be lower than eligibility for access running at 512 Kbps.

No eligibility data exist for all countries as operators cannot measure precisely how many local loops are too long to support DSL, added to which new technical developments can increase eligibility levels (e.g. the 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 actual percentage of the population that can be physically equipped with DSL (see detailed calculations in the country monographs).

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

In respect to **3G customers**, measurement is based on the number of broadband mobile customers. Figures refer to subscribers using 3G-based services and paying specifically for broadband data packages in a few cases only (e.g. the UK, Spain). More often, they refer to active 3G subscribers (i.e. mobile users with a 3G-capable handset and at least one connection to a 3G-based service over the past 3 months, regardless of the duration or the amount of data transmitted). The gap is narrowing but is still significant: we could estimate that, on average at the end of 2009, around 57% of 3G capable handsets were used by active 3G users (90.4 million active users at the end of 2008 compared to 160 million 3G capable handsets).

3G coverage is measured as a % of population (according to locations of residence) and as a % of territory. Wherever possible we distinguish between 3G and enhanced networks (more specifically HSDPA). Figures on 3G coverage refer to the mobile network with the highest rate of coverage in each national market.

Country-specific data were also used to establish European benchmarks and averages. Averages have been calculated on a weighted basis. Furthermore, as surveys before 2008 did not cover Bulgaria and Romania, we have provided two sets of benchmarks:
- the first comparing and averaging data at year end in 2009 only, covering the 29 countries examined in this survey,
- the second one with time series (2007-2008-2009), covering the EU-25 + 2.

NB: In the tables and graphs, "n.a." or no indication means that data is not available (while "0" indicates that there are no subscribers) and "n.r." is used when categories are not relevant.

2. Executive summary

There were 125.8 million fixed broadband subscribers in the 29 European countries surveyed[1] at the end of 2009, a 9% increase over the previous year. This translates into a 24.8% penetration rate (24.8 subscribers per 100 inhabitants, 2 percentage points higher than at the end of 2008) on average, and 27.1% when looking only at Western European countries (the EU-15 + Norway and Iceland). Country by country, take-up figures range from 13% in Romania to 38% in Denmark.

DSL and cable modem remain by far the most prominent technologies. With 97.6 million subscribers (+7.3% in 2009), DSL accounted for 77.6% of total fixed broadband connections at the end of 2009 while cable modem accounted for 15.5% of the subscriber base (19.5 million subscribers, +12% in 2009). The remaining 7% (+1.1 percentage point compared to the share at the end of 2008) are connected chiefly via fixed wireless access and FTTx technologies.

DSL coverage is over 94%

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. At the end of 2009, average DSL coverage was over 94% (94.4% in the EU-27 + 2), and even very close to 98% in western countries (97.9% in the EU-15 + 2): this is 1.5 points higher than at the end of 2008, and more than 3 points higher than at the end of 2007. At national level, DSL coverage is now over 90% in 23 countries, with two other countries very close to this level (Lithuania, 88.5% and Latvia 88.8%). Only four countries (Poland, Romania, Bulgaria and Slovakia) are still lagging behind with coverage ratios between 74.5% and 82%; despite significant progress in part of them (from 68% to 75% in Romania in 2009).

However, these national figures still reveal discrepancies between urban/suburban and rural areas. On average in the EU-27+2, DSL coverage in rural areas was at 80% at the end of 2009, compared to 99% in urban areas: the gap between coverage in urban and rural areas has been reduced from 21 points at the end of 2008 to 19 points at the end of 2009. The gap (between coverage in rural areas and coverage in urban areas) is particularly significant in Bulgaria (82 points), Cyprus (70), Romania (51), Slovakia (46), Poland (42) and Greece (40) but minimal in Benelux countries, Denmark, France, the UK, Spain and Norway.

Figure 1: Gaps ranging from 0% to 66% between DSL coverage in rural areas and national DSL coverage
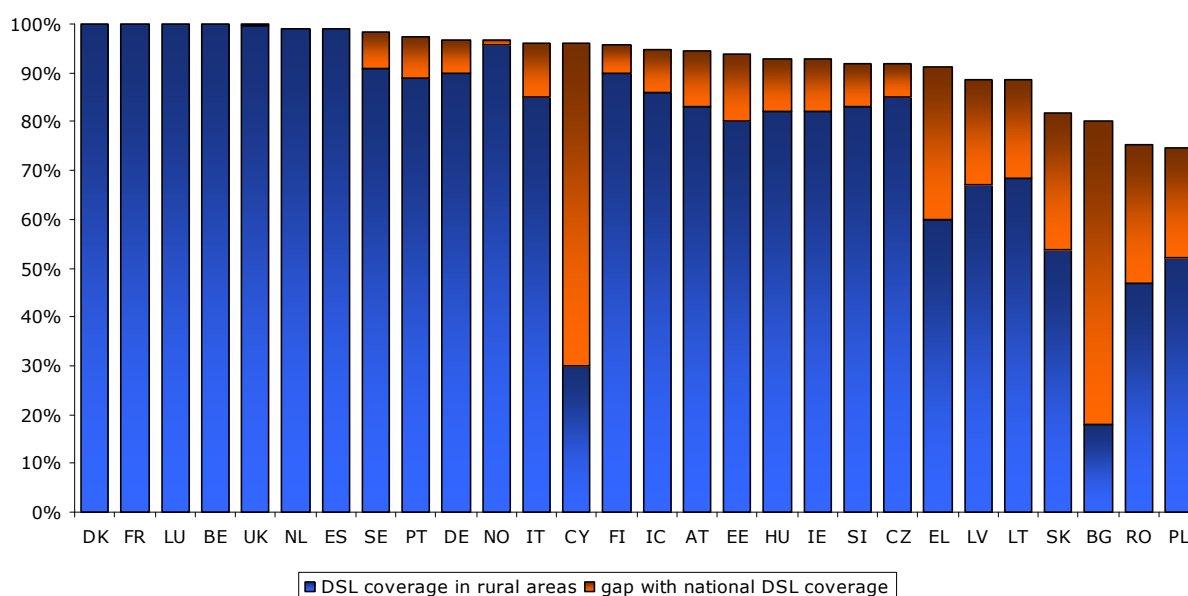
Nota: Definition of rural areas not applicable in Malta

Source: IDATE survey

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[1] EU-27 plus Norway and Iceland

As to DSL penetration, national figures range from 3.7% in Romania and 3.9% in Bulgaria to 30.8% in Iceland, with a weighted average of 19.3% for the 29 countries and 22.4% for Western countries (+1.3 percentage point in 2009 in each case). At the end of 2009, DSL penetration was over 20% in 10 countries with Italy very close to the mark. There are disparities between penetration levels in rural areas and national levels as well as general differences in the penetration/coverage ratio. This means that in rural areas, not only deficient coverage limits penetration, but the late introduction of broadband in those areas has created further delays in take-up. However in some countries (mainly the UK, Estonia, Latvia, Slovenia and Norway), DSL penetration is higher in rural areas as a result of the lack or the limited coverage of competitive access technologies, largely available in the other areas (cable, fibre…).

Figure 2: Gaps of 0% to 19% between DSL penetration in rural areas and national DSL penetration
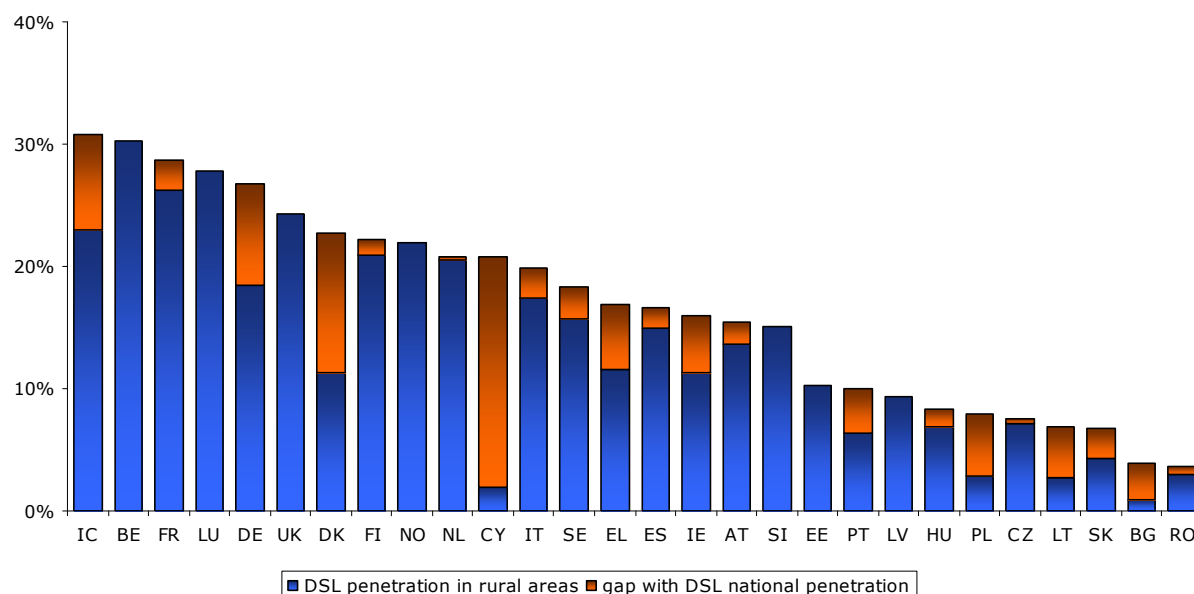
Nota: Definition of rural areas not applicable in Malta
Source: IDATE survey

71% of DSL connections with download speeds over 2 Mbps

On the matter of download speed, 71.2% of DSL users subscribed to offers with speeds of over 2 Mbps (increase of more than 10 percentage points compared to the end of 2008), and 28.4% to a service running at over 8 Mbps (+15 points). Connections delivering speeds of over 2 Mbps account for 80% or more of all broadband in 10 countries (Belgium, Bulgaria, Denmark, Latvia, Malta, Portugal, Romania, Slovakia, Spain and the UK) while they accounted for less than 30% in Poland (26%), Slovenia (23.5%) and Cyprus (15%). Disparities between connection rates subscribed to nationally and in rural areas are narrowing only slowly with the average share of DSL connections with download speeds over 2 Mbps still 13 points lower in rural areas than at national level at the end of 2009.

Regarding the origin of DSL access, 55% of DSL connections were supplied directly by incumbent carriers to end-users at the end of 2009 (1 percentage point lower than at the end of 2008), with competing offers being now based chiefly on unbundled lines (33.5%, + 2.5 points), while resale/bitstream offers only account for 11.5% of all connections. Unbundling remains less common in rural areas but is now more popular than connections through resale/bitstream offers (21% of DSL connections via unbundled lines, compared to 15.8% via resale/bitstream solutions).

Cable modem ahead of other fixed broadband access technologies

Cable modem availability is low compared to DSL: the average national coverage rate was only 44.8% at the end of 2009, and cable is not, or no more, available at all in three countries (Italy, Greece and Iceland). In some large countries (France, the UK), cable is available primarily in big cities, with an average of only 13.4% coverage in rural areas.

Cable modem penetration was 3.8% at the end of 2009 (19.5 million subscribers in the 29 countries, up 12% compared to the end of 2008) and only 1% in rural areas.

Download speeds are generally higher than for DSL: in particular, connections with download speeds over 8 Mbps account for more than 58% of total cable modem subscriptions: this share is twice the one for DSL.

Other fixed access technologies are in progress but remain marginal in terms of both coverage and take up. With 2.6 million subscribers at the end of 2009, FTTH/B increased by more than 50% in one year: however, the number of homes passed (17 millions) accounts for only 8% of total households in Europe while the subscriber base represents 2% of the total number of fixed broadband connections.

Fixed wireless access networks (notably WiMAX and two-way satellite) have also attracted between 2.5 and 3 million subscribers altogether.

Strong dynamics of mobile broadband access

In the mobile segment, 3G population coverage was above 85% on average at the end of 2009, with eight countries (Denmark, Malta, Finland, Sweden, Luxembourg, Ireland, Slovakia and the Netherlands) at or very close to 100%, with other four countries (Latvia, Norway, Portugal and Belgium) in the range of 97%-98%. A large part of 3G networks have been upgraded to HSDPA and/or HSUPA: 3G+ population coverage stood at 82%. However, geographical coverage remains lower as rural areas in particular are still underserved in numerous countries. In most European countries, UMTS territory coverage has reached 90-100% in urban areas but it does not reach 50% in rural areas in most of them.

The number of active 3G users was just over 90 millions at the end of 2009, i.e. one out of seven mobile customers

3. European benchmark

3.1. EU-27 + Norway & Iceland at the end of 2009

3.1.1. Fixed broadband subscriber bases and penetration

Subscriber base

Figure 3: Fixed broadband subscriber base at the end of 2009 (in million subscribers)
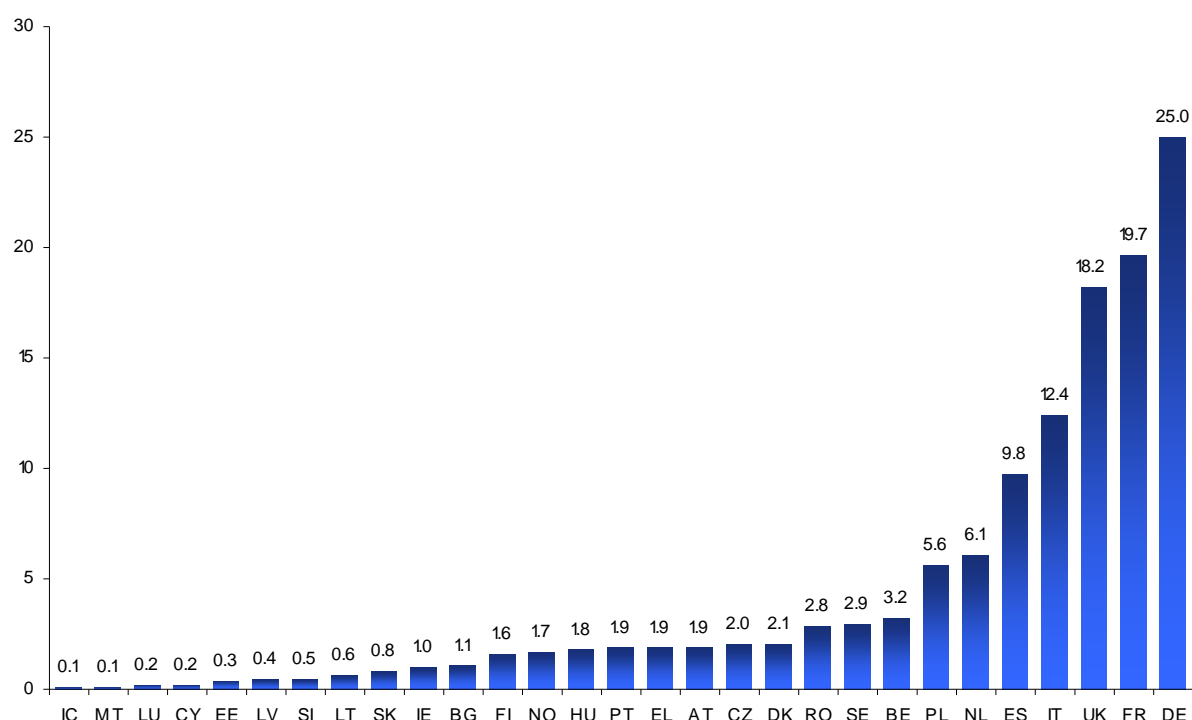
There were 125.8 million fixed broadband subscribers at the end of 2009 in the 29 European countries covered by the survey, representing a 9.3% increase over the previous year (115.2 million subscribers at the end of 2008). Germany (25.0 million), France (19.7 million) and the UK (18.2 million) remain the largest contributors to this base; the three countries together account exactly for half of the broadband subscriber base in the region with their share decreasing regularly over time. On one hand, growth was still higher than 25% in 5 markets in 2009: Bulgaria (+36%), Slovakia (+28%), Greece (+27%), Poland (+27%) and Cyprus (+26%). On the other hand, growth is now low in some advanced countries (Denmark, +2%; Netherlands, +1%), it has even began decreasing in a few ones (Sweden, -1%; Finland,-3%).

Table 1: Fixed broadband subscriber bases at the end of 2009 (in million subscribers)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
107.737	109.532	120.137	121.931	124.032	125.827

Fixed broadband penetration

Figure 4: Fixed broadband penetration at the end of 2009
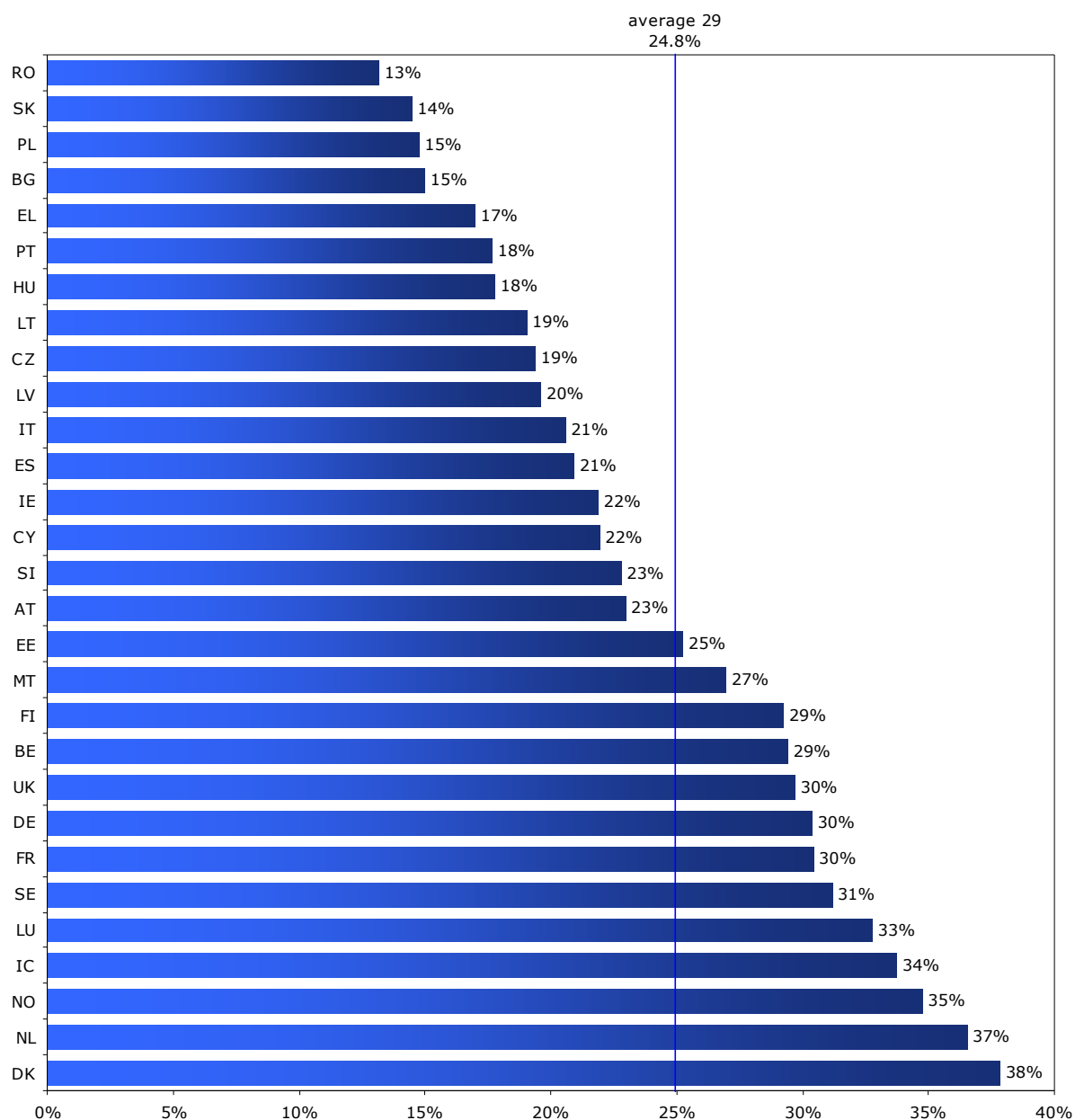
In terms of penetration, figures range from 13% in Romania[2] to 38% in Denmark, with a weighted average for the 29 countries of 24.8%. Scandinavian and Benelux countries, now with France, Germany and the UK, all report penetration rates over or close to 30%, which are the highest in the world (only South Korea also appears in this range). The other two largest European countries, Spain and Italy are still lagging behind at just over 20%. Take-up is generally lower in Eastern European countries, with Greece and Portugal also remaining home to relatively low penetration levels.

Table 2: Fixed broadband penetration at the end of 2009 (broadband connections as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
27.1%	27.1%	25.4%	25.5%	24.7%	24.8%

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[2] Bulgaria, which was behind at the end of 2008, gained 3 steps in 2009 and now ranks ahead of Poland, Slovakia and Romania

3.1.2. DSL coverage and penetration

DSL coverage

Figure 5: National DSL coverage at the end of 2009
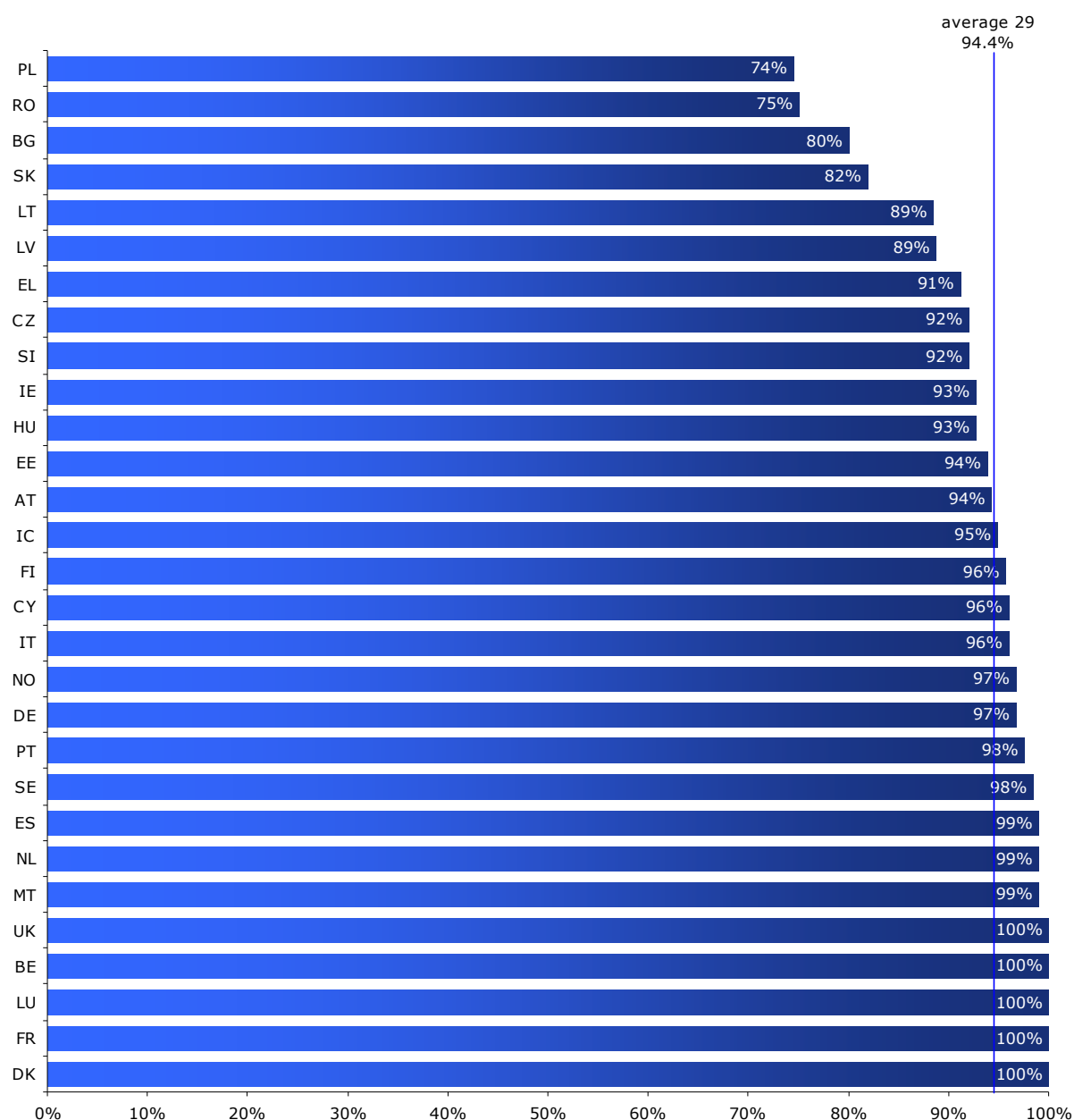
DSL coverage at the national level ranged from 74% (Poland) to 100% or very close to 100% (Denmark, France, Luxembourg, Belgium, the UK) at the end of 2009, with a regional weighted average of 94.4% (+1.4 percentage points compared to DSL coverage at the end of 2008). DSL coverage at national levels is now higher than 90% in 23 out of the 29 countries surveyed

Table 3: DSL coverage at the end of 2009 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
97.9%	97.9%	95.5%	95.5%	94.4%	94.4%

Figure 6: DSL coverage in rural areas at the end of 2009

average 29
79.9%

Country	Coverage
MT	nr
BG	18%
CY	30%
RO	47%
PL	52%
SK	54%
EL	60%
LV	67%
LT	69%
EE	80%
IE	82%
HU	82%
AT	83%
SI	83%
IT	85%
CZ	85%
IC	86%
PT	89%
DE	90%
FI	90%
SE	91%
NO	96%
ES	99%
NL	99%
UK	100%
BE	100%
LU	100%
FR	100%
DK	100%
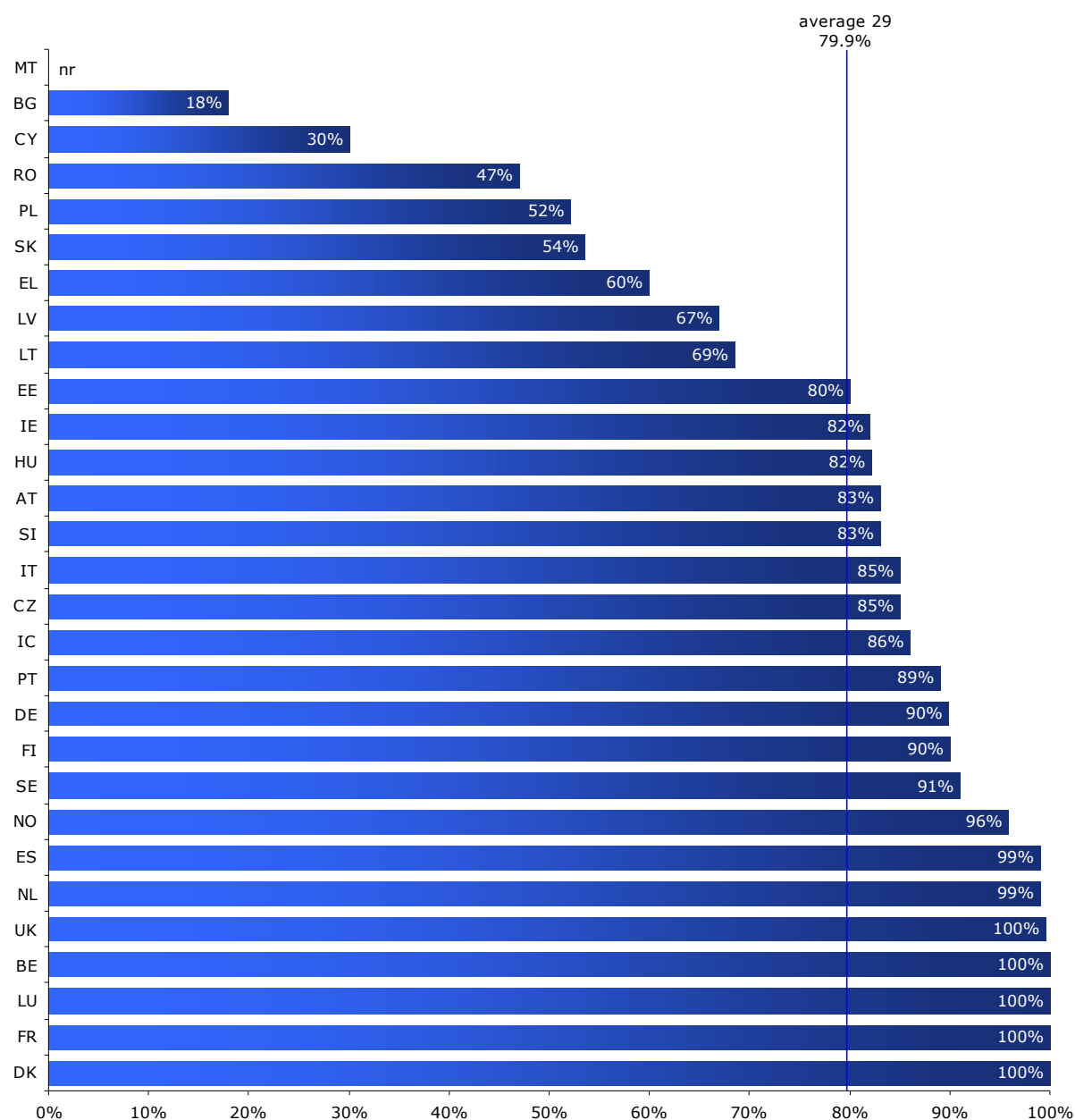
Coverage in rural areas is very close to 80% on average in the 29 countries surveyed, which is still 14.5 points below the national average. The gap between rural and national coverage decreases only slowly due to limited progress in a few countries with large rural regions and low DSL coverage in those regions (Romania and Poland notably). DSL coverage in rural areas is similar or very close to national average in 8 countries. On the opposite, difference is superior to 50 pp in 2 countries (Bulgaria and Cyprus).

Table 4: DSL coverage in rural areas at the end of 2009 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
92.6%	92.7%	83.6%	83.9%	79.5%	79.9%

DSL penetration

Figure 7: National DSL subscriber base at the end of 2009 (in million subscribers)
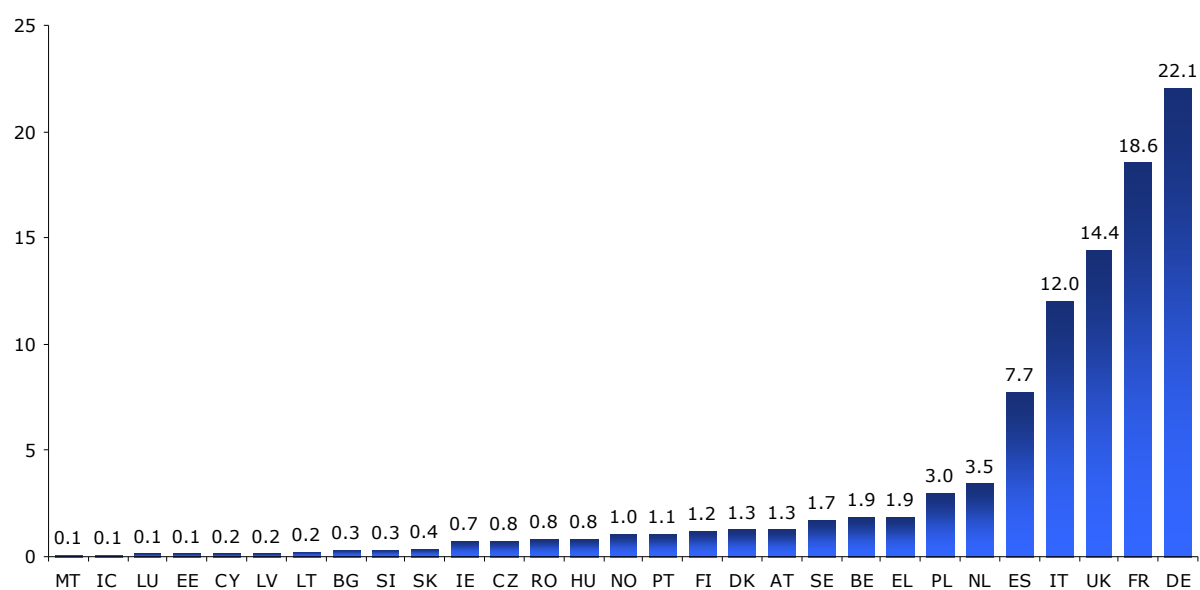
There were 97.6 million DSL subscribers at the end of 2009 in the 29 countries covered, representing a 7.3% increase in a year. Germany (22.1 million), France (18.6 million), the UK (14.4 million) and Italy (12.0 million) are by far the largest contributors, and together account for 69% of the regional DSL subscriber base.

Table 5: National DSL subscriber bases at the end of 2008 (in million subscribers)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
89.340	90.464	95.418	96.542	96.487	97.611

Figure 8: National DSL penetration at the end of 2009
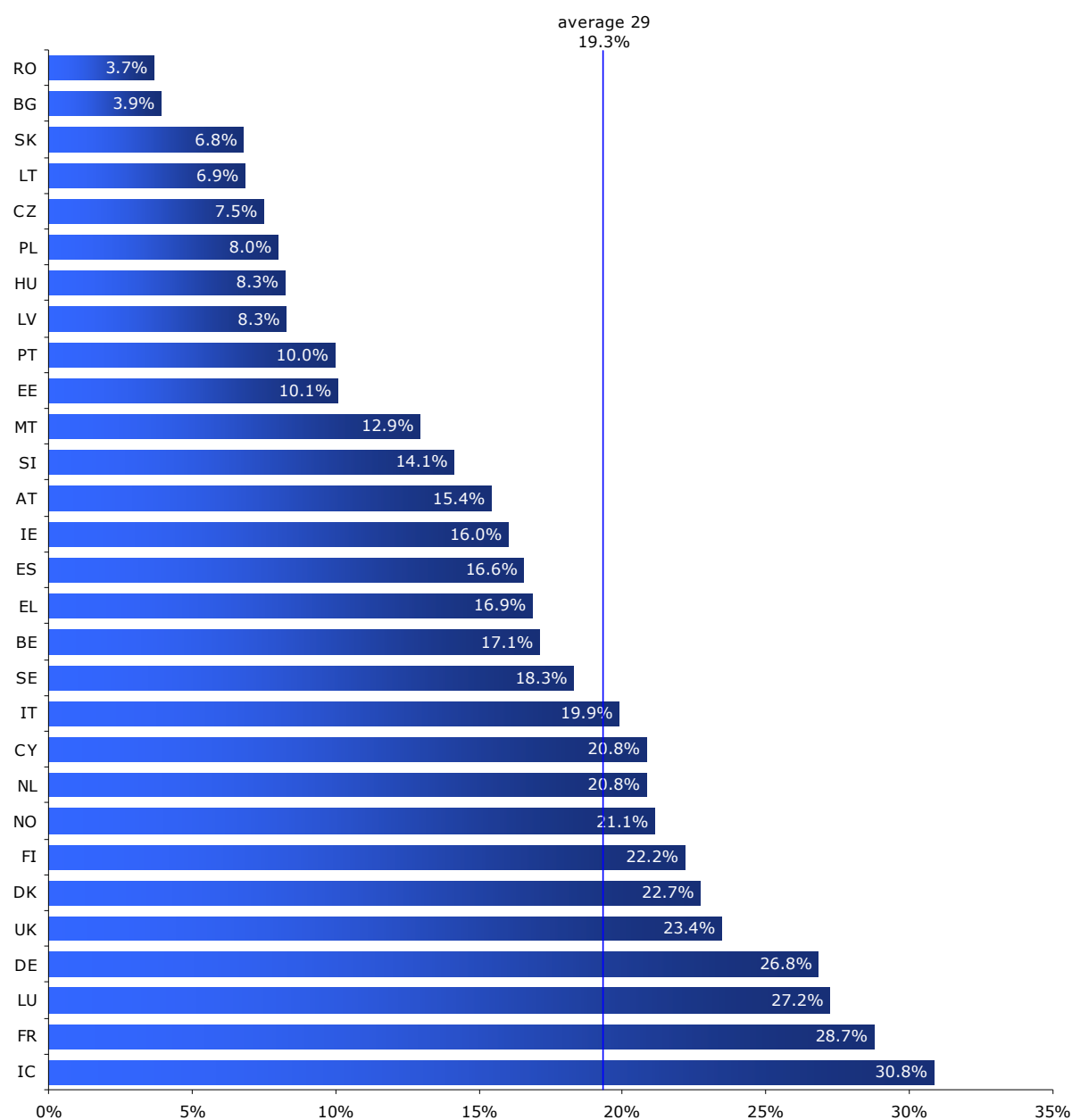
In terms of penetration, figures range from 3.7% in Romania to 30.8% in Iceland, with a weighted average for the 29 countries of 19.3% (compared to 18.1% at the end of 2008). DSL remains by far the leading broadband access technology in Europe and DSL take-up depends on the general level of broadband development in each country: however, it also depends on the level of competition from other technologies, mainly until now from cable modem and more and more from FTTx.

Table 6: National DSL penetration at the end of 2009 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
22.4%	22.4%	20.2%	20.2%	19.2%	19.3%

Figure 9: DSL penetration in rural areas at the end of 2009
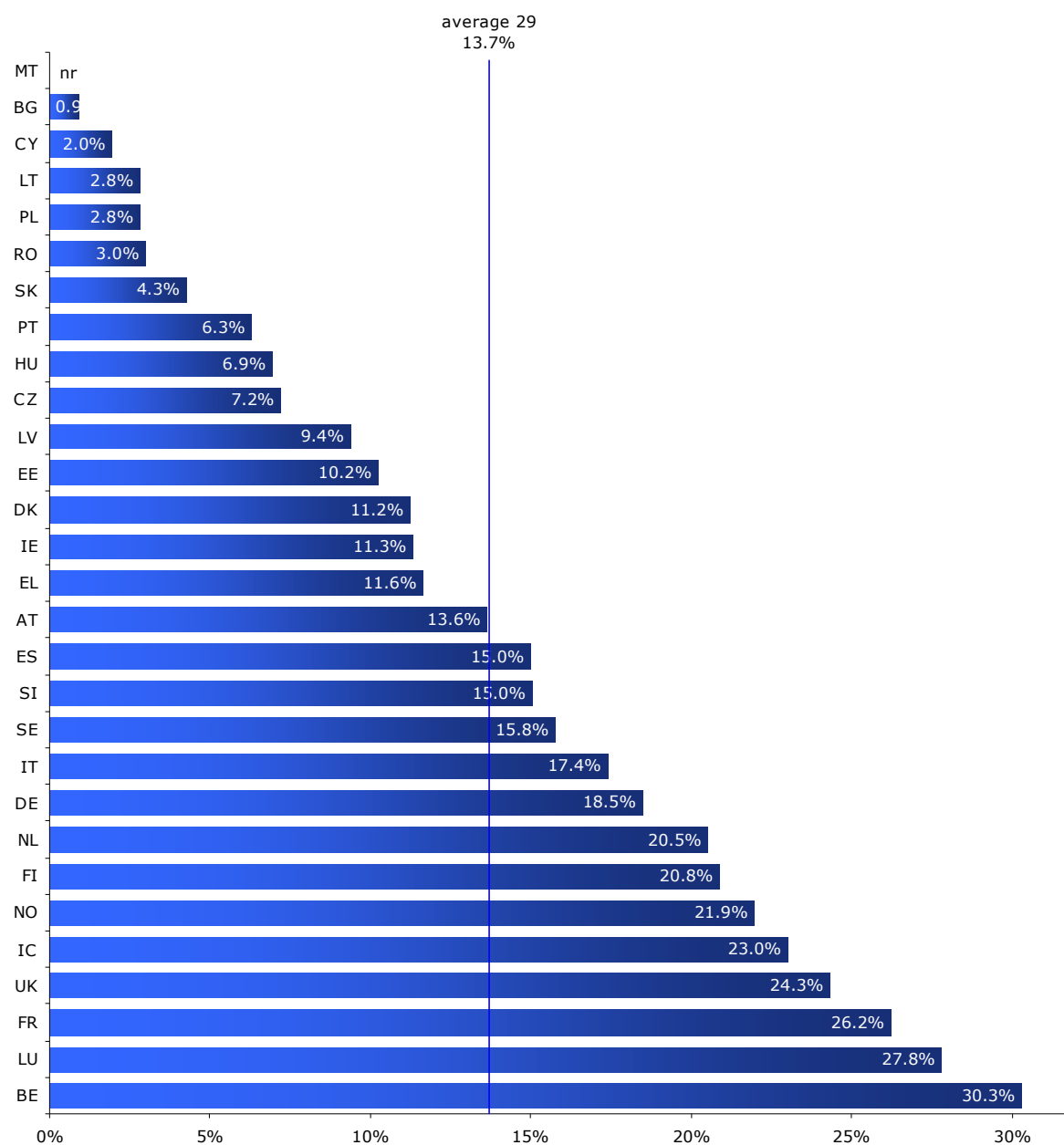
DSL penetration in rural areas is still below national levels (13.7% on average vs. 19.3%) but it continued to increase in 2009, particularly in a few eastern countries where DSL coverage in rural regions was expanded substantially during the last two years: Hungary, Poland, Romania and Slovakia.

Table 7: DSL penetration in rural areas at the end of 2009 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
19.0%	19.1%	14.7%	14.9%	13.5%	13.7%

DSL download rate segmentation

Figure 10: DSL subscriber bases broken down by download rates, at the end of 2009
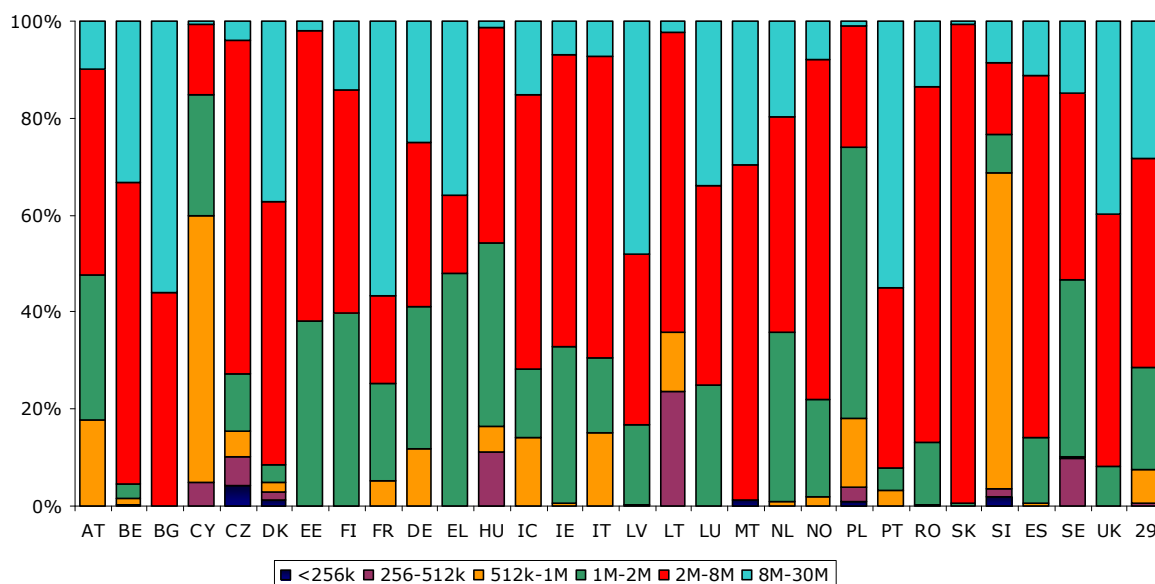
On average, more than two out of every three DSL customers subscribe to offers with download rates over 2 Mbps, including more than 28% subscribing to download rates over 8 Mbps (ADSL2+). France, the UK and Germany (not including VDSL) concentrate the largest bases with DSL subscribers at download rates in the higher category (more than 10 million for France, 5.7 and 5.5 million for the UK and for Germany respectively).

In rural areas, DSL connections with download speeds over 2 Mbps now account for more than half of total DSL connections (indeed close to 60%): however, it is still 13 percentage points below national levels.

Figure 11: Breakdown of rural DSL subscriber bases by download rate, at the end of 2009
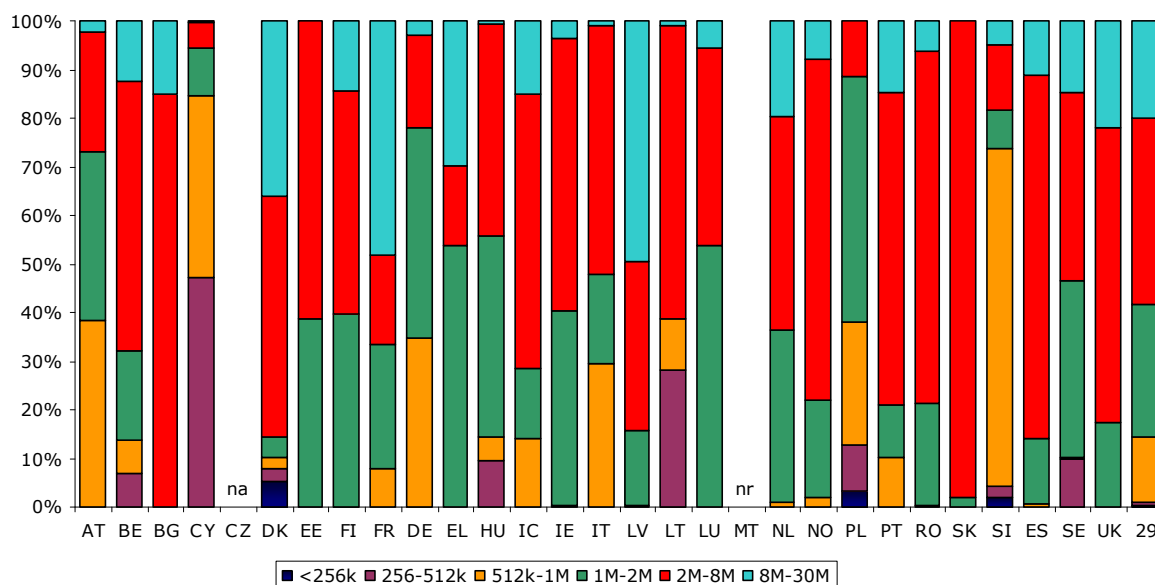
* Average calculation excludes countries where figures are not available.

DSL access origin

Figure 12: DSL subscriber bases broken down by access origin, at the end of 2009
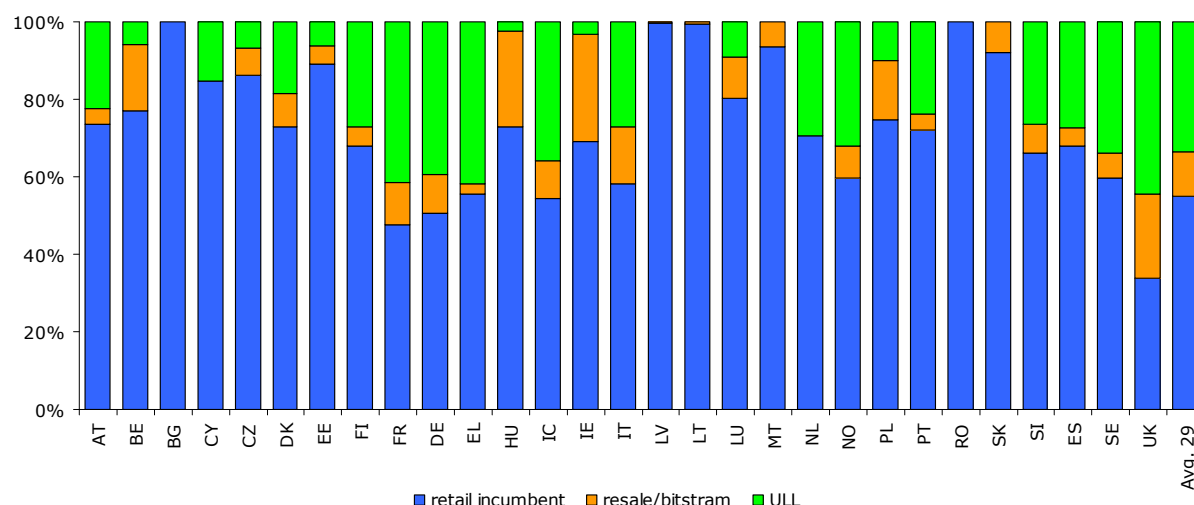
On average, 55% of DSL connections are supplied directly by incumbent carriers (1 percentage point less than at the end of 2008), while 11.5% are sold through resale and bitstream offers (vs. 13.1% one year before): with 33.5%, the share of DSL connections provided through unbundling has gained 2.5 percentage points within one year and more than 6 points from the end of 2007 (27.3%). LLU is particularly well-entrenched in the UK (44.3% of DSL connections at the end of 2009, + 3 pp compared to the end of 2008), France (41.6%, +4 pp), Greece (41.6%, +5 pp) and Germany (39.4%, +3 pp). Not surprisingly, unbundling remains less developed in rural areas (only 21% on average) due to the smaller size of local exchanges which makes it less economical for a competitive supplier to install its own DSLAMs; however, it has nevertheless become more popular than resale offers also in those areas.

Figure 13: Breakdown of rural DSL subscriber bases by access origin, at the end of 2009

* 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 2009

average 29
44.8%

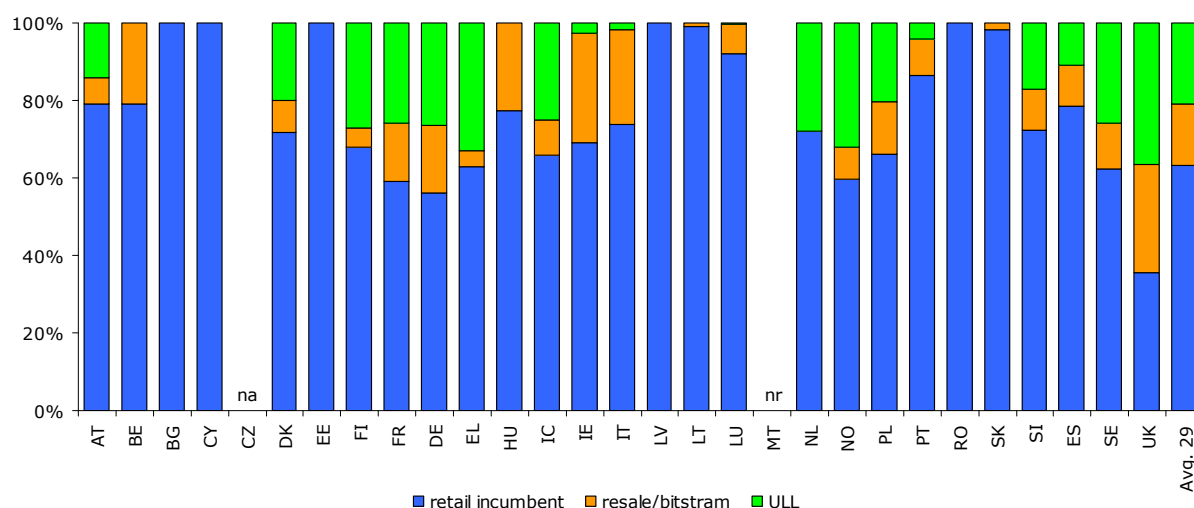|	
IT	0%
EL	0%
IC	0%
CY	28%
FR	29%
NO	30%
SK	32%
PL	34%
IE	38%
SE	38%
FI	40%
CZ	43%
AT	43%
UK	48%
SI	49%
LT	49%
ES	55%
LV	58%
DE	59%
DK	60%
RO	68%
EE	69%
LU	76%
HU	82%
PT	85%
BG	85%
BE	91%
NL	94%
MT	95%
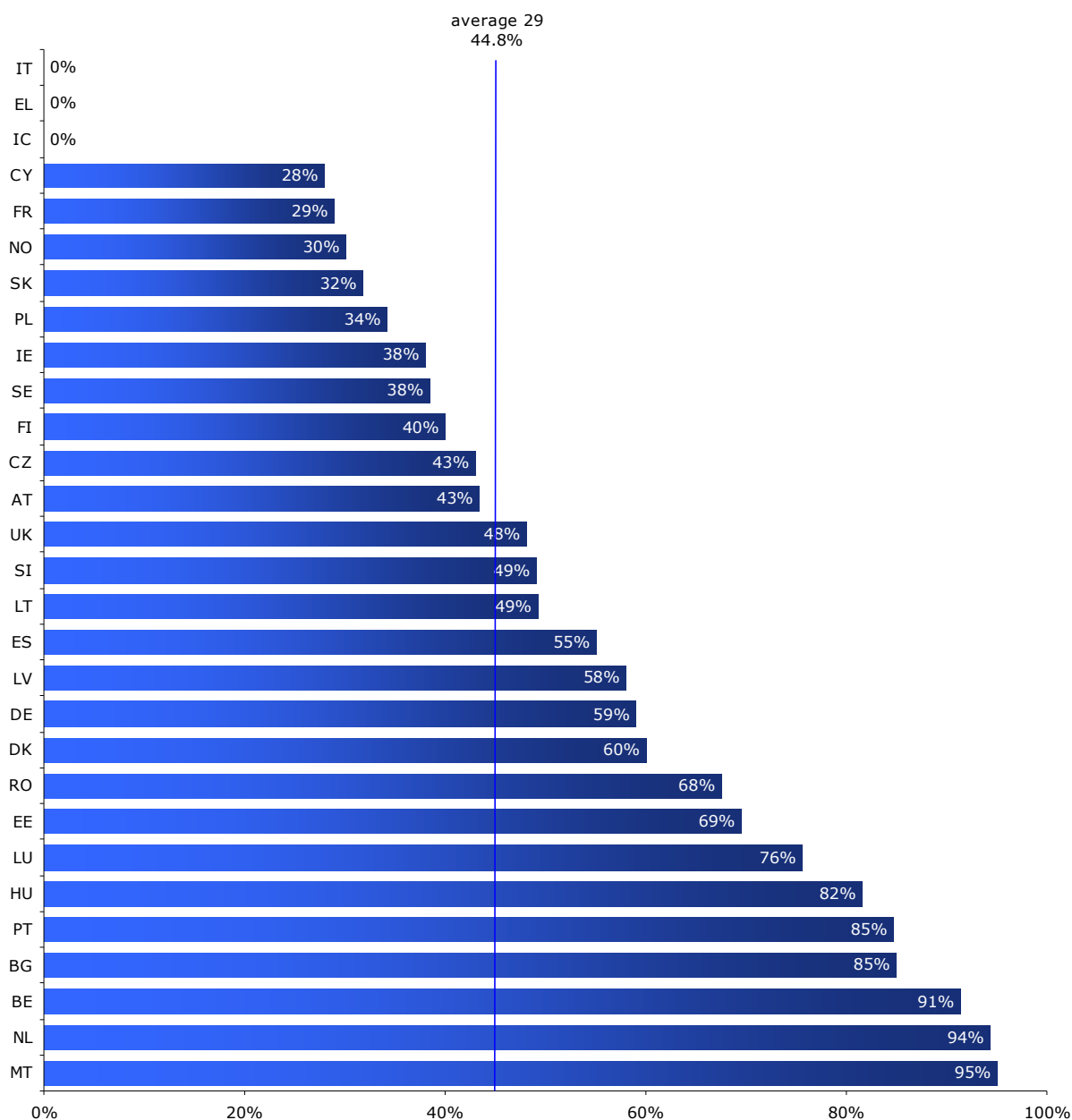
Cable modem coverage at national levels ranged between 0% (Greece, Italy, where it is not at all available and Iceland where service was abandoned two years ago) and 95% (Malta) at the end of 2009, with a regional weighted average of 44.8%, a slight increased compared to the end of 2008. Besides the Netherlands and Belgium, cable modem is generally more ubiquitous in Eastern European countries, especially in Bulgaria, Hungary, Estonia, Romania and Latvia (all five countries with national cable modem coverage levels between 58% and 85%) and in Slovenia, Lithuania and the Czech Republic (with coverage between 43% and 49%).

Table 8: Cable modem coverage at the end of 2009 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
43.1%	43.0%	43.2%	43.2%	45.0%	44.8%

Figure 15: Cable modem coverage in rural areas at the end of 2009
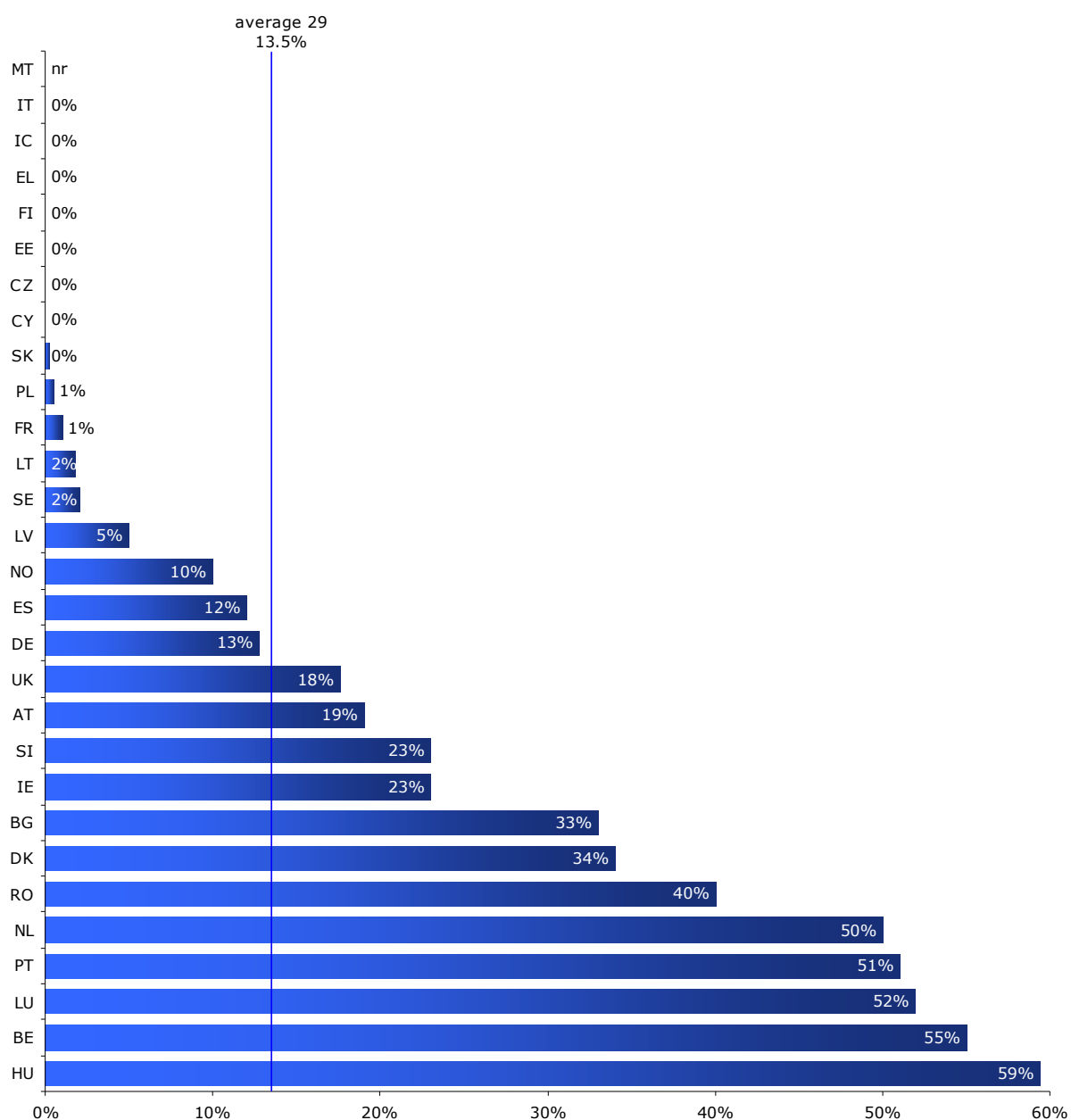
In rural areas, cable modem coverage has reached 13.5% on average: it did not progress in 2009[3] and remained far below the national levels due to the fact that, in some large countries (France, the UK notably), cable is available primarily in big cities only.

Table 9: Cable modem coverage in rural areas at the end of 2009 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
11.0%	10.9%	10.6%	10.6%	13.6%	13.5%

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[3] The slight decrease appearing in 2009 figures is mainly due to revised figures on the Swedish market

Cable modem penetration

Figure 16: National cable modem subscriber bases at the end of 2009 (in million subscribers)
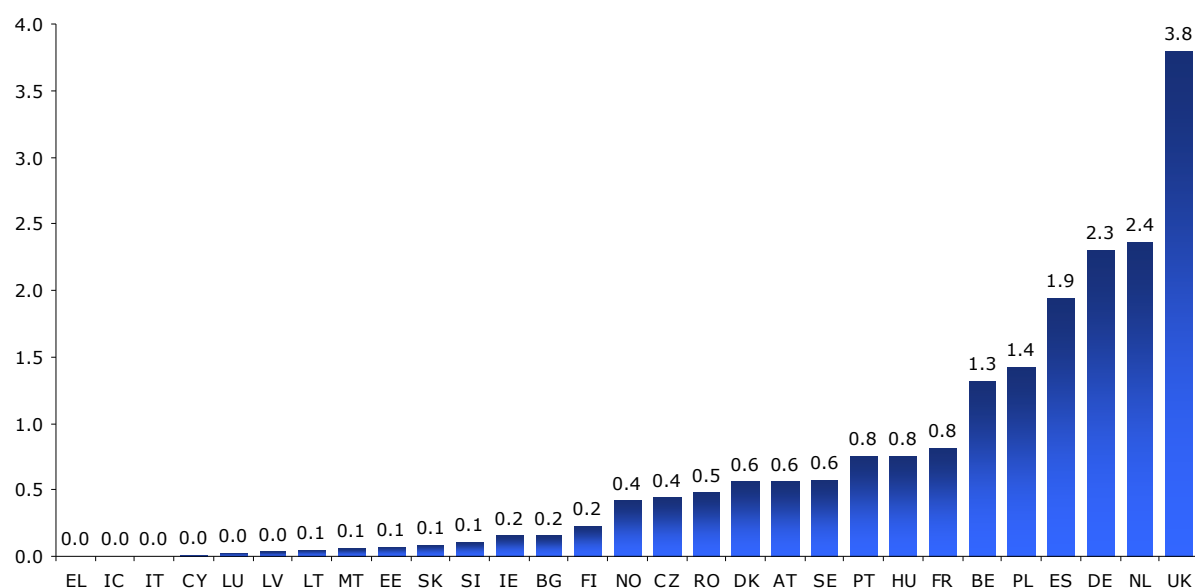
There were 19.5 million cable subscribers at the end of 2009 in the 29 countries covered, which represents a 11.8% increase over the year before (17.4 million cable modem subscribers at the end of 2008). The UK still leads the way with 3.8 million subscribers but its share declined to just below 20% (compared to 21% at the end of 2008) as growth of cable modem subscribers in the British market was only 3% in 2009. The six largest cable modem markets in Europe (the UK, Netherlands, Germany, Spain, Poland and Belgium) account for more than two thirds of the regional subscriber base.

Table 10: National cable modem subscriber bases at the end of 2009 (in million subscribers)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
15.380	15.794	18.415	18.830	19.055	19.470

Figure 17: National cable modem penetration at the end of 2009
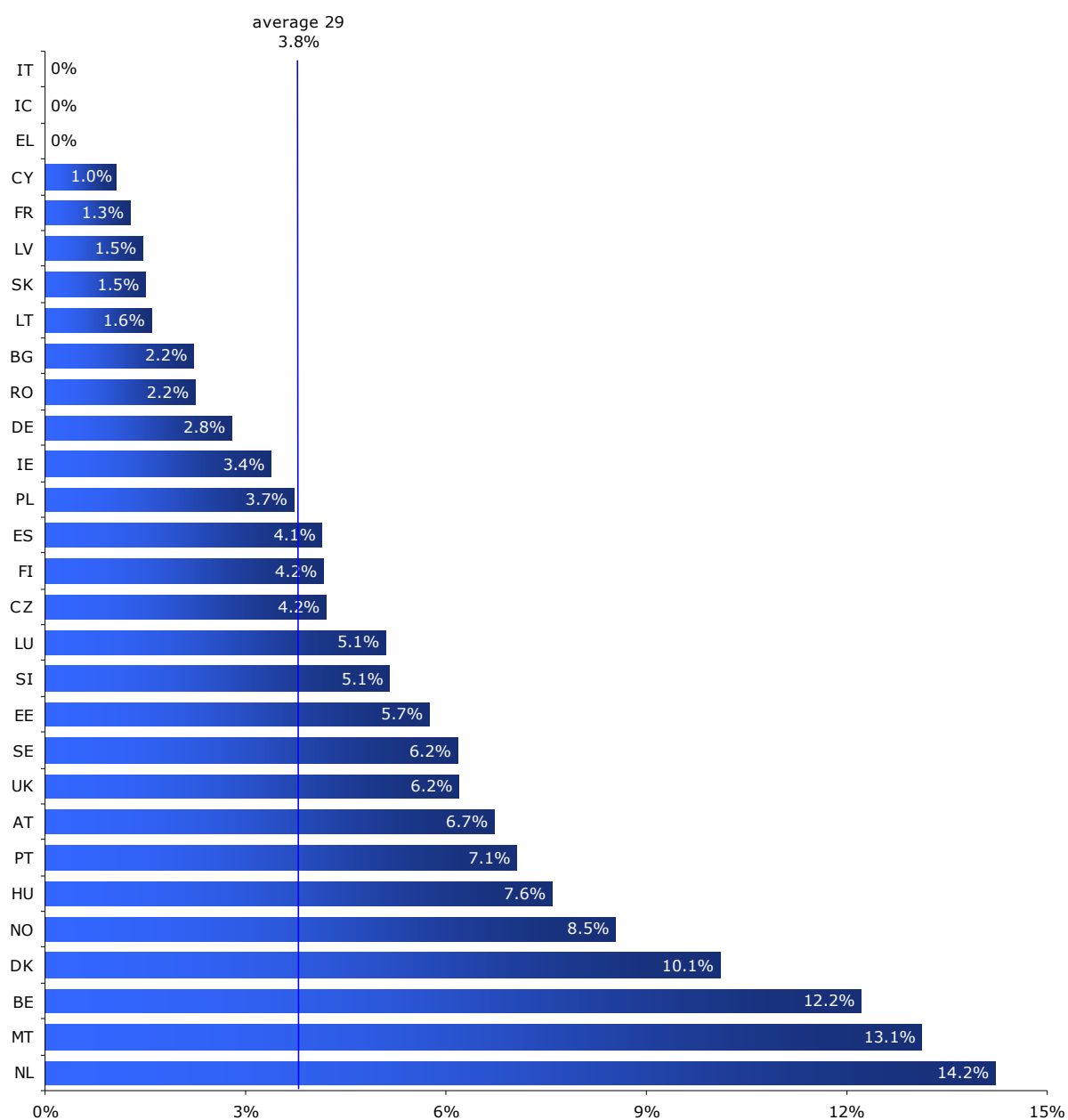
In terms of penetration, figures ranged from 0% in Greece, Italy and Iceland, where cable is not or no more (Iceland) available, to 14.2% in the Netherlands at the end of 2009, with a weighted average for the region of 3.8%, i.e. five times lower than DSL penetration rates.

Table 11: National cable modem penetration at the end of 2009 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
3.9%	3.9%	3.9%	3.9%	3.8%	3.8%

Figure 18: Cable modem penetration in rural areas at the end of 2009
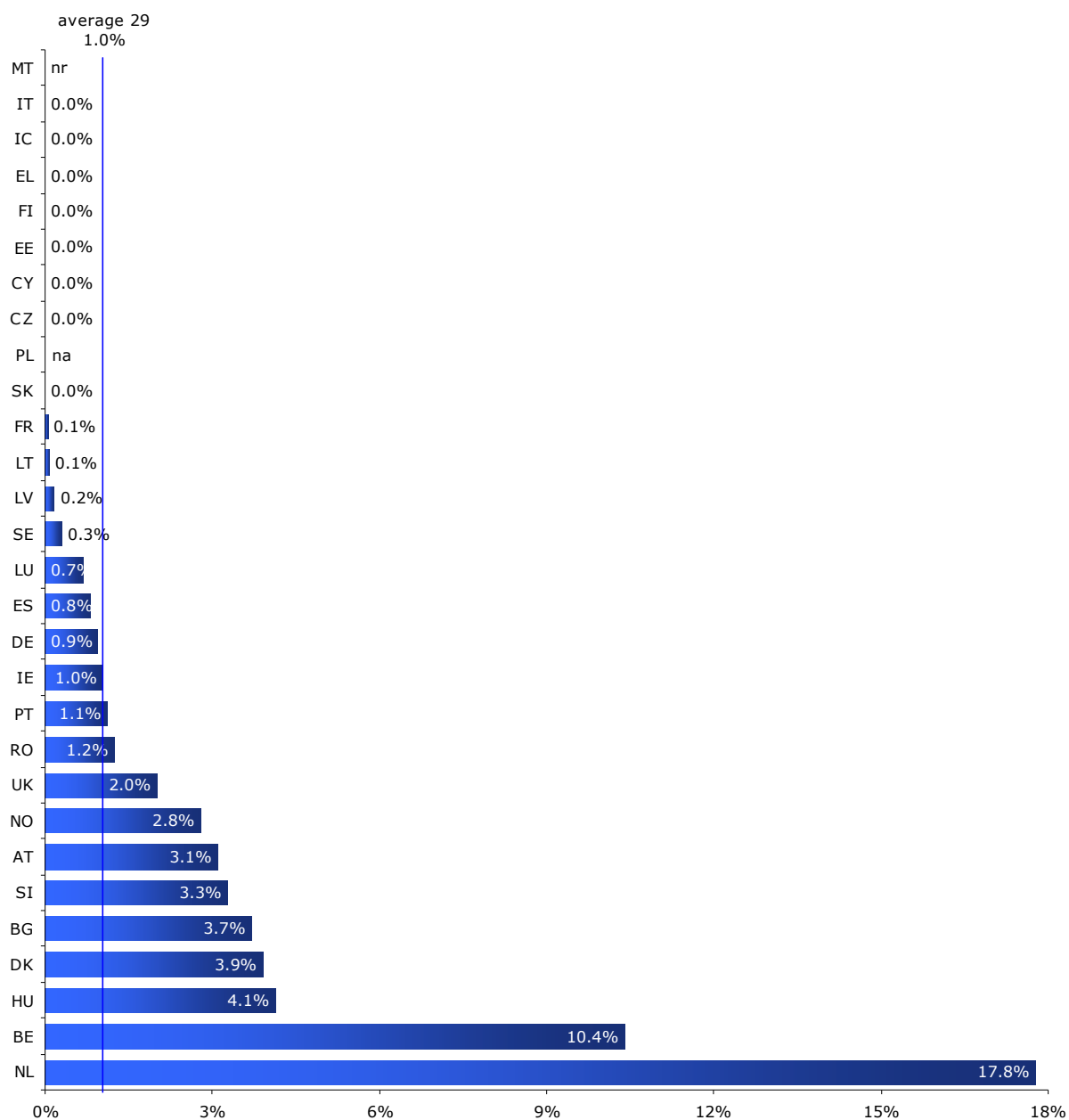
Cable modem penetration in rural areas is very low, with a European average of only 1%, with only Belgium and the Netherlands reporting significant penetration in rural areas.

Table 12: Cable modem penetration in rural areas at the end of 2009 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
1.0%	1.0%	0.9%	0.9%	0.9%	1.0%

Cable modem download rate segmentation

Figure 19: Breakdown of cable modem subscriber bases by download rates, at the end of 2009
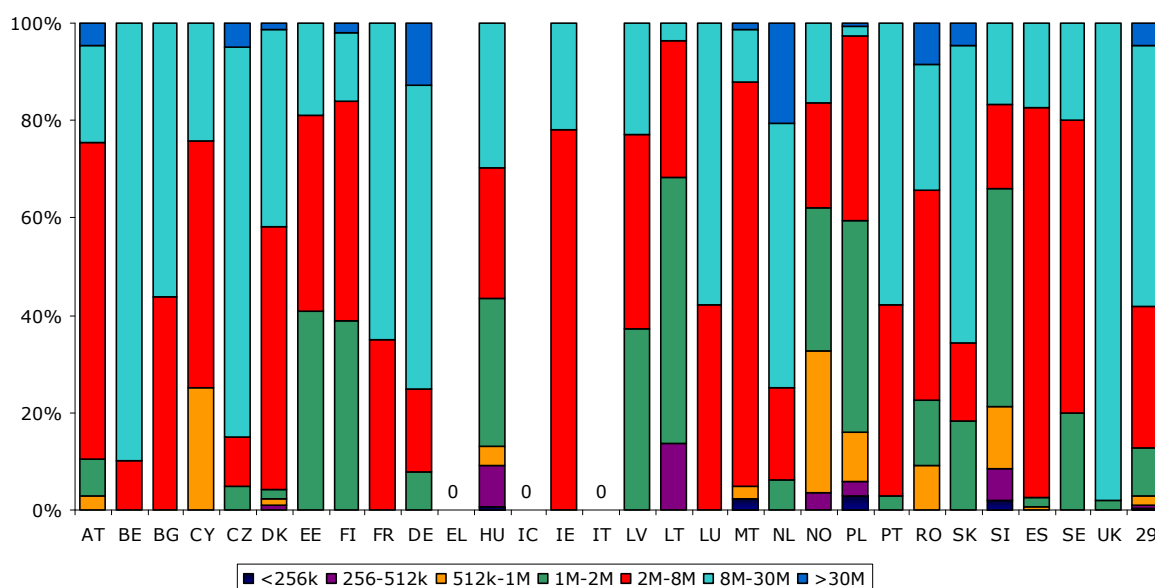
On average, 87.2% of cable modem customers subscribed to offers with download rates of over 2 Mbps: this share has very much increased in the recent period (more than 20 percentage points in one year, 30 pp over two years). More significantly, 58.3% subscribe to download rates of over 8 Mbps, which is more than double compared to figure at the end of 2008. In 5 countries (Belgium, the Czech Republic, Germany, the Netherlands and the UK), connections with download speeds over 8 Mbps account for 75% or more of total cable modem connections. On average, cable modem connections offer slightly higher download rates than DSL, including in rural areas.

Figure 20: Breakdown of rural cable modem subscriber bases by download rates, at the end of 2009
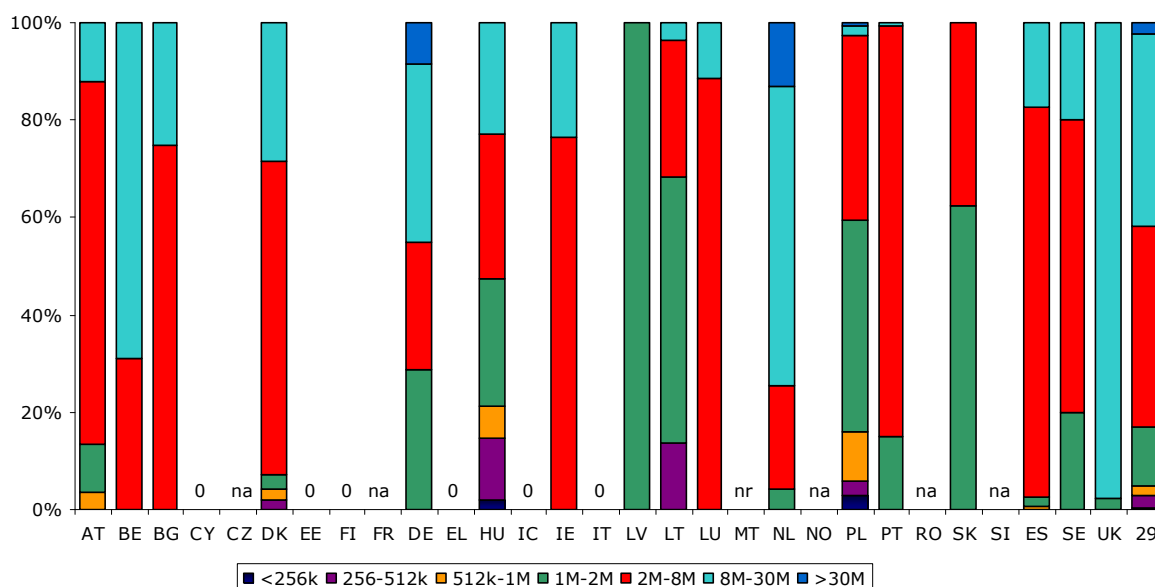
3.1.4. FTTH/B coverage and penetration

FTTH/B homes passed

Figure 21: Number of FTTH/FTTB homes passed, at the end of 2009

Country	Homes passed
MT	0
EL	na
CY	100
BE	4,950
IE	16,300
RO	20,000
LU	30,000
IC	32,000
AT	60,000
PL	70,265
UK	86,180
EE	110,000
HU	120,000
LV	138,000
CZ	182,000
ES	205,500
NO	332,000
SI	415,000
FI	486,700
DE	538,000
NL	576,500
SK	623,000
DK	720,100
LT	726,000
BG	1,000,000
PT	1,150,000
SE	1,296,900
IT	2,193,000
FR	5,700,750
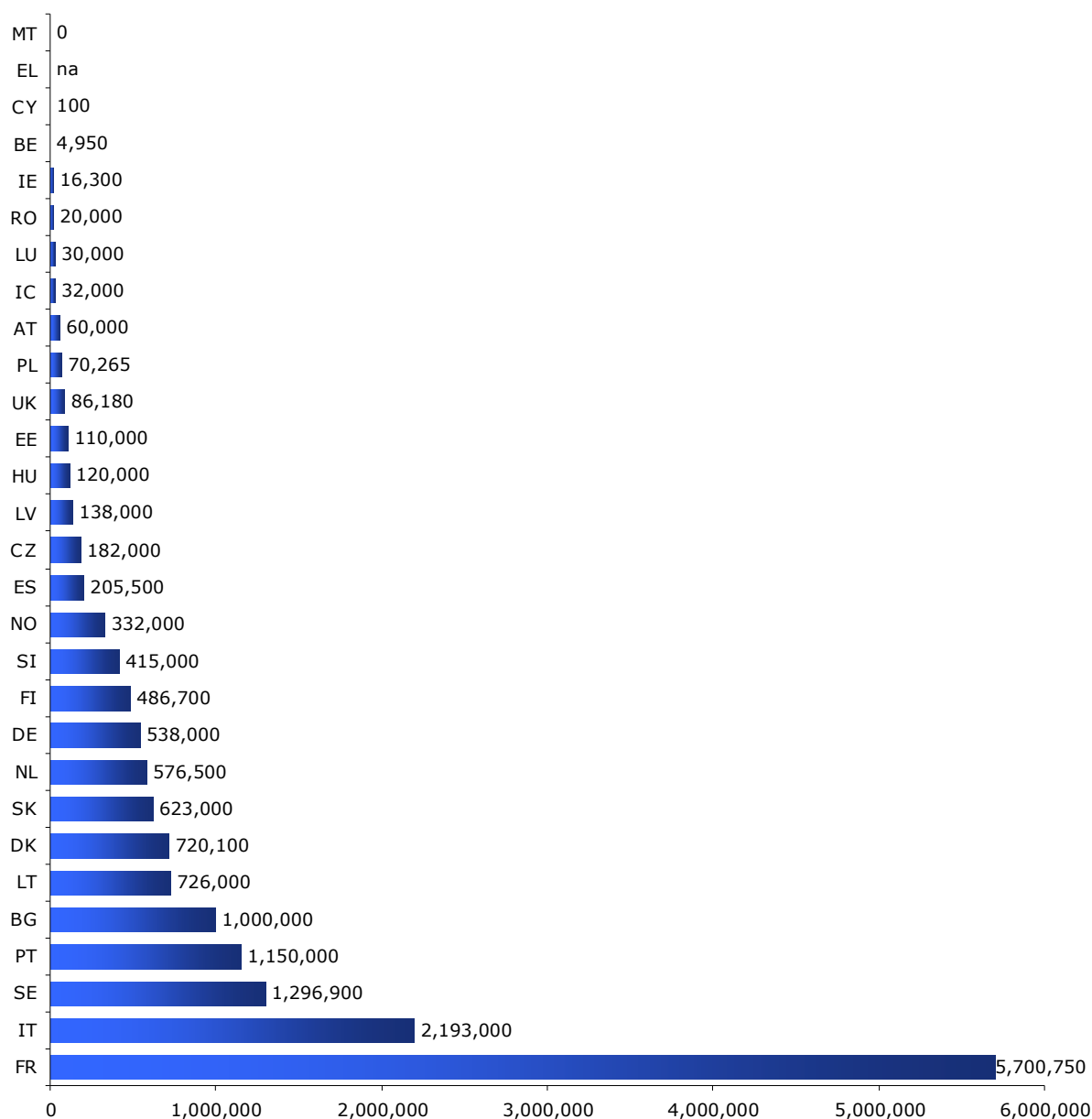
There were 16.8 million FTTH/B homes passed in the 29 countries surveyed at the end of 2009, with France accounting for one third of this total due to the upgrade plan of Numericable (4.7 million FTTB homes passed).

Table 13: National FTTH/B homes passed at the end of 2009 (in millions)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
13.065	13.429	15.449	15.813	16.469	16.833

FTTH/B subscribers

Figure 22: Number of FTTH/FTTB subscribers, at the end of 2009

Country	Subscribers
MT	0
CY	100
LU	300
EL	2,000
UK	3,650
BE	4,200
HU	7,247
IC	7,500
IE	8,610
RO	10,000
LV	11,800
AT	13,750
EE	15,000
ES	15,867
PL	21,265
BG	29,000
PT	41,500
CZ	44,000
SK	64,500
SI	68,442
FI	70,440
DE	87,000
DK	160,800
NL	194,800
NO	208,071
LT	239,900
FR	308,200
IT	328,000
SE	537,100
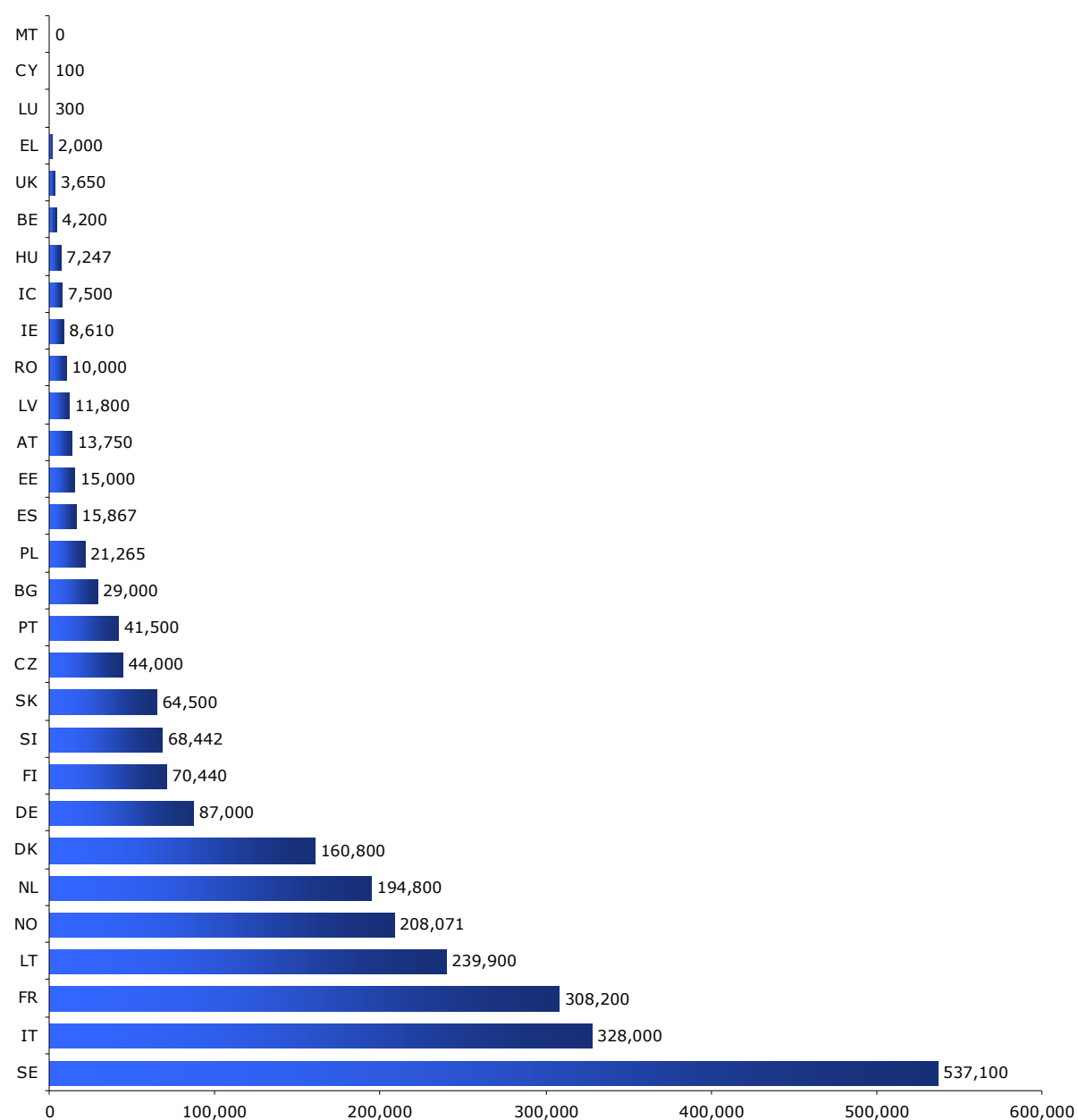
The number of FTTH/FTTB subscribers was just over 2.5 million at the end of 2009 in the 29 countries covered – up from 1.6 million at the end of 2008 (+54%). Almost 80% of the installed base is concentrated in seven countries (Sweden, Italy, France, Lithuania, Norway, the Netherlands and Denmark).

Table 14: National FTTH/B subscriber bases at the end of 2009 (in millions)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
1.743	1.959	2.179	2.395	2.287	2.503

3.1.5. WiMAX solutions

WiMAX subscribers

Figure 23: WiMAX subscriber base, at the end of 2009 (in thousands)
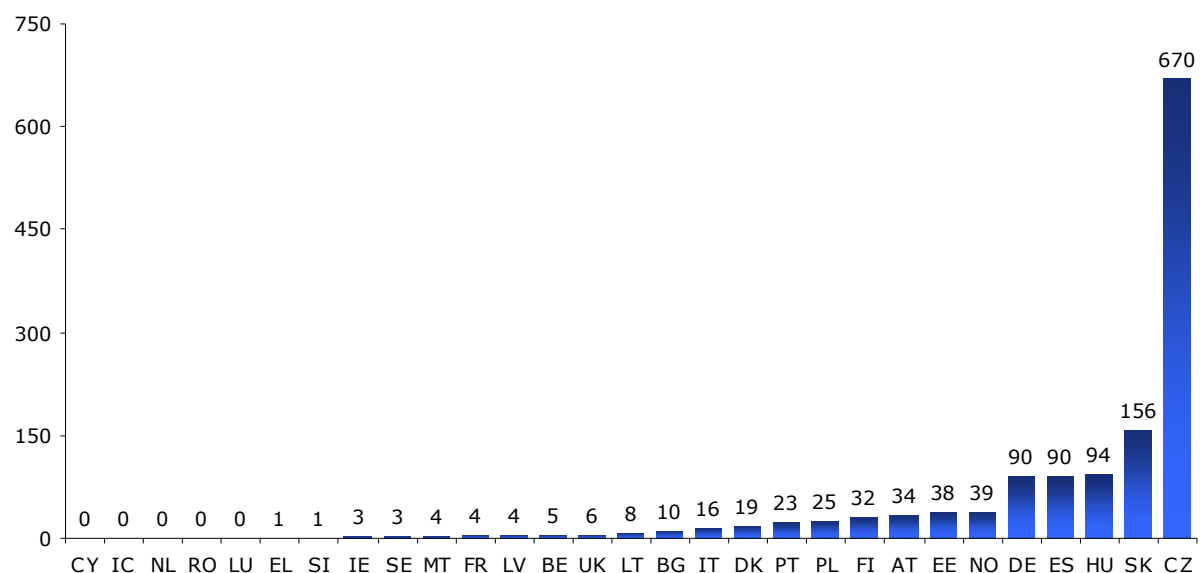
There were 1.4 million WiMAX subscribers in the 29 European countries surveyed at the end of 2009: half of them were concentrated in only one country, the Czech Republic. More generally, WiMAX appears to be more popular in eastern countries, with also Slovakia and Hungary as market leaders.

Table 15: WiMAX subscriber bases at the end of 2009 (in thousands)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
326.5	365.5	1,327.0	1,366.0	1,337.0	1,376.0

3.1.6. Satellite solutions

Satellite can prove to be a competitive solution for reducing the digital divide:

- Covering broadband dead zones requires considerable investments from telcos who have neither an obligation nor necessarily a financial incentive to undertake them. As a result, it often falls to public authorities, and usually local ones, to provide coverage in these areas.

- While satellite-based broadband solutions were cost prohibitive at the start of the century, recent technological developments have made it possible to deliver access at 4 Mbps downlink for a reasonable price (e.g. 35 EUR a month, terminal included, in France).

- Despite certain technical restrictions, the introduction of the Ka band is helping to drive a "revival" of high-speed satellite access thanks to a much more appealing business model than the one tied to the introduction of the Ku band several years back.

3.1.7. 3G coverage and take-up

3G population coverage

Figure 24: National 3G (UMTS) population coverage at the end of 2009
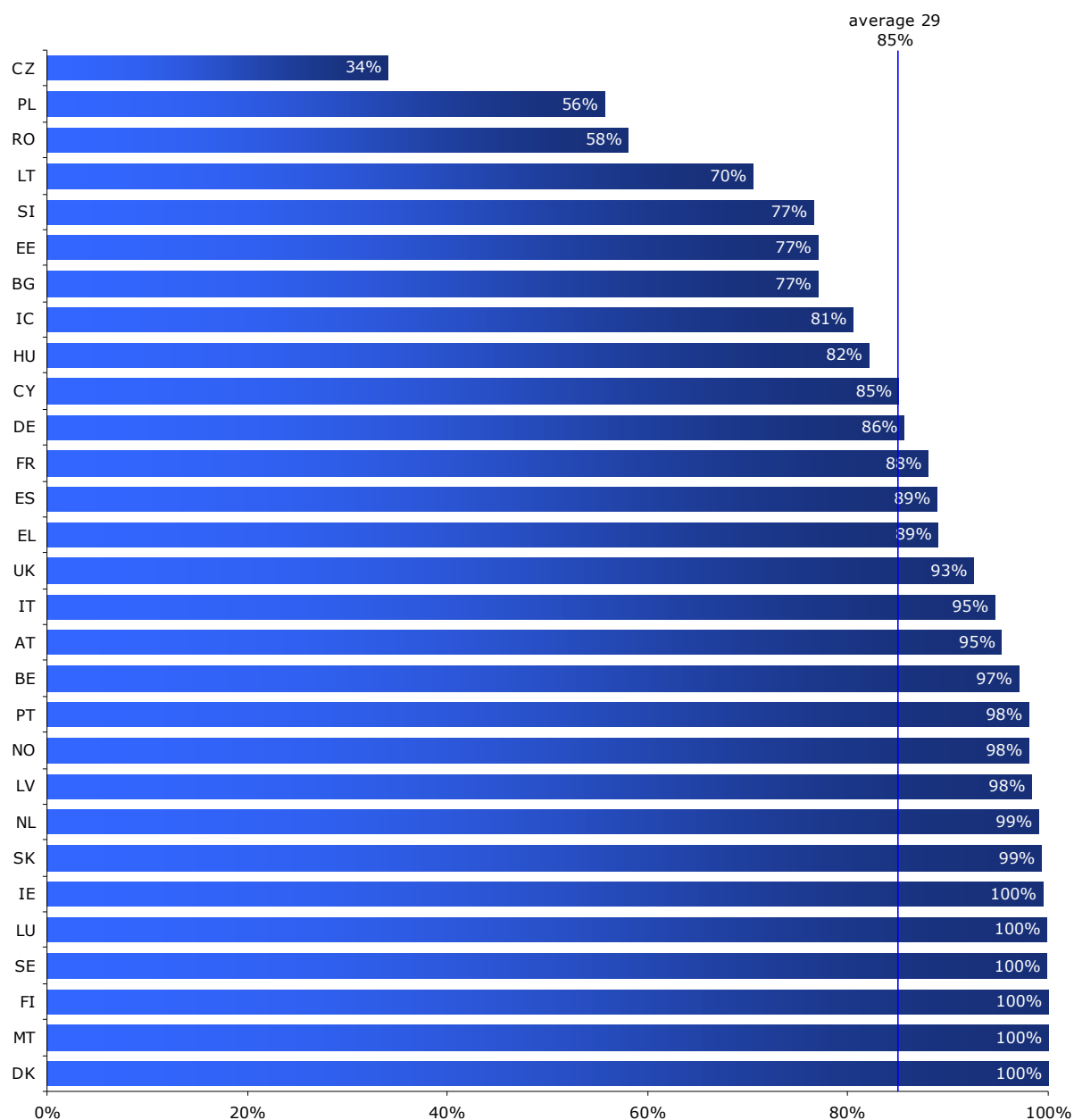
At the end of 2009, 3G deployment was underway in all countries, with an average population coverage of 85%. The above figure refers to UMTS coverage with speeds of 384 Kbps and upwards. In numerous countries, operators have also upgraded their networks to 3.5G (HSDPA notably) to offer higher speeds (1.5 Mbps+). See page hereafter for details.

Table 16: 3G coverage at the end of 2009 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
91%	91%	87%	87%	85%	85%

3G+ population coverage

Figure 25: National 3G+ (HSDPA) population coverage at the end of 2009
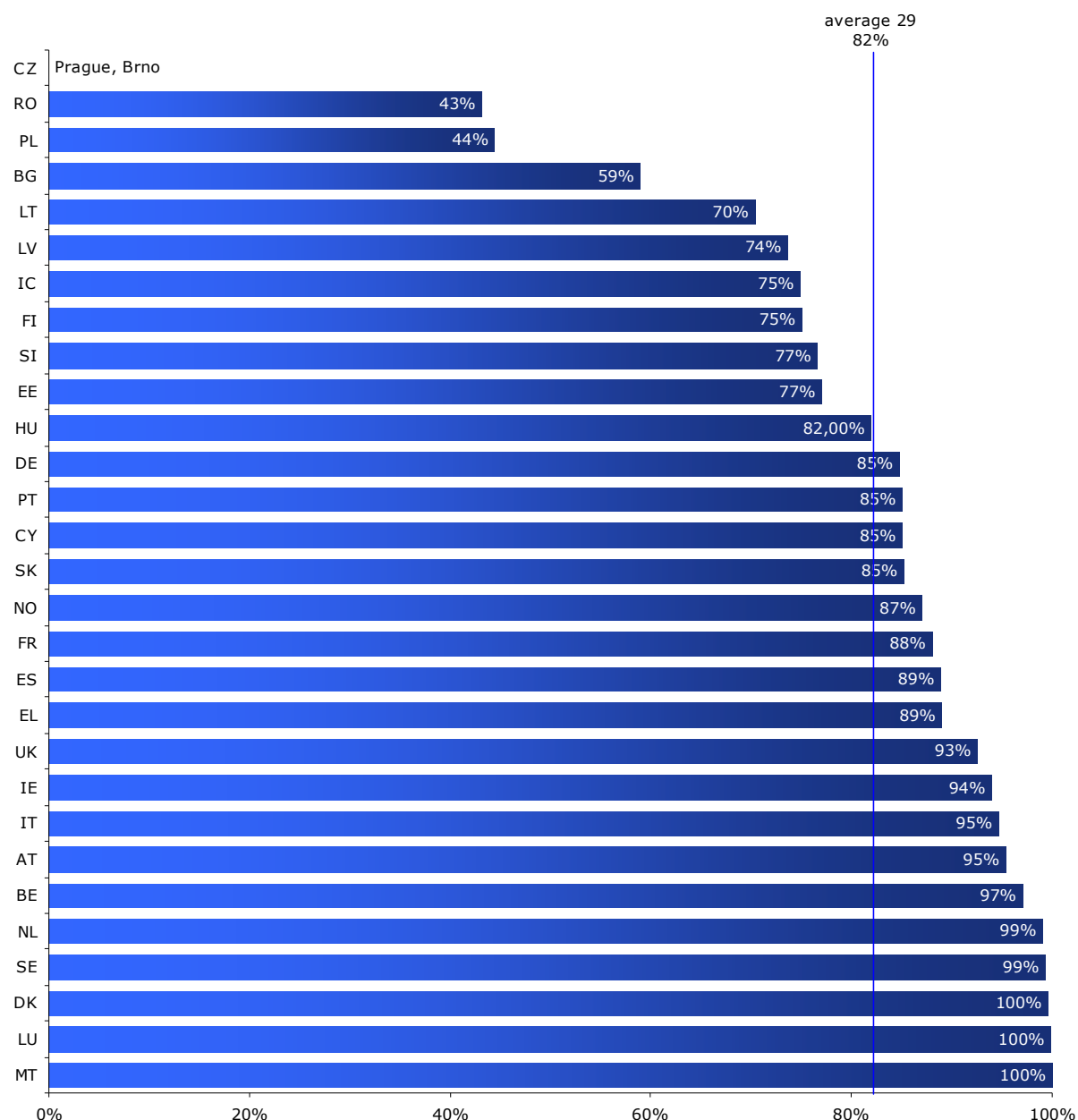
On the whole, 3G+ coverage is by now close to 3G coverage levels, especially in Western European countries (90% on average compared to 91% for 3G population coverage). However, there are still significant gaps between 3G and 3G+ coverage in Finland, Latvia, Bulgaria, Romania, Slovakia and Portugal.

Table 17: 3G+ coverage at the end of 2009 (as a % of the population)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
90%	90%	84%	84%	82%	82%

* Average calculation excludes countries where figures are not available.

Territorial 3G coverage

Figure 26: National territorial 3G (UMTS) coverage at the end of 2009
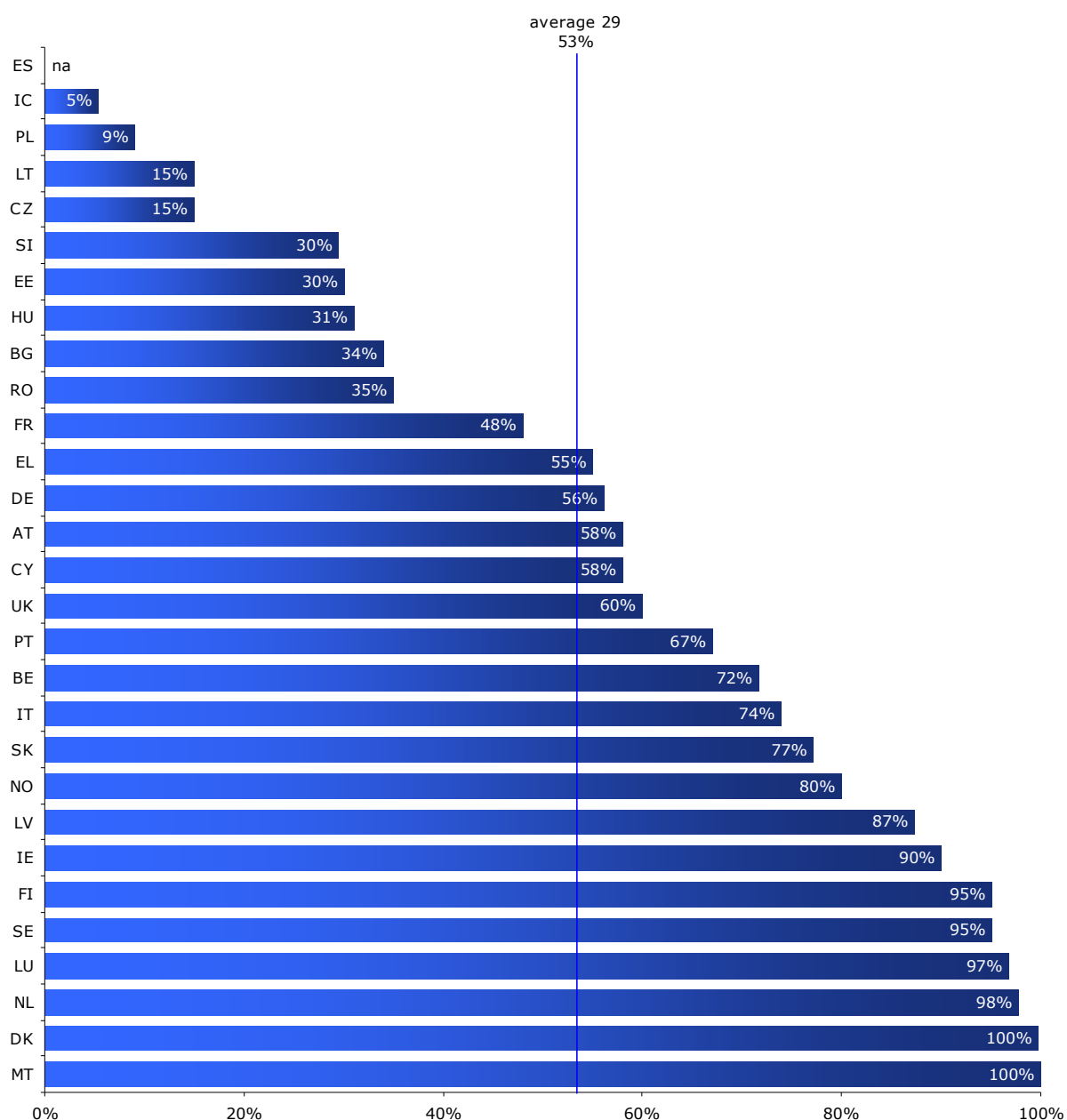
Territorial coverage for 3G (UMTS) is lower than population coverage due to the fact that the first rollouts were performed in densely populated areas (large towns, dense suburban areas) and, except in a few countries, rural areas are still largely underserved. On average, UMTS territory coverage was 53% at the end of 2009. 3G networks were largely upgraded to HSDPA: however, there are still significant gaps in some countries between UMTS and HSDPA territorial coverage levels, notably in a few Nordic countries (Finland, Norway, Latvia) and in Spain. Average for HSDPA territorial coverage is 37% (+10 percentage points compared to the end of 2008).

Table 18: 3G coverage at the end of 2009 (as a % of the territories)

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
60%	60%	54%	54%	52%	53%

* Average calculation excludes countries where figures are not available.

3G penetration

Figure 27: National 3G (UMTS) penetration at the end of 2009
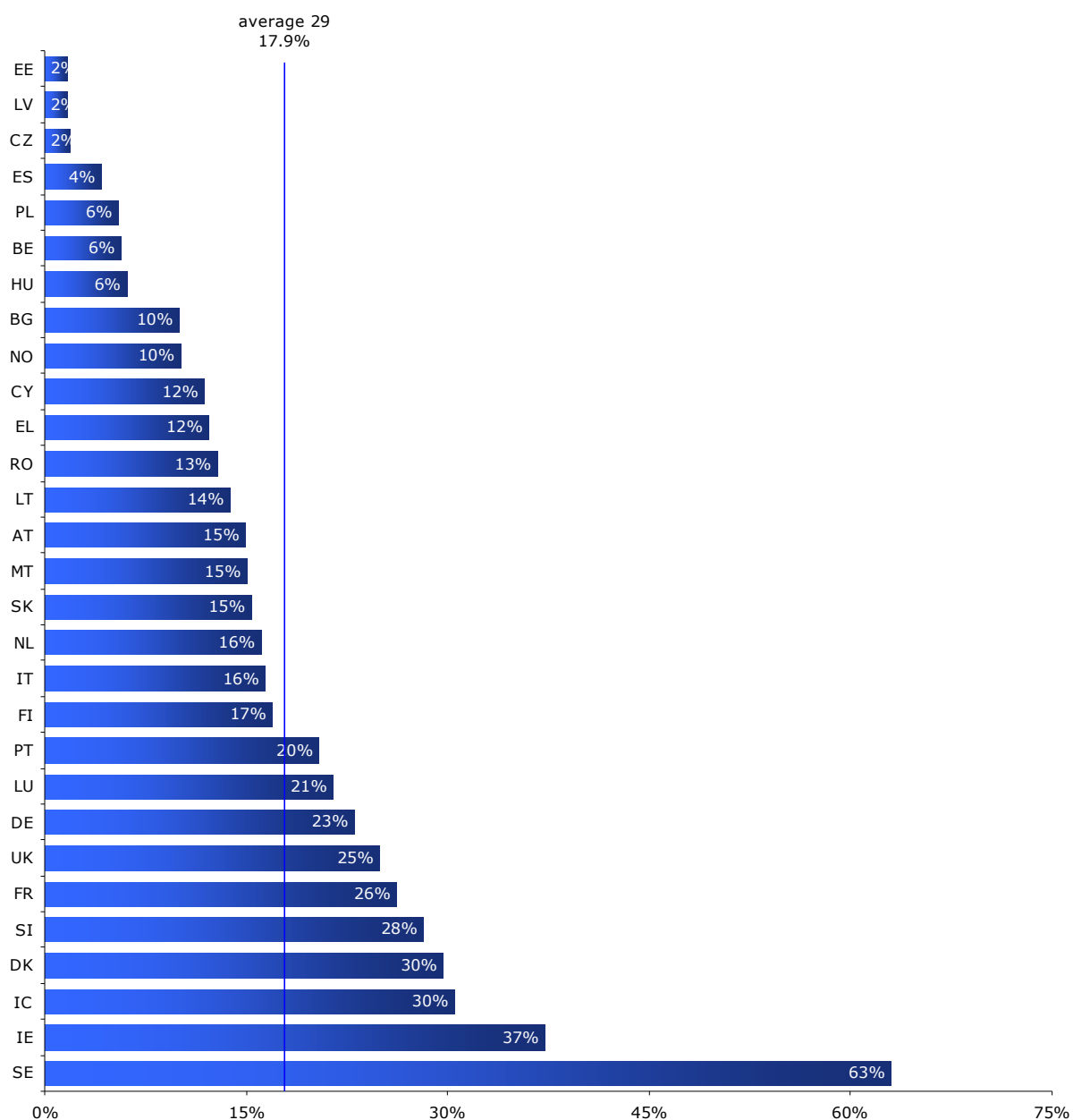
There were 90.4 million 3G active users at the end of 2009 in the 29 countries covered (+45% compared to the end of 2008), which represents a 17.9% penetration rate. Take-up is slightly more advanced in Western countries (EU-15 + 2).

