# Are telecommunications services universally affordable across the EU?

An independent assessment for Vodafone

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# Executive Summary

What measures are required to ensure that telecommunications services are affordable to all households across the EU over the next five years? Answering this question is important for the current debate, initiated by the European Commission, into the future of universal service policy.

Affordability of telecommunications services has improved greatly, but problems remain and may well get worse. A significant proportion of the poorest households[1] in the lowest income member states remain unconnected to voice telephony services, while a substantial majority of these households are not connected for broadband use in any member state.

We define a tariff package as affordable if:

- It allows a household in the lowest income decile to make socially necessary use[2] through sustainable expenditure[3]
- The package helps such a household readily control its expenditure on telecommunications.

With this definition prepay mobile services – whether for voice telephony or broadband - currently offer commercial packages which the poorest households can afford in five selected EU member states - Finland, Poland, Portugal, Romania and the UK.

Such packages allow low-income households to make socially necessary use at monthly costs which are lower than those incurred when using fixed services, even with social tariff packages. They also allow low-income households to control their expenditure on telecommunications better, because the minimum unavoidable costs are far smaller.

Risks to future affordability include some forms of tariff restructuring in the face of reducing mobile termination rates, and socially necessary broadband use growing faster than the provision of low-cost broadband capacity. To ensure that telecommunication services remain affordable across the EU over the next five years we recommend, among other things, that policy makers should:

- Abandon the traditional universal service obligation and concentrate supply side measures on ensuring the geographic availability of prepay mobile services - especially for mobile broadband
- Focus policy on ensuring take-up of basic broadband services. Affordability is an important and growing barrier to take-up of broadband Internet. But it is only one of five main barriers to take-up, which need to be dealt with in an holistic way.
- Ask NRAs in each member state to measure and monitor the affordability of telecommunications services using a common framework, such as that set out in this study, to ensure affordability measures are comparable between member states and policy effectiveness can be assessed
- Require or encourage mobile operators to offer at least one no-frills prepay mobile package to consumers for both telephony and broadband services. It is especially important for such packages to include generous terms on use of credits[4] to ensure they are affordable for the poorest households.

[1] The average household in the lowest income decile ( the lowest 10% of household incomes)

[2] Up to 60 minutes of charged outbound calls and 1GB of data downloads per month

[3] Up to 4% of household income for telephony alone or 6% for telephony plus broadband

[4] e.g. minimum top up fees of €5 with expiry after 90 days

# 1 Introduction

## 1.1 The objectives of the study

The main objective of the study is to provide independent, evidence-based, answers to four questions:

- To what extent are currently available telecommunications services, for both voice telephony and broadband, universally affordable across the EU?
- Where services are unaffordable, what are the best options for dealing with this problem?
- How will market trends change the position on affordability over the next five years?
- What should the EU, member state governments and NRAs do to improve the affordability of telecommunications services?

Vodafone has commissioned this study so as to inform the debate which the recent European Commission consultation has started on the future of universal service policy[5]. It is designed to fill a gap. To date there has been relatively little work done in this area – either to establish criteria for determining what constitutes affordable telecommunications or to assess the extent to which fixed and mobile price packages meet these criteria.

## 1.2 The structure of the report

The study report is structured as follows:

- In Chapter 2 we define and assess the affordability of voice telephony services
- In Chapter 3 we repeat the process for consumer broadband services
- Chapter 4 considers options for improving affordability
- Chapter 5 considers how affordability might change over the next five years and the policy implications of these changes
- Finally Chapter 6 sets out recommendations on what public bodies and operators might do to make telecommunications more affordable to EU citizens.

## 1.3 The focus of the study

We have selected five member states, which span the range of market conditions within the EU, for detailed analysis. These are:

- Two high income member states - Finland and the UK
- Three low income member states - Portugal in Western Europe, and Poland and Romania in Eastern Europe.

[5] *Consultation on future universal service in the digital era*, European Commission, March 2010

Our analysis focuses on the affordability of telecommunications by ***households*** rather than by ***individuals***. A key determinant of affordability is income and this is more easily measured for households than for individuals. At the same time surveys which look at the impact of income on use of telecommunications generally do so by household category. Such an approach is straightforward when considering fixed telecommunication services, but more challenging when considering mobile telecommunications, where services are naturally associated with a person rather than a household. In our analysis we consider that a household with at least one telecoms subscription, whether for voice telephony, for broadband, or for both, is a ***connected*** household.

Our analysis also focuses on the ***affordability*** rather than the ***availability*** of telecommunications services. Clearly availability of services, in terms of both geographic reach and access for those with disabilities, is important. But it is an issue which raises different issues from affordability and one which is largely outside the scope of this study[6].

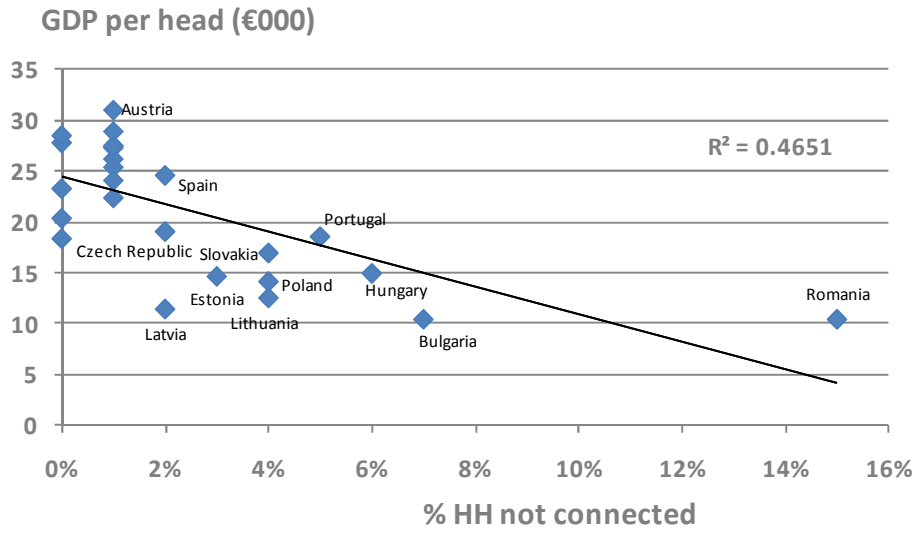
[6] In Section 4.4 we do consider the applicability of voucher schemes for people with disabilities.