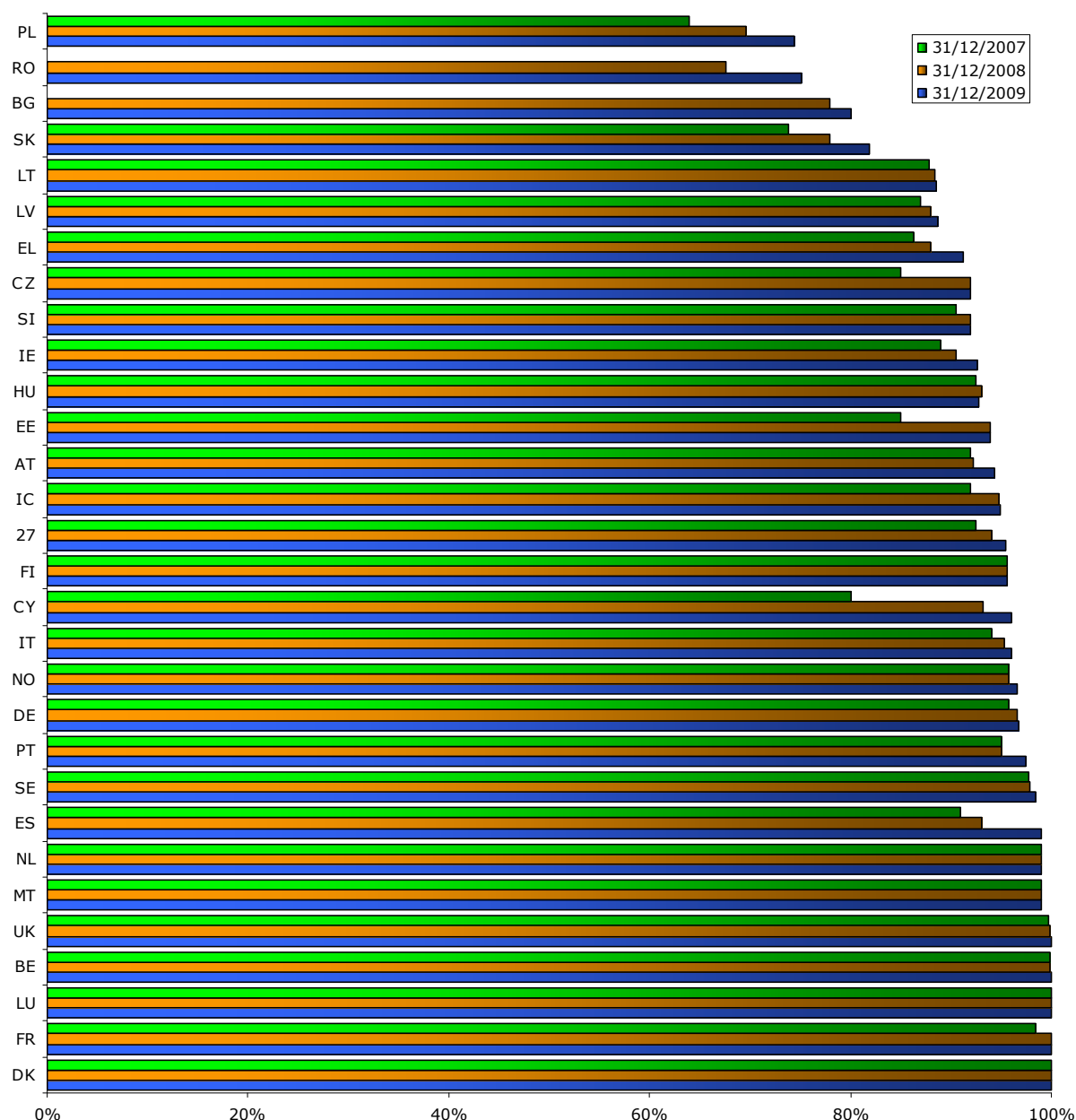**Table 19: 3G penetration at the end of 2009 (as a % of the population)**

EU-15	EU-15 + 2	EU-25	EU-25 + 2	EU-27	EU-27 + 2
20.4%	20.3%	18.3%	18.2%	17.9%	17.9%

3.2. EU-25 + Norway & Iceland, from year-end 2007 to year-end 2009

3.2.1. Coverage

Figure 28: National DSL coverage

Average DSL coverage in the EU-25 + 2* reached 95.5% at the end of 2009, gaining 1.5 percentage points in 2008 and again last year. DSL coverage now exceeds 95% in more than half of the countries surveyed, including the largest 5. In 2009, significant progress was seen in Poland and in Romania (which however remained with the lowest coverage levels in the EU) and, to a lesser extent, in Bulgaria, Slovakia, Greece, Ireland, Austria, Cyprus, Portugal and Spain.

* Comparisons are produced for the EU-25 + 2 since figures for Romania and Bulgaria were not collected for 2007

Figure 29: Rural DSL coverage
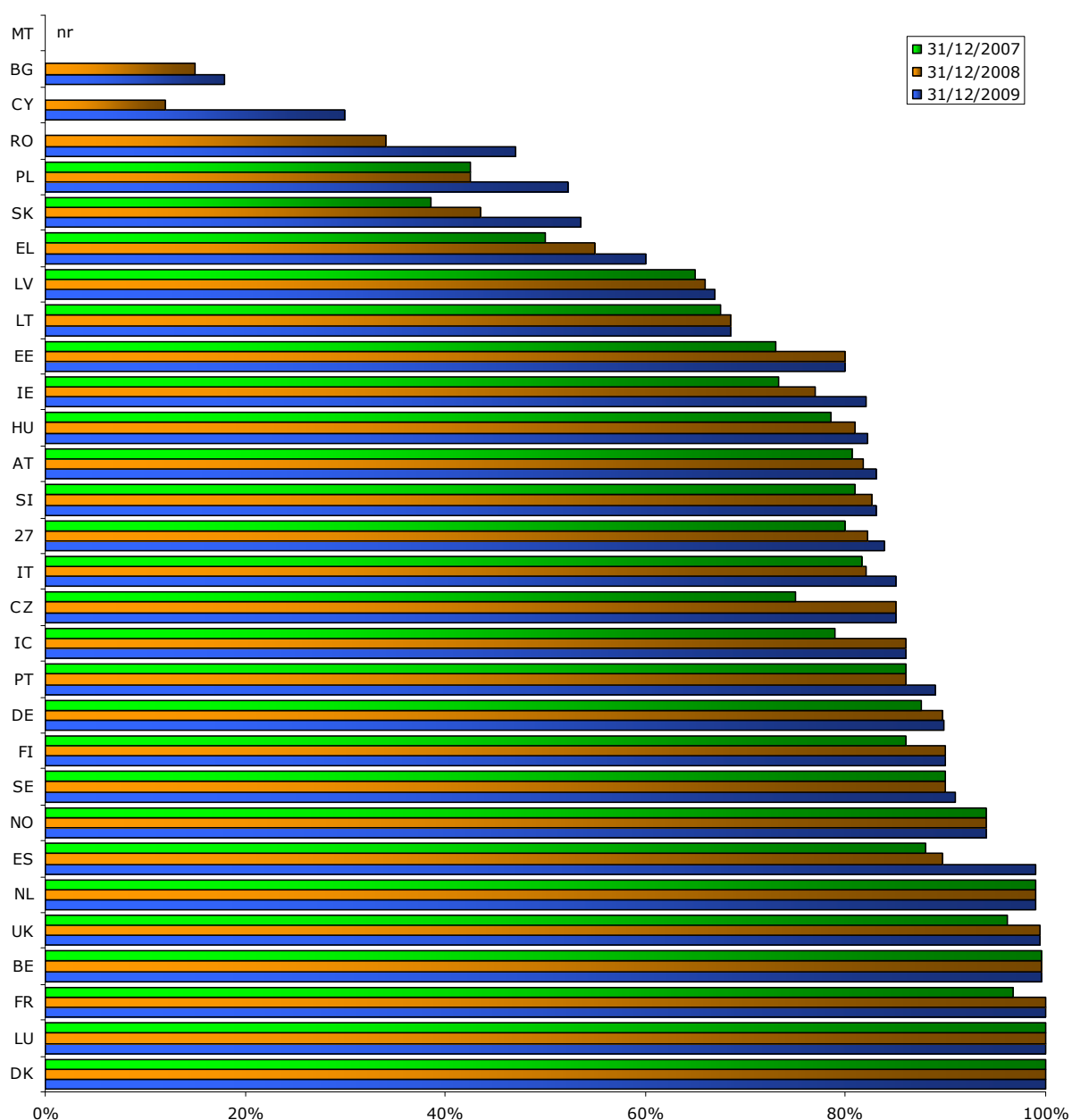
Average DSL coverage in rural areas was close to 84% (EU-25 + 2) at the end of 2009 but the gap with national coverage narrowed only slightly over the recent period, from 11.9% at the end of 2008 to 11.6% a year later. Coverage improved substantially in countries such as Romania, Poland and Slovakia: nevertheless, those countries still lag behind with coverage levels in rural areas just below or just above the 50%-mark. Significant progress was also achieved in Greece, Ireland, Portugal and Spain.

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

Figure 30: National cable modem coverage
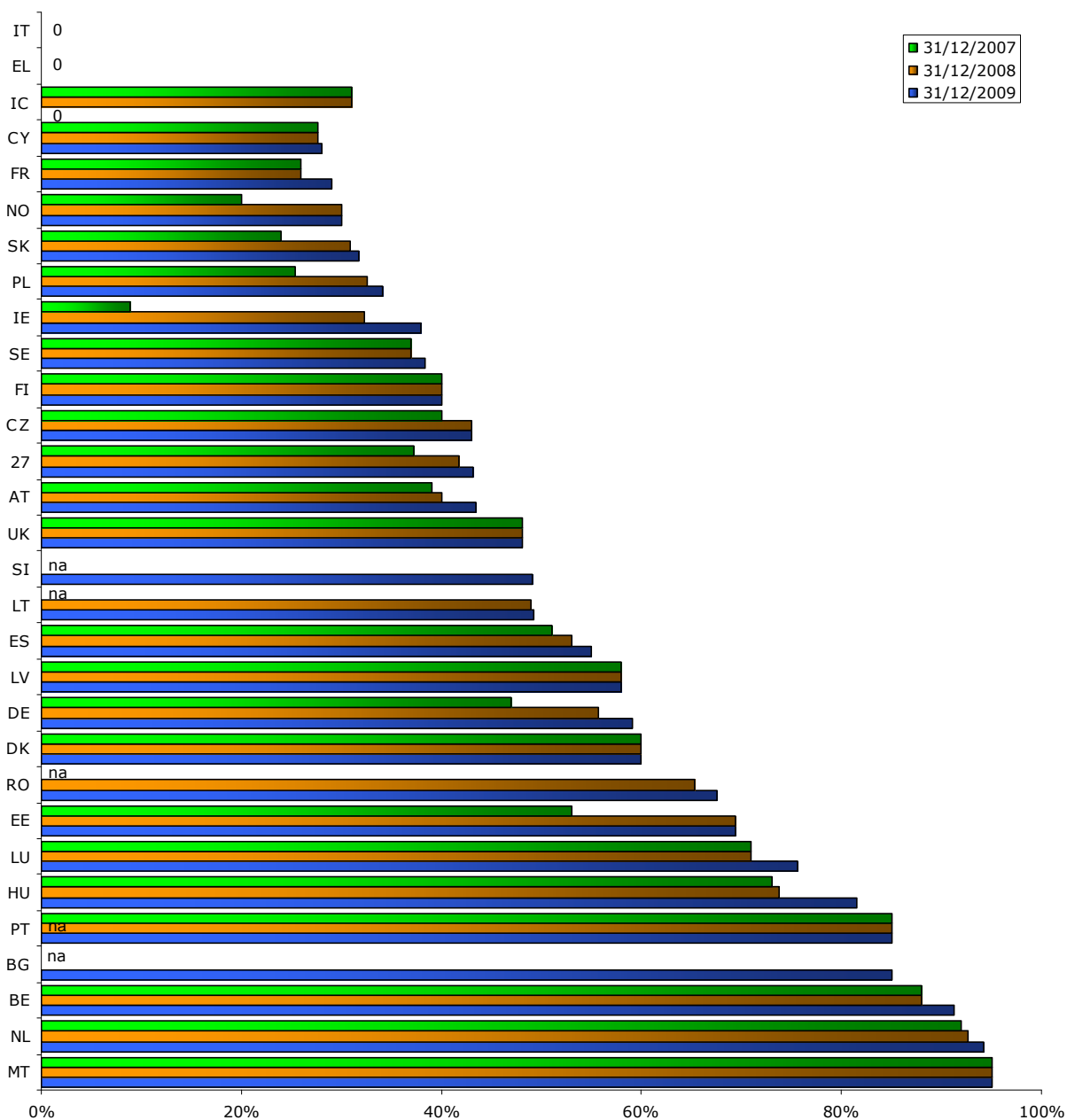
Average cable modem coverage in the EU-25 + 2 was just above 43% at the end of 2009, up from 37% at the end of 2007. The situation still differs widely from country to country: from Greece, Italy and Iceland where cable is not or no more available, to Belgium, the Netherlands or Malta where cable modem is now available to over 90% of the population.

Figure 31: Rural cable modem coverage
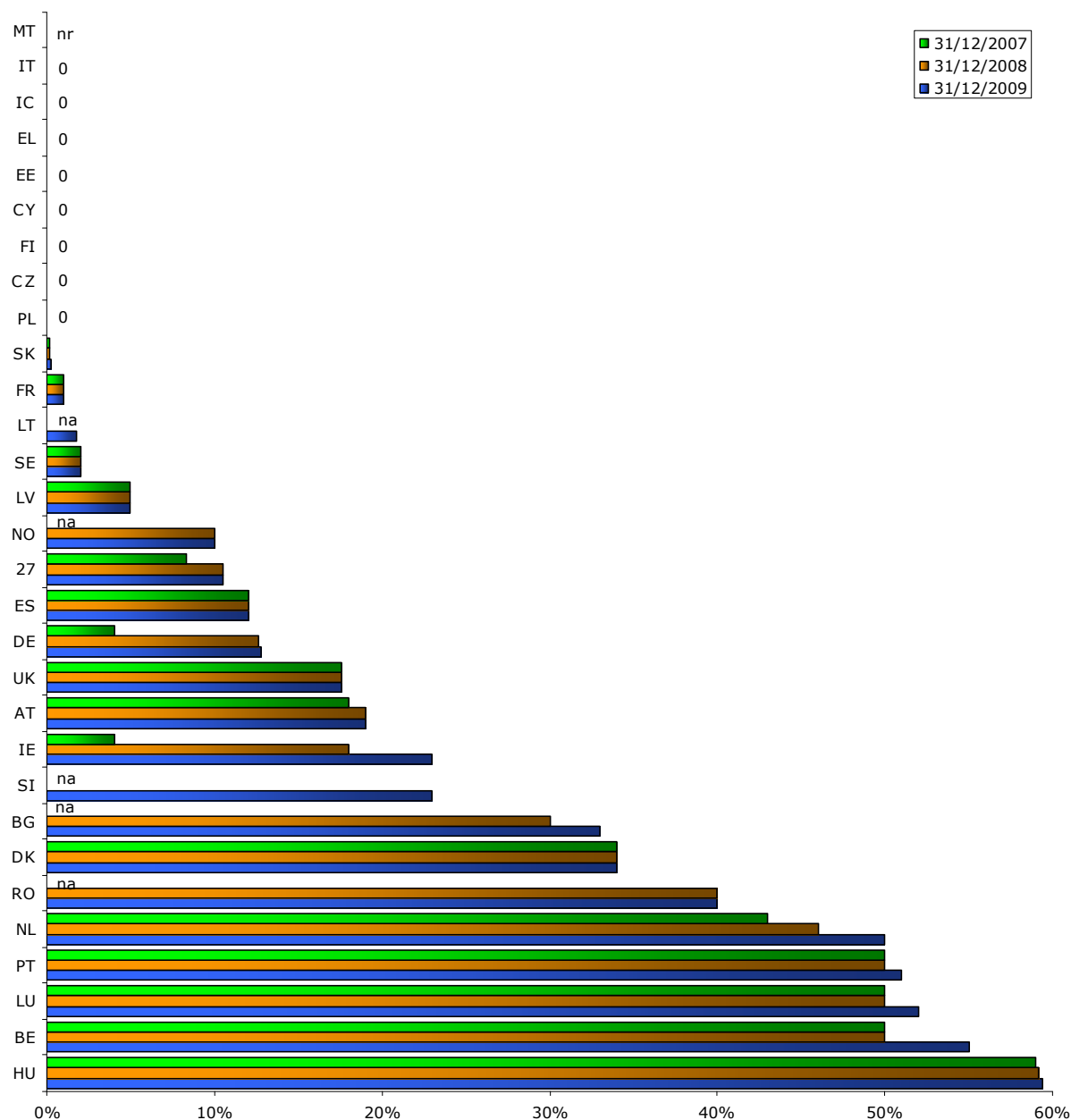
Average cable modem coverage in rural areas is still low compared to national coverage level: only 10.5% (EU-25 + 2) compared to 44.8% for national coverage. Progress was seen in Ireland, in the Netherlands and in Belgium but even in those countries, the difference with national coverage levels is significant.

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

3.2.2. Penetration

Figure 32: Broadband penetration by technology, 2007 and 2009
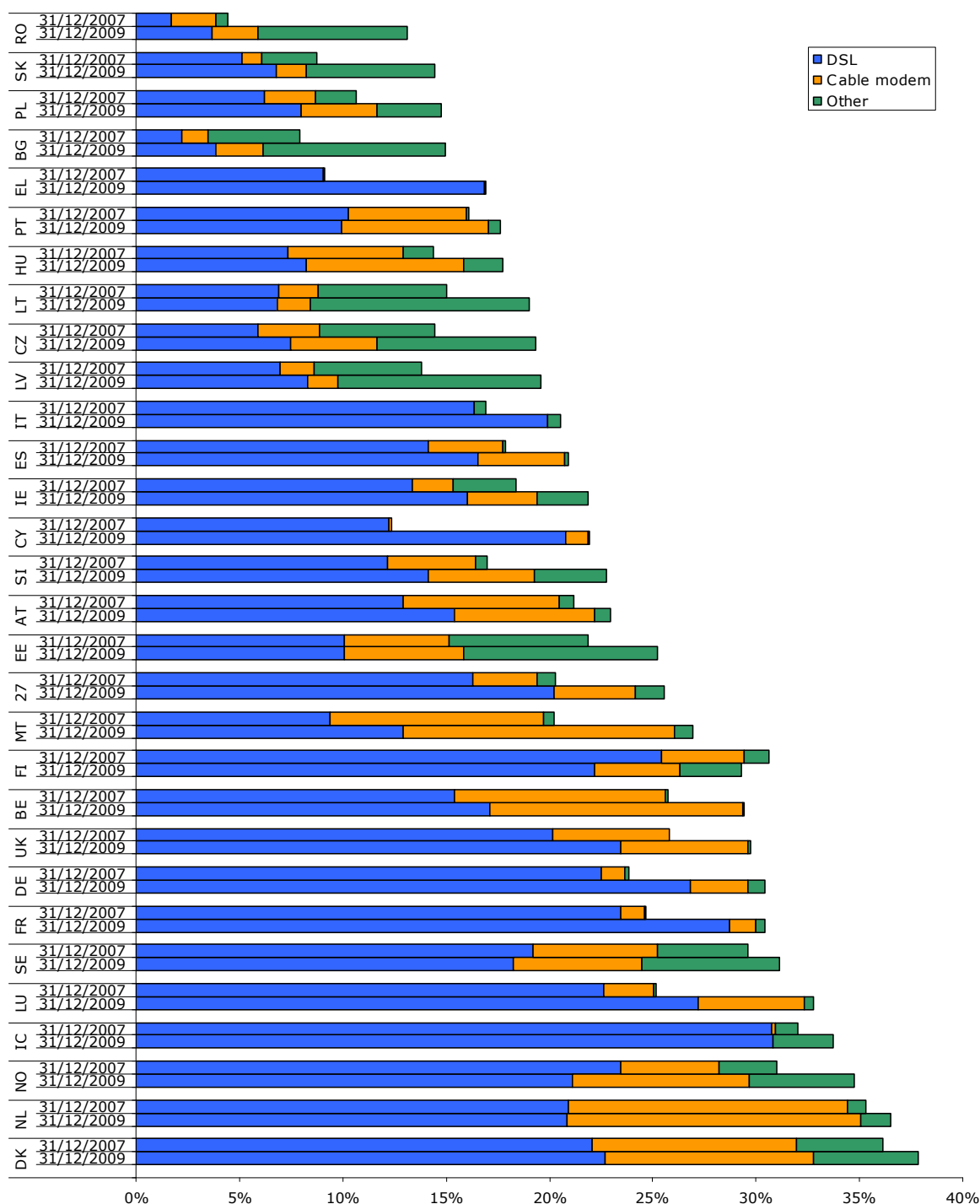
DSL is by far the dominant fixed broadband technology, accounting for just over 80% of broadband connections, on average, in the EU-25 + 2. It leads the way in all Western European countries, but varies in certain Eastern and Central European nations, such as Romania, the Czech Republic, Latvia and Lithuania, where local networks (LAN/RLAN) had been widely deployed to deliver broadband access at a time when ADSL was not available.

In Finland, fixed broadband penetration has been decreasing due to substitution towards mobile broadband

Figure 33: National broadband penetration, 2007 to 2009
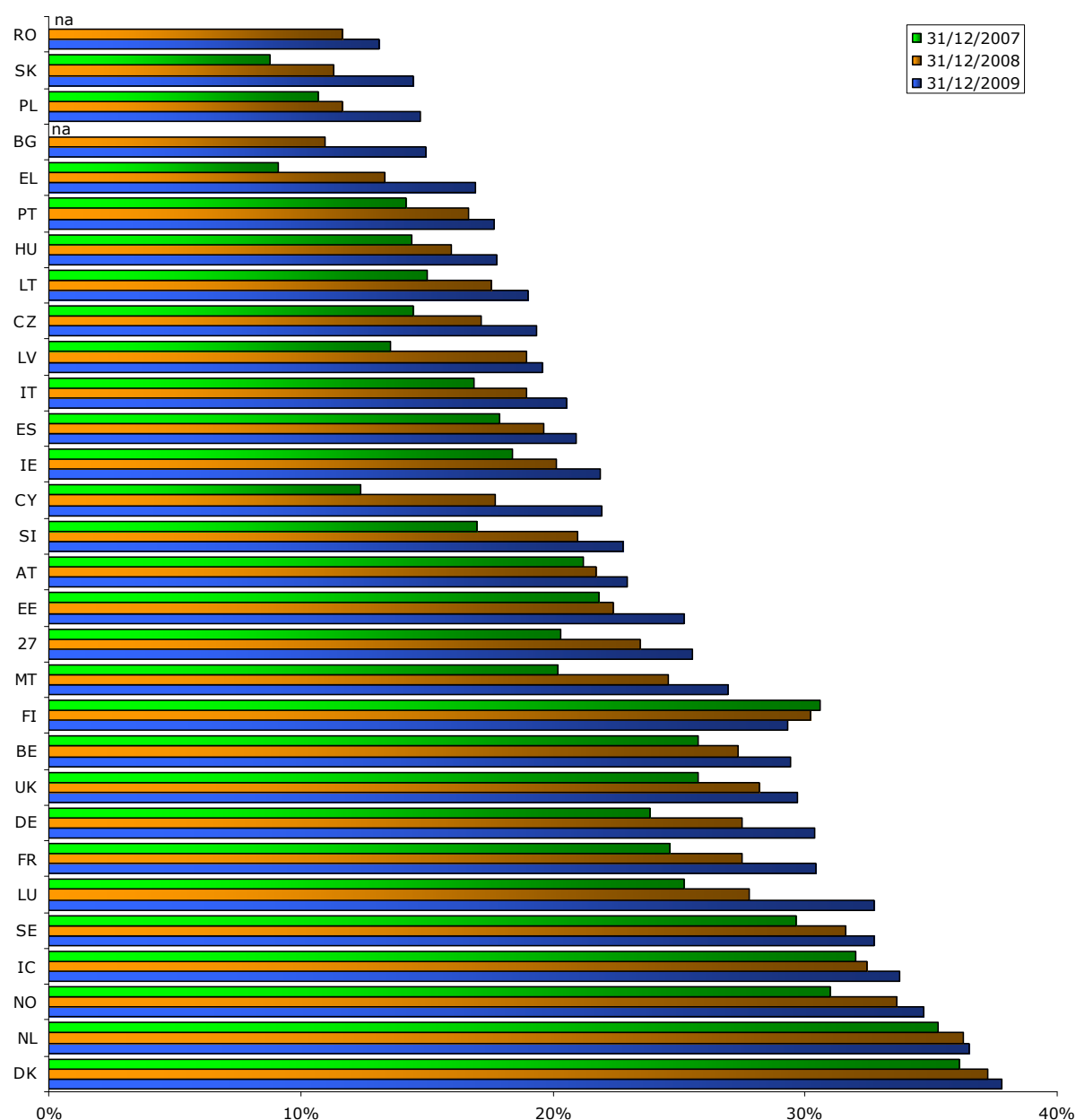
Denmark and the Netherlands rank number one overall in terms of broadband penetration, with a penetration rate over 36% for both at the end of 2009. Growth has been very strong over the last two years in countries such as Bulgaria, Slovakia, Romania, Greece and Cyprus although most of these countries remain with the lowest penetration rates in Europe..

Figure 34: Rural broadband penetration (DSL + cable modem), 2007 to 2009
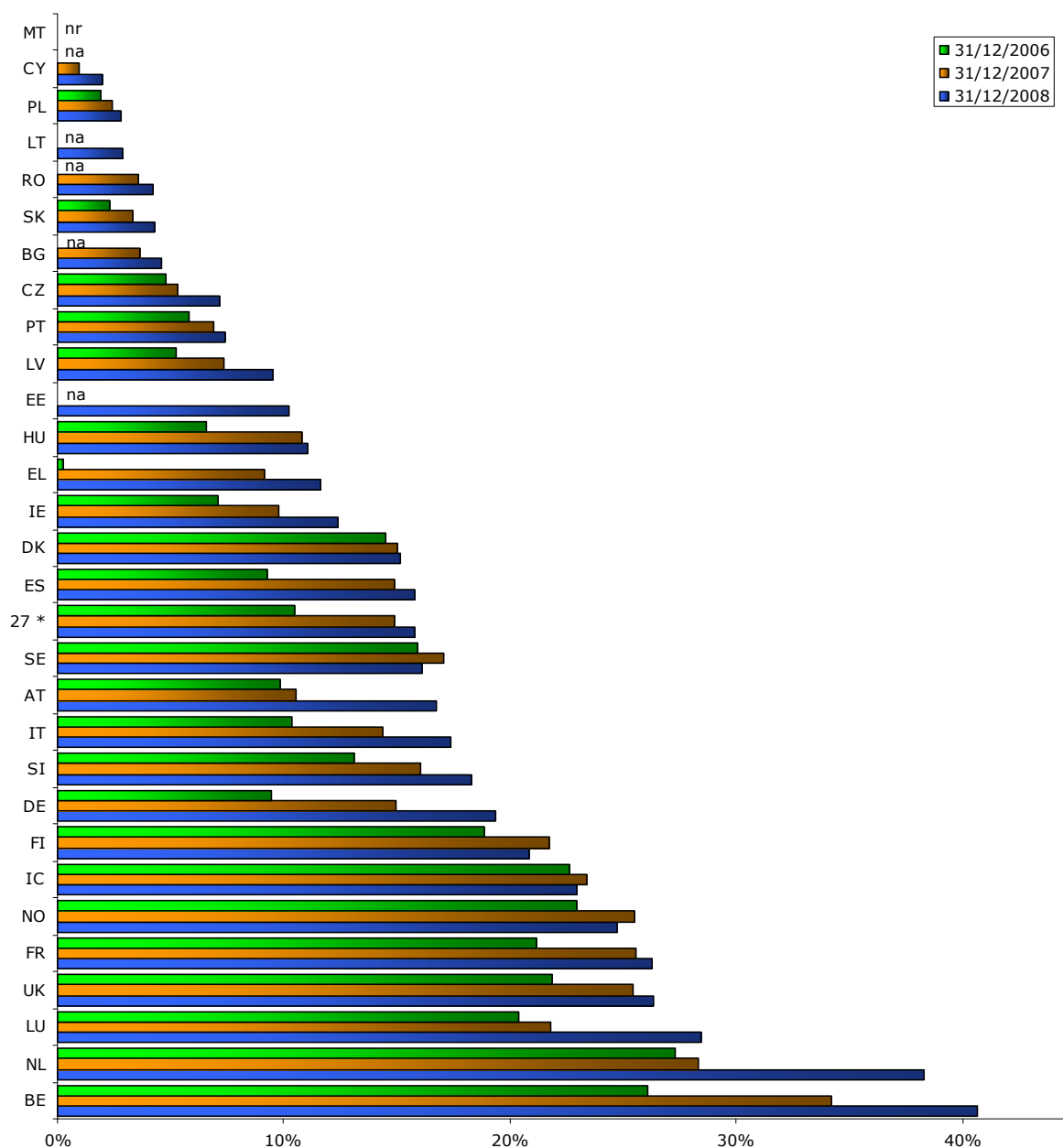
* Average calculation is weighted based on the rural population in the different countries

Fixed broadband penetration in rural areas is generally far lower than at the national level (just below 16% on average in rural areas, compared to more than 25% at the national level), due primarily to lower coverage rates in those areas (3G coverage is now higher in some countries).

3.2.3. Download rates

Figure 35: National DSL download rate segmentation (Dec. 2007-Dec. 2009)
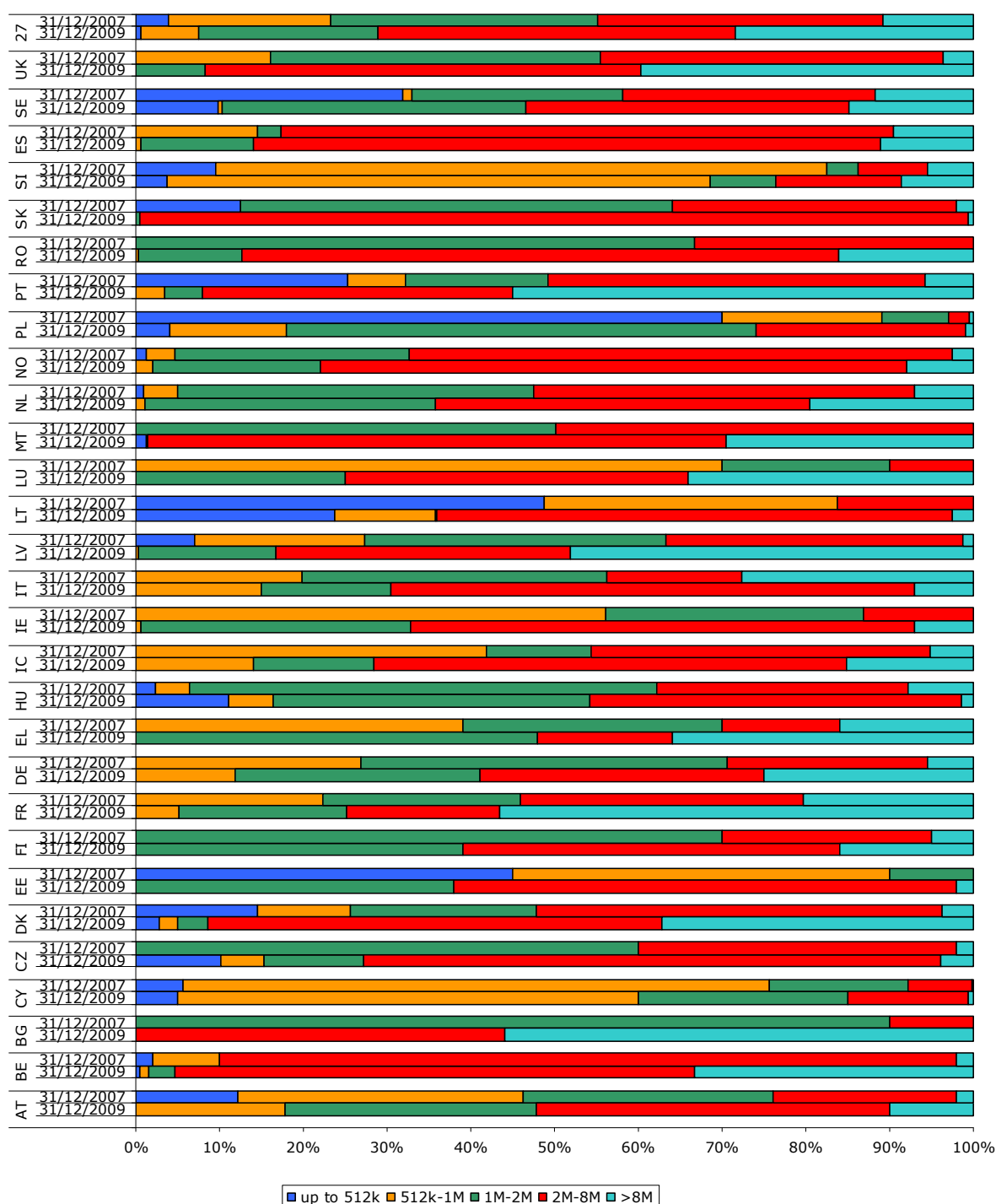
* calculated on the basis of countries for which detailed information is available

On average, the proportion of DSL customers subscribing to a service with a download speed of over 2 Mbps increased by 26 points between the end of 2007 and the end of 2009: going from 45% to 71%.

This trend can be observed, albeit to varying degrees, in all countries. Progress was very significant in Bulgaria (+90 percentage points to 100%), Slovakia (+64 points in the "over 2 Mbps" range, to 99.5%), Estonia (+62 points from 0% to 62%), Romania (+54 points to 87%) and Ireland (+54 points to 67%).

Figure 36: National DSL download rate segmentation (Dec. 2009)

Figure 37: Rural DSL download rate segmentation (Dec. 2007-Dec. 2009)

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

On average, the proportion of DSL subscribers in rural areas with download speeds over 2 Mbps increased by more than 16 points between the end of 2007 and the end of 2009, from less than 42% to just over 58%.

Progress has been especially strong in Slovakia (+82 percentage points, to 98% in the "over 2 Mbps" range at the end of 2009), Latvia (+ 64 percentage points from 0% at the end of 2007), Lithuania (+56 points to 61%) and Ireland (+51 points to nearly 60%).

Figure 38: Rural DSL download rate segmentation (Dec. 2009)

Legend: ■ up to 512k ■ 512k-1M ■ 1M-2M ■ 2M-8M ■ >8M
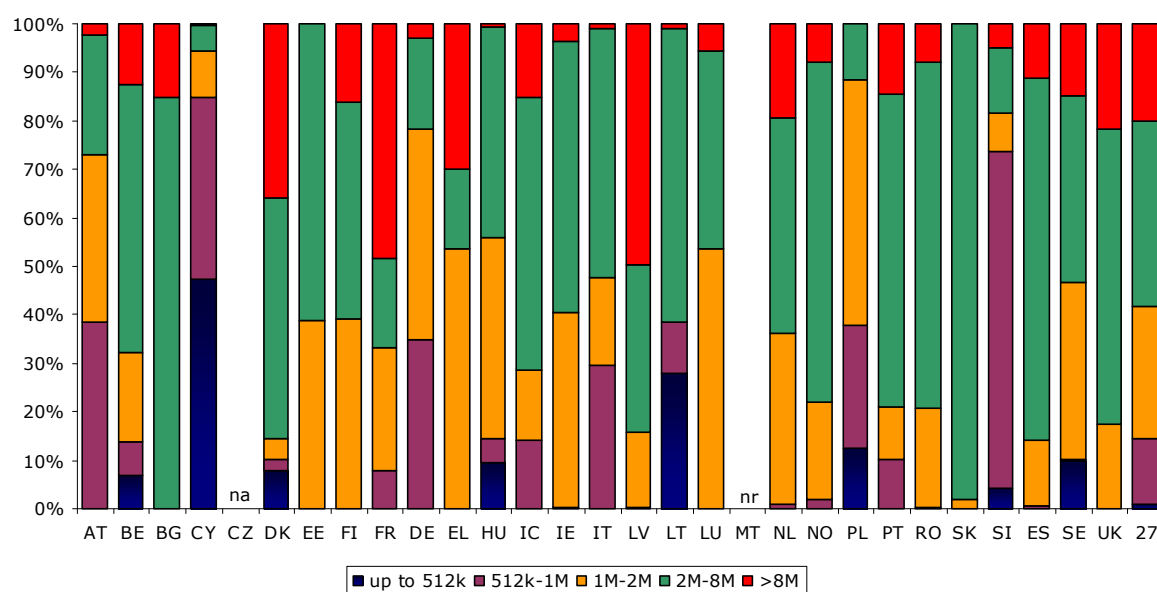
Figure 39: National cable modem download rate segmentation (Dec. 2007-Dec. 2009)
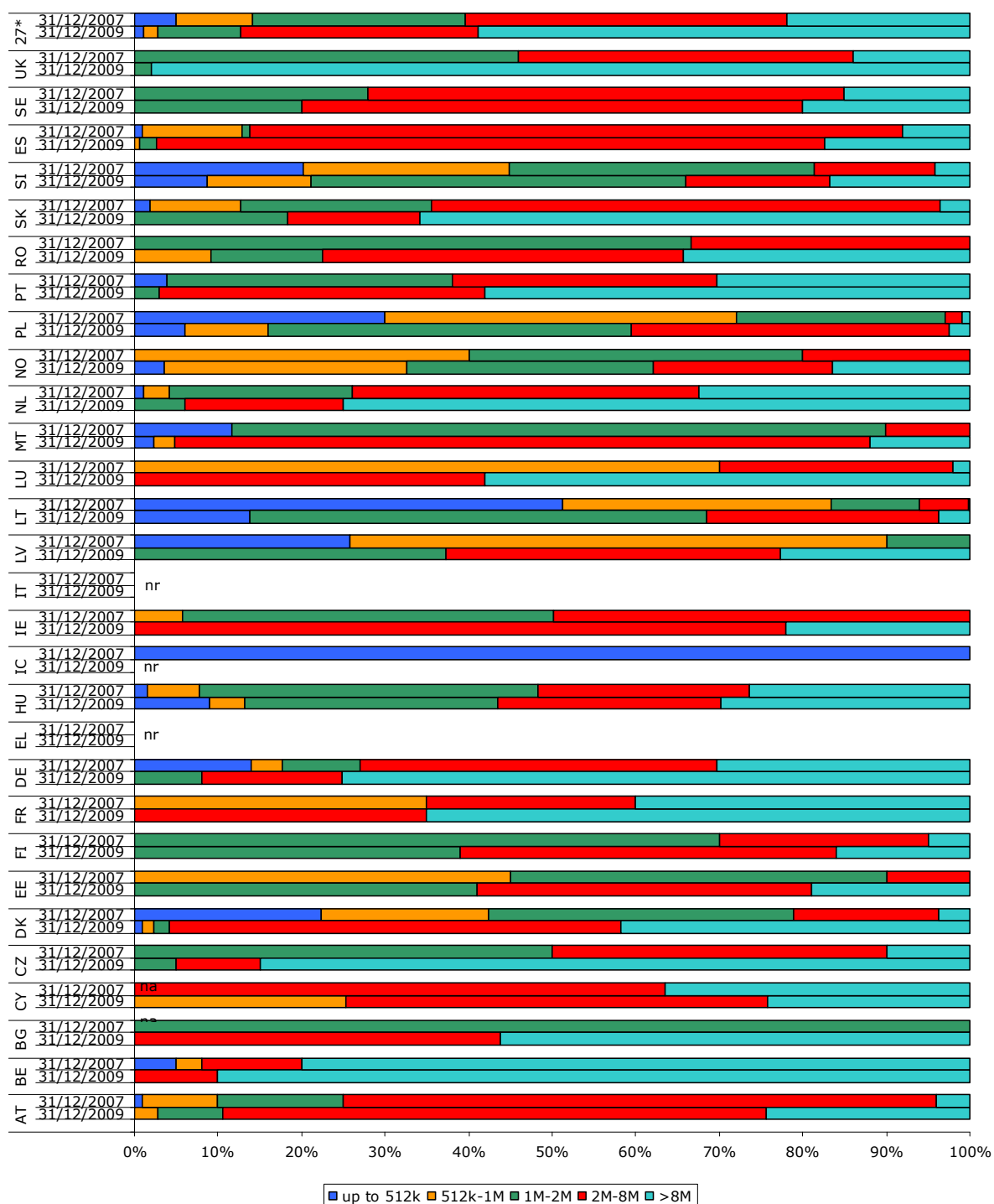
*up to 512k   *512k-1M   *1M-2M   *2M-8M   *>8M*

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

On average, the proportion of cable modem subscribers with download speeds over 2 Mbps increased by 27 percentage points between the end of 2007 and the end of 2009: from 60% to 87%.

Very strong growth occurred during that time in Bulgaria (all cable connections were with download speeds up to 2 Mbps at the end of 2007, all are with download speeds over 2 Mbps at the end of 2009), Denmark (+75 percentage points for connections with download speeds over 2 Mbps, to 96%), Ireland (+50 points to 100%).

Figure 40: National cable modem download rate segmentation (Dec. 2009)
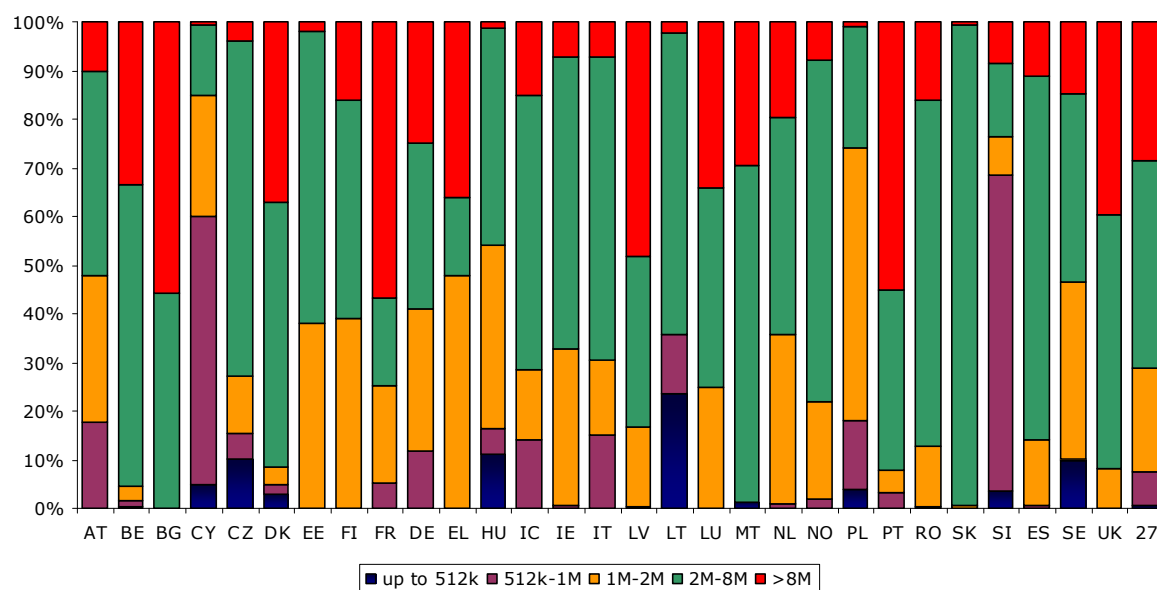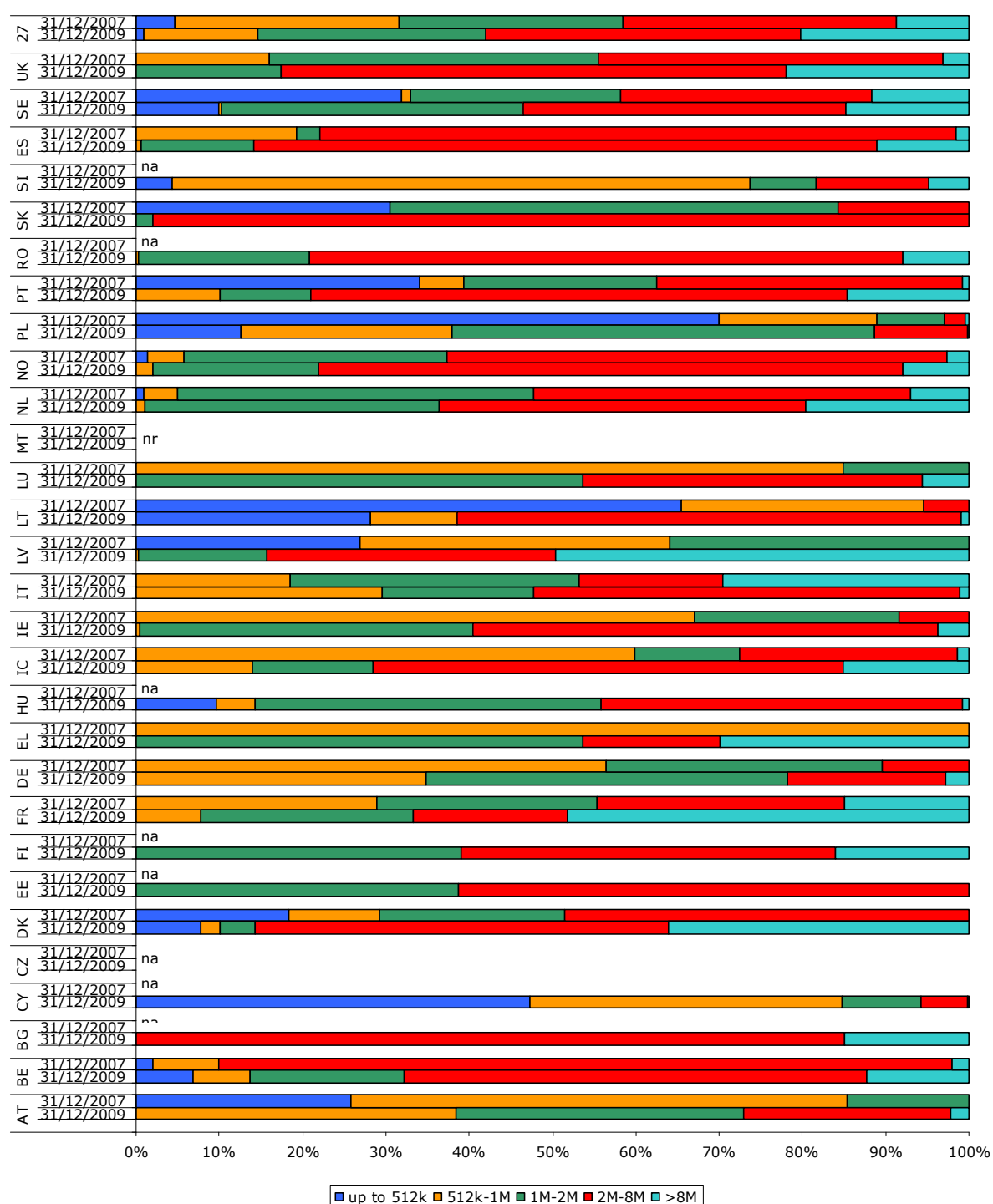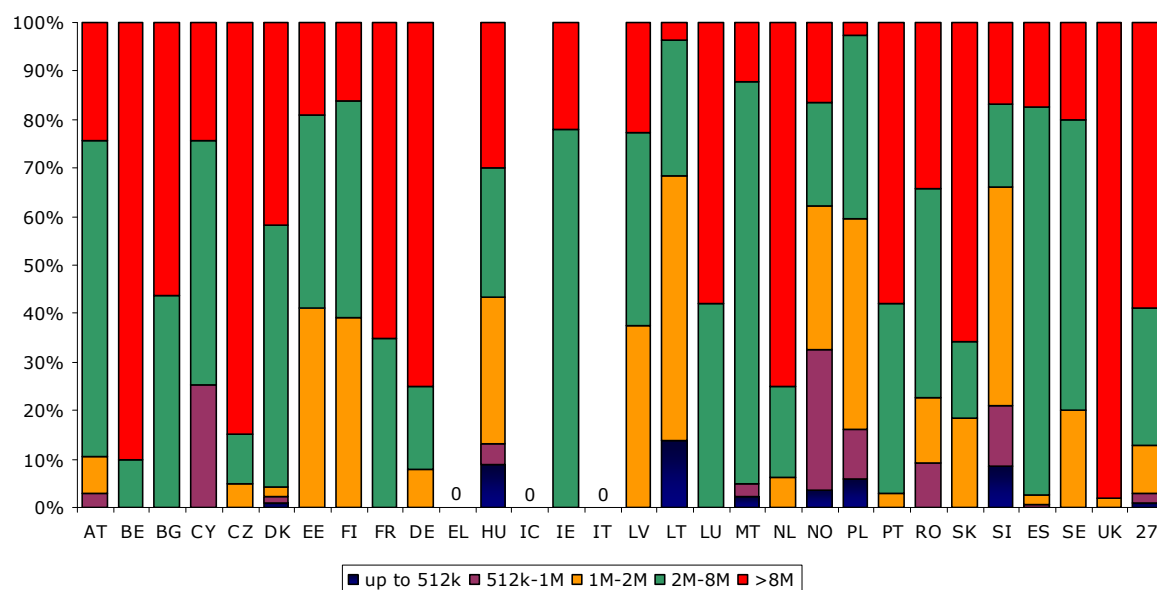
Figure 41: Cable modem download rate segmentation for rural areas (Dec. 2007-Dec. 2009)
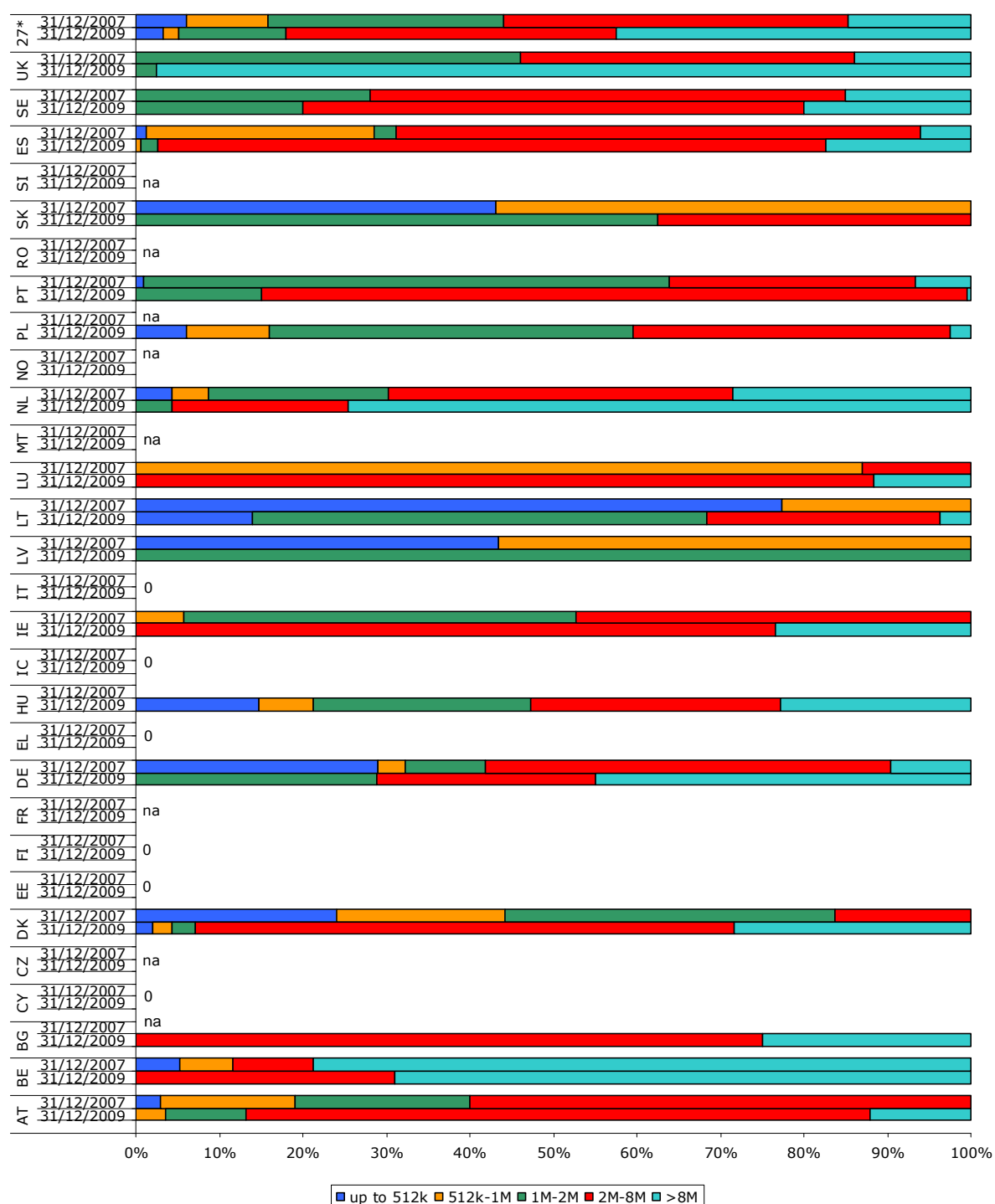
* calculated on the basis of countries for which detailed information is available

On average, the proportion of cable modem subscribers in rural areas with download speeds over 2 Mbps increased by 26 percentage points between the end of 2007 and the end of 2009: from 56% to 82%, which is far higher than with DSL.

Very significant progress was made in Denmark (+77 percentage points in the "over 2 Mbps" range, to 93%), Ireland (+53 points to 100%), in Portugal (+49 points to 85%).

Figure 42: Cable modem download rate segmentation for rural areas (Dec. 2009)
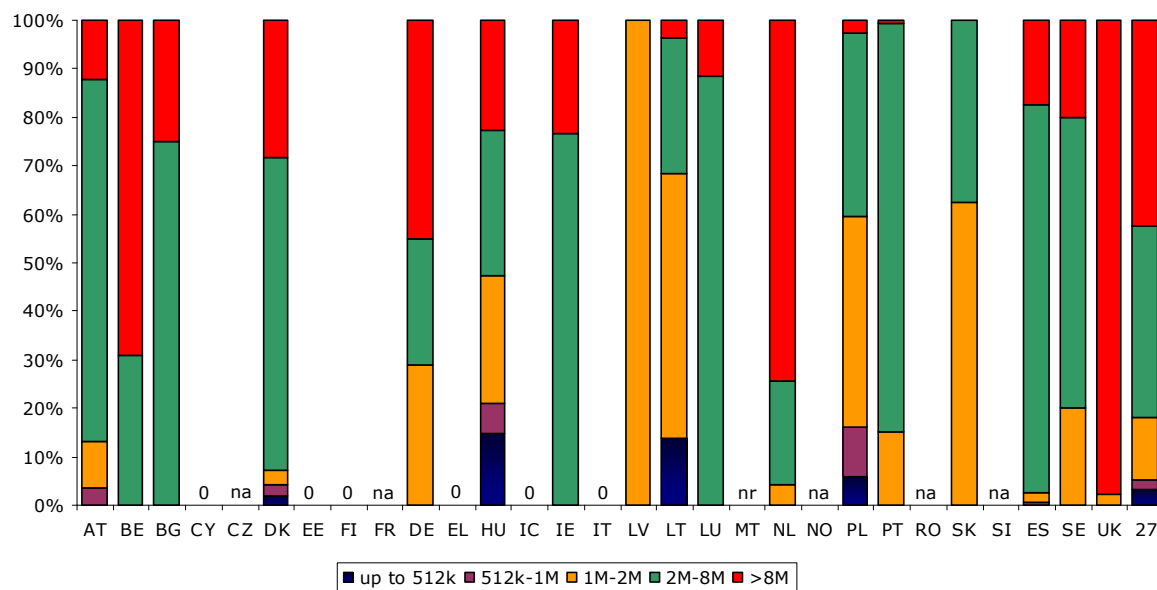
3.2.4. Origin of DSL connections

Figure 43: National DSL market share (31 Dec. 2007-31 Dec. 2009)
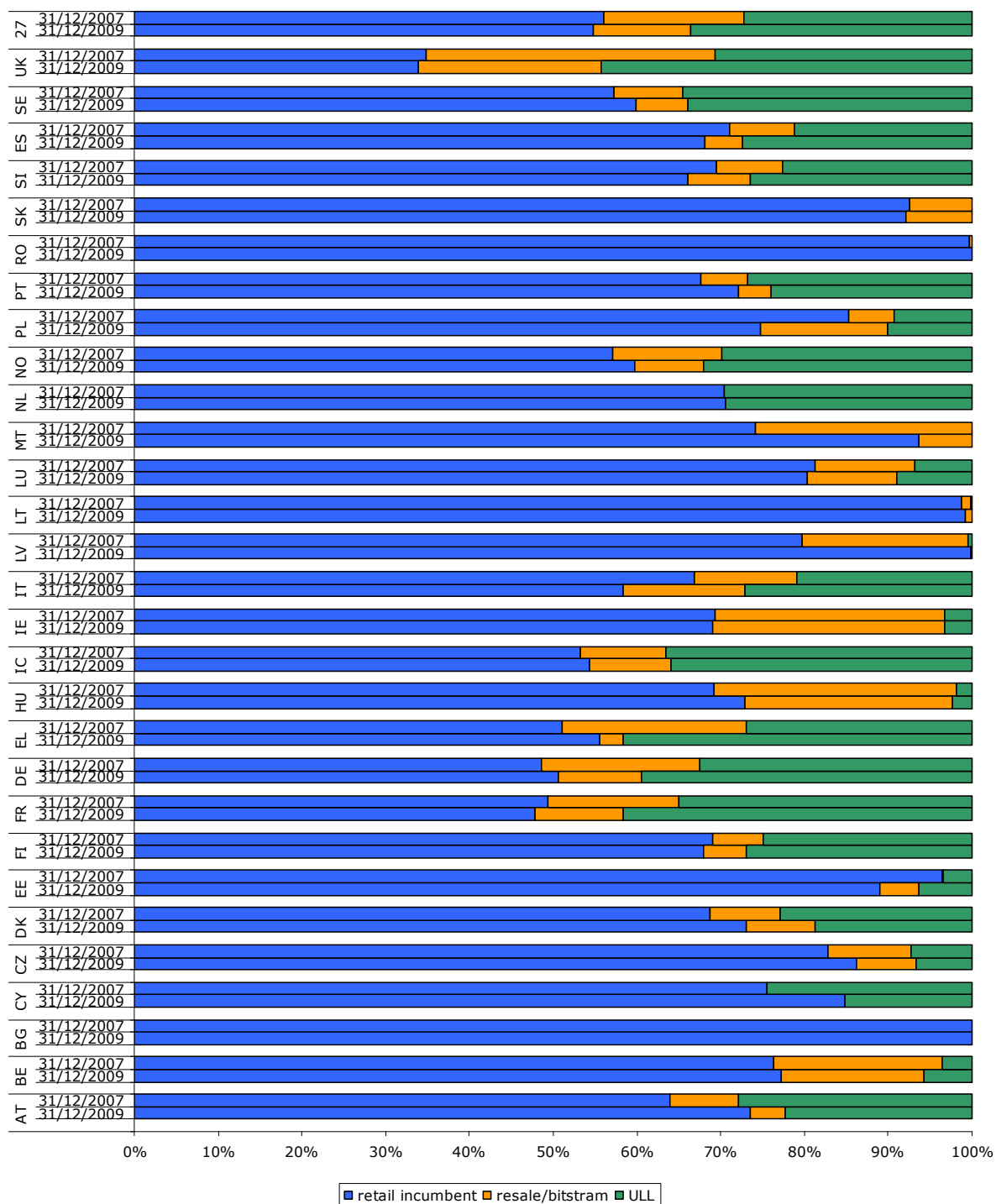
Overall, the percentage of retail DSL lines supplied by incumbent carriers has decreased slightly over the past two years in the EU-25 + 2: from 56.0% to 54.5%. Over a 4-year period (2005-2009), the drop is close to 6 percentage points (from 60.4% at the end of 2005).

The share of LLU (local loop unbundling) increased by more than 6 points between 2007 and 2009 to close to 34% while connections through resale/bitstream offers accounted for less than 12% at the end of 2009 (compared to just below 17% et the end of 2007).

Figure 44: National DSL market share as of 31 December 2009
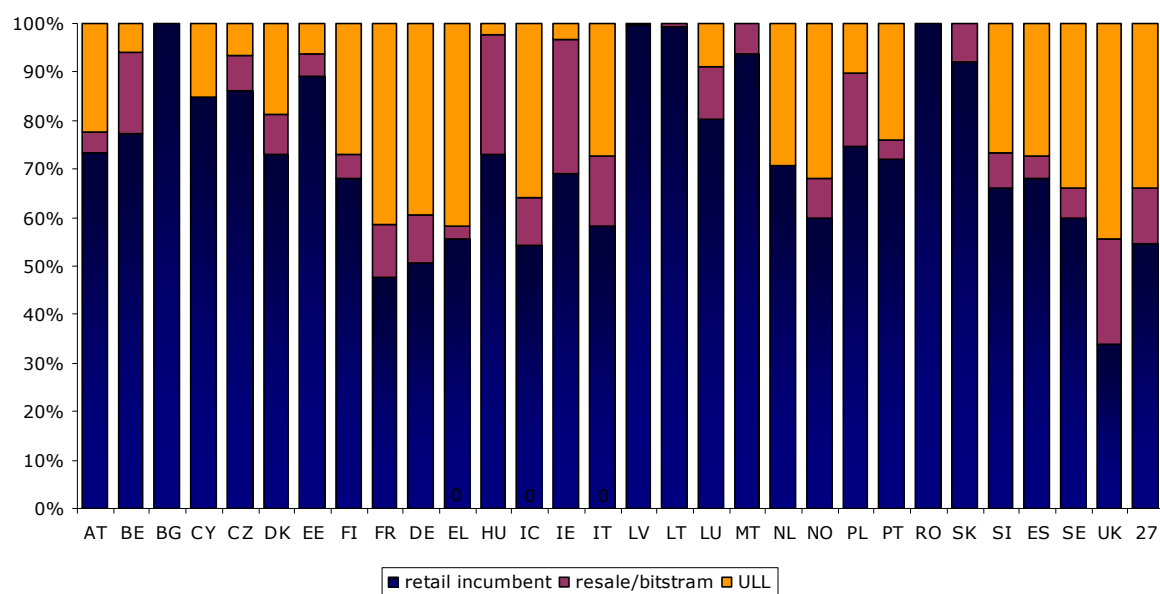
Figure 45: Incumbent carriers' national DSL market share
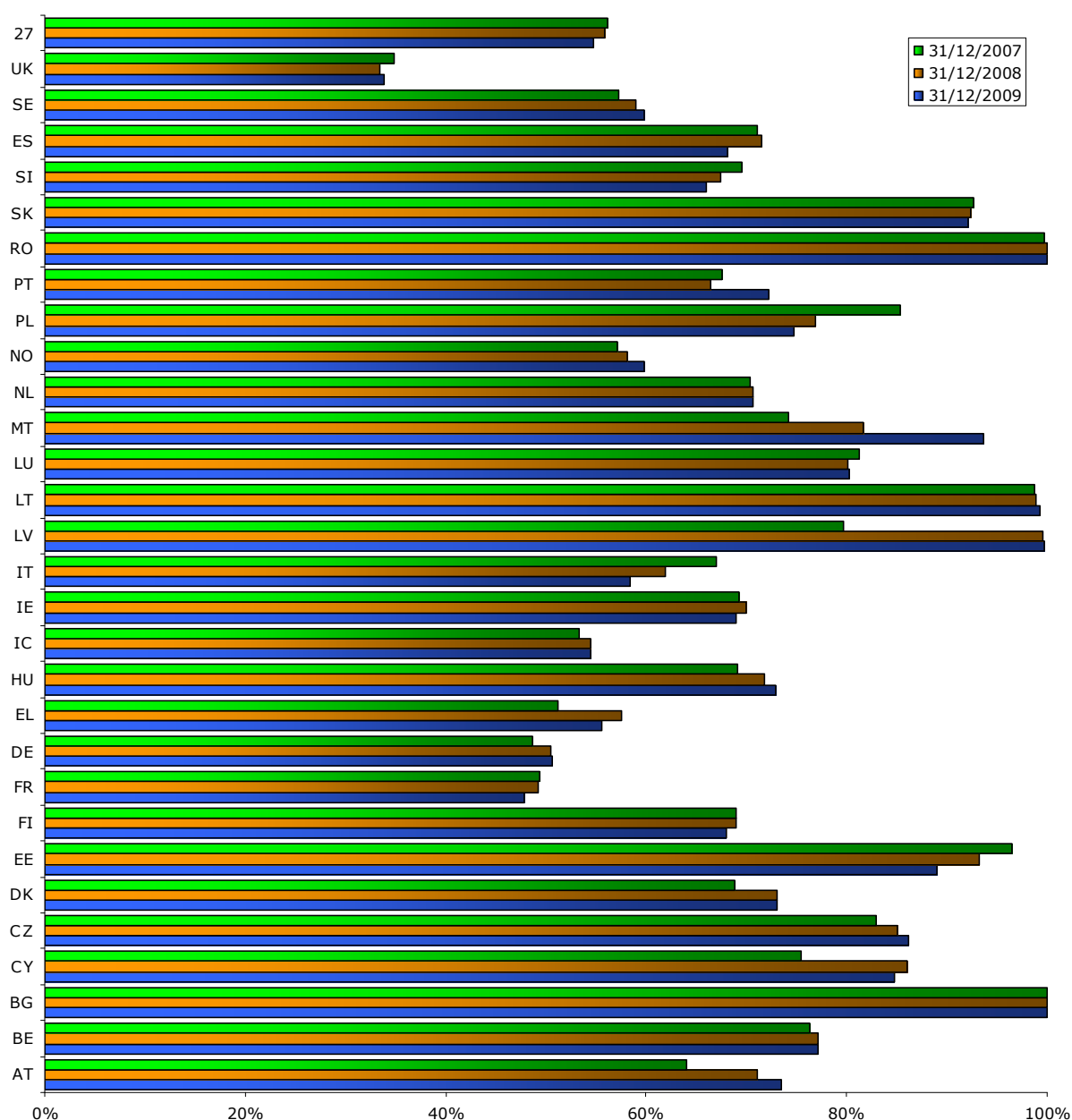
In some countries, the incumbent carrier gained back market share in the recent period: in Austria (from 64% to 73.5% within two years), in the Czech Republic (from 82.9% to 86.2%), in Denmark (from 68.8% to 73%), in Germany (from 48.6% to 50.6%), in Hungary (from 69.2% to 73%), in Malta (from 74.2% to 93.6%), in Norway (from 57.1% to 59.7%), in Sweden (from 57.3% to 59.8%), in Portugal (from 66% at end of 2008 to 72.2% at the end of 2009) and, to a lesser extent, in the UK.

4. Country profiles

4.1. Austria

4.1.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	3,342,104	2,339,473	2,673,63	8,355,260
Share of total population	40.0%	28.0%	32.0%	100.0%

4.1.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	86%	91%	92%	92%	94%
DSL subscribers	684,600	874,000	1,040,000	1,149,800	1,289,200
DSL penetration (% population)	8.3%	10.6%	12.9%	13.8%	15.4%
Cable modem coverage (% population)	31%	36%	39%	40%	43%
Cable modem subscribers	471,681	565,000	605,000	610,000	562,000
Cable modem penetration (% population)	5.7%	6.8%	7.5%	7.3%[1]	6.7%[1]
FTTx subscribers	2,200	3,000	5,000	5,900	26,800
PLC subscribers	5,000	5,300	5,800	4,800	4,500
WLL subscribers	14,900	20,100	45,000	37,100	34,100
Satellite subscribers	3,000	3,000	1,000	1,000	800
Total	1,181,381	1,470,400	1,701,800	1,808,600	1,917,400
Total fixed broadband penetration (% population)	14.7%	17.8%	21.2%	21.7%	22.9%
Mobile broadband subscribers				969,500	1,252,000
Mobile broadband penetration (% population)				11.6%	15.0%

[1] population base revised in 2008

Austria's fixed broadband subscriber base grew from 1.8 millions in 2008 to more than 1.9 millions in 2009, reaching an overall fixed broadband penetration of 22.9%. The increase is mainly due to a strong uptake of DSL subscribers and a slowly emerging VDSL and fibre access market, whereas the cable subscriber base decreased slightly. Consequently, DSL remains the leading technology with a 67% share of all fixed broadband connections. Mobile broadband continues its growth story and almost reached the same subscription level as DSL in 2009. Other broadband technologies remain insignificant within the Austrian broadband market, except for WLL with a subscriber base of 34,100 in 2009 (down from 37,100 in 2008).

4.1.3. DSL coverage and take-up

Coverage and penetration
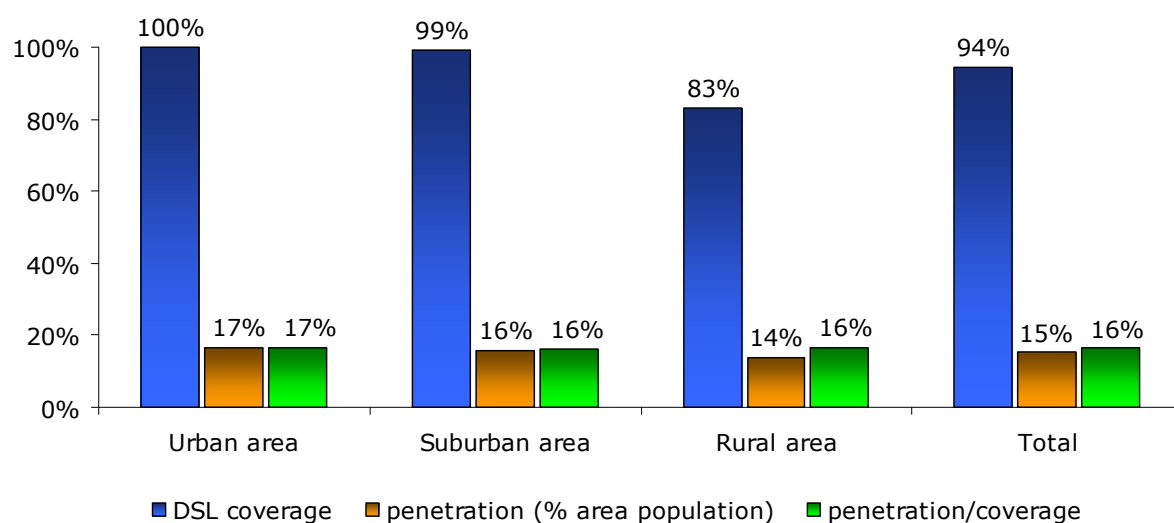
DSL has nearly reached full coverage within urban and suburban areas but there are still some uncovered areas in rural regions (approximately 32% of the Austrian population live in rural areas). In terms of subscriptions, DSL penetration increased from 13.8% in 2008 to 15.4% in 2009.

Number of DSL connections by download rate
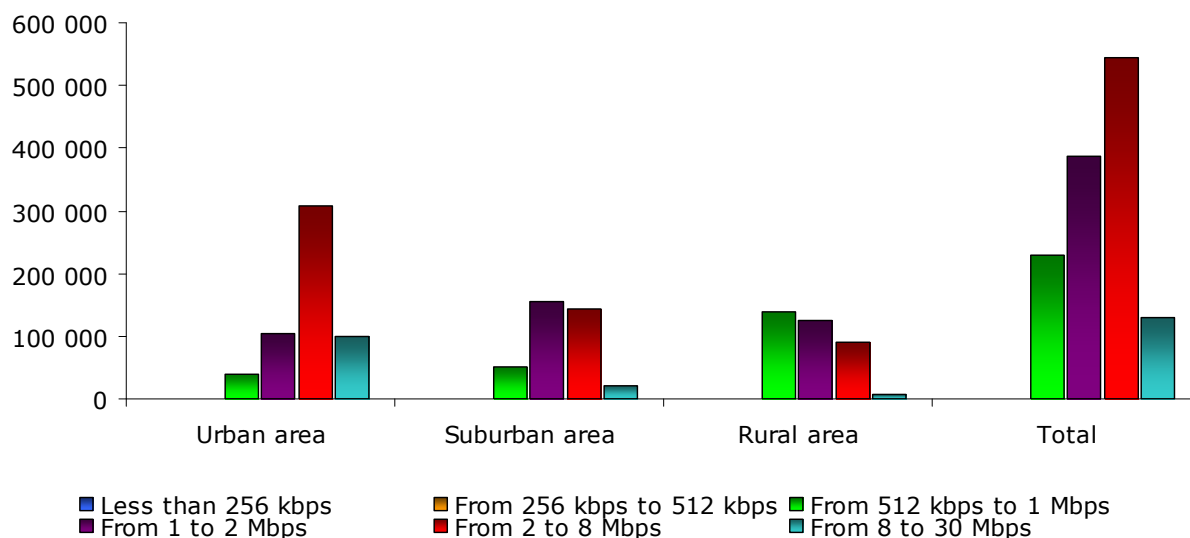
DSL connections of less than 1 Mbps have declined but still account for roughly one fifth of all DSL subscribers. As more service providers offer faster speeds at the same or even lower prices, Austrians increasingly migrate to faster speeds by updating their connections. Thus, bandwidths of more than 2 Mbps now account for more than 50% of all broadband connections.

Percentage of DSL connections by type of provider
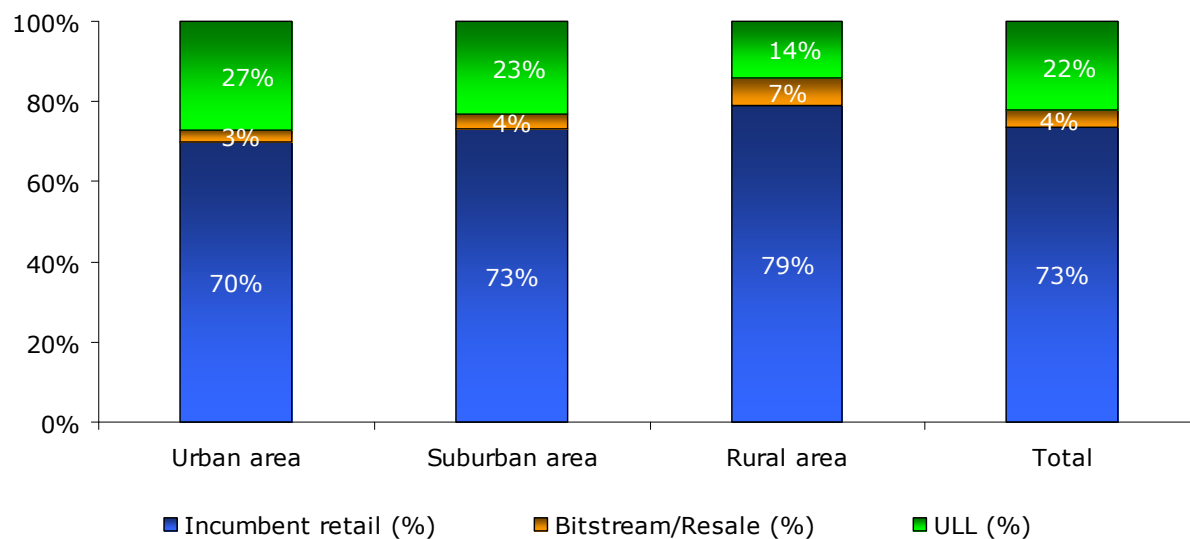
Telekom Austria, Austria's incumbent telecommunications provider, regained market share, now accounting for 73.5% of all DSL lines. The bitstream/resale share decreased to 4.3% (from 5.8% in 2008). ULL connections also decreased and now account for 22.2% of DSL subscribers.

4.1.4. Cable modem coverage and take-up

Coverage and penetration

coverage ■ penetration (% area population) ■ penetration/coverage
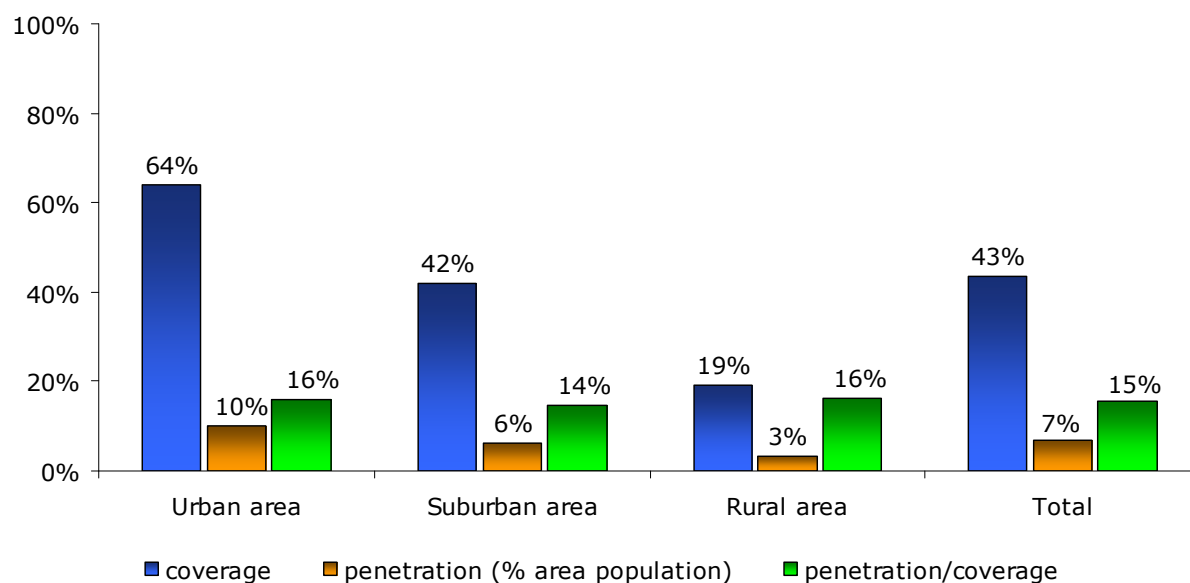
The slowdown of cable modem sales led to a declining cable subscriber base in 2009. The main reason for this is the strong competition with DSL. Total cable coverage is at 43% with coverage of 64%, 42% and 19% for urban, suburban and rural areas, respectively. Only 6.7% of the Austrian population access the internet via broadband cable, with UPC Austria being the leading cable operator.

Number of cable modem connections by download rate

■ Less than 256 kbps   ■ From 256 kbps to 512 kbps ■ From 512 kbps to 1 Mbps
■ From 1 to 2 Mbps   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps
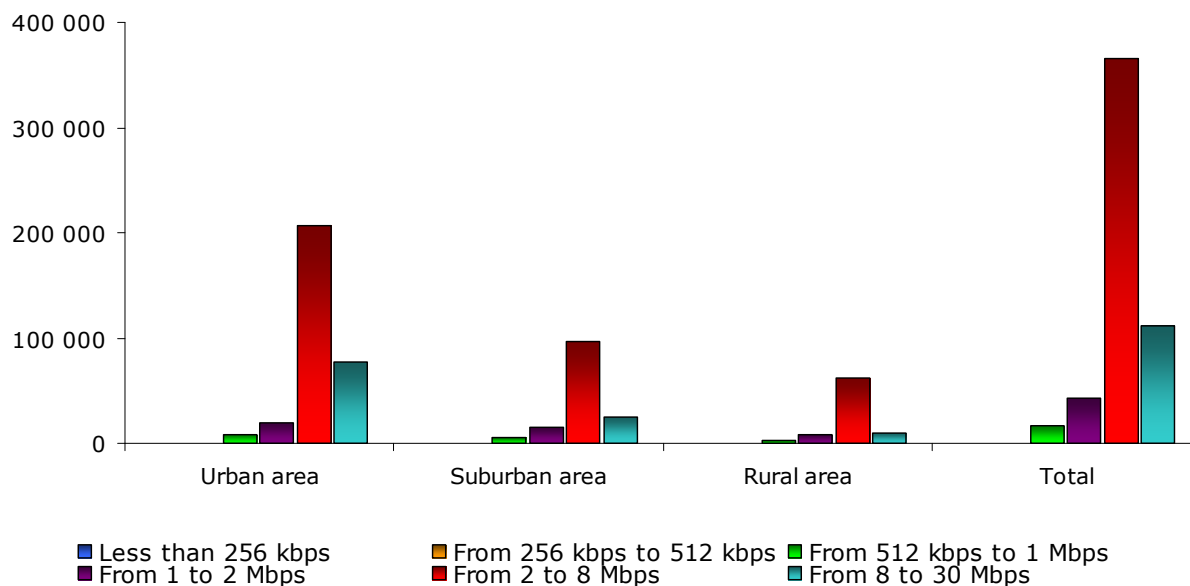
In Austria, broadband via cable offers significantly higher bandwidths than DSL. About 90% of all cable subscribers access with speeds over 2 Mbps.

4.1.5. FTTx coverage and take-up

Coverage and penetration

■ coverage   ■ penetration (% area population)   ■ penetration/coverage
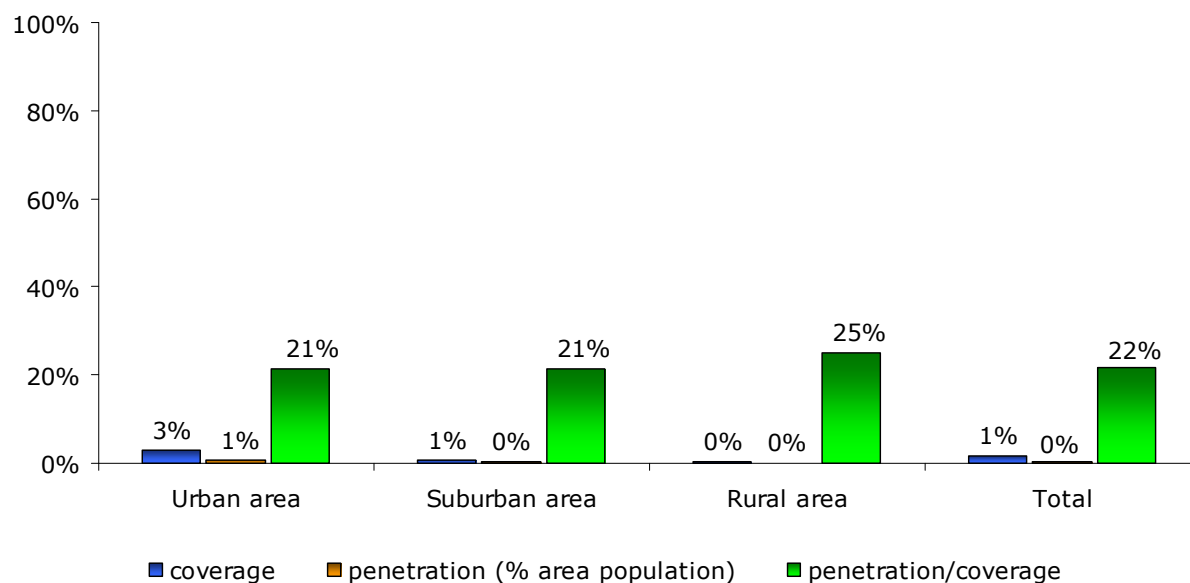
Fibre coverage is still fairly low in Austria but gradually gains market shares. As incumbent Telekom Austria has extended its FTTH network in urban areas and even started a VDSL roll-out in rural areas in late 2009, higher growth rates can be expected in 2010.

FTTx connections by download rate

■ Less than 2 Mbps   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps   ■ More than 30 Mbps
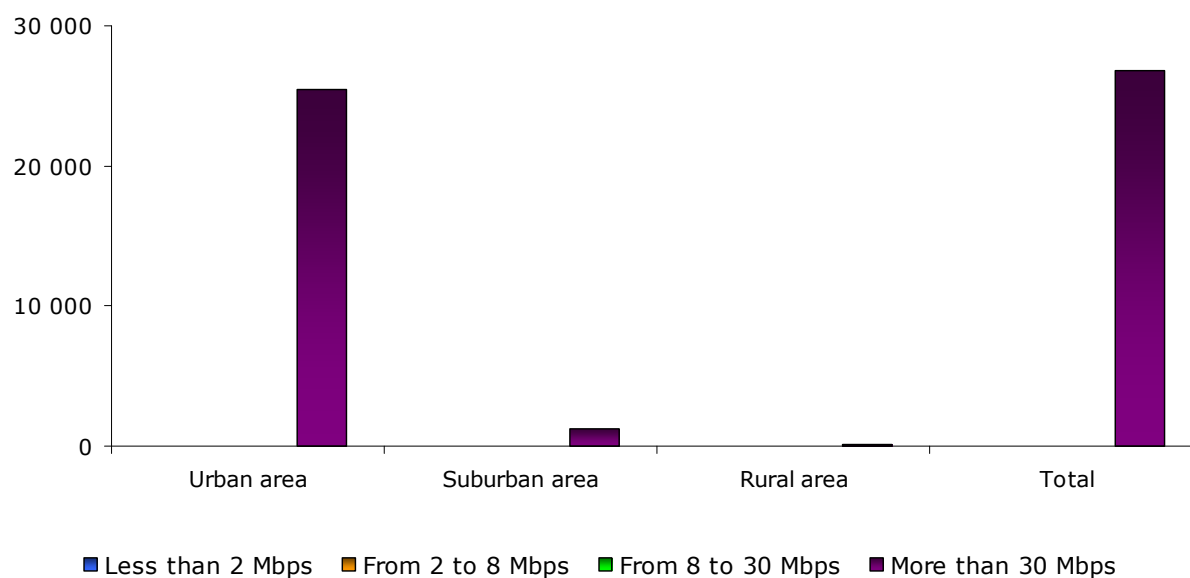
At the end of 2009, 26,800 Austrians used an FTTx broadband connection, with speed over 30 Mbps.

4.1.6. Other fixed broadband access technologies

PLC

The solely remaining provider of PowerLine Communication services in Austria is Linz AG, a regional electricity supplier serving the Linz region. Other operators ceased marketing their PLC services. The subscriber base is slowly dying off with 4,500 at the end of 2009 (from 4,800 in 2008).

WLL/WiMAX

The number of fixed wireless connections declined to 34,100 subscribers in 2009 (from 37,100 in 2008). According to Telekom Austria, further investments in WiMAX have been stopped as UMTS and HSDPA are considered more viable subjects for further investments.

Satellite

Internet via satellite is offered by several players of which SES Astra is the largest provider in Austria. The total number of satellite subscribers stagnates at around 1,000.

4.1.7. Mobile broadband coverage and take-up

Coverage by technology
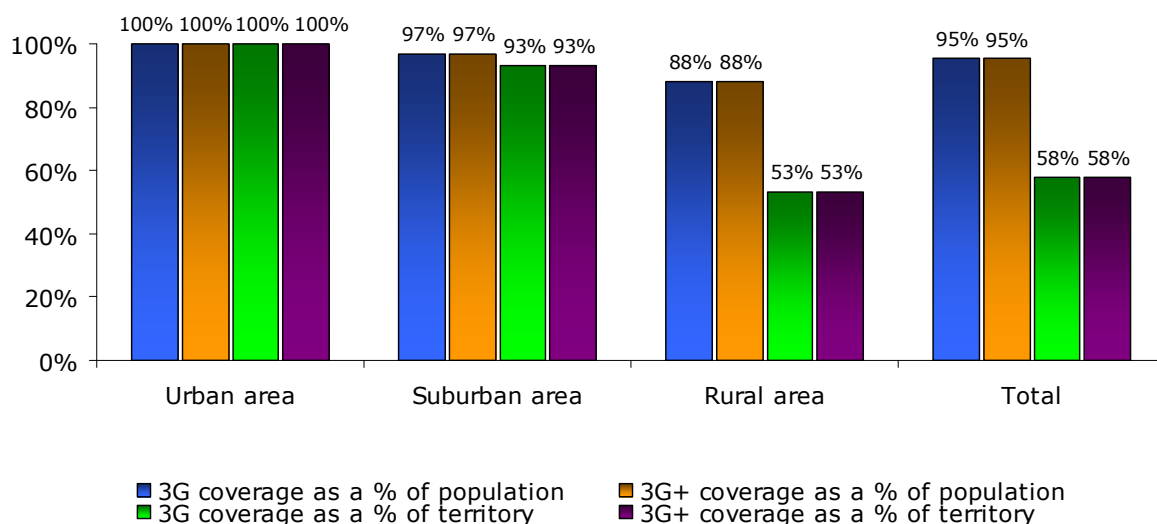
The uptake of mobile broadband subscribers has not slowed down yet: three quarters of new broadband subscriptions are mobile. According to the Austrian National Regulatory Authority (RTR), users having at least 250MB/month data volume included have increased to 1.25 millions in 2009 from around 970,000 in 2008.

Technological developments have moved on into 3.5G (HSPA+) coverage, enabling speeds of up to 21 Mbps. The initial roll-out was first realised by Austrian MNO Mobilkom in March 2009. Mobile broadband has subsequently reached almost the same subscriber level as DSL. Furthermore, 95% of the population and 58% of the Austrian territory is covered with a 3G+ network fully upgraded to HSDPA.

Penetration
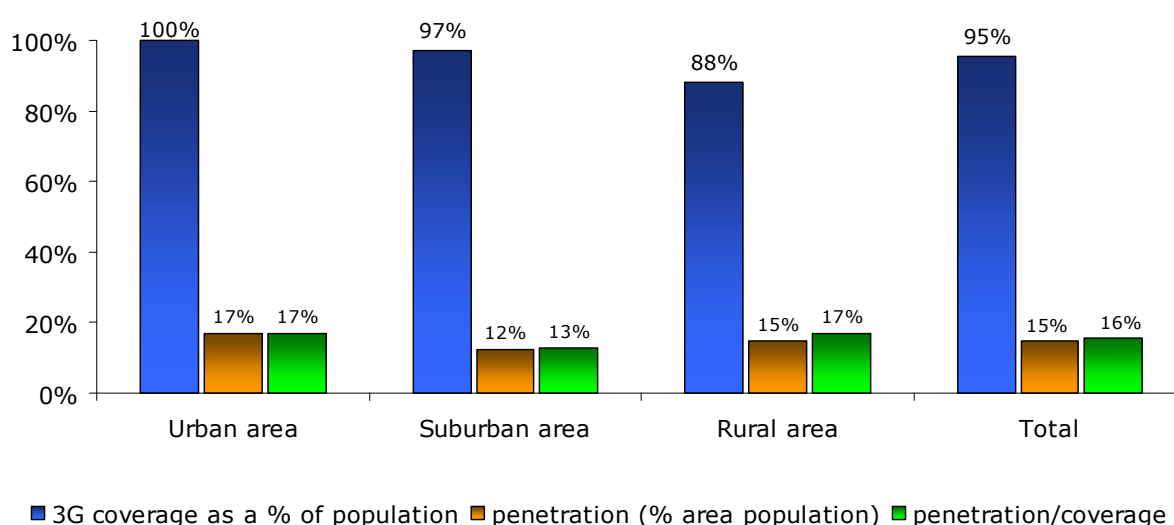
4.2. Belgium

4.2.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	5,636,220	4,791,981	381,625	10,809,826
Share of total population	52.1%	44.3%	3.5%	100.0%

4.2.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	100%	100%	100%	100%	100%
DSL subscribers	1,294,362	1,516,885	1,620,222	1,742,544	1,850,000
DSL penetration (% population)	12.4%	14.4%	15.4%	16.4%	17.1%
Cable modem coverage (% population)	80%	80%	88%	88%	91%
Cable modem subscribers	699,300	900,000	1,071,107	1,160,000	1,321,000
Cable modem penetration (% population)	6.7%	8.6%	10.2%	10.9%	12.2%
FTTH/B subscribers	0	0	56	3,000	4,200
PLC subscribers	0	0	0	0	0
WLL subscribers	3,597	5,500	14,313	8,600	5,167
Satellite subscribers	0	0	0	0	0
Total	1,997,259	2,422,385	2,705,698	2,914,144	3,180,367
Total fixed broadband penetration (% population)	19.1%	23.0%	25.7%	27.3%	29.4%
Mobile broadband subscribers				414,038	614,831
Mobile broadband penetration (% population)				3.9%	5.7%

In 2009, broadband coverage has not much evolved as compared to 2008. Virtually all Belgians can access DSL: the technology accounts for 58.2% of broadband connections in the country. VDSL, which was available to 60% of Belgian homes at the end of 2009, is increasing rapidly in terms of subscribers: it accounted for over 20% of DSL subscribers.. Over the recent period, dynamics have also been strong in cable modem, which recorded a 14% growth in 2009 (vs. +6.1% for DSL subscribers). This is the result of increased coverage and of higher speeds available with cable. FTTH subscriber is only accounting for 0.13% of all broadband connections

Mobile broadband coverage was significantly expanded, reaching 97% of the population at the end of 2009.

4.2.3. DSL coverage and take-up

Coverage and penetration
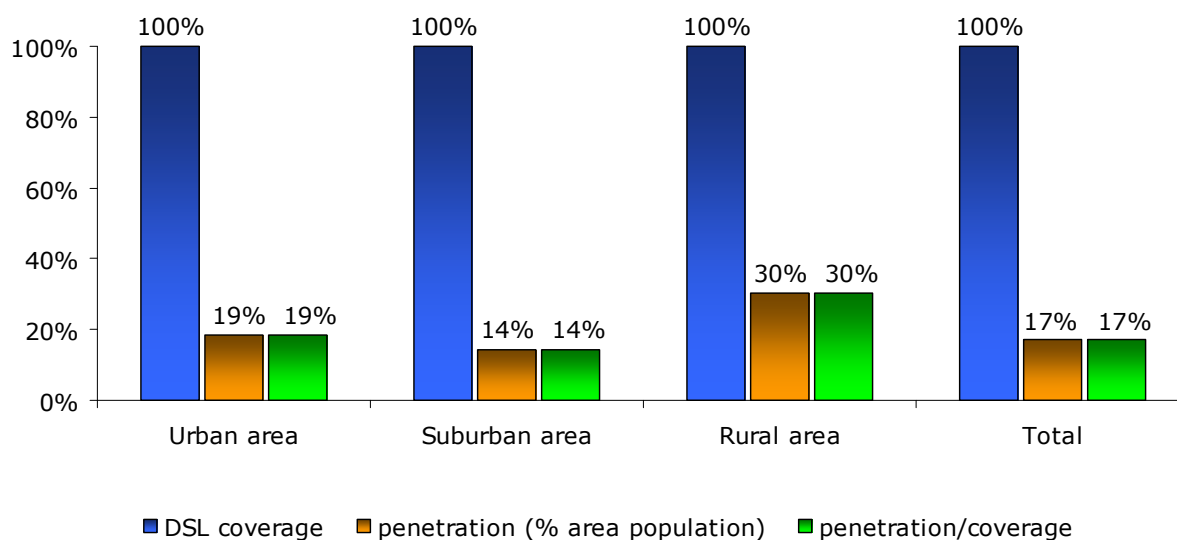
Although DSL coverage is close to 100%, DSL penetration reaches only 17.1%. Higher penetration rates in rural areas can be explained by less deployed cable networks in part of those areas.

Number of DSL connections by download rate
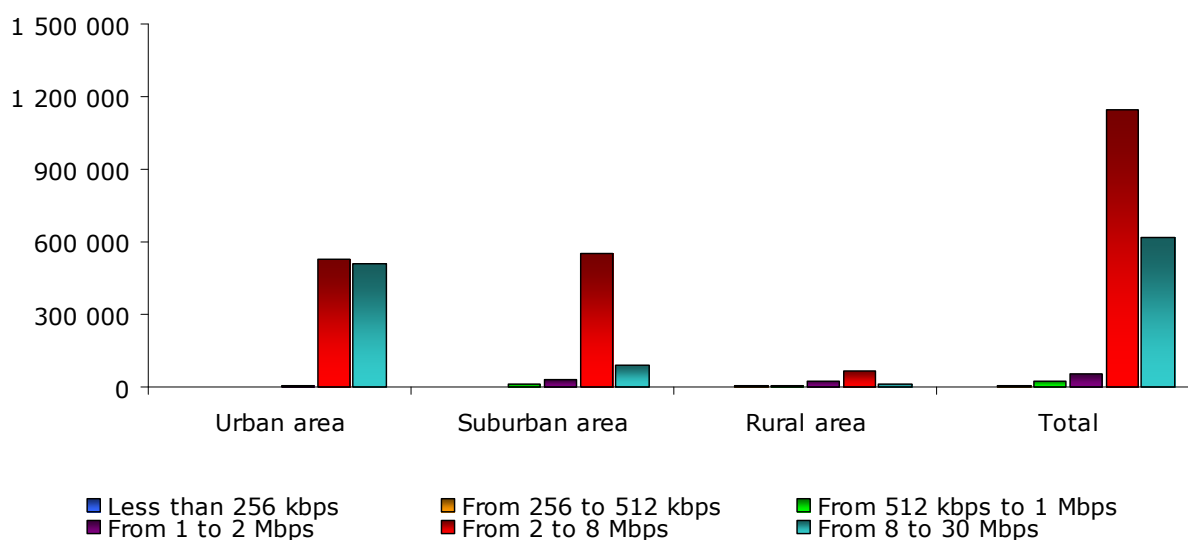
DSL speeds continue to increase and higher speeds gradually spread from most densely populated areas toward less densely populated areas.

Percentage of DSL connections by type of provider
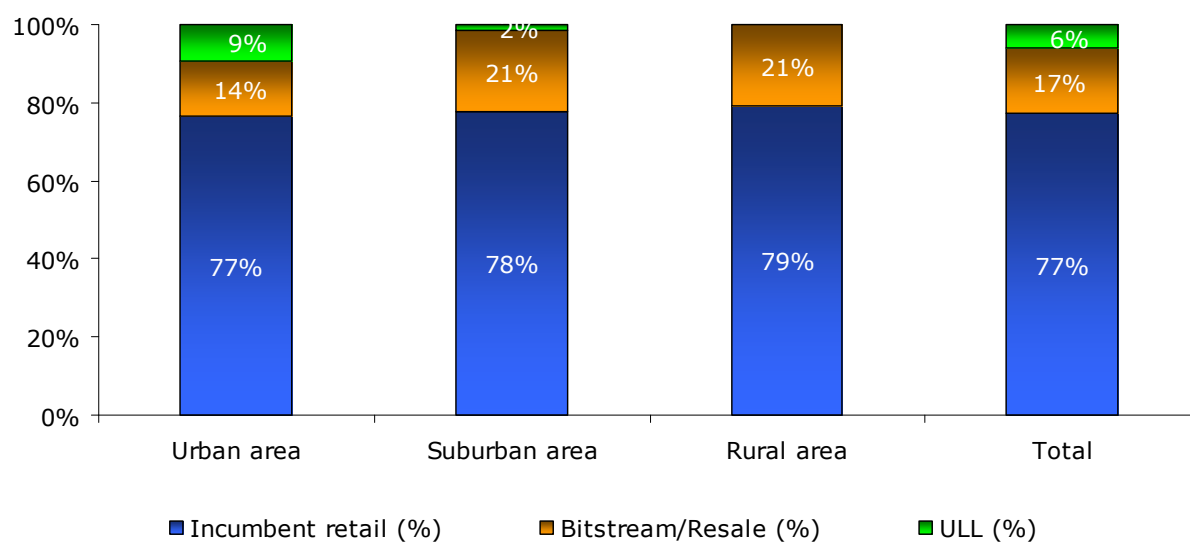
Unbundling is still marginal in Belgium accounting for only 5.8% of total DSL connections. It is mostly used in urban areas and quite inexistent in rural areas. In 2009, incumbent operator Belgacom lost market share in urban areas while it remained dynamic in other areas, especially in rural areas.

4.2.4.   Cable modem coverage and take-up

Coverage and penetration
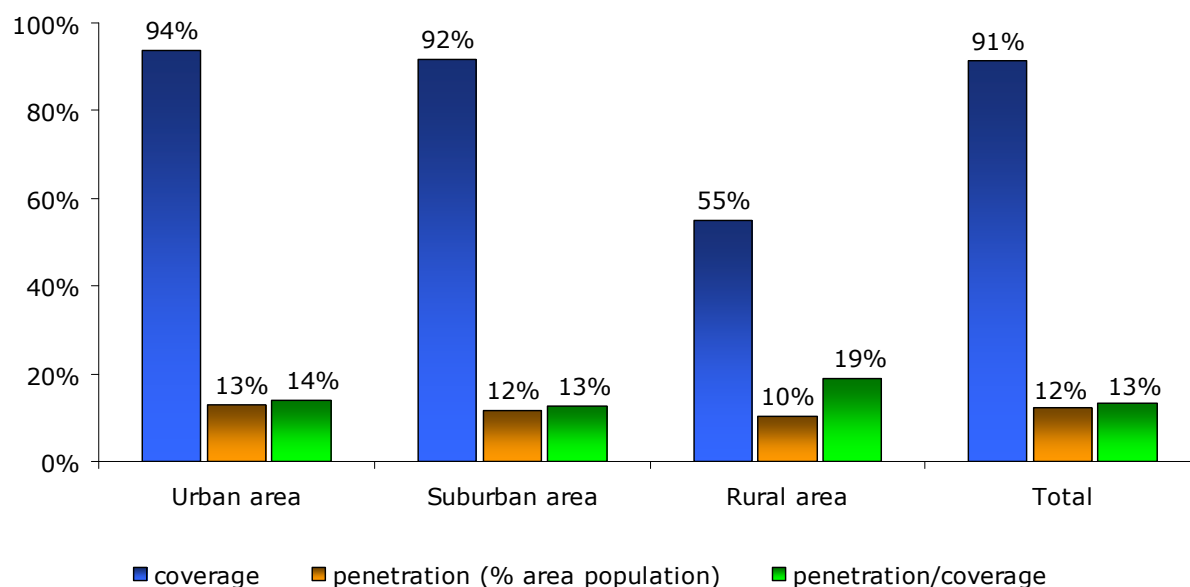
From 88% in 2008, cable modem coverage increased to 91.3% of the population at the end of 2009 on a nation wide basis. The main cable operator, Telenet, which is also the main competitor to incumbent Belgacom, gained market share of the overall broadband market.

Number of cable modem connections by download rate
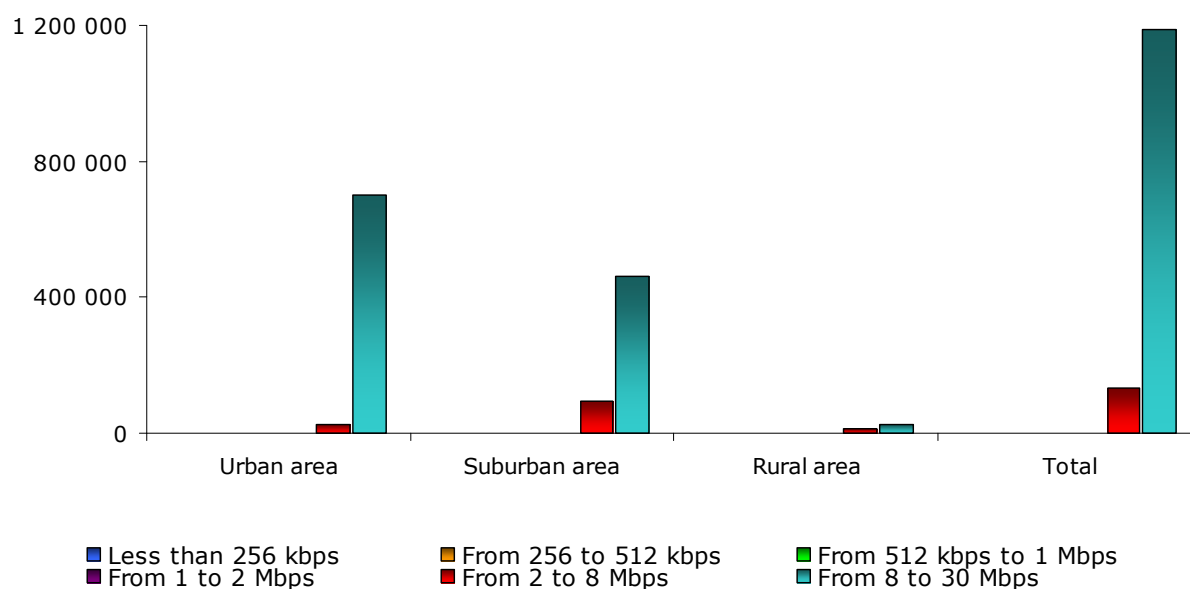
Over recent years, cable modem connection speeds increased: all subscribers have now connections with speeds over 2 Mbps and for most of them, it is over 8 Mbps. Reportedly 96% of Telenet customers (the main cable operator) benefit from download speeds superior to 10 Mbps.

4.2.5. FTTx coverage and take-up

Coverage and penetration
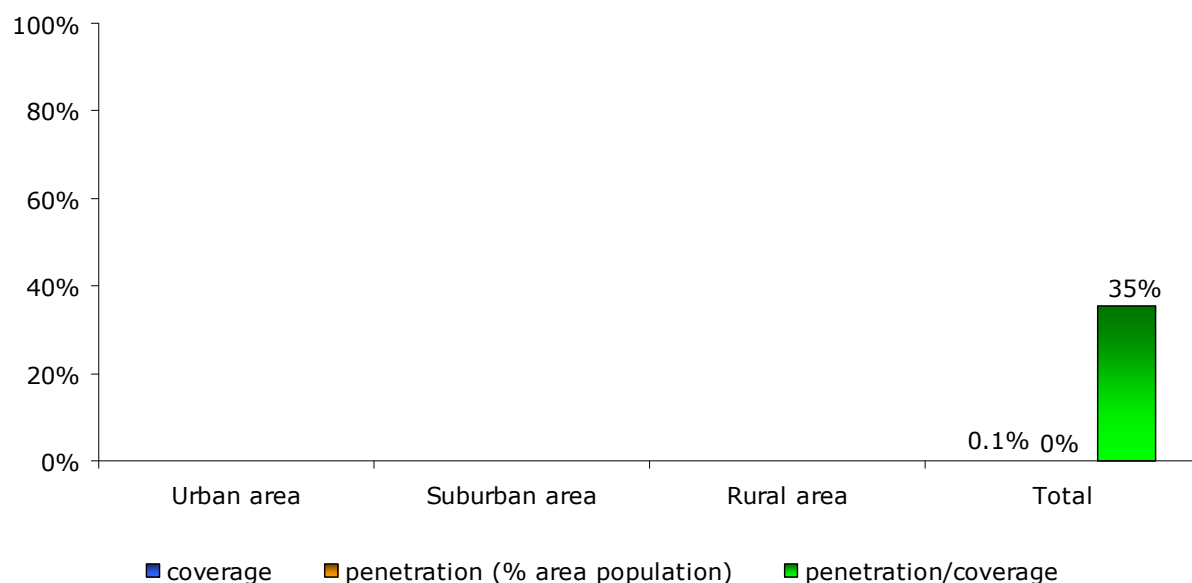
With only 0.1% of the Belgian population covered by very high broadband services, FTTH access networks are still marginal. Incumbent operator Belgacom has opted for VDSL technology (with current connection speeds at 20 Mbps and included in DSL connections) to further leverage on its wide copper network infrastructures while cable modem operators have rather selected Docsis 3.0 technology (current offers generally at 30 Mbps).