# 2 The affordability of voice telephony services

## 2.1 Is there a problem?

How many households do not have access to voice telephony services? If all households are connected then it is reasonable to argue that there is not an affordability problem. But this is not the case, as Figure 2-1 shows. This figure plots the proportion of unconnected households at the beginning of 2010 against GDP per head for the 27 member states, using findings from the latest Eurobarometer e-communications survey[7].

**Figure 2-1: Unconnected households vs GDP per head – beginning of 2010**




We can see that:

- There is a reasonable correlation between low income per head in a member state and a high proportion of unconnected households. This suggests that affordability of telephony services is a function of household income
- Lack of connectivity to voice telephony services is no longer a significant problem for most high income member states but remains a substantial problem in many low income member states. In Romania for example 15% of households did not have access to voice telephony services at the beginning of 2010.

## 2.2 Who are the unconnected?

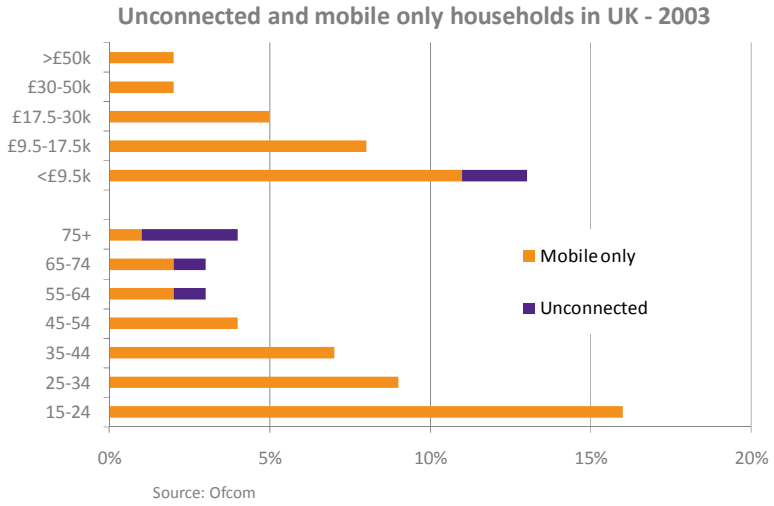
There is little evidence on the characteristics of unconnected households on an EU-wide basis. Eurobarometer surveys do not currently collect information on the income of unconnected households.

[7] *E-Communications Household Survey*, Eurobarometer EB335, European Commission, October 2010

This is an important omission[8]. Understanding the characteristics of unconnected households, especially in low income member states, is an important prerequisite for developing effective measures to make telecommunications services more affordable.

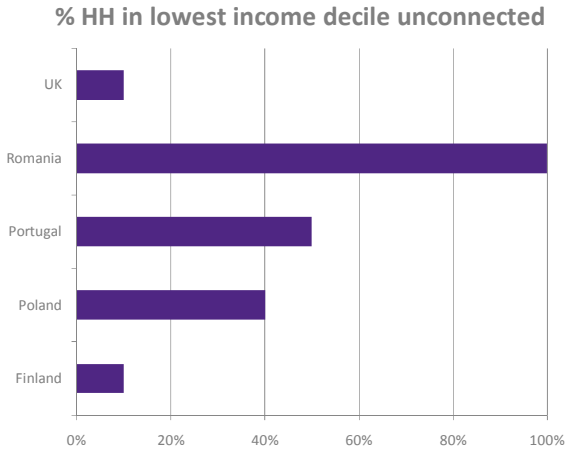
However there is limited information available from NRA surveys. Figure 2-2, which is based on Oftel work, suggests that unconnected households in the UK were concentrated on poor households occupied by older people when the survey was conducted in 2003.

**Figure 2-2: Unconnected and mobile only households in the UK - 2003**




If we assume that the finding that lack of connection is a low income phenomenon applies across the EU, then the proportion of unconnected households in the lowest income decile of the five study countries was roughly as shown in Figure 2.3 at the beginning of 2010.

**Figure 2-3: Unconnected households in the lowest income decile**




[8] The latest Eurobarometer survey (EB 335), which measures the position across the EU at the beginning of 2010, does however categorise survey responses in terms of difficulty in paying bills (three categories) and "self positioning on the social staircase" (three categories).

We can see that the proportion of unconnected households in Income Decile 1 in the poorer member states is likely to be substantially greater than the corresponding proportion in the richer member states.

## 2.3 How do the unconnected become connected?

The way in which a household gains access to voice telephony services is changing over time. Figure 2-4 shows how.

Figure 2-4: Access to voice telephony services over time


Again the availability of time series data is limited. But Figure 2-4 indicates that:

- In the UK mobile only households are gradually replacing fixed only households, while the proportion of unconnected households is steady at 1%
- In Finland there is a strong move to mobile only access for voice telephony
- In Poland and Romania (together with Bulgaria) unconnected households and fixed only households are becoming mobile only households

- There was a problem in Portugal. Between 2002 and 2008 mobile only households displaced other connected households but take up of mobile services did not reduce the proportion of unconnected households, as in other low income member states. But the last two years have shown a marked reduction in the proportion of unconnected households.

There are also limited indications that the unconnected households are taking up prepay rather than contract mobile services when they connect. For example in the UK 76% of households in the bottom quintile use prepay rather than contract mobile services. This proportion falls to 47% for richer households. Anecdotal evidence, from those we talked to in the course of the study, suggest that these statistics are not atypical of the EU as a whole.