FTTx connections by download rate
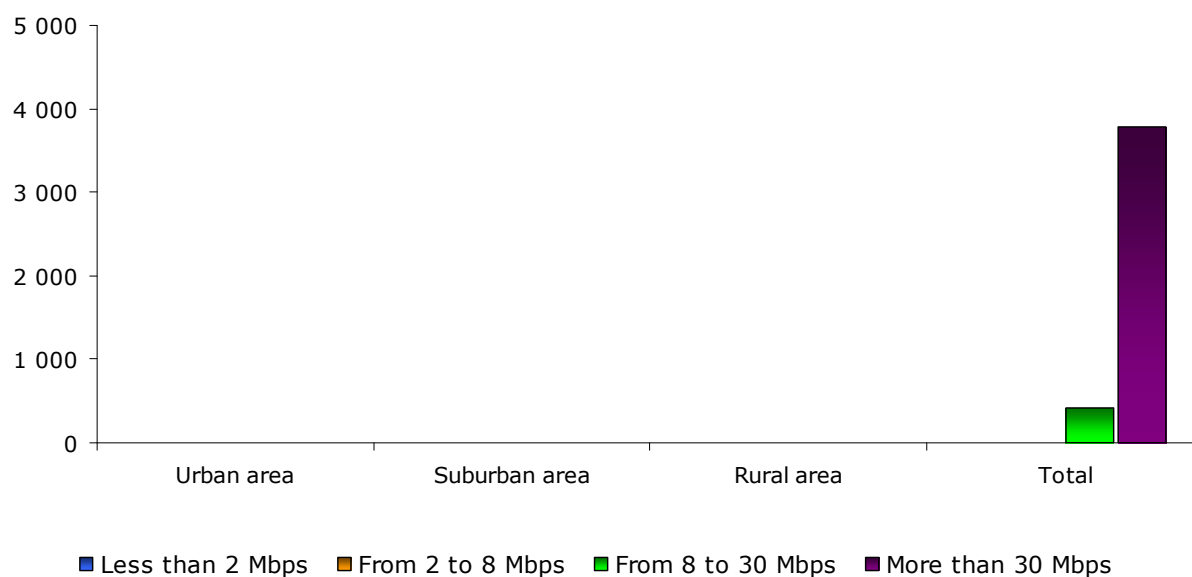
Most FTTH connections offer speeds over 30 Mbps.

4.2.6. Other broadband access technologies

Wi-Fi

Belgacom and Telenet have been active in Wi-Fi services since 2003.

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 use its Wi-Fi network. It now operates more than 1,000 hotspots across the country.

WLL/WiMAX

With Clearwire as the main WiMAX operator in Belgium, we estimate the total customer base to reach 5,200 customers, which accounts only for 0.2% of all broadband customers. This "easy-to-connect" solution is mostly used in big cities.

Satellite

While the whole country is covered by satellite, there is no satellite broadband usage as people can access from everywhere higher speed (and less expensive) solutions thanks to other broadband technologies.

4.2.7. Mobile broadband coverage and take up

Coverage by technology

■ 3G coverage as a % of population   **■** 3G+ coverage as a % of population
■ 3G coverage as a % of territory   **■** 3G+ coverage as a % of territory
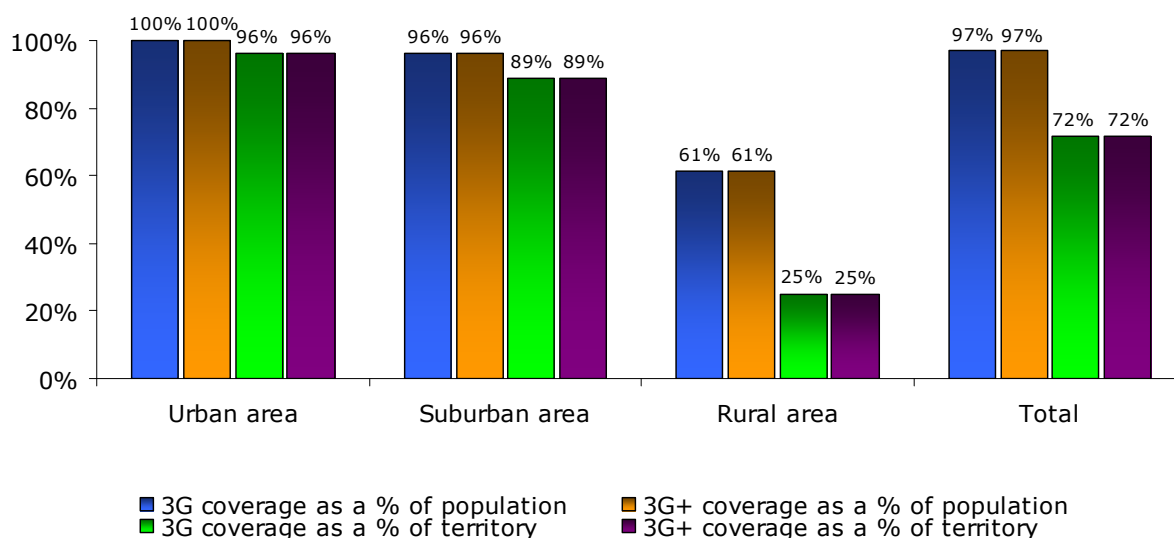
As compared to the end of 2008, progress has been made in 3G coverage in suburban and rural areas, with understandably a big gap between territory and population coverage in less densely populated areas. Nearly all 3G base stations have been upgraded to support 3G+ in the downlink (HSDPA) as well as in the uplink (HSUPA).

Penetration

■ 3G coverage as a % of population   **■** penetration (% area population)   **■** penetration/coverage
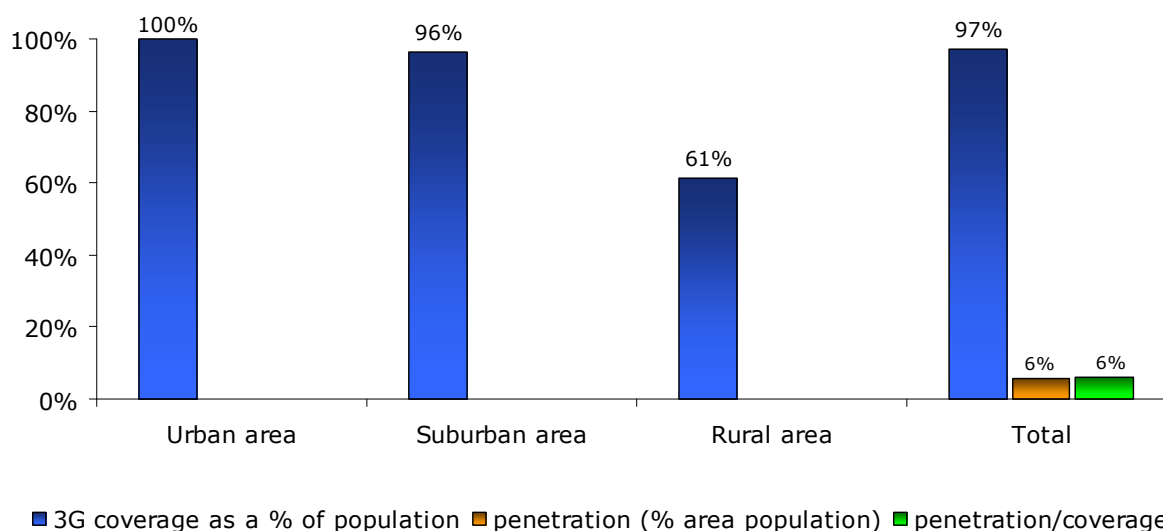
The 3G subscriber base has more than doubled in 2009, to 2.97 millions at the end of the year, However, the number of active users is far smaller (614,000) and penetration is still below 6%.

4.3. Bulgaria

4.3.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	4,178,414	1,929,486	1,080,404	7,188,304
Share of total population	58.1%	26.8%	15.0%	100.0%

4.3.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	na	na	na	78%	80%
DSL subscribers	40,000	93,000	163,756	230,000	280,000
DSL penetration (% population)	0.5%	1.2%	2.2%	3.2%	3.9%
Cable modem coverage (% population)	na	na	na	na	85%
Cable modem subscribers	101,700	163,000	150,000	140,000	160,000
Cable modem penetration (% population)	1.3%	2.1%	1.3%	1.9%	2.2%
FTTx subscribers	na	na	384,000	420,000	625,000
PLC subscribers	na	na	500	na	na
WLL subscribers	na	na	1,584	4,500	10,000
Satellite subscribers	0	0	0	100	500
Total	141,700	256,000	700,040	794,600	1,075,500
Total fixed broadband penetration (% population)	1.8%	3.3%	9.6%	11.1%	15.0%
Mobile broadband subscribers				120,000	720,000
Mobile broadband penetration (% population)				1.7%	10.0%

There were 1,075,500 fixed broadband subscribers in Bulgaria at the end of 2009, representing a substantial increase (+281,000 or +35%) compared to the end of 2008. Close to 50% of households are connected to broadband.

Fifty nine percent of fixed broadband subscribers use LAN (FTTB + LAN in urban areas or FTTN + LAN in other areas) and only 26% are DSL subscribers. Last mile in some rural areas is provided through wireless technology as deployment is easier and more economical.

In 2009, mobile broadband usage improved significantly with penetration going up from 1.7% at the beginning of the year to 10% of population at the end, mainly thanks to price decrease. However, mobile broadband is in most cases a second or alternative connection for existing broadband users; there is only a tiny share of people, who use broadband with "mobile only" connection.

4.3.3. DSL coverage and take-up

Coverage and penetration
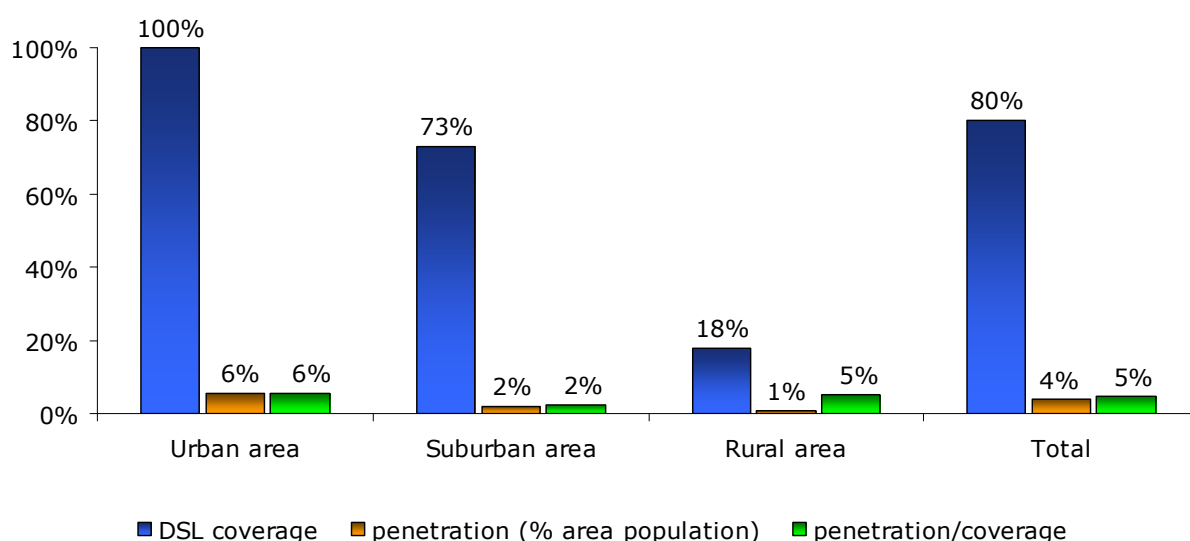
National DSL coverage (as a % of population) slightly increased in 2009 and reached 80% at the end of the year. Urban areas are covered entirely, but population coverage is only 18% in rural areas. This should not increase in the near future as the incumbent operator is switching to wireless connections rather than digitalizing existing copper lines in those areas, for economic and competitive reasons.

Number of DSL connections by download rate
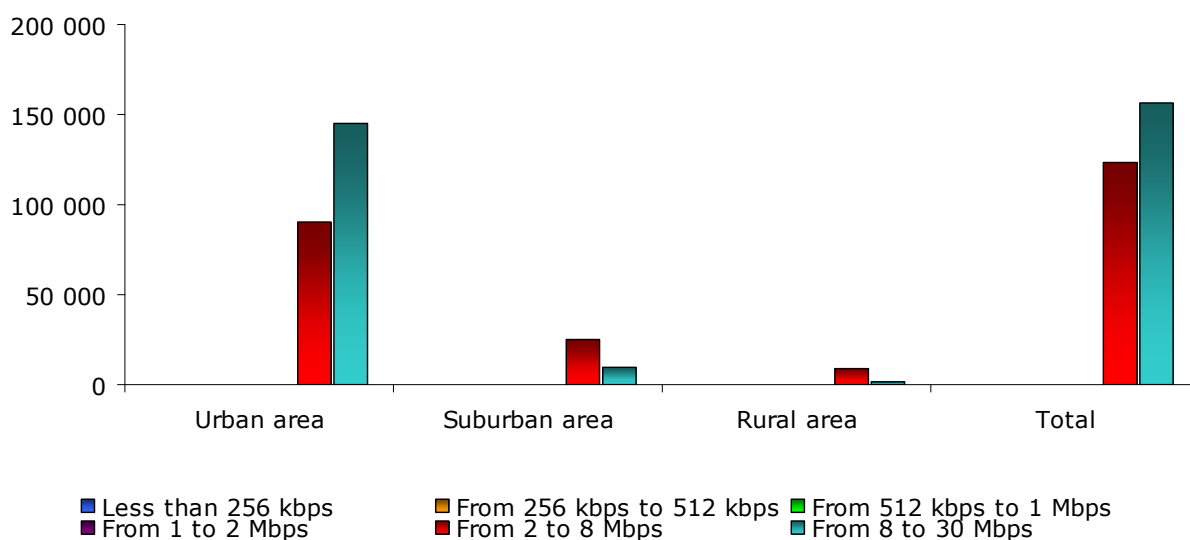
Due to competition in urban areas (from LAN operators notably), the incumbent operator Vivacom had to offer attractive speeds and prices to keep its customers. There is no offer for speeds below 6 Mbps and during some time there has been a geographic discrimination with prices lower in urban areas than in suburban and rural areas. ADSL speeds vary from 6 to 12 Mbps..

Percentage of DSL connections by type of provider
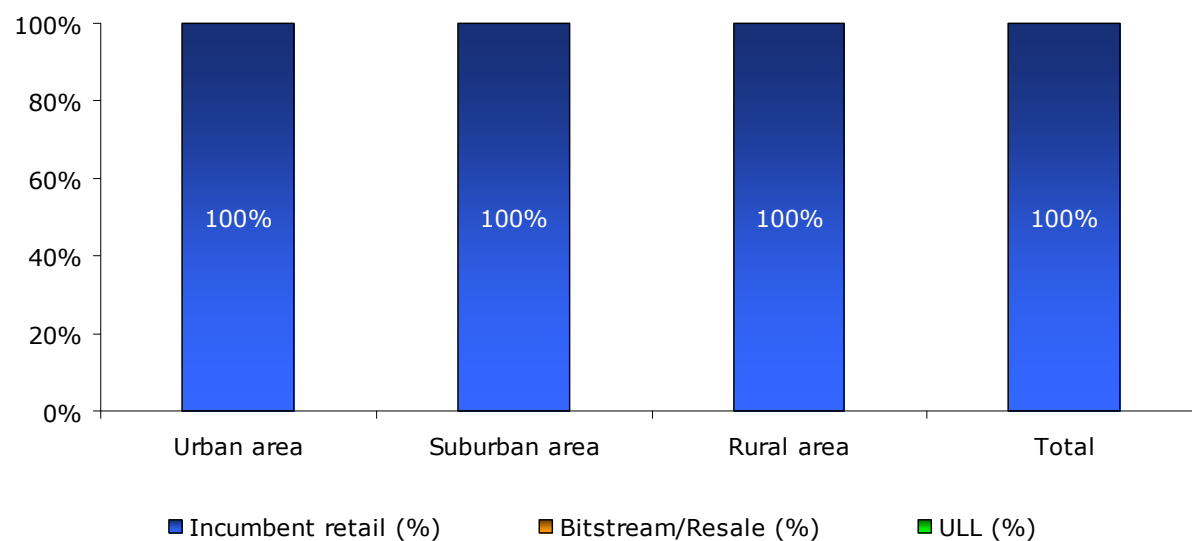
Although formally in place, DSL unbundling was actually never used. A small share of DSL connections have been supplied by alternative operators in the past (4% at the end of 2008) but this has become marginal (only on specific occasions and for temporary connections) as the main alternative player was acquired by an ISP not providing DSL.

4.3.4. Cable modem coverage and take-up

Coverage and penetration
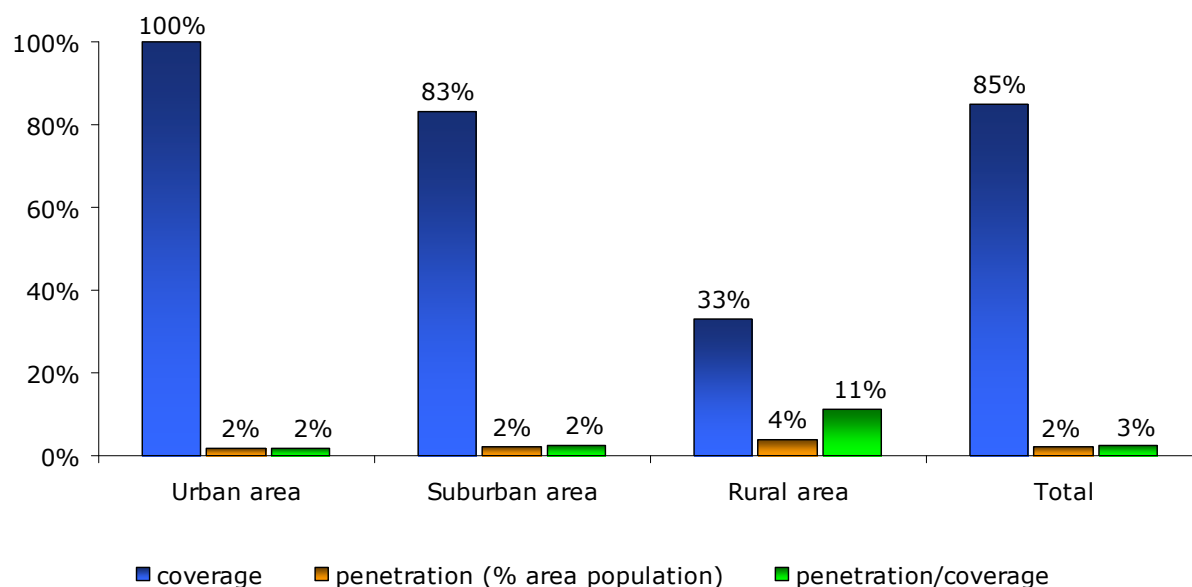
Cable televisions deployed their networks faster than LAN ISPs and practically all people in cities/towns or urban areas have access to cable television. Most of CATV networks started to provide internet, but quite often they use LAN technology instead of traditional cable modem access. Nearly all urban areas are covered by cable. Coverage is also well advanced in suburban areas (83%). It is much lower in rural areas (33%).

Number of cable modem connections by download rate
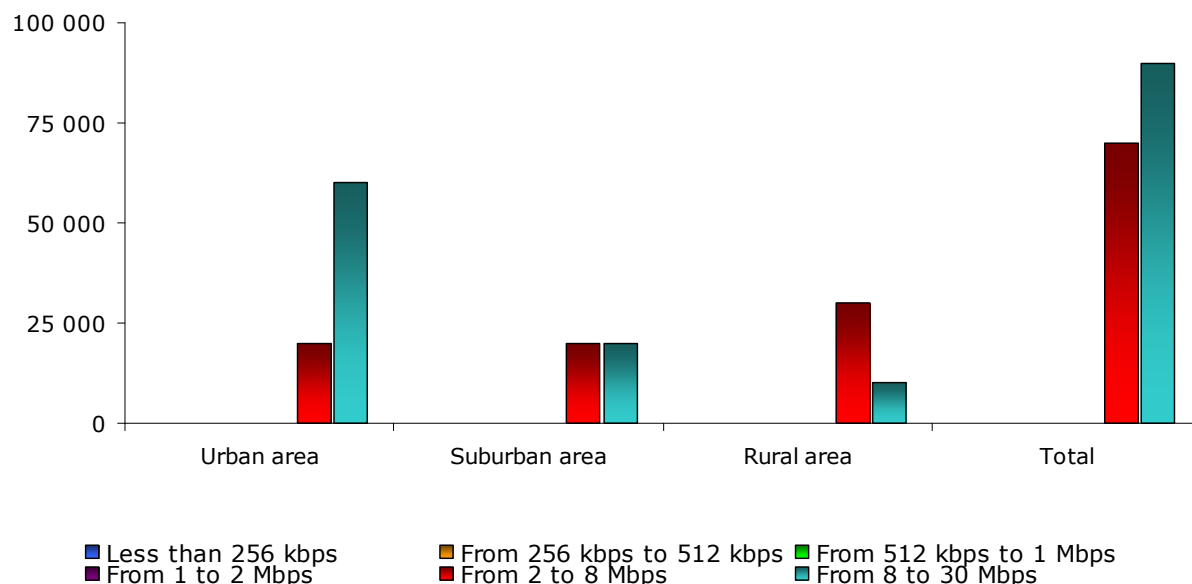
There is no offer for speeds below 2 Mbps, although effective speed can be much lower, below 1 Mbps, especially in remote places. More than half of the lines operate with speeds over 8 Mbps, mainly in urban areas.

4.3.5. FTTx coverage and take-up

Coverage and penetration
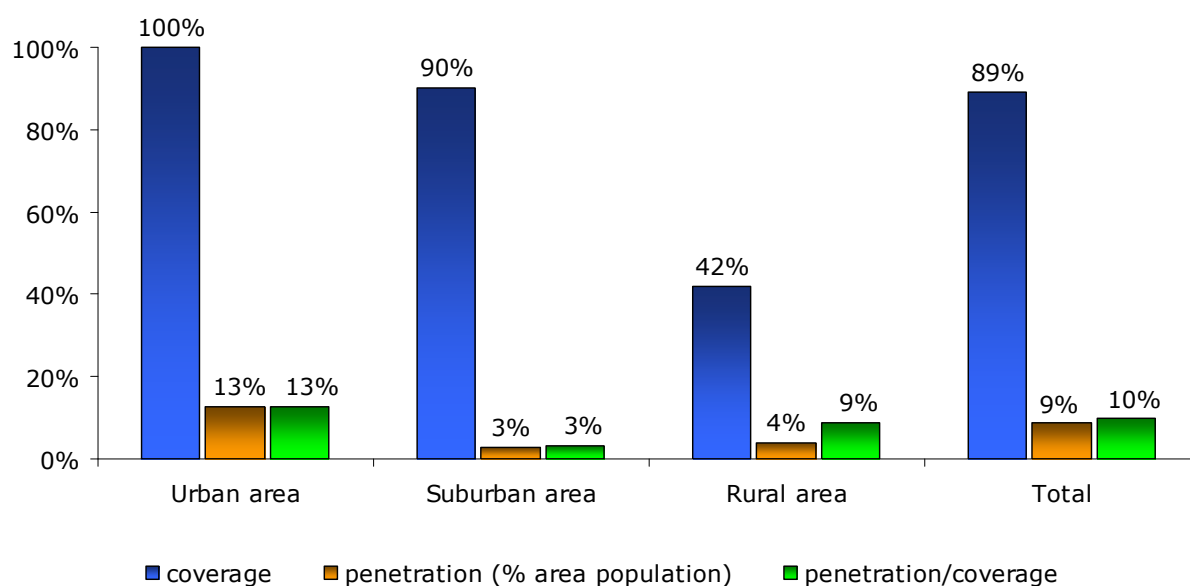
LAN/RLAN access is the leading technology on the Bulgarian broadband market. Speeds vary from 8 Mbps to 100 Mbps. LAN/RLAN networks were the first to bring broadband internet at homes and sustained their leadership in terms of both coverage (89%) and penetration compared to other technologies. In rural areas LAN coverage is 42%, which is significantly higher than cable and DSL coverage levels.

FTTx connections by download rate
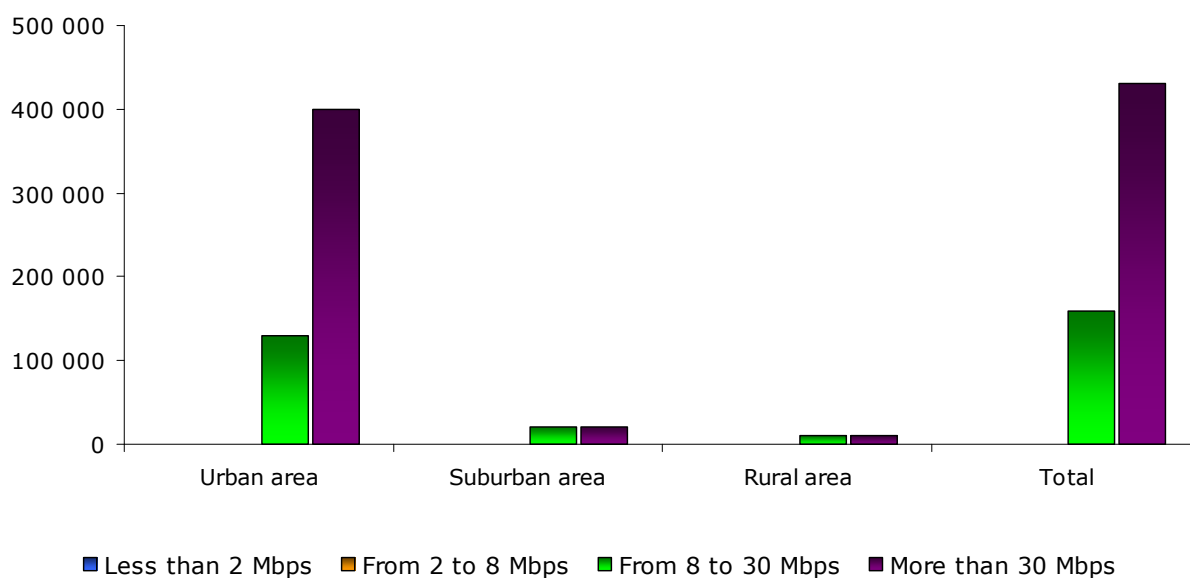
More than two thirds of LAN/RLAN subscribers have connection speeds of 30 Mbps or more. However, quality of service is a major concern.

4.3.6. Other broadband access technologies

Wi-Fi

There is no commercial Wi-Fi provider in Bulgaria, but free Wi-Fi provision of internet (funded by advertisement or innovative social sharing) was on the rise in 2007 and 2008. In each town there are plenty of restaurants and cafes providing free Wi-Fi. Most recently in 2009 a lot of municipalities invested in free Wi-Fi access in public places. Another unexpected provider of free Wi-Fi internet turned out to be a share (10-20%) of ADSL subscribers who have Wi-Fi at their homes and who have not encrypted their connection.

WLL/WiMAX

WiMAX technology is still not widely used and users are mainly businesses. The major WiMAX provider MaxTelecom reports 10,000 clients and coverage of 55% of the population all over the country, although the actual number of subscribers could be lower.

Satellite

VSAT access is provided by Transat and also recently by ViSAT. On one hand the positive issue is the possibility to provide access to virtually every position in Bulgaria, but there is a delay of 250 ms (single loop) which prevents some usage. This technology is mainly used in remote villages, where even telephone connections are missing. Yet, the price is too high for end-users and it is mostly used by businesses (and especially hotels in remote areas) or government.

4.3.7. Mobile broadband coverage and take up

Coverage by technology

- ■ 3G coverage as a % of population
- ■ 3G+ coverage as a % of population
- ■ 3G coverage as a % of territory
- ■ 3G+ coverage as a % of territory
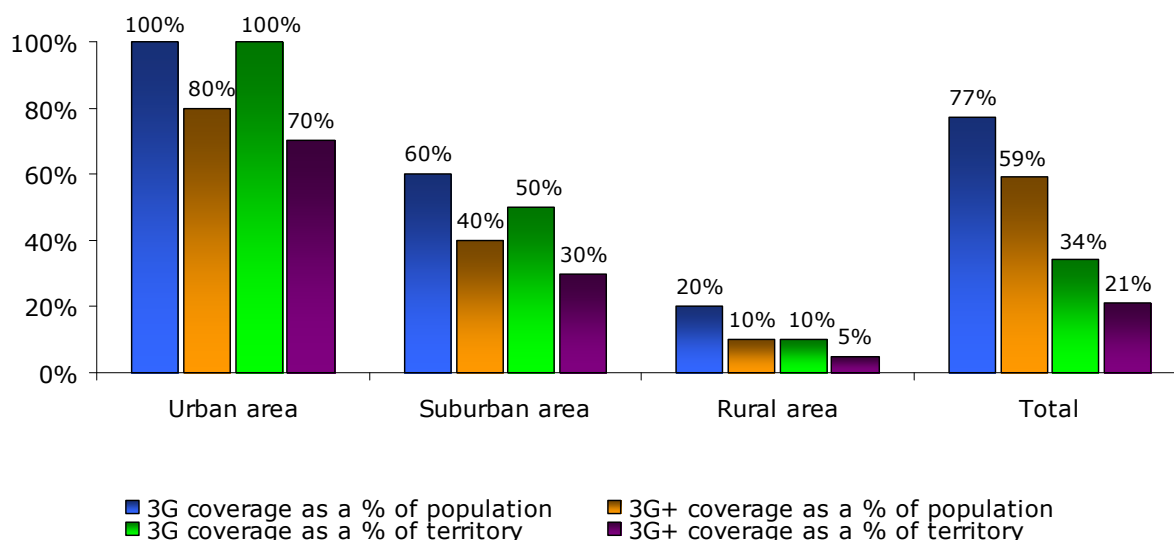
Mobile internet is provided by all three mobile operators in Bulgaria – Mobiltel (M-Tel), Cosmo Bulgaria Mobile (Globul) and Vivacom. 3G coverage reached 77% at national level (100% in urban areas) at the end of 2009 but it is only 59% for HSDPA (80% in urban areas). The highest speed provided is 21 Mbps via HSDPA for download and 5.76 Mbps via HSUPA for upload.

Penetration

- ■ 3G coverage as a % of population
- ■ penetration (% area population)
- ■ penetration/coverage
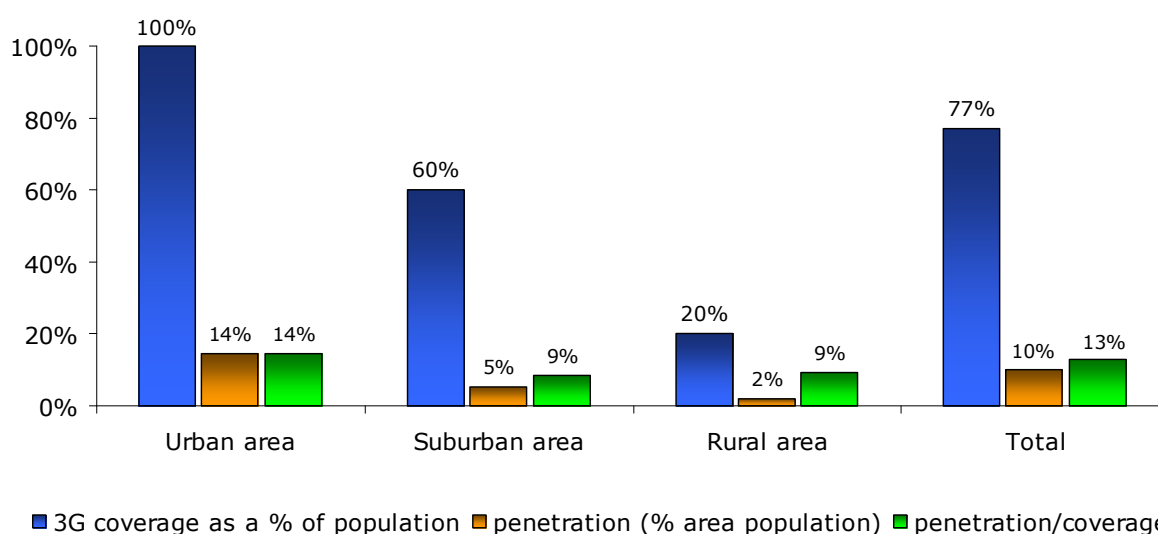
Penetration boomed in 2009 compared to 2008, from 1.7% to a total of 10% of population, however it is still not used by all mobile device owners, mainly because of service prices. Mobile broadband became more affordable in 2009 compared to 2008 and the market was driven by innovation (free usage of Facebook promoted by one operator, introduction of the iPhone…). The mobile internet consumption is predominantly an urban phenomenon (14.4% in urban areas compared to 5.2% in suburban areas and only 1.9% in rural areas) for many reasons:

- Coverage issues: suburban and rural areas have significantly lower coverage in terms of UMTS/HSDPA
- Affordability of devices, capable of using mobile internet is much higher in urban population than in suburban and rural
- Overall internet usage is higher in urban areas than in suburban and rural areas. Various studies suggest that mobile internet is used by people who already use internet.

4.4. Cyprus

4.4.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	557,900	205,000	34,000	796,900
Share of total population	70.0%	25.7%	4.3%	100.0%

4.4.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	70%	70%	80%	93%	96%
DSL subscribers	43,500	60,934	96,335	136,300	165,895
DSL penetration (% population)	5.6%	7.8%	12.3%	17.3%	20.8%
Cable modem coverage (% population)	0%	-	28%	28%	28%
Cable modem subscribers	0	314	718	2,757	8,337
Cable modem penetration (% population)	0.0%	0.0%	0.1%	0.4%	1.0%
FTTx subscribers	0	-	100	100	100
PLC subscribers	0	-	-	-	-
WLL subscribers	0	-	-	-	-
Satellite subscribers	0	0	50	300	561
Total	43,500	63,702	97,153	139,260	174,893
Total fixed broadband penetration (% population)	5.6%	8.1%	12.4%	17.7%	21.9%
Mobile broadband subscribers				57,000	94,537
Mobile broadband penetration (% population)				7.3%	11.9%

Broadband penetration enjoyed strong growth again in 2009, with 35,500 additional fixed subscribers (+4.2 points in penetration) and 37,500 new mobile subscribers.

4.4.3. DSL coverage and take-up

Coverage and penetration
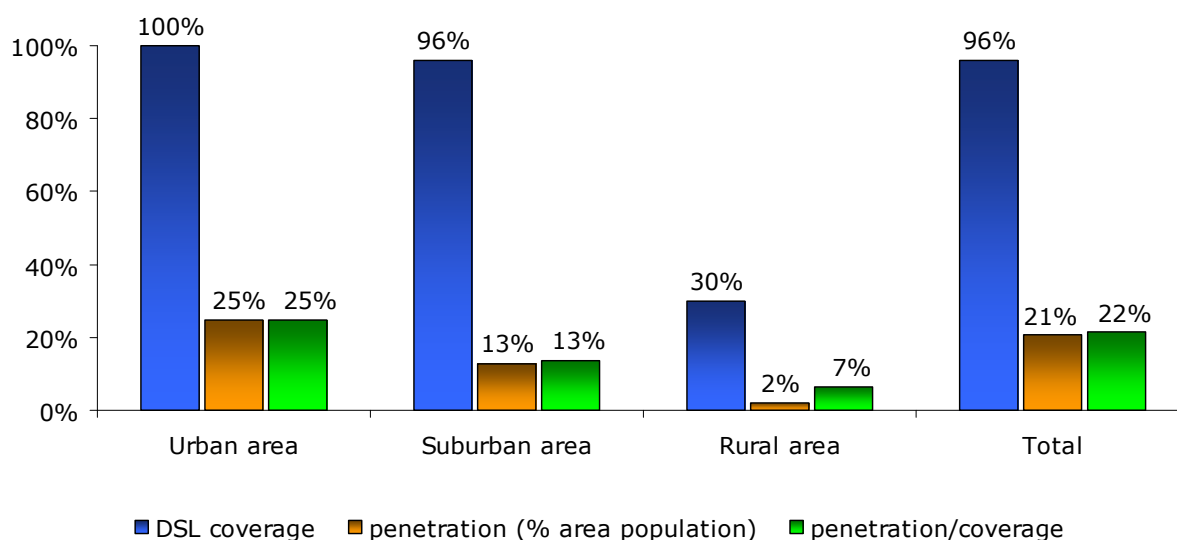
DSL coverage was expanded in 2009 to some rural areas in Cyprus. Penetration increased again significantly in 2009 and it is now above the European average (21% in Cyprus compared to 19% for the European average).

Number of DSL connections by download rate
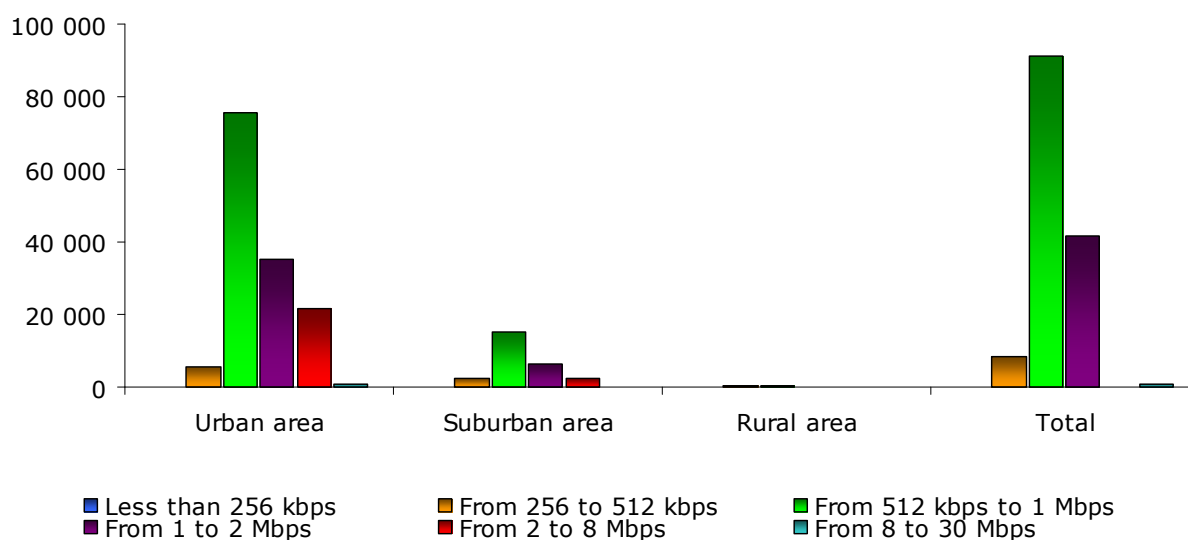
DSL download speeds remain quite low, with most connections supplying only 1 Mbps.

Percentage of DSL connections by type of provider
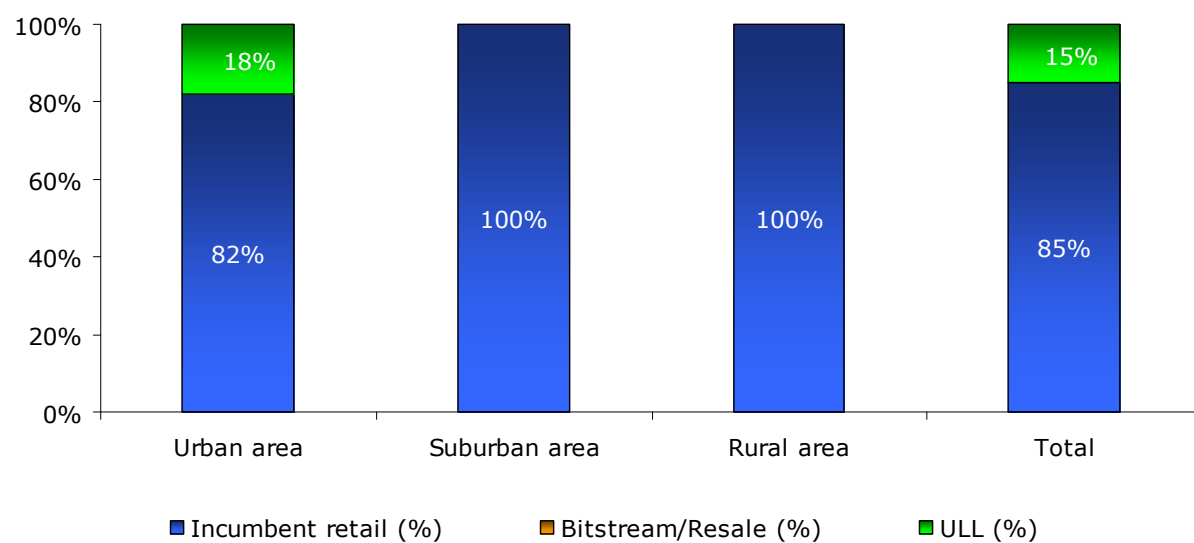
Unbundling is available only in urban areas and used mainly by Cyta's main competitor, Primetel.

4.4.4. Cable modem coverage and take-up

Coverage and penetration
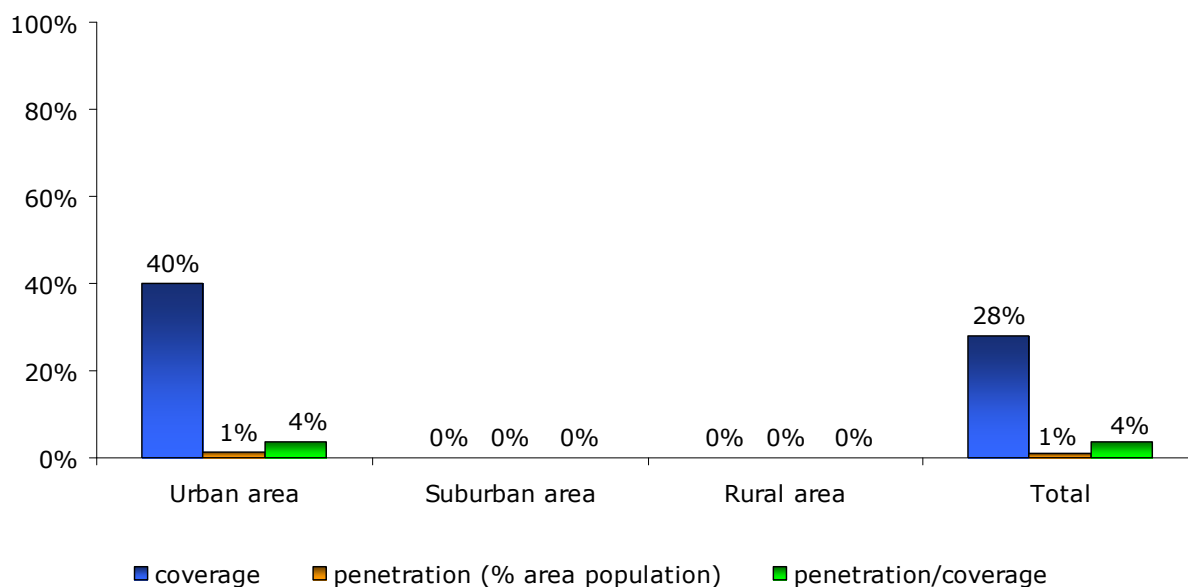
After a slow start, the cable modem subscriber base began to increase significantly in 2008: however, cable market share is still low compared to DSL, with cable modem accounting for only 5% of total broadband connections at the end of 2009.

Number of cable modem connections by download rate
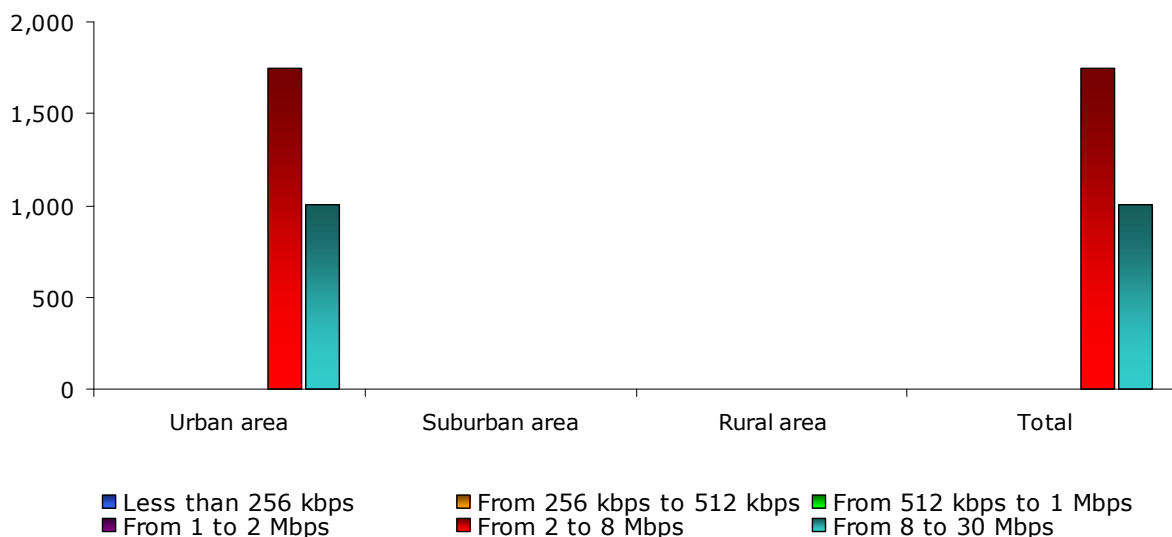
Cable modem connection speeds are significantly higher than DSL speeds.

4.4.5. FTTx coverage and take-up

In 2007, Cyta initiated a pilot project based on both GPON and E-P2P technologies, covering 100 homes. So far, there have been no commercial developments.

4.4.6. Other broadband access technologies

Wi-Fi

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.

Satellite

In addition to Wi-Fi, satellite can also provide broadband access in Cyprus. There were 561 broadband satellite connections at the end of 2009.

In March 2009, the Ministry of Communications & Works for the Republic of Cyprus Republic launched a plan with the aim of covering all villages currently without broadband Internet access with satellite Internet access in combination with Wi-Fi.

4.4.7. Mobile broadband coverage and take-up

Coverage by technology
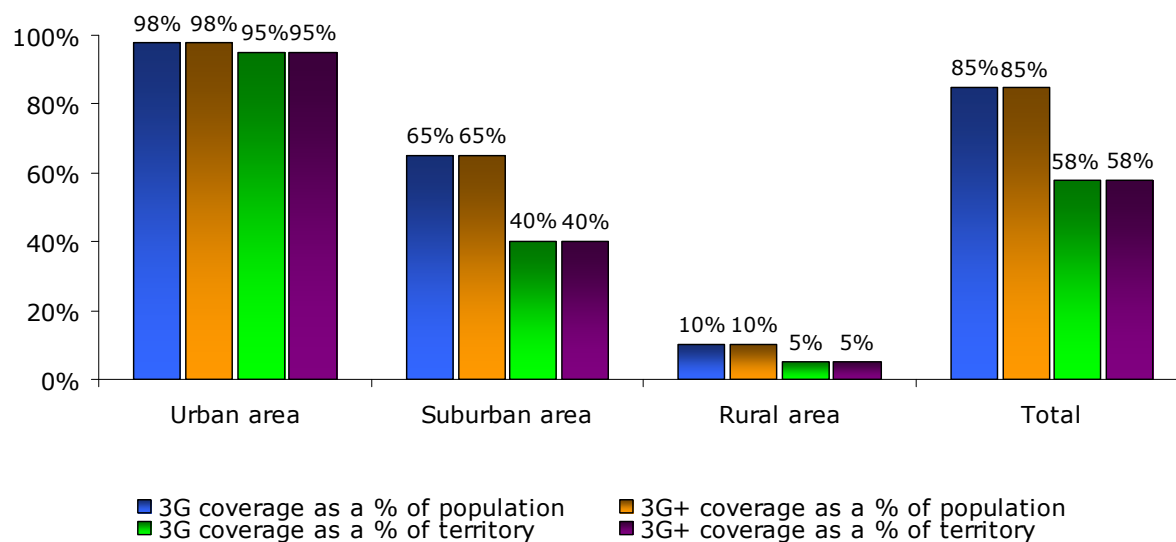
Following the launch of 3G services by its competitor, MTN, at the end of 2004, Cytamobile stepped up its rollout programme: its 3G network now covers 85% of the population and was entirely upgraded to HSDPA.

Penetration
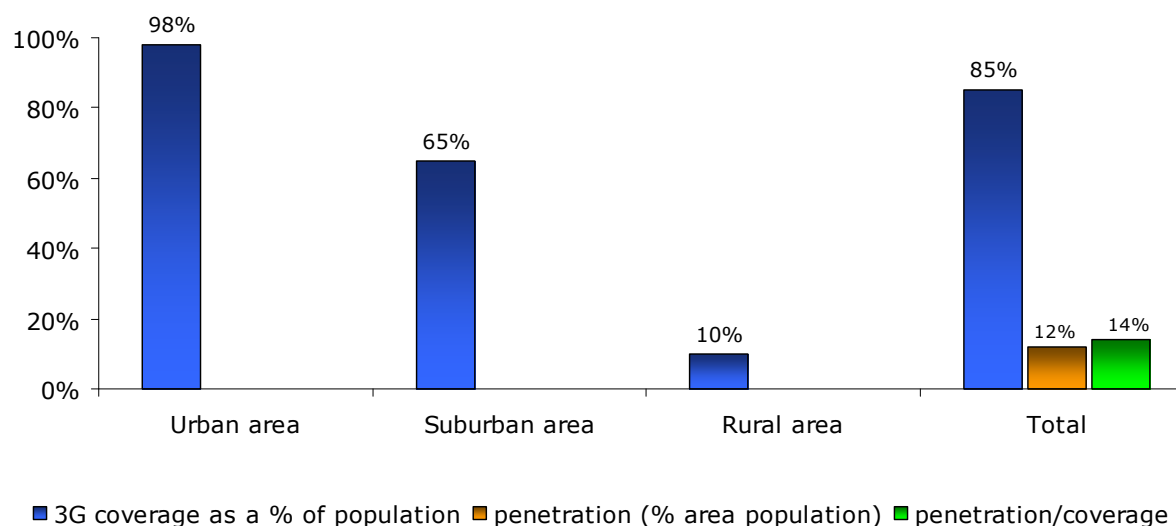
There were 94,537 3G subscribers in Cyprus at the end of 2009, a 66%-increase over one year.

4.5. The Czech Republic

4.5.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	2,414,842	5,356,781	2,735,190	10,506,813
Share of total population	23.0%	51.0%	26.0%	100.0%

4.5.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	75%	81%	85%	92%	92%
DSL subscribers	279,853	494,570	613,200	680,600	785,500
DSL penetration (% population)	2.7%	4.8%	5.9%	6.5%	7.5%
Cable modem coverage (% population)	24%	30%	30%	43%	43%
Cable modem subscribers	132,944	216,000	309,000	360,000	441,700
Cable modem penetration (% population)	1.3%	2.1%	3.0%	3.4%	4.2%
FTTx subscribers	17,049	24,000	55,000	100,000	135,000
PLC subscribers	0	50	200	200	-
WLL subscribers	208,873	350,000	520,000	650,000	670,000
Satellite subscribers	4,000	4,000	4,000	4,000	500
Total	642,719	1,088,620	1,501,400	1,794,800	2,032,700
Total fixed broadband penetration (% population)	6.3%	10.6%	14.5%	17.1%	19.3%
Mobile broadband subscribers					199,200
Mobile broadband penetration (% population)					1,9%

DSL is the most popular type of broadband connection, with a share of almost 39% of fixed broadband connections. The second most popular technology is WLL/WiMAX (33% of fixed broadband connections), used notably in the Moravian region, in the East of the Czech Republic. Cable modem is also quite significant (22% of fixed broadband connections) with UPC accounting for more than 80% of connections in this sub-segment. FTTx technology is mainly used by businesses.

4.5.3. DSL coverage and take-up

Coverage and penetration
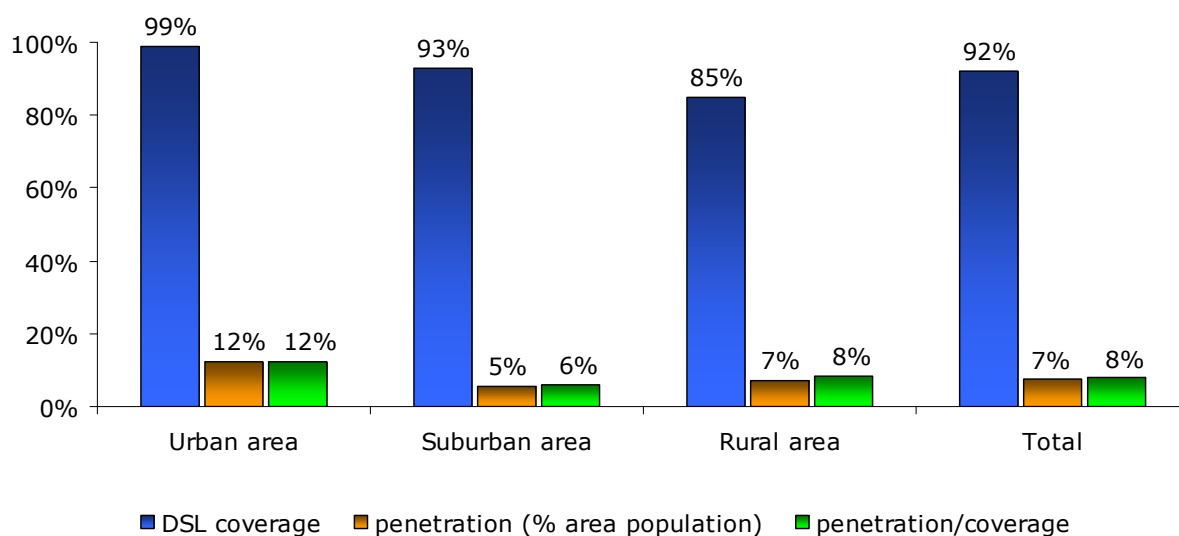
At the end of 2009, there were 785,500 DSL subscribers in the Czech Republic, a 15% growth over one year.

Penetration is significantly higher in urban areas than in the rest of the country.

Number of DSL connections by download rate
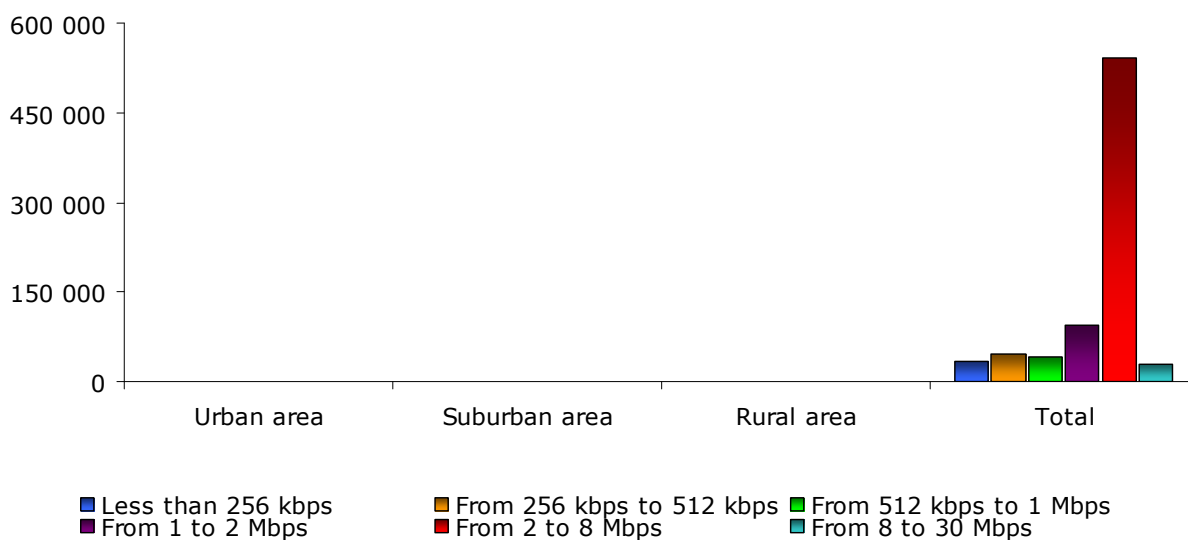
Most DSL subscribers' connection speeds range between 2 and 8 Mbps (69%).

Number of DSL connections by type of provider
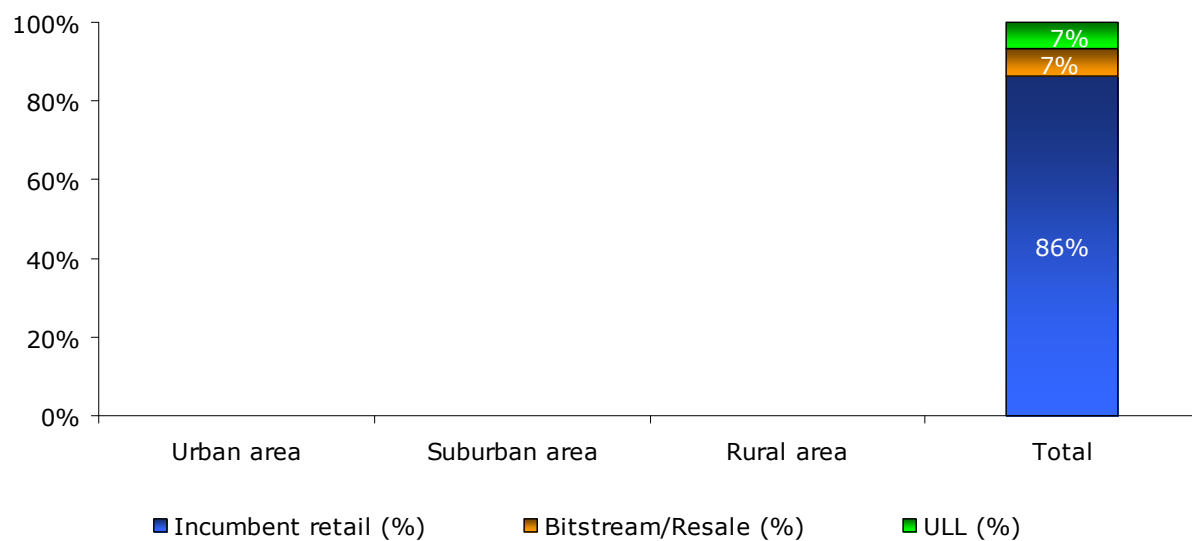
O2 Telefónica, the incumbent operator, directly retails more than 86% of the DSL lines.

4.5.4. Cable modem coverage and take-up

Coverage and penetration
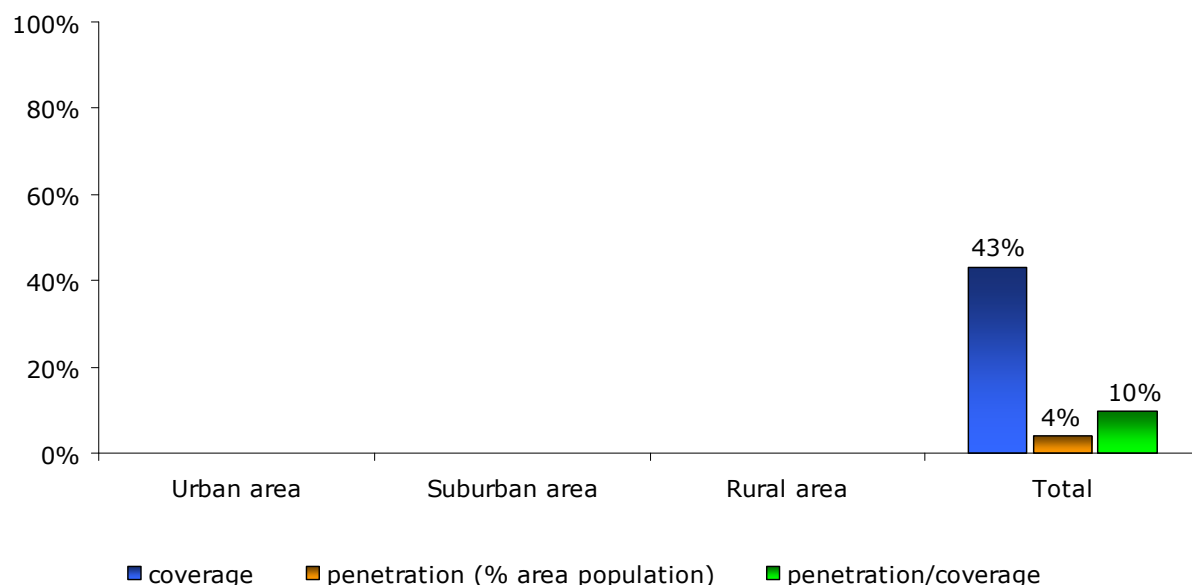
At the end of 2009, there were 441,700 cable modem subscribers. At national level, cable modem penetration is lower than DSL take-up but penetration as a percentage of coverage is higher.

Number of cable modem connections by download rate
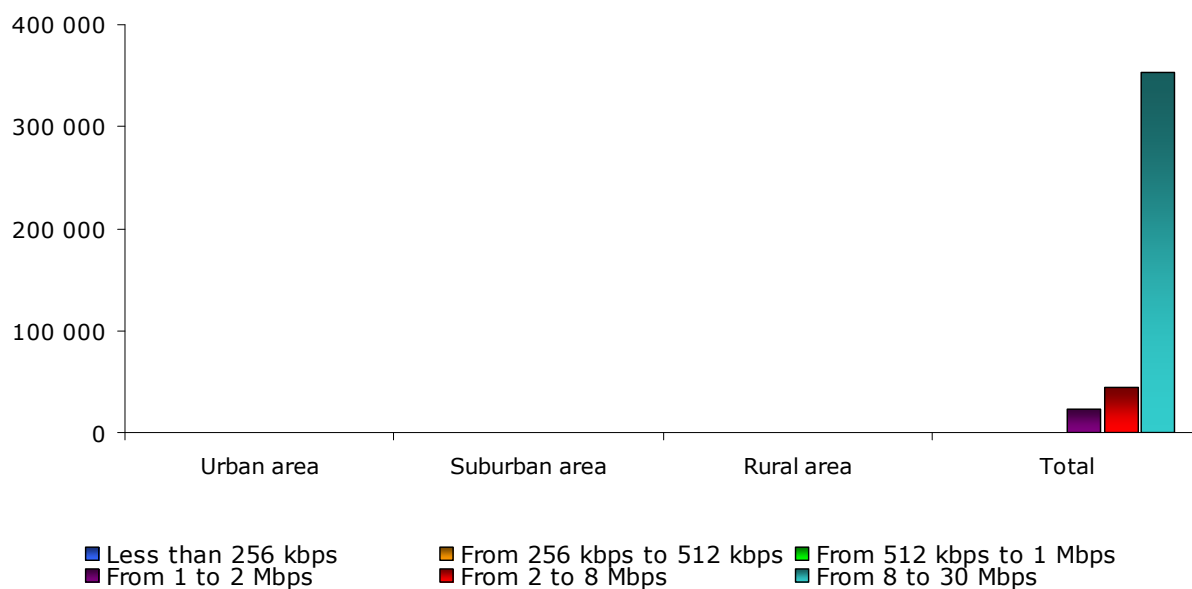
The main player in the Czech cable market is UPC, with a 81.9% market share The rest of the market is organized around more than 20 small local players that are members of the Association of Cable and Telecommunication Operators.

Eighty-five percent of the cable modem subscribers are connected with speeds over 8 Mbps.

4.5.5. FTTx coverage and take-up

Coverage and penetration
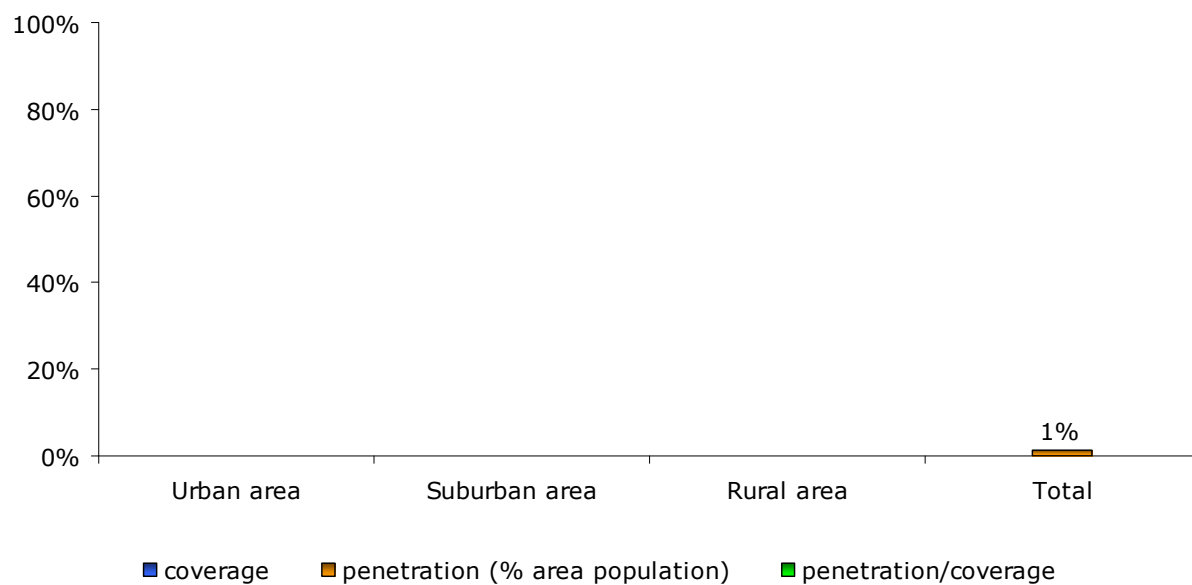
The number of FTTx technology subscribers is about 135,000, most of them are business customers.

Other broadband access technologies

WLL/WiMAX

There were 670,000 WLL/WiMAX subscribers in the Czech Republic at the end of 2009. Most of them are located in suburban areas (62.4%), with only 10% in urban areas.

First WiMAX licences were awarded by the Czech NRA, CTU, in January 2004 and the process was then pursued as part of the National Broadband Access Policy to increase coverage. In general, WiMAX networks are also used to provide voice services.

Dial Telecom/Volny, which is a major alternative broadband operator active in DSL through unbundling, also holds a nationwide licence for the operation of a WiMAX network in the 3.5GHz band. Its network is available in 50 towns in the Czech Republic.

Operators are also using WiMAX to increase capacity in dense and very dense areas. Ceske Radiokomunikace opened a WiMAX service in Prague and in its suburbs at the beginning of 2009 while GTS Novera launched a network in the 26 GHz band .also in the capital city.

Satellite

Two-way satellite technology is very rare in the Czech Republic, with only 500 users.

4.5.6. Mobile broadband coverage and take-up

Coverage by technology

3G coverage as a % of population   3G+ coverage as a % of population
3G coverage as a % of territory   3G+ coverage as a % of territory
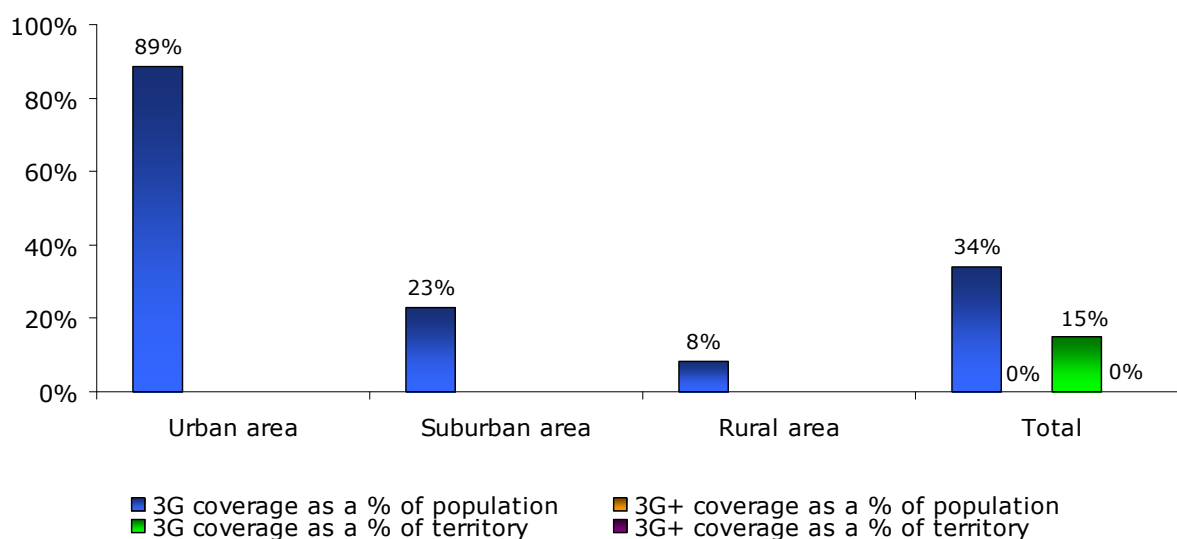
The mobile broadband market is undeveloped in the Czech Republic, mainly because the operators have been hesitating to invest in this technology.

In the Czech Republic 4 operators provide 3G services: O2, T-Mobile, Vodafone and a new entrant U:fon. In terms of deployment, O2 is the most advanced while 3G networks of Vodafone and T-mobile were still in a testing phase at the end of 2009.

Penetration

3G coverage as a % of population   penetration (% area population)   penetration/coverage
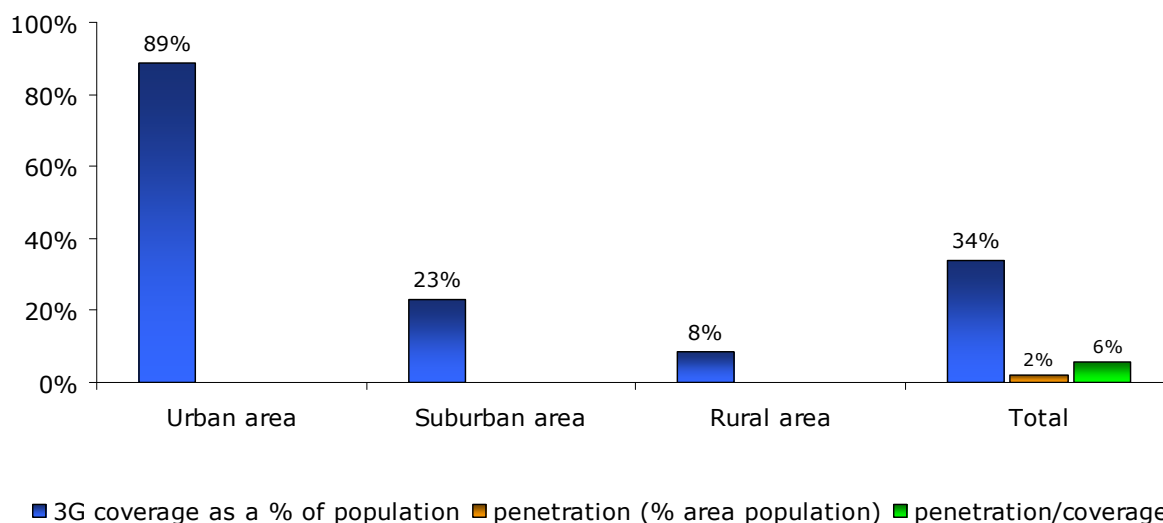
There were close to 200,000 active 3G subscribers in the Czech Republic at the end of 2009, representing a 1.9% penetration rate.

4.6. Denmark

4.6.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,669,969	2,171,513	1,669,969	5,511,451
Share of total population	30,3%	39,4%	30,3%	100,0%

4.6.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	100%	100%	100%	100%	100%
DSL subscribers	836,785	1,063,227	1,207,200	1,246,737	1,251,000
DSL penetration (% population)	15.5%	19.5%	22.0%	22.8%	22.7%
Cable modem coverage (% population)	60%	60%	60%	60%	60%
Cable modem subscribers	462,441	496,227	542,281	538,861	557,000
Cable modem penetration (% population)	8.6%	9.1%	9.9%	9.8%	10.1%
FTTx subscribers	117,028	131,230	205,678	232,437	251,000*
PLC subscribers	92	99	96	0	0
WLL subscribers	15,184	20,124	23,016	22,487	26,000**
Satellite subscribers	111	149	5	0	0
Total	1,431,641	1,711,056	1,978,276	2,040,522	2,085,000
Total fixed broadband penetration (% population)	26.5%	31.4%	36.1%	37.3%	37.8%
Mobile broadband subscribers				1,034,000	1,636,000
Mobile broadband penetration (% population)				18.9%	29.7%

* including 110,000 LAN subscribers (mainly FTTB + Ethernet)
** including 6,000 Wi-Fi subscribers and 19,000 WiMAX subscribers (+ 1,000 WLL)

With over 2 million fixed broadband and about 1.6 million mobile broadband subscribers at the end of 2009, the Danish broadband market remains one of the most advanced markets in the world.

DSL accounts for more than half of the fixed broadband connections and the incumbent carrier, TDC, still has a majority 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, YouSee (former TDC Kabel TV).

FTTx counts for about 250,000 subscribers, i.e. 12.5% of the market for fixed broadband connections and there has been a tremendous growth in mobile broadband connections. The mobile broadband has reached a penetration level at 30%, and it is foreseen that mobile broadband will replace a part of the fixed connections in the future.

The main competitors to TDC are Telia Denmark and Tele2 (DSL), Telia Stofa and Arrownet (cable) and several WiMAX operators (Danske Telecom, the mobile operator Sonofon and bulterNetworks) and in the mobile broadband market the main competitors are Telia, Sonofon and 3 and a number of MVNOs.

4.6.3. DSL coverage and take-up

Coverage and penetration
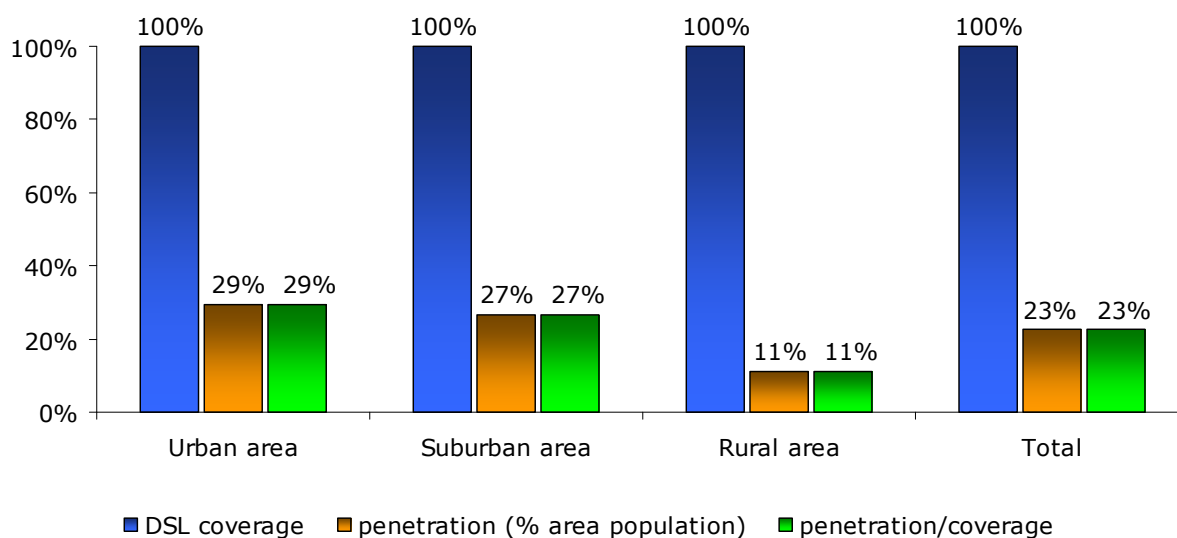
DSL coverage is now deemed complete in all parts of Denmark. All exchanges have been equipped with DSL capability for several years and almost all people are covered with DSL services. Still take-up remains far higher in urban and suburban areas than in rural areas.

Number of DSL connections by download rate
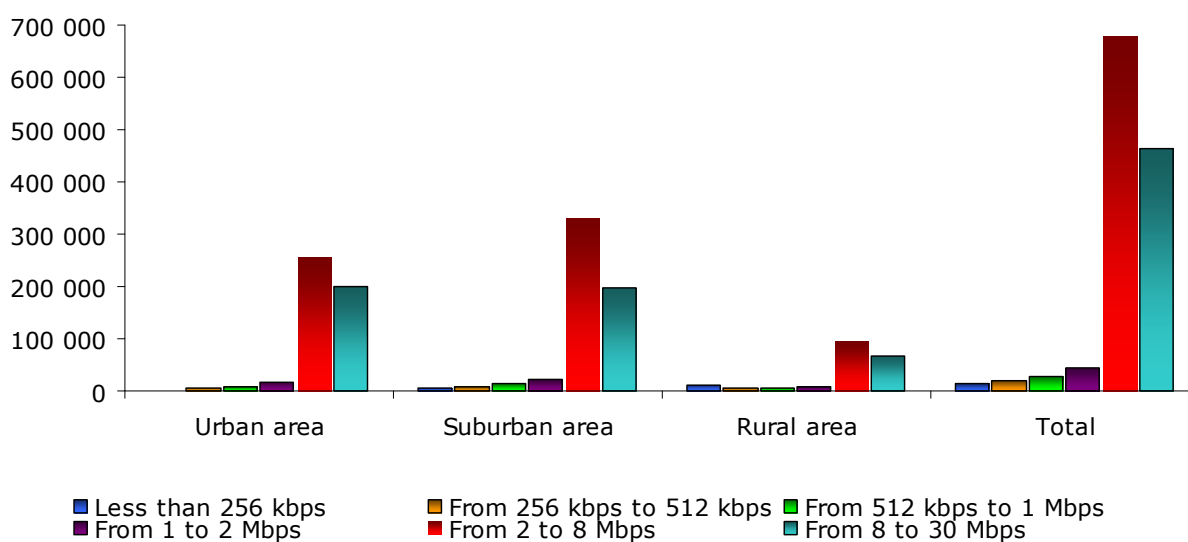
Download speeds are in the 2-8 Mbps and 8-30 Mbps range. The share of the low speed subscribers (up to 2 Mbps) counts for about 10% of the total DSL subscribers.

Number of DSL connections by type of provider
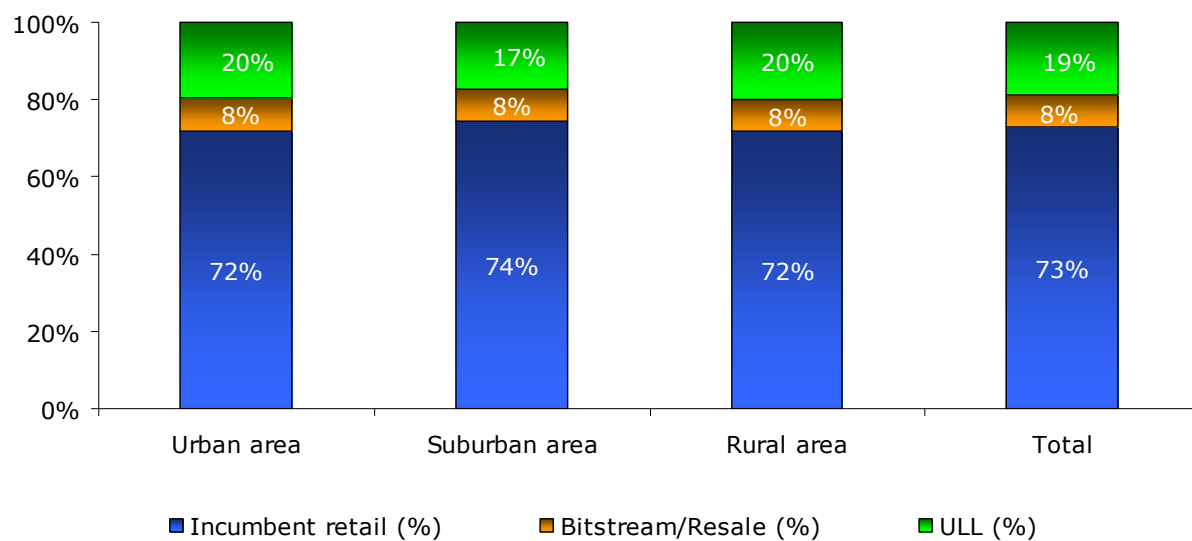
The incumbent (TDC) remains strong, having nearly 73% of the DSL subscriptions.

4.6.4. Cable modem coverage and take-up

Coverage and penetration
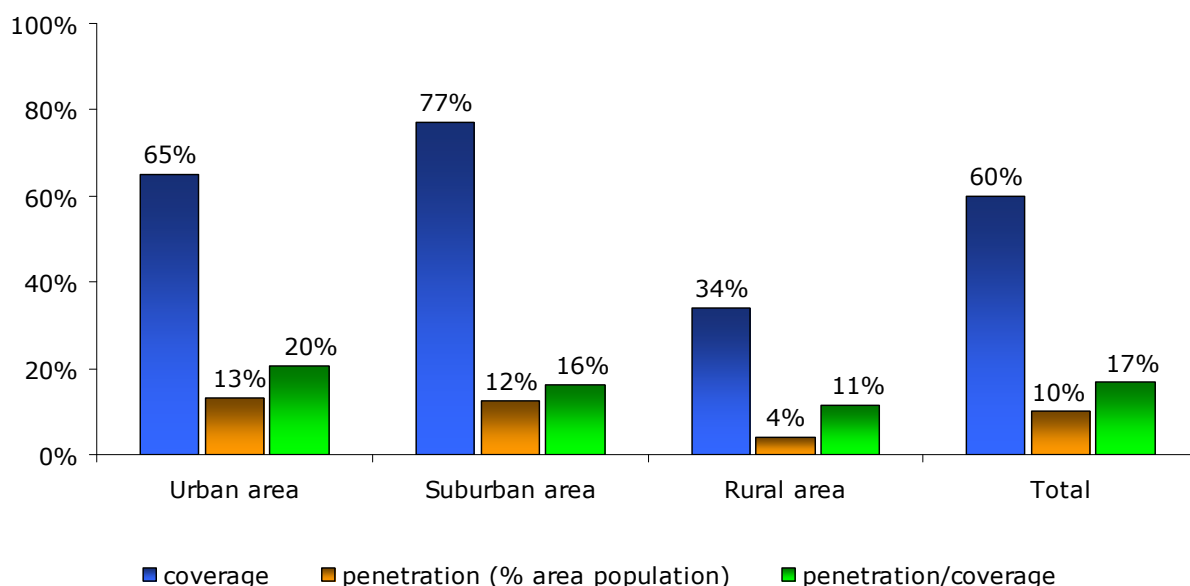
The cable TV broadband is still the second largest fixed broadband platform in Denmark. After analogue shut down and introduction of DTT there was an assumption that some cable TV subscribers will change to DTT and this would have implications on Cable TV broadband subscribers. As cable TV networks were more largely deployed in suburbs, cable modem coverage is also higher in suburban areas. Furthermore, the incumbent telco TDC, which is also active in cable, has given priority to DSL in urban areas.

We cannot see this development at the end of 2009, however, it is important to see how the development of cable TV broadband will be in 2010.

Number of cable modem connections by download rate
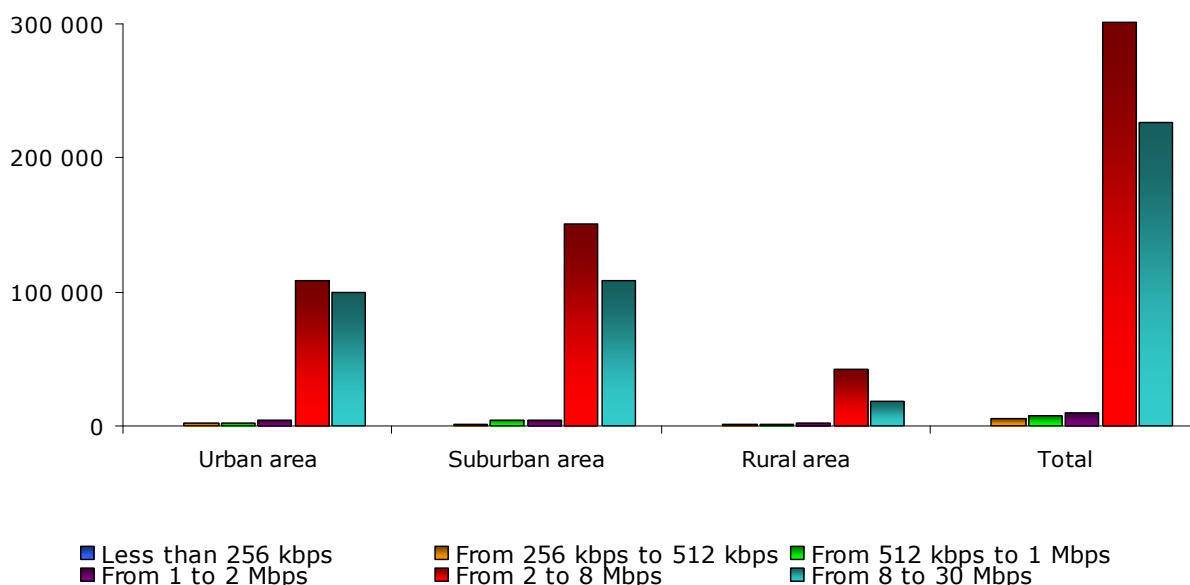
In 2008 we could observe a decrease in the number of cable TV broadband subscribers. In 2009 the development has changed and we see an increase in the number of subscribers.

4.6.5. FTTx coverage and take-up

Coverage and penetration
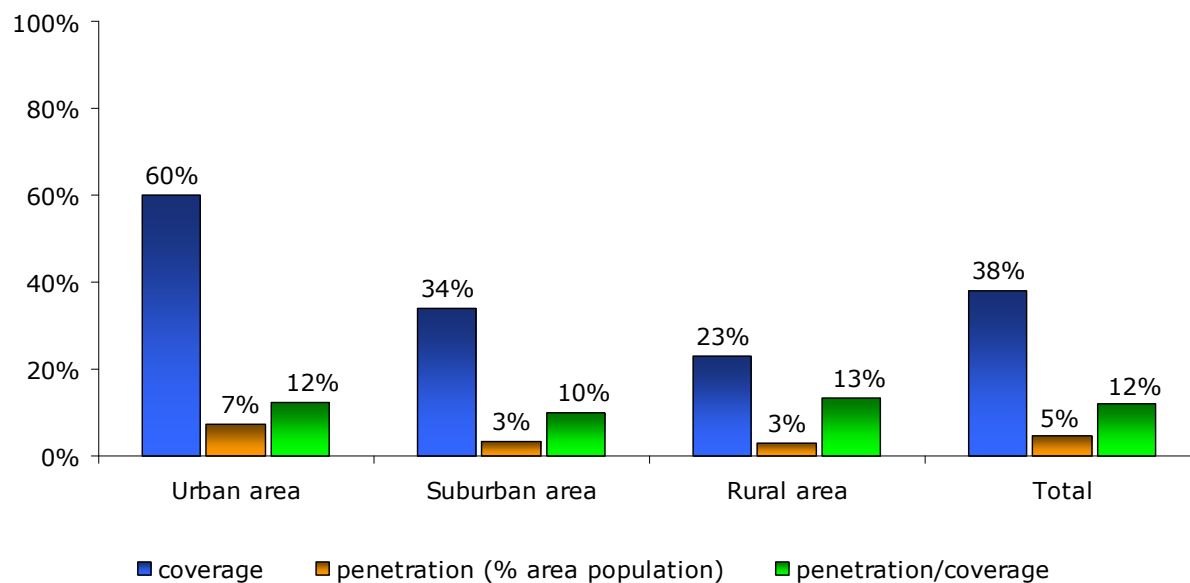
FTTx continues to grow in Denmark, however, the number of FTTH counts for about half of the total FTTx, the other half being LAN subscribers. FTTx counts for about 250,000 subscribers, i.e. 12,5% of the market for fixed broadband connections.

FTTx connections by download rate
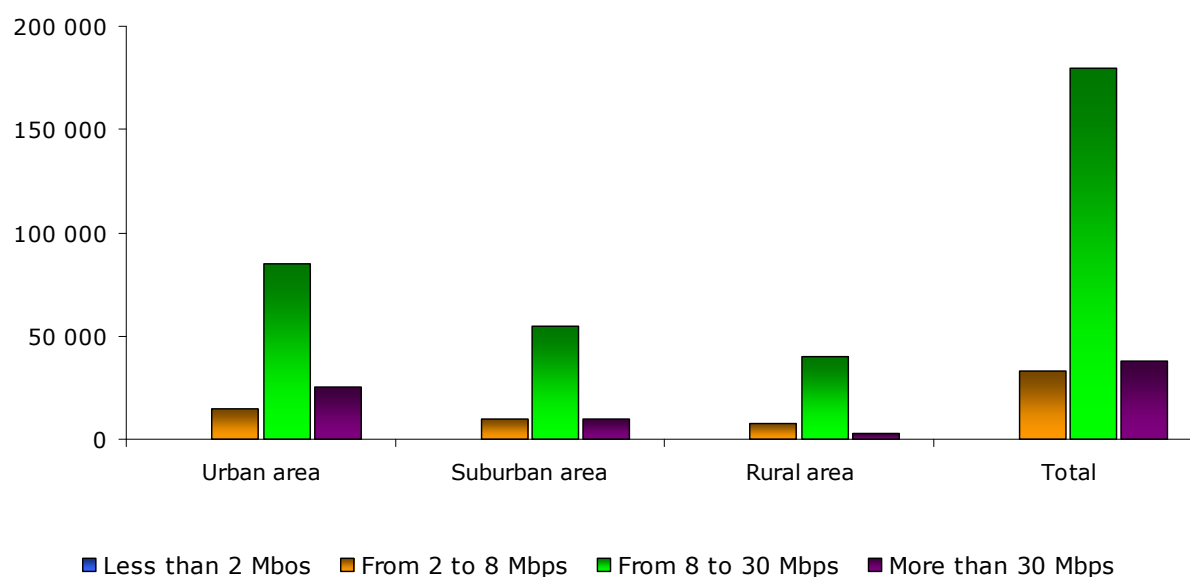
4.6.6. Other broadband access technologies

Wi-Fi

In addition to established operators such as TDC, the market is now populated by new entrants such as Danske Telecom. The number of Wi-Fi subscribers is about 6,000 at the end of 2009.

WLL/WiMAX

WLL is almost nonexistent and WiMAX is developing slowly; there were about 19,000 subscribers in Denmark at the end of 2009.

Following companies are active in the WiMAX market in Denmark: Change Networks, Elro Erhverv, Fuzion, Info- Connect, IP Vision, Nianet, Onfone, Zen Systems.

Satellite

There are no satellite subscribers in Denmark.

4.6.7. Mobile broadband coverage and take-up

Coverage by technology
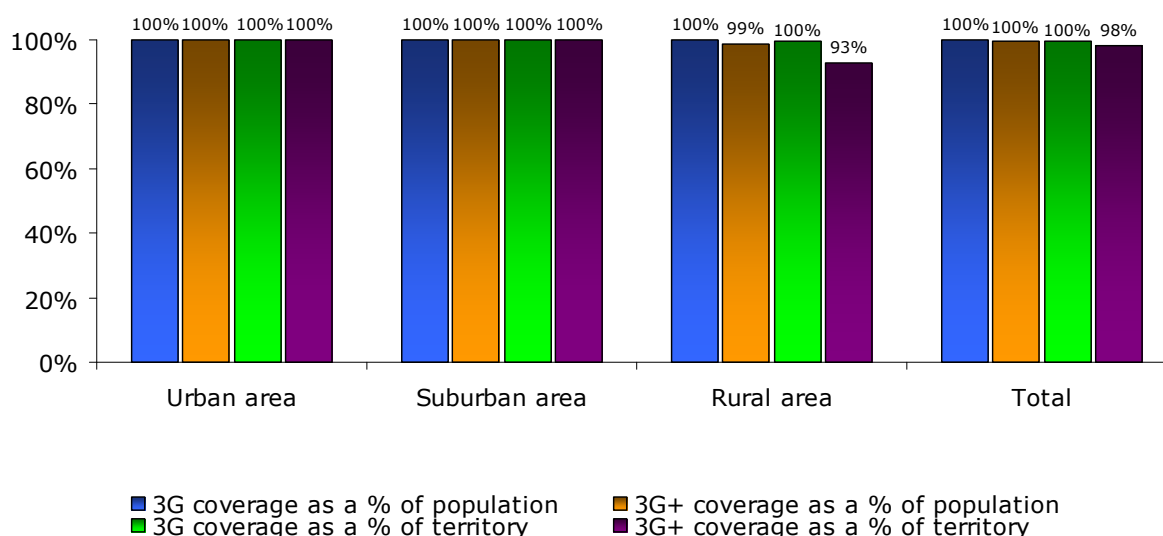
All four existing mobile operators were awarded 3G licences in September 2001. Hutchison's Hi3G launched the country's first 3G service in October 2003, and was the country's sole provider of 3G services until 7 November 2005, which marked the launch of TDC's 3G voice and data services. Meanwhile, in 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.

Penetration
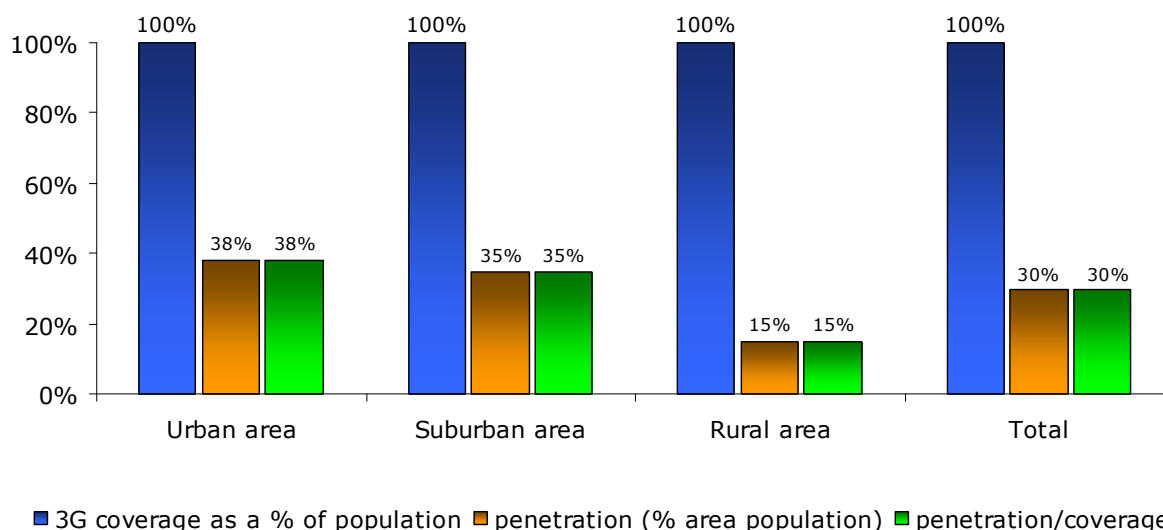
At the end of 2009 there were 1.6 million 3G subscribers in Denmark and the coverage is almost 100%.

As seen there has been a tremendous growth in the number of mobile broadband subscribers in the last couple of years in Denmark.

4.7. Estonia

4.7.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	930,753	0	409,374	1,340,127
Share of total population	69.5%	0.0%	30.5%	100.0%

4.7.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	-	-	85%	94%	94%
DSL subscribers	85,000	102,000	117,000	125,000	135,000
DSL penetration (% of population)	6.3%	7.6%	8.7%	9.3%	10.1%
Cable modem coverage (% population)	53%	53%	53%	69%	69%
Cable modem subscribers	50,000	59,000	71,000	74,000	77,000
Cable modem penetration (% population)	3.7%	4.4%	5.3%	5.5%	5.7%
FTTx/LAN subscribers	40,000	58,000	67,000	81,000	88,000
PLC subscribers	0	0	0	0	0
WLL subscribers	5,000	9,000	25,000	35,000	38,000
Satellite subscribers	0	0	0	na	na
Total	180,000	228,000	280,000	315,000	338,000
Total fixed broadband penetration (% population)	13.4%	17.0%	20.9%	23.5%	25.2%
Mobile broadband subscribers					22,000
Mobile broadband penetration (% population)					1.6%

The number of fixed broadband connections increased by 7% in 2009 (+14% in 2008). There are tens of service providers (82 data communication service providers in total at the end of 2009), with some major ones such as Elion Ettevõtted AS, AS Starman, AS STV, and Televõrgu AS. Market competition has developed mainly between opertors owning their network infrastructure. Among major service providers, Elion provides mainly ADSL services, Starman and STV provided Internet broadband connection services over cable and fibre. Of the total number of fixed broadband end-users, 82% are using services of Elion, Starman or STV. The three operators also entered the very high speed market with solutions with download speeds of 100 Mbps.

Most of end-users are using packaged solutions, including also (mobile) telephone service and/or cable TV. At the end of 2009, 64% (62% in 2008) of end-users were using packaged solutions.

4.7.3. DSL coverage and take-up

Coverage and penetration
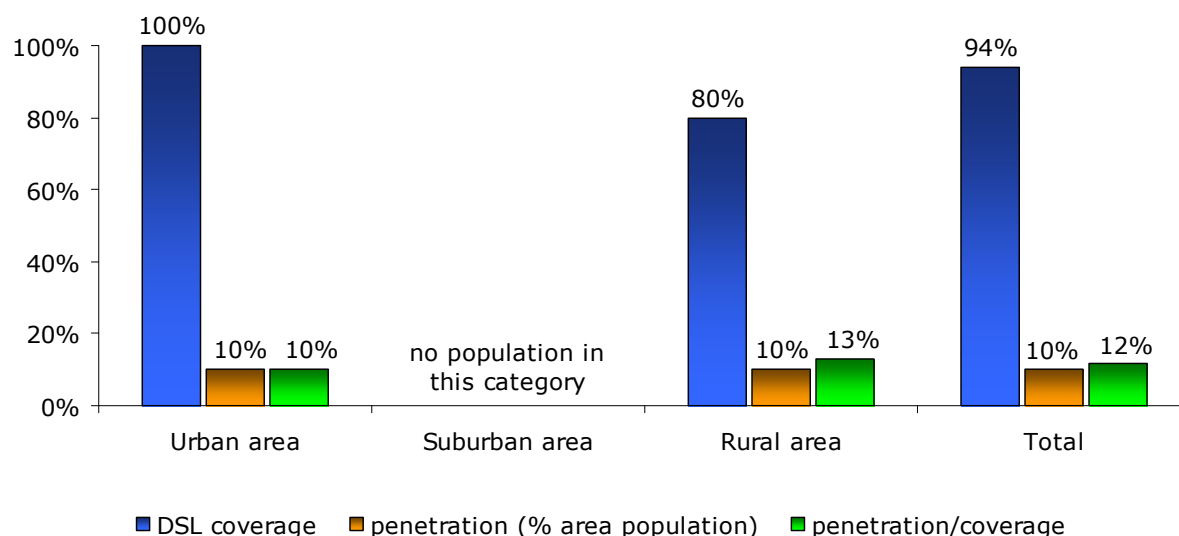
Compared to 2008, the number of ADSL end-users increased by 8% (ca 9% growth in 2008).
It is estimated that 100% of urban areas and 80% of rural areas are covered with ADSL technologies. The geographical split of actual subscribers is estimated, on the assumption that penetration is quite similar in urban and in rural areas (DSL higher penetration/coverage ratio in rural areas compensates for the lack of availability of cable modem solutions in those areas).

Number of DSL connections by download rate
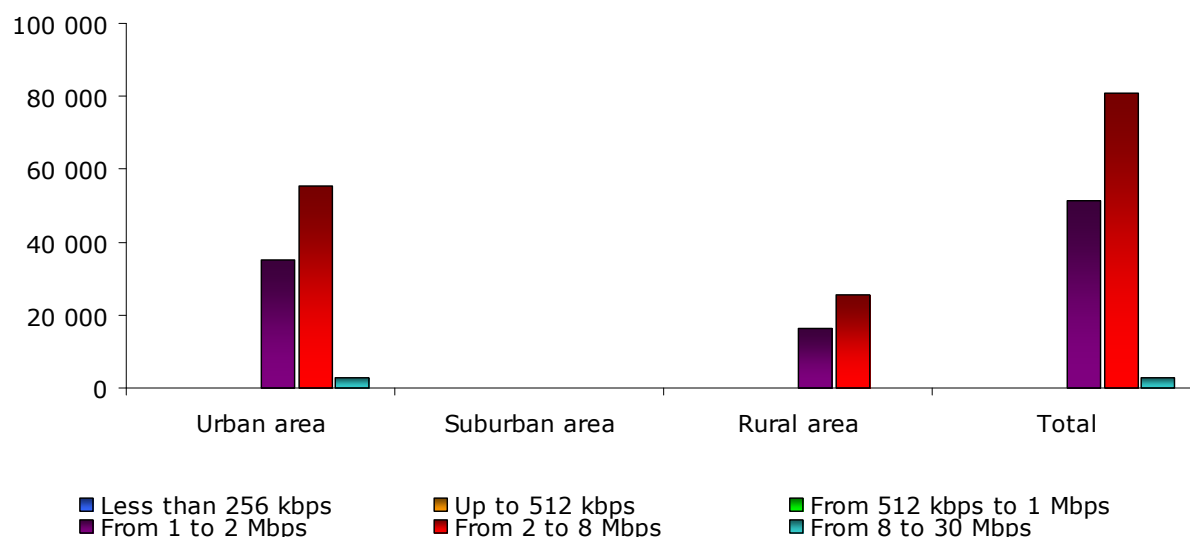
Detailed data on DSL connections by download rate is not available from the providers, but it is estimated that 38% of the connections have speeds up of to 2 Mbps and only 2% have speeds of 10Mbps or higher.

Number of DSL connections by type of provider
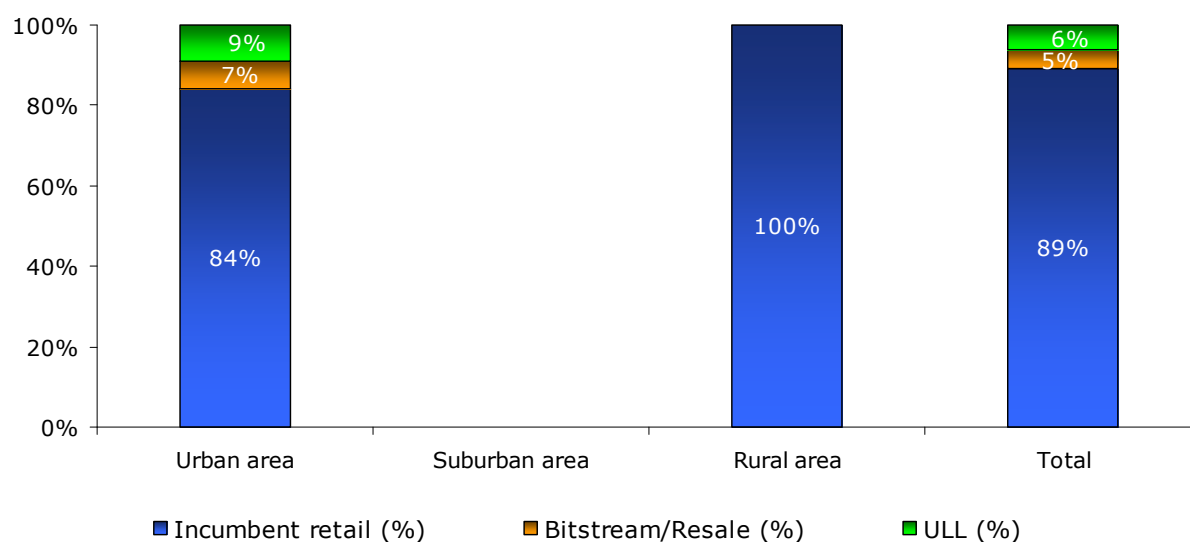
At the end of 2009, only 8,500 Elion local lines were unbundled. In 2008, Elion and Elisa began offering wholesale bitstream access to other companies, attracting 180 customers by year end and 6,300 by the end of 2009[4].

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[4] The total number of DSL users is reported to be 135,000: of them the number of DSL lines directly delivered by incumbent or subsidiary is 127,000 (o/w 6,800 by subsidiary through ULL) and 6,300 are delivered by other DSL providers via Bitstream or Resale. The remaining 1,700 are DSL lines owned and operated by different operators.

4.7.4. Cable modem coverage and take-up

Coverage and penetration
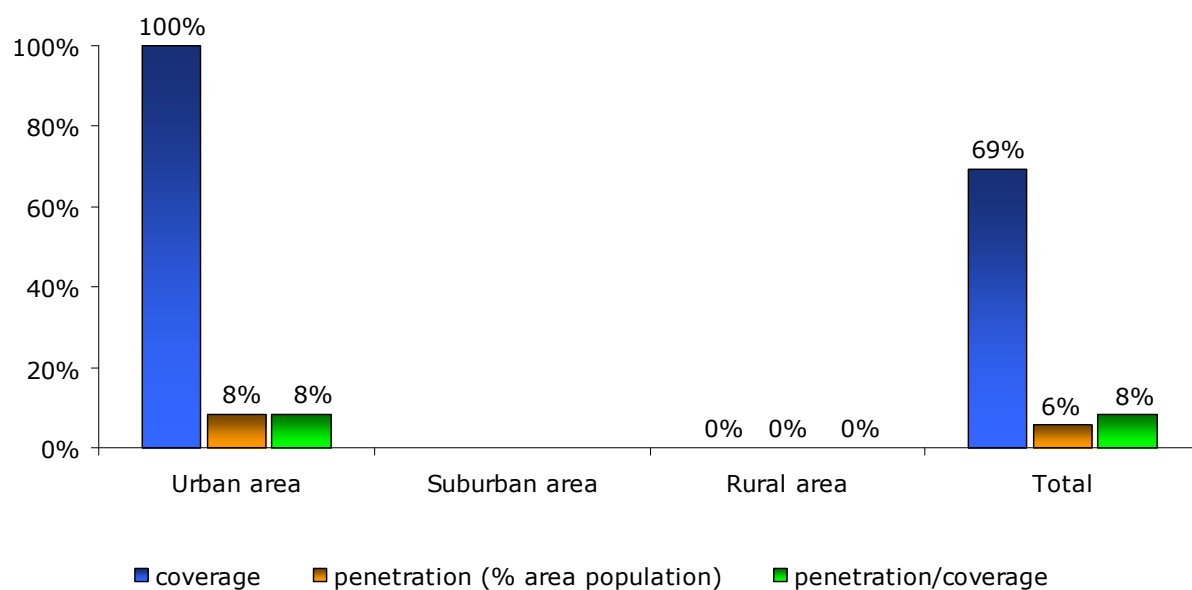
Compared to 2008, the number of cable modem end-users increased by 4%.

It is estimated that only urban areas are covered with cable networks capable of broadband Internet access.

Number of cable modem connections by download rate
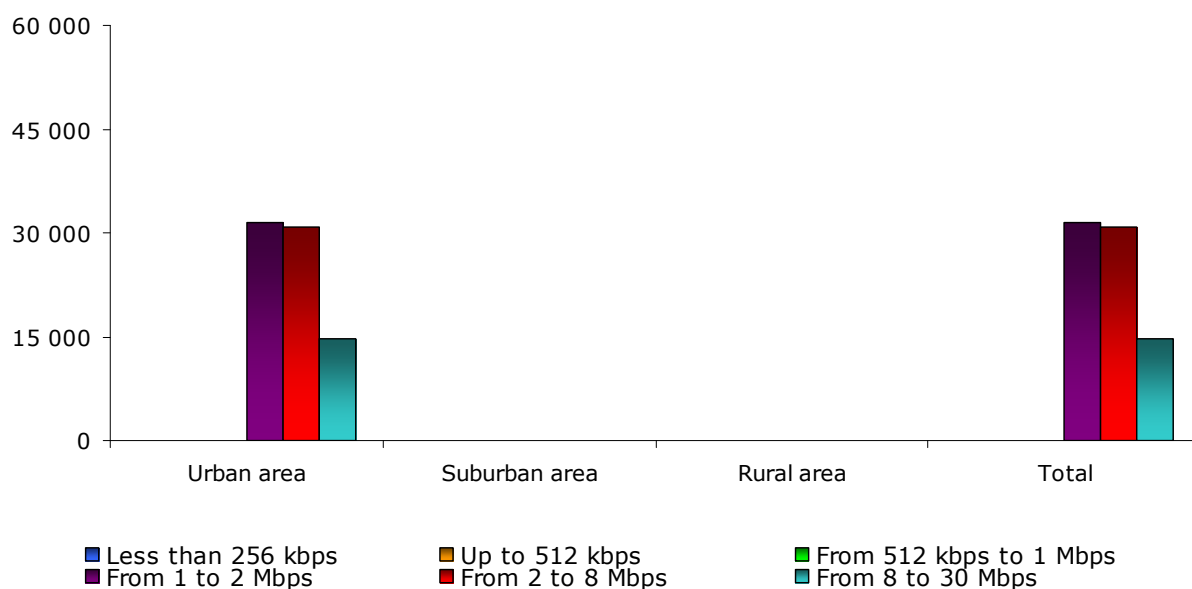
Detailed data on cable modem connections by download rate is not available from the providers, but it is estimated that some 41% of the connections have speeds up to 2 Mbps while 19% have speeds of 10Mbps or higher.

4.7.5. FTTx coverage and take-up

Coverage and penetration
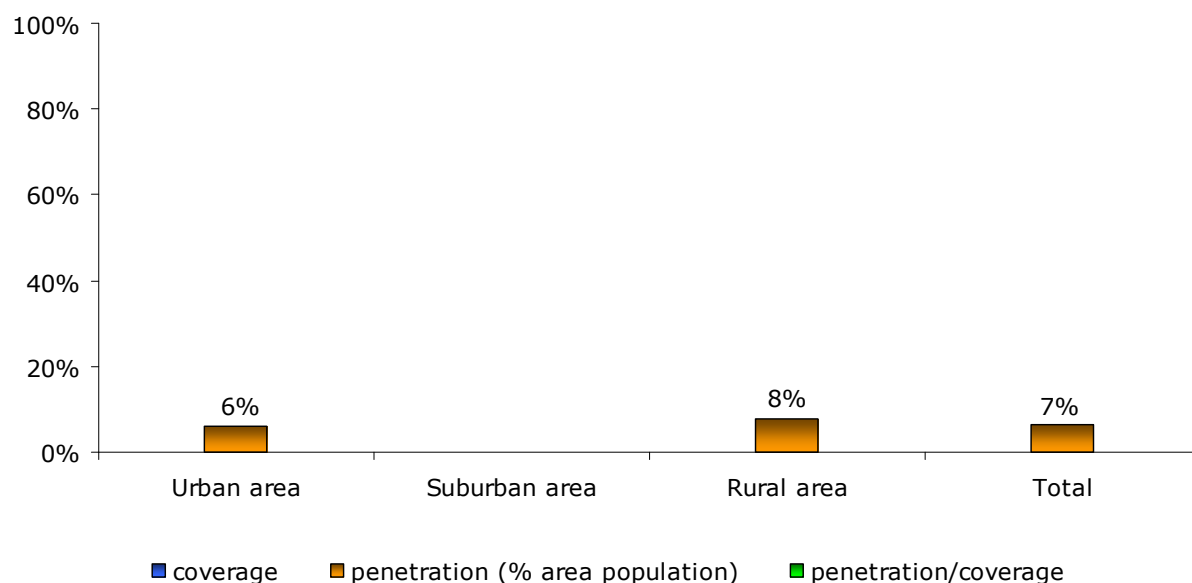
Compared to 2008, the number of end-users of fibre solutions increased by 9% (growth rate was 21% for 2008).

FTTx connections by download rate
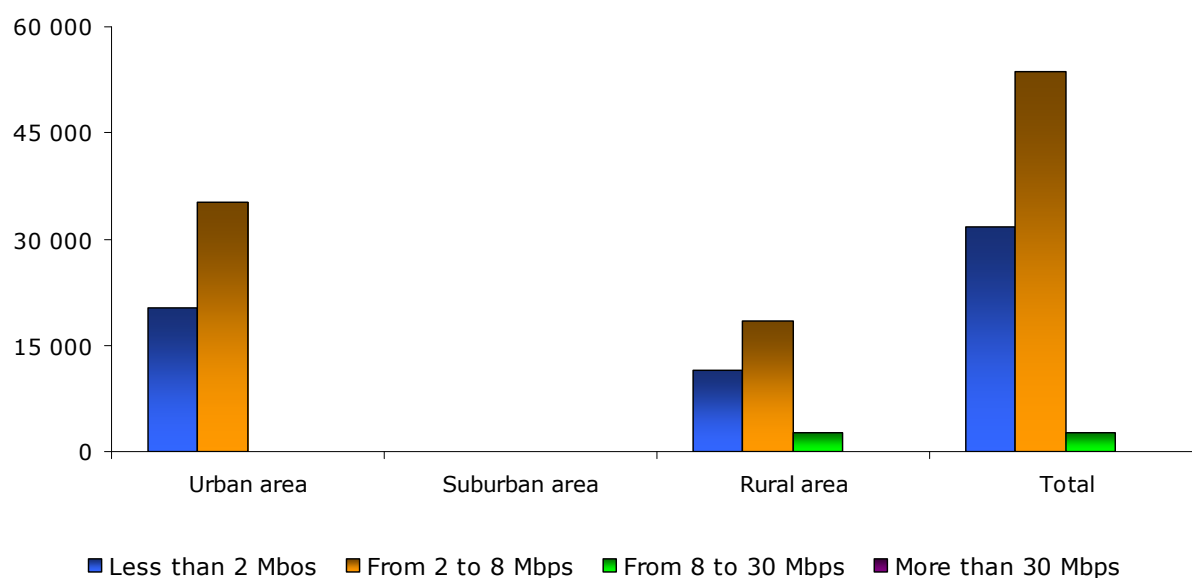
Detailed data on FTTx connections by download rate is not available from the providers, but it is estimated that 36% of the connections have speeds of up to 2 Mbps and 3% only have speeds of 10Mbps or higher (all in rural areas) as most of them are LAN connections using coax cable networks: connection speeds are often symmetrical (for instance, basic rate offered by STV cable is 1Mbps/1Mbps).

4.7.6. Other broadband access technologies

WLL/WiMAX

The number of end-users using WLL solutions increased by 8% in 2009 (38% growth in 2008). Growth in 2008 was caused by the fact that Elisa, in cooperation with Levira AS started to operate pan-Estonian Network based on WiMAX. However the number of WiMAX connections is still low compared to other fixed broadband connections.

A widescale CDMA 450 MHz based network "Kõu" was opened by mid-June 2007, operated by AS Televõrk (related to Eesti Energia AS), but speeds offered are unstable and can not be categorised as full broadband access technologies.

Satellite

There is no company in Estonia owning a satellite network. Elisa is reselling, but detailed data is not available. The share of satellite broadband access technologies is estimated to be low.

4.7.7. Mobile broadband coverage and take-up

Coverage by technology
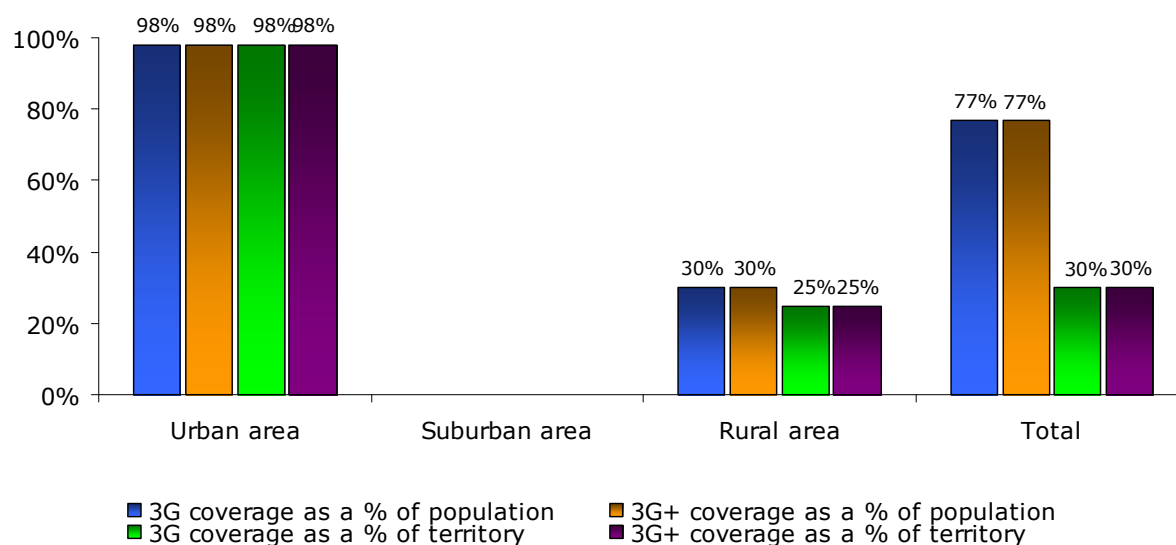
EMT, AS Tele2 and Elisa were awarded ten-year UMTS licences in summer 2003. EMT was the first to trial 3G network in September 2003, but waited until late October 2005 to launch commercial 3G services in the Tallinn area.

As of 2009 all the network operators (Elisa, EMT, Tele2) are operating 3G+ networks and offer 3G+ broadband connections.

Of the population living in urban areas, 98% are estimated to be covered with 3G+, and 30% of those living in rural areas, averaging on 75-80% for the whole country. The respective figures for territory coverage are 98%, 25%, and 30%.

Penetration
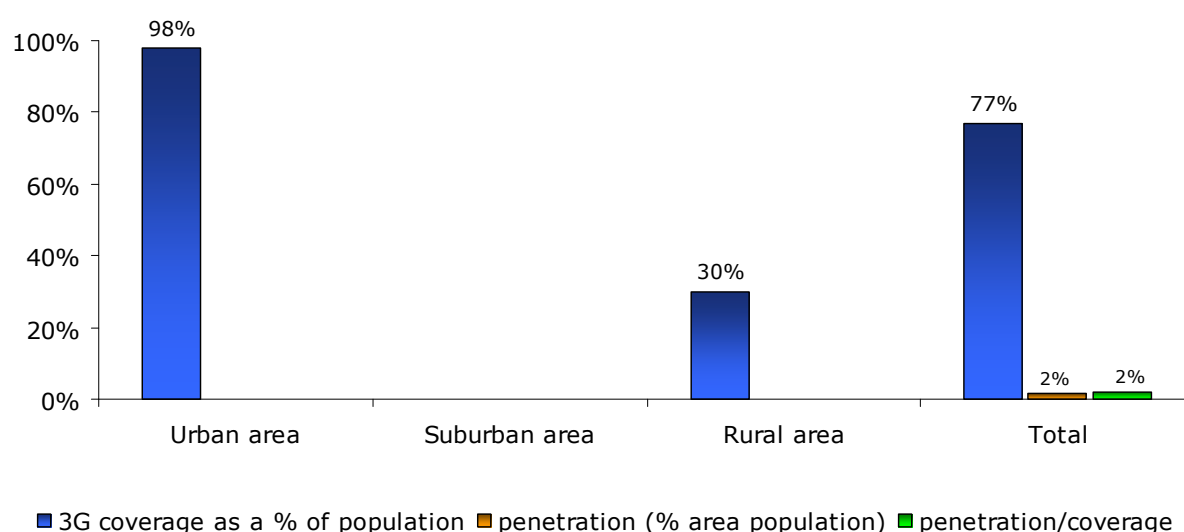
The number of actual users is estimated to be 22,000.

4.8. Finland

4.8.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,886,490	1,674,560	1,790,377	5,326,314
Share of total population	35.3%	31.3%	33.5%	100.0%

4.8.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	90%	92%	96%	96%	96%
DSL subscribers	1,018,700	1,161,100	1,270,500	1,231,300	1,185,900
DSL penetration (% population)	19.1%	21.7%	23.7%	23.1%	22.2%
Cable modem coverage (% population)	33%	35%	40%	40%	40%
Cable modem subscribers	148,900	181,100	209,600	214,800	222,700
Cable modem penetration (% population)	2.8%	3.4%	3.9%	4.0%	4.2%
FTTx/LAN subscribers*	2,700	72,900	114,000	134,900	119,200
PLC subscribers	800	800	1,000	0	0
WLL subscribers	3,500	4,900	15,300	26,100	31,800
Satellite subscribers	0	0	0	0	0
Total**	1,174,600	1,428,900	1,617,100	1,616,900	1,565,600
Total fixed broadband penetration (% population)	22.1%	26.8%	30.2%	30.2%	29.3%
Mobile broadband subscribers			143,100	479,700	908,000
Mobile broadband penetration (% population)			2.7%	9.0%	17.0%

* stated as "real estate and housing company subscriptions" in the Ficora reports (+ FTTH in 2009)
** including broadband connections based on other technologies (8,100 in 2006, 6,700 in 2007, 9,800 in 2008 and 6,000 in 2009)

The Finnish market continues to be dominated by DSL, which is available to 96% of the population and accounts for about 75% of all fixed broadband connections. For the second year running Finland saw a decline in the number of DSL subscriptions due to substitution with mobile broadband and – given the dominant position of DSL – this also resulted in a decline in the total number of fixed broadband subscriptions, as growth in cable and in FTTH was unable to compensate.

There are numerous cable TV operators in Finland (more than 50 including Telia Sonera and Elisa) and coverage is pretty high. Uptake, however, is low while FTTH remains a minor technology.

Download speeds also remain relatively low compared to the other Nordic countries. The National Broadband Strategy, launched in 2004, aimed to have more than 90% of all Internet connections over broadband by the end of 2007, with average download speeds of 8 Mbps. In reality, only 14% have speeds above 8 Mbps at the end of 2009, while 39% still have speeds below 2 Mbps. This is in marked contrast to the other Nordic countries, where average download speeds are much higher.

Mobile broadband is experiencing high growth, however, with a nearly 90% increase in mobile broadband subscriptions. At 17%, the penetration is much higher than in Norway and Sweden, and almost as high as in Denmark.

4.8.3. DSL coverage and take-up

Coverage and penetration
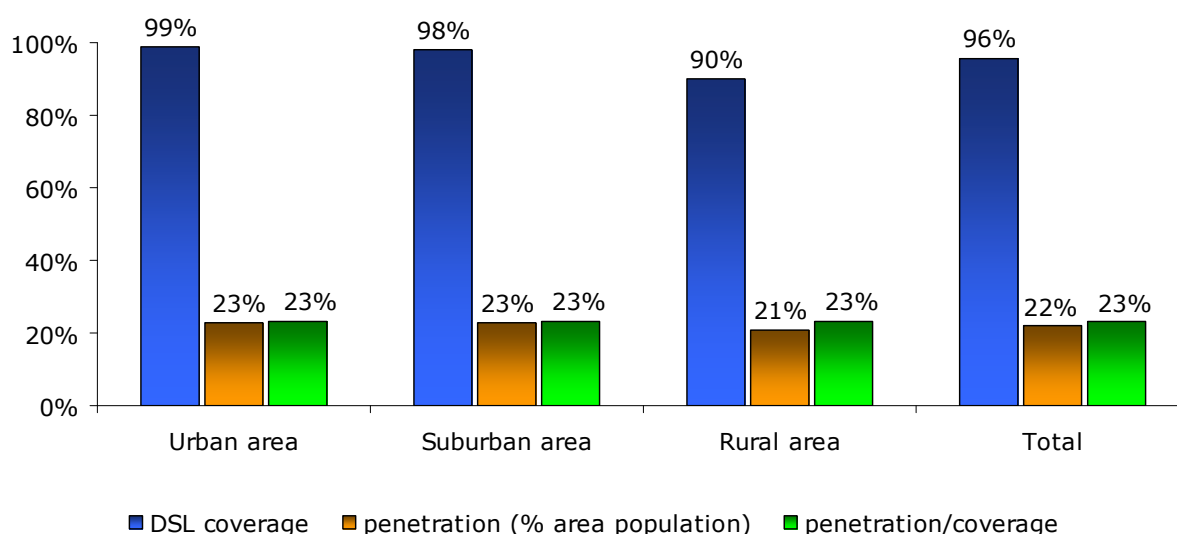
DSL coverage in urban areas is close to 100%. Nationwide, the coverage remains around 96%. According to Ficora, this figure is not likely to increase in the foreseeable future.

The number of DSL connections fell from 2008 to 2009, continuing the trend seen last year.

Either way, like in the other Nordic countries, the number of DSL subscriptions has not only flattened but is now in decline.

Number of DSL connections by download rate
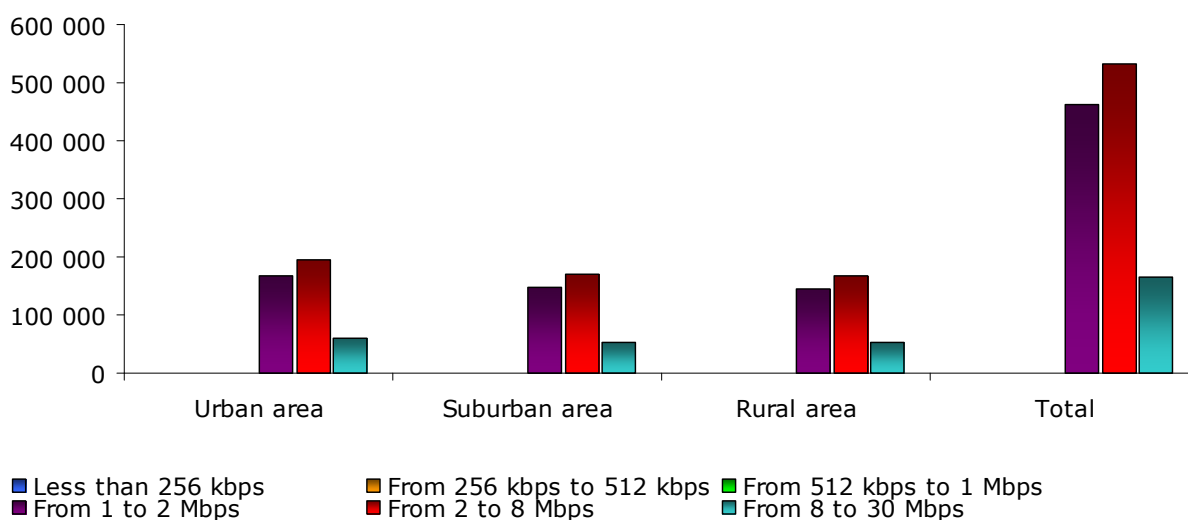
Because no data is available from operators, we have to rely on figures from Ficora, the national regulatory authority. They report that 39% of all broadband subscriptions (DSL and cable) had a download rate of below 2 Mbps, and only 16% above 10 Mbps (here pictured as 8 Mbps). Since DSL dominates the market, the overall figures are probably reasonably accurate for DSL.

Percentage of DSL connections by type of provider
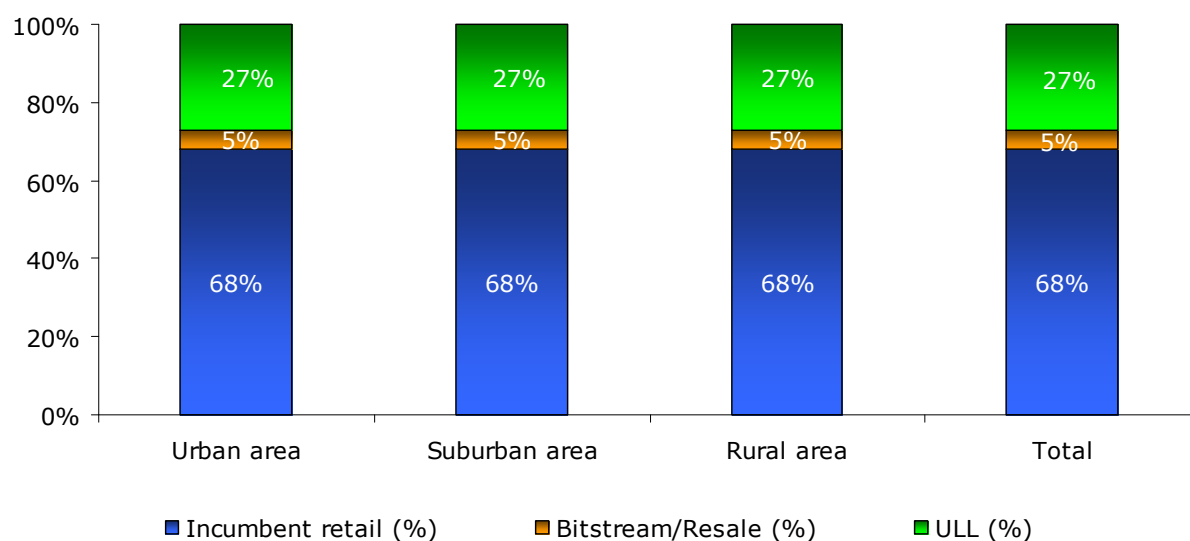
There are several "incumbents" in the Finnish market; dozens of local telcos, each of which can be classified as an incumbent in its own traditional operating area. The split into incumbent and others is therefore very challenging in the Finnish market.

For practical purposes, Elisa, Finnet and TeliaSonera Finland are considered Finland's three incumbents. The split above is based on a discussion with Ficora. There is no significant change from previous years.

4.8.4. Cable modem coverage and take-up

Coverage and penetration
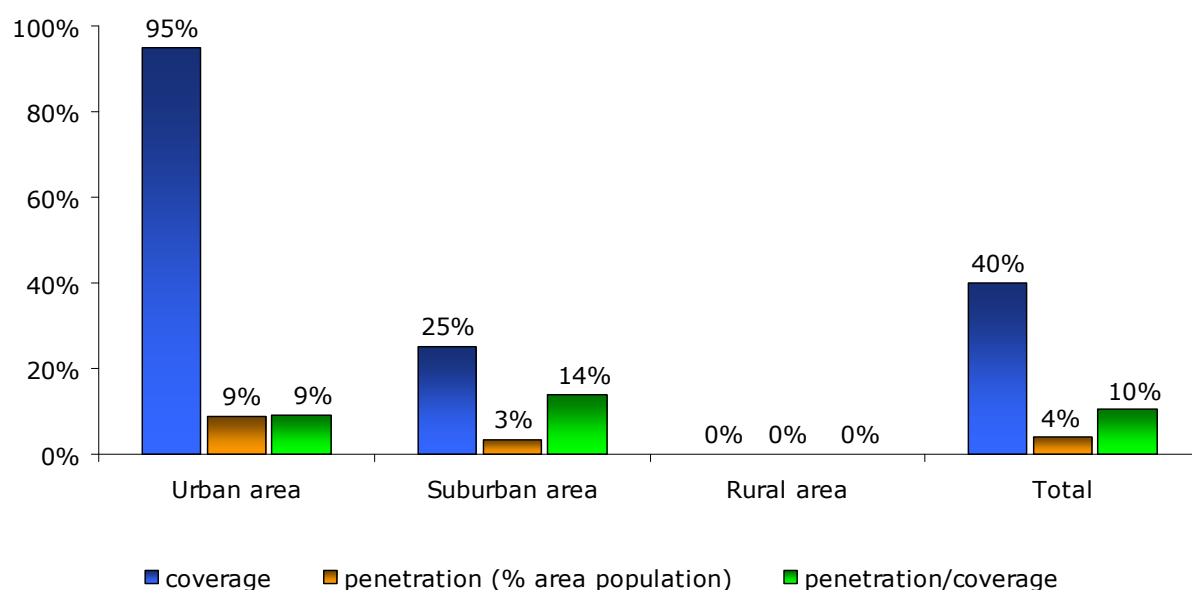
Approximately 40% of the Finish population can be covered by cable modem. Cable modem is available primarily in urban areas. According to Ficora, the coverage is not expected to increase in the foreseeable future.

Number of cable modem connections by download rate
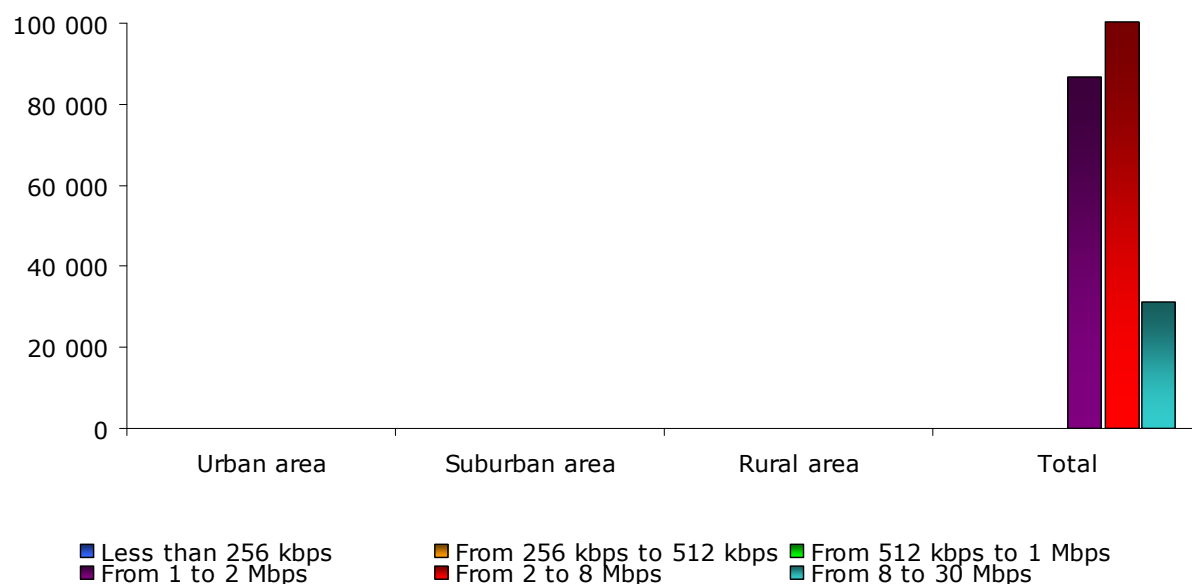
4.8.5. FTTx coverage and take-up

Coverage and penetration
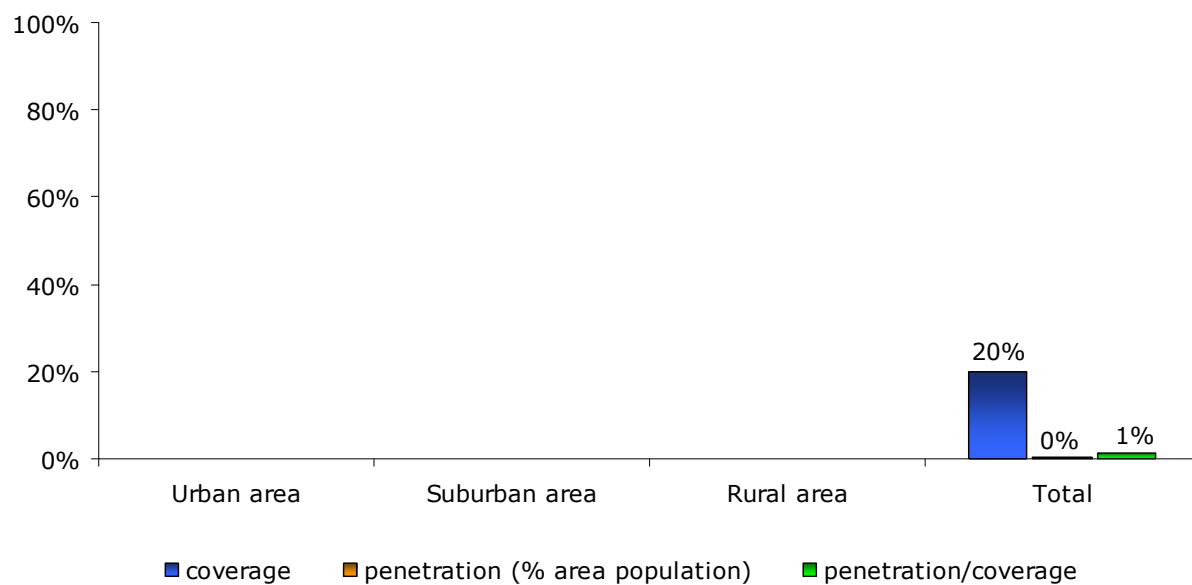
Estimates by IDATE

FTTx connections by download rate
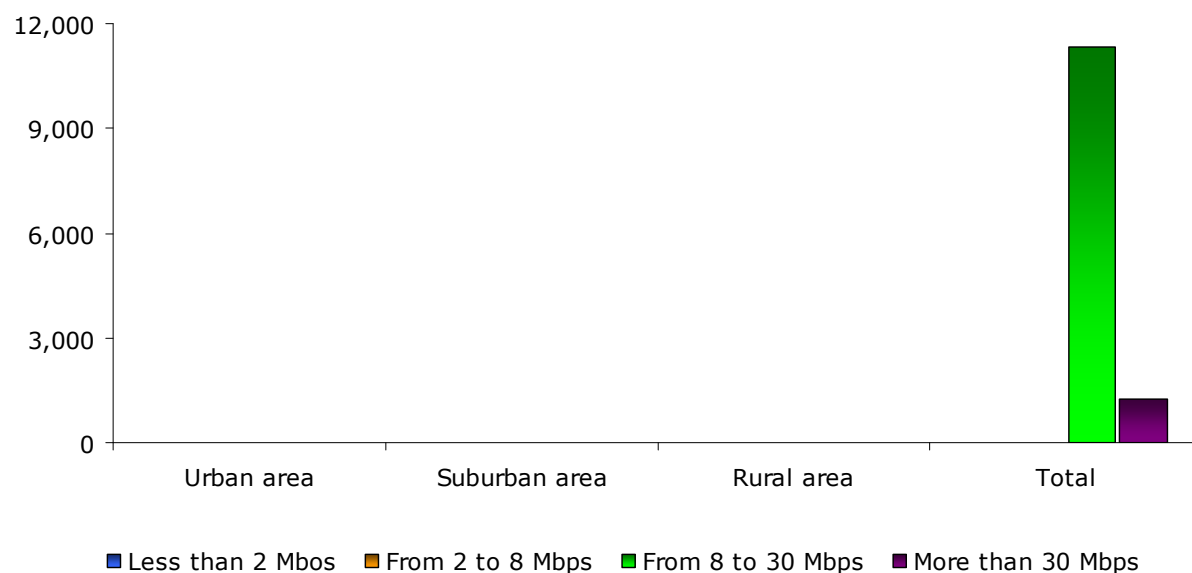
Estimates by IDATE

Other broadband access technologies

Wi-Fi

There are no official statistics on the number of hotspots.

WLL/WiMAX

Coverage and penetration is limited as the technology loses ground to regular mobile broadband.

Satellite and PLC

Satellite does not play a significant role in the Finnish market.

4.8.6. Mobile broadband coverage and take-up

Coverage by technology

- 3G coverage as a % of population
- 3G+ coverage as a % of population
- 3G coverage as a % of territory
- 3G+ coverage as a % of territory
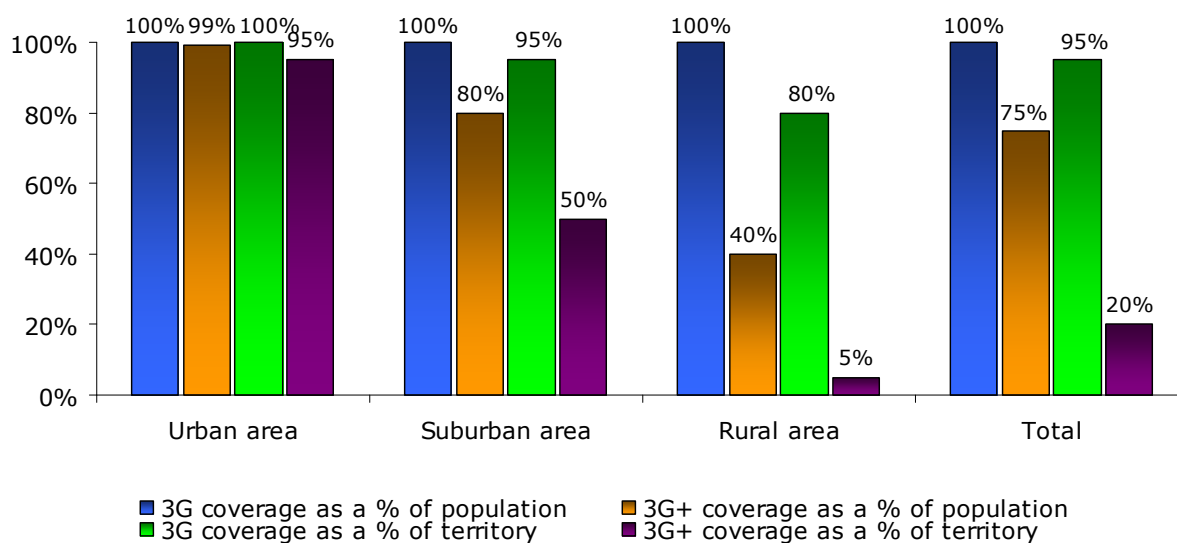
The 3G operators largely cover the same areas and it is estimated that nearly the entire population and a significant part of the territory was covered by some type of 3G at the end of 2009. Urban areas enjoy very high coverage (95-100%), while rural areas are more sparsely covered, with very little coverage outside inhabited areas. HSDPA was first introduced in the largest cities and it is still to be expanded in less dense areas.

Penetration

- 3G coverage as a % of population
- penetration (% area population)
- penetration/coverage
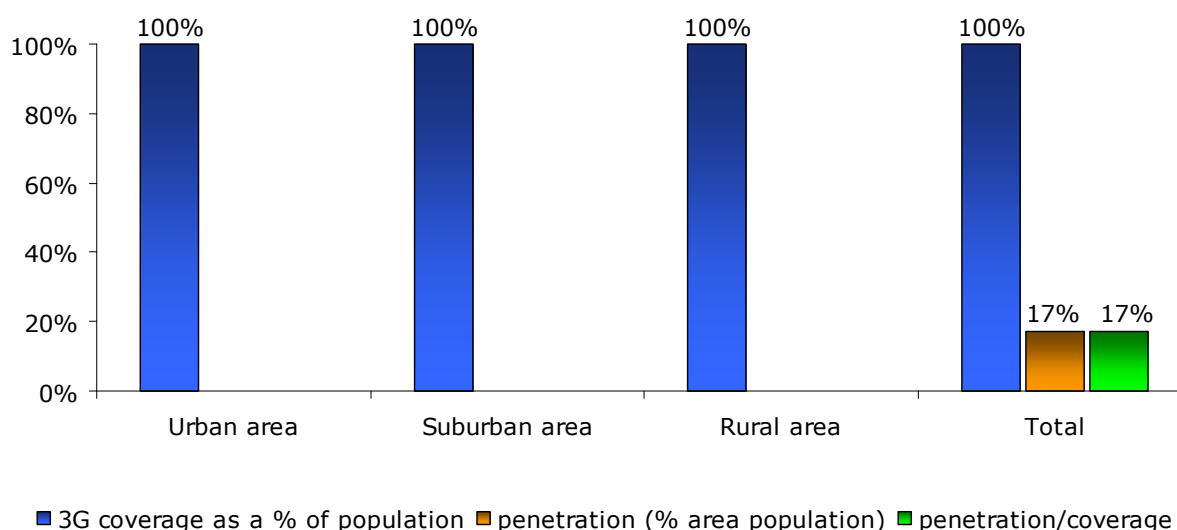
Ficora reports 908,000 mobile broadband subscriptions in 2009, up nearly 90% from last year. This is probably because most new handsets are 3G ready and the service is included in every subscription.

Detailed penetration maps are not available, but at 17% the penetration of mobile broadband is quite high.

4.9. France

4.9.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	34,596,845	15,520,080	14,550,075	64,667,000
Share of total population	53.5%	24.0%	22.5%	100.0%

4.9.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	96%	98%	99%	100%	100%
DSL subscribers	8,777,215	11,877,557	14,800,000	16,804,000	18,500,000
DSL penetration (% population)	14.1%	18.9%	23.5%	26.1%	28.6%
Cable modem coverage (% population)	26%	26%	26%	26%	26%
Cable modem subscribers	566,400	700,000	703,500	686,650	820,000
Cable modem penetration (% population)	0.9%	1.1%	1.1%	1.1%	1.3%
FTTx subscribers	6,800	14,000	43,500	180,550	308,200
PLC subscribers	0	<800	<800	<800	<800
WLL subscribers	1,200	1,200	1,200	4,000	4,000
Satellite subscribers	1,000	1,000	2,000	15,000	35,000
Total	9,352,615	12,594,557	15,551,000	17,691,000	19,668,000
Total fixed broadband penetration (% population)	15.0%	20.0%	24.6%	27,4%	30.4%
Mobile broadband subscribers			5,879,000	11,439,000	16,915,000
Mobile broadband penetration (% population)			9.1%	17.8%	26.2%

The total number of fixed broadband subscribers in France increased by 11.2% in 2009 (2 million new broadband connections in one year) with penetration reaching 30.4% at year-end.

DSL, which is now available to nearly all people in France (all exchanges are DSL-equipped), is still by far the leading broadband access technology, accounting for 94% of total fixed connections. Competition is driven by LLU. ADSL2+ technology is widespread and most users have access to triple play bundles that include IPTV. After consolidation, the DSL market is now concentrated in the hands of three operators: Orange (France Telecom), SFR (formerly neuf cegetel) and Iliad/Free.

The cable modem segment, which is still modest, gained some market share in 2009 as a result of aggressively priced offers from the main cable operator, Numericable.

Furthermore, more than half of cable networks are now upgraded to FTTB, with subscriber base accounting for more than 75% of the FTTx subscriber base.

Mobile broadband subscribers continued to increase substantially: more than one out of every four mobile subscribers is now using 3G services.

4.9.3. DSL coverage and take-up

Coverage and penetration
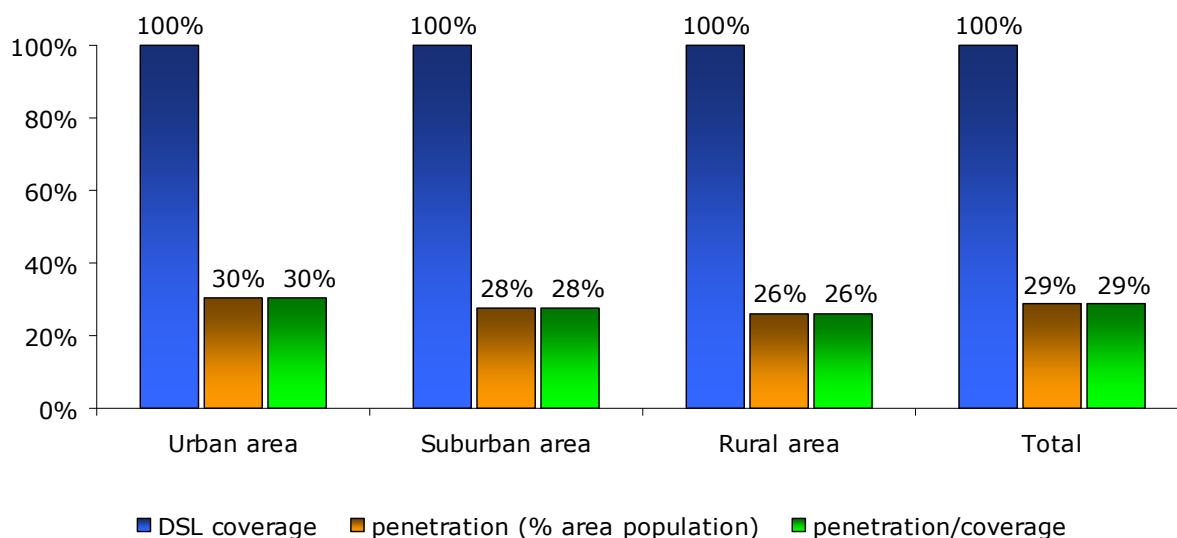
All France Telecom local exchanges are DSL-equipped. However, FT indicates that, due to technical constraints, ADSL can be delivered only to 99% of units depending on those local exchanges, except in certain big cities (Paris, Lyon and Marseille).

1.7 million new DSL subscribers entered the broadband market in 2009 (+10%).

Number of DSL connections by download rate
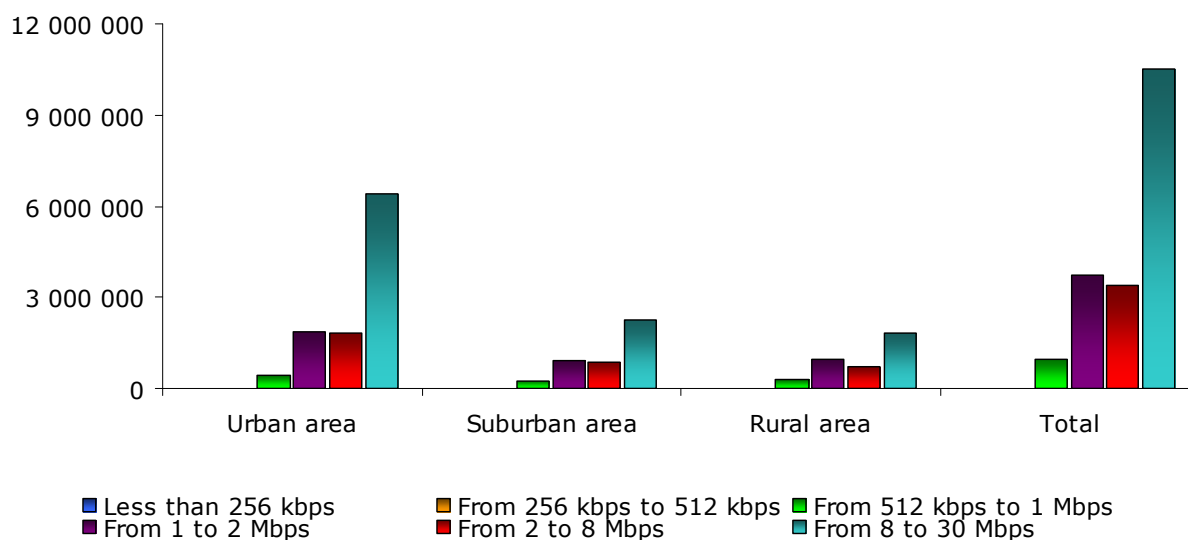
The French ADSL market is characterised by a high proportion of connections with download rates over 8 Mbps, supported by ADSL2+ technology. We estimate that 10.5 million connections (or 57% of total DSL connections) were in this category at the end of 2008. This also means that most DSL subscribers can receive IPTV. According to ARCEP, there were 8.8 million potential IPTV users at the end of 2009.

Percentage of DSL connections by type of provider
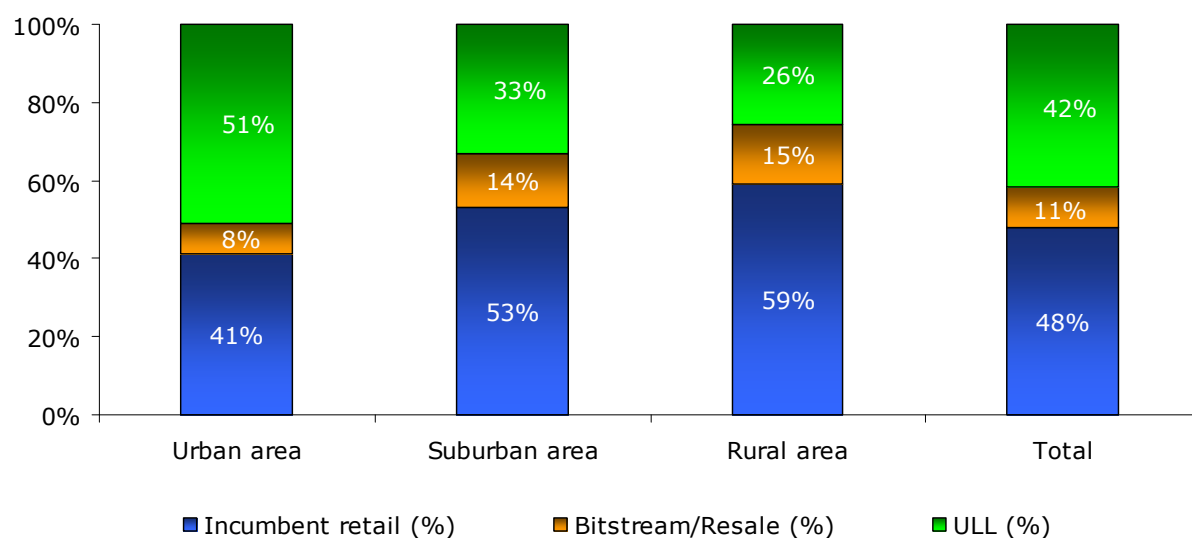
Although the DSL market is highly concentrated, with more than 95% of DSL connections provided by the main 3 ISPs, it is a competitive market. The incumbent's share (in terms of connections) is just below the 50%-mark. SFR and Free have 24% each, mainly through unbundling. Bouygues Telecom entered the market at the end of 2008.

4.9.4. Cable modem coverage and take-up

Coverage and penetration
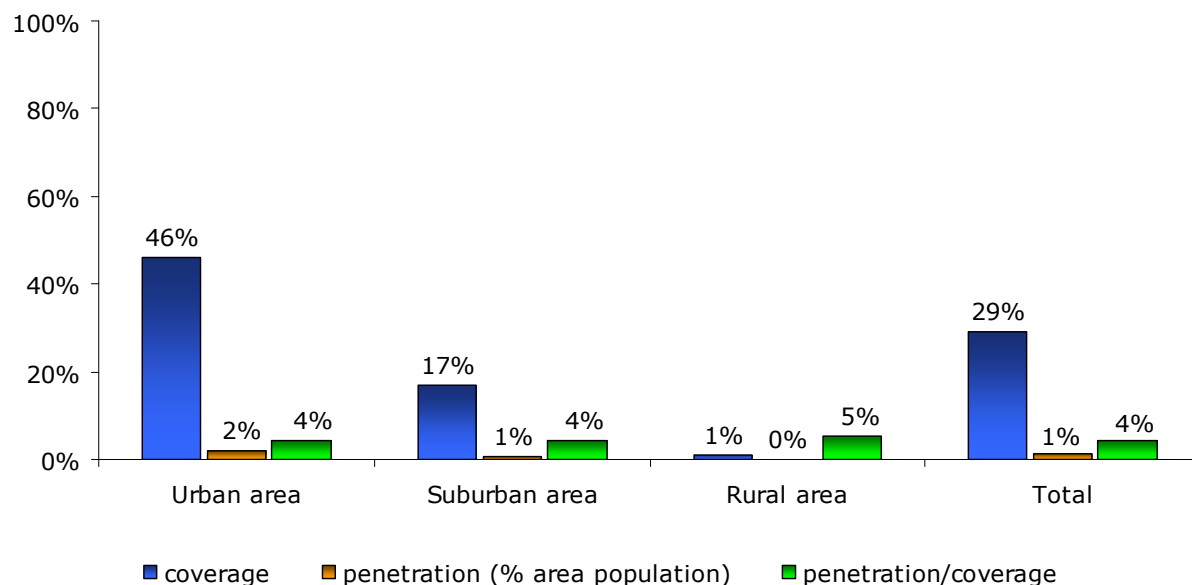
Thanks to some improvements in coverage and aggressive pricing strategy, the cable modem subscriber base increased again in 2009, although Numericable, which now owns close to 100% of country's cable networks, was actively investing in parallel into FTTB technology.

Number of cable modem connections by download rate
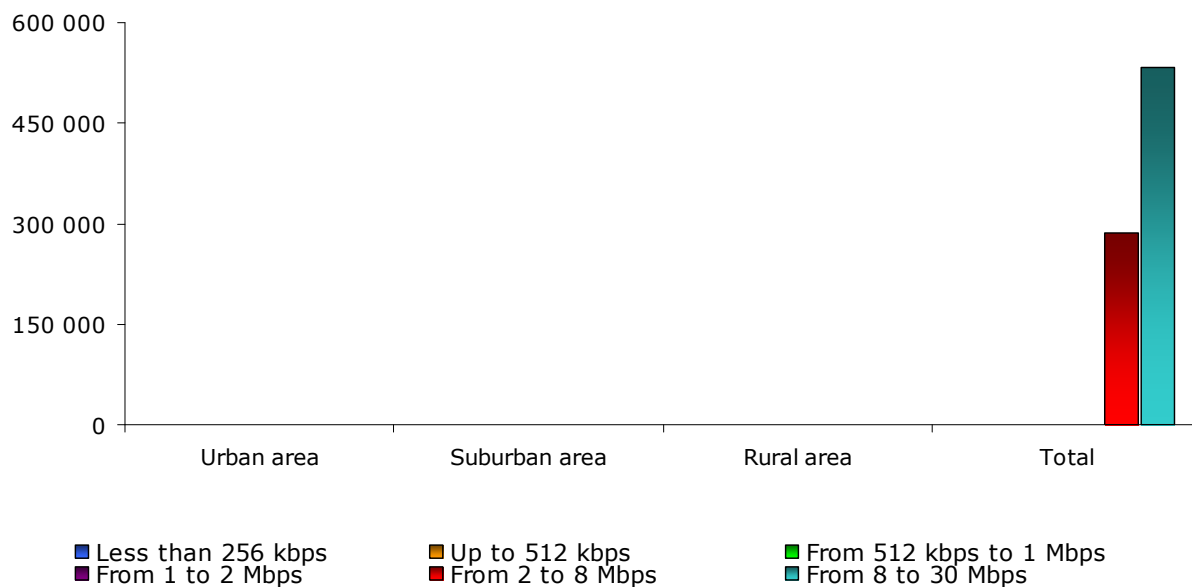
Two-thirds of broadband cable connections in France deliver download rates over 8 Mbps.

4.9.5. FTTx coverage and take-up

Coverage and penetration

■ coverage   ■ penetration (% area population)   ■ penetration/coverage
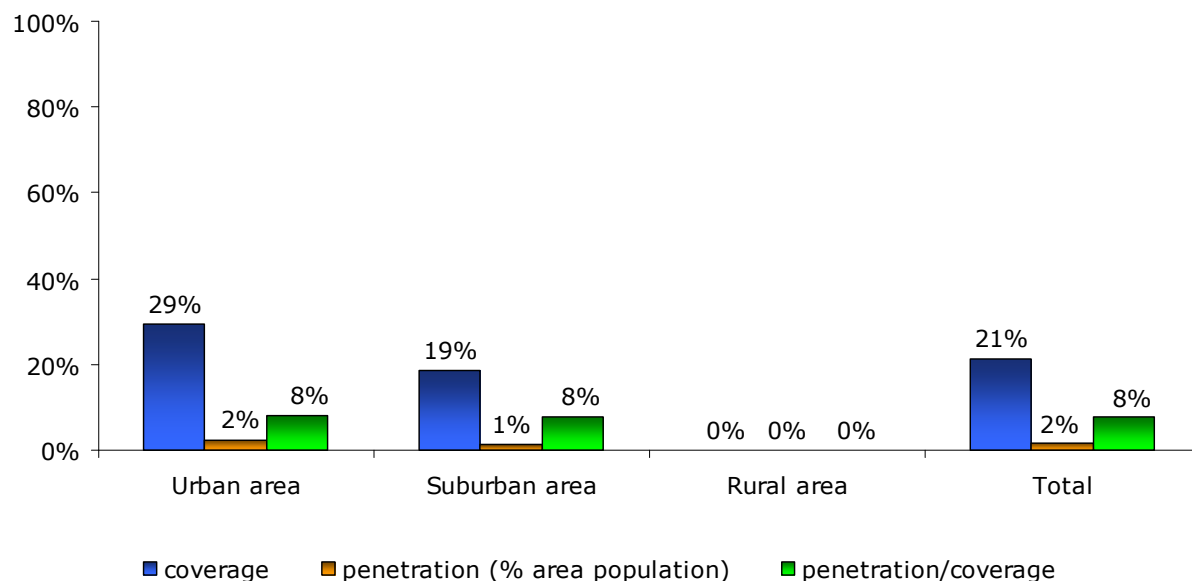
All four of France's major broadband providers (France Telecom, SFR, Free and Numericable) are now involved in FTTH/B access networks deployment with Numericable being the most advanced (more than 4 million homes passed at the end of 2009). Numericable is also n°1 in terms of users with 220,000 FTTB subscribers at the end of 2009, accounting for 75% of the total FTTH/B subscriber base in France.

FTTx connections by download rate

■ Less than 2 Mbps   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps   ■ More than 30 Mbps
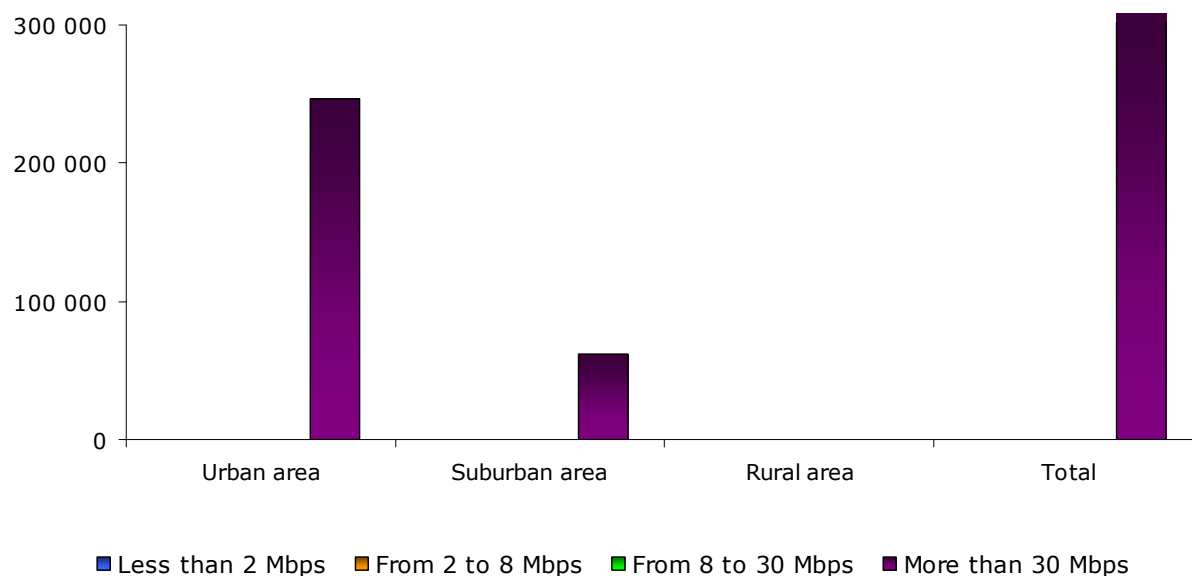
All FTTH/B connections are advertised to provide 100 Mbps speeds: technical measurements showed that speeds were effectively superior to 30 Mbps (between 30 and 50 Mbps in average according to operators).

4.9.6. Other broadband access technologies

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.

Wi-Fi

Hotspots are 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 around 40,000 hotspots in France.

Wireless community networks (SFR/neuf and Free) are also increasing as ISPs are working to expand their wireless coverage turning their customers' IP boxes into Wi-Fi hotspots (for those customers who agree, with only part of the bandwidth made available to other subscribers).

WLL/WiMAX

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).

Following the acquisition of 8 of the 11 WiMAX licenses held by HDDR (a subsidiary of TDF), Bolloré can be considered a national operator, covering 20 out of 22 regions. The other national operator is Iliad/Free which took over Altitude Telecom's nationwide WiMAX licence in September 2005: the company operating WiMAX was renamed IFW.

As operators were late in their deployments, the French regulator put pressure on them by mid-2008 asking in particular for continuous reporting on coverage progress. At the end of 2008, 675 stations only were installed, which was less than 20% of the initial target (3,562). Until now, the effect of ARCEP's actions has been limited: at the end of 2009, IFW was the sole player in line with its obligations. Other operators are still far from the objectives even if some progress could be recorded with a total of 1,135 stations installed. However, the number of WiMAX subscribers has remained very low.

Satellite

Several two-way offers are now available in France, targeting SMEs in rural areas. At the beginning of 2009, three suppliers also announced they were launching broadband access via satellite to cover "white" areas: Orange, through its subsidiary Nordnet (based on SES Astra), Numeo and Sat2Way (based on Eutelsat satellites). We estimate that there were around 35,000 two-way satellite subscribers in France at the end of 2009.

4.9.7. Mobile broadband coverage and take-up

Coverage by technology

- 3G coverage as a % of population
- 3G coverage as a % of territory
- 3G+ coverage as a % of population
- 3G+ coverage as a % of territory
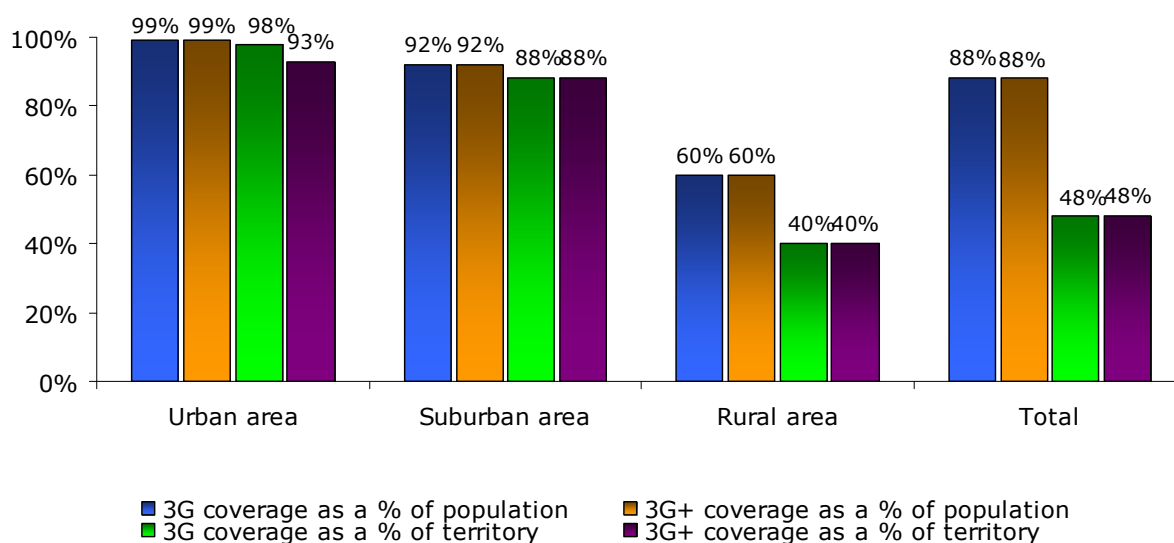
According to ARCEP, Orange appears as the most advanced mobile operator in terms of 3G coverage which was measured at 87% on the 1st of December 2009 hence 88% at the end of the year. All French mobile operators have completely upgraded their 3G networks to HSPA.

Penetration

- 3G coverage as a % of population
- penetration (% area population)
- penetration/coverage
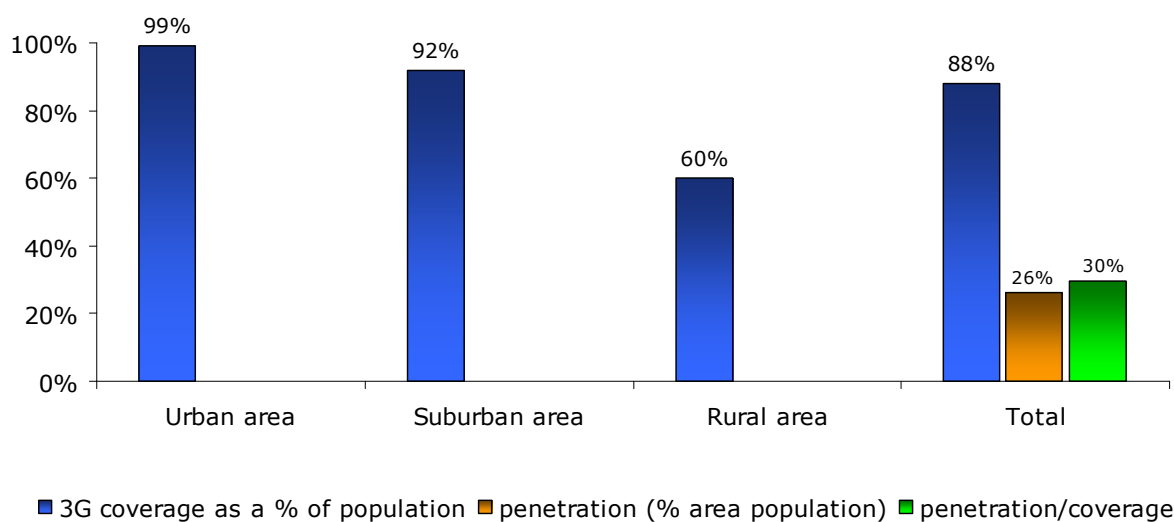
There were 16.9 million active 3G customers at the end of 2009, up 50% compared to the end of 2008.

4.10. Germany

4.10.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	40,411,451	29,395,511	12,507,944	82,314,906
Share of total population	49.1%	35.7%	15.2%	100.0%

4.10.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	92%	93%	96%	97%	97%
DSL subscribers	10,380,000	14,300,000	18,500,000	20,720,000	22,070,000
DSL penetration (% of population)	12.6%	17.3%	22.5%	25.2%	26.8%
Cable modem coverage (% population)	15%	36%	47%	56%	59%
Cable modem subscribers	240,000	600,000	985,000	1,600,000	2,300,000
Cable modem penetration (% population)	0.3%	0.7%	1.2%	1.9%	2.8%
FTTx subscribers	150	20,000	108,000	280,000	510,000
PLC subscribers	9,600	9,500	9,500	10,000	10,000
WLL subscribers	0	0	0	80,000	90,000
Satellite subscribers	57,000	56,000	36,500	31,000	42,000
Total	10,686,750	14,985,500	19,639,000	22,721,000	25,022,000
Total fixed broadband penetration (% population)	13.0%	17.8%	23.9%	27.6%	30.4%
Mobile broadband subscribers				11,500,000	19,000,000
Mobile broadband penetration (% population)				14.0%	23.1%

Fixed broadband penetration in Germany continued to grow significantly and is now at 30.4% (compared to 27.6% in 2008). Despite losing slightly, DSL clearly remains the dominant fixed broadband technology in Germany with a staggering market share of 88%. The slight decrease is due to the strong growth of cable, VDSL and fibre broadband. Cable continues gaining market shares by offering high bandwidth services at competitive prices on its almost fully upgraded network. There were about 2.3 million cable subscribers in Germany at the end of 2009.

FTTx has made significant progress in Germany, too. Besides incumbent Deutsche Telekom's widespread VDSL roll-out in many urban areas since 2006, several smaller regional operators such as NetCologne, M-Net and EWE TEL still achieve robust subscriber growth rates. The governmental broadband agenda which was issued in March 2009 requires operators to provide broadband connections of at least 1 Mbps to all German households by the end of 2010 and a nationwide coverage with 50 Mbps connections available to 75% of German households by the end of 2014. Thus, significant speed uptake is expected in the years to come.

4.10.3. DSL coverage and take-up

Coverage and penetration
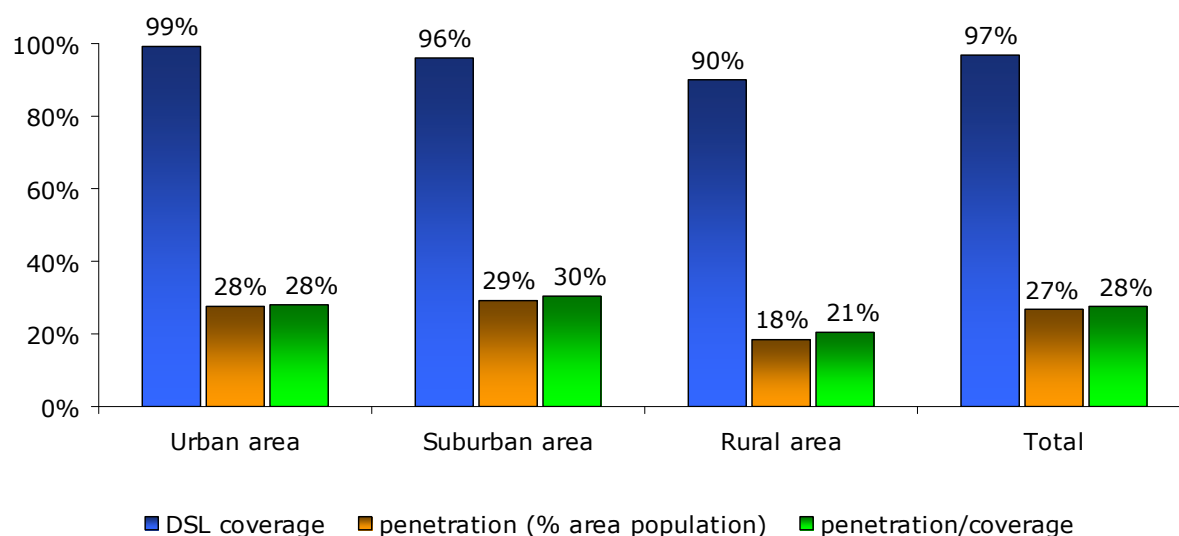
In Germany, most local exchanges are DSL equipped, but DSL coverage is still higher in urban areas. Total DSL coverage in December 2009 is estimated at 97%.

Number of DSL connections by download rate
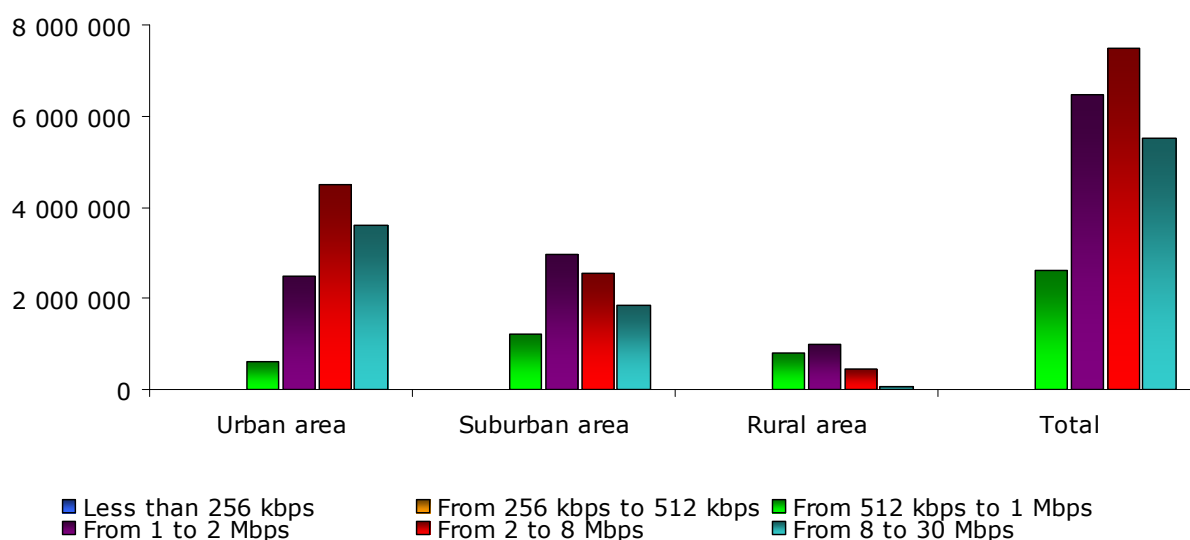
Almost 60% of German DSL subscribers are already equipped with speeds of 2 Mbps and above. Approximately one quarter already accesses the internet with download rates above 8 Mbps.

Percentage of DSL connections by type of provider
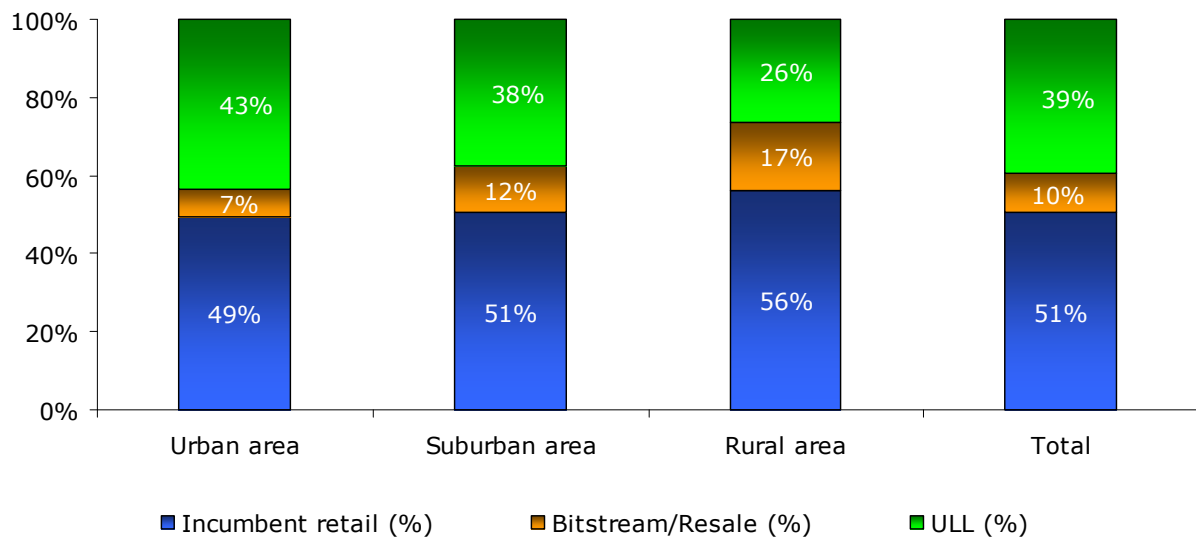
The German incumbent Deutsche Telekom was able to defend its market share between 2008 and 2009 and still accounts for about 50% of all DSL subscribers while the share of unbundling is still growing.

4.10.4. Cable modem coverage and take-up

Coverage and penetration
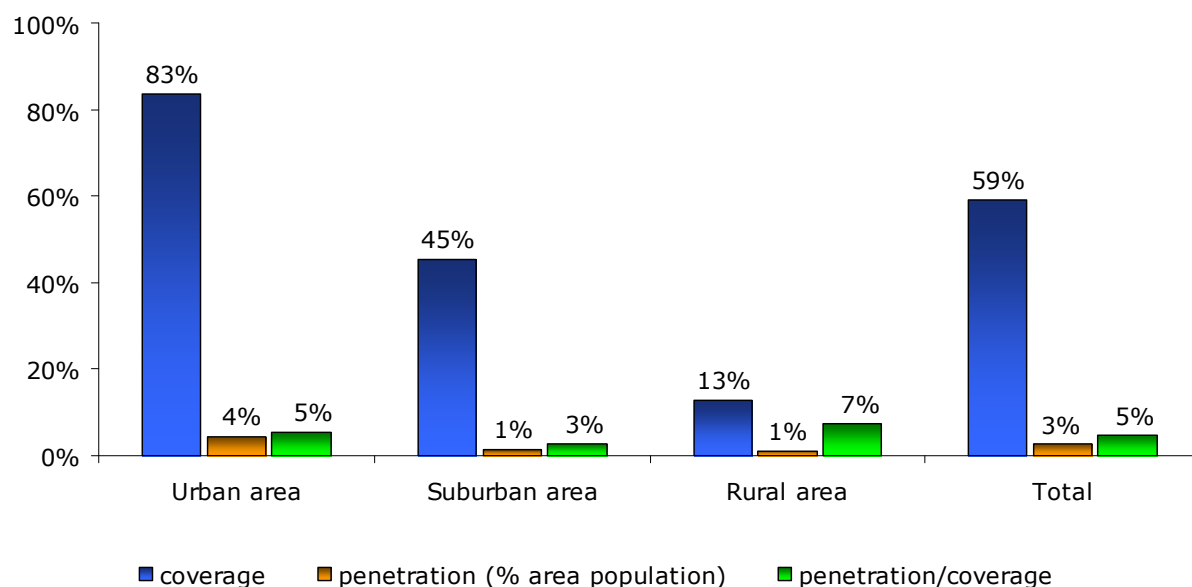
Cable modem penetration is still comparatively low at 2.8%, despite considerable growth within the past two years. Upgrades have primarily been made in urban, suburban and a small number of rural areas around larger cities. In most regions in which cable broadband coverage exists, DSL has already been present for several years thereby significantly limiting cable broadband penetration rates.

Number of cable modem connections by download rate
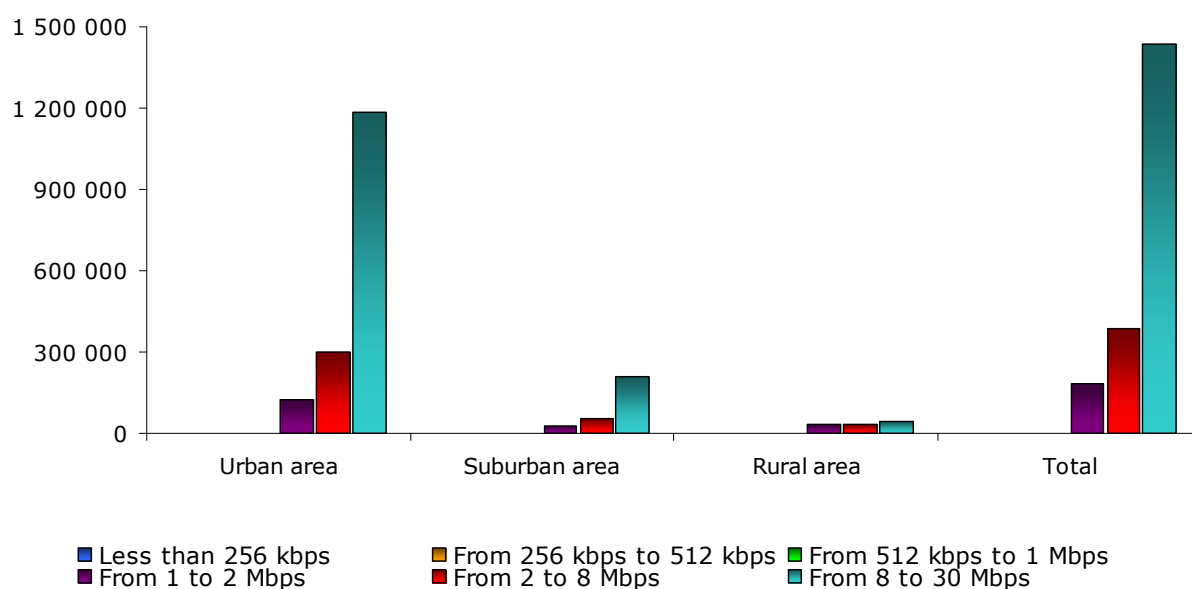
Cable modem subscribers access the internet with significantly higher download rates than DSL subscribers. 75% have download rates of 8 Mbps and above available. About 12% are already equipped with packages offering bandwidths of 30 Mbps or higher. Operators such as Kabel Baden-Württemberg and UnityMedia even started marketing their premium 100 Mbps offers.

4.10.5. FTTx coverage and take-up

Coverage and penetration
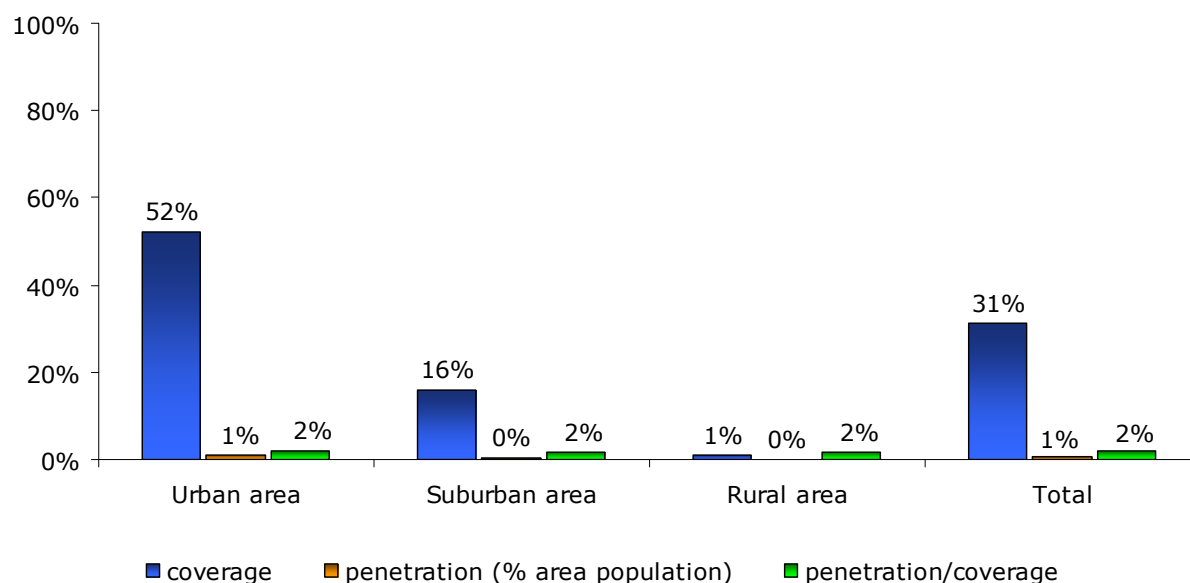
Deutsche Telekom has been upgrading its VDSL network since October 2006 and the rollout has been completed in 50 major cities since the end of 2008. Previously, it was only possible to get T-Home's VDSL access in combination with its IPTV offer. Since mid 2009, an unbundled VDSL offer is available and competitors like Vodafone started offering VDSL, too.

Furthermore, due to companies such as NetCologne, M-Net and EWE TEL, smaller FTTH networks (usually city based) are emerging and bandwidths up to 300 Mbps are available in certain areas. In addition, there are a couple of small FTTH networks in rural areas. Throughout Germany, approximately 500,000 FTTx subscribers have been recorded by the end of 2009.

FTTx connections by download rate
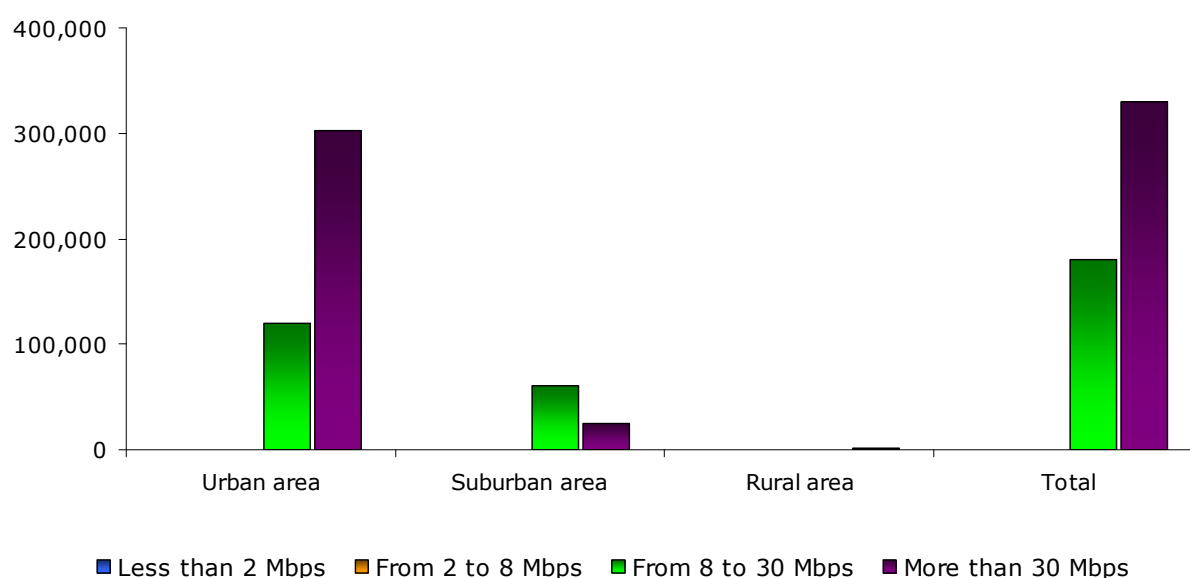
4.10.6. Other broadband access technologies

PLC

The development of PLC in Germany stagnates at a very low level. According to Germany's NRA, the Bundesnetzagentur, there were only 10.000 PLC-based internet subscribers in Germany at the end of 2009, which is the same number as in 2008.

WLL/WiMAX

WLL/WiMAX experienced a revival in Germany in 2008, rising to 80,000 subscribers. This number has further risen by another 10,000 by the end of 2009. Due to its technical properties and its relatively low installation costs, WiMAX is often the only possible access technology for rural areas that are not located in immediate proximity to a fibre backbone.

Satellite

Due to comparatively high costs, broadband via satellite remains a niche solution in areas not covered by DSL or cable. Nonetheless, satellite is still the only available option to get broadband access in various rural areas. Despite the further decrease of uncovered areas in Germany in 2009, broadband over satellite subscribers could gain more subscribers, reaching 42,000, in comparison with the subscriber churn in recent years.

4.10.7. Mobile broadband coverage and take-up

Coverage by technology
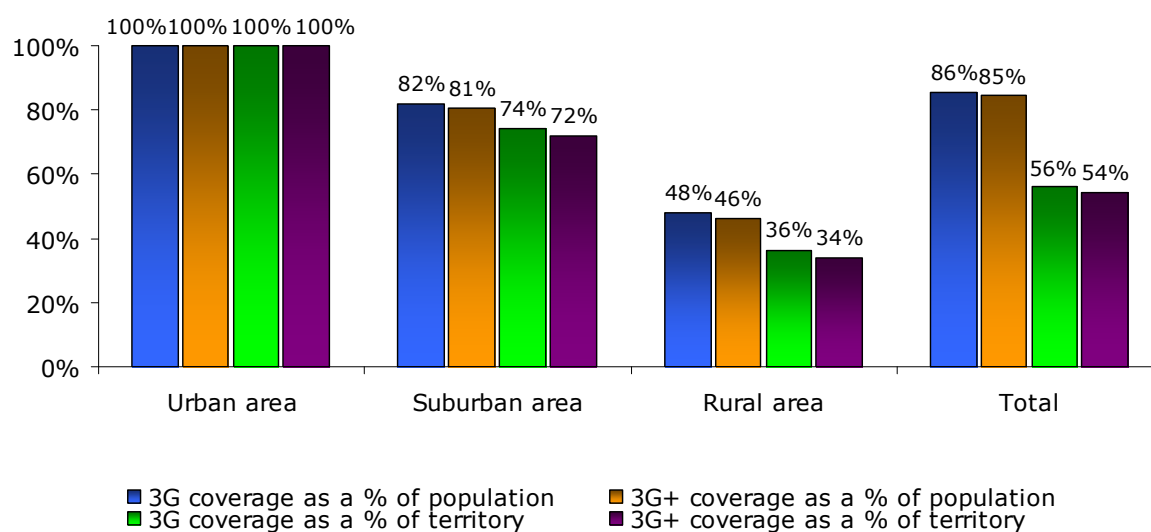
3G coverage reached about 86% of the population and around 56% of the Germany territory. The German 3G network has been upgraded to HSDPA almost completely.

Penetration
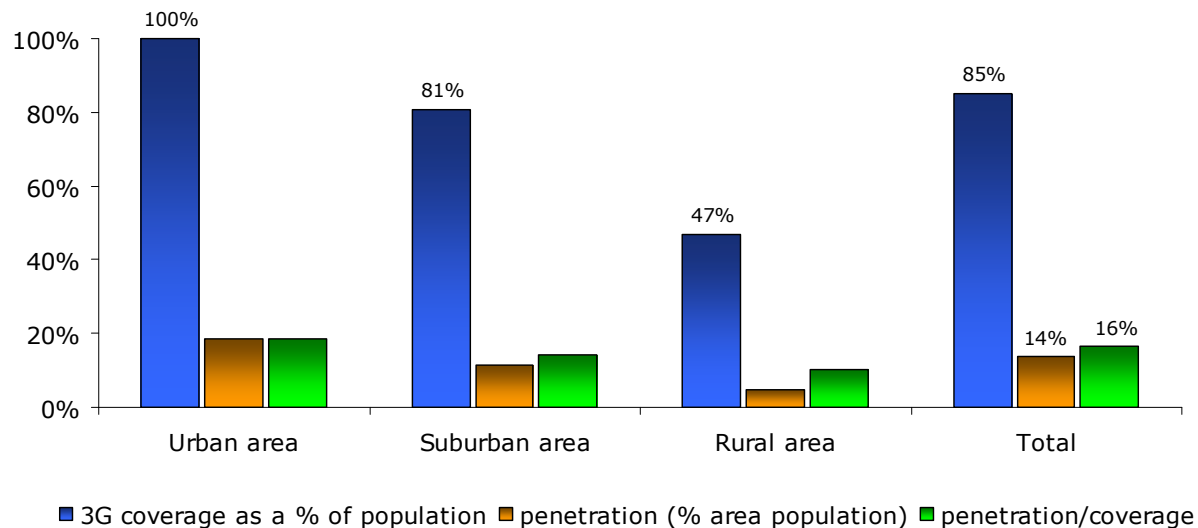
By the end of 2009, the number of active mobile broadband subscribers was approximately 19 millions – a huge uptake compared to 11.5 million mobile broadband users in 2008.

4.11. Greece

4.11.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	6,896,772	1,922,051	2,487,360	11,306,183
Share of total population	61.0%	17.0%	22.0%	100.0%

4.11.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	12%	18%*	86%	88%	91%
DSL subscribers	158,000	485,793	1,016,076	1,500,354	1,908,124
DSL penetration (% population)	1.4%	4.4%	9.1%	13.3%	16.9%
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	220	474	594	2,000	6,882
PLC subscribers	0	0	0	0	0
WLL subscribers	419	648	1,231	2,000	1,059
Satellite subscribers	0	*350*	520	386	565
Total	158,639	487,265	1,018,421	1,504,740	1,916,630
Total fixed broadband penetration (% population)	1.5%	4.4%	9.1%	13.4%	17.0%
Mobile broadband subscribers					1,374,624
Mobile broadband penetration (% population)					12.2%

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

Broadband penetration reached 17% and continued to rise significantly but with a lower rhythm compared to 2008. It still lags behind the EU average. More and more customers choose double-play and triple-play bundles.

Due to the impact of the financial crisis some players had big difficulties (Wind Hellas faced a capital restructuring to reduce debt) and market consolidation continues (Vodafone/HOL alliance).

The incumbent operator is leading the market but competitive providers increase their market shares and should reach collectively 50% in 2010.

Urban/rural disparities are expected to shrink over the coming years through the fibre-optic broadband network development plan.

Mobile broadband penetration has not developed much since last year.

4.11.3. DSL coverage and take-up

Coverage and penetration
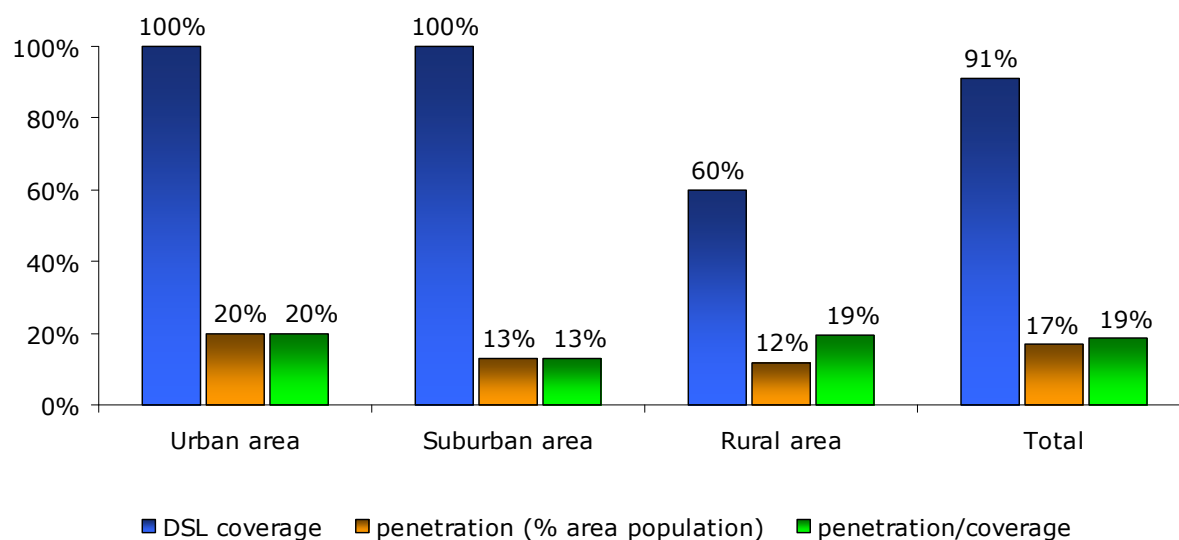
There were nearly 2 million DSL connections in Greece at the end of 2009 most of them in urban areas.

Number of DSL connections by download rate
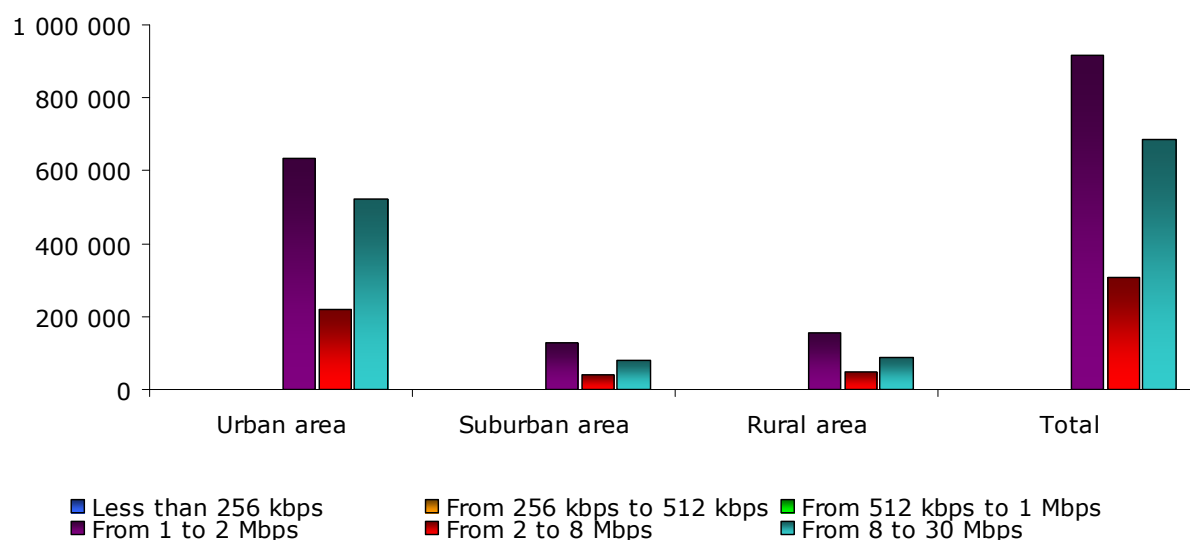
The majority of the broadband lines (52%) offer access speeds above 2 Mbps (download). Broadband speeds of more than 8 Mbps represent 36% of the total.

Percentage of DSL connections by type of provider
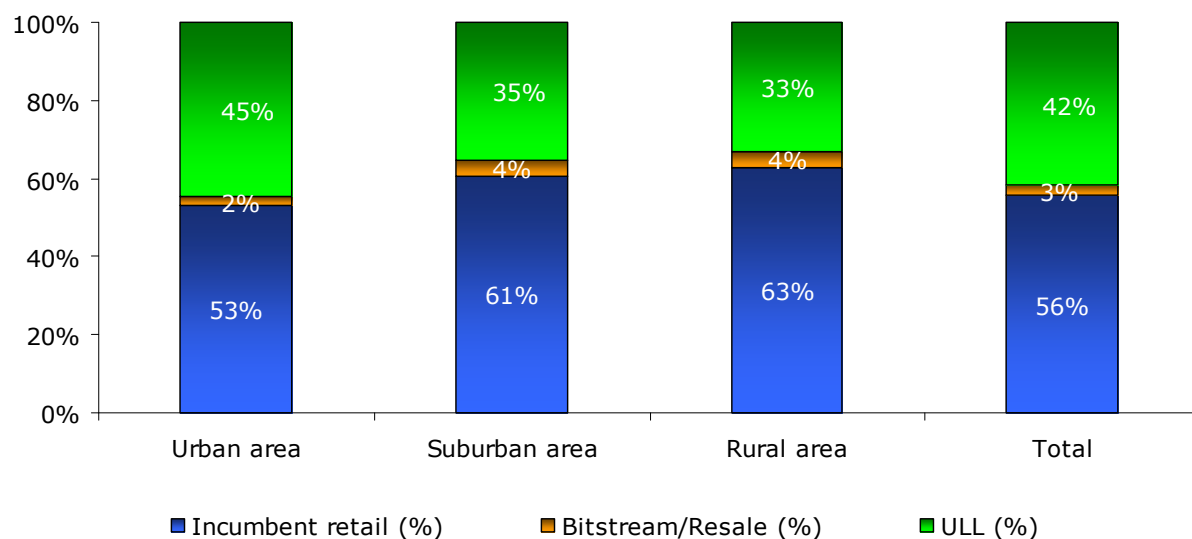
The incumbent operator is leading the market with a 56% market share but competitive providers are improving their positions.

The number of DSL connections marketed by alternative operators via bitstream solutions continues to decline. In percentage, it has been cut in half from 2008.

At the end of 2009, OTE was providing physical collocations through 168 local exchanges.

4.11.4. Cable modem coverage and take-up

Cable modem is not available in Greece.

4.11.5. FTTx coverage and take-up

Coverage and penetration
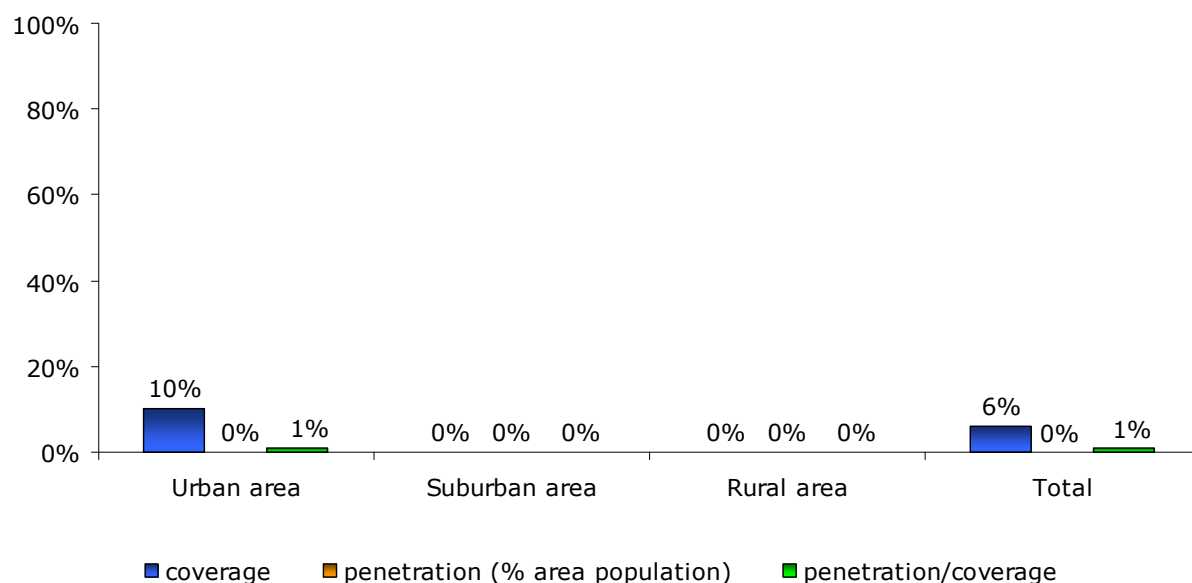
FTTH is not commercially available in Greece.

FTTB services have been officially launched by HOL in Athens and Thessaloniki.

The new government is reviewing the previous administration's plan for the nationwide fibre-optic broadband network of 2 billion €. The first homes should get FTTH by the beginning of 2012.

FTTx connections by download rate
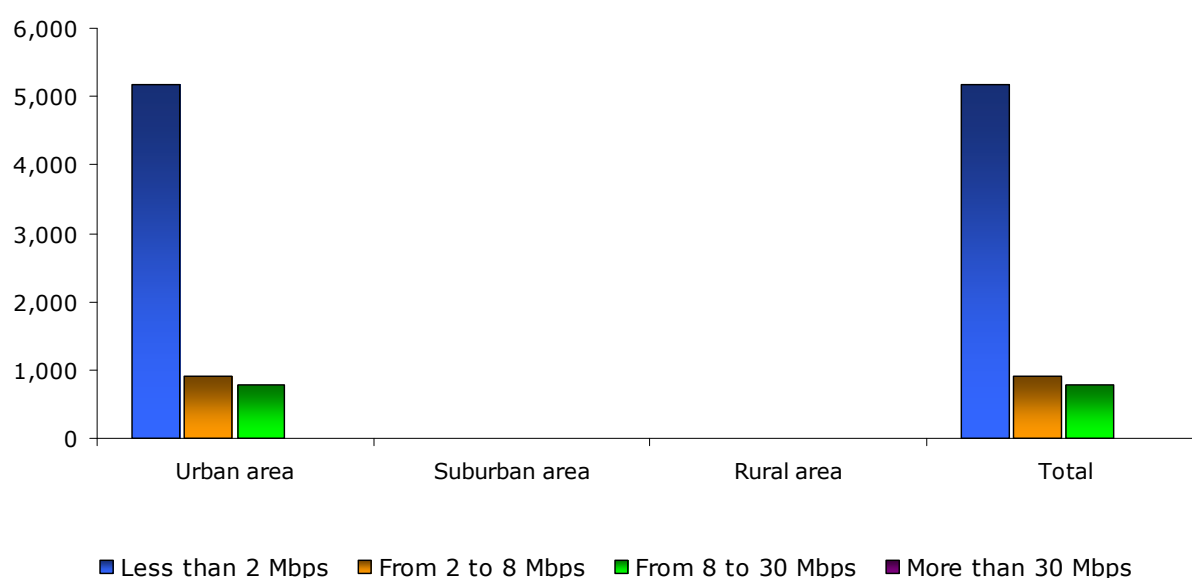
FTTB was deployed very recently and the number of subscribers was less than 2,000 at the end of 2009. Other subscribers in this category are LAN subscribers with download speeds up to 2 Mbps.

4.11.6. Other broadband access technologies

Wi-Fi

Hotspots are not widely deployed in Greece. Some hotels, cafes and restaurants offer Wi-Fi (wireless 802.11b) Internet access. The city of Athens has free Wi-Fi hotspots in operation. The city of Trikala has implemented 34 hotspots.

WLL/WiMAX

The licenses are granted to Craig, OTE, Cosmoline and Wind.

Net One operates Craig Wireless' network in Greece in the Athens and Thessaloniki areas which cover 25 percent of the Greek population.

OTE operates experimental networks in Attica and Halkidiki regions.

Satellite

There were nearly 565 satellite customers in Greece at the end of 2009.

4.11.7. Mobile broadband coverage and take-up

Coverage by technology
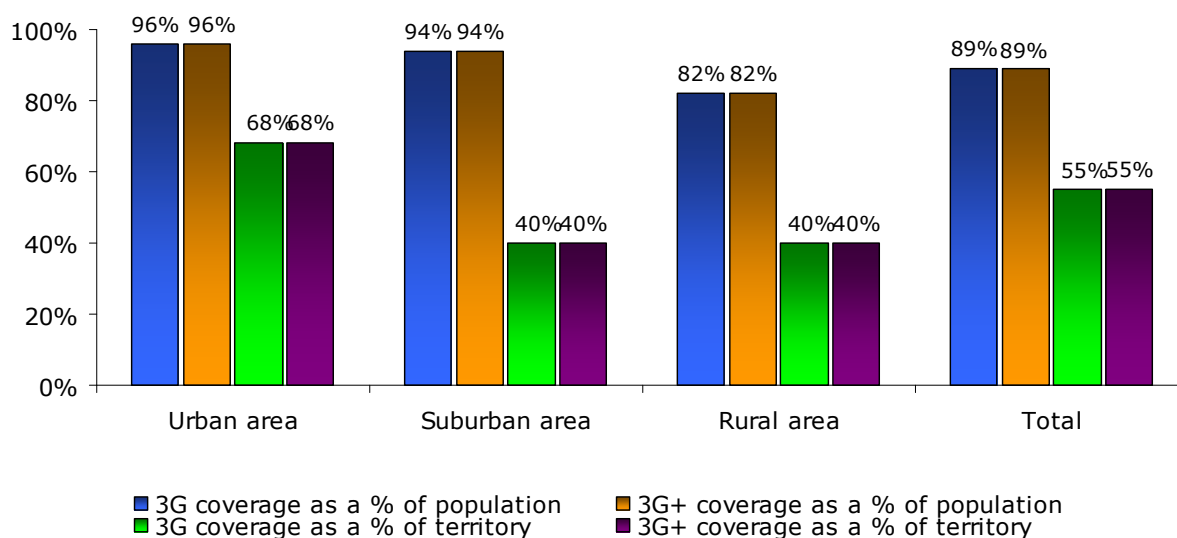
The Greek NRA (EETT) has awarded rights of use for radio frequencies for GSM/DCS technology in the 900 and 1800 MHz bands, UMTS technology in the 2.1 GHz band and for Fixed Wireless Access systems in 3.5 and 25 GHz bands.
Three licences for the development of 3G networks were granted in 2001 to Vodafone, Wind and Cosmote.

Penetration
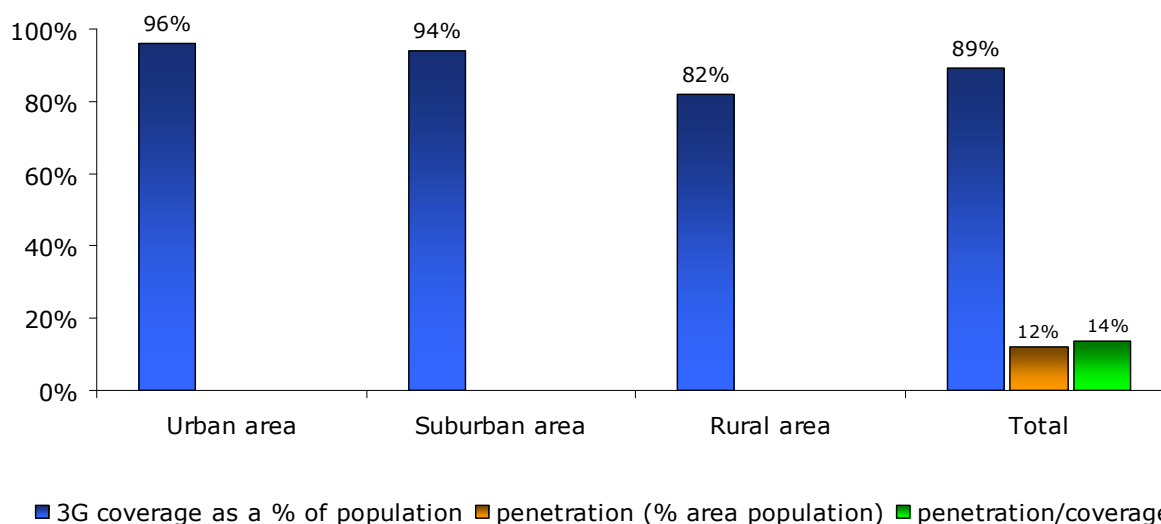
The number of subscribers of 3G mobile using 3G services reached 1,374,783 of which 225,325 used Internet services on their laptop.

4.12. Hungary

4.12.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	3,424,862	2,764,518	3,841,093	10,030,473
Share of total population	34.1%	27.6%	38.3%	100.0%

4.12.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	85%	89%	93%	93%	93%
DSL subscribers	372,523	597,331	739,028	800,404	827,692
DSL penetration (% population)	3.7%	5.9%	7.4%	8.0%	8.3%
Cable modem coverage (% population)	66%	72%	73%	74%	82%
Cable modem subscribers	191,997	374,647	563,593	668,414	760,238
Cable modem penetration (% population)	1.9%	3.7%	5.6%	6.6%	7.6%
FTTx subscribers	1,000	11,021	26,425	53,712	98,725
PLC subscribers	0	0	1	1	206
WLL subscribers	24,019	59,058	125,000	83,374	93,810
Satellite subscribers	-	-	8	710	0
Total	589,539	1,042,057	1,428,591	1,606,615	1,780,671
Total fixed broadband penetration (% population)	5.9%	10.4%	14.2%	16.0%	17.8%
Mobile broadband subscribers	560	50,000	257,365	414,558	614,421
Mobile broadband penetration (% population)	0.0%	0.5%	2.5%	4.1%	6.1%

The number of fixed broadband subscribers increased to almost 1.8 millions at the end of 2009. Penetration rate at 17.8% is still below the European average. DSL remains the main access technology, with 46% of total fixed broadband connections but cable modem has developed rapidly over the recent period. The cable modem subscriber base is now very close to DSL. Thirty five percent of cable TV homes passed are connected to broadband Internet via cable modem.