## 2.4 What are the relevant characteristics of low income households?

The analysis so far supports the commonsense expectation that it is low income households which are unconnected, or which find it hardest to afford telecommunications services. So it is useful to consider the relevant characteristics of this group before considering any policy measures.

In the EU, the poverty threshold is defined as an income at 60% or less of the median income[9]. Using this definition the proportion of the population at risk of poverty varies between 10% in the Czech Republic and the Netherlands and 21% in Latvia. This variation reflects the extent to which household income is dispersed around the median. Taken together these statistics suggest that we might reasonably test affordability of telecommunications services by considering how affordable they are for the poorest 10% of households in each member state.

Our research suggests that this segment of the population is far from homogeneous. Rather it is a collection of groups with very different characteristics from one another. According to the Cost 605 study[10] key groups of "communications-needy" people within the low-income bracket include:

- The homeless
- Most of the unemployed
- Migrant workers who take temporary and itinerant work
- Older people living on basic state pensions
- Many disabled and chronically sick people
- A lot of recent immigrants to the EU.

This list is very similar to the user groups targeted by Telstra's *Access for Everyone* programme[11]. Anecdotal evidence suggests that, besides having low incomes, a significant proportion of these groups have low credit ratings[12] and/or change address relatively frequently. These characteristics

[9] *Joint report on social protection and social inclusion 2009*, European Commission, March 2009

[10] Document V6 2009-08-09, COST 605 study, L F Pau, P Puga, H Chen, see www.cost605.org

[11] *Telecommunications and well-being - final report*. Telstra Low Income Measures Assessment Committee, March 2009

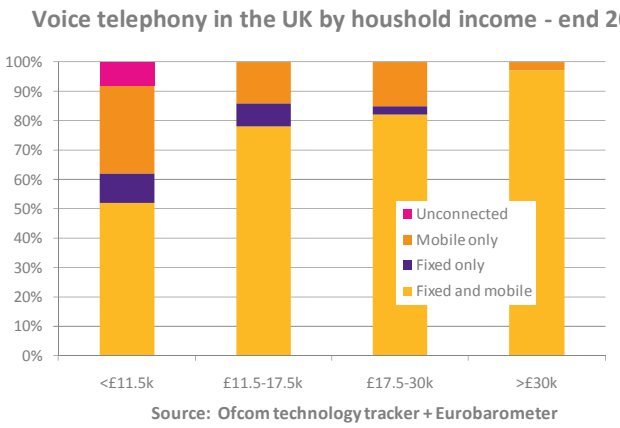
[12] See for example *Low income consumers and the communications market: An attitudinal study into people living on a low income and their experience of communications services*. Annex 4.Ofcom 2007. http://stakeholders.ofcom.org.uk/binaries/research/consumer-experience/annex4.pdf

have implications for what constitutes an affordable telecommunications package. We discuss these later.

People in low-income households make very different use of telecommunications from those in high-income households:

- In the poorer member states there is a good chance that households with low incomes are unconnected. See Figure 2-3 above
- In high-income member states most low income households are connected but a substantial proportion of these are mobile only. Figure 2-5 illustrates for the UK.

**Figure 2-5: How telephony access varies with household income - UK**




Our analysis further suggests that low income households in the richer member states are divided into two main sub-groups:

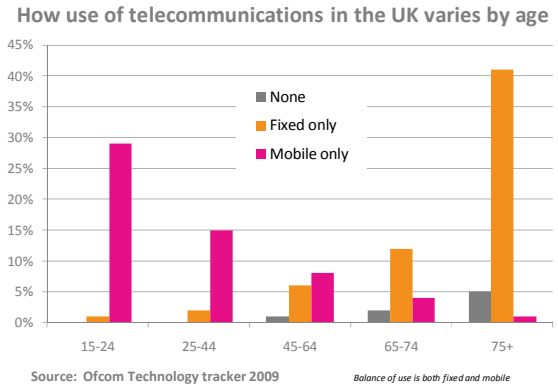
- Households of younger people which are characterised by irregular incomes, poor creditworthiness and relatively frequent changes of address. In the UK this group accounts for 55% of Income Decile 1
- Households of older people which are characterised by regular minimum incomes and a stable address. It is in this group, which makes up 45% of Income Decile 1 households in the UK, that most unconnected households are located.

This second subgroup is currently much more likely to use fixed services only to connect to the network. Figure 2-6 illustrates, again for the UK. This finding is confirmed by recent work by Puga in Portugal[13] and by findings from the latest Eurobarometer survey[14].

[13] *Telecommunications for the needy: how needed are they?* Puga, Undated, Cost 605 project

[14] *E-Communications Household Survey*, Eurobarometer EB335, European Commission, October 2010

Figure 2-6: Access to telephony services by age - UK




How should policymakers enable affordability among this second subgroup? In particular should they require a designated operator to offer a social tariff over the fixed network or promote the take-up of mobile prepay by this subgroup? In considering these questions the following points are relevant.

On the one hand:

- There is some evidence that older people are resistant to change from fixed only to mobile only access to the network. According to Ofcom research in 2007[15] *"Many of the pensioners in this income bracket [Income Quintile 1] were largely uninterested in new services"*
- In many cases this resistance to change is associated with difficulties in using conventional mobile handsets, which tend to assume high dexterity, sharp eyesight and familiarity with selecting desired items from menus.

On the other hand:

- The gap in use of mobile phones between younger and older people is shrinking. See Figure 2-7
- Use of pre pay mobile services will, in many cases, significantly reduce the cost of connecting to the network, as demonstrated in Section 2.7
- Many older people who struggle to afford telecommunications services may not be eligible for social tariffs offered over the fixed network
- Big button mobile phones, which are substantially easier for older people to use are now available[16] - but often through distribution channels, such as the Internet, which are not readily accessible to this sub-group
- There are also low-cost mobile devices into which older people can plug their existing fixed line phones (eg the Vodafone MiniStation, currently marketed in Italy). Such devices could be used to allow older people to benefit from lower cost prepay mobile packages without needing to learn how to use a new voice telephony terminal.
- The demand for fixed services by this subgroup will probably decline substantially over the next 10 years. The younger cohort joining the over 65s subgroup, where use of fixed only connections is currently high, are much more likely to be mobile users than existing members of the subgroup.