FTTx is also expanding rapidly (subscriber base has almost doubled in 2009) while WLL is still largely used in rural areas where other fixed access technologies are too costly.

In addition there were just over 614,000 mobile broadband subscribers, a 50% increase in one year.

4.12.3. DSL coverage and take-up

Coverage and penetration
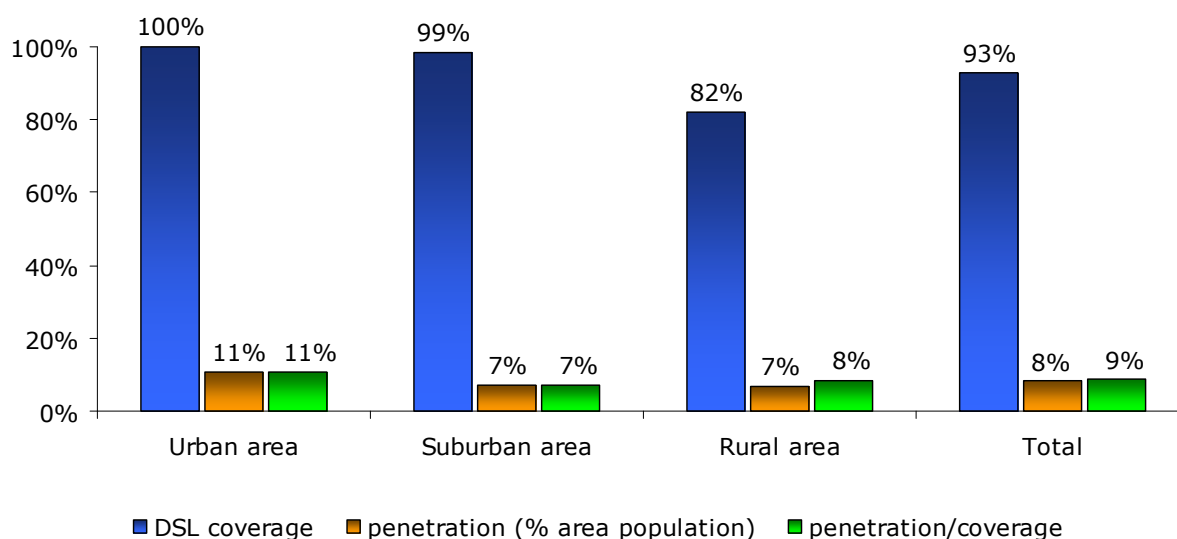
Change in coverage was minimal in 2009 with less than 50 new settlements covered, mostly in rural areas.

The DSL subscriber base grew only little, even when price decreased. Price reduction was the growth driver in the 2004-2007 period, but it has now stopped and competition from cable modem particularly has increased. Penetration has increased only in rural areas as a consequence of expanded coverage.

Number of DSL connections by download rate
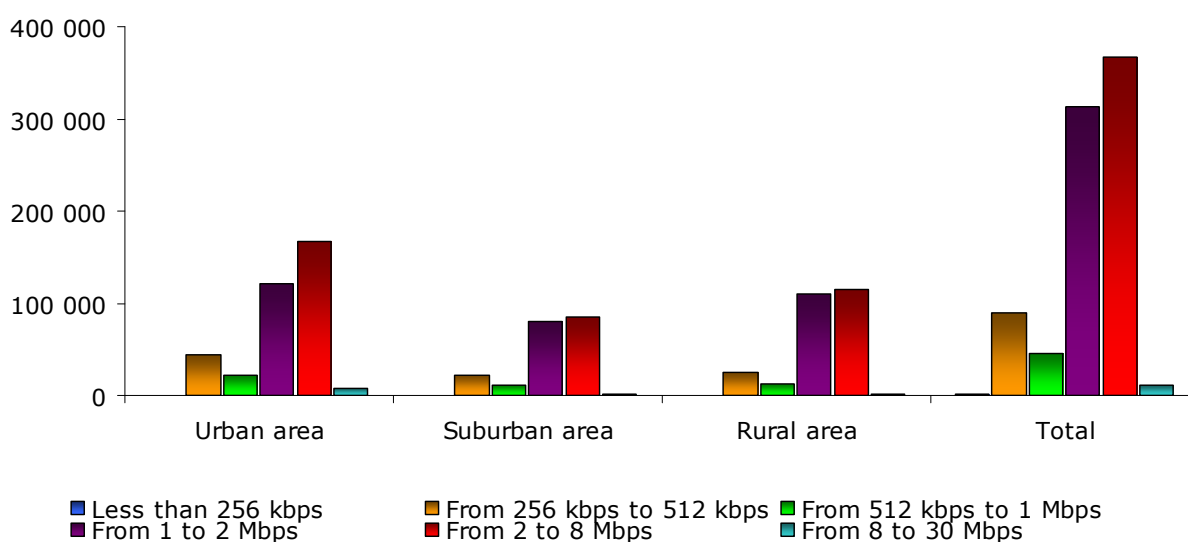
Most customers are concentrated in the 1-4 Mbps category (50% to 62% depending on densities). Connections speeds of 4-10 Mbps are mainly subscribed in urban areas.

Percentage of DSL connections by type of provider
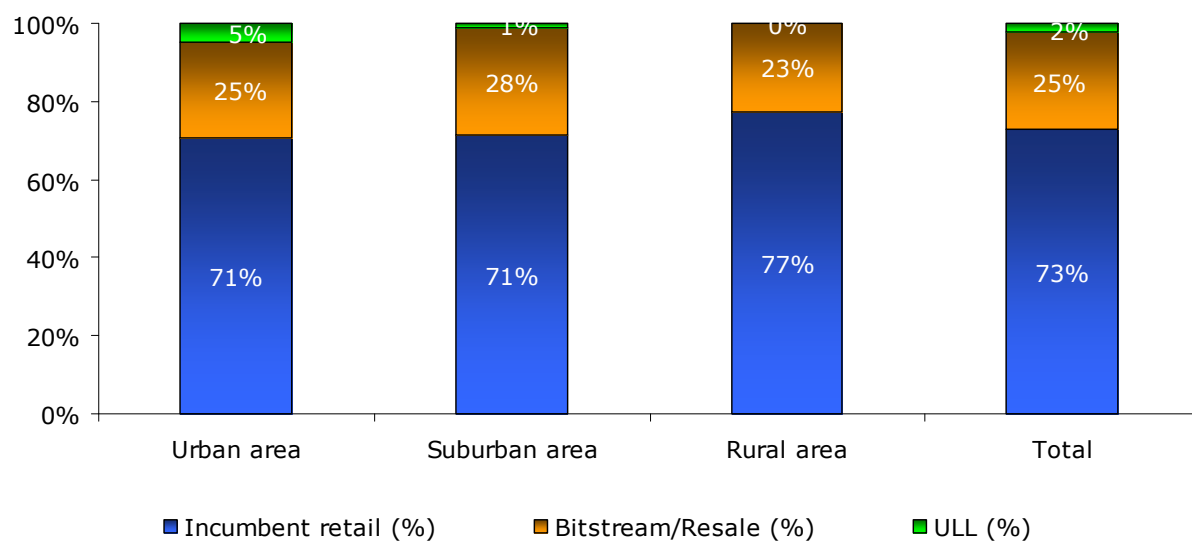
The incumbent's share in DSL subscriber base increased slightly in 2009 to 73% while the number of connections provided through bitstream or resale offers declined. Unbundling gained some ground although it is still not significant.

4.12.4. Cable modem coverage and take-up

Coverage and penetration
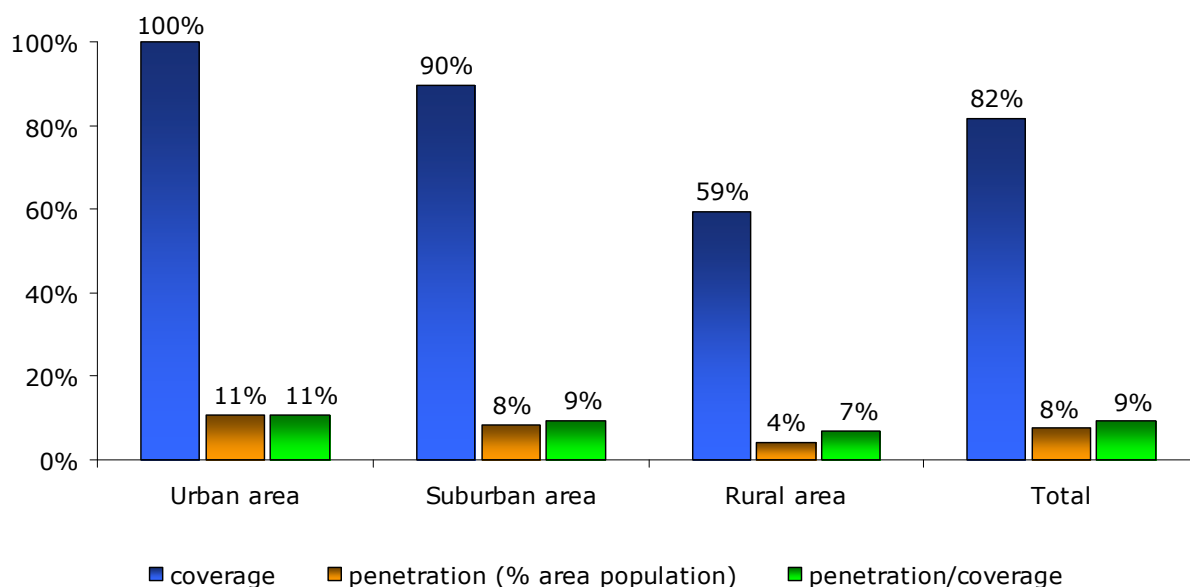
Cable modem coverage has expanded in 2009 and parts of existing platforms were upgraded to offer double or triple play packages. As a result, cable modem was the most dynamic segment in fixed broadband, with 92,000 new connections (+14%).

Number of cable modem connections by download rate
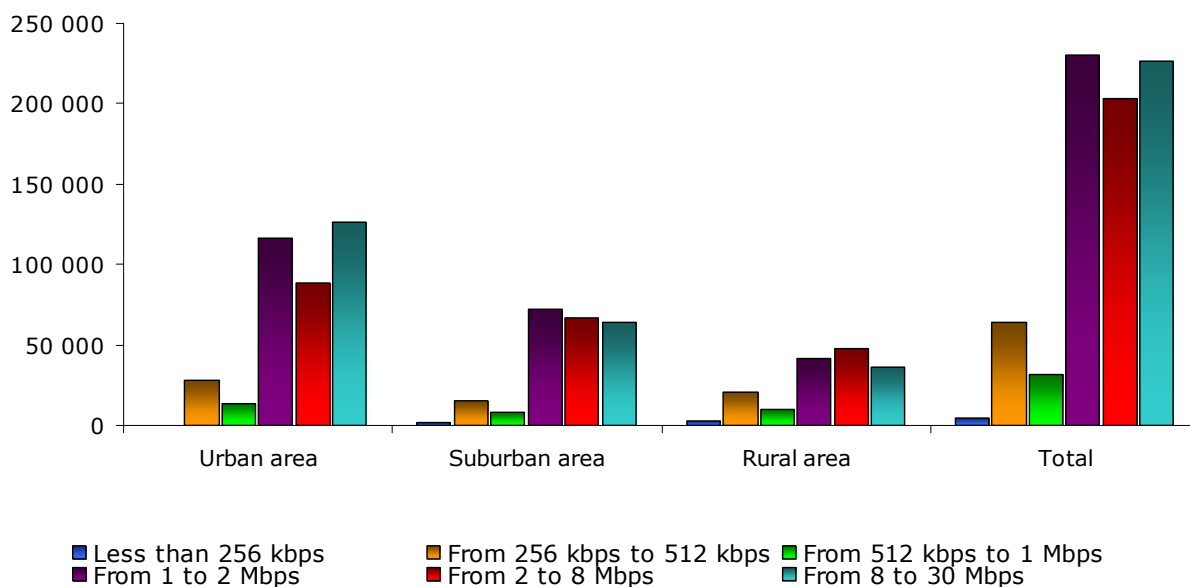
In general download speeds provided with cable modem access in Hungary are higher than those provided with DSL: 23.1% of cable modem connections were in the 10-20 Mbps category and 6.7% over 20 Mbps (more than 10% in this category for urban areas).

4.12.5. FTTx coverage and take-up

Coverage and penetration
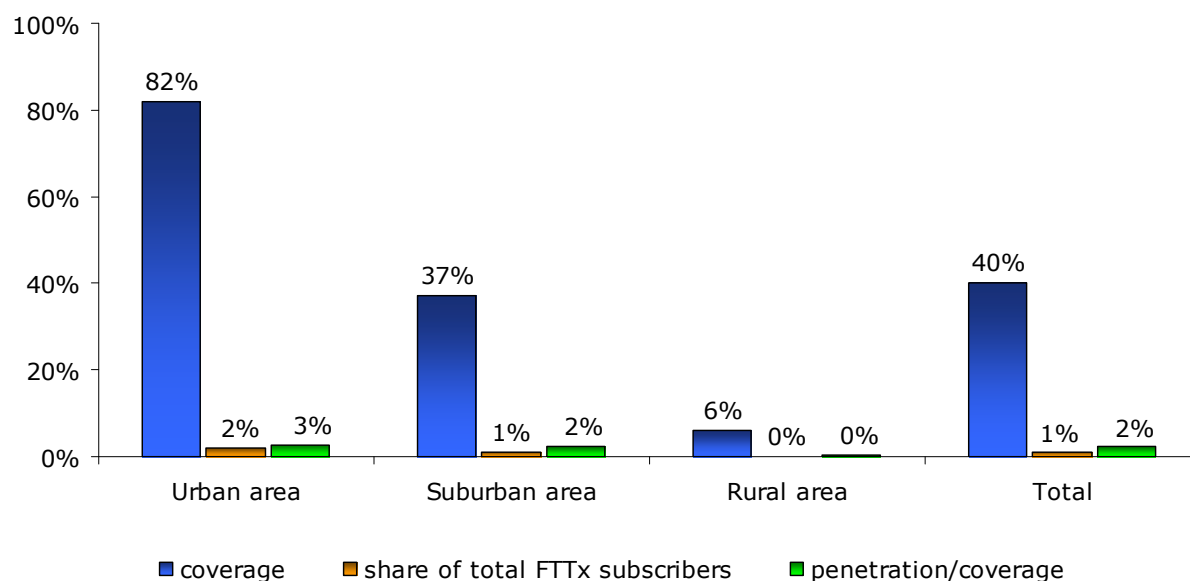
The incumbent operator, T-Com, launched a 3-year plan to deploy FTTH to 780,000 households until 2011. More largely, FTTx was available to 40% of households at the end of 2009, mainly concentrated in urban areas.

FTTx connections by download rate
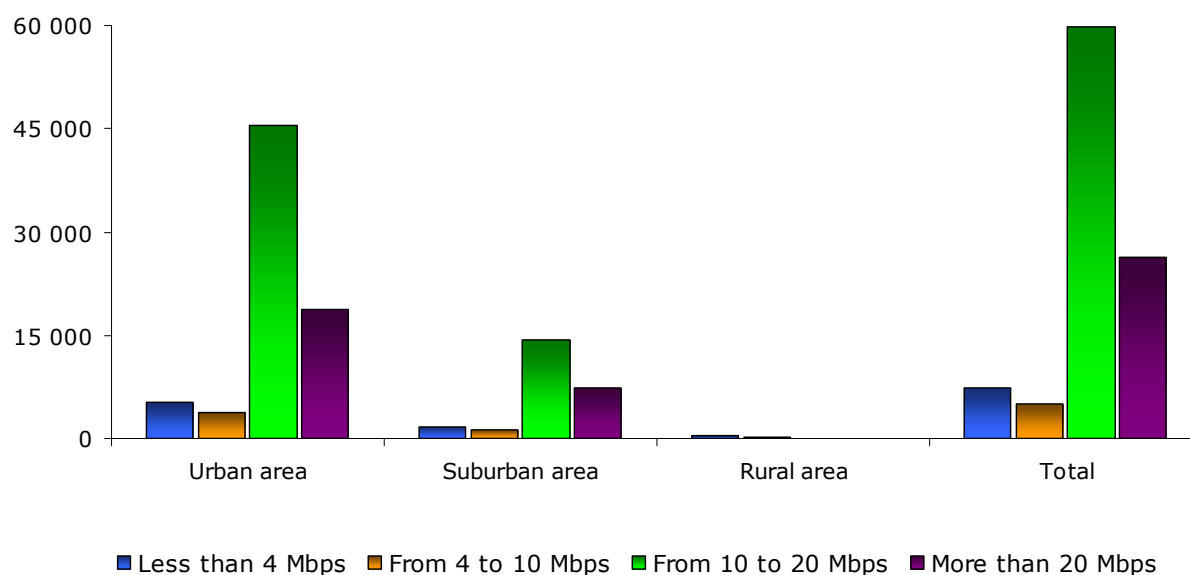
Download speeds of FTTx connections are mainly in the 10-20 Mbps category.

4.12.6. Other broadband access technologies

Wi-Fi/WiMAX

WLL networks are still an attractive solution for serving remote areas but they are more and more challenged with DSL expansion and mobile broadband solutions.

WLL

Temporary WLL networks were partly replaced with other fixed networks (mainly DSL). However, they are still relevant in rural areas where wireline connections are less deployed and WLL accounted for 5.3% of fixed broadband connections at national level.

Download speeds offered by WLL technology are generally lower than those of DSL and cable modem connections: 87.6% of WLL connections do not exceed 4 Mbps (34.6% up to 1 Mbps only).

Satellite

The broadband satellite market had no clients at the end of 2009 in Hungary.

4.12.7. Mobile broadband coverage and take-up

Coverage by technology

■ 3G coverage as a % of population   ■ 3G+ coverage as a % of population
■ 3G coverage as a % of territory   ■ 3G+ coverage as a % of territory
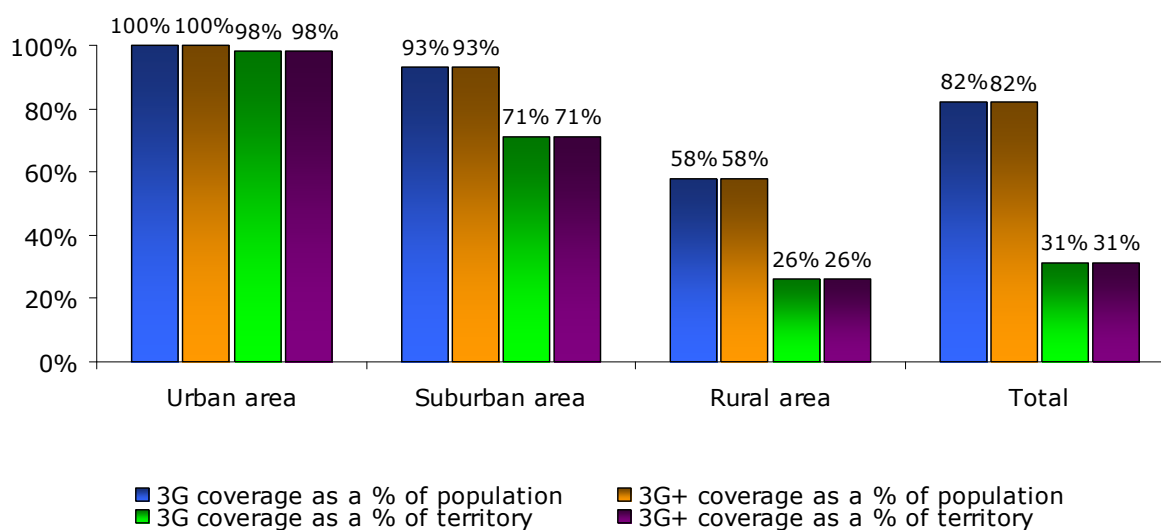
The development of mobile networks in Hungary was fast, thanks to the strong competition between the three operators (T-Mobile, Pannon – now Telenor and Vodafone).

The overall 3G/3G+ population coverage was 82%, and territory coverage was 31% at the end of 2009. The development of 3G/3G+ networks in the building phase was concentrated in urban and suburban areas. All urban and most suburban settlements were covered. Five hundred settlements were also covered in rural areas.

Penetration

■ 3G coverage as a % of population   ■ penetration (% area population)   ■ penetration/coverage
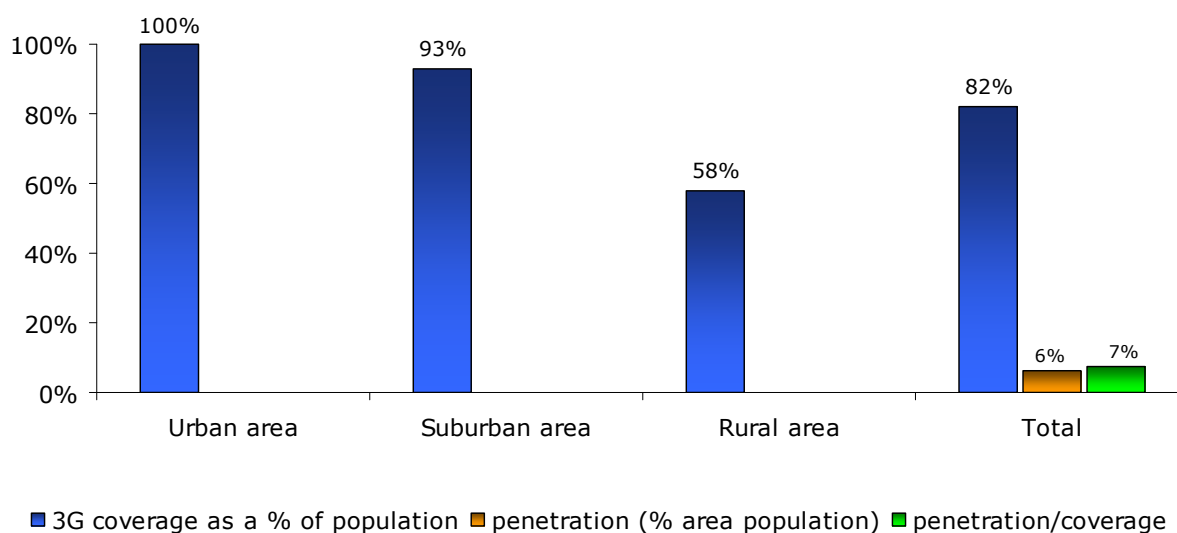
The number of users was 414,556 at the end of 2008, and 614,421 at the end of the year 2009 (effective users).

4.13. Iceland

4.13.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	201,000	-	116,440	317,440
Share of total population	63.3%	0.0%	36.7%	100.0%

4.13.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	92%	92%	92%	95%	95%
DSL subscribers	75,897	84,350	94,630	98,762	97,862
DSL penetration (% of population)	25.9%	28.1%	30.8%	30.9%	30.8%
Cable modem coverage (% population)	31%	31%	31%	31%	31%
Cable modem subscribers	432	500	500	0	0
Cable modem penetration (% population)	0,1%	0.2%	0.2%	0.0%	0.0%
FTTx subscribers	204	500	1,218	2,615	6,908
PLC subscribers	-	-	-	-	-
WLL subscribers	1,380	1,500	2,017	2,252	2,238
Satellite subscribers	104	150	*72*	68	64
Total	78,017	87,000	98,437	103,697	107,072
Total fixed broadband penetration (% population)	26.6%	29.0%	32.0%	32.5%	33.7%
Mobile broadband subscribers				46,742	96,789
Mobile broadband penetration (% population)				14.6%	30.5%

Broadband penetration is high in Iceland due partly to a relatively high DSL take-up, partly to a strong take-up of mobile broadband since 2008, and finally to an increasing penetration of FTTx. The cable modem service has been marginal and has been closed completely since 2008. Penetration of DSL is 30.8% in 2009; penetration of mobile broadband is 30.5%, more than doubling the number of mobile broadband users since end 2008; in addition, FTTx has increased from 2,252 in 2008 to 6,908 in 2009.

The coverage of DSL has increased slightly since 2008. It has increased by approximately 300 ports in an estimated 20 sites, which however in terms of percentage is a very small increase (+0.3%). The penetration of DSL has, on the other hand, decreased slightly. The increase in broadband penetration is in mobile broadband and, to some extent, in FTTx.

The incumbent Icelandic operator Siminn uses GPON in greenfield fibre operations, but most FTTx in Iceland is FTTC using VDSL2 for the last 100m. Fibre is mostly in the area of the capital city Reykjavik. The FTTC network reaches around 2/3 of the homes in the capital area.

The government of Iceland has as policy to increase penetration to 100% by the end of 2010. This will primarily be done by using HSDPA for fixed installations in farms in the countryside providing 2Mbps per farm site.

4.13.3. DSL coverage and take-up

Coverage and penetration
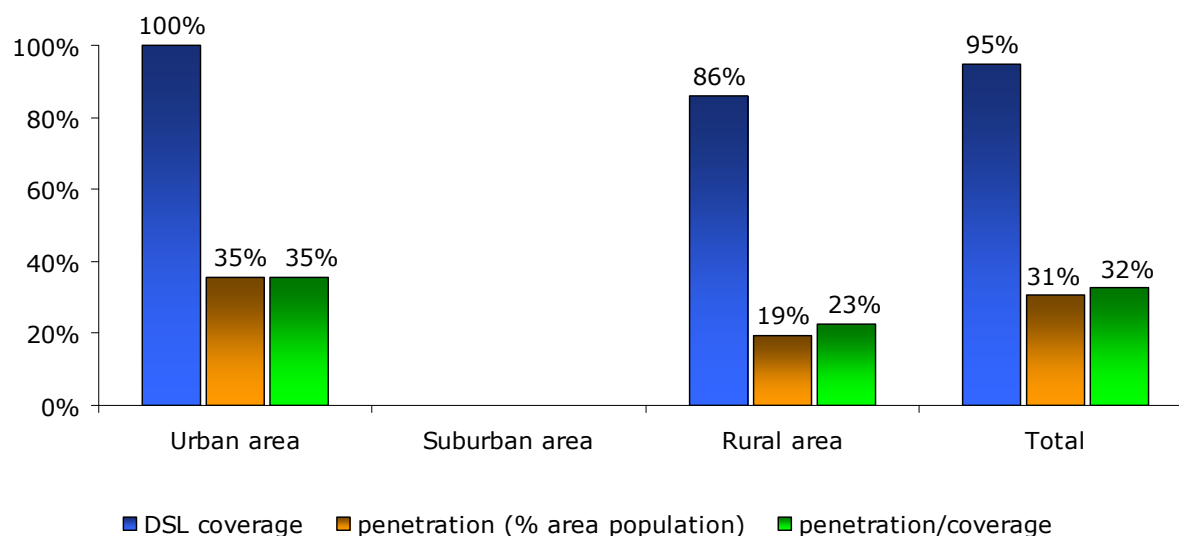
DSL coverage increased very slightly during 2009 by 300 ports in 20 sites; in relative terms this represents only a 0.3% increase.

Take-up of DSL has decreased slightly, which indicates that DSL has saturated and that future growth will be in mobile broadband and fibre.

Number of DSL connections by download rate
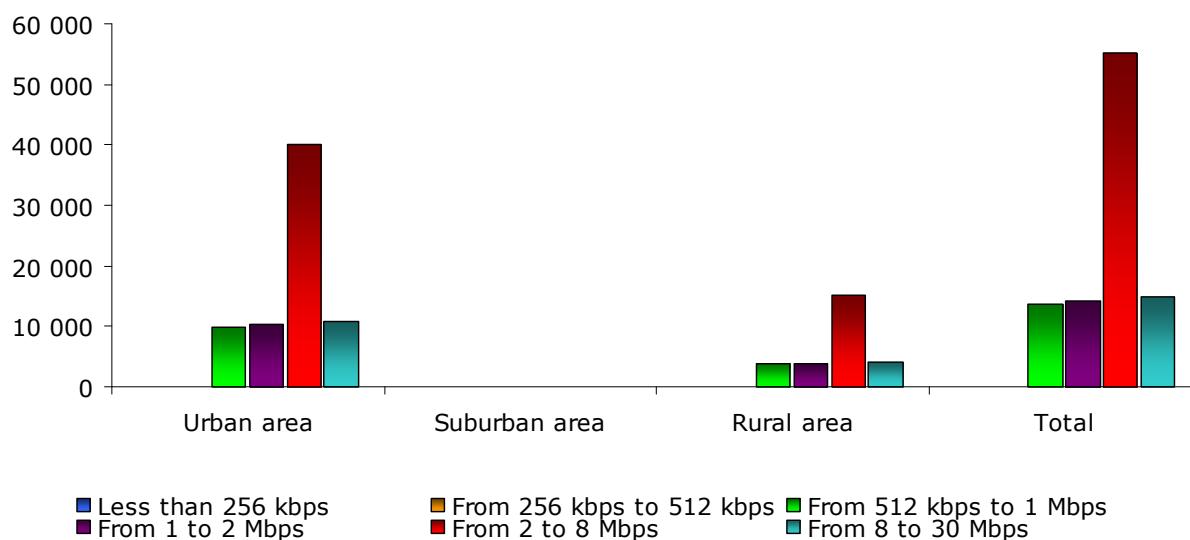
The distribution of DSL connections by download rates remained unchanged in 2009 compared to 2008, contrasting with the move towards higher speeds that we could observe previously.

Percentage of DSL connections by type of provider
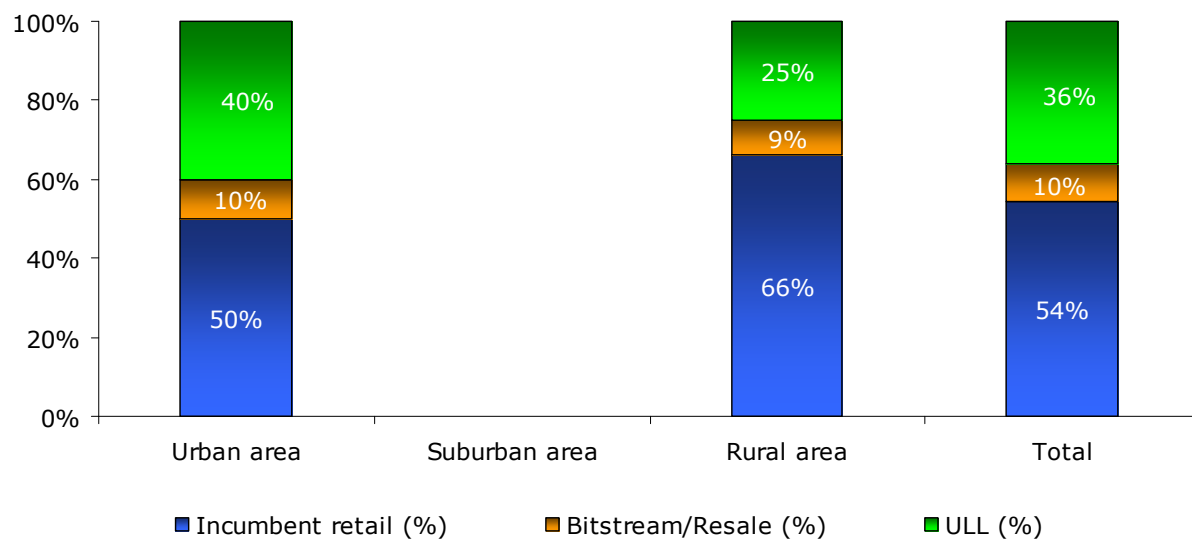
There are 4 DSL providers in Iceland: Siminn, Vodafone, Tal, and Aðrir. The incumbent Siminn holds 54% of subscribers.

4.13.4. Cable modem coverage and take-up

Cable modem is not used any more in Iceland. Service was terminated in 2008.

4.13.5. FTTx coverage and take-up

Coverage and penetration
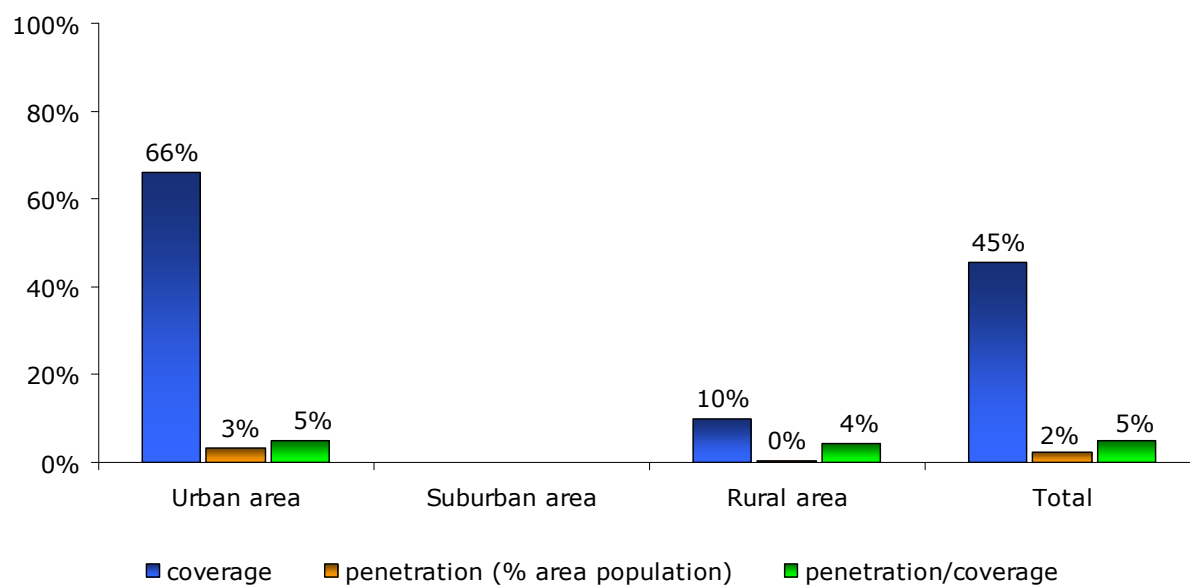
FTTx is available in Reykjavík and also in some areas of Akureyri, Akranes and Sauðárkróki. In the Reykjavik area, coverage is around 2/3 of homes.

Penetration has increased by a factor of 2.5 during 2009. At the national scale, penetration is slightly above 2% of population.

FTTx connections by download rate
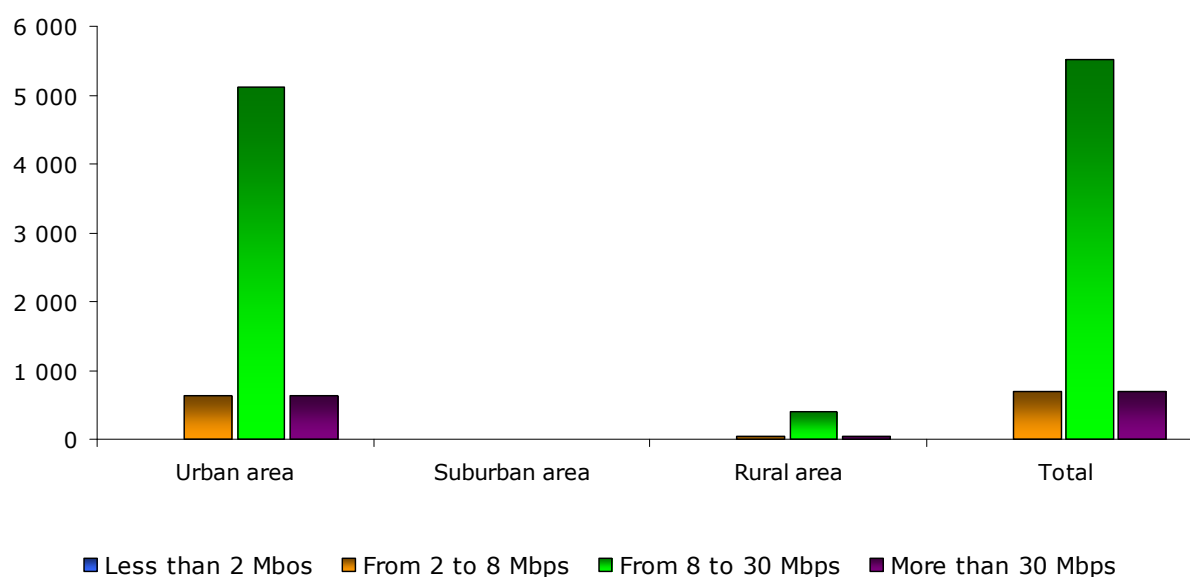
Download speeds are up to 50 Mbps on GPON as well as on FTTC with VDSL2. However, different subscription speeds are offered.

4.13.6. Other broadband access technologies

Wi-Fi

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

WLL/WiMAX

The number of WLL users has decreased a little since the end of 2008 – from 2,252 in 2008 to 2,238 in 2009.

Satellite

There are very few and even a decreasing number of broadband satellite subscribers in Iceland. By the end of 2009, there were 64 users in the country.

4.13.7. Mobile broadband coverage and take-up

Coverage by technology

- 3G coverage as a % of population
- 3G+ coverage as a % of population
- 3G coverage as a % of territory
- 3G+ coverage as a % of territory
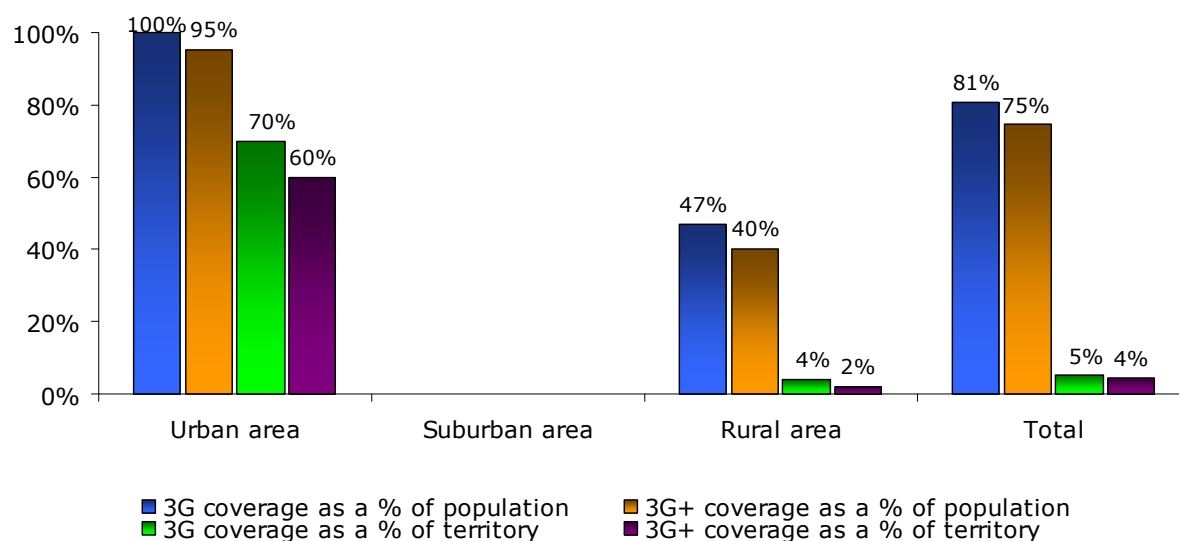
Mobile broadband coverage per population is 100% in the capital area of Reykjavik. In the rest of Iceland coverage per population is only half as high. Because of the low density and concentration of the population in Reykjavik, coverage as a percentage of the territory is very low.

Penetration

- 3G coverage as a % of population
- penetration (% area population)
- penetration/coverage
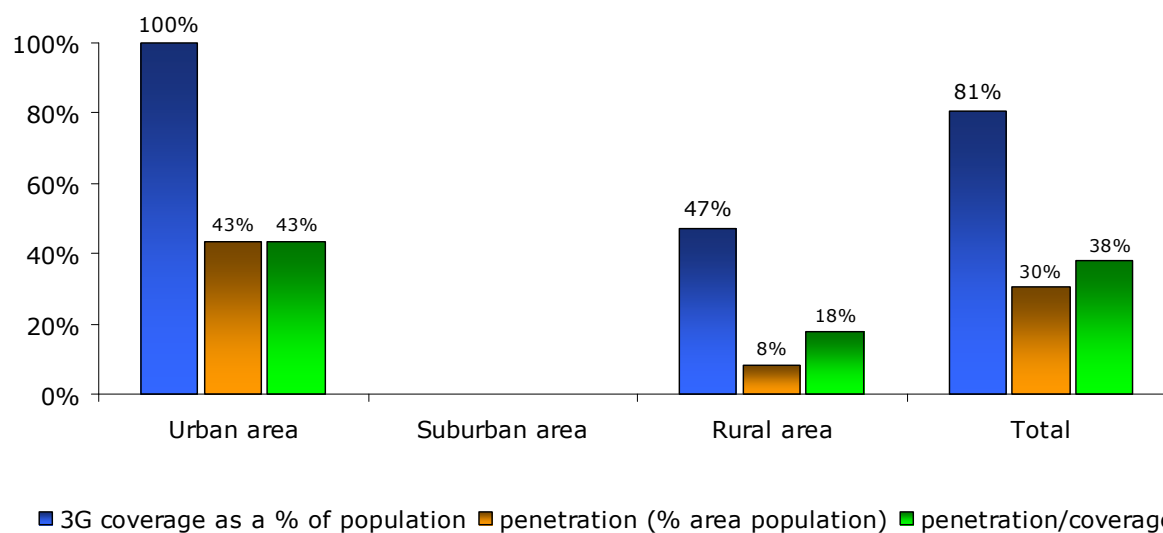
Mobile broadband services were introduced in the autumn 2007. The number of 3G subscribers using either voice and data or data only more than doubled in 2009 to 96,789 at the end of the year.

4.14. Ireland

4.14.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,896,006	798,215	1,765,080	4,459,300
Share of total population	42.5%	17.9%	39.6%	100.0%

4.14.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	82%	86%	89%	93%	93%
DSL subscribers	202,246	389,245	555,727	660,025	714,200
DSL penetration (% of population)	4.9%	9.2%	13.4%	14.8%	16.0%
Cable modem coverage (% population)	11%	*18%*	27%	32%	38%
Cable modem subscribers	25,000	55,320	82,500	104,133	150,910
Cable modem penetration (% population)	0.6%	1.3%	2.0%	2.3%	3.4%
FTTx subscribers	450	na	3,967	6,780	8,610
PLC subscribers	-	-	-	-	-
WLL subscribers	40,000	75,000	118,400	118,497	102,894
Satellite subscribers	2,950	4,000	4,247	1,911	8,000
Total	270,646	528,165	764,841	891,346	984,614
Total fixed broadband penetration (% population)	6.6%	12.5%	18.4%	20.2%	22.1%
Mobile broadband subscribers				903,521	1,662,666
Mobile broadband penetration (% population)				20.3%	37.3%

Nota: figures in *italics* are estimates.

The total number of fixed broadband subscribers continued to increase in 2009 to reach 22.1% of the population. The annual growth for 2009 for fixed broadband (+10%) is not as substantial as the previous year (+17%) although cable subscription has increased its stake into the total fixed broadband market to represent over 15% in 2009.

Mobile broadband was supported by the National Broadband Scheme, an initiative that aims at addressing the demographic challenge of connectivity since the Irish population is characterised by a low density for a large proportion of the total population, whereby fixed broadband cannot be economically viable when compared to the mobile alternative.

4.14.3. DSL coverage and take-up

Coverage and penetration
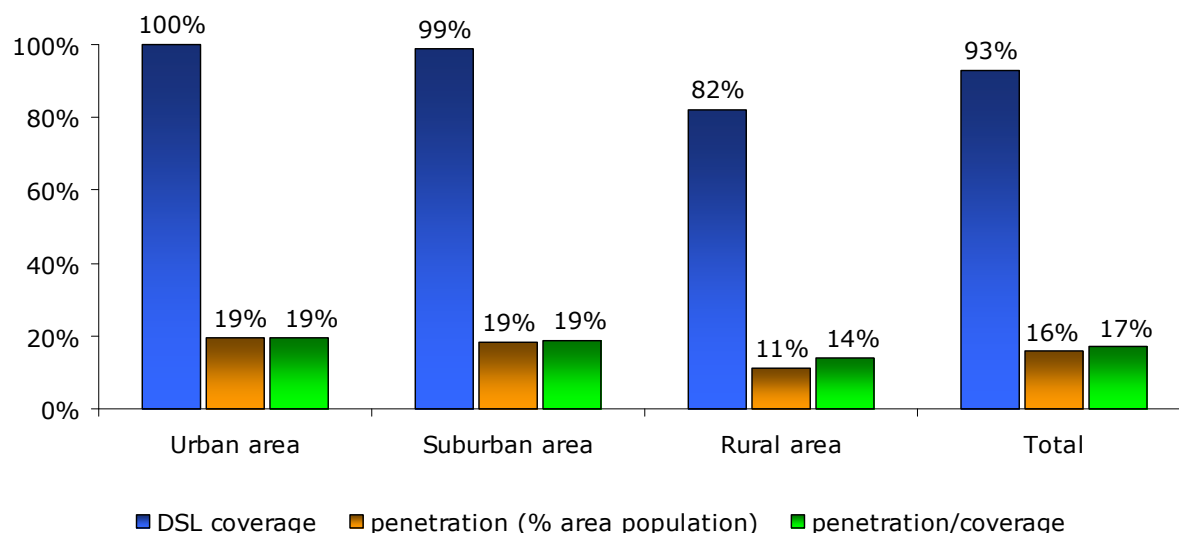
The coverage in rural areas is progressing with 82% coverage compared to 77% the previous year. This illustrates the investment carried out by operators. The number of DSL subscribers totalled 714,200 at the end of 2009, an 8% increase in one year. Penetration relative to coverage remained lower in rural areas.

Number of DSL connections by download rate
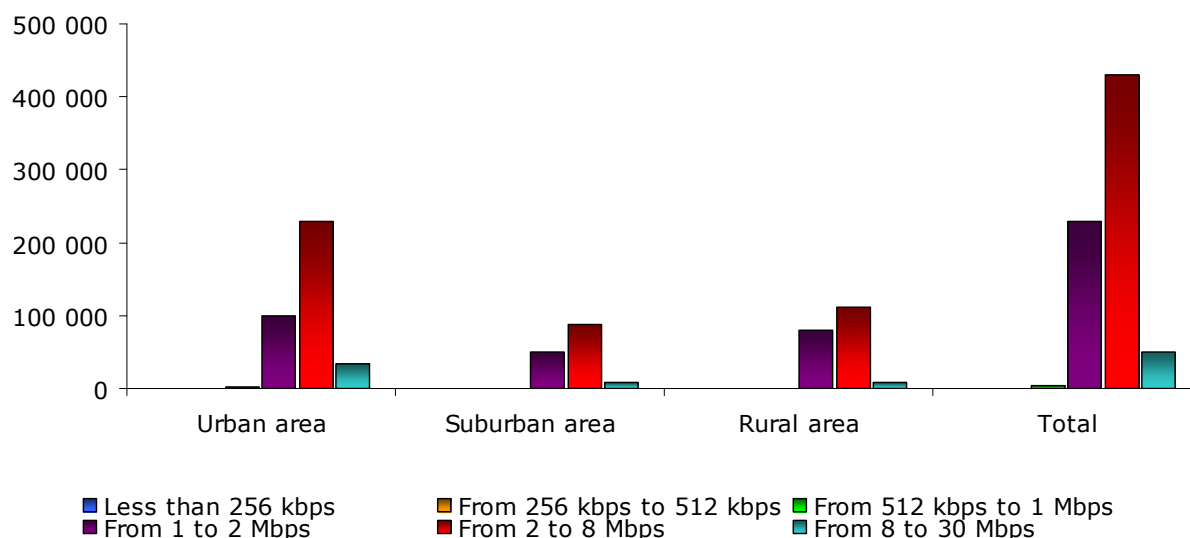
The headline speeds are increasing and the dominant proportion of packages is now the "2 to 8 Mbps" as operators have upgraded their service tiers. The packages included within "2 to 8 Mbps" capture now nearly 2/3 of all subscriptions. The spread of service is far from being uniformed across the densities since 68% of the "2 to 8 Mbps" are located in urban areas whereas this class of population represents 42% of the total population. This is most likely a consequence of the loop lengths in urban areas when compared to those of rural areas, assumed longer and therefore minimising the speed available at such a distance from the exchange. The "8 to 30 Mbps" package starts to make its first foray into the market albeit mainly limited to the urban areas. The slower speed packages, less than 256 kbps and upward till the "up to 1 Mbps" are no longer available to purchase and the 1 to 2 Mbps is soon to be extinct. At the end of 2009 Eircom had a very limited customer portfolio that was still on the lower package "up to 1Mbps".

Percentage of DSL connections by type of provider
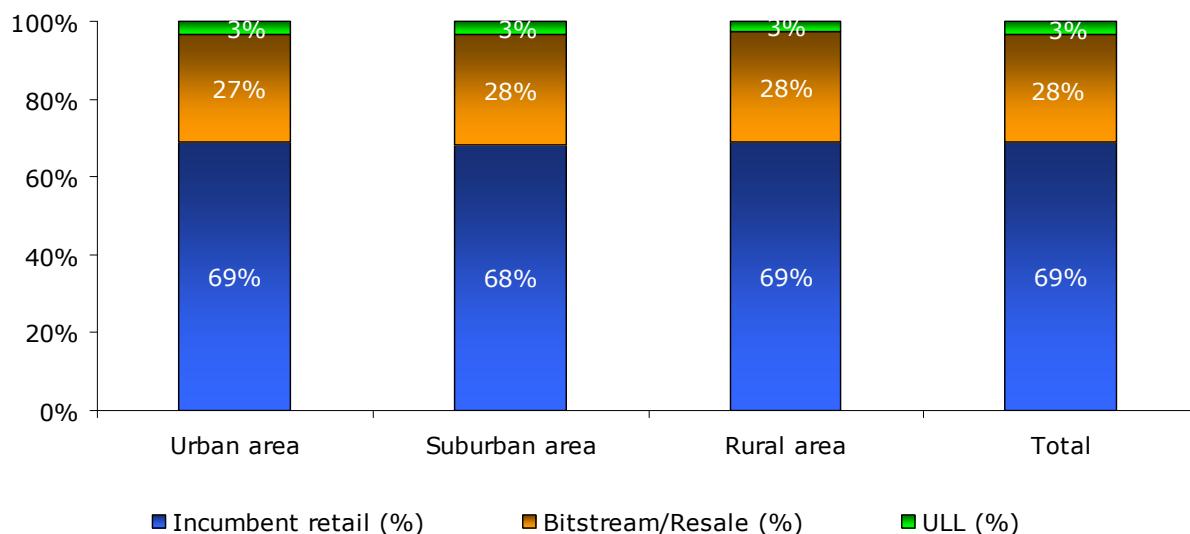
The share of the incumbent is only slightly eroding when compared to the previous year, a drop of 1 percentage point to 69%. The proportion is reasonably consistent across the densities. Eircom is growing on a par with the market. Thirty one percent of the DSL subscribers are served by companies other than Eircom and only 3% of the customers have their service entirely unrelated to Eircom via LLU.

Within the 28% of Bitstream/resale there have been some migrations since in March 2009 BT pulled out of the Irish retail broadband market and transferred all its customers to Vodafone. The strategic intent is, for both partners, to increase the number of exchanges to be unbundled. Should it bear fruit, the 3% of LLU that has been fairly stable for the last 2 years might increase in the near future.

4.14.4. Cable modem coverage and take-up

Coverage and penetration

- coverage
- penetration (% area population)
- penetration/coverage
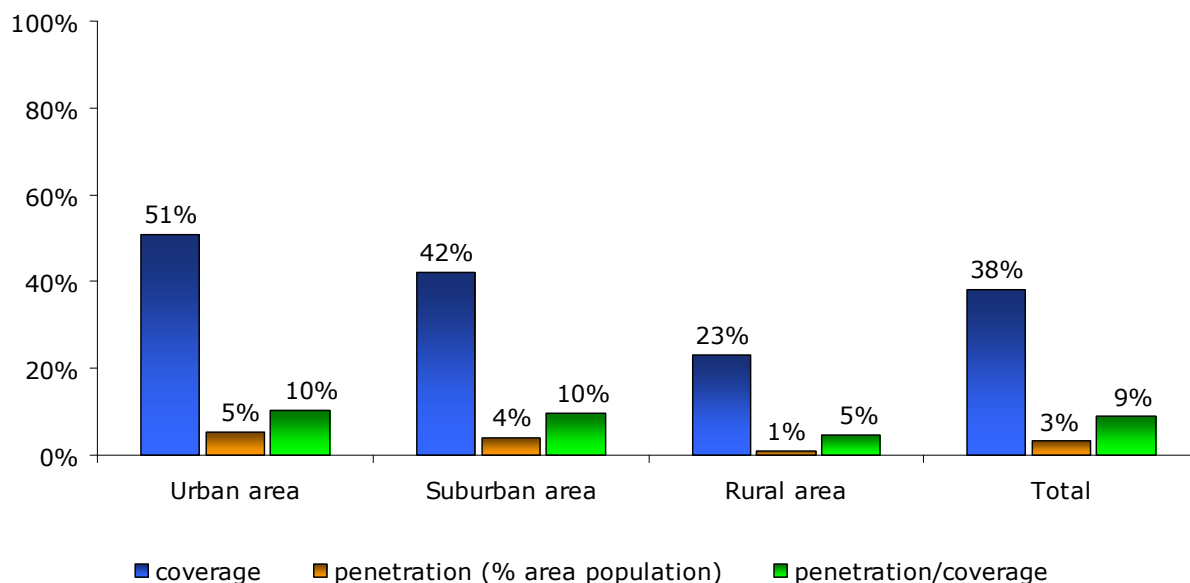
UPC, the cable operator has seen progress on 2 fronts in 2009: the number of homes passed that has increased by 80,000 to reach 593,000. This is reflected in the increase of coverage reaching 51% in urban areas. And it also increased its penetration over coverage to reach 10% in Urban area and 9% overall, a 2 points rise when compared to the previous year. As a result Cable broadband has increased its share of the fixed broadband market to 15%, which means that the share of broadband subscriptions to cable technology is growing faster than the market. Its share was 11% in 2008.

Number of cable modem connections by download rate

- Less than 256 kbps
- From 256 kbps to 512 kbps
- From 512 kbps to 1 Mbps
- From 1 to 2 Mbps
- From 2 to 8 Mbps
- From 8 to 30 Mbps
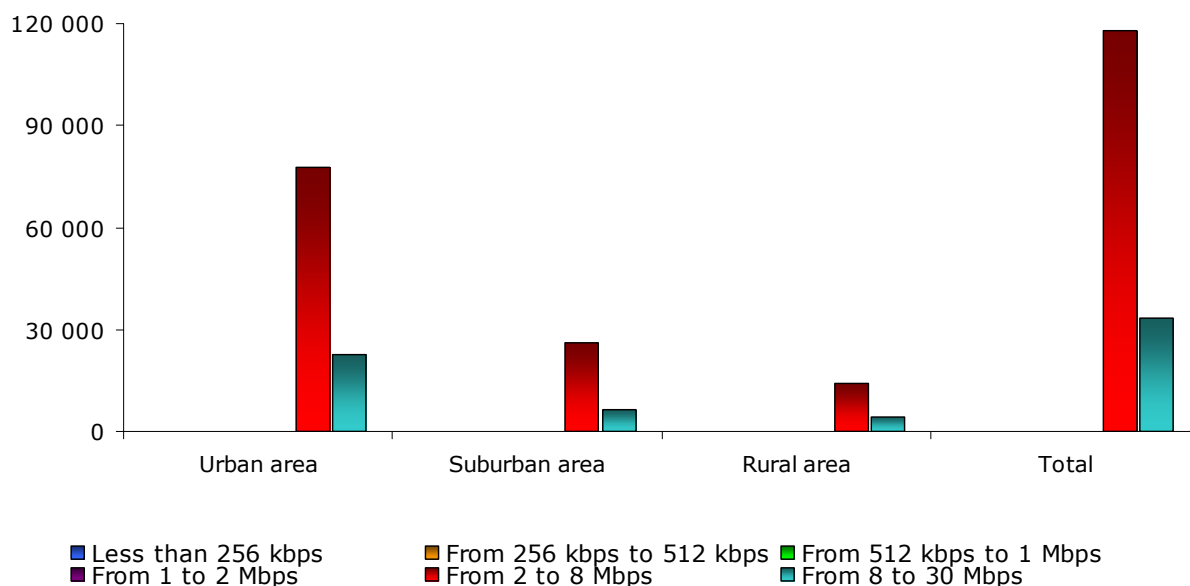
The dominance of the "2 to 8 Mbps" is even more contrasting with cable technology than with DSL; 78% of the cable subscribers are served by connections in this class, which now includes the entry package. The packages available in 2009 were 5, 15 and 30 Mbps. UPC introduced a migration upgrade program whereby customers from an old and lower package could be upgraded to the newer and faster packages at his/her request without any cost to the customer. This migration benefited mainly to the service tier just above the old packages. The upper speed available (up to 30 Mbps) has only moderately increased in term of overall penetration when compared to the previous year.

4.14.5. FTTx coverage and take-up

Coverage and penetration

■ coverage   ■ penetration (% area population)   ■ penetration/coverage
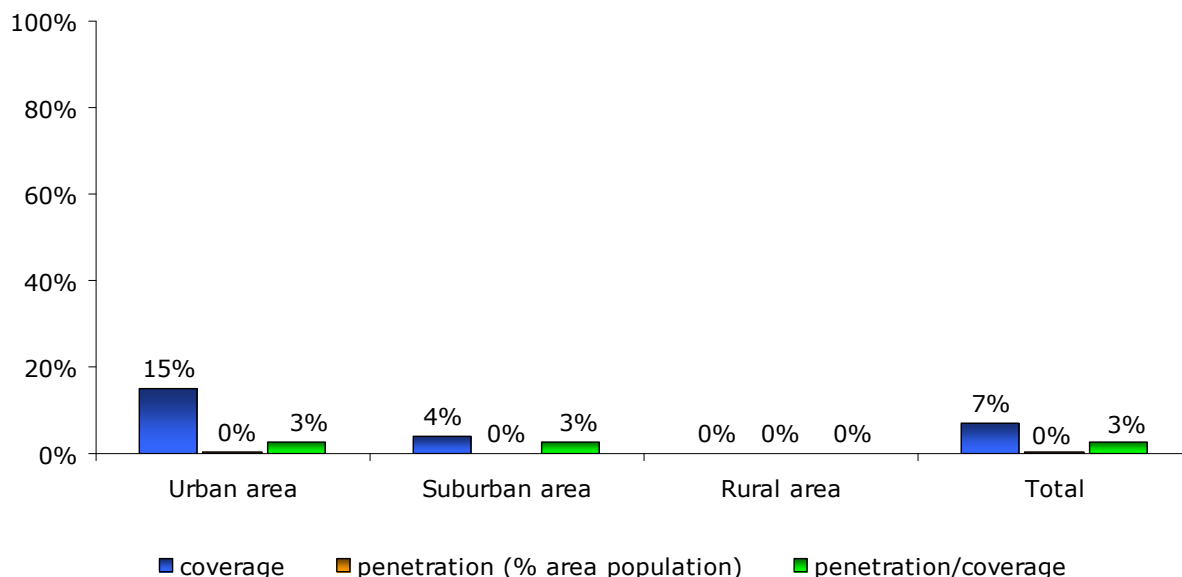
Optical fibre is still very moderately present in Ireland, with only a couple of providers and the little information available is considered commercially very sensitive. Compared to the previous year the major initiative has been the deployment in FTTN technology by the incumbent. As this deployment was still in the early days, the penetration remained very humble since the new services related to NGA from Eircom where not yet launched at the end of the year. Overall the number of fibre connections represents only 0.9% of the total fixed broadband subscription base. In late 2009 H2O Ireland opened an office with the intention to provide dark fibre to operators deployed via the sewage system during 2010.

FTTx connections by download rate

■ Less than 2 Mbos   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps   ■ More than 30 Mbps
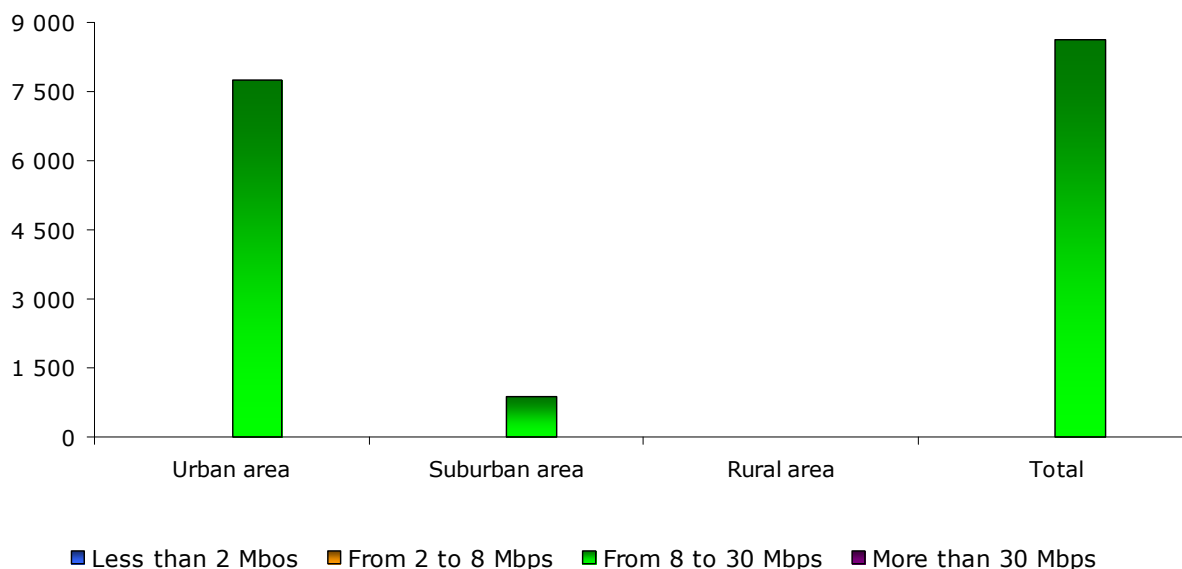
The population density of Ireland is not very conducive to FTTx deployments outside urban or suburban areas. Most of connections are pilot schemes and targeted at businesses. There have been occasional pilot schemes in remote towns in less populated areas such as in the West Country where deployments are taken place like in Kilrush along with 65 other towns (average density in that part of the country is below 50 inh/km²). The completions of these are expected in 2010. The deployments are initiated by the government and then handed over to private operators for management and maintenance.

4.14.6. Other broadband access technologies

Wi-Fi

There are a handful of Wi-Fi hotspots providers in Ireland, including the incumbent operator with over 1,000 hotspots. Eircom has upgraded many of its public payphone with Wi-Fi to provide a wide network of outdoor public hotspot, the majority being located in Dublin. Other operators tend to specialise in Wi-Fi provision indoor. The most frequent locations are hotels, public buildings such as libraries, hospitals and airports. Business models vary by providers and many have roaming agreements with hotspots aggregators that provide access in international locations. Most of the coverage is mapped with business activity and therefore mainly in urban and suburban areas.

WLL/WiMAX

WiMAX broadband is particularly dynamic in Ireland with Imagine! and Clearwire being the main two providers. WiMAX operates in the 3.4/3.6 GHz band. The deployments were in their early days at the end of 2009, and subscriptions were only operational in the first quarter of 2010. The plans for deployments are reasonably aggressive thanks to the ease of deployment of the infrastructure when compared to the fixed technology.

Satellite

Satellite connectivity is very slow and used as a complementary technology to other means of connection. As described below (see mobile broadband) it addresses the gap the 3G & 3G+ technologies cannot viably cover as part of the National Broadband Scheme. Independently of the NBS, satellite services are available from a range of small companies such as "Satellite Broadband", Digiweb and Satellite Business Broadband.

4.14.7. Mobile broadband coverage and take-up

Coverage by technology
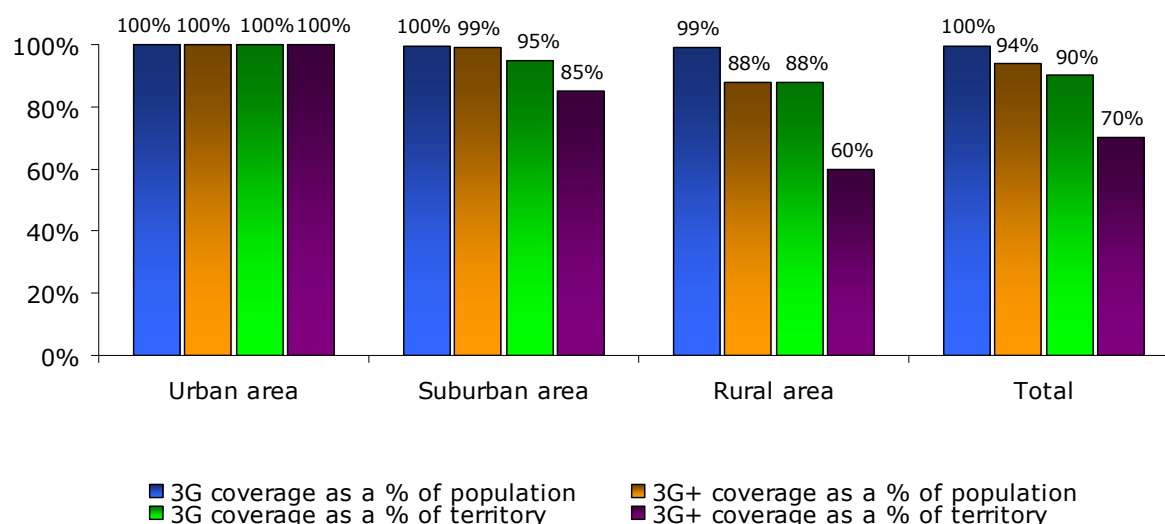
Mobile broadband is a significant enabler of broadband availability in Ireland and represents a third of the total broadband subscriber base in Ireland. The Mobile broadband uptake benefits of the coverage challenge that DSL faces. The technology is further favoured by the National Broadband Scheme (NBS) especially in the rural areas.

The NBS aims at supporting financially the coverage by mobile broadband of the 10% of the population living in remote areas that would be not viably covered with fixed broadband. The scheme which is subsidised by the government was subject to an invitation to tender the previous years and Hutchison 3G Ireland won the contract against BT and Eircom. The total investment is expected to reach € 223 millions, of which the support from the government will be a contribution of a maximum of nearly € 80 millions. Not all connections will be covered by 3G and 3G + technologies, it was expected that about 8% of the very remote areas would be covered by satellite, provided by "Satellite Broadband" the retained partner of H3G Ireland into this venture. This initial expectation of 8% was later revised by H3G at only 5%. The subscription cost to the customers will be circa €20 per month with a set-up fee of €49 for installation and equipment.

Penetration
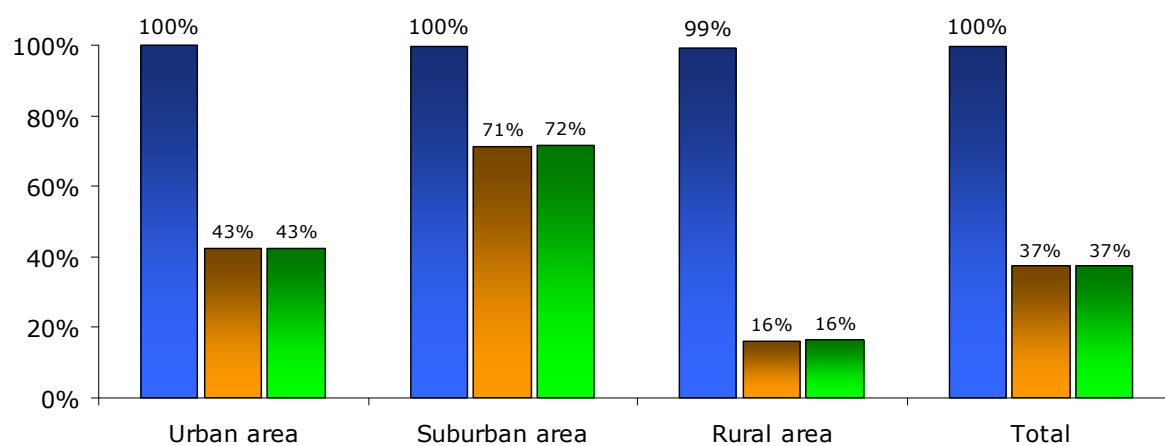
■ 3G coverage as a % of population ■ penetration (% area population) ■ penetration/coverage

The success of mobile broadband is not confined to the rural boundaries and has proven to be also successful in urban and suburban areas.

The overall take up of the NBS scheme remains for the time being below the national average broadband penetration however the deployment of the scheme is not yet completed so time will tell if rural populations are as eager to be broadband connected as its urban counter parts.

Beside the NBS, most operators also offer mobile broadband packages, hence the success of this technology.

4.15. Italy

4.15.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	30,443,810	22,196,667	7;404,591	60,045,068
Share of total population	50.7%	37.0%	12.3%	100.0%

4.15.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	86%	89%	94%	95%	96%
DSL subscribers	6,500,000	8,200,000	9,700,000	10,900,000	12,000,000
DSL penetration (% of population)	11.1%	14.0%	16.4%	18.3%	19.9%
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	206,000	229,000	268,000	309,000	328,000
PLC subscribers	0	0	0	0	0
WLL subscribers	800	1,400	2,000	3,000	16,000
Satellite subscribers	128,000	106,000	89,000	81,303	52,000
Total	6,834,800	8,536,400	10,059,000	11,293,303	12,396,000
Total fixed broadband penetration (% population)	11.7%	14.5%	17.0%	18.9%	20.5%
Mobile broadband subscribers			23,300,000	29,000,000	32,920,000
Mobile broadband penetration (% population)			39.4%	48.6%%	54.8%

At the end of 2009, total broadband Internet connections reached 12 million lines, a 10% increase over the previous year. Due to the lack of cable networks and the limited coverage of FTTH, DSL is still by far the main broadband access technology.

The Broadband access market is experiencing the typical life-cycle trend of a service in its introduction and development phases. Current growth rates are still sustained, but decreasing.

Bundling of complementary services (Voice over IP + Internet access), based on xDSL network is increasing. The number of FTTH subscribers increased only slightly due to the fact that no significant network deployments have been realized.

At the end of 2009 there were three IPTV providers in Italy: Fastweb, Telecom Italia and Wind/Infostrada, with a customer base of around 600,000 users, of which 200,000 are customers of Fastweb TV and around 400,000 subscribed Alice Home TV (Telecom Italia).

Fastweb has been 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 Unbundled ADSL, 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.

4.15.3. DSL coverage and take-up

Coverage and penetration
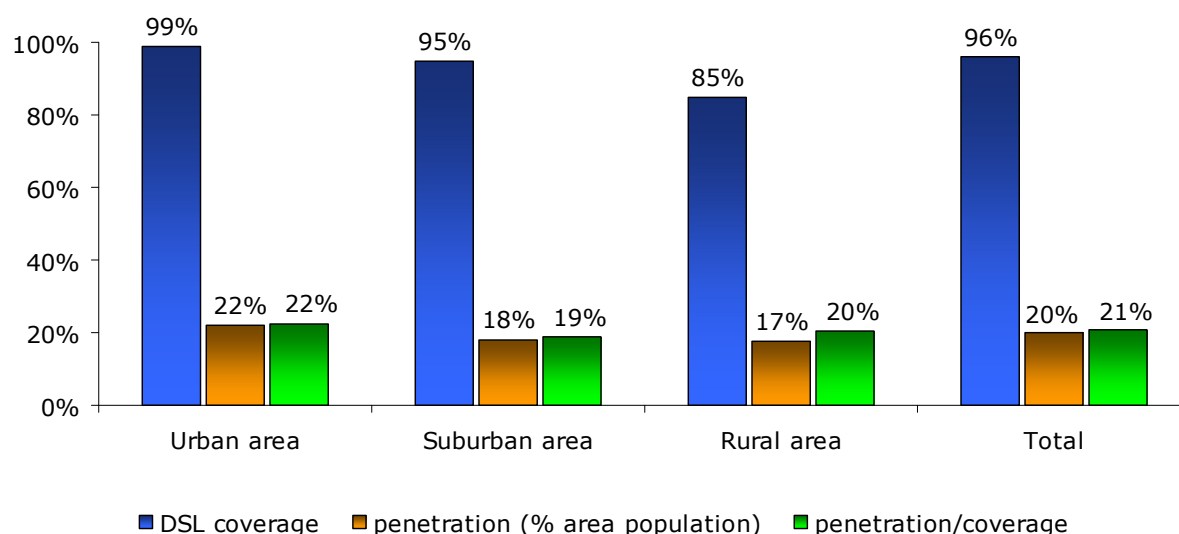
According to Telecom Italia, at the end of 2009 there were about 8,600 central offices equipped with DSLAMs, covering 96% of the total population.

Coverage in rural areas rose by more than 3 points in 2009 (from 82% at the end of 2008), and total coverage by one point (from 95% at the end of 2008).

Number of DSL connections by download rate
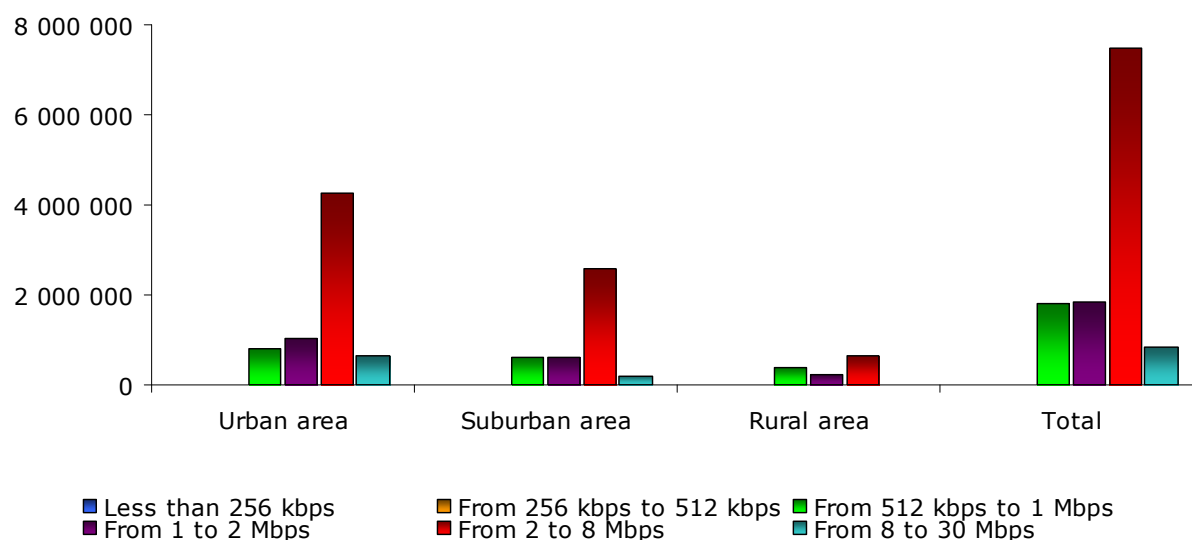
Continuous bandwidth increase, allowed by technological development, together with the introduction of new services and the evolution of demand, created a virtuous circle between demand and bandwidth availability.

At the end of 2009, it can be estimated that more than 60% of active connections were in the range of 2 to 8 (included) Mbps download rates and a further 7% were in the range of 8 and 30 Mbps. It can therefore be stated that the majority of connections are at speeds equal or higher than 2 Mbps and most of the investments concentrated to improve and increase the number of high speed connections.

However, only a small part of subscribers (less than 10%) opted for premium connections at more than 8 Mbps, although such services are now available to more than half of the population.

During last years, all the Italian telecom carriers improved their ADSL and ADSL2+ offerings with various downstream rates (from 2 Mbps to 20 Mbps).

The leading market players are:

- The incumbent, Telecom Italia, offering ADSL services up to 20 Mbps.
- Fastweb, who has an FTTH offer at 10 Mbps and ADSL services up to 20 Mbps;
- Infostrada (Wind) offering ADSL services up to 20 Mbps;
- TeleTu and Vodafone, two different brands owned by Vodafone Omnitel NV, offering ADSL services up to 7 Mbps.

It must be noticed that during the last 2 years Vodafone Omnitel NV aggressively addressed the ADSL market with two different brands: Vodafone and TeleTu (Tele2 till the end of 2009), and even if it has not yet implemented an ADSL2+ offer, a lot of converging services has been deployed.

Percentage of DSL connections by type of provider
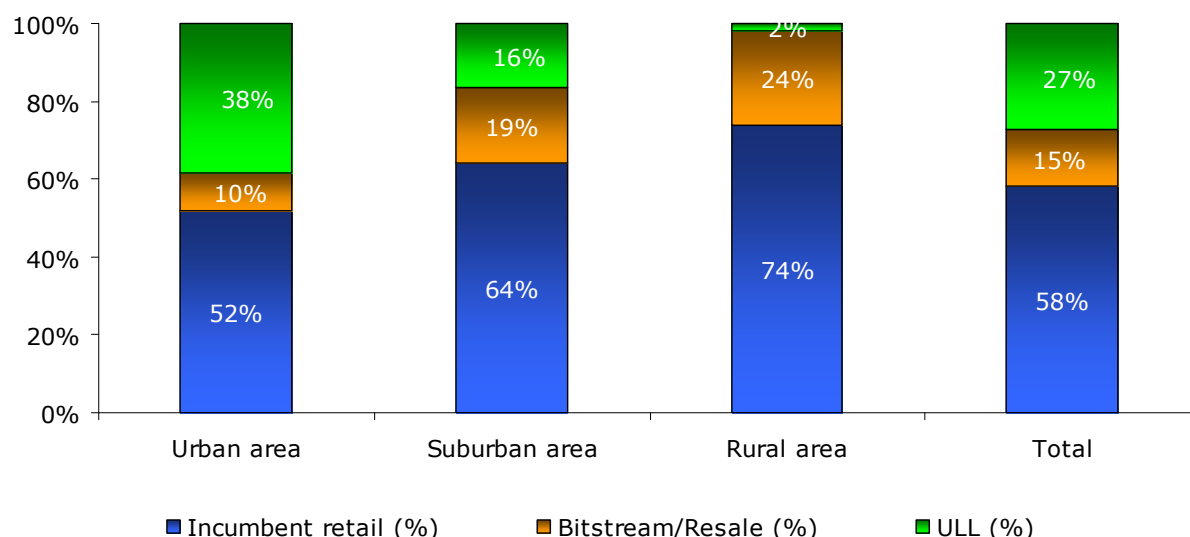
Also as a consequence of Vodafone/TeleTu's performances, at the end of 2009, Telecom Italia's share of the DSL retail market was 58% (4 percentage points less than the previous year) with 7 million ADSL lines.

ULL/Shared Access lines are the fastest growing markets: with around 3.3 million units, their share increased from 25% to 27% in the last year.

Competition is still growing: in 2002 the first two alternative providers together accounted for only 13% of the retail market, now they cumulate around 26% of the total broadband connections.

The third component, DSL based on TI wholesale offer, increased its market share. There has been a slight increase, from 13% market share at the end of 2008 to 15% at the end of 2009, for a base of more than 1.7 million units.

After a first step based on wholesale offerings (for simple resale), starting from 2004/2005 ULL&BSA has increased significantly. This evolution has been favoured by a larger ULL coverage of several important players as well as by the steady development of multiple play offerings.

4.15.4. Cable modem coverage and take-up

Cable modem is not available in Italy.

4.15.5. FTTH coverage and take-up

Coverage and penetration

■ coverage   ■ penetration (% area population)   ■ penetration/coverage
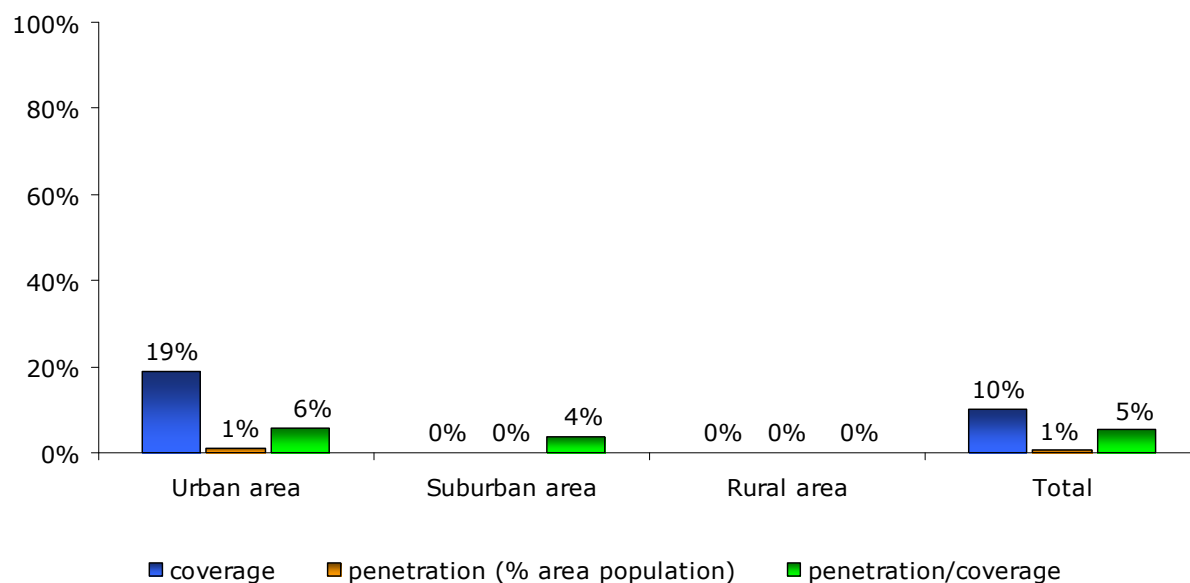
Fastweb sells its FTTH services to both business and consumer segments, while Colt Telecom, BT Italia, Wind and Telecom Italia offer their services to a very small group of business and corporate customers.

Fastweb reports that FTTH is available in more than 30 cities: primarily in Milan (and in 17 outlying municipalities), Rome (and in two suburbs), Naples, Turin (and 1 outlying municipality), Geneva, Bologna (and 6 outlying municipalities) and Bari.

Number of FTTH connections by download rate

■ Less than 2 Mbos   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps   ■ More than 30 Mbps
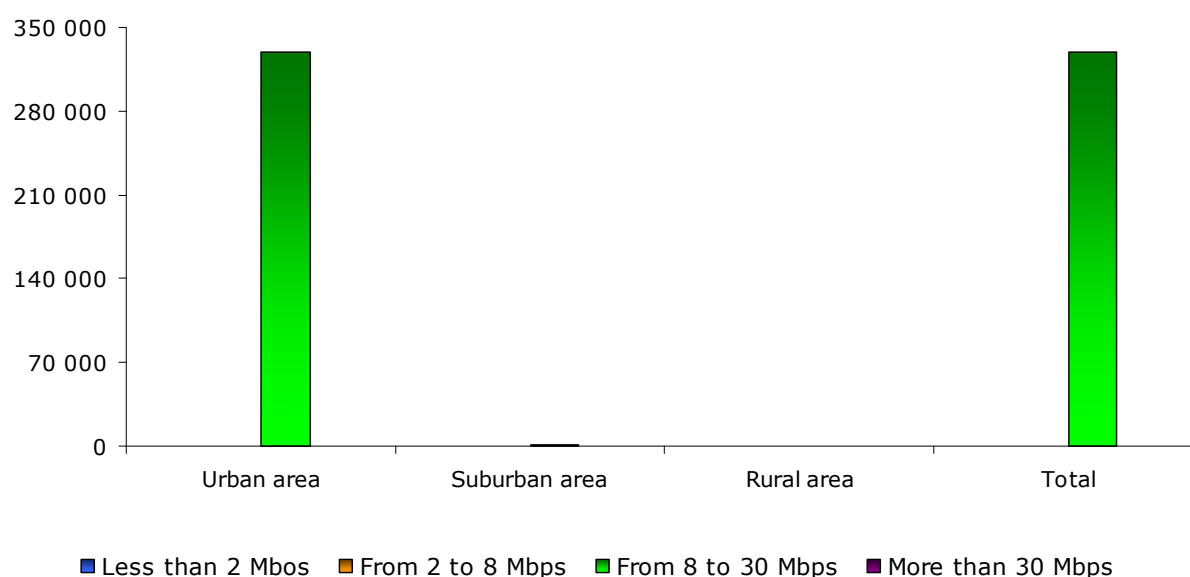
All FTTH access services sold by Fastweb have a speed of at least 10 Mbps. These are symmetric services that offer a lower download speed than ADSL2+, but an upload speed 10 times higher than ADSL2+ upload speed.

4.15.6. Other broadband access technologies

Wi-Fi

According to the Ministry of Economic Development – Communication Department, at the end of 2009 there were 4,207 active Wi-Fi hotspots in Italy. The best equipped region was Lombardy, followed by Lazio, Emilia-Romagna and Tuscany.

According to a survey carried out by Between, at the end of 2009 there were around 150 WISPs (Wireless Internet Service Providers) which offered WiFi/Hiperlan services, 20 of which entered the market in the last year. Coverage is approximately 15% of the Italian population, but with significant regional differences (northern Italian regions present a much higher level of coverage than southern regions) and close to 20% for rural areas.

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 by a public bid hold by the Ministry of Communications. Licences were granted to 13 network operators.

At the end of 2009, it can be estimated that the scenario is about the same as at the end of 2006 with a base of roughly 1,000 WLL business customers in north-eastern Italy.

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 operators with a national presence and 7 are local operators. Some of these operators have started deployment, but they do not cover more than 5% of the population. All these companies are required to develop significant local coverage, especially in digital divide areas (coverage obligations linked to frequency acquisition).

WiMAX subscribers, at the end of 2009, were almost 15,000 and they were concentrated in a few regions. This is due to the fact that only 60% of the Italian regions had an active WiMAX service provider (Lombardy was the only region with more than two WiMAX service providers).

Satellite

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

According to the 15th Progress Report on the single European Electronic Communications Market, at the end of December 2009, there were 52,000 satellite Internet subscribers in Italy with a drop of about 30,000 units in the last year.

4.15.7. Mobile broadband coverage and take-up

Coverage by technology
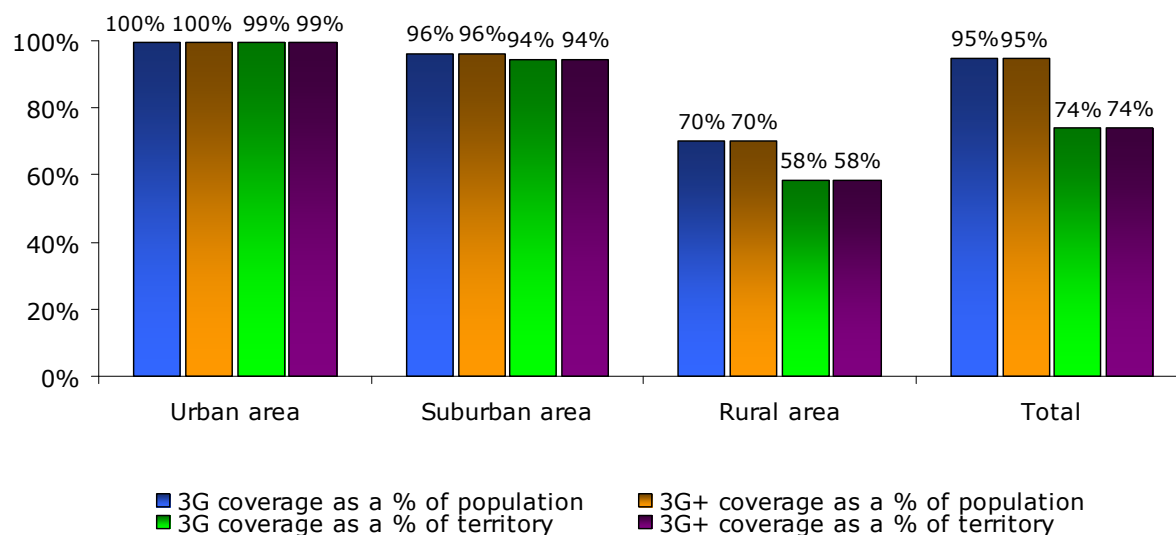
Mobile broadband coverage in Italy reaches almost 95% of the total population, with a great difference between rural and urban areas (about 30 percentage points)[5]. In 2009, UMTS and HSxPA (3G+) coverage reached the same level due to the fact that mobile operators upgraded all BTSs (Base Transceiver Stations) to 3G+.

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[5] Coverage has been calculated according to the lists of covered municipalities published by the operators' websites. Each municipality reached by an operator has been considered as completely covered (100% of resident population). UMTS and HSxPA coverage is based on Between National Broadband Observatory data.

Penetration

■ 3G coverage as a % of population ■ penetration (% area population) ■ penetration/coverage
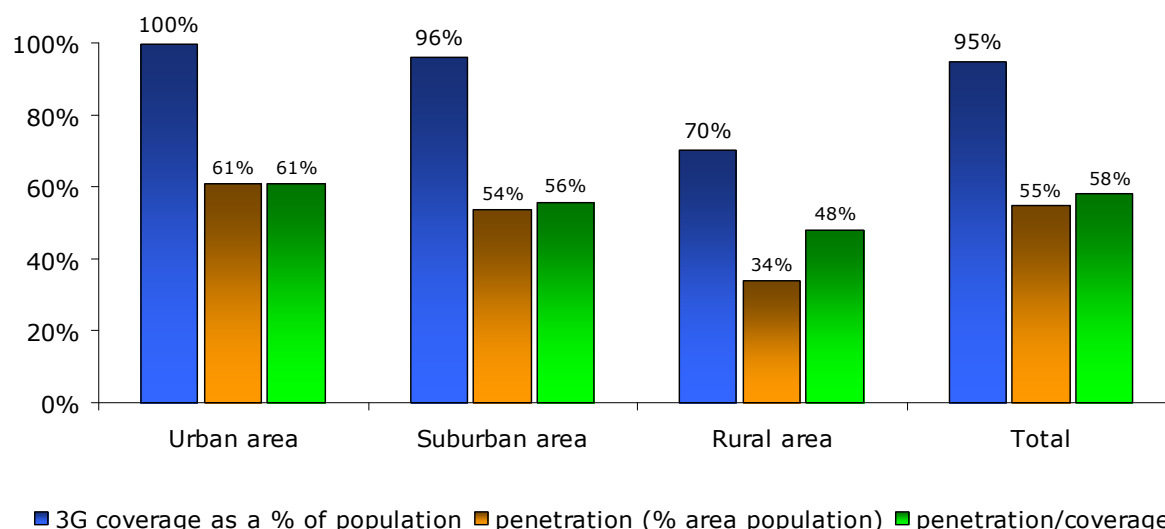
* Mobile broadband subscribers: number of UMTS Sim Cards / Terminals

According to the National Regulatory Agency (AGCOM's Annual Report 2010), at the end of 2009 there were 32.9 million UMTS lines (including all available terminals, SIM cards & mobile BB dedicated data services). At the same time, there were 9.9 million mobile BB active users (access to dedicated data services via modems/cards and other active 3G-equivalent advanced data users using mobile terminals) and 4.1 million mobile dedicated data services only devices (cards/modem/keys).

The Italian mobile market is comprised of four operators plus a certain number of MVNOs:

- TIM (Telecom Italia) with 30.9 million customers, of which more than 7.3 million UMTS lines;
- Vodafone Italia, with 29.9 million customers, of which more than 11.1 million UMTS lines;
- Wind, with 18.4 million mobile customers, of which about 5.6 million UMTS lines;
- H3G with near 8.9 million customers (all lines are UMTS)

MVNOs, which currently have 2.4 million customers (mostly belonging to the consumer segment), significantly increased their customer base in the last year (around 1.2 million units during 2009). The main player is Poste Mobile – the mobile telecom arm of the national postal service provider- which, according to the National Regulatory Agency's 2010 Annual Report, approximately accounts for 50% of all MVNOs' customers.

4.16. Latvia

4.16.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,477,199	62,955	708,246	2,248,400
Share of total population	65.7%	2.8%	31.5%	100.0%

4.16.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	-	72%	87%	88%	89%
DSL subscribers	68,569	120,000	158,000	182,326	186,631
DSL penetration (% of population)	3.0%	5.3%	7.0%	8.0%	8.3%
Cable modem coverage (% population)	-	50%	65%	65%	58%
Cable modem subscribers	16,000	*27,000*	38,000	37,217	32,971
Cable modem penetration (% population)	0.7%	1.2%	1.7%	1.6%	1.5%
FTTx subscribers	1,000	1,200	8,700	159,808	170,720*
PLC subscribers	44	60	60	0	0
WLL subscribers	54,623	92,000	109,798	50,485	49,707**
Satellite subscribers	-	60	80	329	360
Total	140,236	240,320	314,638	430,165	440,389
Total fixed broadband penetration (% population)	6.1%	10.6%	13.8%	19.0%	19.6%
Mobile broadband subscribers				33,604	37,917
Mobile broadband penetration (% population)				1.5%	1.7%

* including 148,583 LAN subscribers

** including 36,000 CDMA-based FWA connections (Triatel)

The broadband market trends in 2009 were:

- continued development of infrastructure planned or initiated in previous years, leading to increased data speed for the user and new offers promising 50-100 Mbps at a price comparable to the average price of Internet services across the country.
- development of "triple play" services thanks to increased capacity and partnerships between different operators to provide a unique package.
- revenue decrease for ISPs with in particular a drop of "premium" or "luxury" services sales and reduced income from corporate segment due to the massive business activity recession.
- strengthening and tightening competition on the market, especially in urban areas, due to the modernization of infrastructure and the emergence of NGN networks on the one hand, and the sharp decline in purchasing power on the other.

4.16.3. DSL coverage and take-up

Coverage and penetration
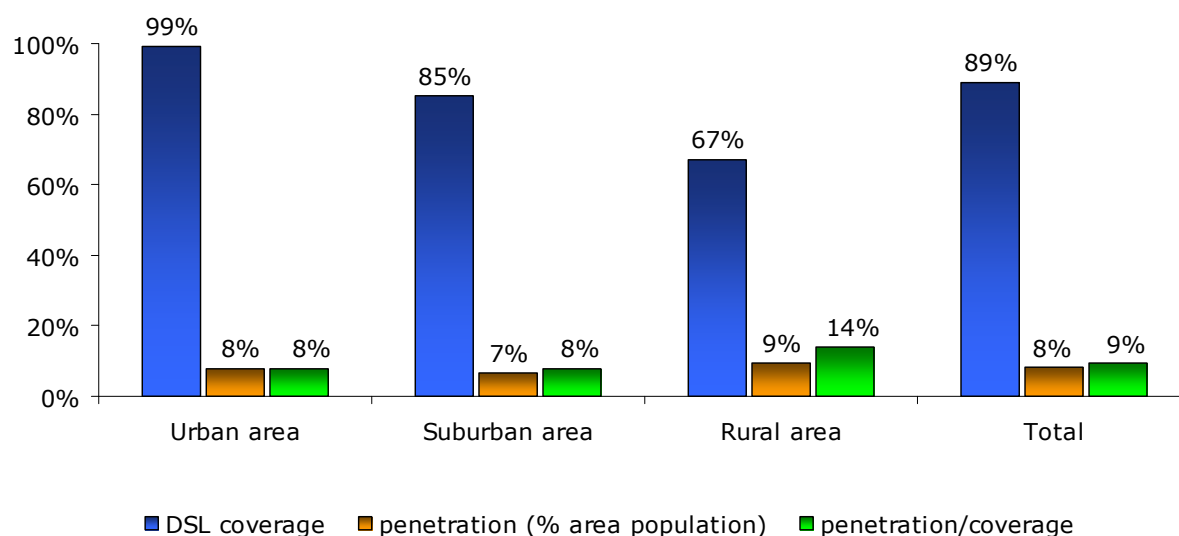
DSL technology remains the most widespread broadband Internet access mode. DSL coverage appears to have reached its maximum level and it will no longer expand in the future. DSL will likely to be displaced and changed to new technologies, like optical fibre or various types of wireless broadband.

Number of DSL connections by download rate
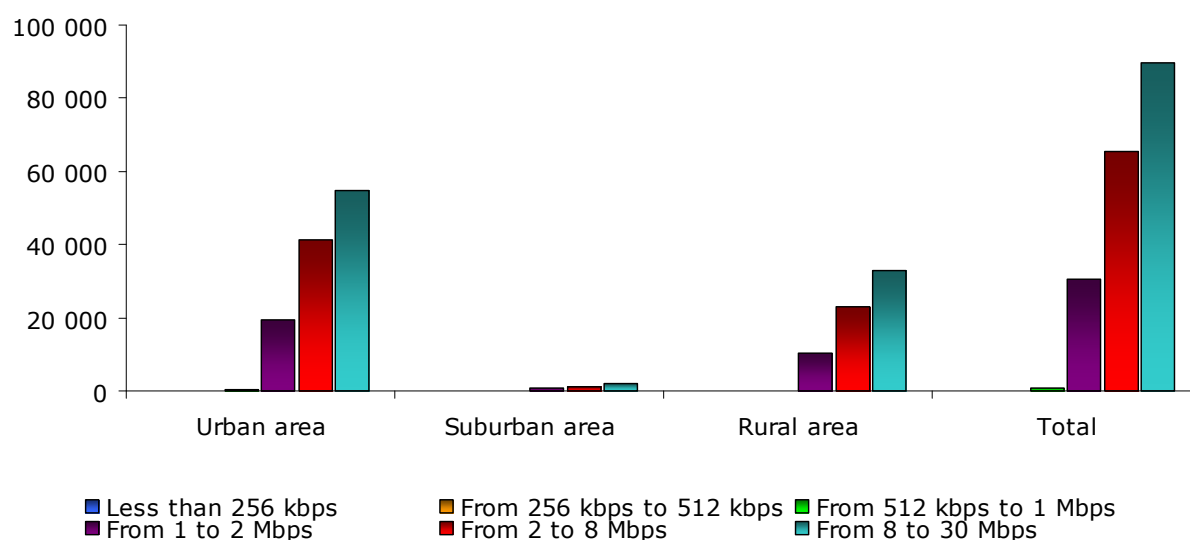
Not expanding territorially, DSL services gain in quality. Trying to keep customers Lattelecom (Latvian incumbent operator) lowers prices for DSL packages with higher speeds or substitutes service with higher quality for existing users, while maintaining the same price. As a result at the end of 2009 most DSL users had a download speed above 8 Mbps.

Percentage of DSL connections by type of provider
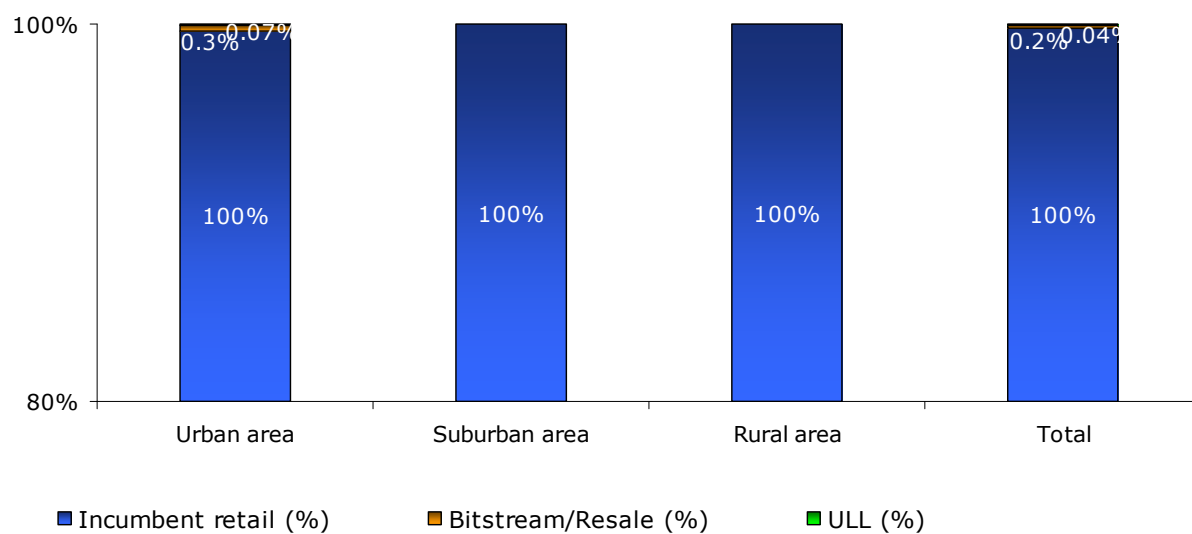
DSL resale and unbundling markets did not emerge in Latvia. Though Latvian legislation requires unbundling from a dominant player, ISPs do not opt for providing DSL service. High competition level and small size of the Latvian broadband market leads them to concentrate on their own networks and products.

4.16.4. Cable modem coverage and take-up

Coverage and penetration
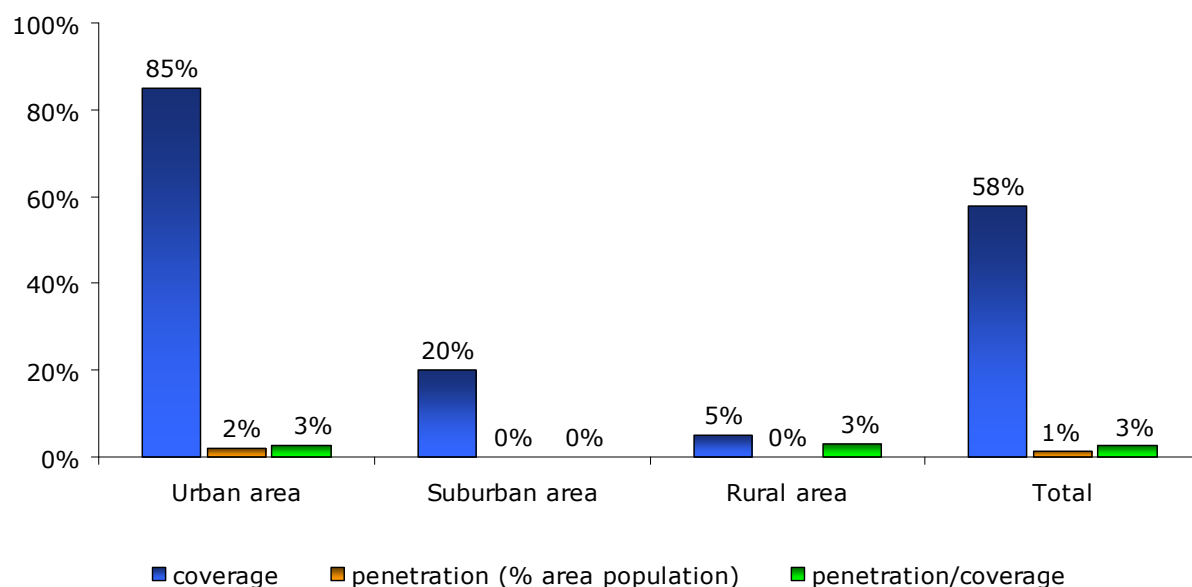
During 2009 the process of cable TV network infrastructure upgrade was still in progress. Due to the growing pressure from fibre optic networks to provide digital TV, coverage of cable TV networks is decreasing and it should continue to scale down within the next few years.

Number of cable modem connections by download rate
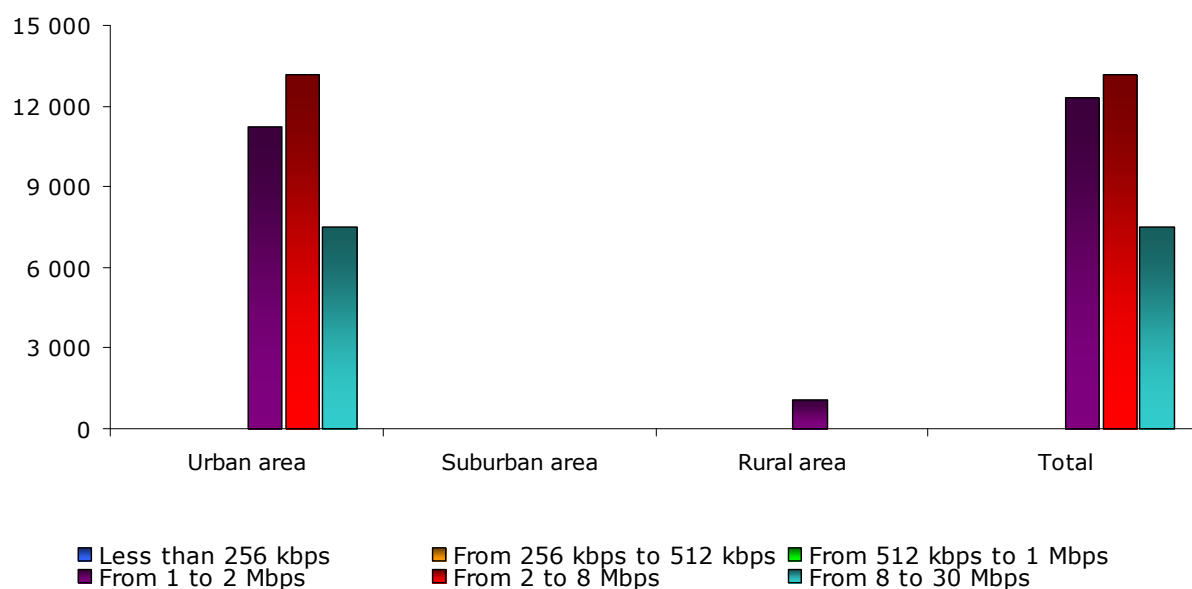
Following market demand, cable TV network operators try to provide higher Internet access speeds, where infrastructure allows doing so. Total number of cable modem subscribers decreases (from 37,200 at the end of 2008 to less than 33,000 at the end of 2009) as a result of growing competition from fibre optics access networks in particular.