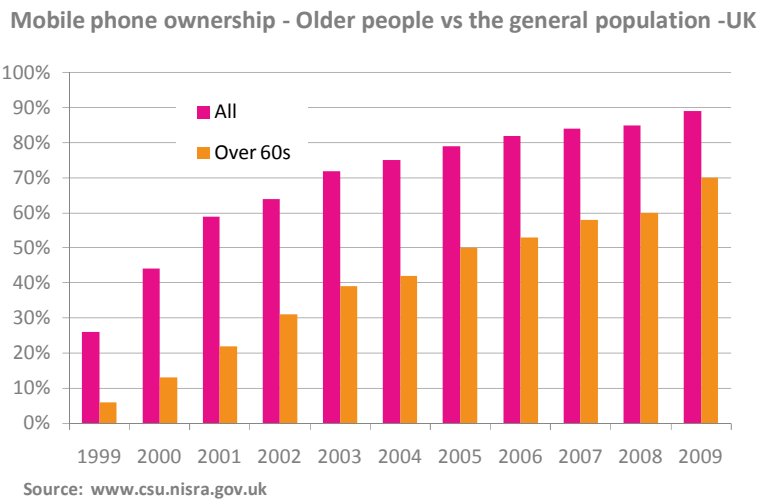
[15] *Low-income users and the communications market*, Ofcom, 2007

[16] Priced at €40 upwards

At the same time the older cohort in this subgroup will naturally reduce in numbers over the next 10 years.

The balance of arguments may vary from one member state to another.

Figure 2-7: Use of mobile phones by older people - UK




## 2.5 What makes a telephony package affordable?

### The definition of affordability

The term affordable is used in many different ways. It is important, if we are to make our analysis rigorous, to define this term as precisely as we can. Having reviewed literature on the subject[17] we propose to define a telecommunications service package as affordable if:

- The package allows a household in the lowest income decile to make socially necessary use through sustainable expenditure i.e. expenditure which is without detriment to other essential spending
- The package helps such a household readily control its expenditure on telecommunications.

This definition then requires us to answer three questions:

- What constitutes socially necessary use of voice telephony?
- What constitutes sustainable expenditure?
- What indicators can be used to measure how well a tariff package allows a household to control its spending on telecommunications?

[17] For example *Towards defining and measuring affordability of utilities*, Claire Milne for PUAF, 2004, and *Affordability of telephony and Internet: an international overview*, Claire Milne, May 2009

In so doing we consider the average household in Income Decile 1. Clearly there will be individual households within this decile which, even when tariffs meet affordability conditions, struggle to afford telecommunications.

## What is socially necessary use?

There is a general consensus that voice telephony is now a social necessity. This is reflected in the universal service policy of the EU over the last decade. But what level of use is socially necessary? To a large extent, the answer to this question is subjective. It will vary with the circumstances of individual low-income households and may vary with the overall wealth of the member state concerned and other factors.

We have looked at the definitions of low usage and socially necessary usage implied by the sources listed in Figure 2-8.

**Figure 2-8: Use of voice telephony by low volume users**

| Category | Source | Minutes of outbound calls per month |
|---|---|---|
| Bundled use in a social tariff | Orange mobile social package – France | 40 |
| | BT Basic - fixed line bundled minutes – UK | 15 |
| | Telefonica's Linea Libre – Spain | 63 |
| | Safelink Pennsylvania – US | 42 |
| | Safelink Mass - US | 80 |
| Minutes considered light usage | OECD light user – fixed – global | 220 |
| | OECD light user - mobile - global | 45 |

*Source: Plum analysis*

Based on this range of inputs we have set ***30 and 60 paid minutes per month*** as possible average socially necessary minimum levels of use of voice telephony in our definition of affordability. We note that this level of use is made more valuable if low-income households can make essential calls (eg to the emergency services and select help lines) free of charge. In a few member states, such as France and the UK, calls from mobiles to many freephone numbers are charged at substantial rates eg €0.2 per minute. In others, calls to freephone numbers are disabled from mobiles and the user must call a fixed line number instead.

## What is sustainable expenditure?

The issue of what constitutes sustainable expenditure arises when considering household consumption of water, gas and electricity. Here the standard approach is to set some maximum proportion of household expenditure, above which services are judged unaffordable. We follow the same approach here - using the proportion of income actually spent by low-income households on telecommunications as a guide in setting this affordability limit.

Using this approach Figure 2-9 provides estimates of affordability limits, above which we consider telephony too expensive. In estimating these affordability limits:

- We assume that it is sustainable for a household in the lowest decile to spend 4% of household income on telecommunications. This is consistent with the third row of Figure 2.9
- We assume that the average household in the poorest income decile spends 70% as much as the average household in Income Quintile 1. This is the observed proportion in the UK - the only study country for which we have expenditure statistics by income decile
- We ignore the low proportion of spending on telecommunications by the poorest households in Romania. This proportion reflects the fact that many of these households are unconnected and so spend nothing on telecommunications from home.