4.16.5. FTTx coverage and take-up

Coverage and penetration
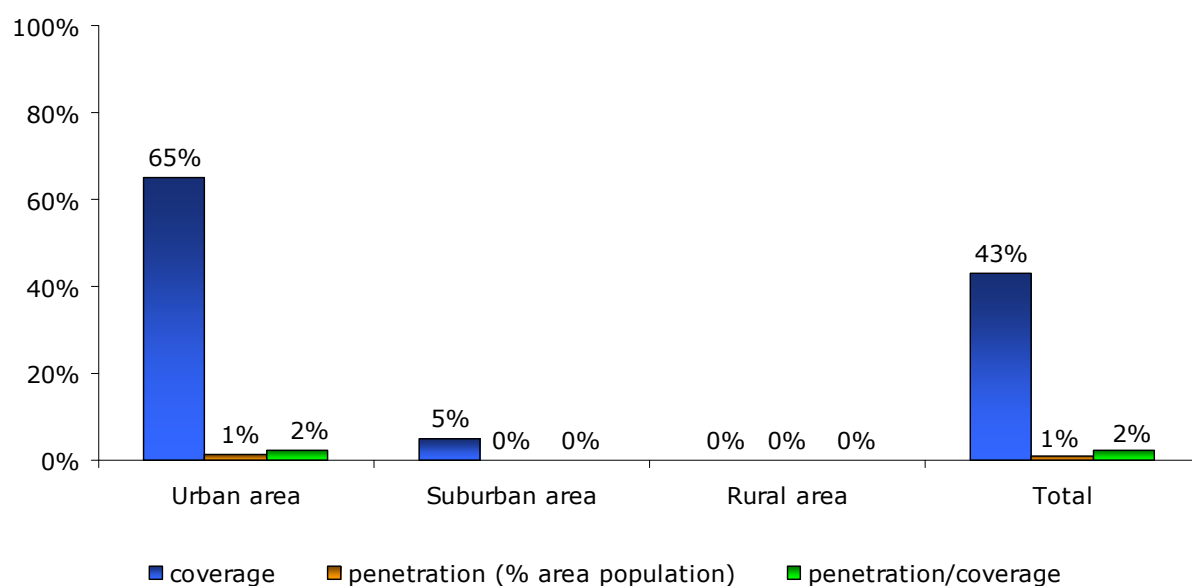
In 2009 Latvian LAN operators actively deployed optical networks. As LAN networks are largely used for Internet access in Latvian cities, most of LAN operators perform step-by-step network upgrades, changing copper infrastructure to fibre optics. The same process takes place with cable TV networks. As a result, largest part of Latvian LAN connections are actually mix of Fibre To The Building and Fibre To The Node. Lattelecom is also investing in fibre (including FTTH) and markets its new fibre optic infrastructure in Riga and other major cities of Latvia.

FTTx connections by download rate
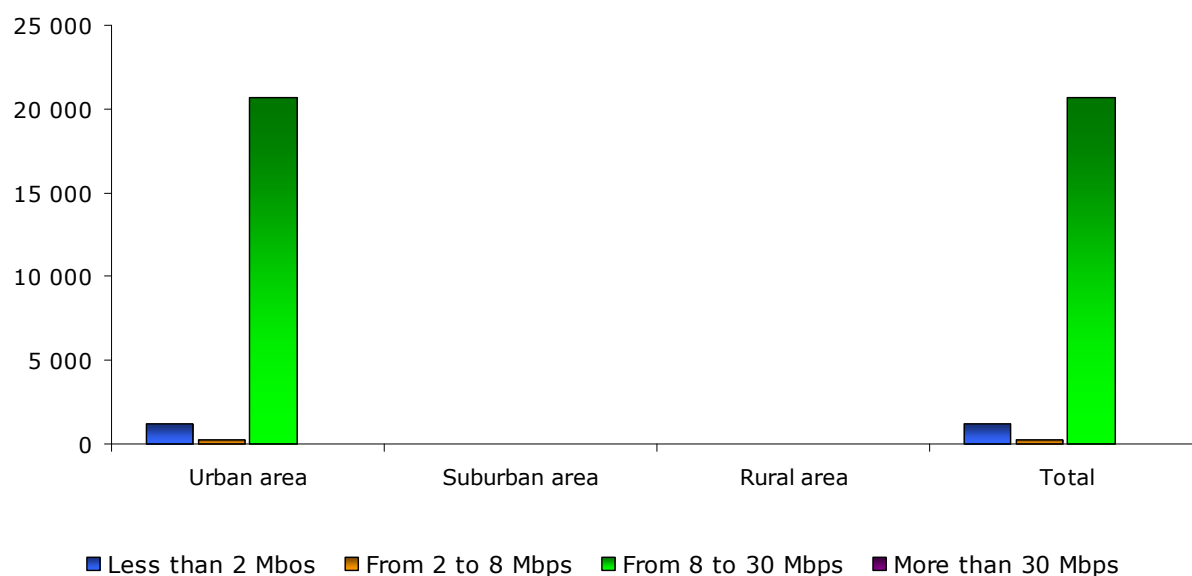
Though advertisements promising Internet access at speeds of 100 Mbps or even 200 Mbps, effective speeds declared by operators and confirmed by Latvian Regulator in 2009 did not exceed 30Mbps.

In 2009, competitors were challenged by Lattelecom, which launched an aggressive marketing campaign to attract customers to its new network, offering 20Mbps Internet package including digital TV at the average price of a basic internet access (around 18 EUR).

4.16.6. Other broadband access technologies

Wi-Fi

Wi-Fi in Latvia is mostly used to build home or office local area networks. Public Wi-Fi services in Latvia are provided by the incumbent operator Lattelecom. Users are requested to buy access cards to get connection. Usage of public Wi-Fi is very limited, and does not impact broadband market in Latvia. There is no declared plan to develop public Wi-Fi solutions.

WLL/WiMAX

There are up to 20 ISPs in Latvia using WiMAX and WLAN solutions. Lattelecom owns WiMAX network covering the capital city Riga, Riga's area and several cities (Ogre, Daugavpils, Dunalka). Due to technological limits and growing pressure from 3G mobile networks, WiMAX development in Latvia is limited and its future is uncertain.

Triatel company provides WLL solutions based on CDMA 450 1x network. At the end of 2009, there were 36,000 Triatel WLL customers, mainly in rural areas.

Satellite

The satellite is still not popular in Latvia. Considering 3G mobile internet availability and competitive price, prospects are very limited for satellite internet access.

4.16.7. Mobile broadband coverage and take up

Coverage by technology
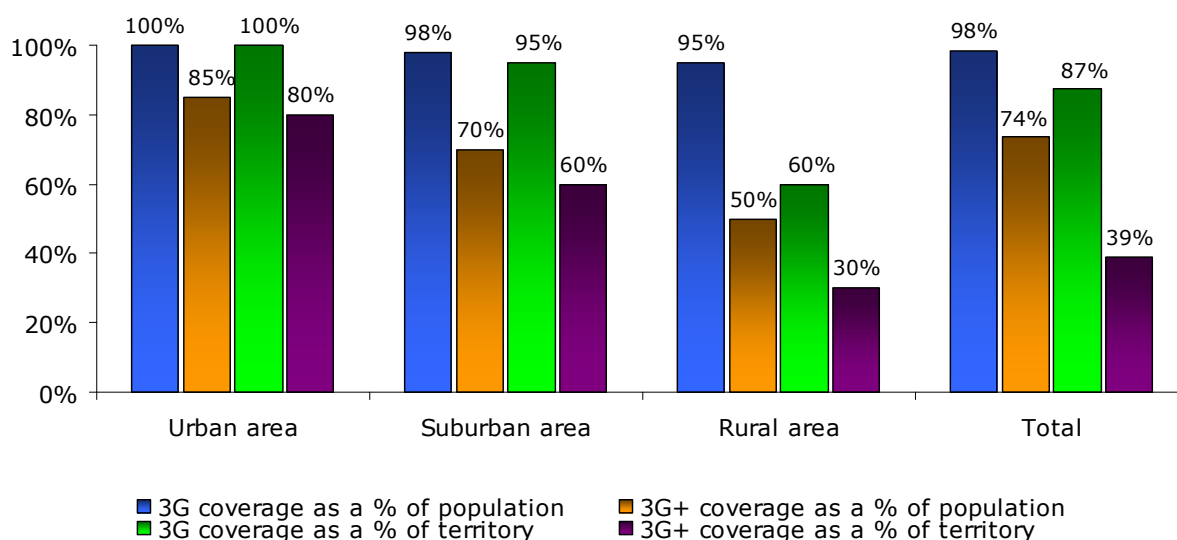
There are four mobile internet service providers in Latvia: Latvijas Mobilais Telefons (LMT), Tele2, Bite and Triatel. LMT, Tele2 and Bite operate GSM/UMTS/HSDPA networks (3G+). Triatel owns a CDMA EV-DO Rev A network using the 450Mhz frequency (3G) that provides internet access with 3.2 Mbps downlink speed and 1.8 Mbps uplink.

In 2009, the mobile operators invested a lot to upgrade their networks and expand UMTS and HSDPA coverage, enabling 74% of the Latvian population to access to 3G+ services.

Penetration
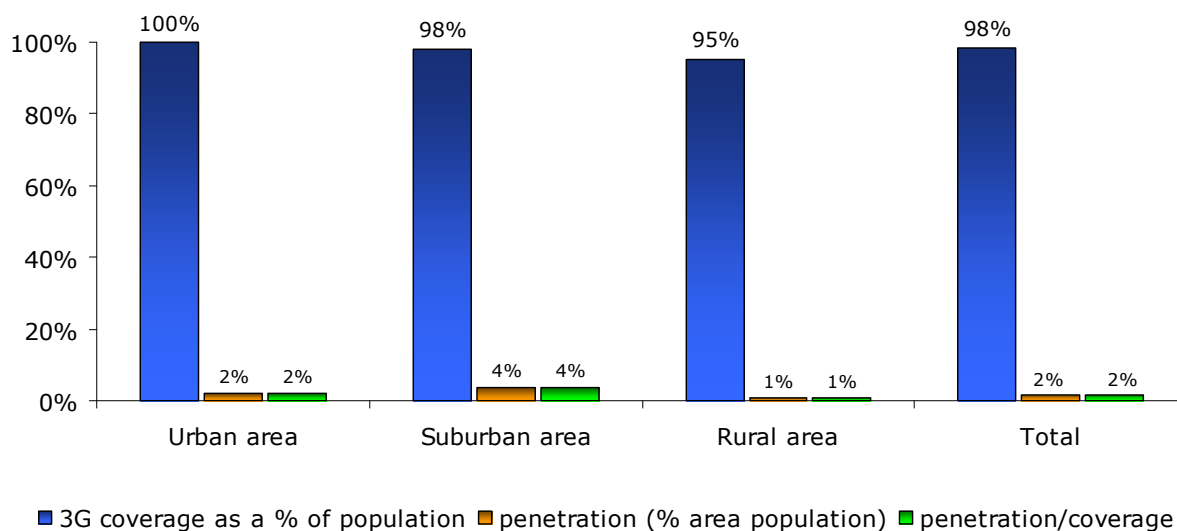
Despite of coverage and quality improvements, the mobile internet subscriber base increased only very slightly in 2009, from 33,600 at the beginning of the year to 37,900 at the end, as no application was able to make value from the mobility of the broadband access and it is still too expensive and too limited to replace fixed connections.

4.17. Lithuania

4.17.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,961,639	235,394	1,131,973	3,329,006
Share of total population	58.9%	7.1%	34.0%	100.0%

4.17.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	82%	83%	88%	88%	89%
DSL subscribers	104,798	178,302	231,951	250,966	228,042
DSL penetration (% of population)	3.1%	5.3%	6.9%	7.5%	6.9%
Cable modem coverage (% population)	-	-	-	49%	52%
Cable modem subscribers	49,631	*59,000*	64,995	65,487	52,820
Cable modem penetration (% population)	1.4%	1.9%	1.9%	2.0%	1.6%
FTTx/LAN subscribers*	60,260	89,171	145,178	212,729	283,075
PLC subscribers	0	0	0	0	0
WLL subscribers**	17,937	33,618	64,084	59,425	69,038
Satellite subscribers	0	0	0	0	0
Total	232,626	366,849	506,208	588,607	632,975
Total fixed broadband penetration (% population)	6.8%	10.8%	15.0%	17.6%	19.0%
Mobile broadband subscribers				351,660	460,091
Mobile broadband penetration (% population)				10.6%	13.8%

* including LAN subscribers
** including WLAN connections

The total number of fixed broadband subscribers grew by 7.5% in 2009. FTTx was again the most dynamic segment, gaining more than 40,000 customers (+20%). At the end of the year, the number of FTTx lines was for the first time exceeding the number of DSL lines. The number of "traditional" broadband connections, DSL and cable modem, declined in 2009. However, DSL was still the most popular access mode for businesses.

The mobile broadband subscriber base increased by 31% in 2009; in particular, the number of mobile dedicated data cards, modems or dongles was almost 40% up, to 160,000 at the end of the year.

4.17.3. DSL coverage and take-up

Coverage and penetration
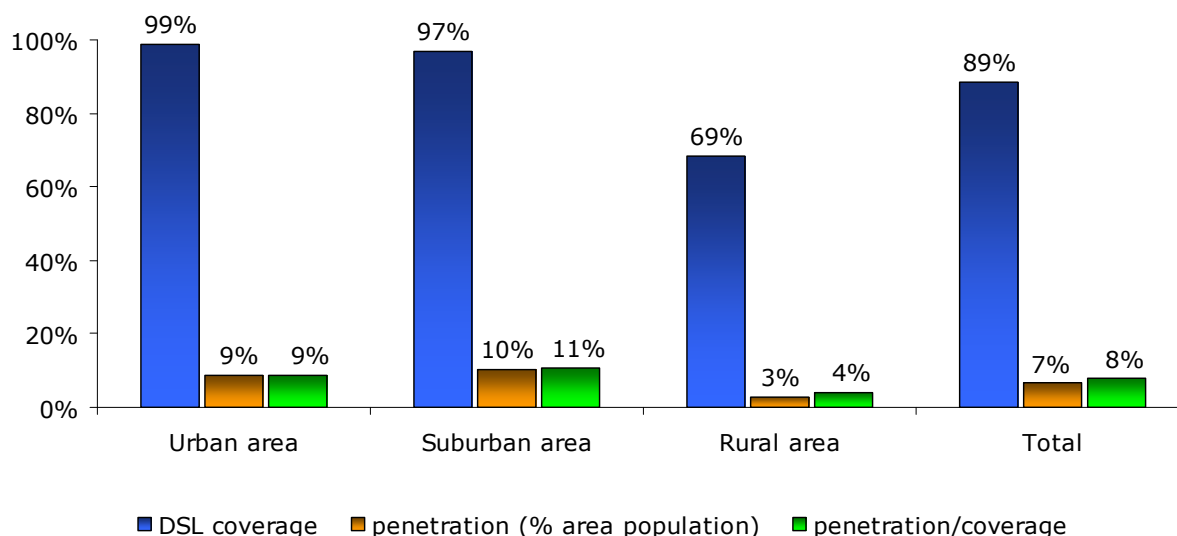
At the end of 2009, DSL accounted for 36% of fixed broadband connections in Lithuania, losing ground (and losing customers) to FTTx. Due to deployments of fibre optics networks, investments in DSL networks are now limited and DSL coverage did not expand in 2009.

Number of DSL connections by download rate
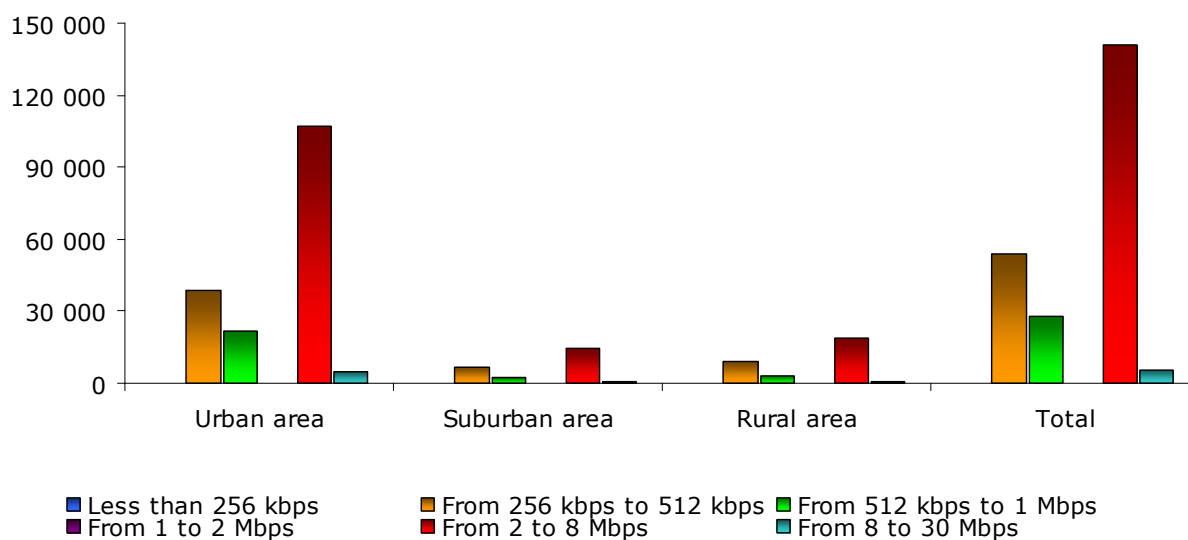
In 2009, the incumbent operator introduced a new plan called "Start" (speed rate up to 512 kbps) dedicated to the beginners and new customers, because of its attractive price.

Offers for business units are generally in the range from 1 to 10 Mbps and are adjusted according to customer demands.

Percentage of DSL connections by type of provider
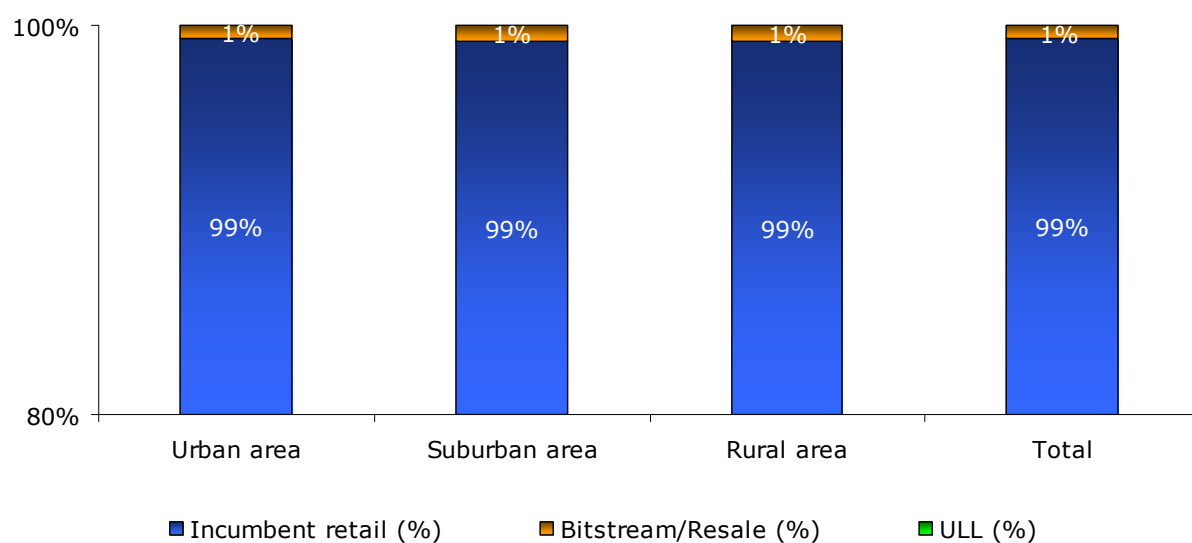
The incumbent operator "TEO LT" is the leading provider of broadband Internet access in Lithuania, with 99.3% of xDSL subscribers at the end of 2009.

The number of DSL lines provided through wholesale offers declined from 2,217 to 1,606.

4.17.4. Cable modem coverage and take-up

Coverage and penetration
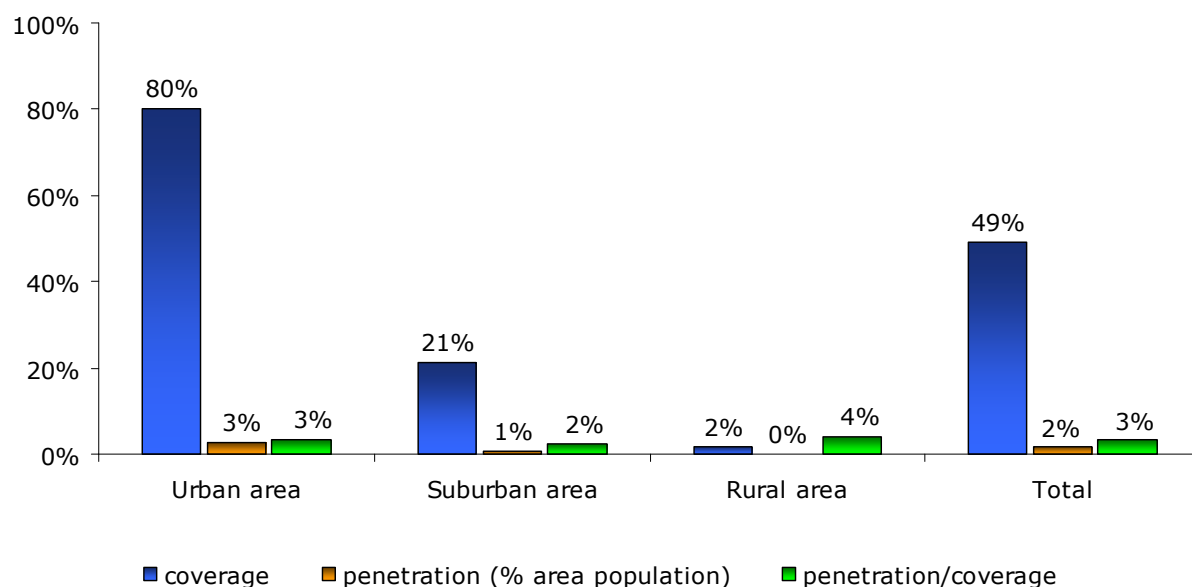
The number of cable modem subscribers decreased by 20% in 2009 to 52,000, as cable operators are now investing in FTTx and subscribers transfer their lines. Most Cable TV networks are concentrated in urban areas.

Number of cable modem connections by download rate
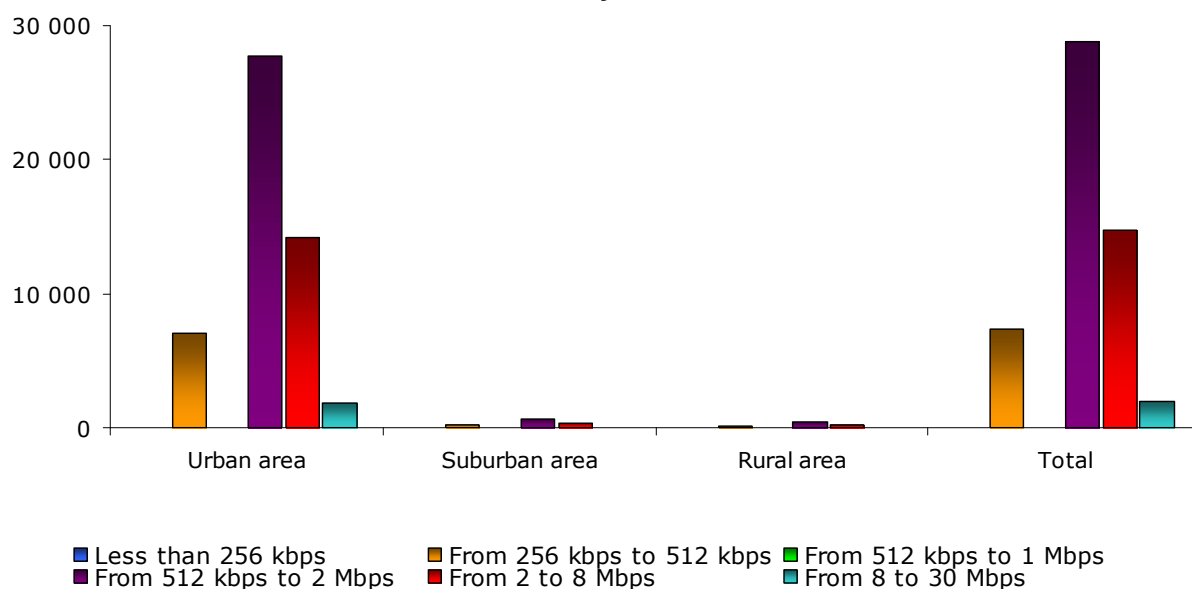
The most popular connection speed rate in Lithuania was 512kbps–2Mbps, due to an affordable price in this category. Conversely speed rate above 10 Mbps was chosen by 3.7% of Cable TV subscribers.

4.17.5. FTTx coverage and take-up

Coverage and penetration
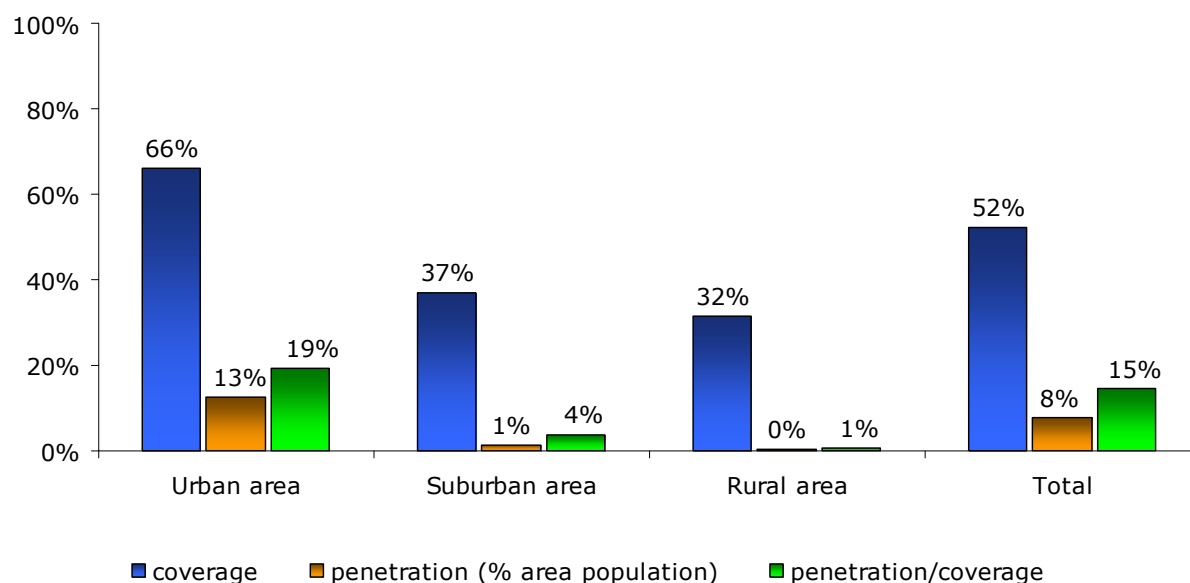
FTTx networks are growing rapidly in Lithuania. At the end of 2009, there were 254,550 optical fibre subscribers in the country (plus 28,525 LAN subscribers), up 19% compared to the end of 2008. FTTx lines account for more than 40% of total fixed broadband connections: most of them are FTTB (202,847). But FTTH is gaining ground as network coverage expands.

There were about 55 providers offering FTTx connections in 2009. The main players were the incumbent TEO LT, Dokeda (brand Meganet) and KIS.

FTTx connections by download rate
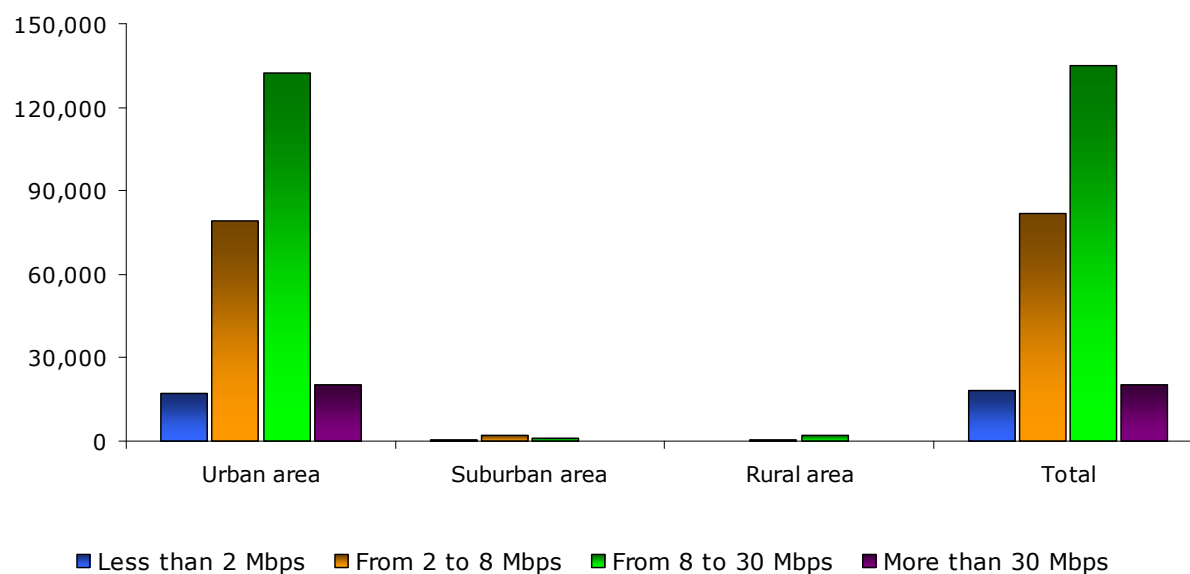
The most popular speed rates are in the 8 to 30 Mbps range. Higher speeds are provided in the major cities, urban and suburban areas.

4.17.6. Other broadband access technologies

LAN

At the end of 2009, there were 28,525 LAN subscribers, mostly located in urban areas, as an alternative to optics and DSL network. Most of them remain from the times when LAN was very popular among subscribers

For today only few providers offer LAN connection in areas where there are no FTTx possibilities, usually in small towns of Lithuania. Few years ago, as optics networks had started to grow rapidly, LAN providers started to rebuild their networks. As of today the majority of them has launched fibre instead of LAN or even fibre in the backbone.

Wi-Fi

At the end of 2009 there were 4,202 hotspots in Lithuania. Most of them (3,998) are operated by the incumbent TEO. Hotspots with download speed up to 10 Mbps are available in airports, hotels, restaurants, petrol stations; shopping centres etc..; 191 of them located in public spaces are free of charge. There were 55,382 Wi-Fi subscribers at the end of 2009.

WLL/WiMAX

The third most popular technology for fixed broadband access is wireless, in particular for serving rural areas where wireline technologies are missing. Lithuanian broadband providers mostly offer WLL access in unlicensed frequencies.

In 2009 three operators were providing wireless broadband access services in the 3.5 GHz radio frequency band, two in the 10.5 GHz frequency band, four in the 26 GHz band and one in the 28 GHz band.

In 2008, the Lithuanian NRA granted WiMAX licences to "Lithuanian Radio Television Centre", "Balticum-TV" and "Nelte". At the end of 2009, 200 WiMAX base stations were installed, covering the largest cities and suburbs (44% coverage at national level)..There were 8,200 WiMAX subscribers

Satellite

There is no broadband satellite provider in Lithuania.

4.17.7. Mobile broadband coverage and take-up

Coverage by technology

- 3G coverage as a % of population
- 3G coverage as a % of territory
- 3G+ coverage as a % of population
- 3G+ coverage as a % of territory
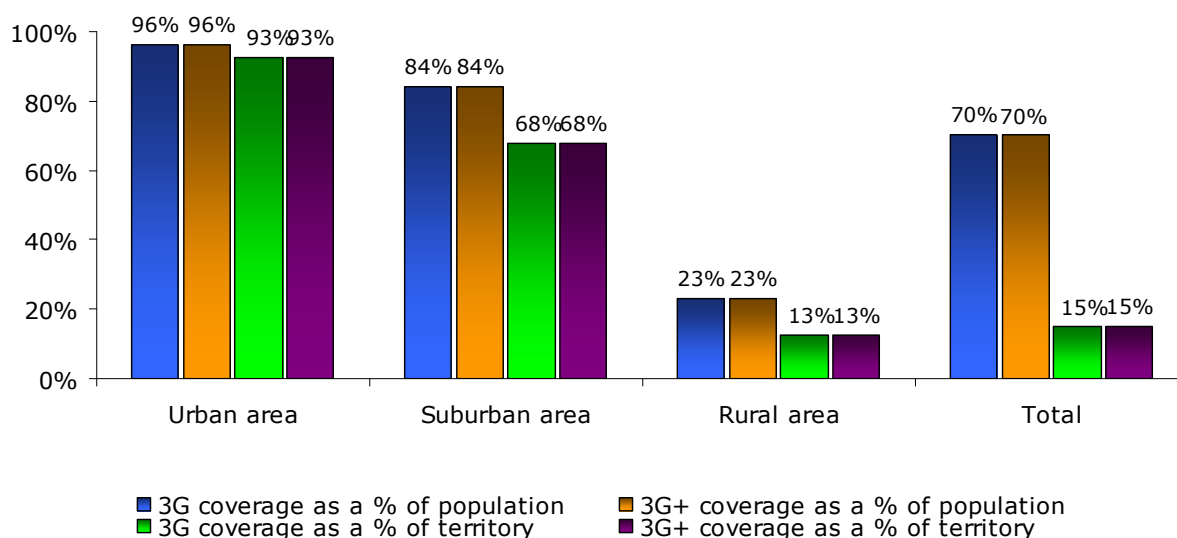
In 2009 the number of UMTS base stations increased by 24%, to 903 at the end of the year. All three mobile operators, Omnitel, Bite and Tele2, expanded their 3G network. At national level 3G/3G+ networks cover about 70% of the population and 15% of territory.

Penetration

- 3G coverage as a % of population
- penetration (% area population)
- penetration/coverage
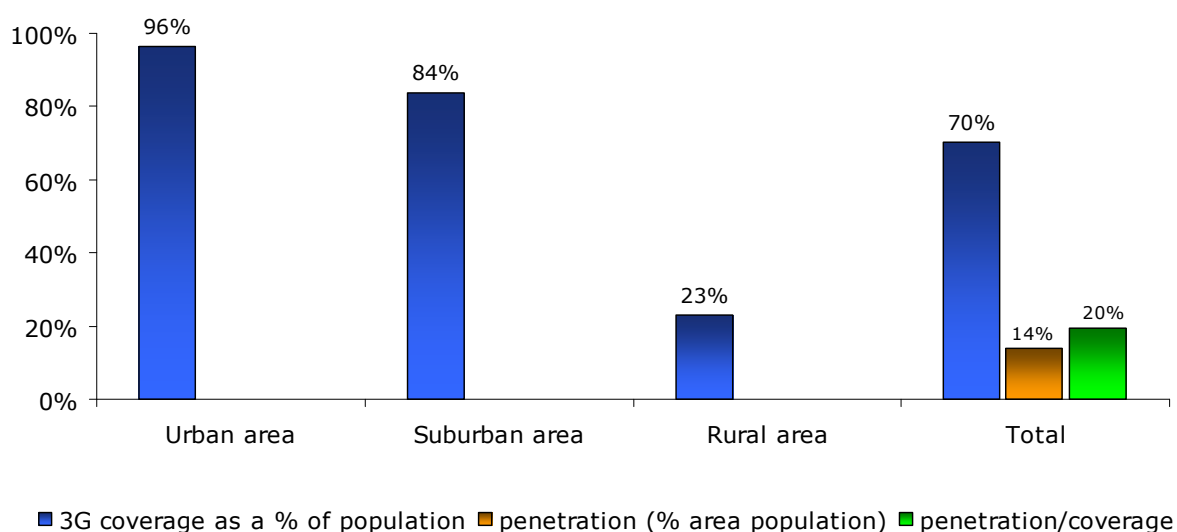
At the end of 2009, 160,083 (10.4 %) subscribers had access to mobile Internet via computer. The number of active mobile internet subscribers who used UMTS services was 460,091 (active subscribers, who were using 3G handsets are included); a small half of them (219,424) used UMTS based HSDPA (3G+).

4.18. Luxembourg

4.18.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	236,610	183,901	72,989	493,500
Share of total population	47.9%	37.3%	14.8%	100.0%

4.18.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	100%	100%	100%	100%	100%
DSL subscribers	63,132	87,275	108,621	114,853	134,313
DSL penetration (% of population)	14.2%	19.7%	22.6%	23.9%	27.2%
Cable modem coverage (% population)	50%	70%	71%	71%	76%
Cable modem subscribers	6,877	9,566	11,531	17,427	25,130
Cable modem penetration (% population)	1.5%	2.2%	2.4%	3.6%	5.1%
FTTx subscribers	150	*300*	*650*	1,000	2,000
PLC subscribers	0	0	0	0	0
WLL subscribers	69	*120*	*140*	140	140
Satellite subscribers	0	0	0	0	0
Total	70,228	97,261	120,942	133,420	160,583
Total fixed broadband penetration (% population)	15.8%	21.9%	25.2%	27.8%	32.7%
Mobile broadband subscribers				48,843	105,684
Mobile broadband penetration (% population)				9.9%	21.4%

In 2009, the fixed broadband market has been very dynamic in Luxembourg with the number of connections increasing by more than 20% (compared to a 10% growth in 2008). Growth was significant both in DSL (+9,500 connections), which still concentrates more than 83% of the total fixed broadband subscriber base, and in cable modem (+7,700, a 50% growth in one year). FTTx is emerging. On total, fixed broadband penetration rate is very high.

On the mobile broadband market, 3G and 3G+ technologies are widely available with population coverage of 99.8% and the number of subscribers more than doubled in 2009 to 105,684.

4.18.3. DSL coverage and take-up

Coverage and penetration
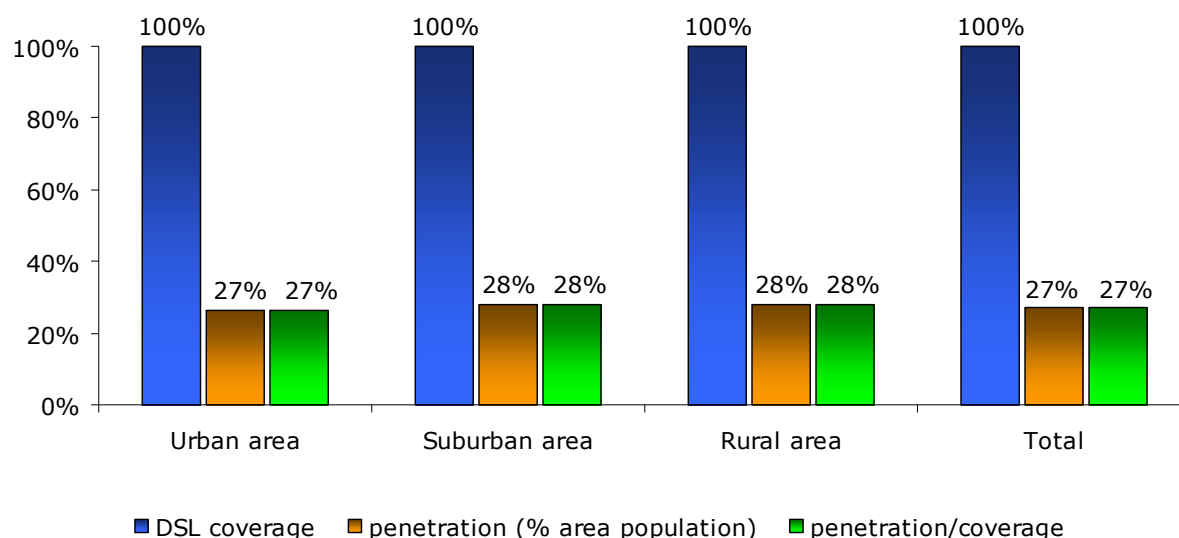
DSL technology is virtually available to all people in Luxembourg.

Number of DSL connections by download rate
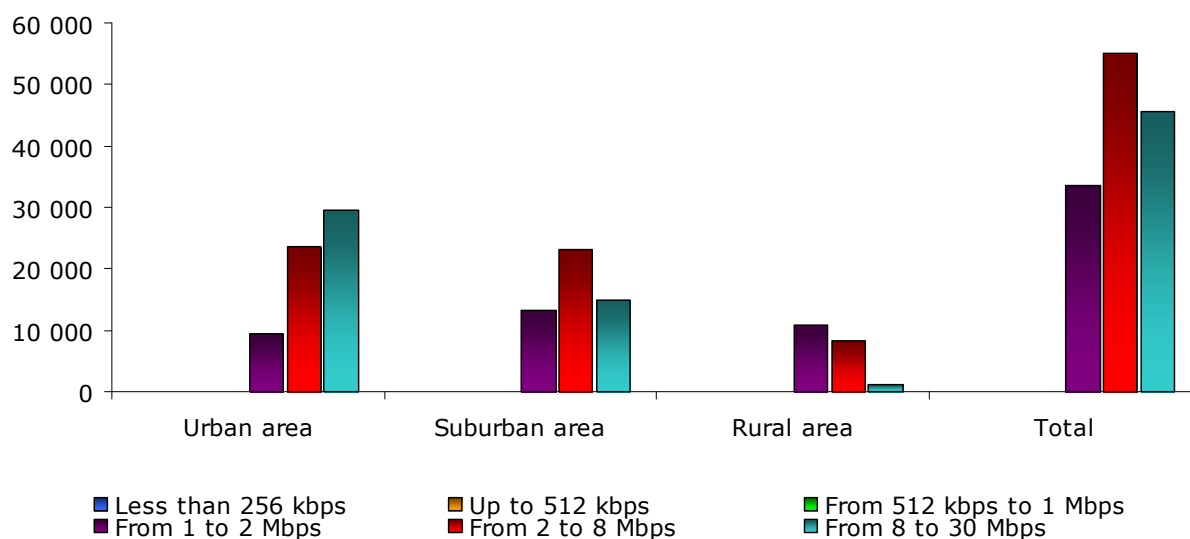
As compared to 2008, DSL offers with speeds superior to 8 Mbps have gained in popularity with P&T Luxembourg offering 10 and 20 Mbps connection speeds and Tele2 Tango, the alternative DSL operator, offering 8 and 20 Mbps speeds. Offers with connection speed superior to 8 Mbps make up for 47.3% of all DSL accesses in urban areas. In suburban areas, offers in the 2 to 8 Mbps class are mostly subscribed while in rural areas, offers in the 1 to 2 Mbps class account for more than half of DSL connections.

Percentage of DSL connections by type of provider
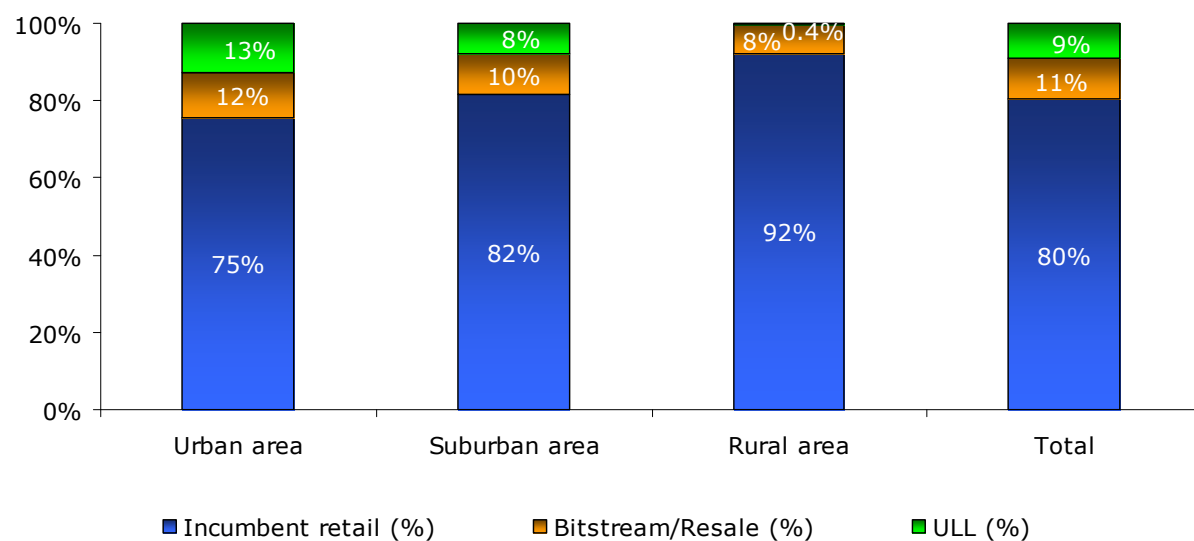
In 2009, market shares from the incumbent operator P&T Luxembourg changed only little. Tele2 Tango and Luxembourg online still have limited space; they are using more and more ULL, especially in urban and to a lesser extent in suburban areas.

4.18.4. Cable modem coverage and take-up

Coverage and penetration
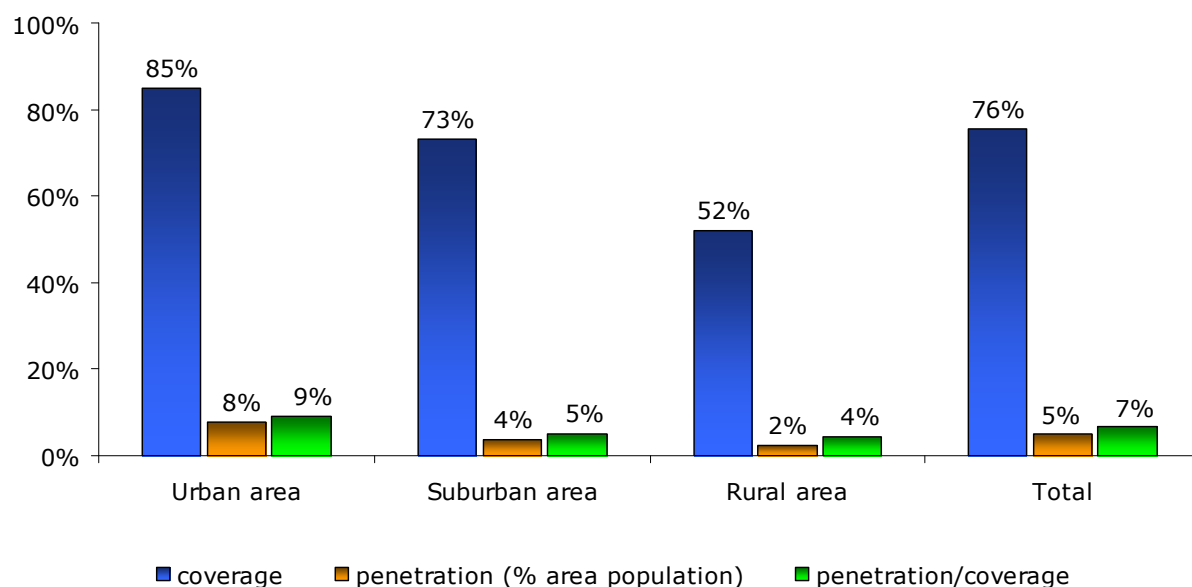
In 2009, cable operators have continued to build and develop infrastructure. However, cable modem only represents 15.6% of total fixed broadband connections.

Number of cable modem connections by download rate
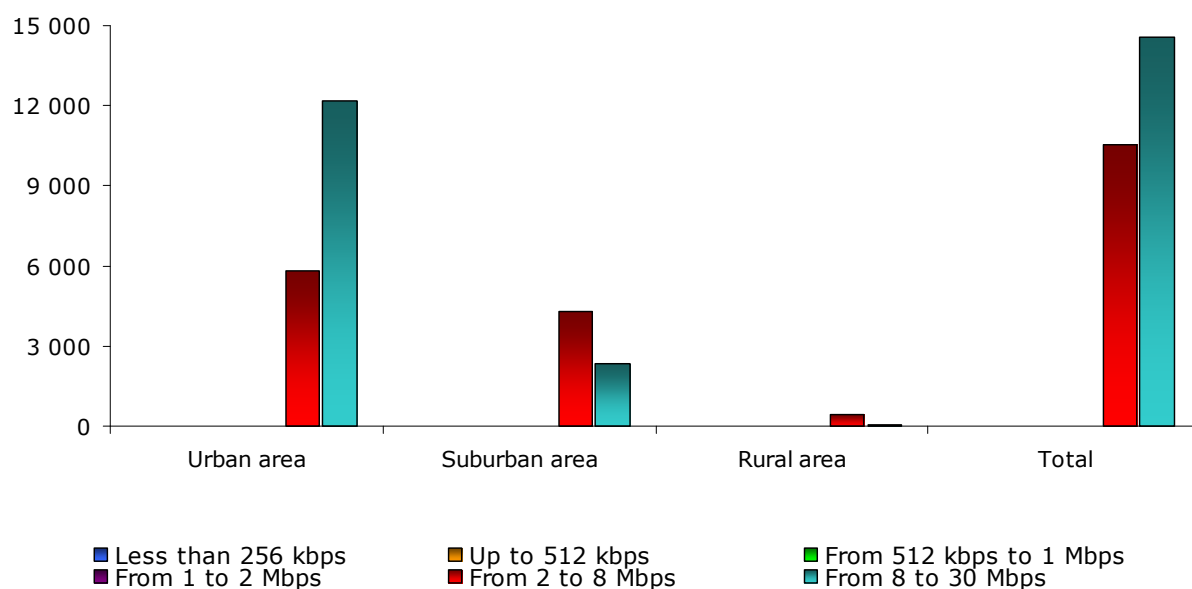
Cable modem connection speeds are all superior to 2 Mbps, with 58% being over 8 Mbps. The fastest speeds available are provided by Numericable (30 Mbps download).

4.18.5. FTTx coverage and take-up

Coverage and penetration
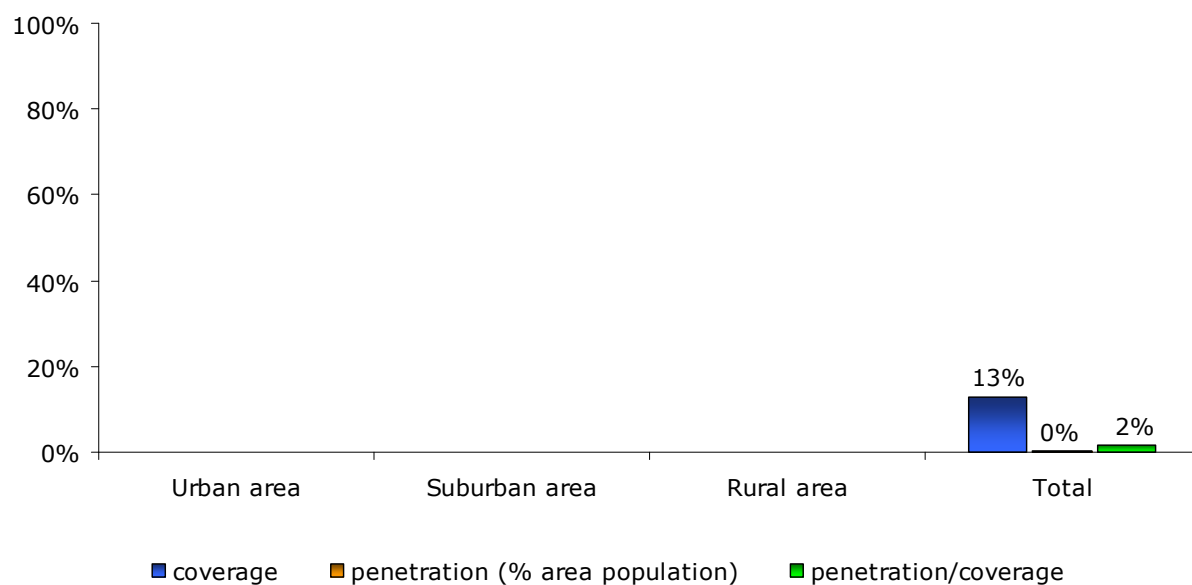
With only 2,000 FTTx subscribers the take-up of very high broadband is still low despite a year over year growth of 100%.

FTTx connections by download rate

Most FTTx connections are assumed to be superior to 30 Mbps.

4.18.6. Other broadband access technologies

WLL/WiMAX

Most of Broadband Fixed Wireless Accesses are provided under the WiMAX technology and through Cegecom Internet Service Provider. We estimate the company had 140 WiMAX subscribers in 2009, mostly in urban areas. The customer base remained flat in 2009.

Satellite

While the whole country is covered by satellite, the very large DSL coverage does not require people to rely on this access technology

4.18.7. Mobile broadband coverage and take-up

Coverage by technology
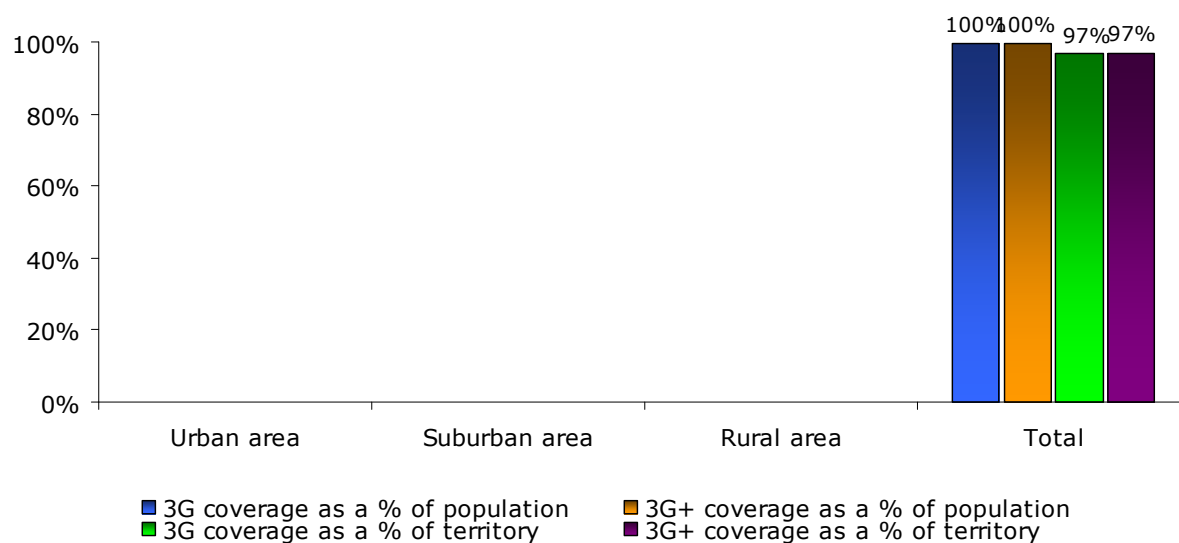
In 2009, 3G and 3G+ coverages were almost complete.

Penetration
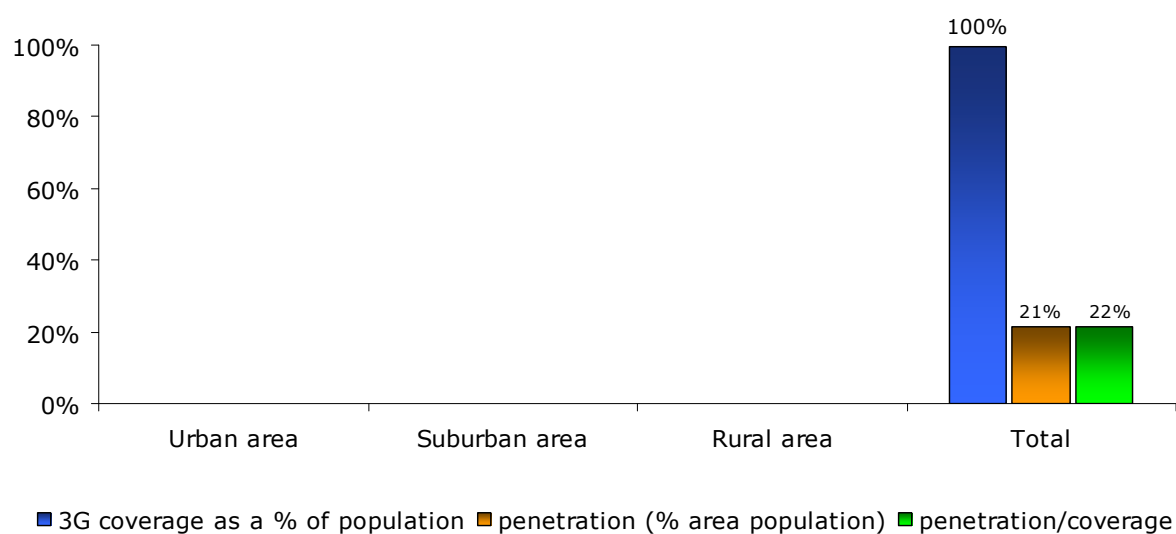
In 2009, 47% of all wireless subscribers benefited from 3G subscriptions (230,000 3G subscribers at the end of the year, a 51% growth compared to the end of 2008), with only 105,684 active users.

4.19. Malta

4.19.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	413,609	not relevant	not relevant	413,609
Share of total population	100.0%	not relevant	not relevant	100.0%

4.19.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	99%	99%	99%	99%	99%
DSL subscribers	30,000	35,704	38,972	46,004	53,509
DSL penetration (% population)	7.5%	8.8%	9.6%	11.2%	12.9%
Cable modem coverage (% population)	95%	95%	95%	95%	95%
Cable modem subscribers	21,000	30,629	42,185	51,983	54,221
Cable modem penetration (% population)	5.2%	7.6%	10.3%	12.7%	13.1%
FTTx subscribers	0	0	0	0	0
PLC subscribers	0	0	0	0	0
WLL subscribers	100	-	949	2,882	3,813
Satellite subscribers	12	15	-	-	-
Total	51,112	66,348	82,106	100,869	111,543
Total fixed broadband penetration (% population)	12.7%	16.4%	20.2%	24.6%	27.0%
Mobile broadband subscribers				40,887	62,345
Mobile broadband penetration (% population)				10.0%	15.1%

Broadband in Malta is accessible through DSL, cable modem and WiMAX platforms. At the end of 2009, 48.0% of broadband connections were DSL, 48.6% were cable modem connections and the remaining 3.4% were WiMAX connections. Total broadband penetration stood at 27.0% of the population, with a 12.9% penetration rate for DSL 13.1% for cable modem and 0.9% for WiMAX.

All three platforms (DSL, cable, WiMAX) enjoy nationwide coverage and reach nearly all households. DSL is mainly provided by GO plc (incumbent), and a small (and decreasing) number of competitive ISPs. The cable broadband network is owned and operated by Melita plc. The first WiMAX network deployed in Malta by Vodafone also has nationwide coverage and is based on the standard 802.16d. The mobile arm of the incumbent GO, GO Mobile, has completed the deployment of the second WiMAX nationwide network using the 802.16e standard.

4.19.3. DSL coverage and take-up

Coverage and penetration
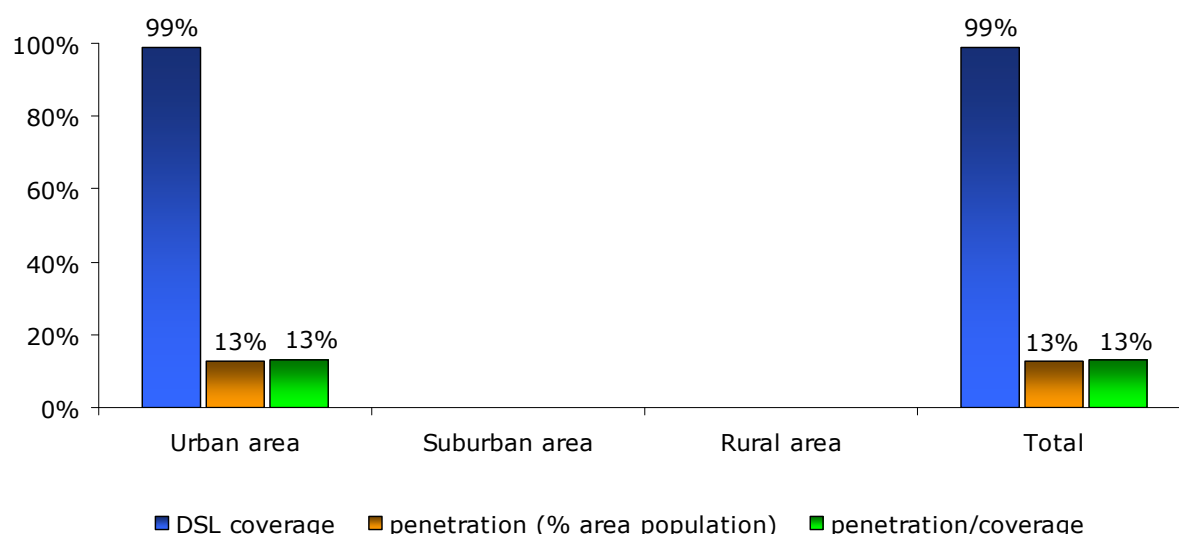
Note: data for suburban areas and rural areas are not relevant as the whole Maltese territory was considered a urban area.

In 2009, DSL subscriptions continued to experience an increase and DSL penetration stood at 12.9%, an increase of 1.7 percentage points over the 11.2% figure registered in 2008. Penetration per coverage stood at just 13%. The increase is mainly due to products aimed at low-end users namely 4MB download packages. A number of price reductions and special offers, coupled with increases in download limits and speeds, further attracted new users.

Number of DSL connections by download rate
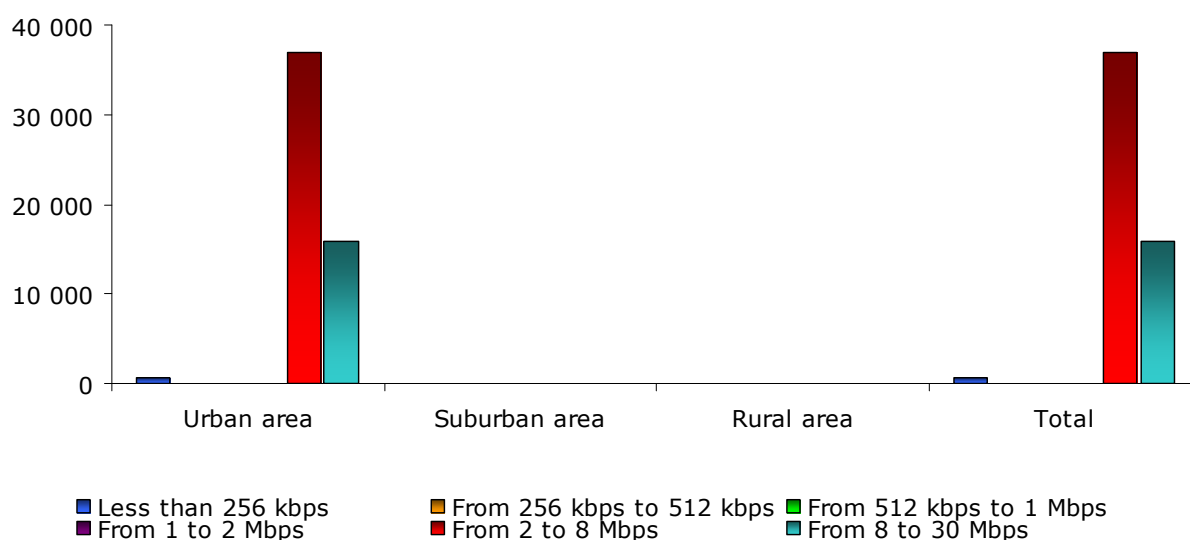
In 2009, the DSL incumbent again upgraded its entire product line-up and doubled the speed of its low-end package from 2 Mbps to 4 Mbps at no extra charge for the consumer. At the end of 2009, GO was offering 4 Mbps, 8 Mbps, 12 Mbps and 20Mbps solutions, each with different download limits and prices.

During 2009, the large majority of DSL users opted for the 4 Mbps product with slow growth being registered in the 8 Mbps product and very low take-up of the 12 Mbps and 20 Mbps products. Low take- up of high speed packages is mainly due to low demand for such high speed service and the relatively high prices of these packages.

A number of independent ISPs also offer DSL services and all offer the same broadband packages as the incumbent, albeit at slightly higher prices. The number of ISPs continued to decline in 2009, after further consolidation occurred.

Percentage of DSL connections by type of provider
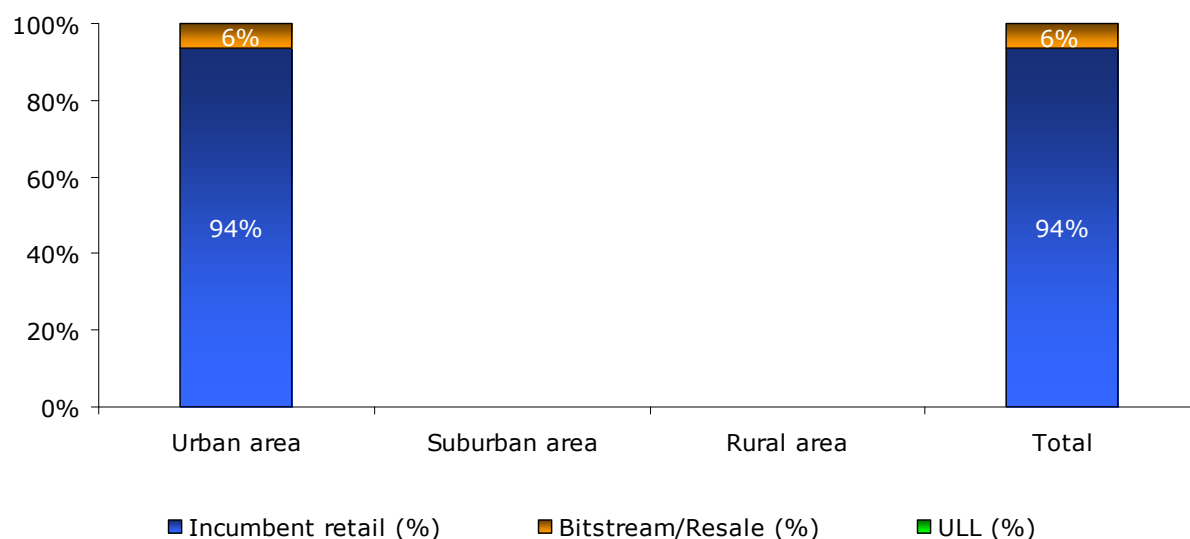
At the end of 2009, DSL in Malta was provided by around 8 ISPs. Following the trend observed in the previous years, further consolidation in the ISP market caused the number of these providers to decrease. The market share of these ISPs continued to decrease in 2009 to 6.4% in comparison to 18.3% in 2008. On the other hand, the incumbent DSL provider increased its market share to 93.6% from 83% in 2008.

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

4.19.4. Cable modem coverage and take-up

Coverage and penetration

- coverage
- penetration (% area population)
- penetration/coverage
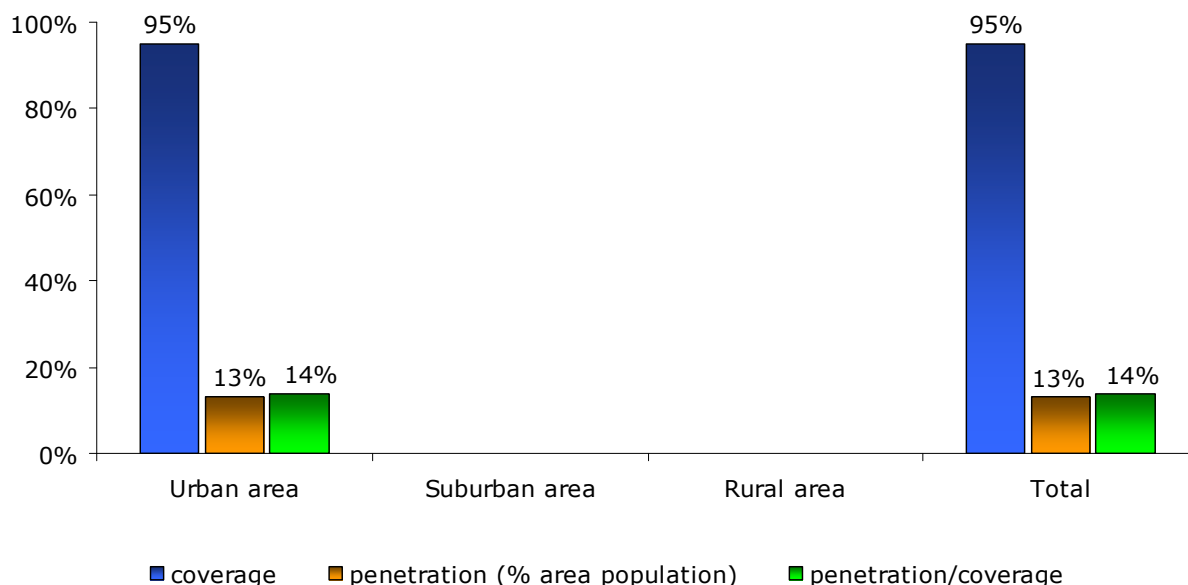
Cable broadband in Malta is exclusively supplied by Melita plc. The cable network has ubiquitous coverage with more than 95% of households having access to the cable network. Broadband cable penetration totals 13.1%. During 2009, the cable provider continued to increase its market presence in the broadband sector.

Number of cable modem connections by download rate

- Less than 256 kbps
- From 256 kbps to 512 kbps
- From 512 kbps to 1 Mbps
- From 1 to 2 Mbps
- From 2 to 8 Mbps
- From 8 to 30 Mbps
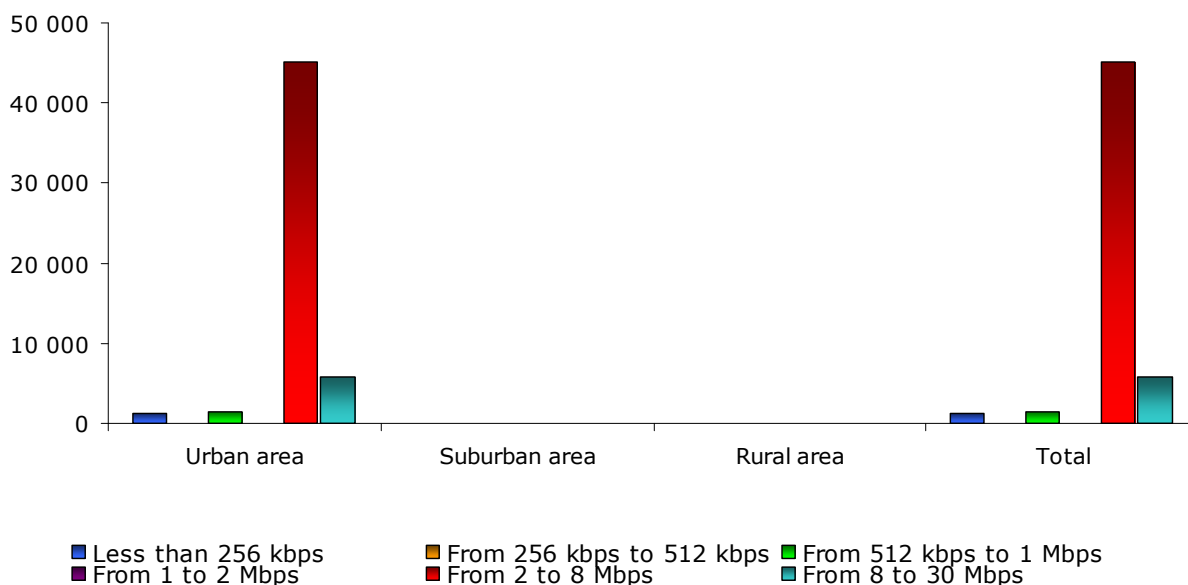
At the end of 2009, there were 53,509 cable broadband connections representing an increase of 7,505 connections over the same period last year. Of these, 45,110 subscribers have a speed between 2 and 8 Mbps, which represents 83.2% of all cable modem subscribers. The cable operator offered 3 packages - the 5 Mbps, 10 Mbps and 50 Mbps (however, a small number of legacy subscribers still have products with speeds as low as 128 or 256 kbps). In a similar fashion to the DSL incumbent, the cable packages have been upgraded throughout 2009 at no extra cost for the consumer. The 50 Mbps product, which was launched as an upgrade to the 30 Mbps product, has also experienced a low take-up due to the high price and low consumer demand.

4.19.5. FTTx coverage and take-up

In 2009, no FTTx connections were available.

4.19.6. Other broadband access technologies

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 in public places, providing high-speed access to the Internet. Two of the three mobile operators namely GO Mobile and Vodafone, operate a number of hotspots in public places, mostly in tourist and business areas.

WLL/WiMAX

Vodafone Malta Ltd. continued to offer broadband and fixed telephony services over its WiMAX network. The number of subscribers at the end of 2009 stood at 3,813. A second WiMAX network has been deployed by GO, however take-up was very low due to very high start-up costs charged by GO.

The WiMAX operator offers three products, providing 2 Mbps, 4 Mbps and 5 Mbps speeds. The prices of these packages are similar to those offered by the DSL and cable operators.

Satellite

Satellite access is only used by a very small number of large commercial institutions for backup interconnectivity and data transfer. No data is available on this service.

4.19.7. Mobile broadband coverage and take-up

Coverage by technology
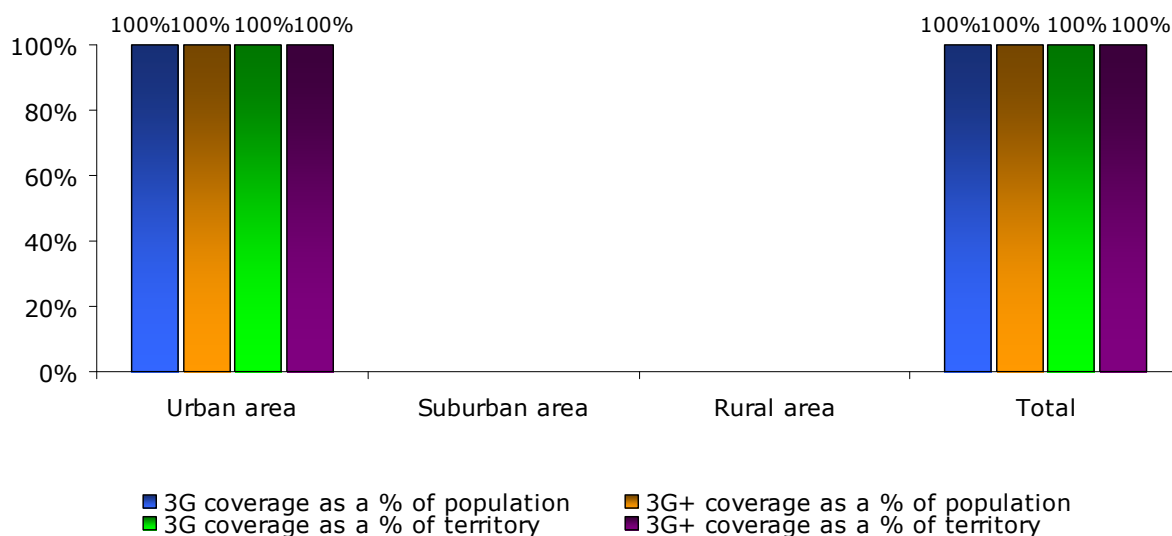
As at the end of 2009, 3G coverage was 100% for Vodafone and GO Mobile. In February 2009, Melita Mobile (subsidiary of the cable operator Melita plc.), launched its 3G mobile service on a national scale. Whilst Vodafone and GO Mobile operate 2G and 3G networks in parallel, Melita Mobile operates only a 3G network. The majority of mobile subscribers are still using 2G SIM cards, although significant growth has been registered in 3G subscriptions. This growth has been fuelled by new offerings on 3G mobile handsets and increased competition following the entry of Melita Mobile.

Penetration
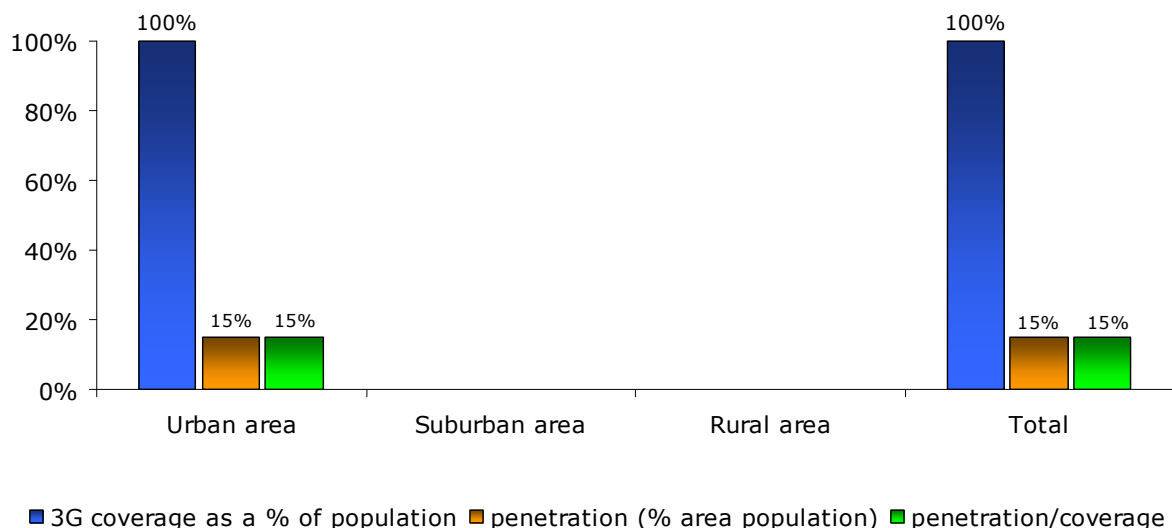
At the end of 2009, there were 62,345 effective mobile broadband users. This represents 15% of the population. 7,925 of these subscribers access broadband through Mobile BB dedicated data services (only cards/modems/dongles).

4.20. The Netherlands

4.20.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	11,471,708	4,774,352	331,552	16,577,612
Share of total population	69.2%	28.8%	2.0%	100.0%

4.20.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	99%	99%	99%	99%	99%
DSL subscribers	2,551,052	3,028,000	3,410,000	3,590,000	3,453,000
DSL penetration (% population)	15.6%	18.5%	20.9%	21.8%	20.8%
Cable modem coverage (% population)	82%	90%	92%	93%	94%
Cable modem subscribers	1,562,521	1,970,000	2,207,000	2;210,000	2,358,000
Cable modem penetration (% population)	9.6%	12.1%	13.5%	13.4%	14.2%
FTTx subscribers	60,000	111,000	140,000	180,000	242,000
PLC subscribers	-	-	-	0	0
WLL subscribers	-	-	-	0	0
Satellite subscribers	1,000	1,000	1,000	0	0
Total	4,173,573	5,110,000	5,758,000	5,980,000	6,053,000
Total fixed broadband penetration (% population)	25.6%	31.1%	35.3%	36.3%	36.5%
Mobile broadband subscribers				2,070,000	2,667,000
Mobile broadband penetration (% population)				12.6%	16.1%

Broadband penetration in the Netherlands is one of the highest in Europe and ranks second in Europe after Denmark. Market growth has significantly slowed down and the fixed broadband penetration now stands at 36.5% (compared to 36.3% in 2008). The Netherlands are almost entirely covered in terms of DSL availability, which also maintained its lead in terms of fixed broadband market share (57%). Nevertheless, the total number of DSL connections decreased. Fixed broadband growth is increasingly driven by cable and FTTx. Both access technologies gain market shares in this saturated market.

4.20.3. DSL coverage and take-up

Coverage and penetration
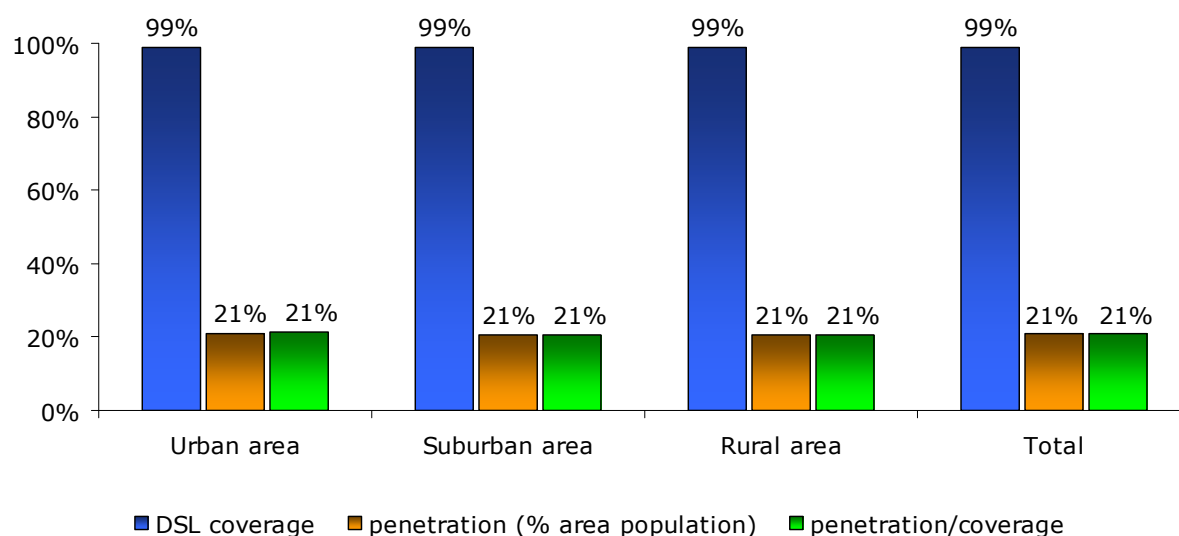
In the Netherlands, DSL coverage is almost complete in terms of availability and penetration rate reached 21.1% at the end of 2009. Compared to 21.8% in 2008 this amounts to a significant decrease as more and more subscribers switch to VDSL, FTTH or cable which offer higher bandwidths. These figures presume that rates are the same in all parts of the country due to the geographical conditions in the Netherlands.

Number of DSL connections by download rate
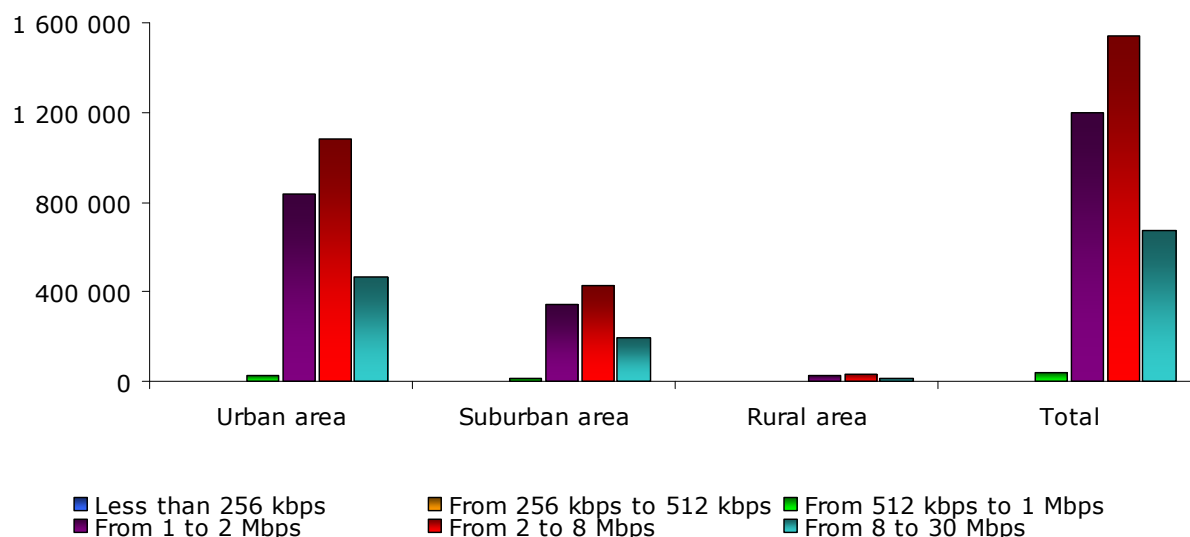
Nearly all DSL subscribers in the Netherland access with speed well above 1 Mbps. About 65% have download rates superior to 2 Mbps. Average download rates have increased over the previous period of measurement.

Percentage of DSL connections by type of provider
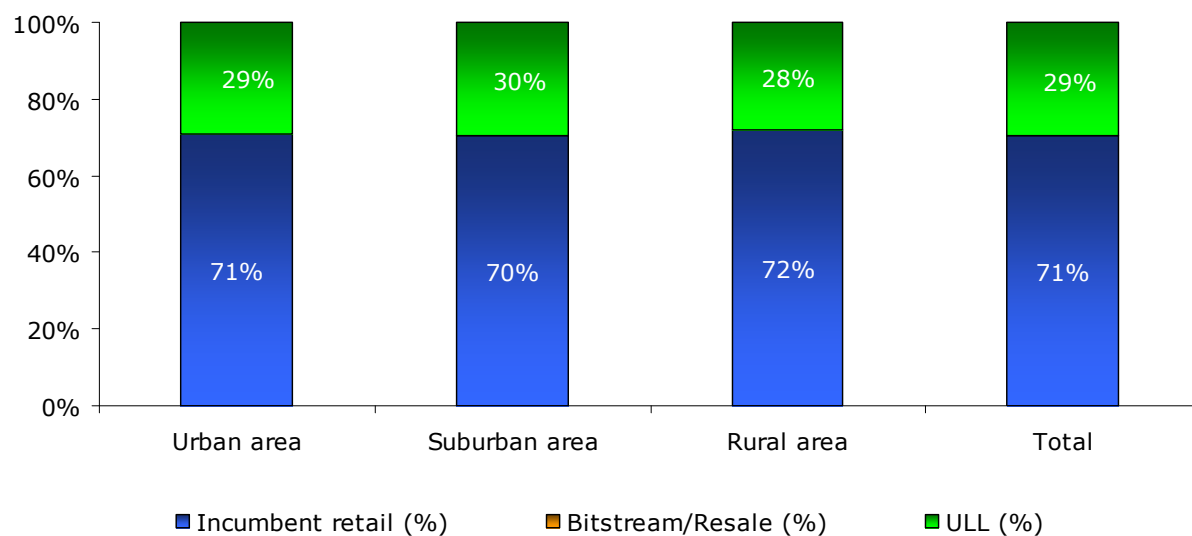
The market share of the Dutch incumbent KPN remains relatively stable. At the end of 2009, KPN retailed 70.6% of DSL connections directly or through its subsidiaries (Planet Internet, XS4ALL, Het Net). ULL accounts for the remaining 29.4% of DSL connections, with the majority of unbundled lines being shared access lines.

4.20.4. Cable modem coverage and take-up

Coverage and penetration
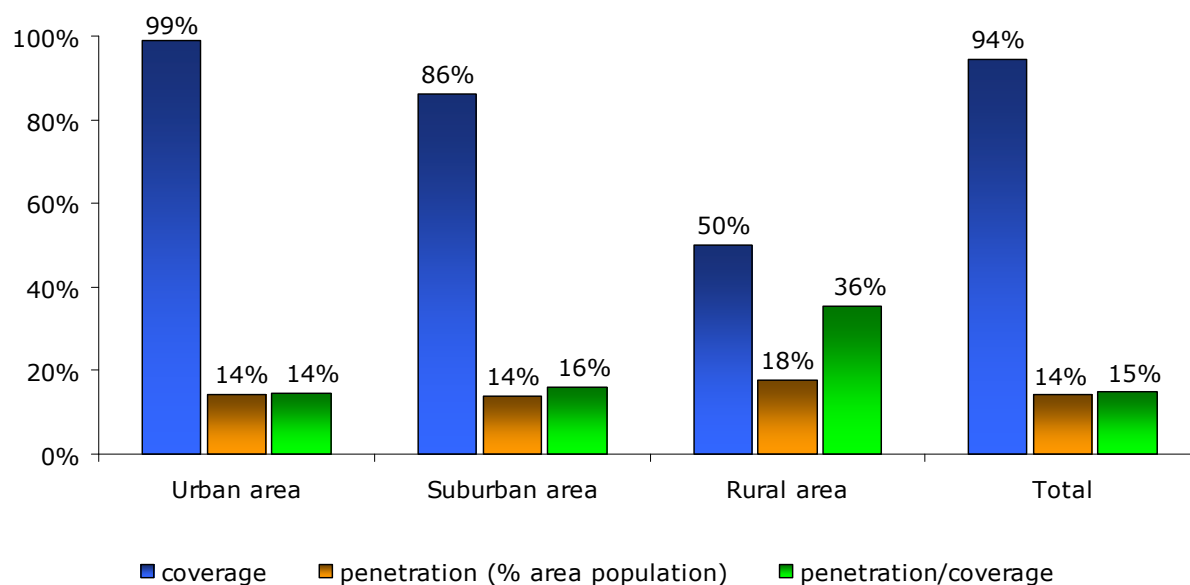
Reaching 94% coverage, cable is almost at the same level as DSL in terms of availability. In 2009, cable broadband subscribers have increased by more than 200,000, leading to a total cable penetration of 14.2% (compared to 13.4% in the year before).

Number of cable modem connections by download rate
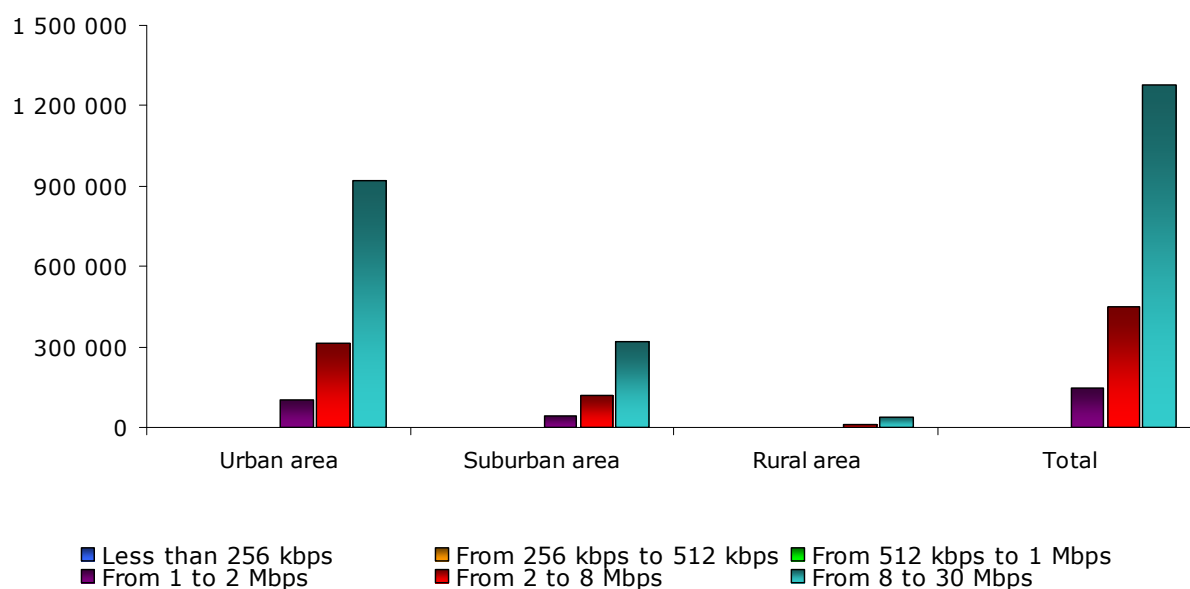
Offered cable download rates are faster on average than available DSL speeds. Nearly 94% of all cable subscribers access the internet with speeds above 2 Mbps and more than 70% access cable broadband with more than 8 Mbps.

4.20.5. FTTx coverage and take-up

Coverage and penetration
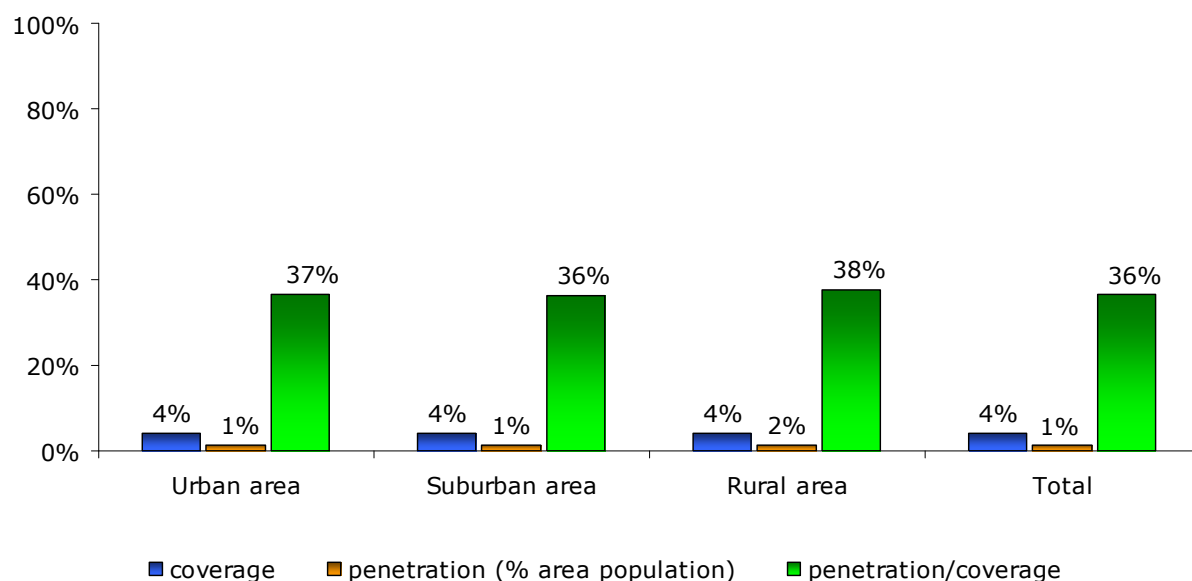
At the moment, FTTx services make a strong contribution to broadband subscriber growth. A number of government funded projects led to the deployment of a metropolitan fibre ring, which provides additional broadband capacity in the largest residential and business centres. Furthermore, several operators, such as Reggefiber move to faster fibre connections and drive the emergence of new applications and services. While incumbent KPN operated trial VDSL services in parts of five cities, competitor Tele2 started rolling out its commercial VDSL offer in September. Currently, there are roughly 240,000 fibre subscribers in the Netherlands, with the majority being connected via FTTH.

FTTx connections by download rate
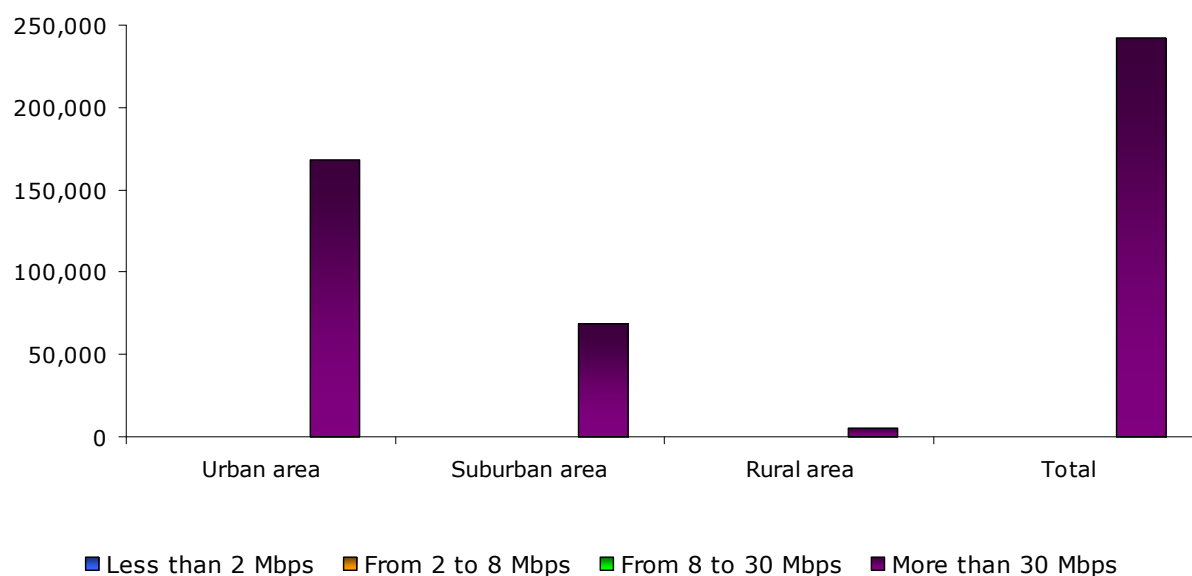
4.20.6. Other broadband access technologies

Wi-Fi

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

4.20.7. Mobile broadband coverage and take-up

Coverage by technology

- ■ 3G coverage as a % of population
- ■ 3G coverage as a % of territory
- ■ 3G+ coverage as a % of population
- ■ 3G+ coverage as a % of territory
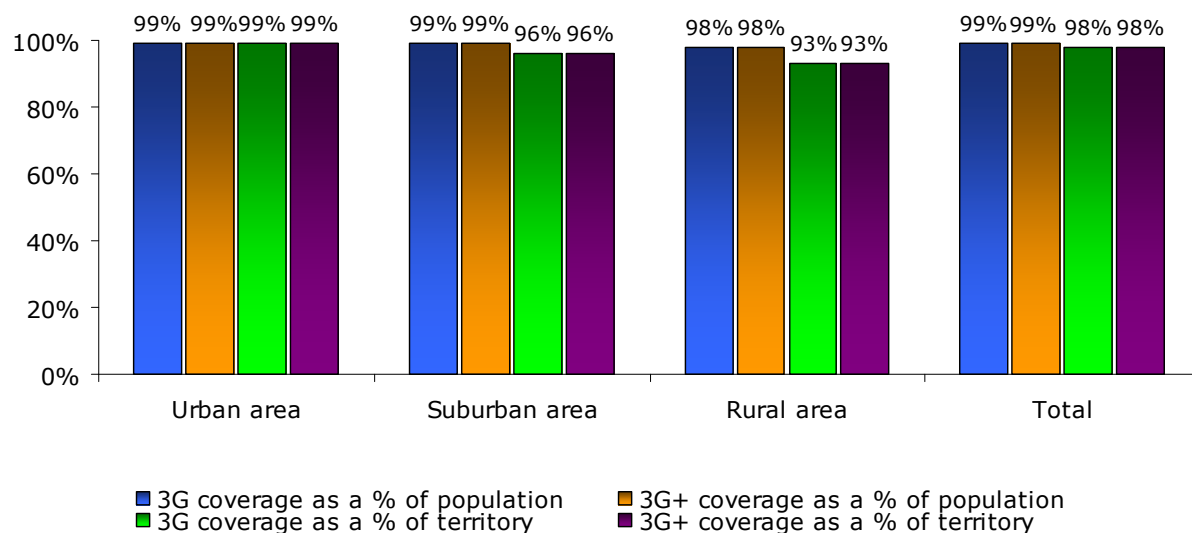
The importance of mobile data services has grown rapidly over the past year although the Netherlands are not a leading market as they are in terms of fixed broadband. Mobile broadband uptake was roughly 30% at the end of 2009, reaching about 2.7 million subscribers. There is almost full 3G coverage in this densely populated country with the largest proportion already being upgraded to 3G+ HSDPA.

Penetration

- ■ 3G coverage as a % of population
- ■ penetration (% area population)
- ■ penetration/coverage
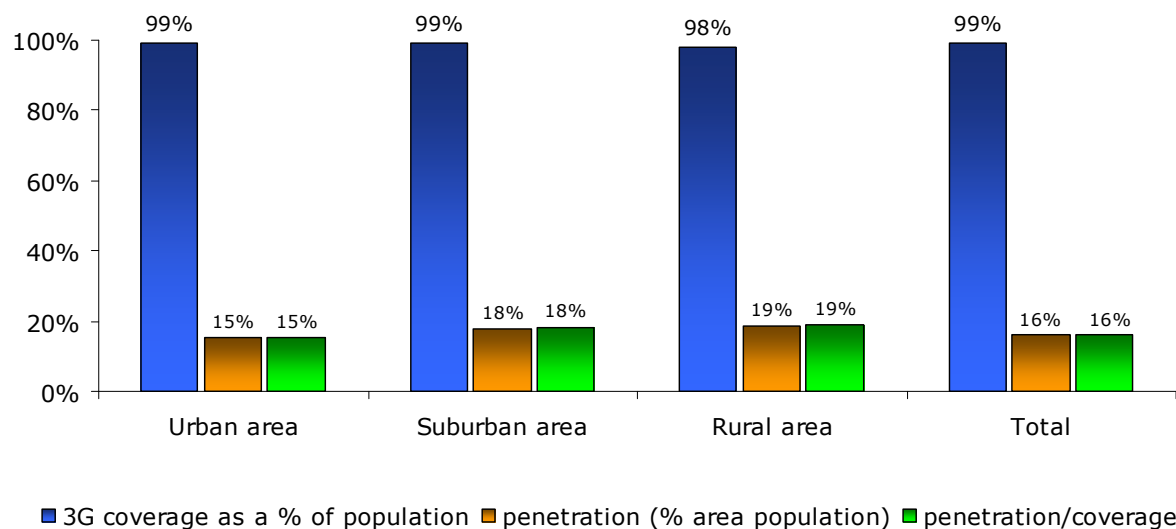
4.21. Norway

4.21.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,228,989	1,283,937	2,345,273	4,858,199
Share of total population	25.3%	26.4%	48.3%	100.0%

4.21.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	88%	91%	96%	96%	97%
DSL subscribers	801,988	997,140	1,110,914	1,109,989	1,026,000
DSL penetration (% of population)	17.1%	21.3%	23.5%	23.1%	21.1%
Cable modem coverage (% population)	20%	20%	20%	30%	30%
Cable modem subscribers	136,706	177,104	225,000	321,439	414,463
Cable modem penetration (% population)	2.9%	3.8%	4.7%	6.7%	8.5%
FTTx subscribers	38,823	70,303	95,000	152,667	208,071
PLC subscribers	0	0	0	0	0
WLL subscribers	13,215	26,900	36,800	31,265	38,987
Satellite subscribers	0	0	0	0	0
Total	990,732	1,271,447	1,467,714	1,615,360	1,687,521
Total fixed broadband penetration (% population)	21.2%	27.2%	31.0%	33.7%	34.7%
Mobile broadband subscribers				266,060	489,337
Mobile broadband penetration (% population)				5.5%	10.1%

With a penetration rate of 34.7%, Norway still ranks among the most advanced countries in terms of fixed broadband.

While still the dominant technology, DSL continues to lose both absolute and relative market share to other broadband technologies. 60% of subscriptions are now through DSL, down from 69%, 76% and 78% in 2008, 2007, and 2006, respectively.

In 2009, the number of DSL subscriptions decreased by 7.5%. This was offset by a strong increase in other fixed broadband technologies. Cable modem grew by 29% and FTTx by 36%. Both technologies offer attractive bundles with Digital TV (HD channels) and PVRs. As a result, the total number of fixed broadband subscriptions grew by 4.5%

Mobile broadband subscriptions also grew strongly, increasing by 84%. In terms of penetration, Norway still lags behind its nordic neighbours.

4.21.3. DSL coverage and take-up

Coverage and penetration
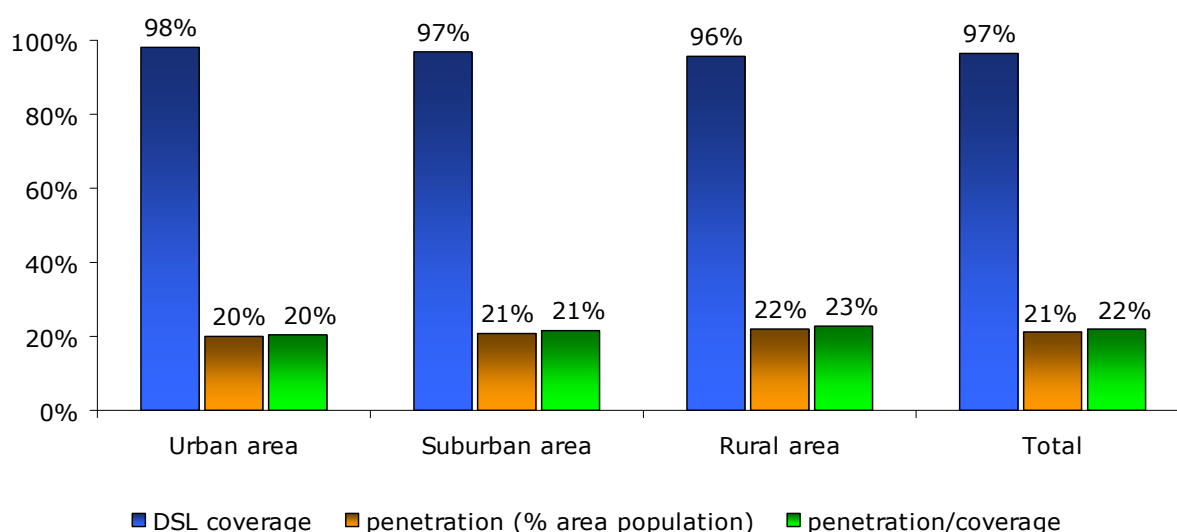
Coverage grew slightly in 2009 and now stands at 97% nationally. This is primarily a result of an increase in coverage in rural areas from 94% in 2008 to 96% in 2009. The total coverage is unlikely to increase much in the near future.

The number of DSL subscriptions fell for the second consecutive year. While only by 0.1% in 2008, the decline increased to 7.5% in 2009.

Number of DSL connections by download rate
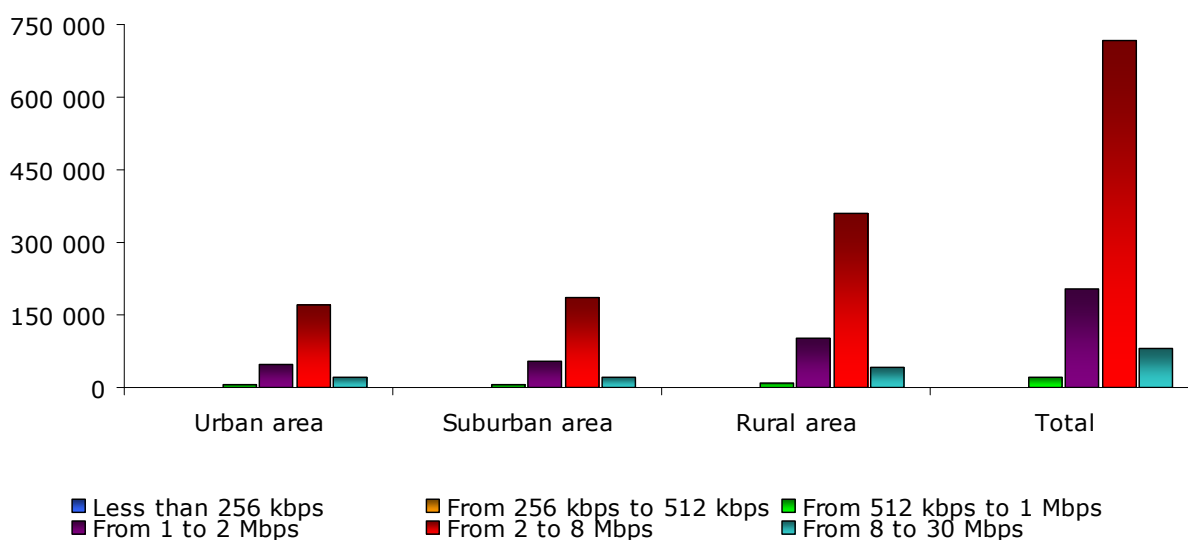
Telenor no longer supplies detailed information on download speeds, but estimates based on available information (general market figures from the regulator and some statistics from the national bureau of statistics) suggest that average download speeds only increased slightly in 2009.