**Figure 2-9: The affordability limits in the five study countries**

| Country | | Finland | Poland | Portugal | Romania | UK |
|---|---|---|---|---|---|---|
| HH income (€000 pa) - lowest quintile | 1 | 13.1 | 5.3 | 8.4 | 2.8 | 18.9 |
| Uplift from 2005 to 2009 | 2 | 1.02 | 1.1 | 1.04 | 1.31 | 1 |
| % spend on telecoms - lowest quintile | 1 | 3.7% | 4.1% | 3.3% | 2.5% | 3.0% |
| HH income (€000 pa) - lowest decile | 3 | 9.4 | 4.1 | 6.1 | 2.6 | 13.2 |
| Affordability limit (€ per month) | 4 | 31 | 14 | 20 | 9 | 44 |

1 From Eurostat for 2005
2 GDP per head 2009/GDP per head 2005
3 Assuming lowest decile income at 70% of lowest quintile as for UK
4 Assuming 4% of lowest decile income on telephony is sustainable

The extent to which those who rely on the basic state pension have an income which puts them in the lowest income decile varies considerably across the EU. In the UK for example the basic state pension is around €7000 per annum, while in the Netherlands it is €22,000 per annum. As a result we might expect that, while a high proportion of older person households in the UK are in the bottom decile, this is not necessarily the case in other member states.

## Which tariff packages make household expenditure controllable?

Many low income households are characterised by:

- Relatively uncertain and irregular income. Some receive social benefits which are subject to interrupted supply; others are in a succession of temporary jobs This impacts choice of telecommunications package. According to Ofcom "*Lack of a regular wage was also a barrier to signing up to a contract which required regular monthly payments. The benefits payments system was not considered sufficiently reliable to risk missed payments and bank charges*"[18].
- Bigger fluctuations in expenditure than richer households. Emergencies, even quite small ones, are more challenging financially for low income households than for those on average income

[18] *Low income consumers and the communications market: An attitudinal study into people living on a low income and their experience of communications services*. Annex 4,.Ofcom, 2007

- Lack of credit worthiness. This makes it difficult for such households to borrow to deal with the large fluctuations in net income (income less expenditure) which they face. Many do not have bank accounts and find it difficult to borrow at anything except punitive interest rates from doorstep moneylenders.

These problems have been highlighted by Milne[19] in the case of telecommunications and by Collins et al[20] more generally across the developing world.

In these circumstances a tariff package is likely to be least manageable if it requires:

- Significant up front connection charges or joining fees
- Substantial long-term commitments. 18 month contracts at €20 per month make a significant dent in the disposable income of a low income household
- Significant minimum monthly payments. Such payments mean that a low income household is not able to economise for a while on use of telecommunications as a way of dealing with a financial crisis.

So in judging the extent to which different tariff packages are affordable we need to consider not just the monthly cost to the household in making socially necessary use of telecommunications but also:

- The size of any initial connection or subscription charges
- The size of the long-term minimum commitment when subscribing to a service and the duration of this commitment
- The size of any regular minimum payments.

## 2.6 Which tariff packages are most affordable?

To assess how well voice telephony packages meet this definition of affordability we have, for each of the five study countries:

- Selected the fixed tariff package and the mobile tariff package with the lowest monthly minimum payments. Where available we have selected social tariffs designed for those on the lowest incomes. In the case of mobile packages we have selected commercial prepay tariffs
- Established the cost of ownership per month associated with 0, 30 and 60 minutes of outbound use
- Tabulated the connection costs, minimum monthly payments and minimum long-term commitment costs[21] for the household.

To keep our analysis simple we have:

- Ignored texting, even though, in some cases, this may offer a cheap substitute for voice calls for those using mobile packages and may help control household expenditure on telecoms
- Excluded the impact of the cost of terminals on affordability. It is now relatively easy to pick up second-hand fixed or mobile handsets for under €20

[19] *Affordability of telephony and Internet: an international overview*, Claire Milne, May 2009

[20] *Portfolios of the poor*, Collins, Morduch, Rutherford, and Ruthven, 2009, Princeton University Press

[21] Minimum monthly payments x minimum contract period

- Calculated usage costs using a blended rate which assumes that 50% of calls are to mobiles, 50% of mobile calls are on-net, and 50% of calls are made in the peak period

Our findings are tabulated in Figures 2-10 and 2-11.

**Figure 2-10: Expenditure control indicators – fixed vs mobile**

| Control measure | | Mobile | Fixed |
|---|---|---|---|
| Connection charge € | | 4 | 12 |
| Minimum long term commitment € | 1 | 7 | 82 |
| Minimum monthly payment € | | 0 | 6 |
| Minimum contract duration (months) | | 0 | 12 |

1 Minimum monthly payment x minimum contract period + connection charges and other up-front charges

Figure 2-10 compares the unavoidable minimum costs, averaged across the five study countries, incurred by low income households in using the selected fixed and mobile packages. We can see that the mobile (prepay) package is superior to the fixed package in that the unavoidable costs are much lower - allowing the household greater control of expenditure.

Figure 2-11 then compares the monthly total costs of using the selected packages. We have shaded the cheaper of the two packages for each level of use and country within the table. See also Annex A for detailed comparisons for individual countries.

**Figure 2-11: The total monthly cost of selected fixed and mobile packages**

| Country | Finland | Poland | Portugal | Romania | UK |
|---|---|---|---|---|---|
| Affordability limit (€ per month) | 31 | 14 | 20 | 9 | 44 |
| % HH unconnected | 1% | 4% | 5% | 15% | 1% |
| HH in lowest decile (m) | 0.24 | 1.4 | 0.36 | 0.73 | 2.5 |
| Total cost (€) per month for: | | | | | |
| 0 minute use - fixed | 12 | 5 | 10 | 5 | 5 |
| 0 minute use - mobile | 0 | 0 | 0 | 0 | 0 |
| 30 minute use - fixed | 17 | 5 | 16 | 7 | 7 |
| 30 minute use - mobile | 3 | 6 | 5 | 5 | 5 |
| 60 minute use - fixed | 21 | 9 | 22 | 9 | 11 |
| 60 minute use - mobile | 4 | 6 | 10 | 5 | 11 |
| Cheapest 60 min as % of afford limit | 13% | 44% | 49% | 58% | 25% |

1 The prices are for social tariffs with restricted availability for PL, PT, RO and UK (fixed)

We can see that:

- Where a household makes no charged calls, but can receive inbound calls and make uncharged outbound calls, the mobile package always offers the lowest cost[22]
- As the volume of outbound monthly use increases, so the cost gap between fixed and mobile packages narrows. Even so, the mobile package remains the lowest-cost option at 60 minutes of use per month
- Commercial mobile prepay packages generate costs which are similar to, or lower than, fixed social packages where they exist

The main finding from our analysis is that, when assessed in terms of both expenditure control and total cost per month, prepay commercial mobile services for voice telephony are as good as, or significantly more affordable than, fixed services, even those offered under social tariffs. This conclusion does not mean that mobile operators are inherently more cost efficient than fixed operators. Rather it reflects the different cost structures of fixed and mobile networks[23]. There are significant costs in setting up and maintaining a connection to a fixed network which an operator needs to recover if it is to make a profit. These costs are far lower for mobile operators, making prepay mobile packages the obvious way to serve low-volume users of voice telephony profitably. Only for users who exceed the socially necessary levels of use do the low costs of fixed usage start to tip the balance from mobile towards fixed.

This finding leads us to conclude that there is no longer a need for the traditional universal service obligation to supply telephony services at a fixed location for virtually all of the EU's population. Prepay mobile services are not available to a small proportion of the population[24] in remote rural areas where mobile coverage is inadequate. But taking steps to enable such coverage is likely to be a more cost effective way of ensuring universal service than current arrangements. Such steps would also strengthen the case for phasing out universal service obligations to supply public payphones.

In considering how to deliver affordable packages to low-income households it is important to note the following:

- Minimum top-up fees and credit expiry conditions play a crucial role in determining the cost to low-income households of mobile prepay packages. This is illustrated in Figure 2-12, in which we combine expiry conditions and minimum top-up fees from across the EU, and then calculate the monthly cost for a user who wants to permanently preserve the option of making outbound calls. As expiry conditions are tightened (Case B vs Case A) and as minimum top-up fees are increased (Case C vs Case A) the cost to the user rises significantly.
- It seems likely that affordability rather than limited geographic availability is the cause of the high proportion of unconnected households in Romania. Figure 2-12 shows that there are greater affordability problems there than elsewhere in the EU. At the same time we know, from statistics provided by Vodafone Romania, that the population coverage of mobile networks in Romania has exceeded 95% for the last five years.

[22] Prepay mobile users must incur top-up fees every so often in order to keep their SIM alive. Typically this amounts to an expenditure of €10 each year or about €1 per month when averaged across the study countries

[23] The greater strength of infrastructure based competition between mobile operators may also contribute to this finding

[24] Now 1% or less in virtually all member states

- Mobile SIMs expire if a prepay service is not used for a period[25]. So there is a danger that a low income households which uses prepay mobile and makes very few calls will find that its service no longer works. To minimise the risk of such an eventuality, operators might wish to follow the practice used in Finland. There, if a prepay SIM is not used for six months, the operator sends a warning SMS, and the user then has two months to activate the SIM, by either making a call or sending a text, before being cut off.

**Figure 2-12: The impact of credit expiry conditions and minimum top up fees**

| Measure | Case A | Case B | Case C |
|---|---|---|---|
| Credit expiry (days) | 30 | 7 | 30 |
| Minimum top up fee | €5 | €5 | €10 |
| Price per min | €0.25 | €0.25 | €0.25 |
| Top up fee buys | 20 min | 20 min | 40 min |
| Total cost for user making: | | | |
| 0 min per month outbound calls | €5 | €21[27] | €10 |
| 30 min per month outbound calls | €7.5[26] | €21 | €10 |
| 60 min per month outbound calls | €15 | €21 | €15 |

[25] Typically six months

[26] 30 min x €0.25

[27] €5 x 30 days/7 days

# 3 Affordability of broadband

## 3.1 Is there a problem?

Figures 3-1 and 3-2 show the proportion of households which do not use broadband connections in the five study countries.

Figure 3-1: The % of households without fixed broadband over time

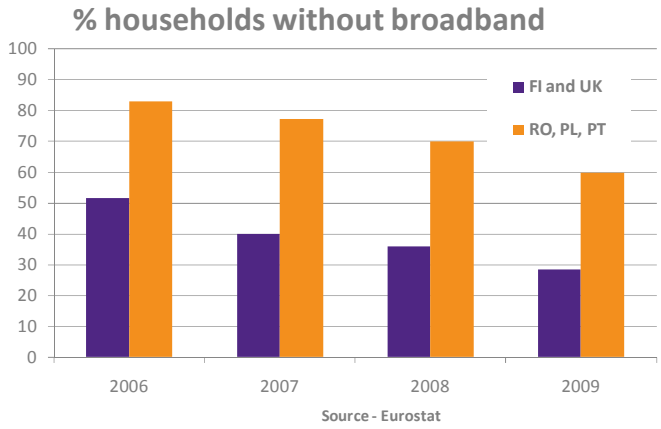
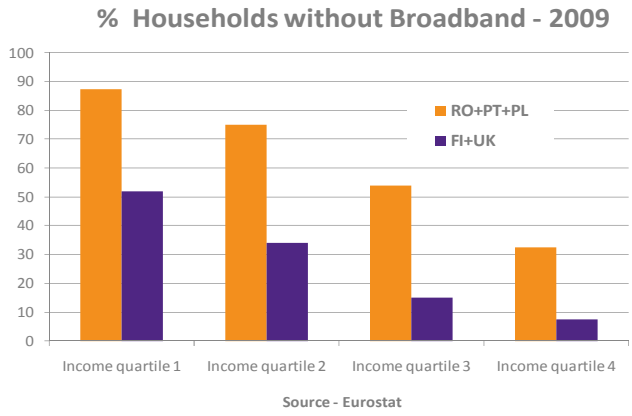



Figure 3-2: The % of households without fixed broadband by household income



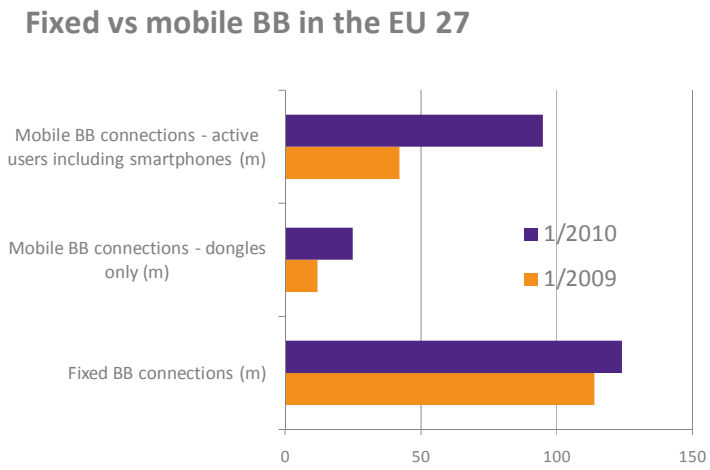

We can see that, while the proportion of households with broadband is growing strongly, there are still many households which remain unconnected. Averaged across the five study countries, just under 50% of households did not have broadband connections in 2009[28]. This proportion is significantly higher, at nearly 90%, for the poorest households in the low income member states.

It is important to note that the statistics used in these figures only include households with fixed broadband and not households which use mobile broadband only. This way of measuring broadband connections has not mattered in the past. But with strong growth in mobile only broadband households

[28] Whether we use simple or weighted averages

it will in future. Figure 3-3 illustrates. It shows that the number of mobile broadband users is growing rapidly to rival the installed base of fixed broadband.

**Figure 3-3: The relative growth in fixed and mobile broadband in the EU**




Source: 15th Implementation report - European Commission

In many cases mobile broadband is used as a complement to fixed broadband. But for low volume users, as we demonstrate in Section 3.4, mobile broadband is an attractive substitute for fixed broadband. In some countries broadband services based on use of public WiFi hotspots may also substitute for fixed and mobile broadband. In the Czech Republic for example broadband services are offered extensively in this way.

## 3.2 The main barriers to broadband Internet take-up

There is a general consensus that consumer take-up of broadband is driven by use of the Internet. As previous studies and surveys have shown[29], there are five main barriers to broadband Internet take-up by households:

- Broadband Internet is too expensive
- The household lacks the necessary digital skills to use the Internet
- The Internet is not relevant to the needs of the household
- The household lacks a debit or credit card needed to carry out e-transactions. So the value of the Internet is significantly reduced
- Broadband at an adequate speed is not available where the household is located.

There are also additional barriers for those who are disabled which we discuss further in Chapter 4.

[29] *Demand-side measures to stimulate Internet and broadband take-up*, Plum Consulting in *Developing Government objectives for broadband*, Vodafone Policy Paper Series, Number 10, March 2010

We can see that affordability is just one of five factors inhibiting broadband connectivity. But, unlike the other factors, lack of affordability is of growing importance as a barrier to broadband Internet use. As the pool of unconnected households shrinks, so the proportion of low income households in the pool grows and affordability becomes (arguably) the main barrier to take up.

The move by low income households to mobile only for voice telephony also makes fixed broadband more expensive. For households using mobile only for voice the cost of adding fixed broadband is not just the cost of the broadband service, but also the cost of the basic line rental. This can more than double the cost of adding fixed broadband.

## 3.3 What are the characteristics of affordable broadband packages?

In considering affordability of broadband we:

- Consider the cost of adding broadband to voice telephony rather than the cost of broadband on its own. In the long-term voice telephony will be just another application on a broadband service. But for the moment the services are sold as separate (or bundled) entities and take-up of voice telephony is widespread, if not quite universal
- Use the same definition of affordability, based around sustainable and controllable expenditure on socially necessary use, as for voice telephony.

We therefore now look at the same three questions as for voice telephony.

### What is socially necessary use of broadband?

We measure broadband usage in terms of gigabytes (GB) of data download per month. Here we find that:

- 44% of US households with broadband consumed less than ***1 GB*** per month in 2008[30]
- 24% of broadband users in Ireland consumed less than ***1 GB*** per month in 2007[31]
- A household which carries out 10 hours of web browsing, sends or receives 200 e-mails (10 with attachments), spends 10 hours on instant messaging, and downloads 30 minutes of MP3 music generates around 0.25 GB of downloads[32]
- The FCC recently reported that the average household in the US now generates 5GB of use per month in mobile only households[33]. But Cisco projections[34] indicate that 80% of this data is now video or file sharing. If we remove such applications as not socially necessary, then consumption reduces to 1 GB per month

[30] *Priced and unpriced on-line markets*, Ben Adelman, Journal of Economic Perspectives, Summer 2009, Volume 23 Number 3

[31] Response to ComReg con Doc 08/41, eircom, August 2008

[32] http://shop.orange.co.uk/shop/mobile-broadband;jsessionid=mHLlMkQD0m0vMhKN9KBnybCLz06vvJ41IjhjJv6TkLzvh0nlsVnJ!-458086414

[33] *Mobile broadband: the benefits of additional spectrum*, OBI Technical Paper, October 2010

[34] *Cisco Visual Networking Index: Forecast and Methodology, 2009–2014,* Cisco June 2010

Based on these inputs we propose to set ***0.5 and 1.0 GB per month*** as possible socially necessary levels of use in 2010, But we expect these levels to grow. How much they grow is a major issue for future broadband affordability. We discuss this issue further in Chapter 5.

### What is sustainable expenditure?

Most low income households spend their money on telephony rather than broadband given that, as Figure 3-2 shows, well over half of such households do not subscribe to broadband. It is reasonable to expect that:

- The affordability limit for voice telephony and broadband combined will be higher than that for telephony alone
- Low income households will substitute additional expenditure on broadband for other items of household expenditure.