Number of DSL connections by type of provider
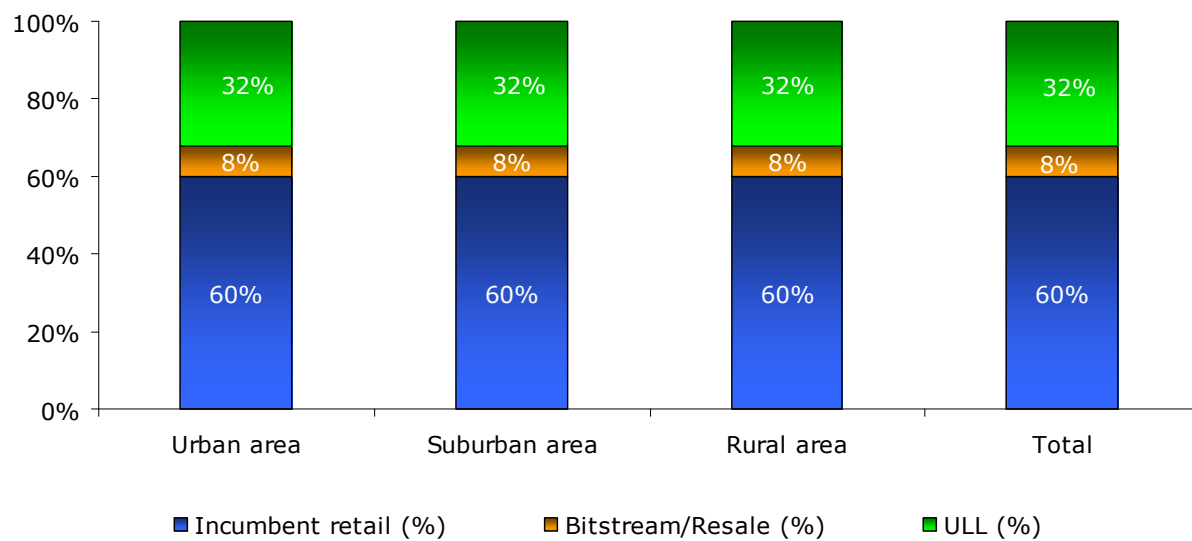
As in 2008, the incumbent continued to increase its relative share by about 1 percentage point in 2009.

4.21.4. Cable modem coverage and take-up

Coverage and penetration
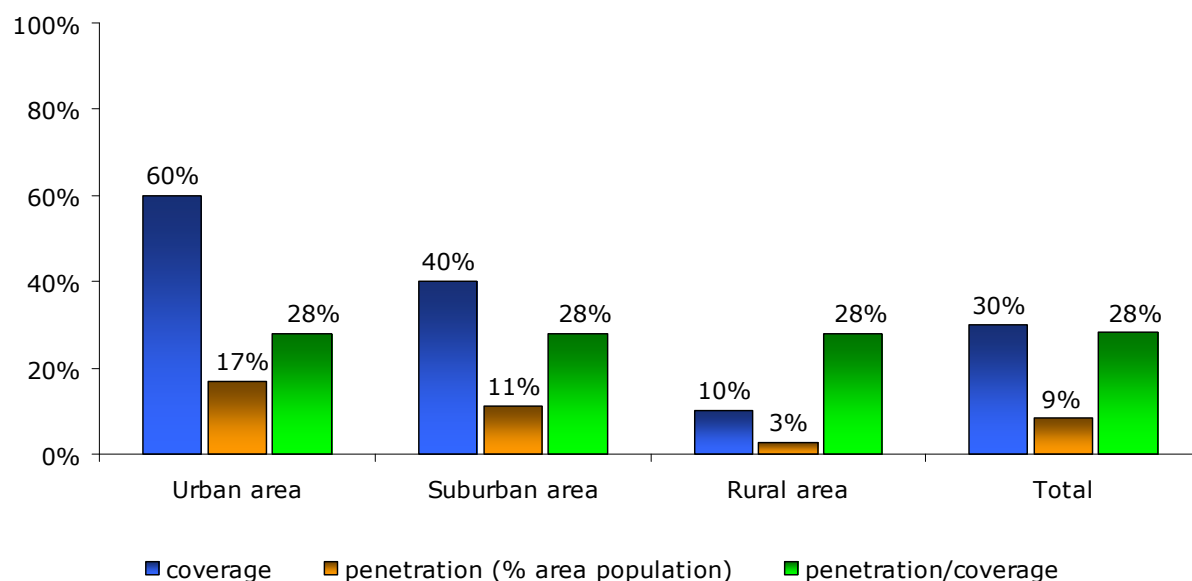
Cable modem subscriptions saw strong growth in 2009, increasing by 29%. Penetration increased from 6.7% to 8.5%. Revised in 2008, coverage estimates are unchanged in 2009.

Both major operators, Telenor (Canal Digital) and Get (formerly UPC) continue to aggressively market broadband connections and VoIP alongside their Digital TV (and HDTV) offers.

Number of cable modem connections by download rate
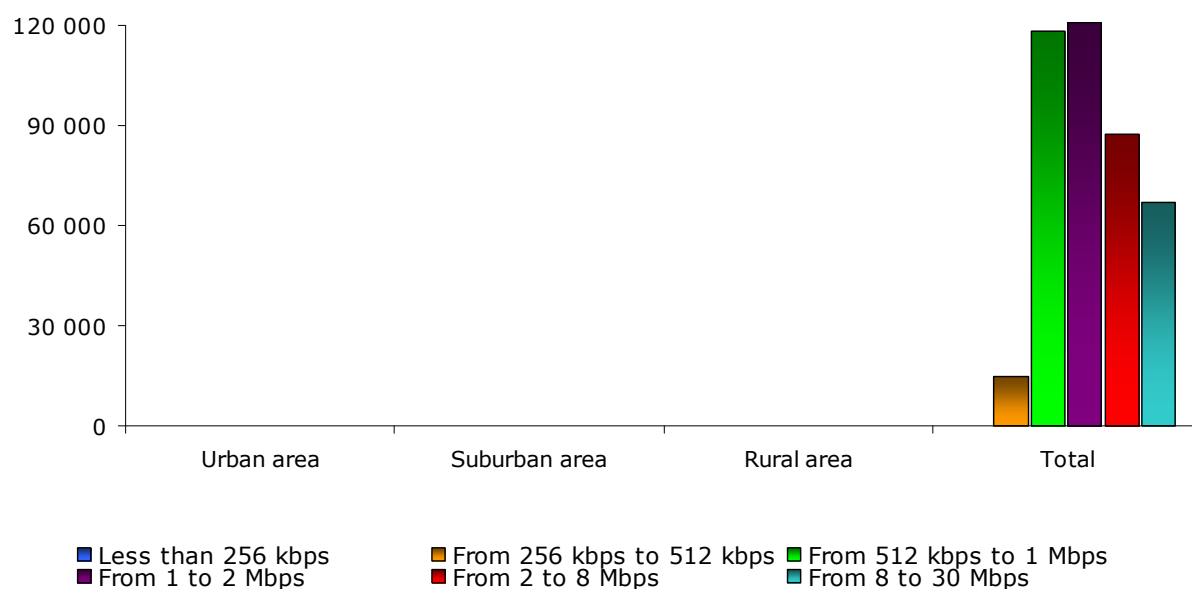
In 2008, cable download rates were assumed to be similar to DSL download rates, given the highly competitive nature of the Norwegian broadband market. A study by the regulator, giving the total market download rates, suggests this is not so and download rates have been revised, using the same methodology as for 2007. In short, the overall cable speed distribution has been estimated using the overall market figures, less DSL and FTTx figures. See also methodology notes.

4.21.5. FTTx coverage and take-up

Coverage and penetration
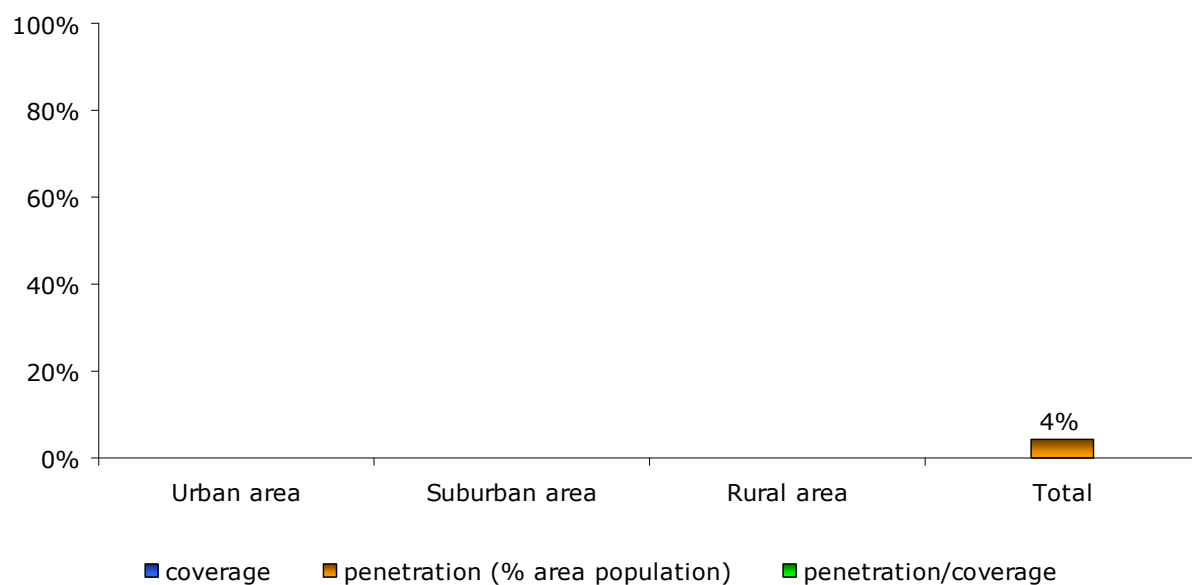
There is little information available on FTTx coverage and geographical distribution. Estimates are too unreliable to publish.

FTTx connections by download rate
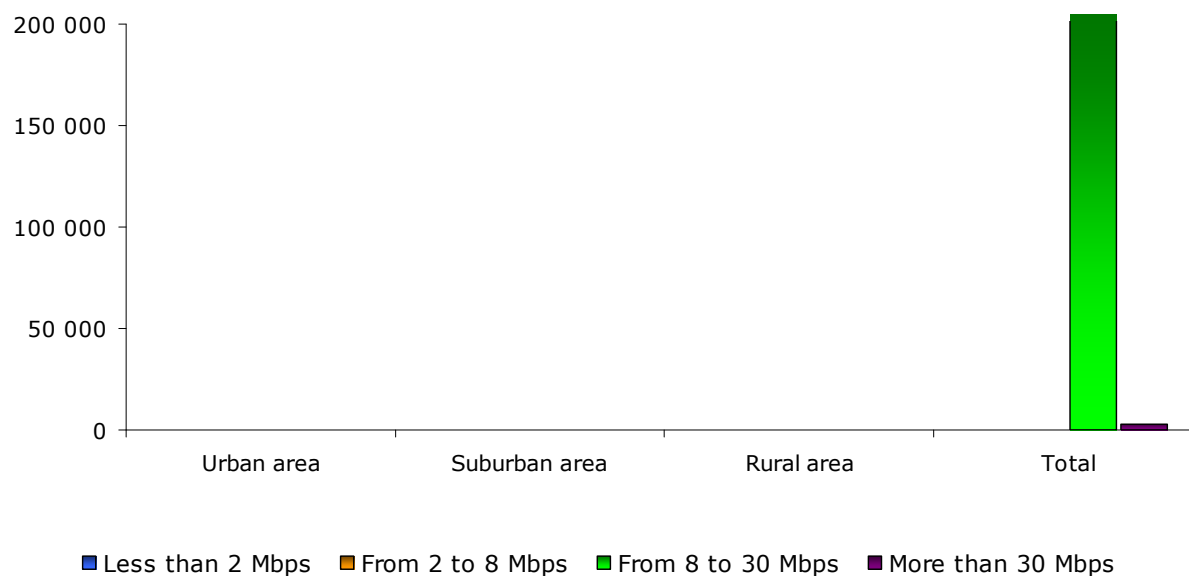
Given the overall market figures, nearly all subscriptions are assumed to lie in the 8-30 Mbps range. This is commensurate with the packages being offered by the operators.

4.21.6. Other broadband access technologies

Wi-Fi

There are no official statistics on the number of hotspots, but Wi-Fi access has an almost ubiquitous presence in hotels, restaurants, airports, petrol stations and other public places throughout the country.

WLL/WiMAX

Looking at the list of municipalities covered by the technology, coverage is a maximum 10% of the population. The suburban / urban areas covered are primarily clustered around the south-west coast. Actual subscribers probably live in rural areas, given the wide availability of DSL and mobile broadband in urban (and the major suburban) areas, also cable. The technology does not play a significant role in the Norwegian market.

The geographical split in subscriptions (see Excel file) is a rough estimate, based on actual population coverage, adjusted for the assumption that the uptake is likely to be slightly higher in rural than suburban areas.

Satellite

It does not play a significant role in the Norwegian market.

4.21.7. Mobile broadband coverage and take-up
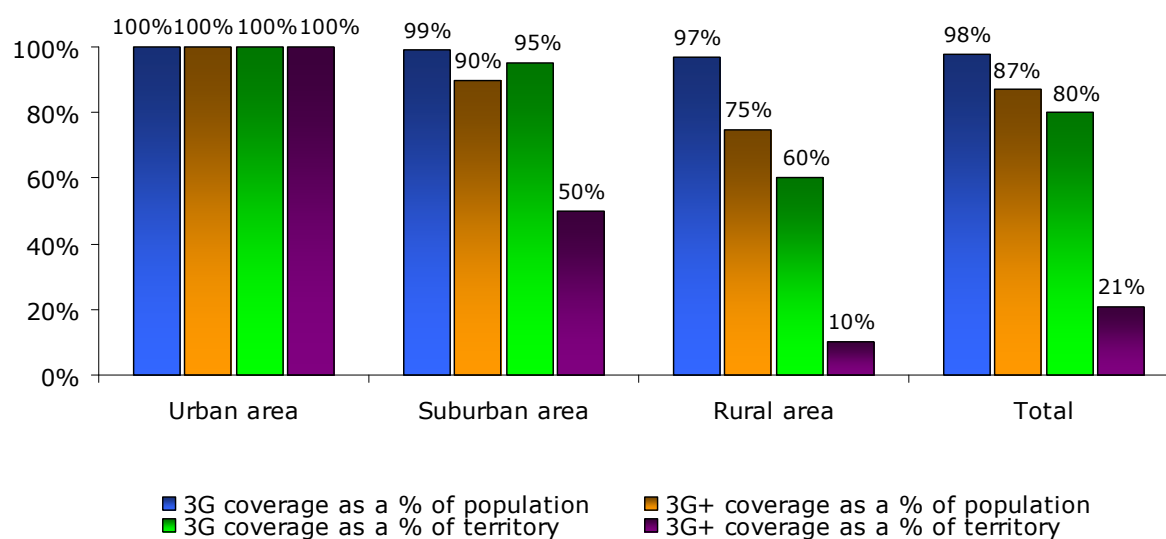
Coverage by technology

It is estimated that nearly the entire population and a significant part of the territory was covered by some type of 3G network at the end of 2009. Like Finland, urban areas enjoy very high coverage (95-100%), while rural areas are more sparsely covered, with very little coverage outside inhabited areas.

Penetration
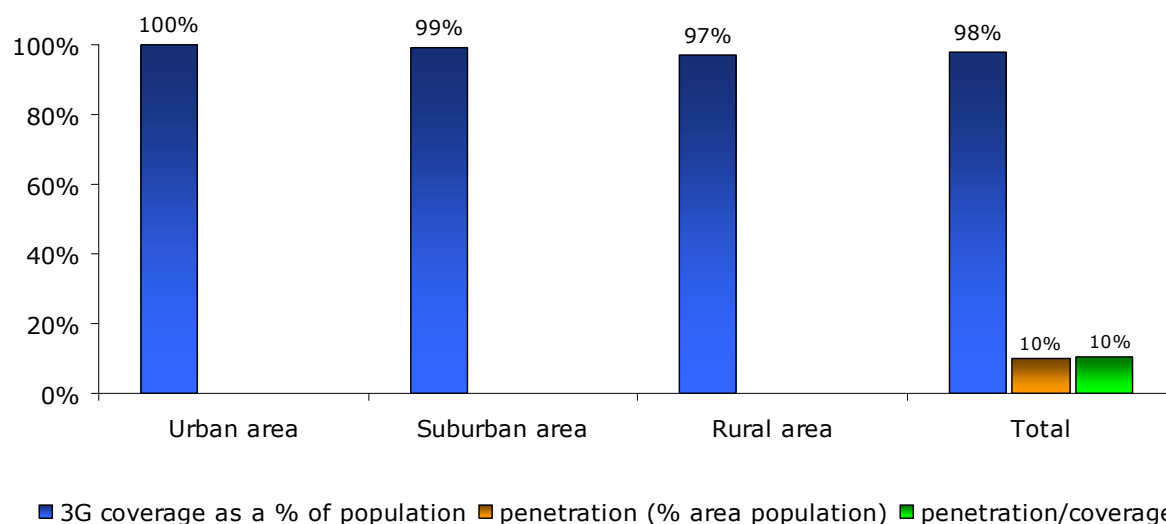
Mobile broadband subscriptions grew strongly in 2009, increasing by 84%, but Norway's penetration (just above 10%) lags behind that of its Nordic neighbours.

4.22. Poland

4.22.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	17,521,728	4,733,539	15,918,433	38,173,700
Share of total population	45.9%	12.4%	41.7%	100.0%

4.22.2. General broadband data

	12/05	12/06	12/07	12/07	12/09
DSL coverage (% of population)	56%	60%	64%	70%	74%
DSL subscribers	1,254,029	1,855,000	2,376,629	2,725,632	3,037,967
DSL penetration (% of population)	3.3%	4.9%	6.2%	7.2%	8.0%
Cable modem coverage (% of population)	12%	18%	25%	33%	34%
Cable modem subscribers	371,000	721,000	946,500	1,175,200	1,421,080
Cable modem penetration (% of population)	1.0%	1.9%	2.5%	3.1%	3.7%
FTTx subscribers	-	-	180,000	184,000	315,000
PLC subscribers	0	0	0	0	0
WLL subscribers	-	-	575,000	354,000	860,000
Satellite subscribers	93	100	1,000	1,000	1,100
Total	,1,637,108	2,596,100	4,079,129	4,439,832	5,635,147
Total fixed broadband penetration (% population)	4.3%	6.8%	10.7%	11.6%	14.8%
Mobile broadband subscribers				1,550,000	2,100,000
Mobile broadband penetration (% population)				4.1%	5.5%

At the end of 2009 the number of fixed broadband subscribers in Poland reached 5.6 millions. However, effective growth in 2009 was less than what can be calculated directly from the above table (approx. 27%) as it appears that the numbers for FTTx and WLL subscribers at the end of 2008 were under-estimated. Figures for these two access technologies as reported here are also far higher than those provided by other sources (in particular ECTA) as we include in FTTx all FTTC or FTTB terminated with Ethernet LAN and in WLL all fixed WLAN/Wi-Fi connections (see also comments on sub-segments). FTTx and WLL connections all together account for 20% of fixed broadband connections in Poland.

The number of mobile broadband subscribers increased only moderately in Poland.

4.22.3. DSL coverage and take-up

Coverage and penetration
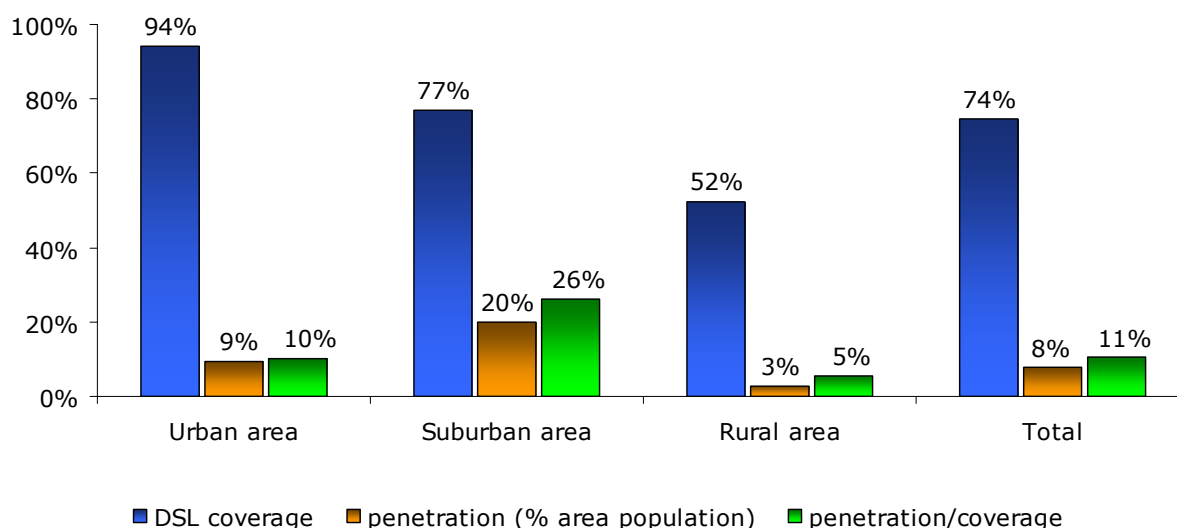
DSL coverage has increased rapidly over the past few years but it is now constrained by the non-availability of copper local loop for most of the remaining potential market. The number of DSL connections increased by 11% in 2009, which is lower than growth in 2008 (+15%) and far lower, in relative terms, than recent growth in other broadband access technologies.

Number of DSL connections by download rate
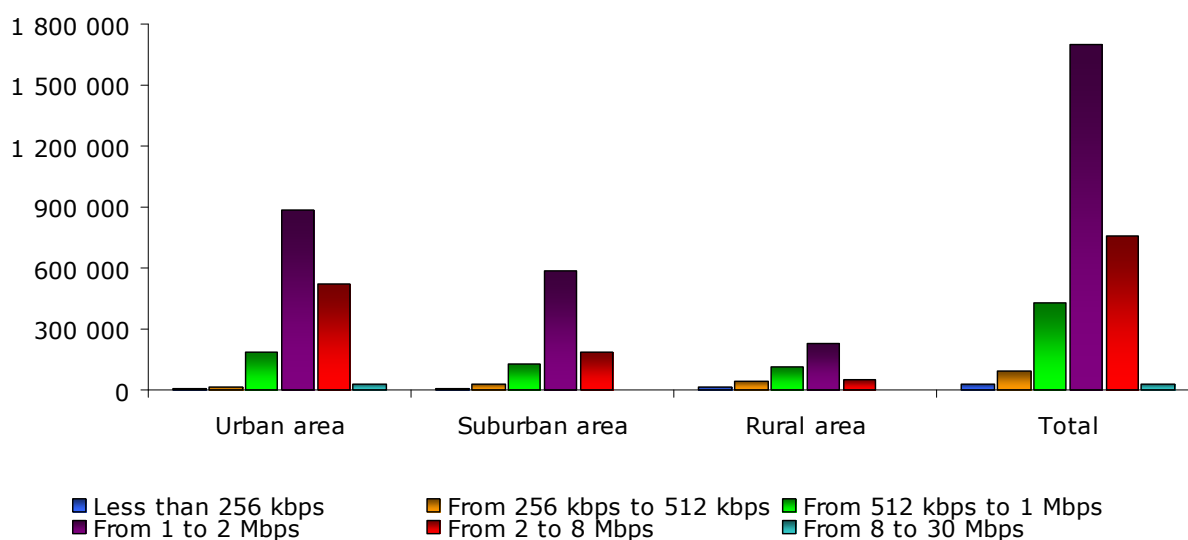
The overall structure of speeds has shifted substantially towards higher levels: in 2009 the share of speeds below 1 Mbps has fallen to 14% (compared to 60% at the end of 2008). Most DSL lines (56%) have download speeds in the 1-2 Mbps range and 25% provide speeds above 2 Mbps.

Percentage of DSL connections by type of provider
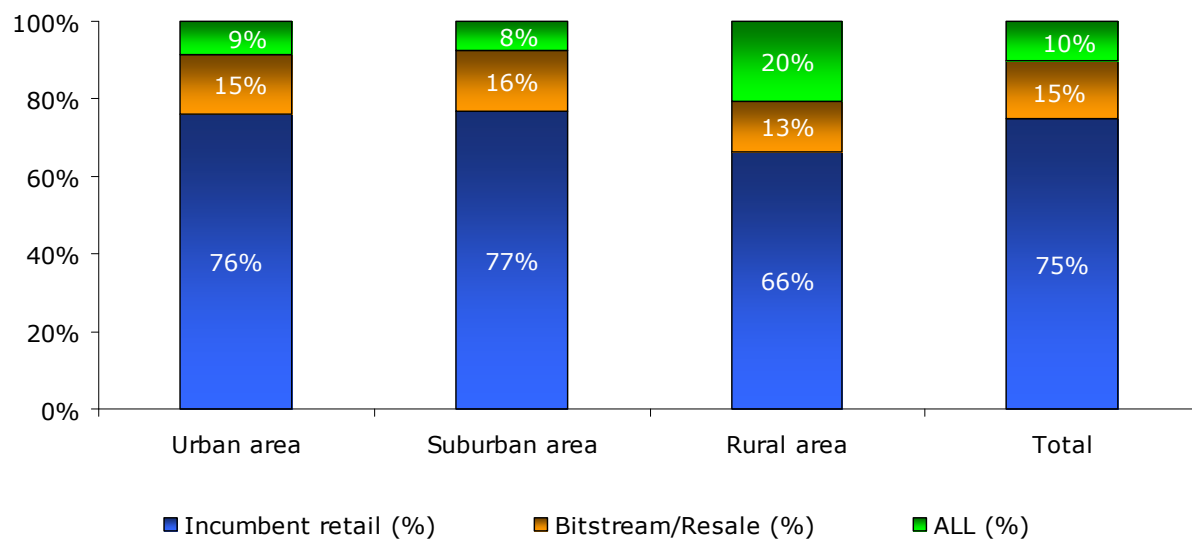
The number of ADSL access retailed directly by the incumbent TP decreased slightly, but the overall number of ADSL access provided by the TP Group increased due to BSA fixed line access supplied by Orange, its mobile arm.

The total number of ADSL lines retailed via BSA/Resale rose to almost 460,000, a 30% growth in one year. However, they account for only 15% of all DSL connections. Full LLU has just emerged (approx. 51,600 lines – below 2%) and most lines in the third group (ALL) are based on local loops built and owned by alternative operators.

4.22.4. Cable modem coverage and take-up

Coverage and penetration
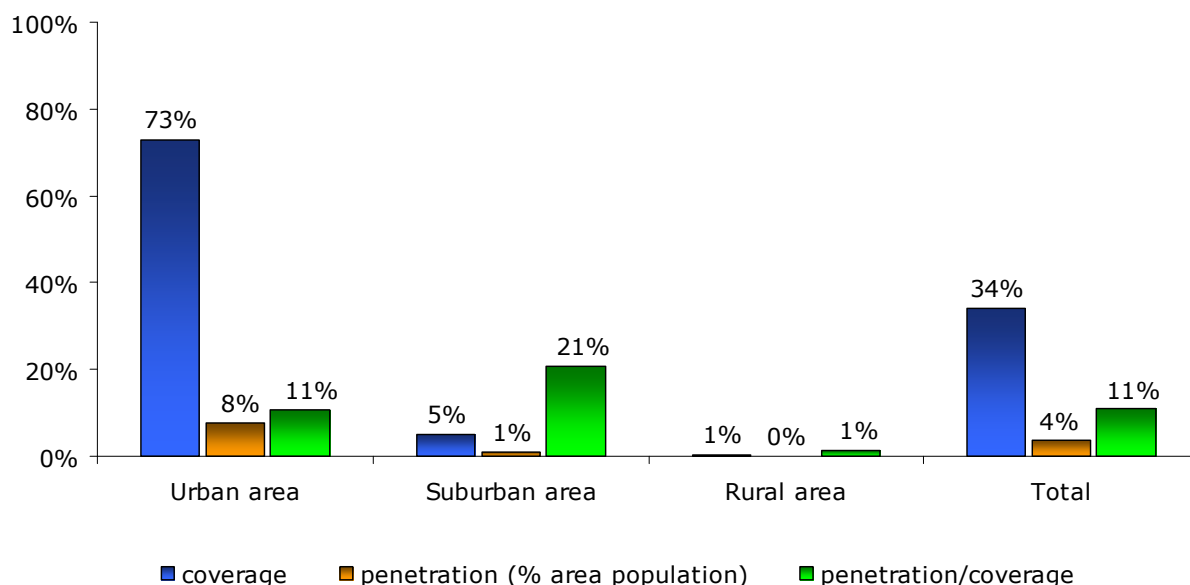
Cable networks, which are largely widespread in Poland, attract a lot of customers (4.6 million CATV subscribers). They are the main competitors to telecom operators in the Internet broadband market in urban areas. At the end of 2009, the market share of cable modem was 25% at national level but 41% in urban areas. Subscriber base growth was still high in 2009 (+18%).

Number of cable modem connections by download rate
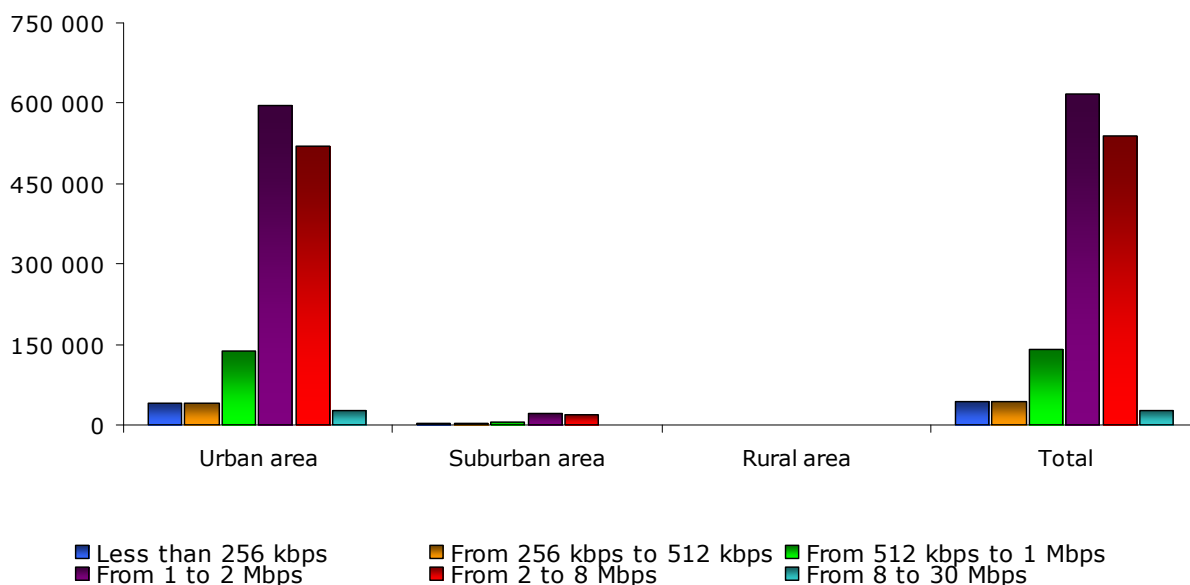
In 2009, users moved up from speeds in the 512 kbps-1 Mbps range (30% of cable modem users in this category at the end of 2008, only 10% at the end of 2009) to upper speeds categories (38% in the 2-8 Mbps range at the end of 2009; this category accounted for 17% one year earlier). The share of users of the 8-30 Mbps range was only 2%. This is due to a very limited coverage even in the large towns Double speeds access available during night time became common practice.

4.22.5. FTTx coverage and take-up

Coverage and penetration
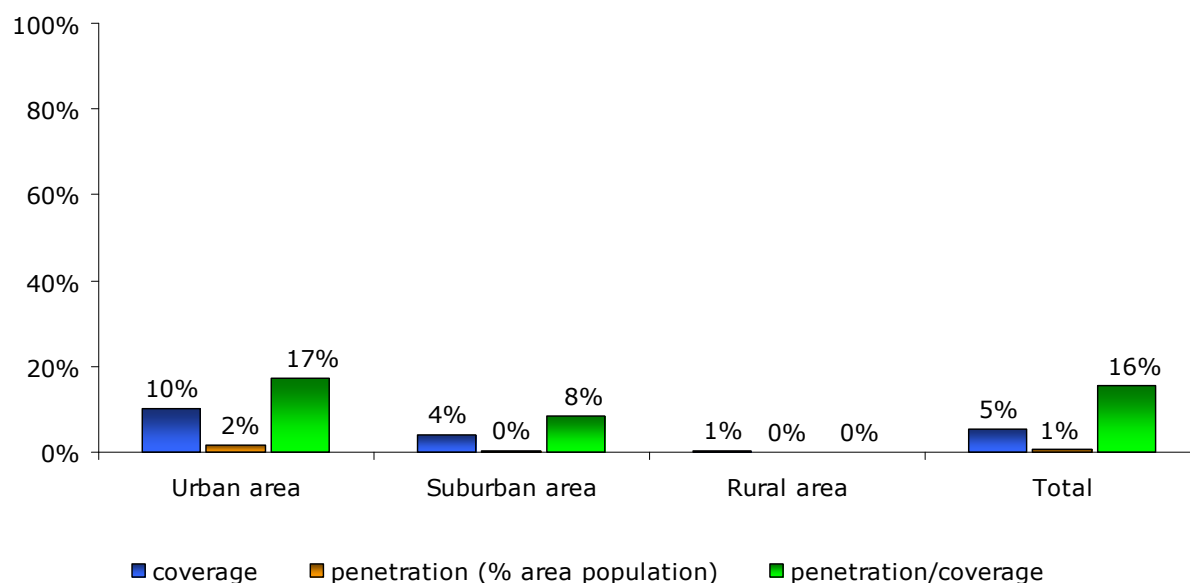
The popular architecture of the networks using FTTx technology (mostly in housing blocks in the towns of Upper and Lower Silesia in southern parts of the country), is Fibre-to-the-Node located near the buildings, and FastEthernet/Ethernet LAN access reaching the end-user apartments. The majority of such networks, operated mainly by small local ISPs, have up to one thousand users each. Access to end-users is increasingly attractive to the alternative operators: Netia, one of the three biggest alternative telecom operators, continued the policy of acquiring local FTTx/LAN networks. By this acquisitions in 2009 Netia added almost 17,000 active users, so at the end of 2009 it had more than 105,600 active users and approx. 415,000 homes passed, providing good ground for future developments.

The main obstacle for supplying FTTx – especially in towns – is the shortage of available ducts. In the case of new investments in FO backbone and access network the acute problem is lengthy and complicated administrative procedure required to obtain right of way and clearances from all services involved (road administration, water and sewage and other public utilities etc.). In practice the procedure itself can take as long as 2 to 3 years. During 2009 a special law supporting development of broadband networks has been discussed and prepared. It has only been voted by Parliament in May 2010 and it is expected to come into effect in 2011.

The FTTx/ LAN networks provide Ethernet/Fast Ethernet with speeds up to 100 Mbps. Some networks offering not only Internet access and VoIP telephony, but also IPTV for a slowly growing number of users (estimated in range of few thousands). Until the end of 2009 there was still no commercial offer of 1 Gbps to the consumer/SOHO market.

FTTx connections by download rate

No split available.

Other broadband access technologies

PLC

After very limited tests by two power utilities in Warsaw and Cracow in the years 2006-2007 the PLC technology has practically disappeared from the access market. It remains a niche LAN networking technology. PLC modems are offered by incumbent TP as an add-on to WAN modem/router for home networking.

Wi-Fi

The online database of community-driven hotspots (www.hot.spots.pl), although not comprehensive, lists nearly 2,000 hotspots and 160 WiFi providers across Poland, located in big cities, small towns and popular tourist destinations. 550 are managed by the biggest of the three mobile operators. More than 65% of hotspots listed are free of charge, including WiFi access for students at almost all large universities, as well as hotspots in cafés and restaurants.

WLL/WiMAX

WLL access services are provided by ISPs and telecom operators. The popular configuration is WLAN/WiFi architecture representing an overwhelming majority of connectivity solutions used in a last mile of fixed wireless channel in Wide Area Networks (WAN), in small towns, suburbs and rural areas. In this architecture WiMAX is used for backhauling. The number of fixed wireless access grew substantially in 2009 to 860,000 at the end of the year (including not only solutions with WiMAX or LMDS for backhauling but also with fibre optics or operator grade DSL).

Last mile WiMAX is used mainly by business customers due to high price of terminal equipment. Netia reports 21,000 VoIP-over-WiMAX telephony customers and 17,000 broadband Internet access (mainly SMEs).

Further tenders for WiMAX licences in the 2.5GHz and 3.6 GHz bands were organized in 2009, leading to mixed results, with areas ended with no licensee due to a lack of bidders.

Satellite

Satellite access was still a niche technology mainly because of the high cost of equipment. The number of users has remained unchanged for some years at approx. 1,000. The 800-1,000 VSAT terminals used for data transmission by the state lottery are using mainly narrowband connections and are not included here.

4.22.6. Mobile broadband coverage and take-up

Coverage by technology
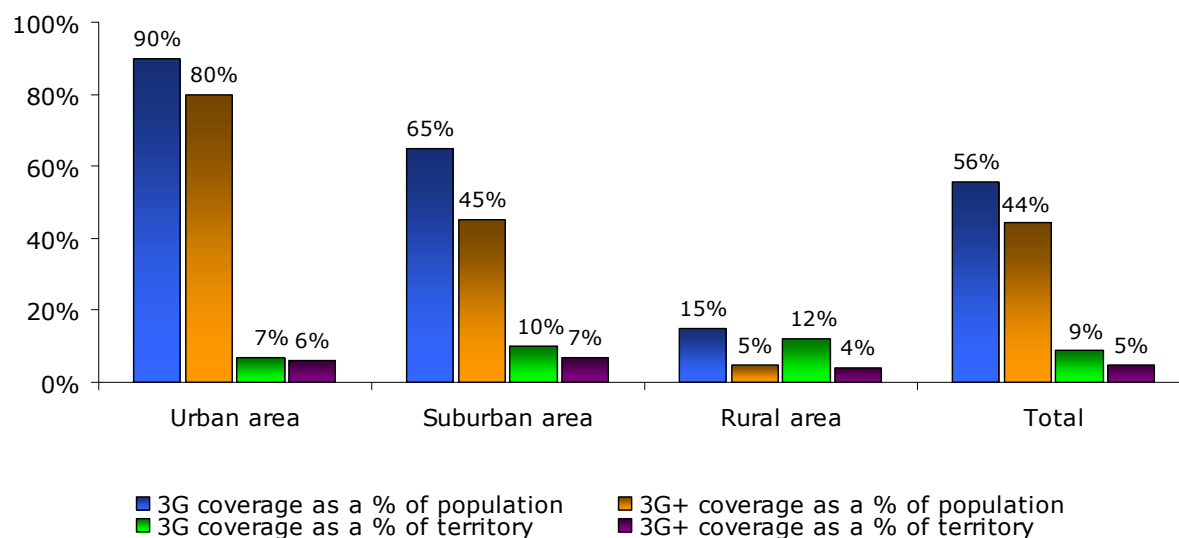
The "Big Three" mobile operators (PTK Centertel-Orange, Polkomtel-PlusGSM and PTC-Era) intensely upgraded their 3G networks to HSDPA in 2009 while the fourth (P4-Play) which delayed deployment due to environmental constraints, directly built a 3G+ network.
In the second half of 2009 new entrants (Aero 2, Mobyland) together with the former CDMA fixed-telephony operator Sferia, started to build up their 3G/3G+ networks to operate in the 900, 1800 and 2100 MHz.

Penetration
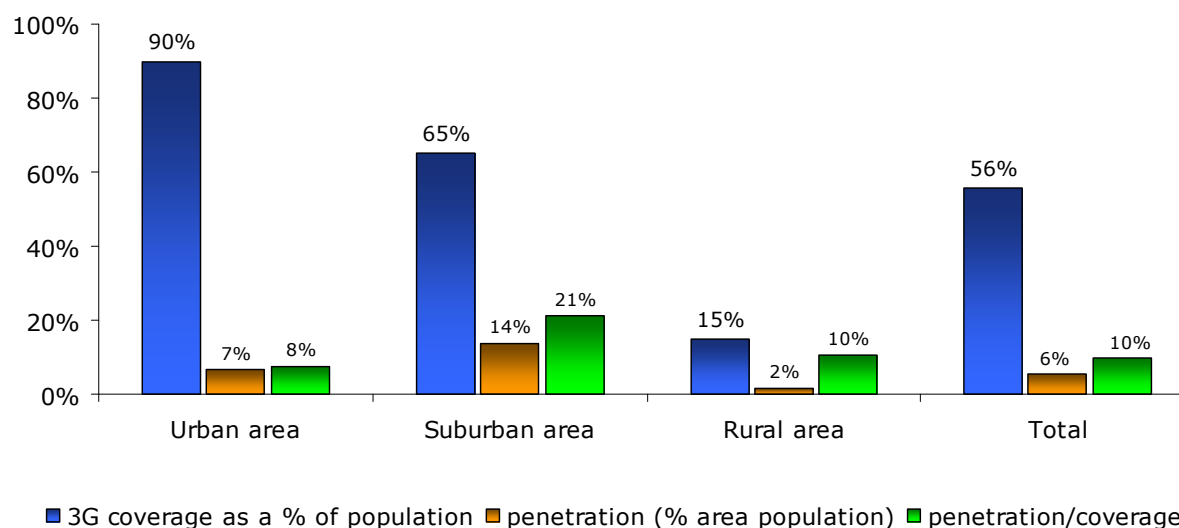
Despite progress in coverage, penetration remains low compared to other EU countries but mobile Internet is actively promoted by operators.

4.23. Portugal

4.23.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	4,102,838	4,123,326	2,401,086	10,627,250
Share of total population	38.6%	38.8%	22.6%	100.0%

4.23.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	93%	94%	95%	95%	98%
DSL subscribers	672,800	883,746	1,087,725	1,069,000	1,059,817
DSL penetration (% of population)	6.3%	8.3%	10.2%	10.1%	10.0%
Cable modem coverage (% population)	75%	80%	85%	85%	85%
Cable modem subscribers	489,892	537,552	605,887	661,685	750,300
Cable modem penetration (% population)	4.6%	5.1%	5.7%	6.2%	7.1%
FTTx subscribers	3,218	4,180	6,700	14,500	41,500
PLC subscribers	1,600	0	0	0	0
WLL/WiMAX subscribers	1,700	3,700	8,200	21,504	23,305
Satellite subscribers	-	-	-	15	15
Total	1,169,210	1,429,178	1,708,512	1,766,704	1,874,937
Total fixed broadband penetration (% population)	11.0%	13.5%	16.1%	16.6%	17.6%
Mobile broadband subscribers				1,215,000	2,169,894
Mobile broadband penetration (% population)				11.4%	20.4%

In 2009, the fixed Portuguese broadband market somehow recovered from the year before with a total growth rate of 14.8% as compared to 7.7% in 2008. Interestingly, with a penetration rate of 17.6%, Portugal now has fewer fixed broadband subscribers than mobile broadband subscribers, but with lower connection speeds for the latter.

In the fixed segment, DSL access technology still accounts for 56.5% of broadband connections although the number of DSL subscribers decreased in 2009. This was compensated by strong growth in the cable modem segment, which now represents 40% of fixed broadband connections and in the FTTx segment.

In the wireless market, mobile broadband experienced an impressive and noteworthy 87% subscriber growth year over year with a penetration rate of more than 20% at the end of 2009.

4.23.3. DSL coverage and take-up

Coverage and penetration
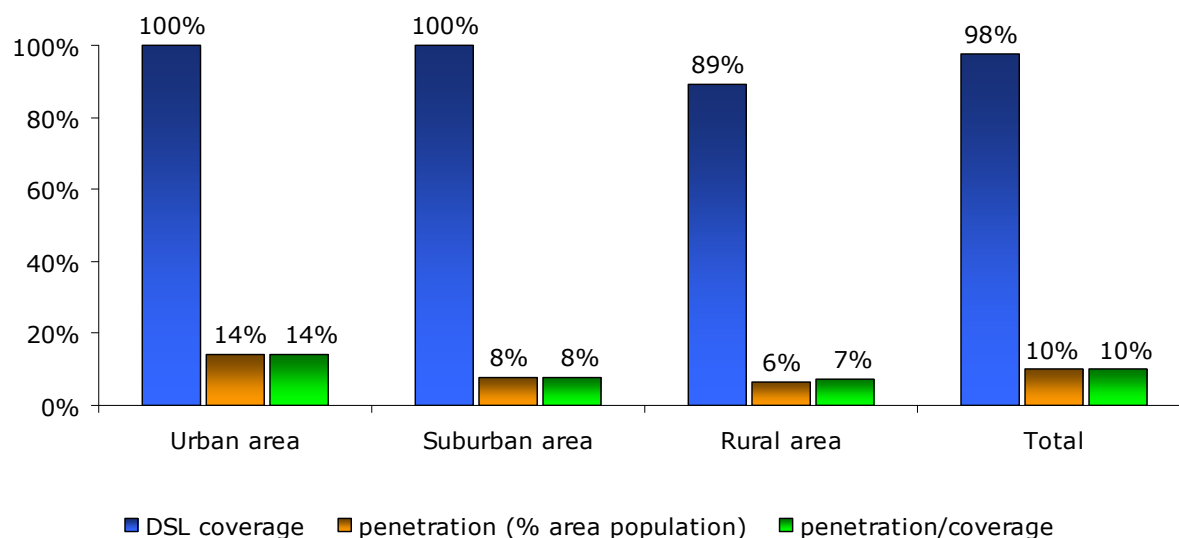
DSL is now available to virtually all households located in urban and suburban areas. But in rural areas, population coverage has only little progressed, from 86% at the end of 2008 to 89% in 2009.

Number of DSL connections by download rate
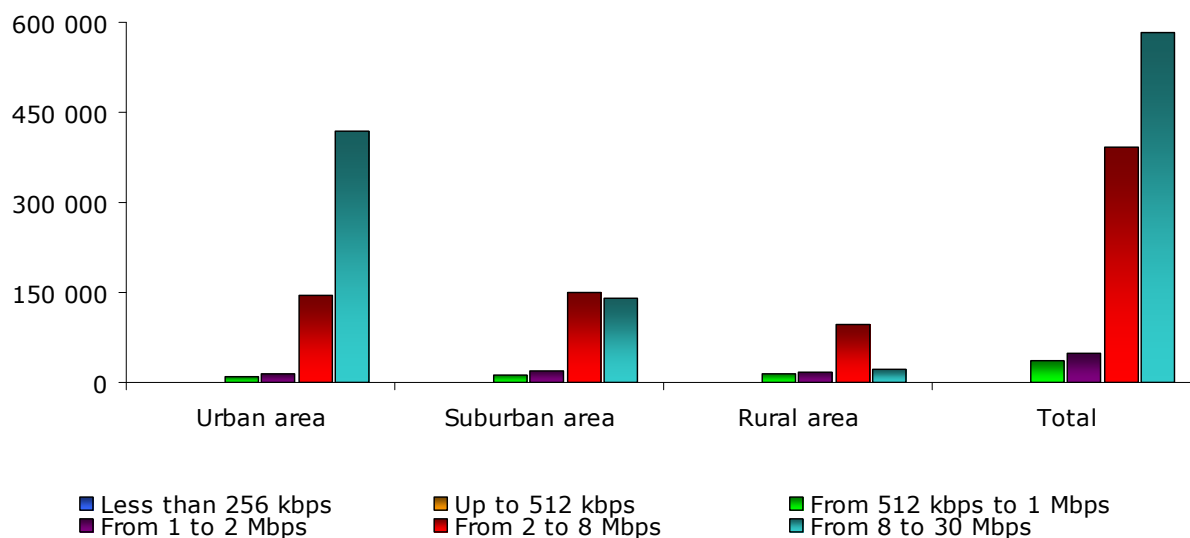
DSL connections with speeds up to 2 Mbps tend to disappear, including in rural areas. On the opposite, connections with speeds over 8 Mbps account for 55% of DSL accesses.

Percentage of DSL connections by type of provider
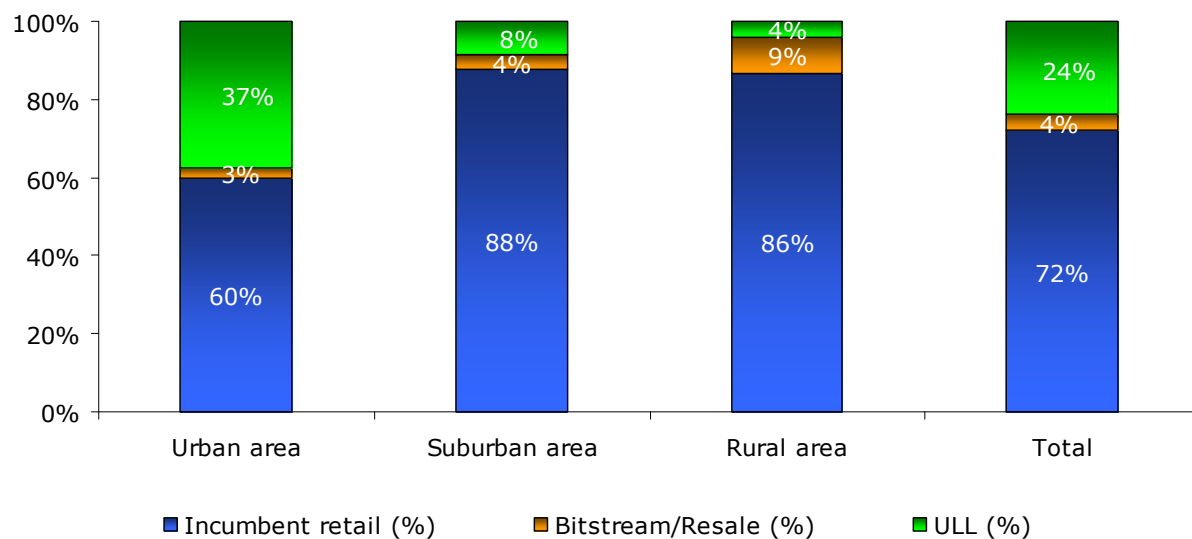
Incumbent operator Portugal Telecom has strengthened its position in the DSL market especially in the most densely populated areas where it had lost market shares in the previous years. It also holds strong position in other areas where alternative DSL operators can hardly make profit.

4.23.4. Cable modem coverage and take-up

Coverage and penetration
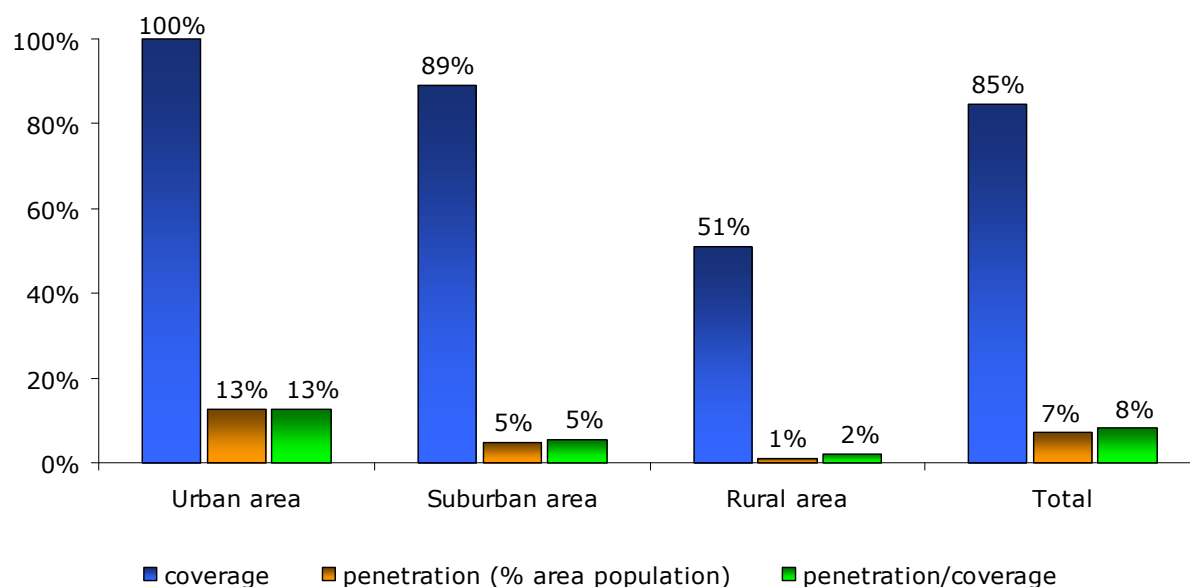
Cable operator Zon Multimedia has become the main competitor to its formerly parent company (Portugal Telecom) with a market share of 32.7% on the whole fixed broadband market. There is no progress in cable coverage as it is now relayed by deployments in FTTx networks.

Number of cable modem connections by download rate
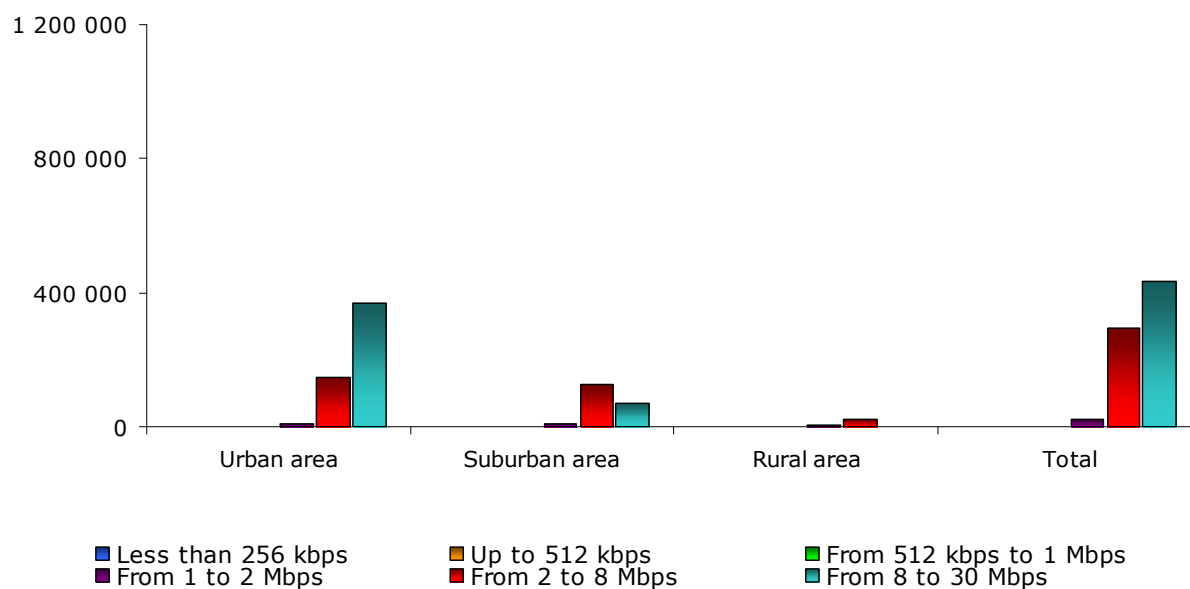
As in the DSL market, cable modem connections with speeds up to 2 Mbps tend to disappear. Connections with speeds between 2 and 8 Mbps are still dominant in suburban areas and represent nearly all connections in rural areas (with total number of cable modem connections very low in those areas). Connections over 8 Mbps became the standard in urban areas.

4.23.5. FTTx coverage and take-up

Coverage and penetration
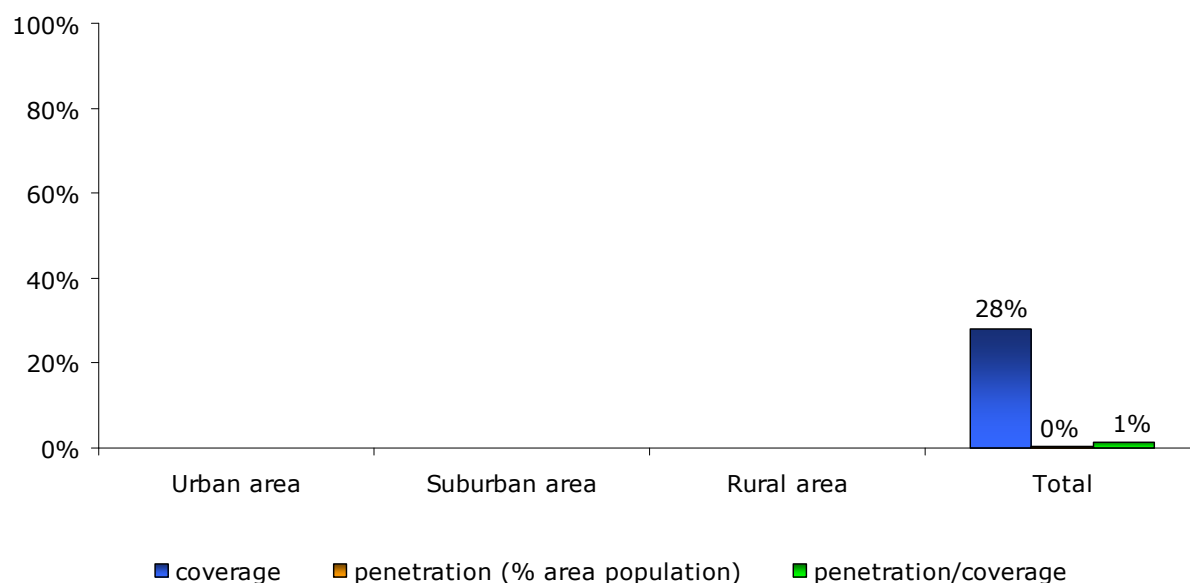
Although only 41,500 customers benefited from a FTTx access to the internet at the end of 2009, fibre based connections increased very rapidly (from 14,500 at the end of 2008). Sonaecom, which launched commercial service in September 2008, is the main fibre access provider.

FTTx connections by download rate
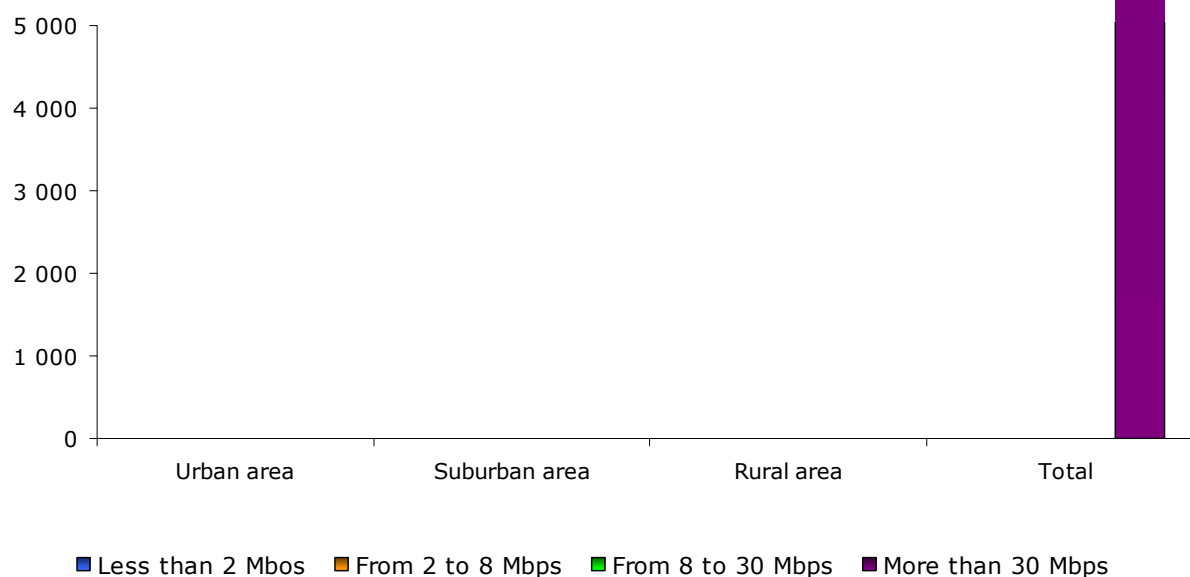
Although no statistics are produced, we estimate that most of fibre based connections offer speeds over 30 Mbps.

4.23.6. Other broadband access technologies

WLL/WiMAX

Reportedly, the biggest player providing WiMAX in Portugal is ART Telecom. Most of its subscribers are located in urban areas.

Satellite

With only 15 customers, satellite broadband access in Portugal is marginal, in part due to good wireline infrastructures and to the large availability of mobile internet infrastructure (see after).

4.23.7. Mobile broadband coverage and take-up

Coverage by technology

■ 3G coverage as a % of population   ■ 3G+ coverage as a % of population
■ 3G coverage as a % of territory   ■ 3G+ coverage as a % of territory
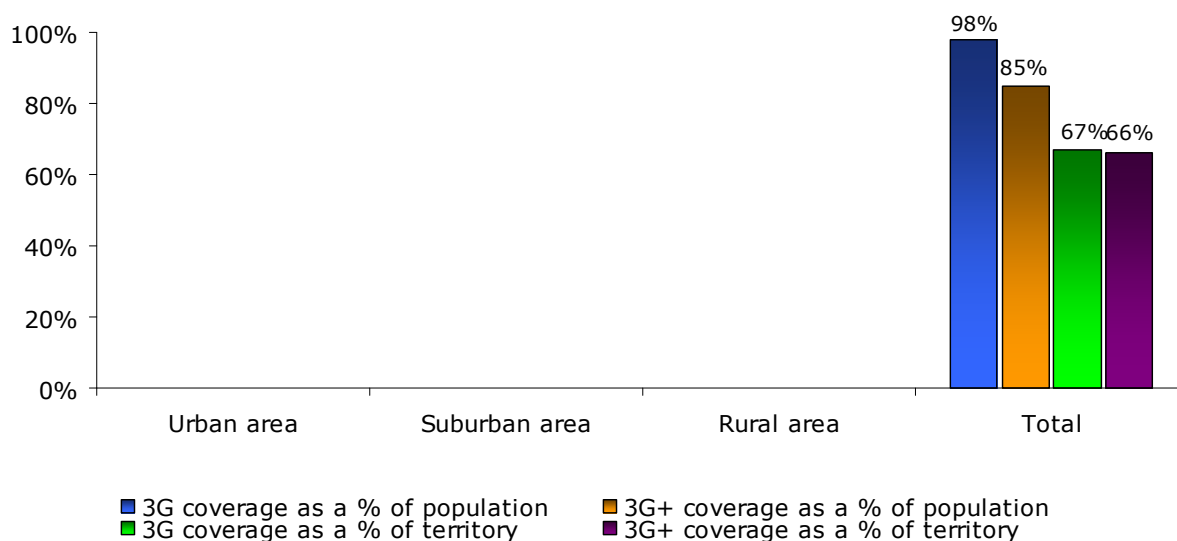
In 2009, the three Mobile Network Operators focused their investments in upgrading their legacy 3G infrastructures to 3G+ hence a more homogeneous coverage of the territory. In 2009, first HSPA+ trials were carried in Portugal, paving the way for increased penetration of mobile broadband in the country in 2010.

Penetration

■ 3G coverage as a % of population ■ penetration (% area population) ■ penetration/coverage
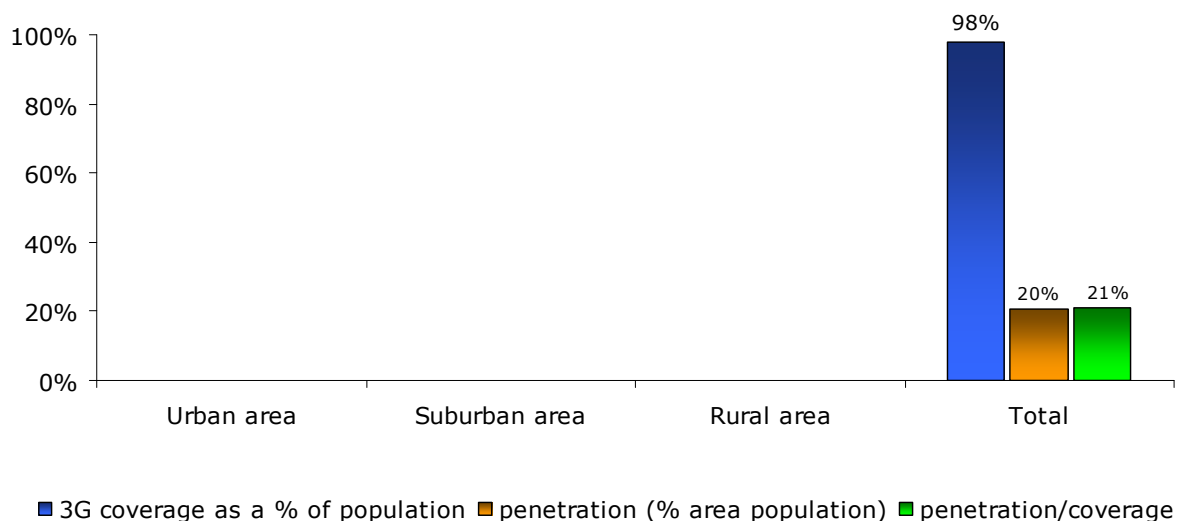
At the end of 2009, there were nearly 2.2 million mobile broadband subscribers.

4.24. Romania

4.24.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	11,845,737	0	9,624,222	21,469,959
Share of total population	55.2%	0%	44.8%	100.0%

4.24.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	-	-	-	68%	75%
DSL subscribers	10,000	100,000	360,000	660,000	789,000
DSL penetration (% of population)	0.0%	0.5%	1.7%	3.1%	3.7%
Cable modem coverage (% population)	-	-	-	65%	68%
Cable modem subscribers	250,000	390,000	440,000	470,000	480,000
Cable modem penetration (% population)	1.2%	1.8%	2.0%	2.2%	2.2%
FTTx subscribers	120,000	580,000	1,110,000	1,360,000	1,530,000
PLC subscribers	-	-	-	-	-
WLL subscribers	-	14,000	11,000	10,000	20,000
Satellite subscribers	-	100	200	400	1,000
Total	380,000	1,084,100	1,921,200	2,500,400	2,820,000
Total fixed broadband penetration (% population)	1.8%	5.0%	8.9%	11.6%	13.1%
Mobile broadband subscribers	_	480,000	790,000	1,530,000	2,760,000
Mobile broadband penetration (% population)		2.2%	3.7%	7.1%	12.9%

Broadband penetation remains very low in Romania compared to the EU average. The increase of the DSL subscriber base (+129,000 units or +17%) in 2009 has been low compared to the growth recorded in this segment in 2007 and 2008, meanwhile the cable modem subscriber base has been quite flat.

FTTx remained dynamic: LAN access networks are well developed in Romania and represent a very large part of this segment (1,430,000 LAN connections via UTP/FTP cable vs. 100,000 FTTH subscribers).

One thousand and sixty five ISPs were providing Internet access at the end of 2009 (there were 1,100 at the end of 2008).

The incumbent carrier, Romtelecom, holds the DSL customer base, while RDS&RCS and UPC Romania are the largest cable modem and FTTx players.

Mobile Internet also developed steadily in 2009, with 2.8 million subscribers at the end of the year.

4.24.3. DSL coverage and take-up

Coverage and penetration
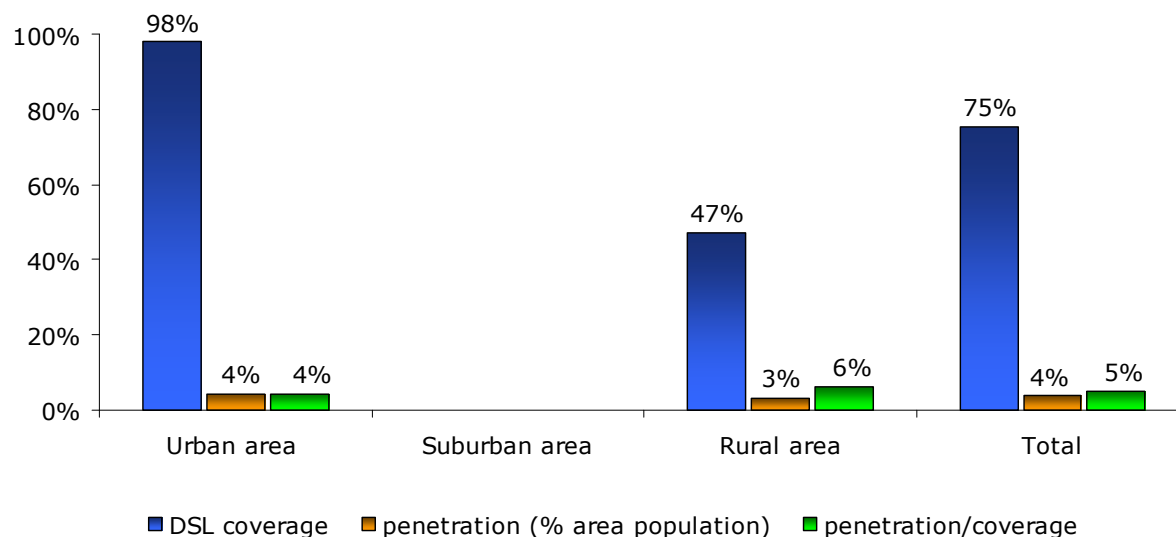
In 2009 the number of DSL subscribers continued to increase, partly thanks to coverage improvement, notably in rural areas. However, penetration is still low, at 3.7% at the end of the year.

Number of DSL connections by download rate
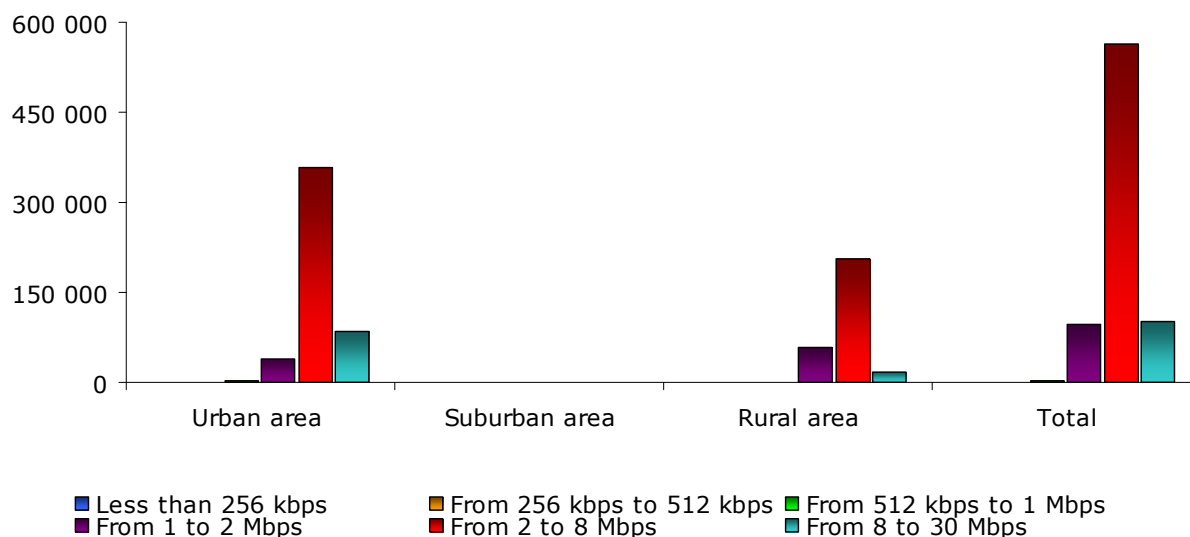
In 2009, the DSL provider offered six plans with download rates of 3/6/8/12/20 and 30 Mbps rate.

Most DSL users were connected to the Internet via 6 or 8 Mbps access. Service delivering access at 20 and 30 Mbps is offered mostly in urban areas while download rates under 2Mbps were offered only for back up solution where the (higher) speed was not available. In 2009 the DSL provider increased automatically the speed for all subscribers, as it did for previous years.

Percentage of DSL connections by type of provider
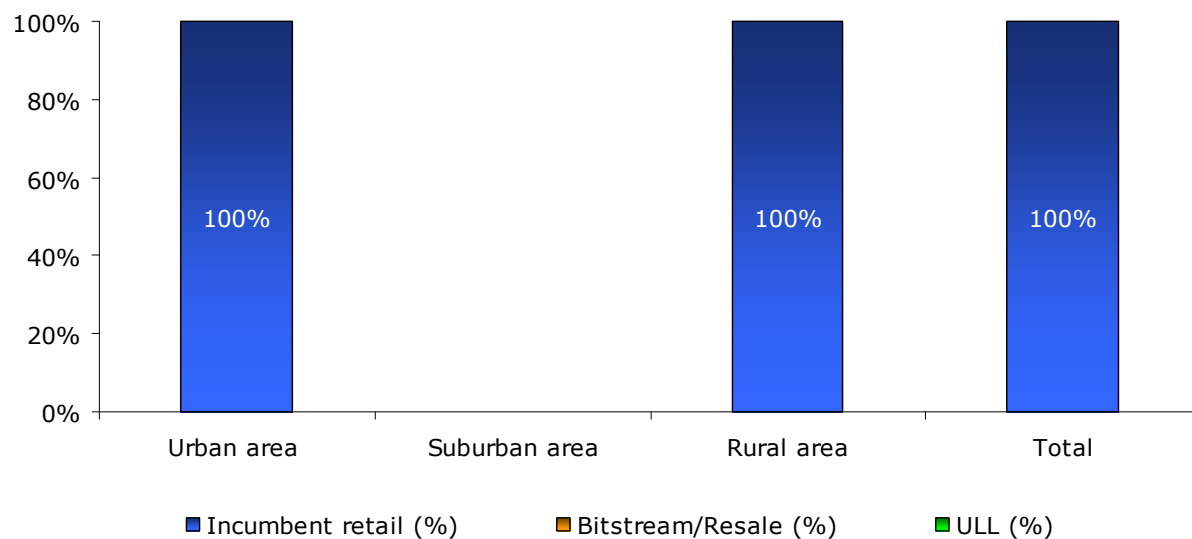
The incumbent is the sole provider of DSL.

There have been several attempts of small providers to lease unbundled local loop in the past but due to the high rental price, they have all failed.

4.24.4. Cable modem coverage and take-up

Coverage and penetration

■ Less than 256 kbps   ■ From 256 kbps to 512 kbps ■ From 512 kbps to 1 Mbps
■ From 1 to 2 Mbps   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps
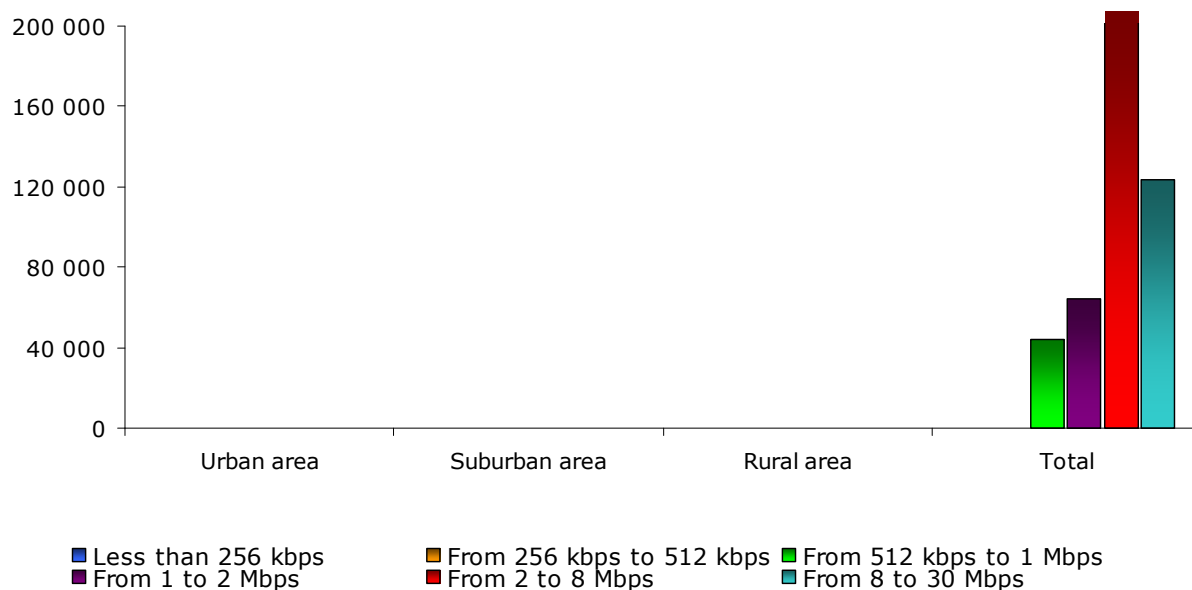
The number of cable modem subscribers slightly increased in 2009 (+10,000) but the share of this access technology in fixed broadband connections decreased from 18.6% at the end of 2008 to 17.1%¨at the end of the last year.

Most of Romanian local cable operators provide broadband Internet access with RDS&RCS and UPC Romania being the 2 major ones.

Number of cable modem connections by download rate

■ Less than 256 kbps   ■ From 256 kbps to 512 kbps ■ From 512 kbps to 1 Mbps
■ From 1 to 2 Mbps   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps
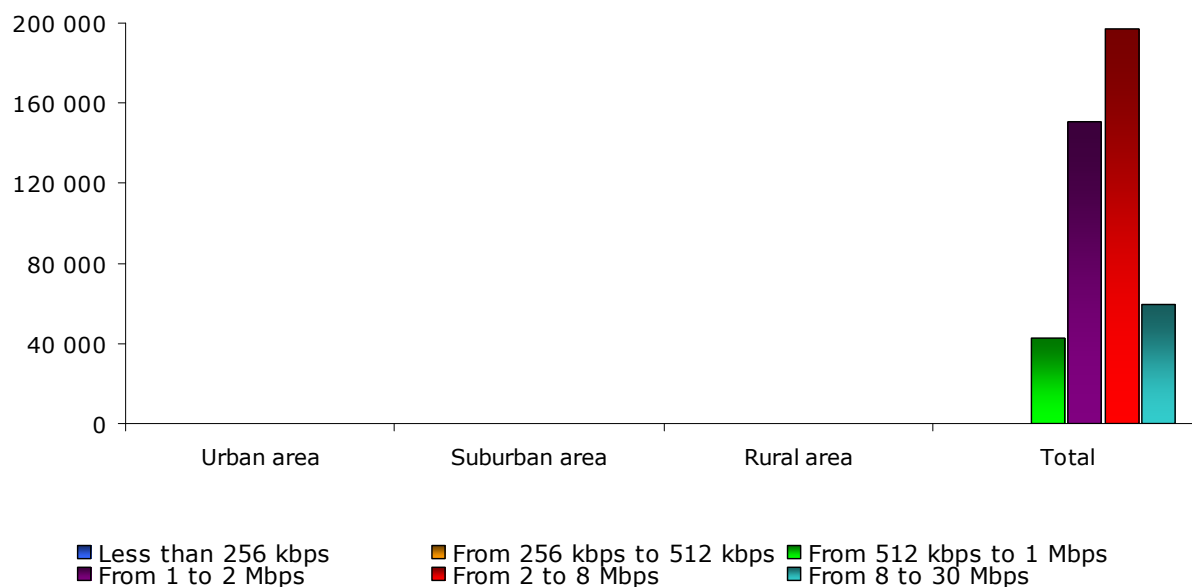
The most popular download rates are similar to what can be seen in the DSL market, i.e. connections with speeds between 2 and 8 Mbps and over 8Mbps

.

4.24.5. FTTx coverage and take-up

Coverage and penetration

■ coverage   ■ penetration (% area population)   ■ penetration/coverage
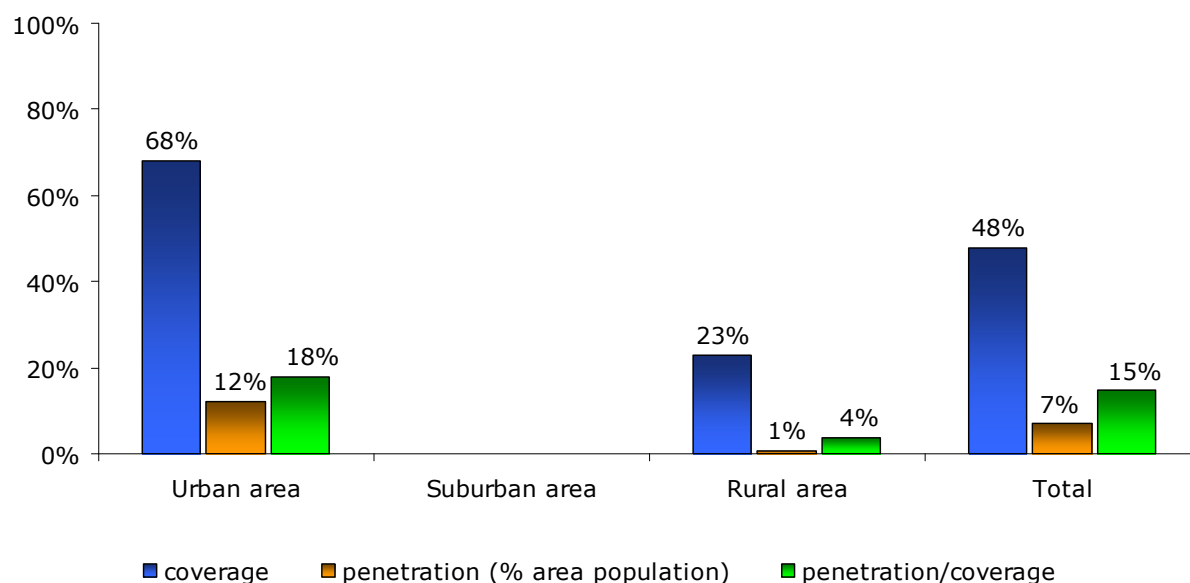
The number of FTTx/LAN subscribers continued to increase in 2009.

At the end of 2009, there were 1,530,000 FTTx/LAN subscribers in the country (100,000 FTTx and 1,430,000 LAN subscribers), 170,000 more as compared to the end of 2008.
FTTx networks covered most of the biggest cities of Romania.

FTTx connections by download rate

■ Less than 2 Mbos   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps   ■ More than 30 Mbps
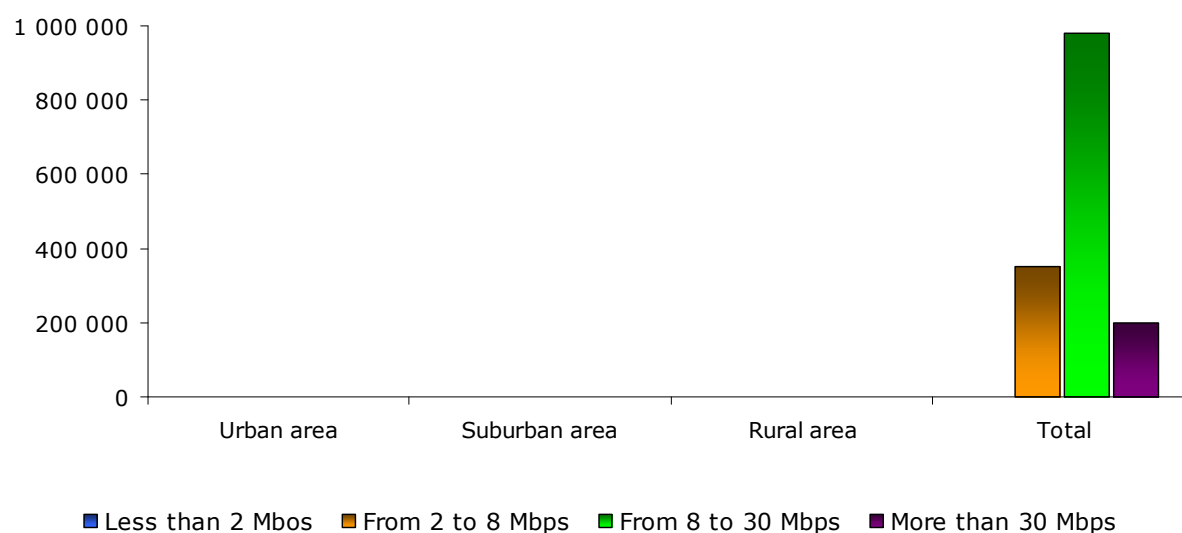
Most of the fibre connections are FTTB or FTTH delivering connections for business and residential market (LAN subscribers).

4.24.6. Other broadband access technologies

Wi-Fi

At the end of 2009, there were more than 2,000 hotspots operated in the country – hotels, shopping centers, airports, mostly with free access.

WLL/WiMAX

WiMAX is not available in Romania yet.

The largest percentage of WLL subscribers is located in the areas where use of other technologies (DSL, cable modem, FTTx,...) is limited.

In 2009 the number of WLL subscribers increased significantly, from 10,000 to 20,000.

Satellite

According to the National Regulatory Authority 1,000 subscribers were connected to broadband via satellite at the end of 2009.

4.24.7. Mobile broadband coverage and take-up

Coverage by technology

- 3G coverage as a % of population
- 3G+ coverage as a % of population
- 3G coverage as a % of territory
- 3G+ coverage as a % of territory
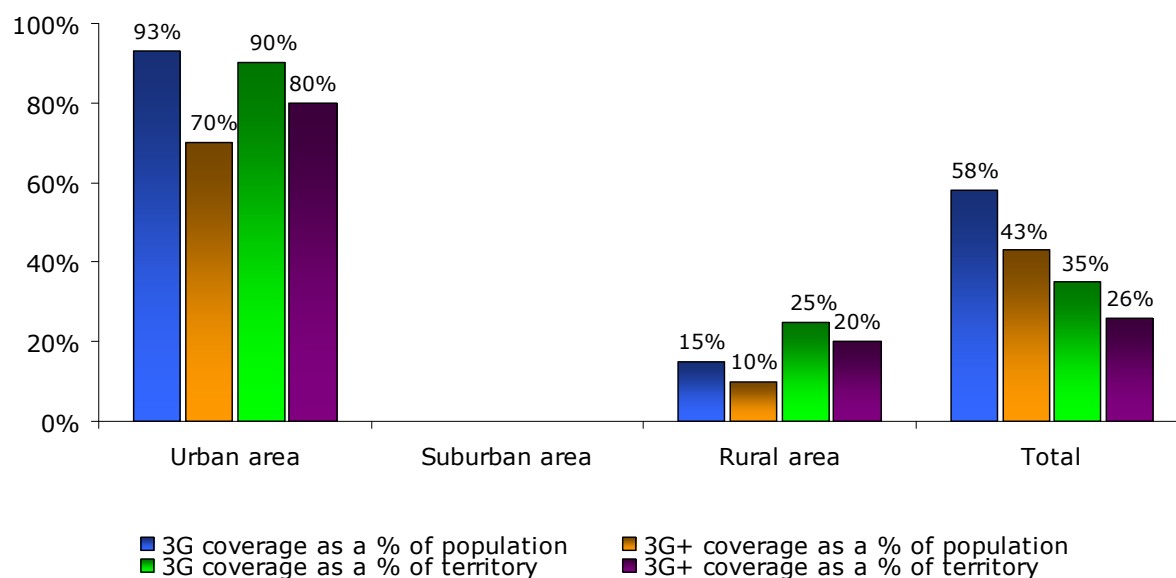
3G (UMTS, HSDPA, HSUPA, CDMA/EVDO) geographical coverage has increased substantially over the last two years. 58% of the population was covered with 3G and 43% covered with 3G+ at the end of 2009; both technologies are now widely available in the largest cities.

Penetration

- 3G coverage as a % of population
- penetration (% area population)
- penetration/coverage
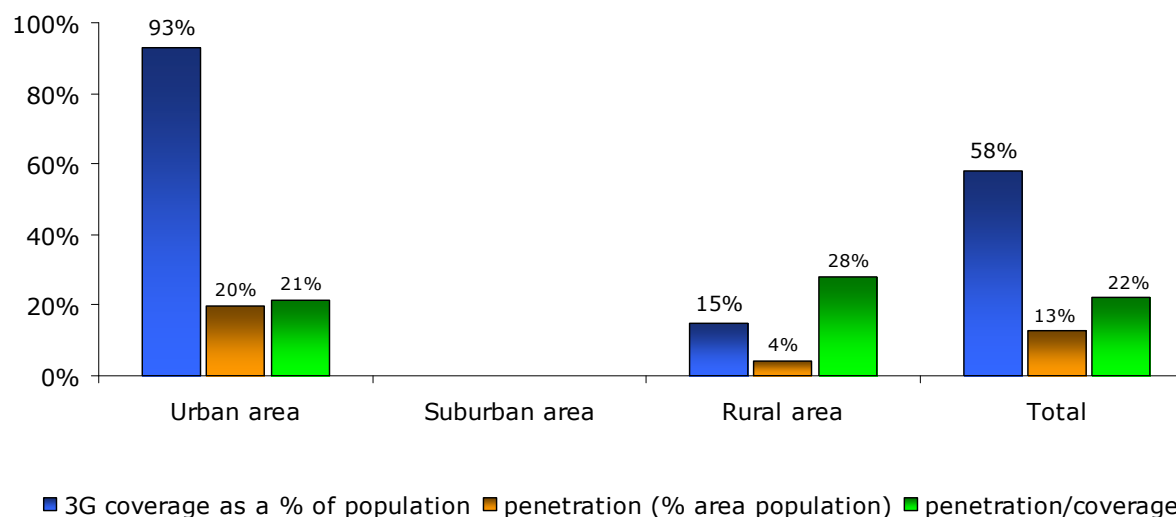
By the end of 2009 there were 2,760,000 mobile broadband subscribers in Romania, compared to 1,530,000 at the end of 2008 (+80%).
There are five mobile operators in Romania providing access to the broadband mobile Internet: Vodafone, Orange, Cosmote, RDS&RCS using HSDPA, UMTS, EDGE and Romtelecom, Cosmote, using CDMA/EVDO 1x and UMTS technologies.

4.25. Slovakia

4.25.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	1,845,590	1,983,648	1,595,687	5,424,925
Share of total population	34.0%	36.6%	29.4%	100.0%

4.25.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	61%	66%	74%	78%	82%
DSL subscribers	104,899	182,391	277,832	336,369	367,723
DSL penetration (% population)	1.9%	3.4%	5.1%	6.2%	6.8%
Cable modem coverage (% population)	8%	15%	24%	31%	32%
Cable modem subscribers	26,083	36,701	51,405	63,806	81,004
Cable modem penetration (% population)	0.5%	0.7%	1.0%	1.2%	1.5%
FTTx subscribers	58,319	66,649	87,269	118,021	180,540
PLC subscribers	0	0	0	0	0
WLL subscribers	24,518	69,629	92,356	94,257	155,984
Satellite subscribers	4	5	5	115	205
Total	213,823	355,375	508,867	612,568	785,456
Total fixed broadband penetration (% population)	4.0%	6.6%	9.4%	11.3%	14.5%
Mobile broadband subscribers	2,200	97,176	192,329	567,503	831,219
Mobile broadband penetration (% population)	0.0%	1.8%	3.6%	10.5%	15.4%

At the end of 2009, the number of fixed broadband subscribers was 785,500, up 28% when compared to the end of 2008 while there were 1.1 million mobile broadband users.

During 2009, the broadband market development was influenced mainly by:

- a quasi monopoly of the incumbent operator – Slovak Telekom - in fixed local loop (regulated unbundling local loop regime was implemented in February 2010 only),
- increased coverage of xDSL by the incumbent operator (250 additional municipalities can access DSL), but half of population living in rural areas is still not covered,
- gradual progress in coverage of alternative fixed infrastructures at local level, notably through cable networks,
- rapid increase of FTTx connections which compensates for lack of competition in DSL,
- rapid development of commercial and municipal wireless broadband (WiFi, FWBA/WiMAX and WLL (FWA) networks
- rapid development of mobile internet access by 3G/3G+ networks and by FLASH-OFDM network (also called FLARION).

4.25.3. DSL coverage and take-up

Coverage and penetration
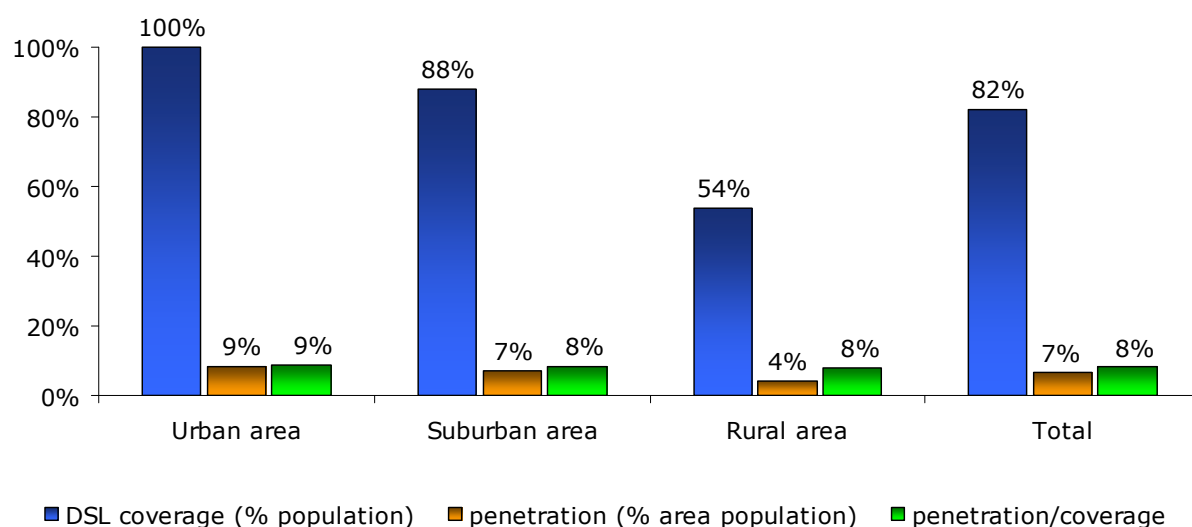
In 2009, ADSL services were available in 1,217 municipalities (including 17 municipalities within Bratislava-City and 22 municipalities within Kosice-City), which represent 41.5% of the country's 2,928 municipalities and more than 82% of total population. However, effective xDSL availability is limited because parts of PSTN lines are not capable of delivering xDSL, mainly due to distance constraints.

Number of DSL connections by download rate
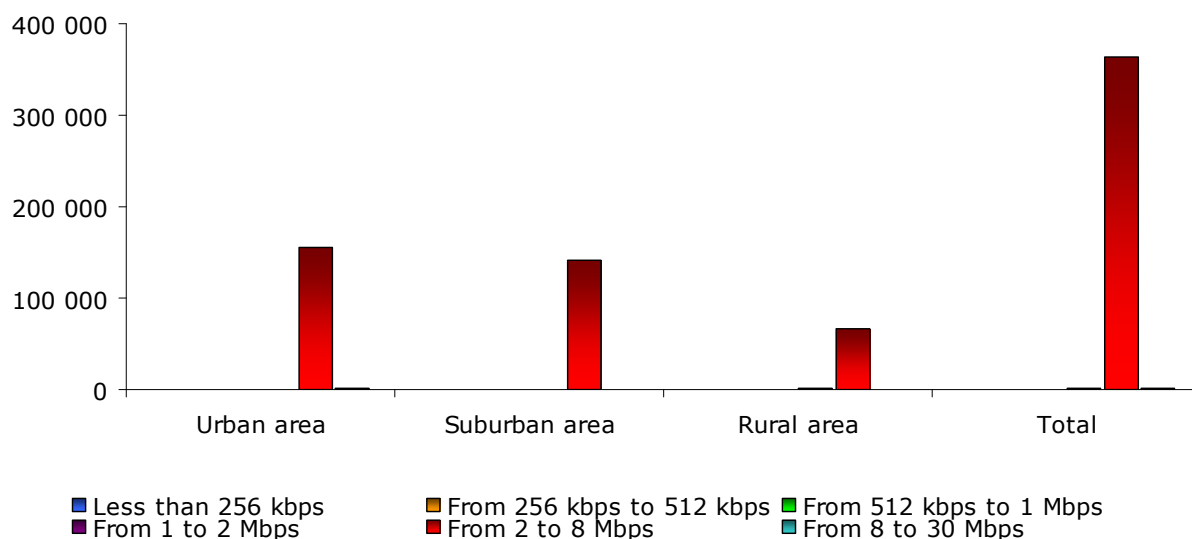
Slovak Telekom launched ADSL services in 2004 and ADSL2+ services were introduced at the end of 2006. Practically all xDSL services (98.9%) were provided with download speeds in the 2–8 Mbps range (256 kbps upload), the remaining connections were provided with speeds in the 1-2 Mbps range (256 kbps upload) and some, for lines very close to a local exchange in urban areas, in the 8-30 Mbps range (512 kbps upload).

Percentage of DSL connections by type of provider
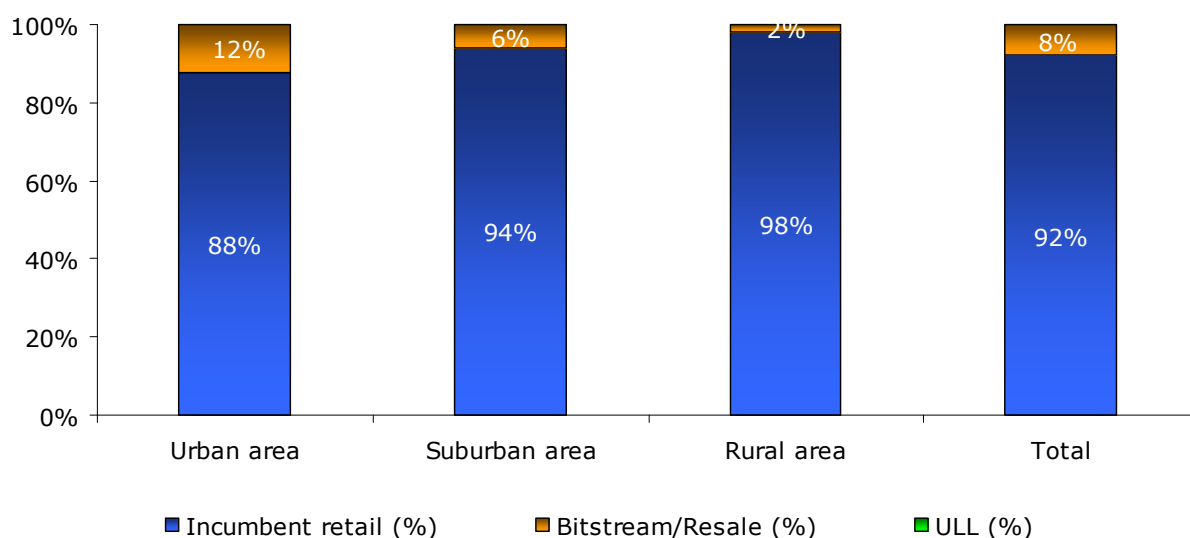
Slovak Telekom delivers 92.1% of all xDSL lines directly (similar share as the previous two years). The remaining 7.9% cover bitstream/resale offers. Unbundling tariffs, though price decreased in 2008 and in 2009, were still too high to attract competitors.

Other ADSL service providers are Slovanet, GTS Nextra and SWAN.

In 2009 DSL services were also provided by Railway Telecom Operator (ZSR-Zeleznicne Telekomunikacie), but the activity is limited to territories in the railway infrastructure footprint and there were only 32 customers at the end of 2009.

4.25.4. Cable modem coverage and take-up

Coverage and penetration

■ coverage (territory) ■ penetration (% area population) ■ penetration/coverage
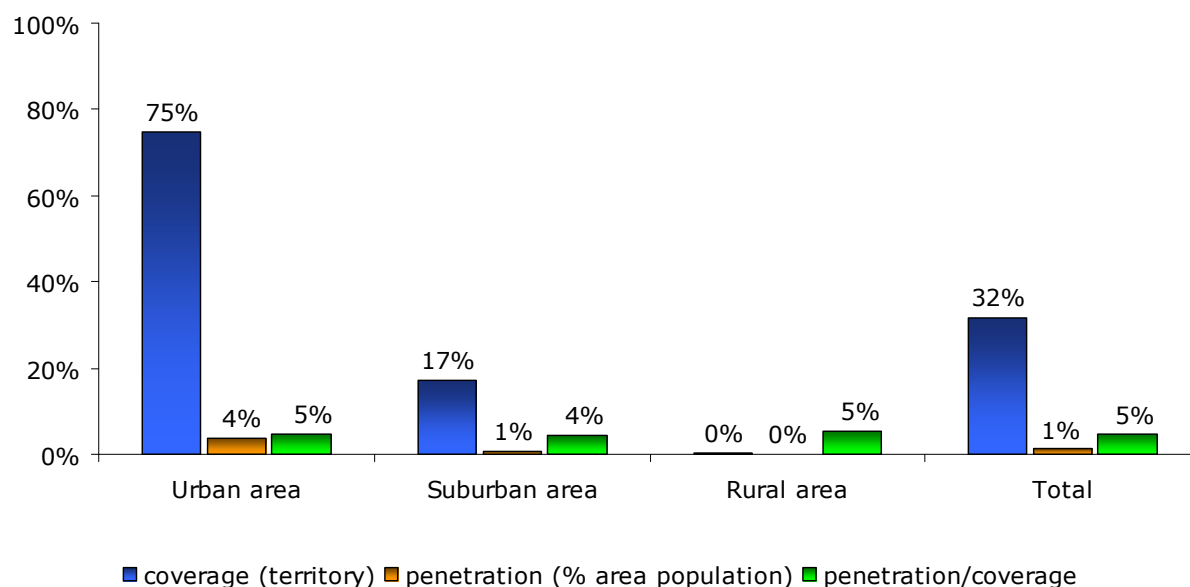
Cable modem was the first broadband access technology available in Slovakia; commercial services were introduced in 2003.

At the end of 2009, cable modem was available in 73 municipalities (including several municipalities within Bratislava-City and Kosice-City), accounting for 31.8% of total population (1.725 million inhabitants).

Number of cable modem connections by download rate

■ Less than 256 kbps   ■ From 256 kbps to 512 kbps ■ From 512 kbps to 1 Mbps
■ From 1 to 2 Mbps   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps
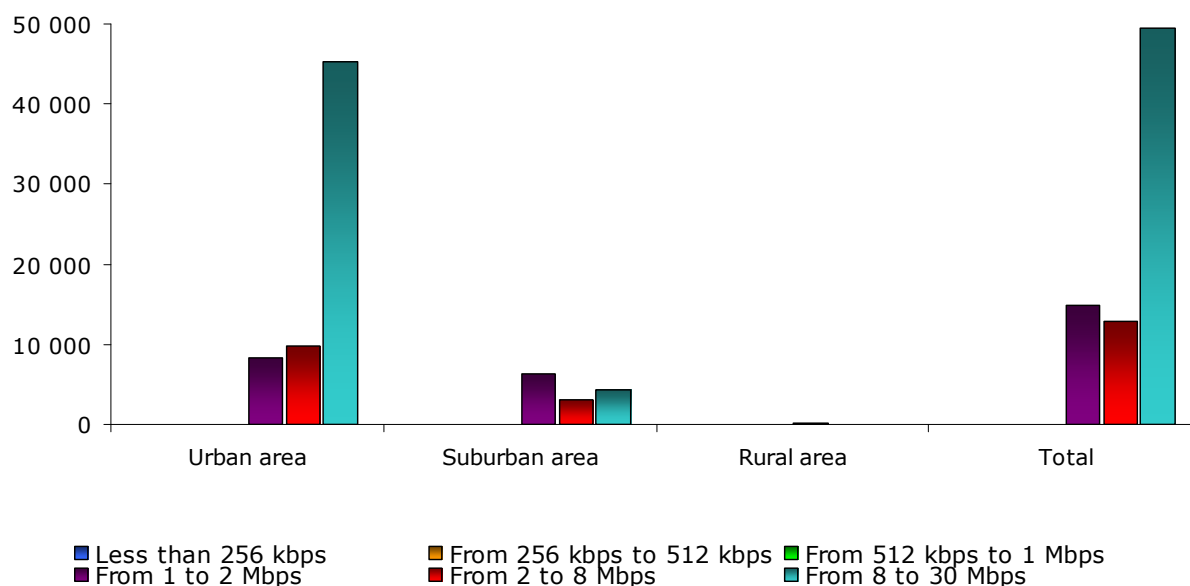
The number of cable modem connections reached 81,000 at the end of 2009 with UPC Broadband Slovakia serving 77% of them. Other main regional or local players are SATRO, Martico, Digi Slovakia and KROM–SAT. Also a few municipalities operate cable modem services.

Connection download speeds were mostly (61.1%) in the 8-30 Mbps range (512 kbps-1 Mbps upload).

4.25.5. FTTx coverage and take-up

Coverage and penetration

100%	

■ coverage   ■ penetration (% area population)   ■ penetration/coverage
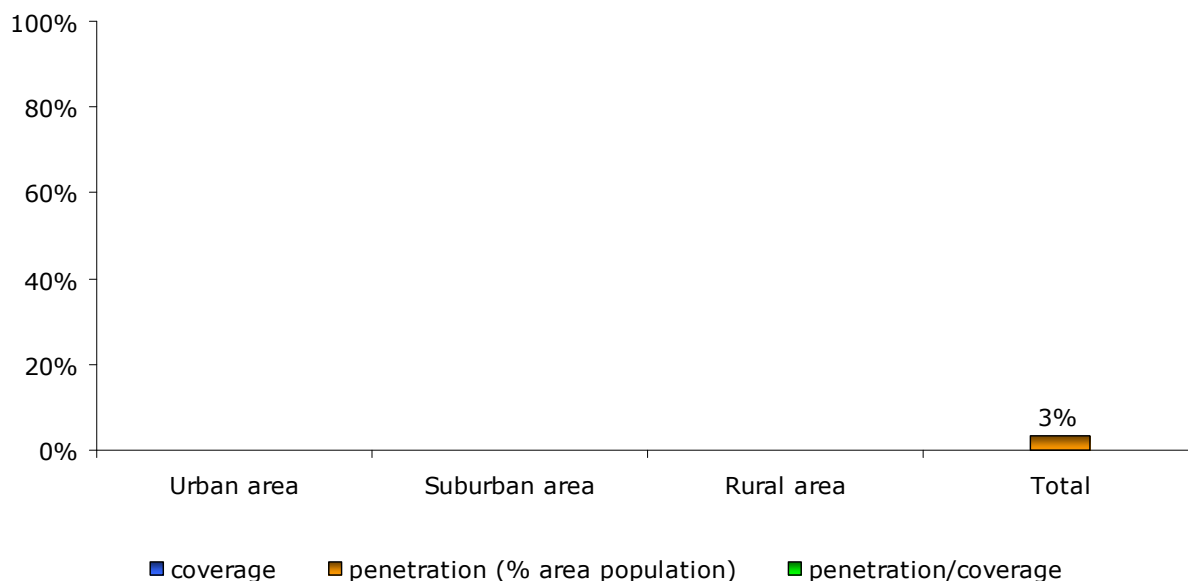
FTTx is the most dynamic segment within the fixed broadband market. During 2009, FTTx services were provided by several national and many local alternative operators in 91 towns or local municipalities within Bratislava-City and Kosice-City, mainly in urban areas.

At the end of 2009, there were 180,000 FTTx subscribers, a 50% growth over the year before.

Main FTTH operators at national level are Orange, SWAN, Slovanet and Slovak Telekom, at regional/local level Antik and GAYA.

FTTB services are provided by few national alternative operators/providers and one academic network operator (SANET). The main commercial FTTB providers are Energotel (only wholesale services), ZSR-Zeleznicne telekomunikacie (Railways Telecom operator), Orange, Slovanet, SWAN and Slovak Telekom at national level and mainly Antik at regional/local level. Commercial FTTB services are mainly available in urban and suburban areas (only in territories close to energy lines or railways in rural areas).

FTTx connections by download rate

FTTx services with download speeds over 30 Mbps (up to 120 Mbps) were available to approx. 25 % of population (1.37 million inhabitants). Speeds of FTTB services range from 10 Mbps to 1 Gbps.

4.25.6. Other broadband access technologies

PLC

Since 2006, only testing of powerline Internet access has been launched by few private companies in co-operation with electric distribution companies.

WLAN

First pilot projects based on WiFi standard (802.11b) were launched in Slovakia in 2003. In Slovakia it is possible to use the following wireless technologies: RLAN (2400 - 2483,5 MHz), HIPERLAN (5150 – 5350 MHz only indoor) and HIPERLAN (5470 – 5725 MHz outdoor). There is a general authorisation regime with registration obligation. At the end of 2009, 72 operators were registered.

The number of public WiFi hotspots rapidly grew from 2003 to 2009 to approx. 3,900 units at the end of 2009. Data for private wireless LAN based on WiFi standard are not available.

T-Mobile enables its own EDGE/UMTS/FLASH-OFDM customers to use also its WiFi hotspots without additional payments. Since 2007, several municipalities launched non-commercial public WiFi services free of charge – mainly in urban and suburban areas.

At the end of 2009, WLAN services were available in 2,012 municipalities covering 90.4% population. Six hundred public radio network operators were registered and the total number of WiFi customers reached 120,000.

WLL/WiMAX

The tender for 3.5 GHz FWA services was opened in August 2005 and four licences were granted. Three operators have started commercial services just before the end of 2005. All operators are using WiMAX technology. Since 2007, approx. 90 new FWBA permissions (10 GHz bandwidth) for several local/regional operators in 38 localities were granted by the national regulator (Telecommunication Office).

In December 2009, the total number of FWBA customers was approximately 34,000. FWBA services are available mainly in urban and suburban areas. The leading operator in 2009 was still WiMAX Telecom Slovakia.

WLL services are based on the 26 GHz frequency, also known as FWA. The tender for 26 GHz FWA services was opened in 2001 by the Telecommunication Office (national regulator). In July 2001 three licences were granted (the last one was withdrawn). There are two existing operators – GTS Nextra and SWAN.

The total number of WLL customers was circa 1,200. At the end of 2009, FWBA/WLL services were available in 913 municipalities.

Satellite

Two-way satellite Internet access is offered in Slovakia mainly by the Towercom, GiTy and Softel.

At end of December 2009, there were 205 satellite Internet subscribers. The main end-users are mountain hotels, betting shops, stone pits, gas stations, schools in rural areas and companies with foreign investors.

4.25.7. Mobile broadband coverage and take-up

Coverage by technology
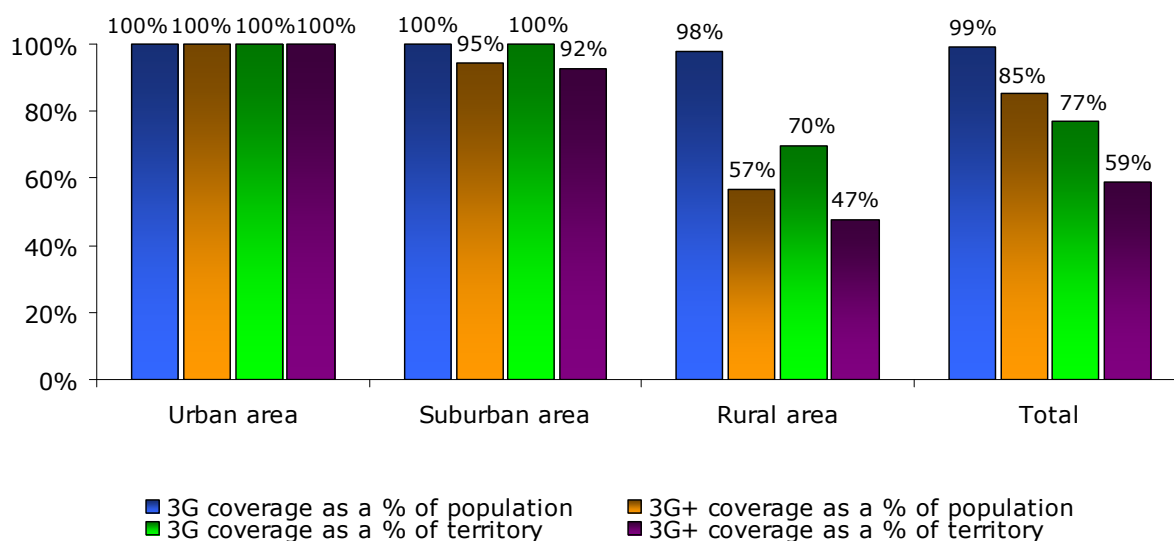
Commercial 3.5G/HSDPA services (Orange) with 3.6 Mbps download rate have been available in Slovakia since March 2006. The download rate has been upgraded to 7.2 Mbps since July 2008. In December 2009, 3G/HSDPA was covering 405 municipalities (nearly 68% of total population) while FLASH-OFDM was available in 1,606 municipalities (83% of total population). The combined population coverage for 3G+/FLASH-OFDM was 85% and 99% for 3G services. As for territory coverage, ratios were 59% for 3G+/FLASH-OFDM services and 77% for 3G services.

Penetration
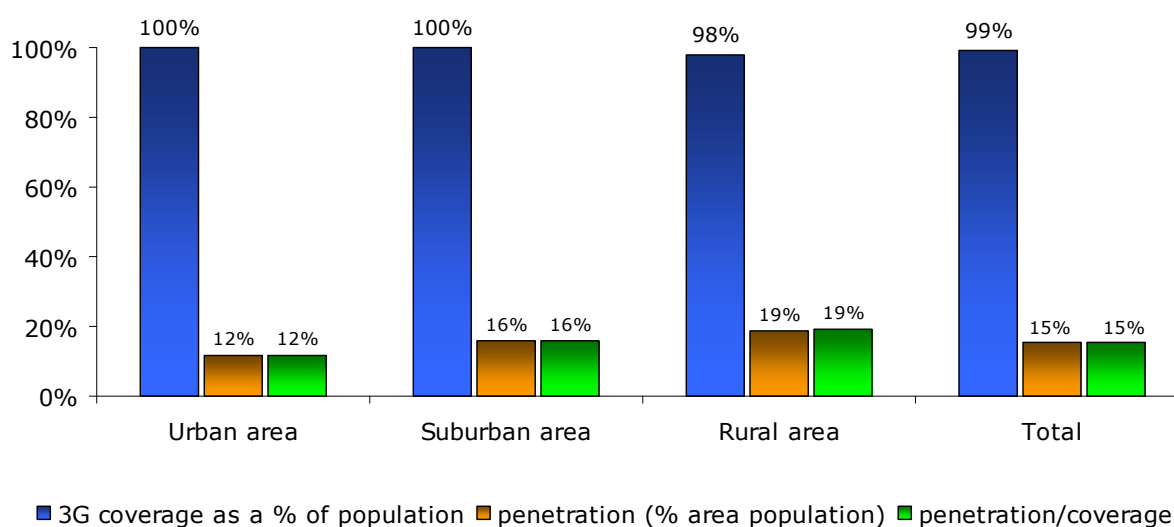
At the end of 2009, the total number of mobile internet users in Slovakia was 1.387 millions (one out of 4 mobile subscribers), of which 831,219 active 3G subscribers.

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4.26. Slovenia

4.26.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	463,090	801,102	782,784	2,046,976
Share of total population	22.6%	39.1%	38.2%	100.0%

4.26.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	55%	88%	92%	92%	92%
DSL subscribers	130,602	194,250	247,195	285,866	289,400
DSL penetration (% population)	6.5%	9.7%	12.2%	14.1%	14.1%
Cable modem coverage (% population)	-	-	51%	52%	54%
Cable modem subscribers	46,822	81,446	85,502	95,076	106,587
Cable modem penetration (% population)	2.3%	4.0%	4.2%	4.7%	5.2%
FTTx subscribers	1,188	2,876	10,022	44,564	68,442
PLC subscribers	0	0	0	0	0
WLL subscribers*	2,645	3,273	921	1,082	3,279
Satellite subscribers	15	0	7	7	16
Total	181,272	281,845	343,640	426,595	467,724
Total fixed broadband penetration (% population)	9.0%	14.0%	17.0%	21.0%	22.8%
Mobile broadband subscribers	25,670	100,291	261,765	446,863	577,392
Mobile broadband penetration (% population)	1.3%	5.0%	12.9%	22.0%	28.3%

* including 764 WiMAX subscribers in 2008 and 1;163 in 2009 (others are MMDS subscribers)

DSL remains the most popular fixed broadband access mode but the subscriber base remained flat in 2009. Its share of fixed connections dropped from 67% at the end of 2008 to 62% at the end of last year. In the meantime, the cable modem subscriber base increased by 12% to 106,600 and FTTx connections recorded a growth of more than 50%: one out of 7 fixed broadband subscribers was connected with FTTx at the end of 2009.

WLL and two way satellite remain marginal: since 2009 WiMAX access is no more commercially available in Slovenia.

The number of mobile broadband subscribers continued to grow steadily, now representing a significant share of mobile users: it is also 20% higher than the number of fixed broadband subscribers at the end of 2009.
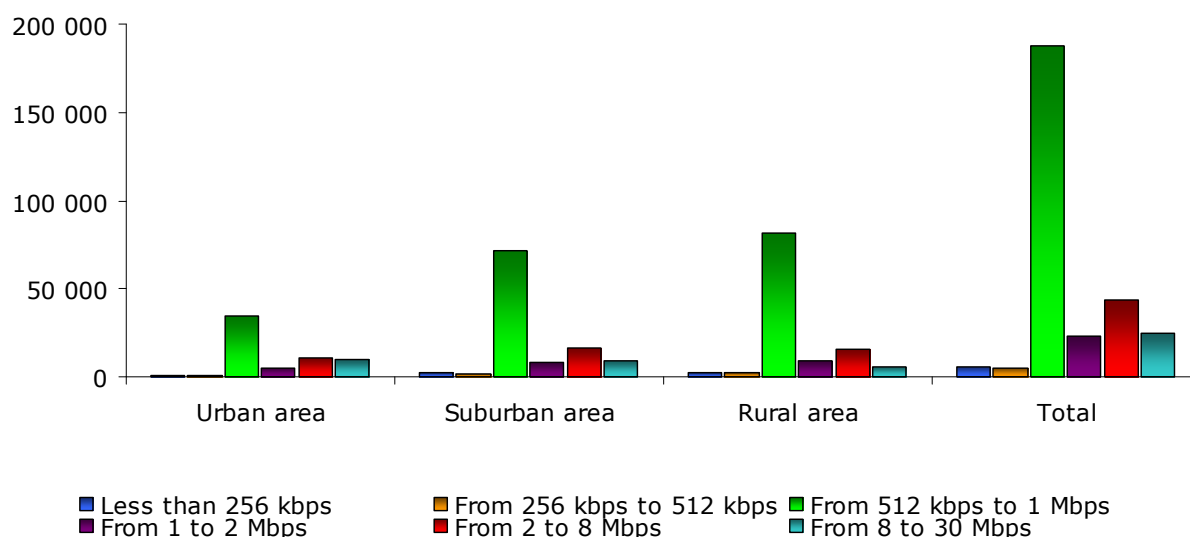
4.26.3. DSL coverage and take-up

Coverage and penetration

■ DSL coverage   ■ penetration (% area population)   ■ penetration/coverage
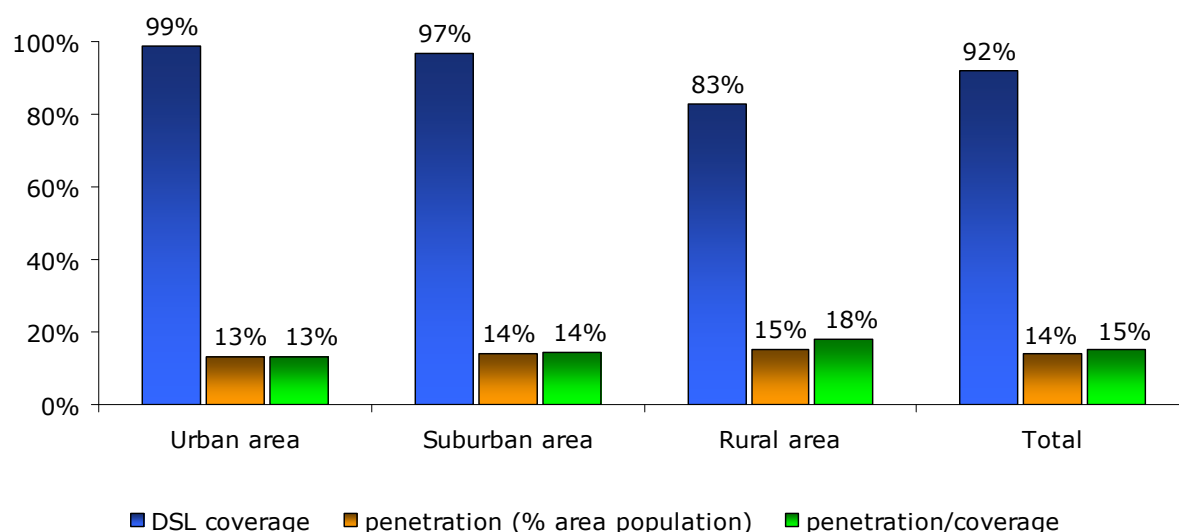
DSL coverage did not change in 2009 as the incumbent operator did not equip any new exchange. That can partly explain why take up did not increase. Another factor is of course competition from other access modes, in particular from FTTx and to some extent from mobile broadband access.

Number of DSL connections by download rate

■ Less than 256 kbps   ■ From 256 kbps to 512 kbps   ■ From 512 kbps to 1 Mbps
■ From 1 to 2 Mbps   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps

Connection speeds are low with most subscriptions (65%) offering download rates in the 512 kbps-1 Mbps range. A greater share of connections with higher speeds (over 8 Mbps notably) can be found in dense areas but it is nevertheless not well developed.
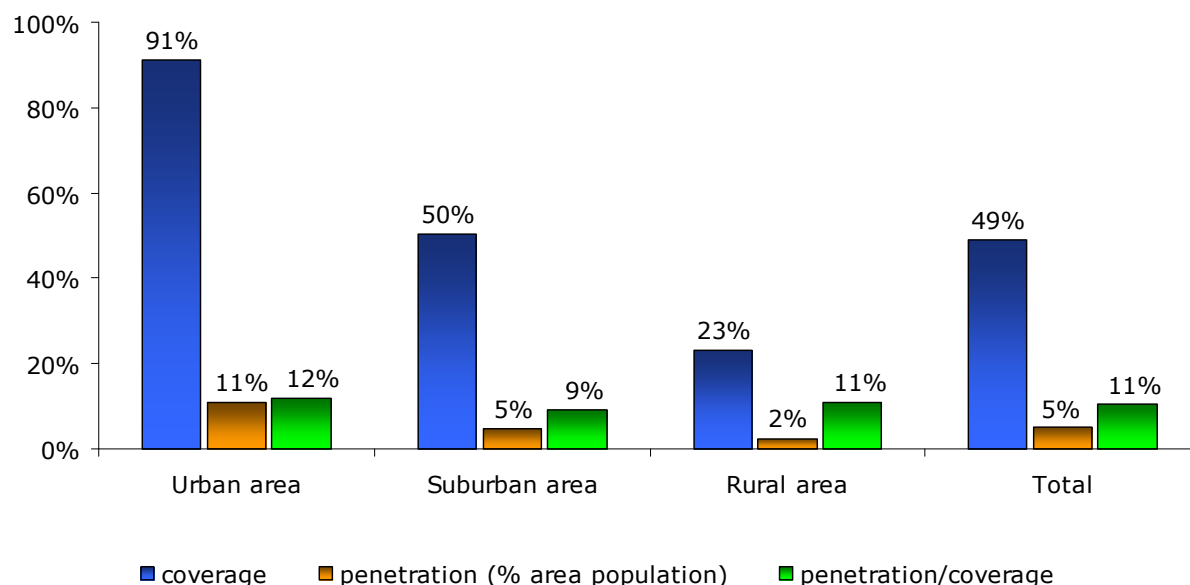
Percentage of DSL connections by type of provider
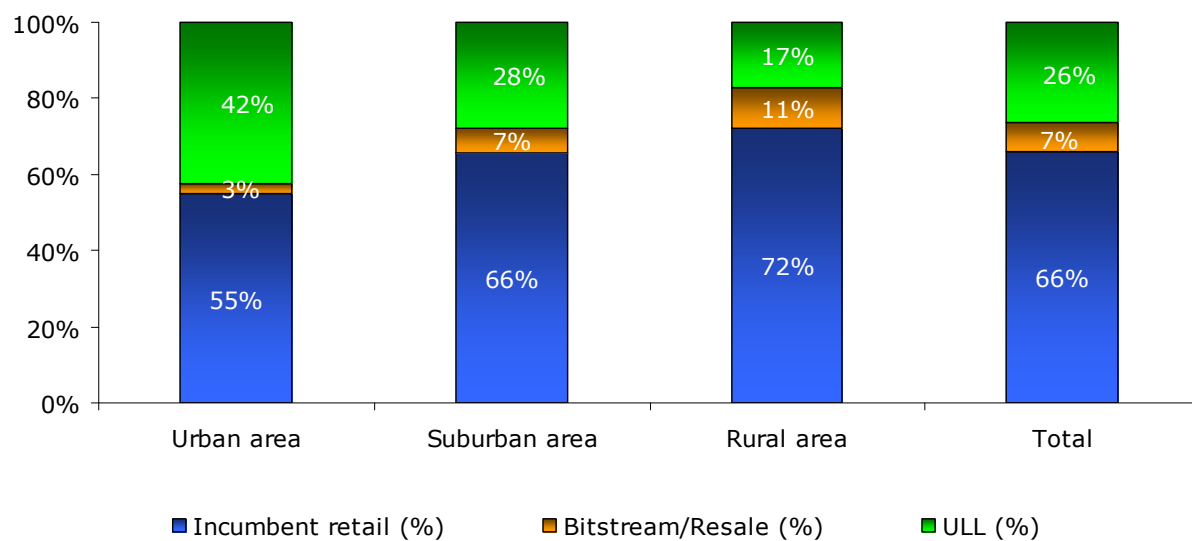
At national level the share of incumbent retail decreased from 67% to 66% in the period 2008 to 2009, while the share of bitstream/resale remained almost unchanged at 7%. The share of unbundled lines increased from 25% to 26%.
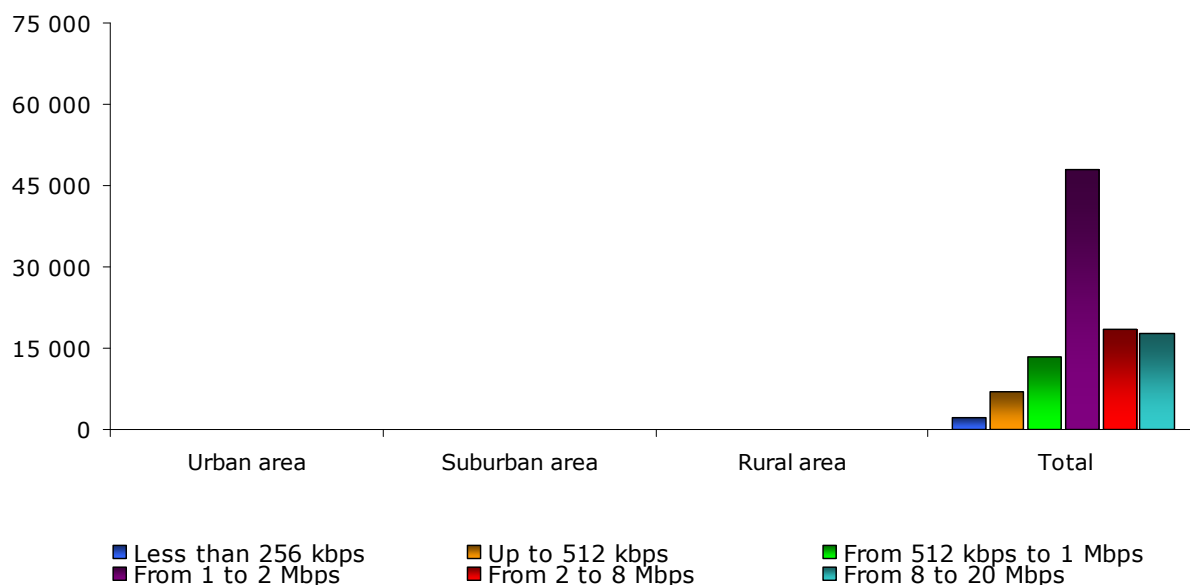
4.26.4. Cable modem coverage and take-up

Coverage and penetration

At the end of 2009 49% of the population at national level could be provided with cable modem access, while only 5% actually subscribed. Cable modem access could be provided to 91% of the urban population, 50% of suburban population and 23% of rural population.

Cable modem penetration was slightly up as the subscriber base increased by 11,511 (+12%) in 2009.

Number of cable modem connections by download rate

At the end of 2009 the majority of cable modem users at national level were subscribing to download speeds from 1 to 2 Mbps (45 %), followed by users subscribing to download speeds from 2 to 8 Mbps and 8 to 30 Mbps, with 17% for each speed range. Thirteen percent subscribed to speeds from 512 kbps to 1 Mbps while 7% did so to speed from 256 kbps to 512 kbps. Access lines with speeds below 256 kbps represent only 2%.

If compared with DSL download speeds (at the national level), the majority of cable modem subscribers enjoyed higher download speeds.

4.26.5. FTTx coverage and take-up

Coverage and penetration

■ coverage   ■ penetration (% area population)   ■ penetration/coverage
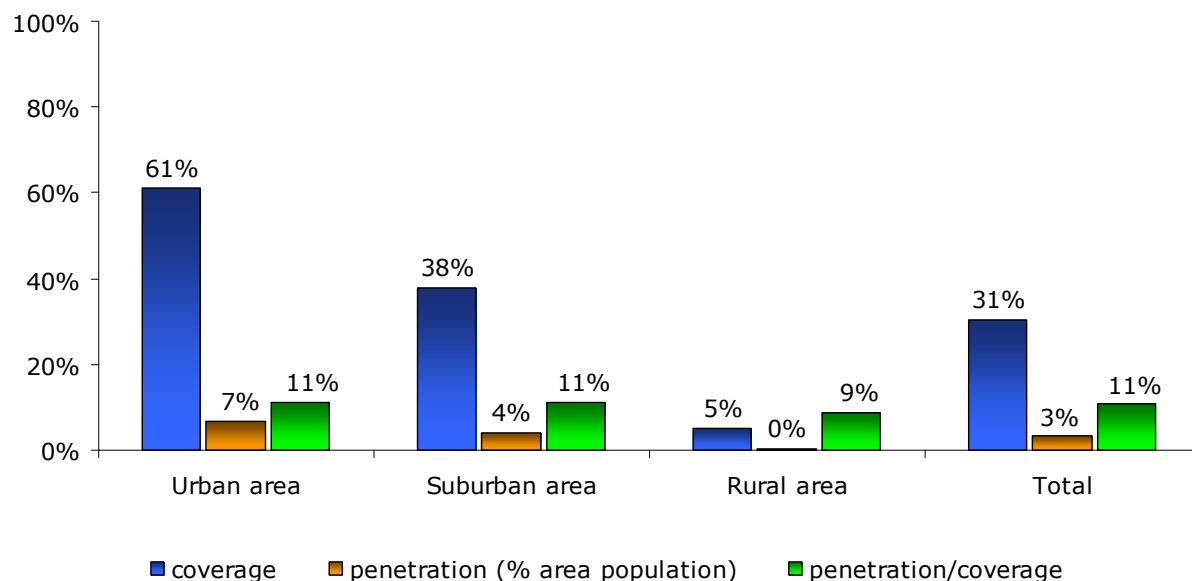
At national level 31% of the population could be provided with FTTH access. FTTH access can be provided to 61% of the urban population, 38% of suburban population and to only 5% of rural population. Fast expansion of FTTH networks in recent years has been happening predominantly in urban and suburban areas; there were almost no deployments in rural areas.

FTTx connections by download rate

■ Less than 2 Mbps   ■ From 2 Mbps to 8 Mbps
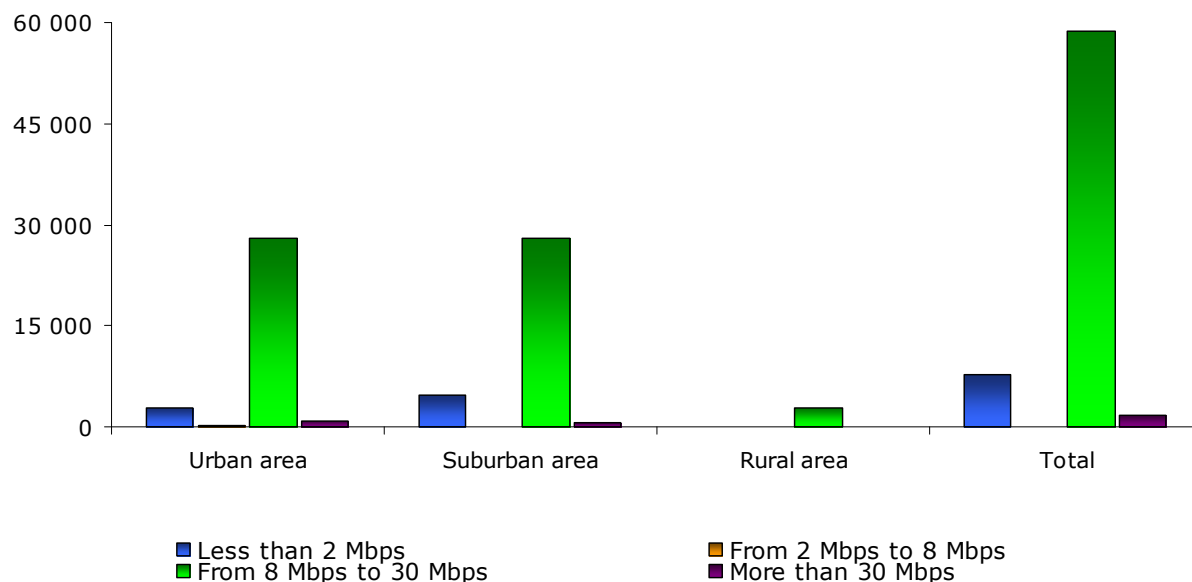■ From 8 Mbps to 30 Mbps   ■ More than 30 Mbps

At the end of 2009 the vast majority of FTTH users at the national level were subscribers to download speeds from 8 to 30 Mbps (86%), followed by those subscribing to download speeds lower than 2 Mbps (11%), download speeds greater than 30 Mbps (2.5%) and from 2 to 8 Mbps (1%).

As it can be seen, FTTH offers far greater download speed to potential users than DSL or cable modem, which also explains why the incumbent Telekom Slovenia has sped up its efforts to expand its own FTTH network, despite being in a monopoly situation in the area of DSL.

4.26.6. Other broadband access technologies

Wi-Fi

The number of Wi-Fi and MMDS subscribers at the end of 2009 was low. Wi-Fi and MMDS (Multichannel Multipoint Distribution Service) are often offered in rural areas, where there is a lack of any suitable alternatives.
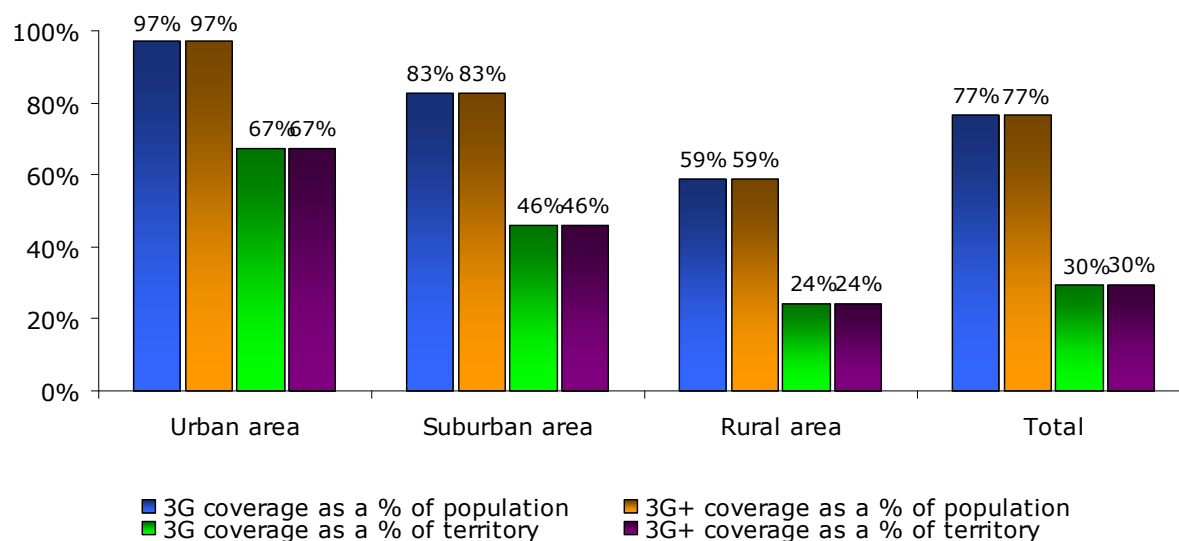
WLL/WiMAX

WiMAX is no longer commercially available in Slovenia.

Satellite

The number of satellite subscribers in Slovenia at the end of 2009 was very low. Most of them are located in remote rural areas. At the end 2009 three operators offered satellite access to Internet: Sensolink, ELSAT Radenci and Intersat. According to two operators contacted, the satellite coverage of Slovenia is very good – 100% of the entire country, since it is covered by many satellites. Consequently even if a signal from one satellite is blocked by a natural or man made obstacle (a mountain or a building), a signal from another satellite can be found. What hampers the broader deployment of satellite access, are high costs of hardware (a satellite antenna can cost up to 400€) and high monthly fees.

4.26.7. Mobile broadband coverage and take-up

Coverage by technology

- 3G coverage as a % of population
- 3G+ coverage as a % of population
- 3G coverage as a % of territory
- 3G+ coverage as a % of territory

At the end of 2009, 3G/3G+ coverage gained 4 percentage points compared to the year before to 77% of the population.

Penetration

- 3G coverage as a % of population
- penetration (% area population)
- penetration/coverage
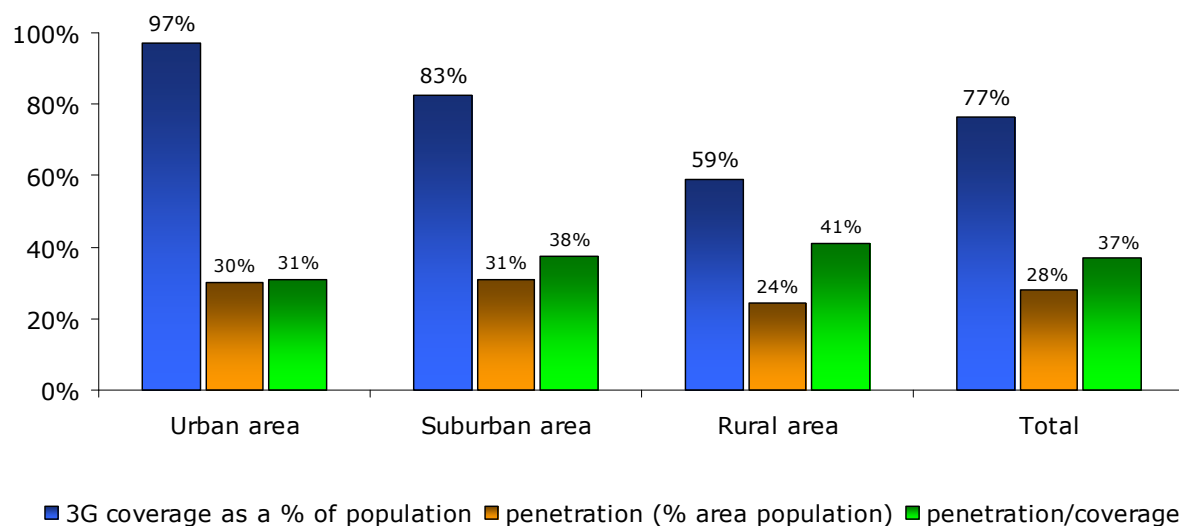
Penetration/coverage is higher in suburban and rural areas which can be seen as a compensation for less deployed fixed broadband access networks in these areas.

4.27. Spain

4.27.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	26,416,296	10,982,981	9,346,530	46,745,807
Share of total population	56.5%	23.5%	20.0%	100.0%

4.27.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% of population)	89%	90%	91%	93%	93%
DSL subscribers	3,876,360	5,243,094	6,393,952	7,208,603	7,747,809
DSL penetration (% of population)	9.0%	12.0%	14.1%	15.6%	16.6%
Cable modem coverage (% population)	42%	48%	51%	53%	55%
Cable modem subscribers	1,176,064	1,417,340	1,633,489	1,839,446	1,939,099
Cable modem penetration (% population)	2.7%	3.2%	3.6%	4.0%	4.1%
FTTx subscribers	1,700	1,700	1,800	2,793	18,669
PLC subscribers	3,650	2,780	2,200	1,887	1,739
WLL/WiMAX subscribers	12,500	30,000	36,600	80,878	59,935
Satellite subscribers	4,450	7,000	9,500	2,144	5,000
Total	5,074,724	6,701,914	8,077,541	9,135,751	9,772,251
Total fixed broadband penetration (% population)	11.8%	15.3%	17.9%	19.5%	20.9%
Mobile broadband subscribers				1,124,633	1,960,706
Mobile broadband penetration (% population)				2.4%	4.2%

The total number of broadband lines continued to increase in 2009 but far slower than in previous years: with a bit more than 635,000 new subscribers, the annual growth of the fixed broadband subscriber base was only 7% (compared to +13% in 2008 and +21% in 2007). The maturity of the market and the economic downturn emerge as the possible causes of this limited growth. Aggressive pricing campaigns made by the operators have not reached their objectives to attract new customers.

The most significant increase came from mobile broadband subscribers with a 74.3% growth as a result of aggressive marketing campaigns from all operators.
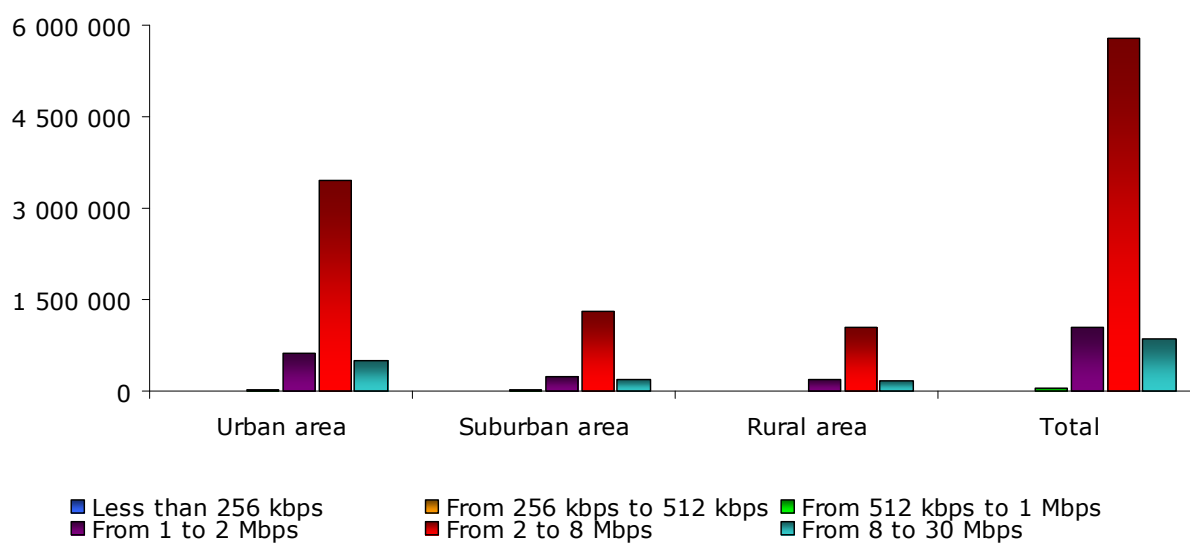
4.27.3. DSL coverage and take-up
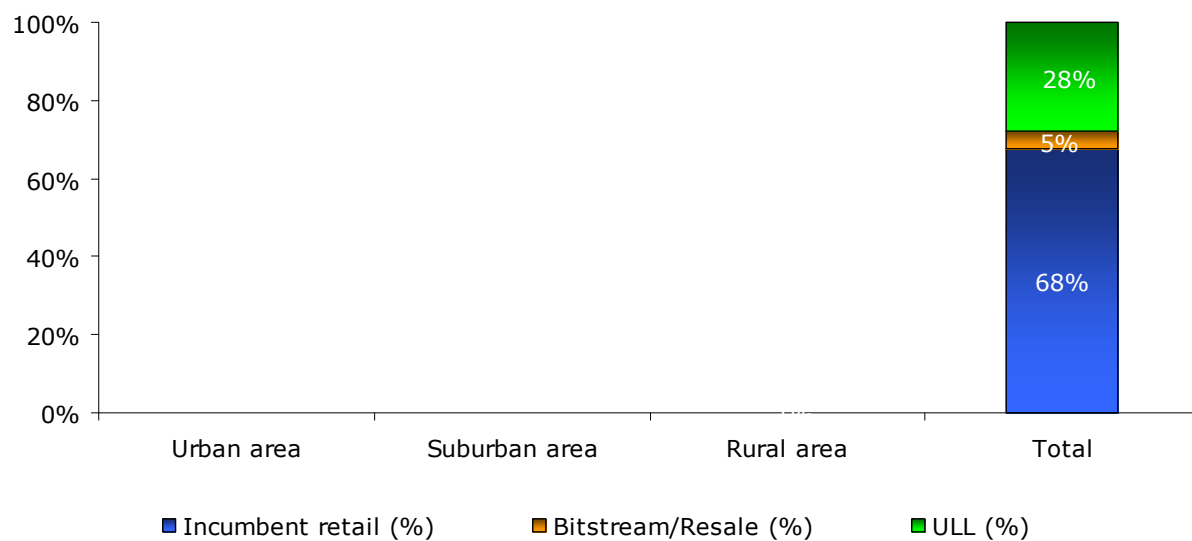
Coverage and penetration
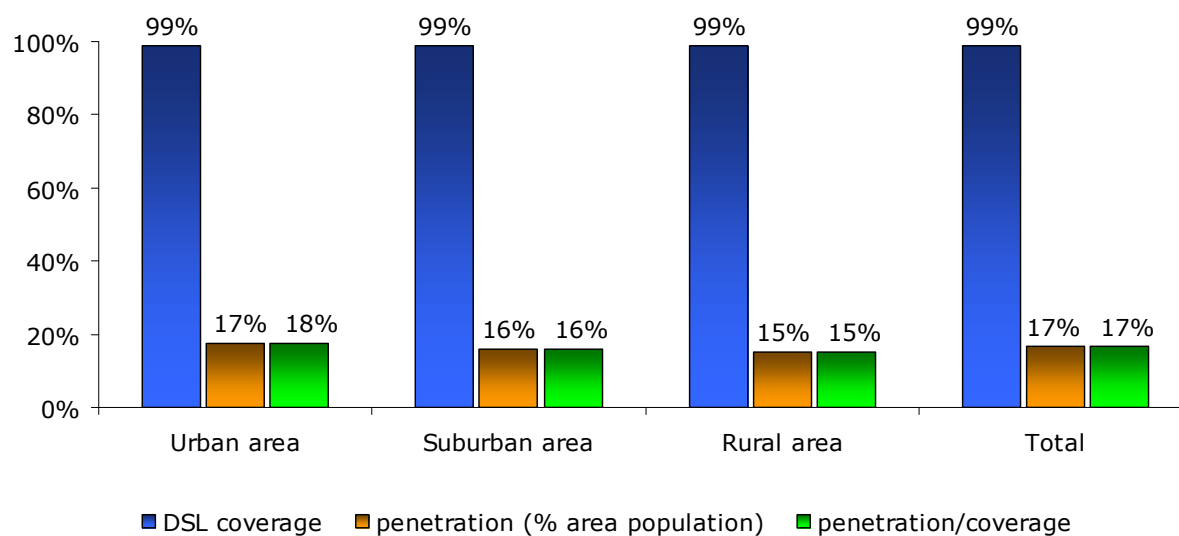
Thanks to the public plan to make broadband available to all Spanish people, including in remote areas, DSL coverage now reaches 99% and penetration increased in all areas.

Number of DSL connections by download rate

The most popular connections are in the "2 to 8 Mbps" range (75%).

Percentage of DSL connections by type of provider

The retail market share of incumbent operator, Telefónica de España, decreased in 2009, from 71% at the beginning of the year to 68% at the end. Connections through bitstream and resale offers also declined while unbundling made strong strides in the market, with its share up from 16% to 28% over the year 2009.

4.27.4. Cable modem coverage and take-up

Coverage and penetration
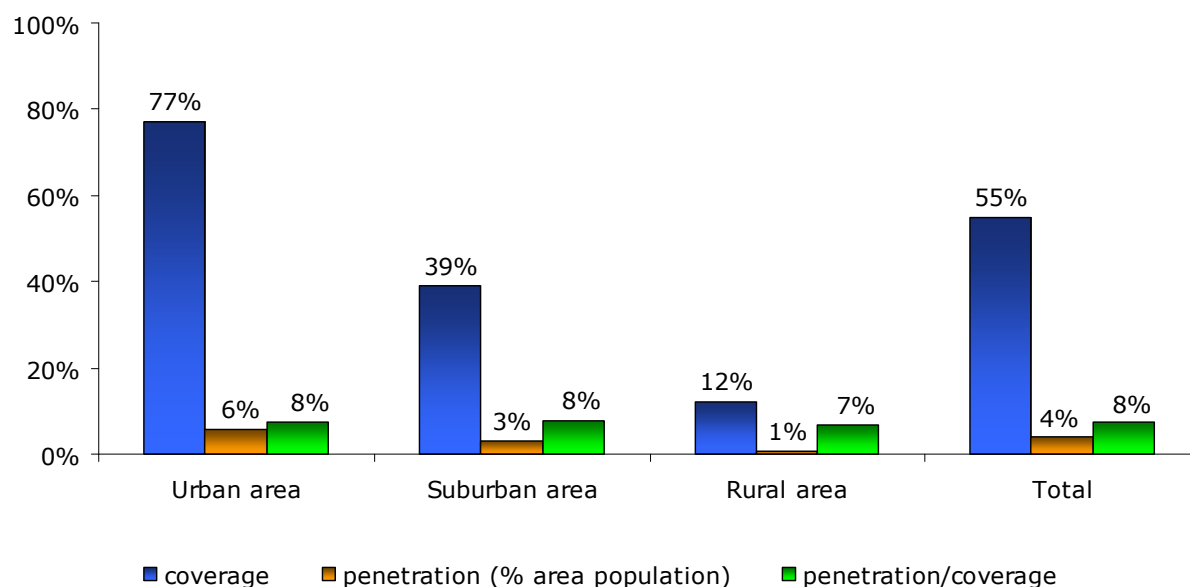
The cable subscriber base was up 5.4% in 2009, partly thanks to expanded coverage in urban and in suburban areas. ONO is the leader in the market with a 70.3% market share, with the balance being in the hands of minor regional operators.

Number of cable modem connections by download rate
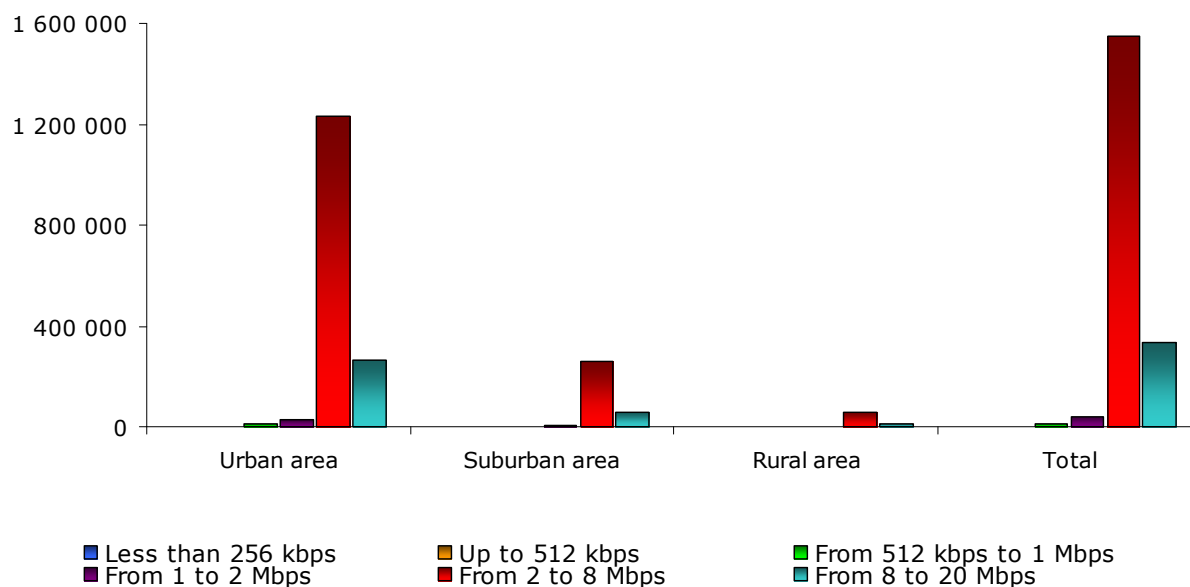
The most popular download speeds regarding cable modem offers are in the 2 to 8 Mbps range; subscribers in this class account for 80% of total cable modem connections.

4.27.5. FTTx coverage and take-up

Coverage and penetration
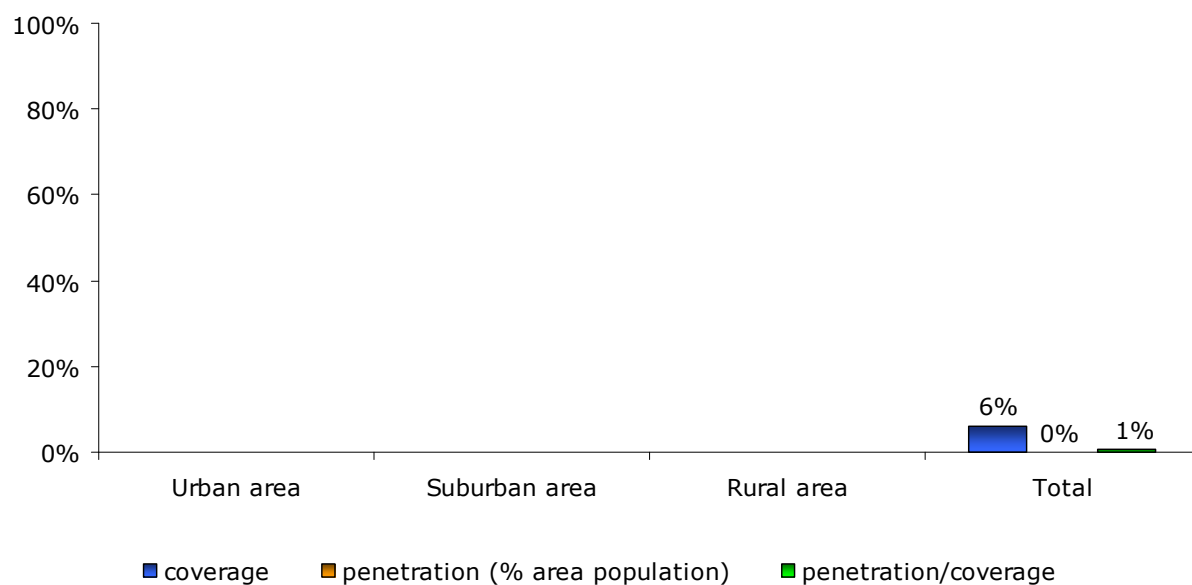
The number of FTTx connections increased in 2009 (18,669 customers at the end of the year) mainly thanks to the growing number of offers. The market is driven by business customers rather than by residential users.

FTTx connections by download rate

Two types of offering are currently marketed, FTTH and DOCSIS3.0.

4.27.6. Other broadband access technologies

Wi-Fi/WLL/WiMAX

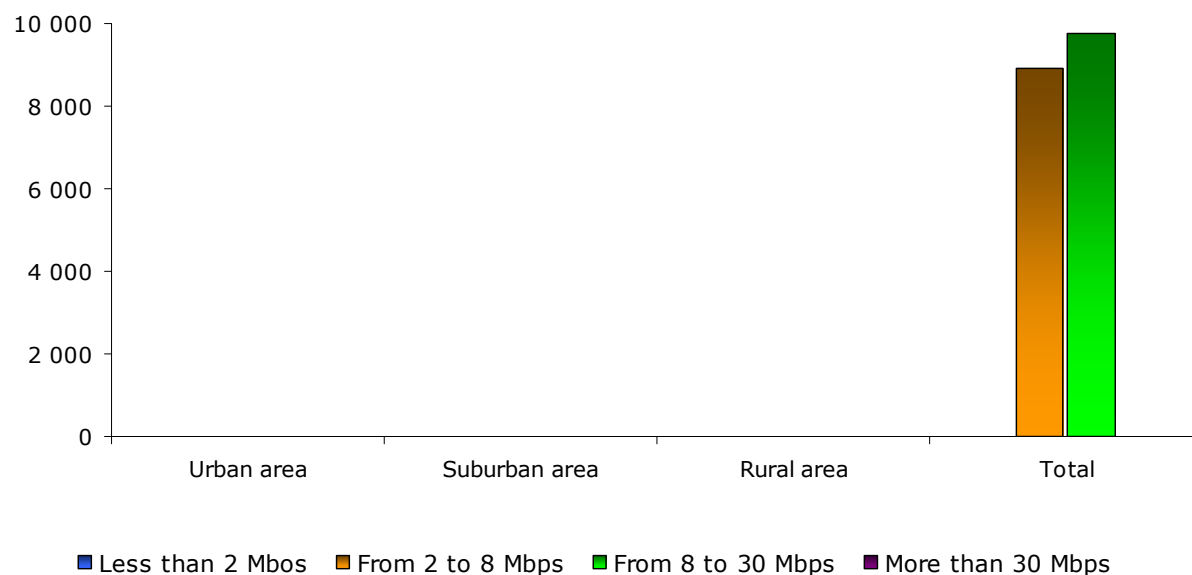The expansion of WiMAX and of all other wireless broadband technologies was closely bound up with the implementation of the Ministry of Industry's PEBA Plan (programme to promote bandwidth increase in rural areas or those hard to reach with other network technologies). However, availability is quite limited and figures show a 26% decline of the subscriber base in 2009.

Satellite

The two-way satellite market is no more active in Spain, with only a small number of "residual" subscribers.

4.27.7. Mobile broadband coverage and take-up

Coverage by technology
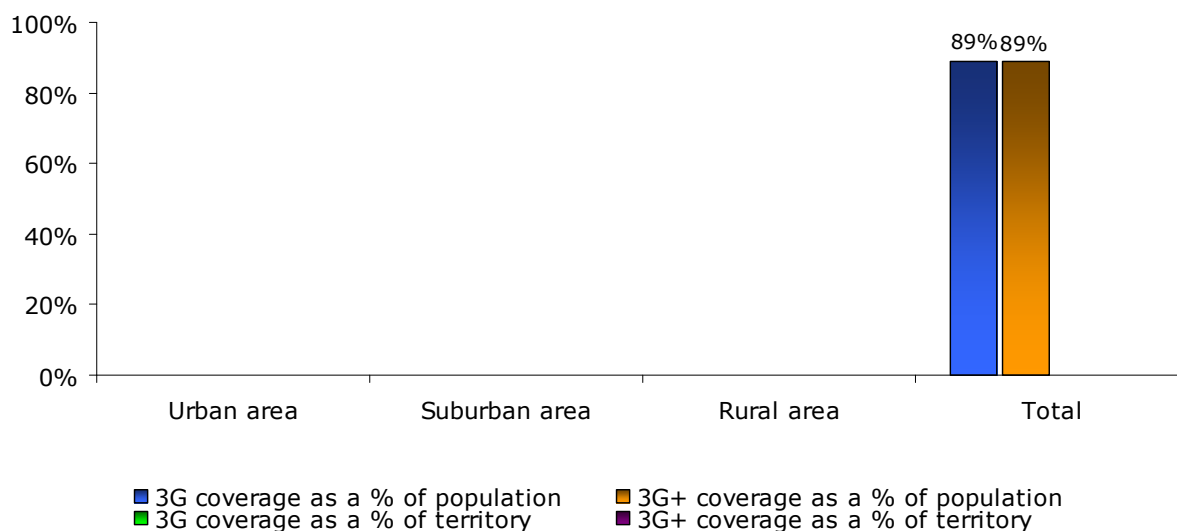
3G/3G+ coverage reached 89% at the end of 2009 up from 80-81% the year before.

Penetration

Sales of datacards (including modems and USB keys) increased dramatically (+74.3% in 2009), in particular with the development of dedicated mobile data plans

4.28. Sweden

4.28.1. Population

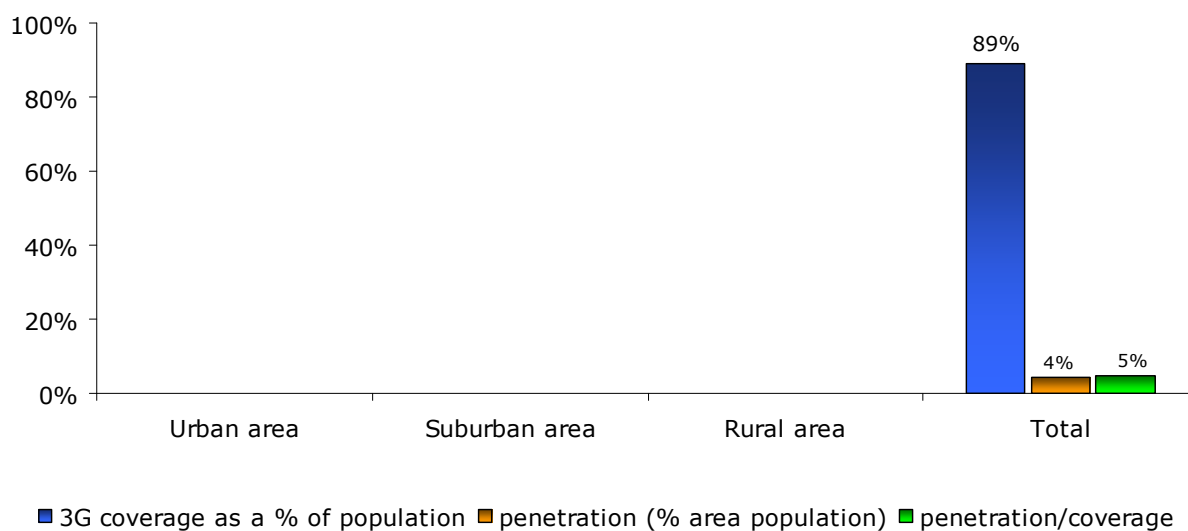|	Urban area	Suburban area	Rural area	National
Inhabitants	4,210,740	3,988,401	1,141,541	9,340,682
Share of total population	45.1%	42.7%	12.2%	100.0%

4.28.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	93%	95%	98%	98%	98%
DSL subscribers	1,207,146	1,531,277	1,764,000	1,769,000	1,708,000
DSL penetration (% population)	13.2%	16.8%	19.2%	19.1%	18.3%
Cable modem coverage (% population)	36%	37%	37%	37%	38%
Cable modem subscribers	354,699	454,291	550,000	563,000	577,000
Cable modem penetration (% population)	3.9%	5.0%	6.0%	6.1%	6.2%
FTTx subscribers	289,199	356,558	400,000	590,000	621,000
PLC subscribers	100	0	0	0	0
WLL subscribers	3,400	6,578	6,578	-	3,000
Satellite subscribers	1,039	704	704	2,200	100
Total	1,855,583	2,349,408	2,721,282	2,924,200	2,909,100
Total fixed broadband penetration (% population)	20.4%	25.8%	29.6%	31.6%	31.1%
Mobile broadband subscribers					5,888,179
Mobile broadband penetration (% population)					63.0%

Sweden's fixed broadband penetration rate marginally decreased from 2008 to 2009, from 31.6% to 31.1%.

Both cable modem and FTTx experienced growth, although not as much as in recent years. Cable was last year eclipsed by FTTH as the second most popular broadband technology. This trend was confirmed in 2009, when cable only grew by half as much as FTTH did.

But even though both cable modem and FTTH experienced growth, it was not enough to compensate for the decline in DSL subscriptions. DSL continues to be the dominant technology for fixed broadband, with 40% more subscriptions than cable modem and FTTx combined, but the number of subscriptions decreased by 3.4% in 2009, resulting in a net decline in the number of fixed broadband subscribers for the first time since the start of this survey.

However, this decline was more than offset by the increase in the number of mobile broadband subscriptions, which rose by 25%. Whereas there were two DSL subscriptions for every dedicated mobile subscription (datacards, keys/dongles) at the end of 2008, the ratio was three for two at the end of 2009.

With high speed mobile broadband being available at competitive prices in large parts of the country, a number of subscribers obviously prefer the flexibility and mobility of mobile broadband over the higher possible download speeds of DSL.

PLC, WLL and satellite do not play any significant role in the Swedish market.

4.28.3. DSL coverage and take-up

Coverage and penetration
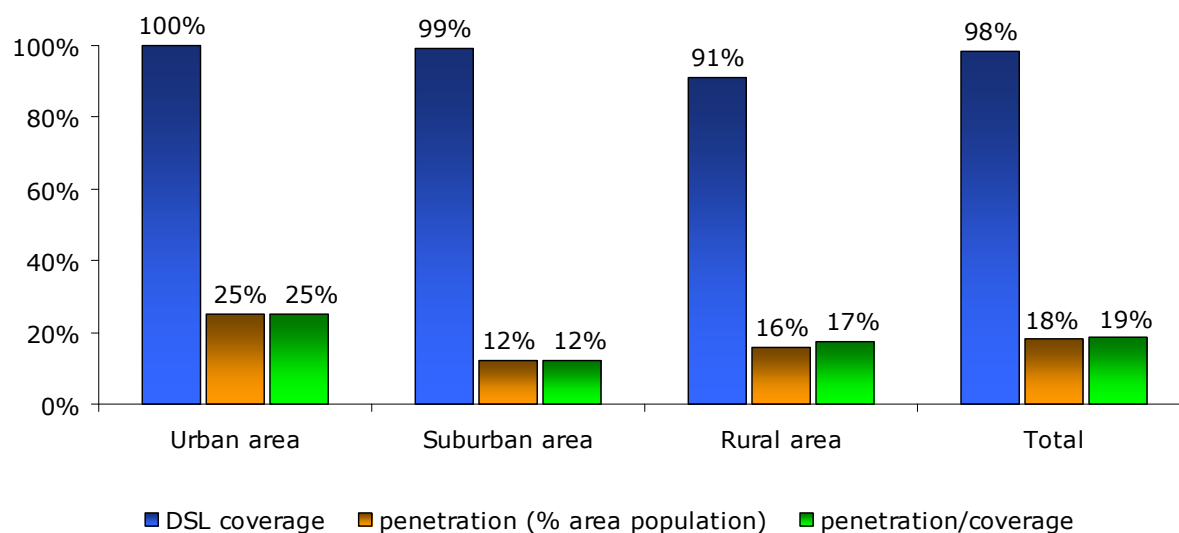
DSL continues to lead the way in Sweden's broadband market, in terms of both coverage (98%) and penetration (18%). Although the technology is in slight decline, with a 3.4% drop in the number of subscribers in 2009, nearly 60% of all fixed broadband subscriptions are DSL.

Number of DSL connections by download rate
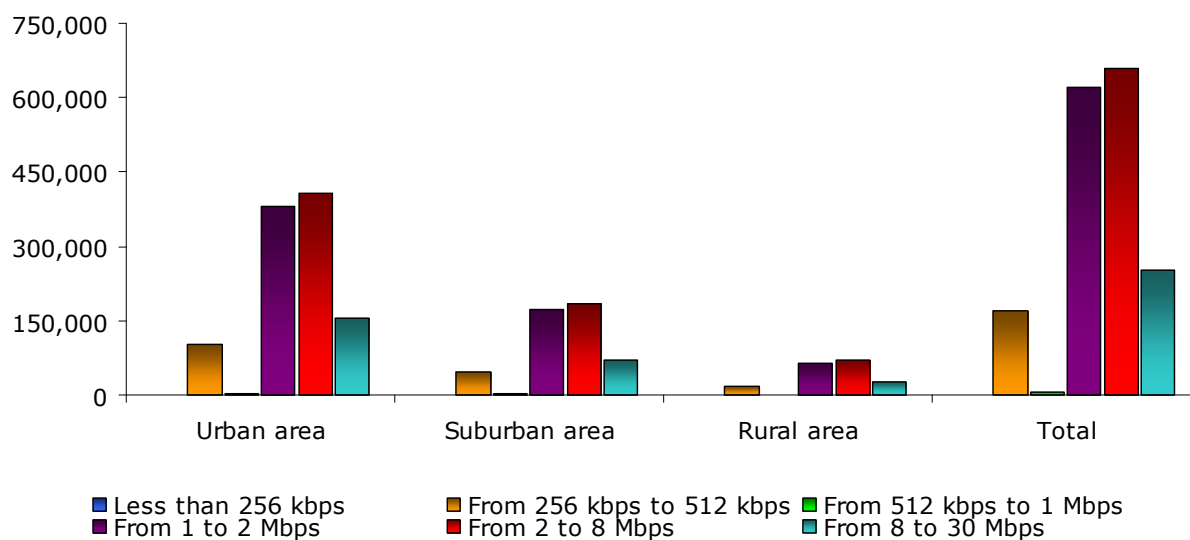
Speeds below 1 Mbps are becoming increasingly uncommon, down from 18.2% at the end of 2008 to 10.3% at the end of 2009. The number of subscriptions in the high end of the scale (> 8 Mbps) is relatively constant. Around three quarters of all subscriptions are in the 1-8 Mbps range.

Percentage of DSL connections by type of provider
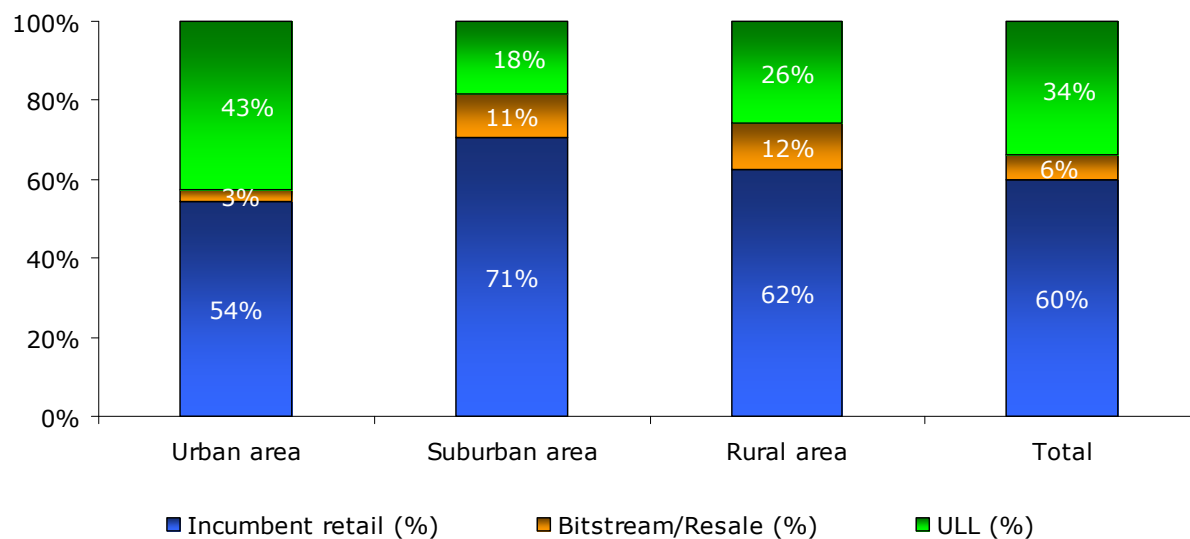
Local loop unbundling has traditionally been used to provide competitive DSL services. At the national level, ULL's market share grew from 30.5% in 2005 to 34.5% in 2007, where it remained through 2008. At the end of 2009, its relative share has gone down slightly to 34.0%.
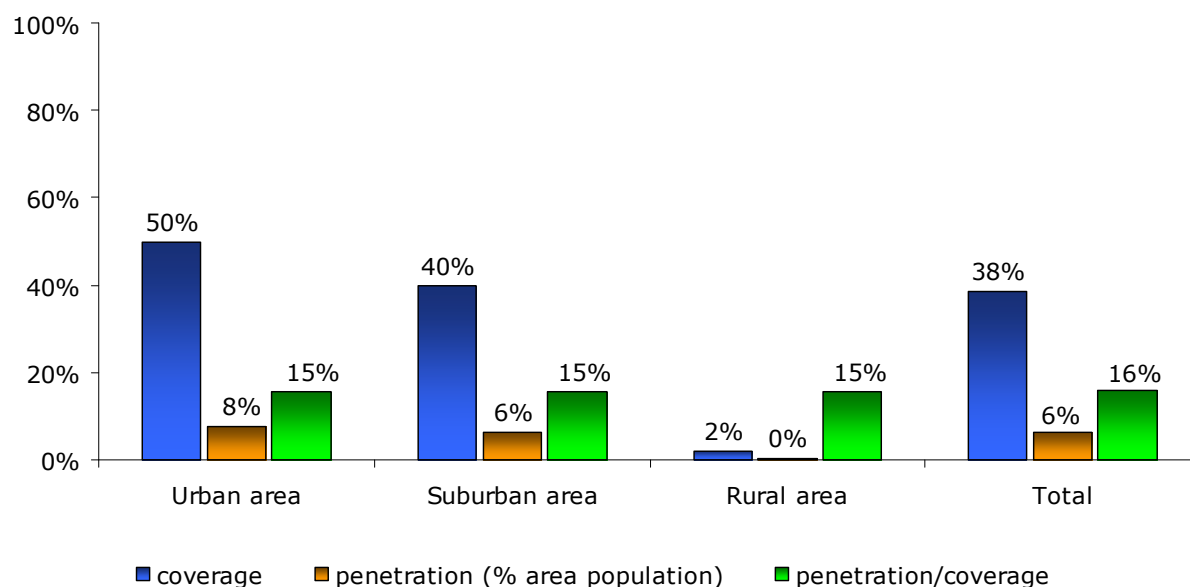
The incumbent's share continues to grow, from 57.3% in 2007 to 59% in 2008 and to 59.8% in 2009.

4.28.4. Cable modem coverage and take-up

Coverage and penetration

Cable operators were comparatively late in upgrading their infrastructure for broadband Internet. In a new comprehensive study released in February 2009, the Swedish regulator revised its previous estimates for cable coverage to 37% (down from 48% in 2007). An even more comprehensive update, released in early 2010, puts the figure at 38.4%

Cable remains a predominantly urban phenomenon, with only two out of 290 municipalities offering cable to more than 80% of its population. More than half of all municipalities have no cable whatsoever.

Number of cable modem connections by download rate
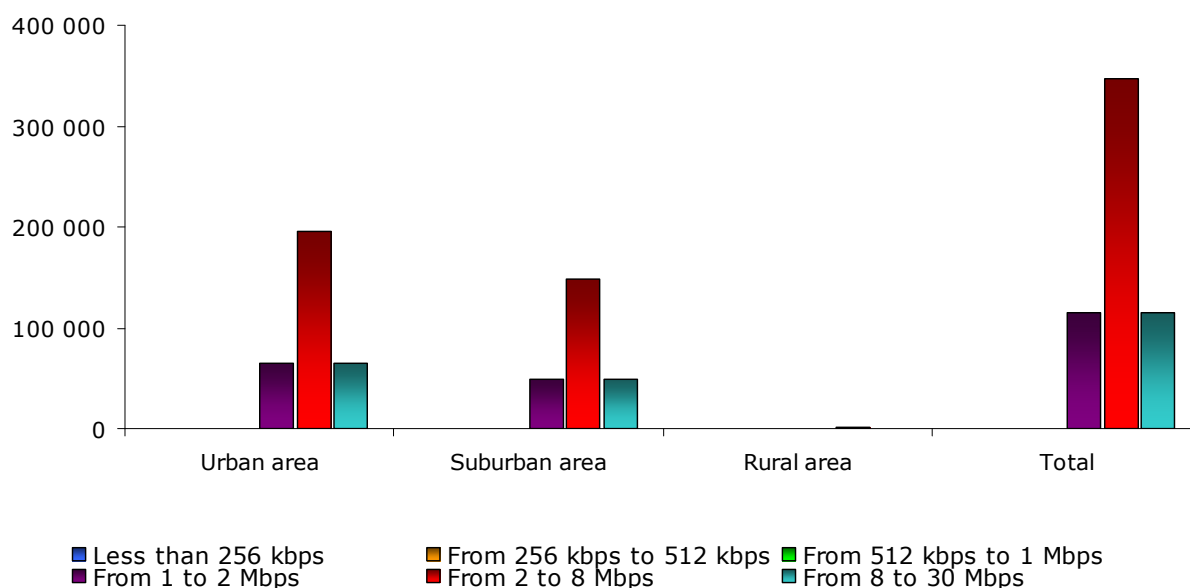
Cable speeds tend to be slightly higher than DSL speeds, with about 60% between 2 and 8 Mbps. 20% are estimated to lie below 2 Mbps and 20% above 8 Mbps.

4.28.5. FTTx coverage and take-up

Coverage and penetration

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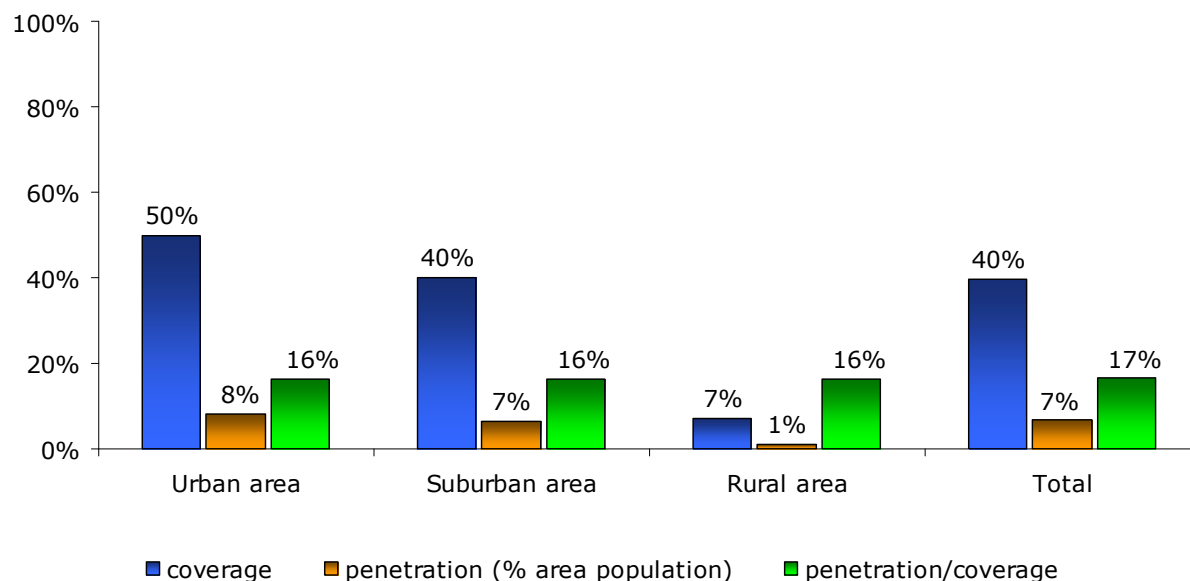
Broadband Internet access via fibre offers download rates of well over 2 Mbps, and Bredbandsbolaget is continuously upgrading existing customers to 100 Mbps.

According to a comprehensive coverage report released by the regulator in early 2010, FTTH has now eclipsed cable not only in the number of subscriptions, but also in coverage.

In 2009 FTTH continued to be the fixed broadband technology with the highest growth, although its relative growth is lower than in 2008.

FTTx connections by download rate

Information on actual uptake is not available through the regulator.

4.28.6. Other broadband access technologies

Wi-Fi

There are no official statistics on the number of hotspots.

WLL/WiMAX

It does not play a significant role in the Swedish market.

Satellite

It does not play a significant role in the Swedish market.

4.28.7. Mobile broadband coverage and take-up

Coverage by technology

3G coverage as a % of population
3G coverage as a % of territory
3G+ coverage as a % of population
3G+ coverage as a % of territory
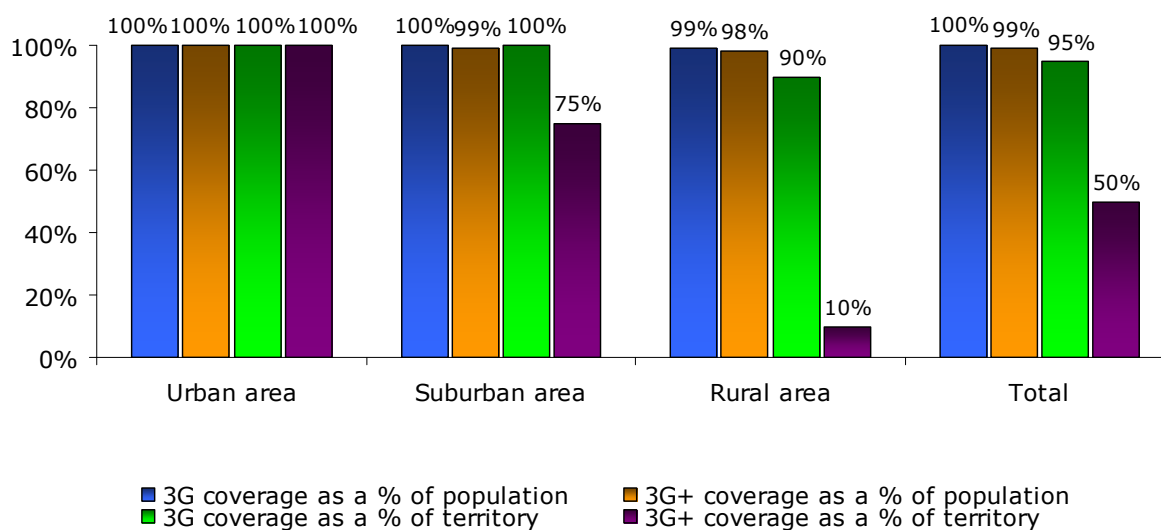
At the end of 2009, virtually the entire population was covered by 3G technology.

Penetration

3G coverage as a % of population   penetration (% area population)   penetration/coverage
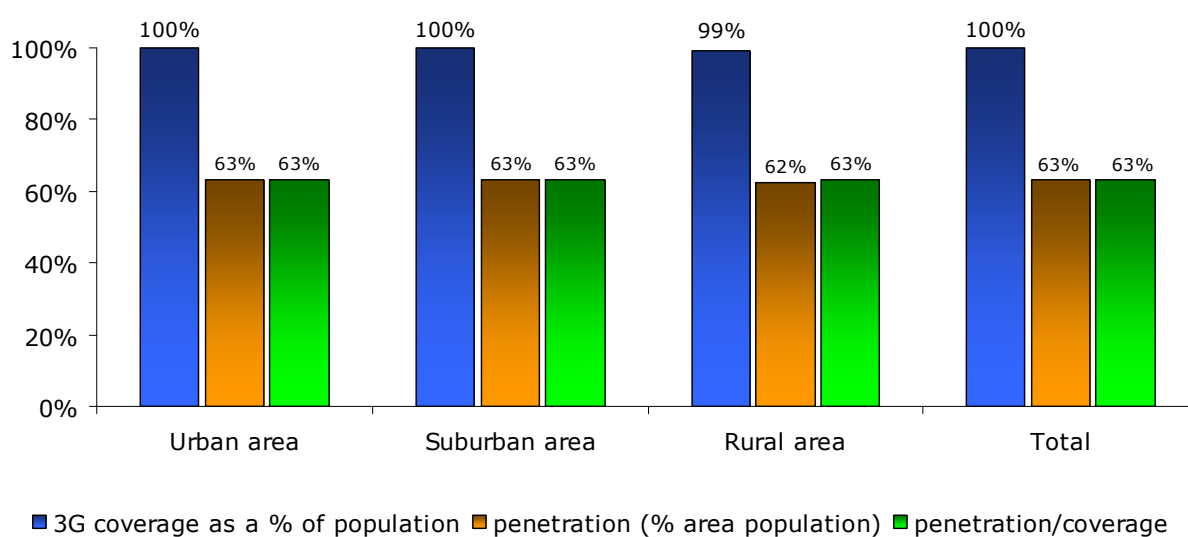
The high coverage of high speed mobile broadband is reflected in the penetration. In 2009, Sweden actually experienced what appears to be a substitution effect, where mobile broadband grew at the expense of fixed broadband technologies like DSL.

4.29. The United Kingdom

4.29.1. Population

	Urban area	Suburban area	Rural area	National
Inhabitants	37,641,277	17,408,734	6,332,989	61,383,000
Share of total population	61.3%	28.4%	10.3%	100.0%

4.29.2. General broadband data

	12/05	12/06	12/07	12/08	12/09
DSL coverage (% population)	99%	99%	100%	100%	100%
DSL subscribers	7,194,913	9,974,000	12,186,000	13,593,000	14,389,000
DSL penetration (% population)	12.1%	16.6%	20.1%	22.3%	23.4%
Cable modem coverage (% population)	48%	48%	48%	48%	48%
Cable modem subscribers	2,663,388	3,058,500	3,413,400	3,683,000	3,796,400
Cable modem penetration (% population)	4.5%	5.1%	5.6%	6.0%	6.2%
FTTx subscribers	0	0	1,500	3,150	45,050
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	9,866,801	13,041,000	15,609,400	17,287,650	18,238,950
Total fixed broadband penetration (% population)	16.7%	21.7%	25.8%	28.4%	29.7%
Mobile broadband subscribers				8,100,000	15,300,000
Mobile broadband penetration (% population)				13.3%	24.9%

The year 2009 has been characterised by a slowdown in the broadband penetration, +5% compared to +11% the previous year. Two factors could have impacted on this trend, the economic slowdown and to a lesser extent a penetration which growth will naturally slow down as it reaches maturity. DSL connections still represent 79% of the fixed broadband connections
Mobile broadband is finding its market, and represents a new pocket of growth. It represents the first online connection for some households.
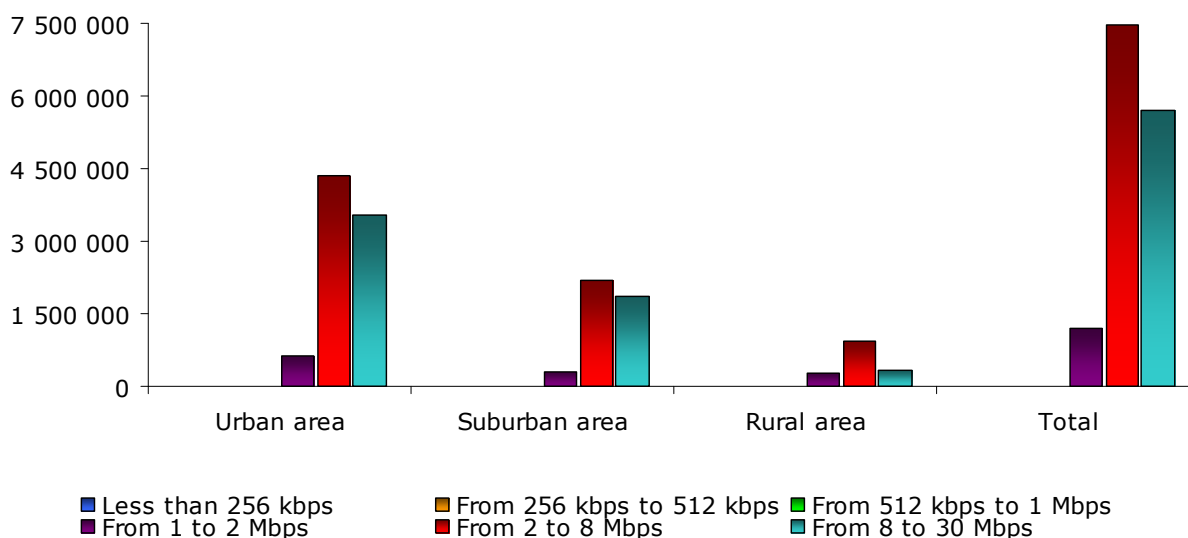
4.29.3. DSL coverage and take-up

Coverage and penetration

■ DSL coverage   ■ penetration (% area population)   ■ penetration/coverage
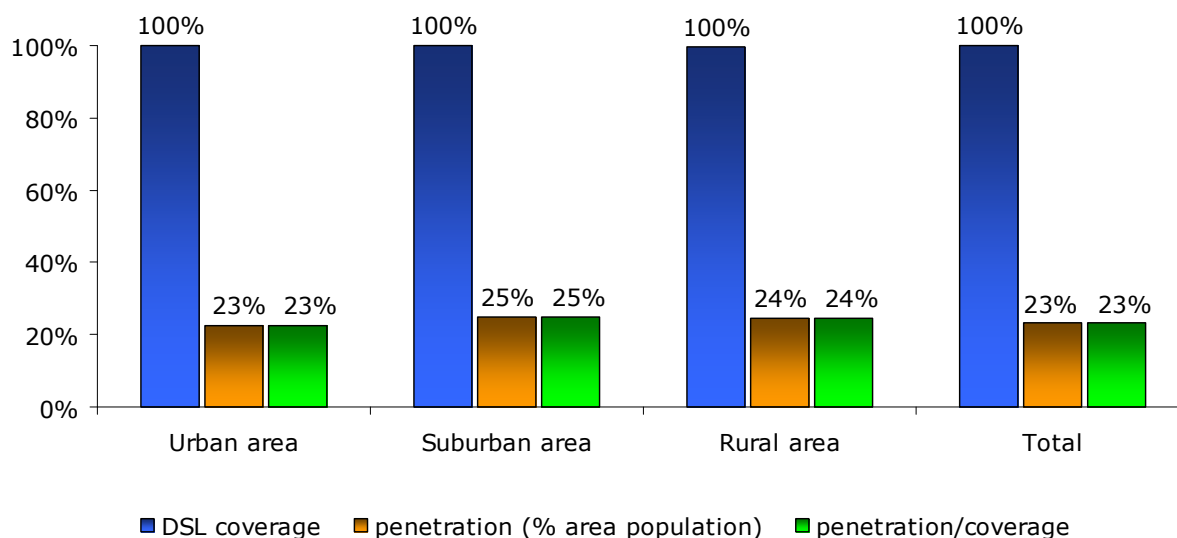
The UK is now fully covered and technically all households are able to receive a DSL connection. Rural has been well covered for a while before reaching quasi 100%. As a result there is very little difference between rural and urban DSL penetration, and DSL rural penetration actually exceeds DSL urban penetration. The overall level of penetration over population is levelling off when compared to the previous year with only an increase of 1%.

Number of DSL connections by download rate

■ Less than 256 kbps   ■ From 256 kbps to 512 kbps   ■ From 512 kbps to 1 Mbps
■ From 1 to 2 Mbps   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps

Operators have substantially increased the advertised speed of their packages and all are gradually standardising their offer to higher speed toward 20 and 24 Mbps. The lower package offers have completely disappeared for new subscriptions. The regulator has nevertheless pointed out that if the advertised speed increased, the gap between the actual and advertised (or headline) speed is increasing as well.

Operators' upgrade policies vary from one to another. They take into consideration the availability of LLU connection at the customer premises and the potential benefits the customer would get from an upgrade, if any. The upgrade can be done at cost or for free depending upon the operator, the type of migration and the benefits a customer can get from the upgrade. For example higher and faster service tiers can include the up-lift of a low download threshold, even if the actual speed will be similar for technical reasons (i.e. loop length).

Percentage of DSL connections by type of provider
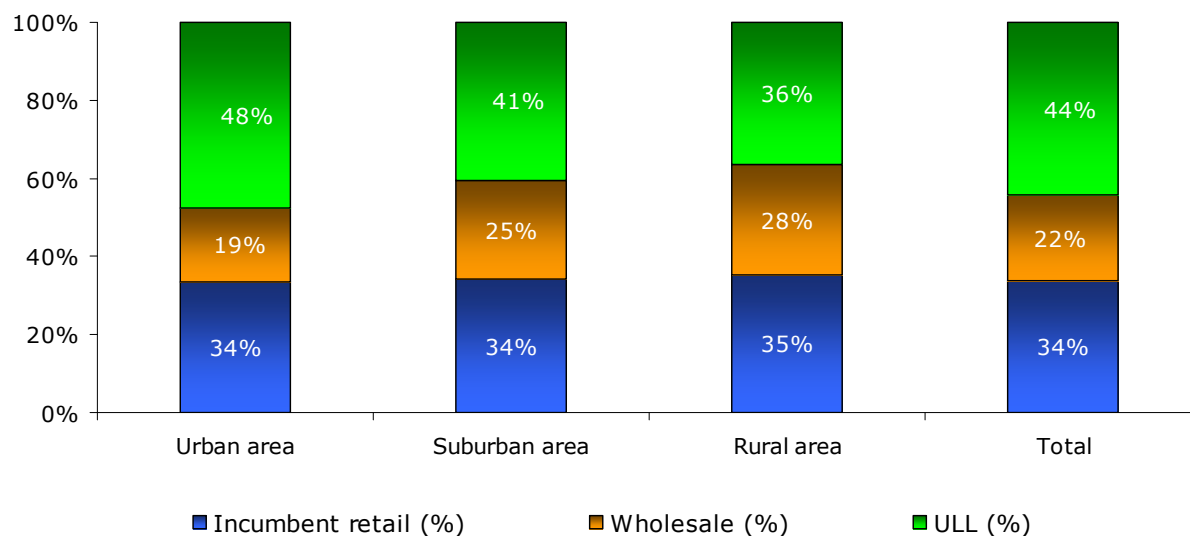
The number of LLU lines has reached 6.4 millions in 2009. The number of LLU lines is growing faster than the market. At the end of 2008 it represented 41% whereas it was 44% at the end of last year. A new trend has been observed whereby as part of triple play services, unbundled lines are increasingly used to also provide fixed voice services. This fosters the increase of DSL unbundled lines. Urban areas are subject to slightly more competition in the unbundled loop. This is probably due to the size of exchanges that are larger in urban areas and more attractive economically than smaller exchanges in rural areas.
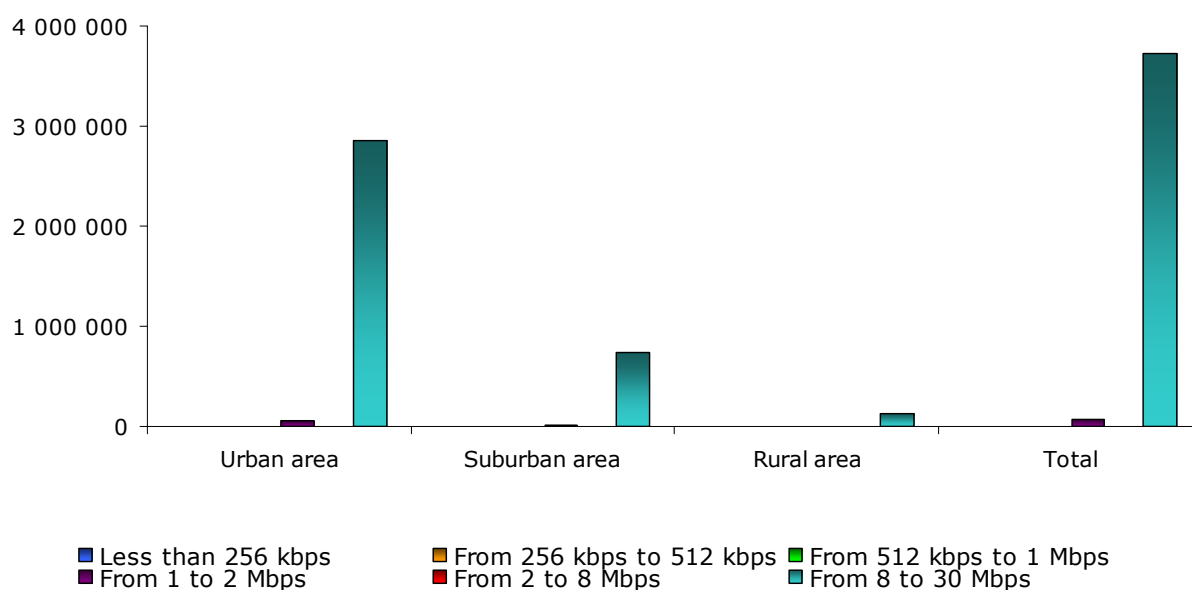
4.29.4. Cable modem coverage and take-up

Coverage and penetration

■ coverage   ■ penetration (% area population)   ■ penetration/coverage
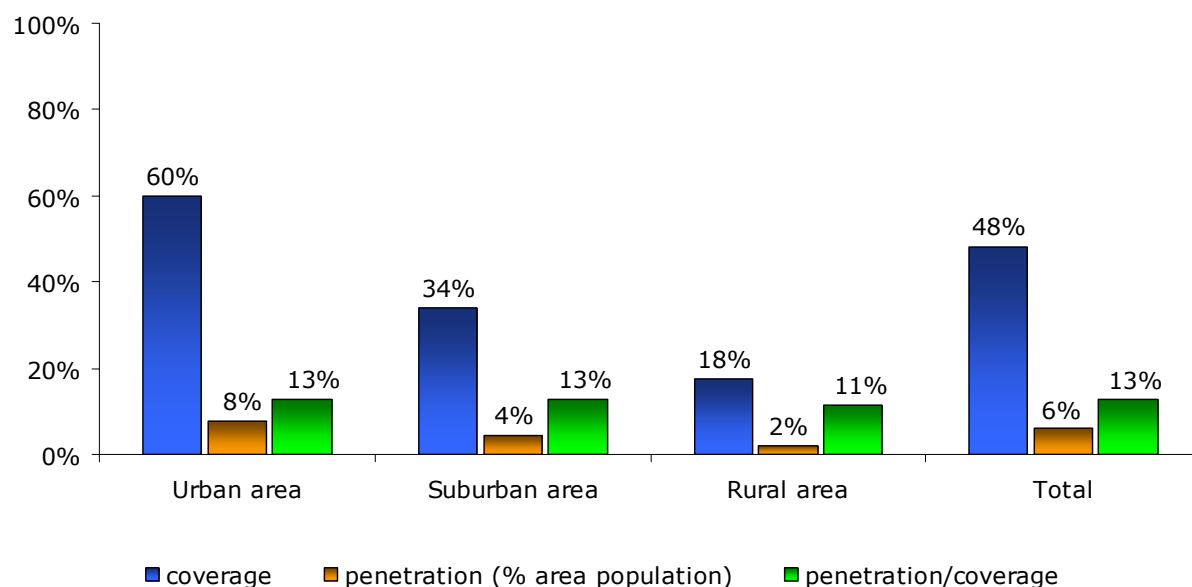
Cable modem coverage has increased in urban areas, as well as its penetration and its penetration over coverage compared to the previous year. This is due to an aggressive marketing campaign from Virgin Media aiming at educating the consumer on the technical limits of the competitive technology; ADSL. Its campaign emphasised its "optic" technology deployment in some section of its network, even though the core of its customers still served via coaxial cabling. This marketing differentiation along with investment in coverage and a churn reduction in cable broadband subscription paid off.

Number of cable modem connections by download rate

■ Less than 256 kbps   ■ From 256 kbps to 512 kbps   ■ From 512 kbps to 1 Mbps
■ From 1 to 2 Mbps   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps

Virgin Media has taken full advantage of its differentiation on speed and nearly completed the upgrade of the customer by the end of 2009, since only less than 2% of subscribers were on a 1 to 2 Mbps package. The other packages available, that regroup 98% of their clients are up to 10 Mbps, up to 20 Mbps and towards the end of 2009 up to 50 Mbps. This last package was classified as FTTx.

4.29.5. FTTx coverage and take-up

Coverage and penetration

■ coverage   ■ penetration (% area population)   ■ penetration/coverage
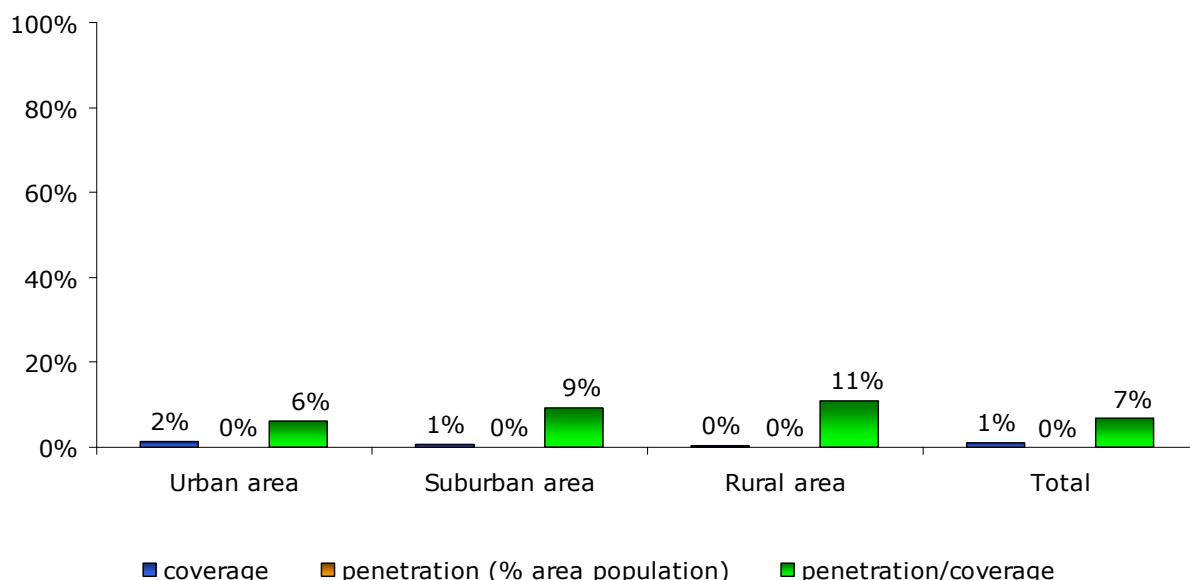
FTTx based broadband coverage is available in geographic pockets in 2009 as pilot schemes multiply. BT has one of the most ambitious plans when compared to other schemes. The incumbent aims at a coverage of 40% of the population by 2012 and 66% by 2015. Virgin Media magnitude of deployment is on a similar scale with the deployment of DOCSIS 3.0 technology across eventually its entire network; that is 12.6 million homes. BT will be using FTTC technology. Other projects from smaller providers include Fibrecity in the south coast of England, Independent Fibre networks in Corby & Swindon, isrighthere in Leeds, Liverpool and Chelsea (London), Velocity in Wembley (London) and West Whitlawburn Housing cooperative in Glasgow. However for all these projects it is the early days and the uptake is regarded as very modest, especially for the largest ones.

FTTx connections by download rate

■ Less than 2 Mbps   ■ From 2 to 8 Mbps   ■ From 8 to 30 Mbps   ■ More than 30 Mbps
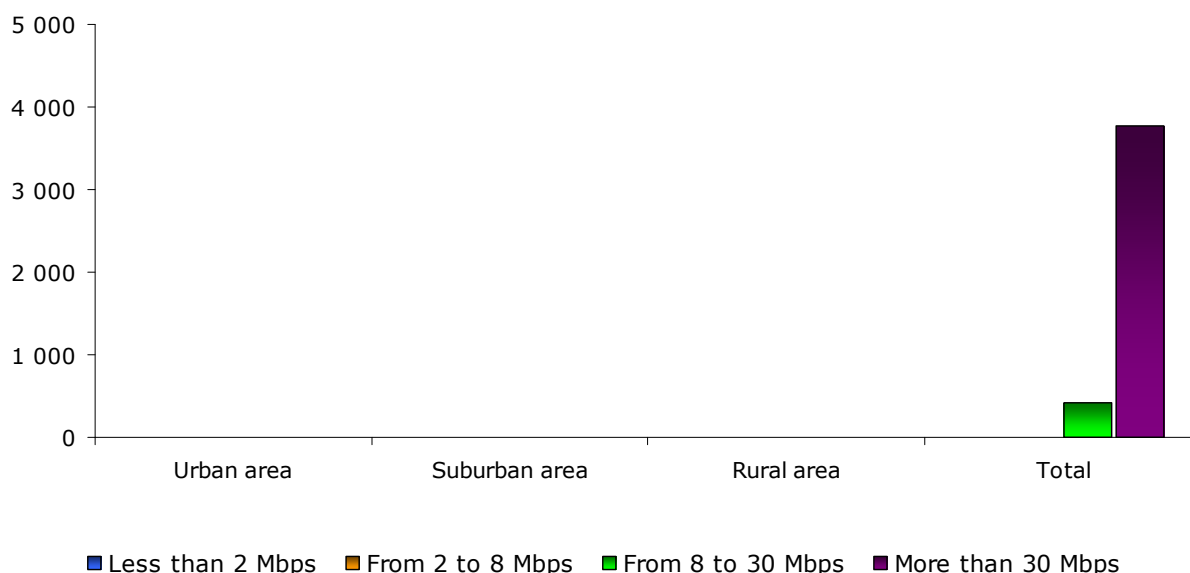
The benefit of FTTx is the very fast speed available, so packages available are on very fast speed regardless of the type of FTTx technology used. There are no offers in the lowest ranges. As more packages are deployed in 2010, the entry level of service tiers is more likely to start at 25 Mbps, where ADSL stops, going upwards with a standard at 40 Mbps (without consideration of actual speed).

4.29.6. Other broadband access technologies

Wi-Fi

The Wi-Fi market is very dynamic in the UK with a multitude of players providing hotspots. Hotspots are available in hospitability places such as Starbuck coffee, McDonald's, hotels chains… Providers are either specialists of the technology such as The Cloud, BT Open Zone or specialists of the verticals sectors that provide a full range of service along hotspots to the hotel industry such as cable TV, CCTV.

There are approximately 25,000 to 30,000 hotspots in the UK. Most of them are located in urban and dense or very dense metropolitan areas. Several mobile operators have agreements with the leading Wi-Fi hotspot providers to off-load the mobile data traffic to address the bottleneck generated on UMTS and HSDPA networks. The surge on mobile data traffic is a result of the success of flat fee packages subscribed by owners of smartphones, such as iPhone or smartphones running on Android. Other sources of large amount of data traffic that contribute to the success of hotspots is the rapid spread of Wi-Fi features embedded in netbooks, laptops and other consumer electronic goods. The fact that most hospitality places (pubs, restaurants, coffee shops) do not charge for the use of their Wi-Fi hotspots to their consumers (unlike most hotels) also contributes to the success of this technology.

WLL/WiMAX

WiMAX is not very widespread in the UK. One of the main license holders Freedom4, previously called Pipex Wireless has not been very successful and sold its license to the other leading license holder, UK Broadband Ltd. UK Broadband is now holder of WiMAX licenses in 15 main locations including London, Northern regions, Southern region etc… In theory WiMAX is meant to provide a viable alternative to the mobile network saturation. The benefits are even more prevalent in rural areas where there are "non-spots" areas. However there is currently no large active deployment of WiMAX in the UK.

Satellite

Satellite offerings remain embryonic with a handful of distributors. The lack of marketing success is partly due to high prices when compared to other broadband technologies available. Satellite is therefore restricted to white zones or very remote areas where the coverage is insufficient to fulfil requirements of customers such as small enterprises located in such areas.

4.29.7. Mobile broadband coverage and take-up

Coverage by technology
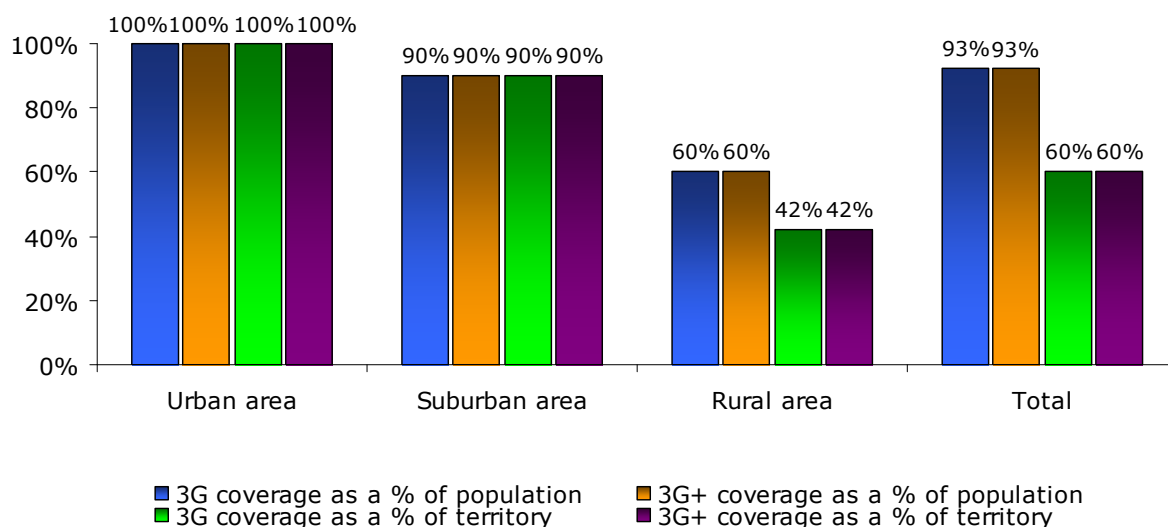
The coverage of the UK with mobile technology is fairly comprehensive according to the operator's claims. 3G coverage is still an area being invested in rural areas however operators are also investing in urban areas even if the coverage is already at 100%. The uptake of mobile broadband and the usage of mobile data with smartphones generated bottleneck areas with large footfall. This drove the operators to either invest more in the current infrastructure with 3G and 3G+ in parallel to investing in alternative networks such as Wi-Fi to address data traffic from heavy users with smartphones. Rural area is still lagging in coverage compared to other densities.

Penetration
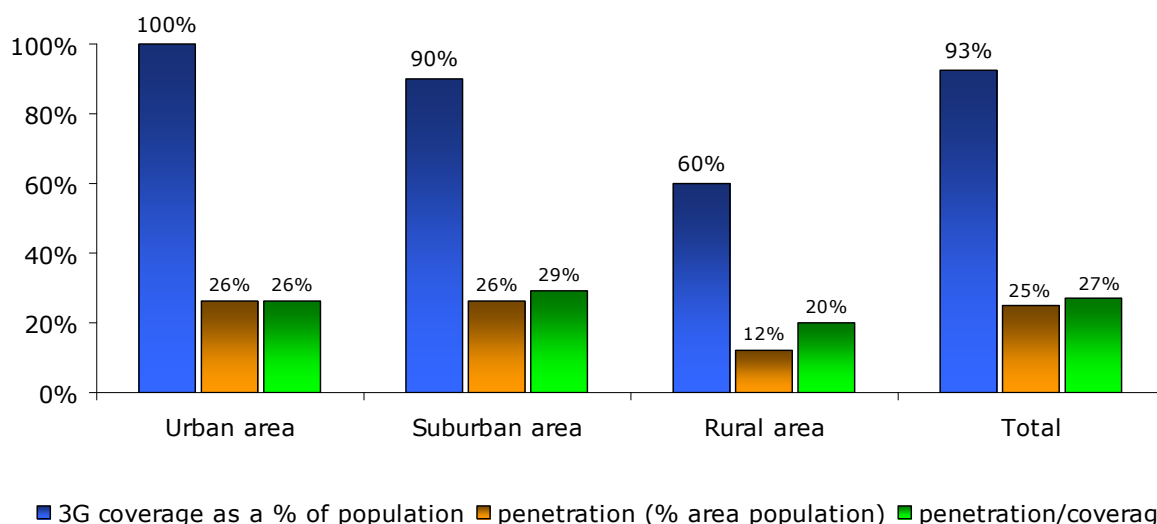
The mobile broadband has been well accepted in 2008 and continued to increase in 2009. The growth has slowed its pace toward the end of the year as it has become main stream. The regulator considers that there are approximately 13% of households using mobile broadband. Retailers have contributed to the success of mobile broadband by offering bundles comprising a data dongle, a monthly subscription and a netbook heavily sponsored by the operators. For some this is the main computer and the sole mean to access the Internet, as proportion of the population does not subscribe to a fixed line.

5. Glossary

3G	3rd (cellular) Generation
(A)DSL	(Asymmetrical) Digital Subscriber Line
BWA	Broadband Wireless Access
DSLAM	Digital Subscriber Line Access Multiplexer
FTTx	Fibre To The x
FTTB	Fibre To The Building
FTTC	Fibre To The Curb
FTTH	Fibre To The Home
FTTN	Fibre To The Node
FTTP	Fibre To The Premise
GPON	Gigabit Passive Optical Network
HSPA	High Speed Packet Access
HSDPA	High Speed Downlink Packet Access
HSUPA	High Speed Uplink Packet Access
ISP	Internet Service Provider
LAN	Local Area Network
LLU	Local Loop Unbundling
PC	Personal Computer
PLC	PowerLine Communication
POTS	Plain Old Telephone Service
PSTN	Public Switched Telephone Network
RLAN	Radio Local Area Network
SIM	Subscriber Identity Module
UMTS	Universal Mobile Telecommunication System
VDSL	Very High speed Digital Subscriber Line
WiFi	(the standard for) Wireless Fidelity
WiMAX	Worldwide interoperability for Microwave Access
WLAN	Wireless Local Area Network
WLL	Wireless Local Loop