With this thinking in mind, we define the affordability limit for voice telephony plus broadband at 6% of household income for households in the lowest income decile. This definition will need to be reviewed as market take-up by lower income households increases and patterns of expenditure provide more reliable indicators of sustainable expenditure.

### What characteristics help control household expenditure?

The characteristics required of a broadband package for controlling household expenditure are basically the same as for voice telephony ie:

- Low connection costs
- Low minimum long-term commitments
- Low minimum monthly payments.

In addition it is important to provide a mechanism to avoid bill shocks. This is especially important for mobile broadband services, where relatively modest video downloads can lead to large bills. Fortunately such mechanisms are relatively easy to provide using warning texts.

## 3.4 Which broadband packages are most affordable?

We have used the basic process of Chapter 2 to assess the extent to which broadband packages are affordable. We have:

- Selected for analysis the fixed and mobile broadband packages with the lowest minimum monthly payments
- Established the total cost of ownership of these packages for households downloading 0.5 and 1 GB of data per month
- Added to this cost the monthly cost of voice telephony services calculated in Chapter 2
- Tabulated the connection cost, minimum monthly payment, and minimum long-term commitment cost for voice telephony and broadband combined.

In carrying out this analysis we have excluded the impact of bundled pricing. But calculations of bundled prices for fixed services[35] in the UK suggest that this approximation is a reasonable one. Figures 3-4 and 3-5 present the results of our analysis and Annex B provides detailed tabulations for each country.

**Figure 3-4: The expenditure control characteristics of broadband and telephony packages combined**

| Control measure | | Mobile | Fixed |
|---|---|---|---|
| Connection charge € | | 4 | 28 |
| Minimum long term commitment € | 1 | 19 | 174 |
| Minimum monthly payment € | | 0 | 21 |
| Minimum contract duration (months) | | 0 | 12 |

1 Minimum monthly payment x minimum contract period + connection charges and other up-front charges

**Figure 3-5: The relative cost of fixed and mobile broadband packages**

| Country | Finland | Poland | Portugal | Romania | UK |
|---|---|---|---|---|---|
| Affordability limit (€ per month) | 47 | 20 | 31 | 13 | 66 |
| % HH unconnected for BB - 2009 | 26% | 49% | 54% | 76% | 31% |
| HH in lowest decile (m) | 0.24 | 1.4 | 0.36 | 0.73 | 2.5 |
| Total cost (€) per month for: | | | | | |
| 0.5 GB + 30 minute use - fixed | 44 | 19 | 26 | 11 | 26 |
| 0.5 GB + 30 minute use - mobile | 18 | 9 | 15 | 15 | 14 |
| 1 GB + 60 minute use - fixed | 48 | 23 | 32 | 13 | 30 |
| 1 GB + 60 minute use - mobile | 19 | 12 | 20 | 15 | 29 |
| Cheapest 1 GB + 60 min as % of afford limit | 41% | 59% | 65% | 101% | 44% |

1 The telephony prices are for social tariffs with restricted availability for PL, PT, RO and UK (fixed)

Figure 3-4 shows that the unavoidable minimum costs of prepay mobile for voice telephony and broadband combined is much lower than the equivalent costs for fixed services - enabling low income households to control expenditure better.

Figure 3-5 indicates that:

- In four of the five countries - Finland, Poland, Portugal and the UK - socially necessary use of prepay mobile packages[36] generates substantially lower monthly costs than equivalent use of fixed services
- In these countries the monthly costs are well below the affordability limits

[35] Prepay mobile services for voice telephony and broadband are not generally offered as bundles

[36] For voice telephony and broadband combined

- In Romania fixed service packages[37] offer socially necessary levels of use at a monthly cost approximately equal to the affordability limit. However these packages are available to a limited proportion of low income households only - partly because of eligibility conditions in the case of the social tariff, and partly because of geographic availability. In Romania the fixed network has limited availability in the rural areas where many low income households are located. At the same time the fixed package generates significantly greater minimum unavoidable costs than the mobile package. As a result of these limitations, low income households in Romania struggle to afford both broadband and telephony services at home[38].

There are four important qualifications to the analysis of Figure 3-5.

***First*** the price of prepay mobile broadband services may not be stable. We know that some, but by no means all, mobile operators in Europe have historically priced mobile broadband packages at levels which might be below cost, so as to use up spare capacity on their 3G networks. As a result the price of mobile broadband now varies significantly across the EU – from €2 to €24 per GB of use. Now that 3G networks are reaching capacity, we might expect prices for mobile broadband to rise. Offsetting this effect, the introduction of new network technologies such as HSPA+ and LTE[39] and the release of additional spectrum for 3G use, especially UHF spectrum, should significantly lower unit costs. In addition our research suggests that, while mobile broadband prices are changing across the EU, the major changes are confined to packages which offer large or unlimited data downloads. The prices for packages which offer restricted use of mobile broadband, the focus of this study, are less likely to change dramatically.

***Secondly*** lack of suitable terminal equipment cannot be ignored when considering the affordability of broadband services. Second hand PCs, whether desktops or laptops, may cost €40 to €100[40] and require relatively high levels of digital skills to use successfully. We discuss this issue further in Chapters 5 and 6.

***Thirdly***, it is clear from our tariff analysis that, as downloads increase from 1 GB per month, it makes increasing financial sense for users to switch from mobile to fixed broadband packages. This again reflects the underlying cost structure of the fixed and mobile networks. The incremental cost of additional traffic on the fixed network is very small. On the mobile network, where users within a cell contend for scarce spectrum, the incremental costs are much higher. There is a crossover point at which the fixed network becomes a lower-cost option than the 3G mobile network. This crossover point, measured in low GB per month for current technology, is likely to rise over the next few years as LTE is rolled out and a more plentiful supply of UHF spectrum becomes available.

***Finally*** availability of mobile broadband in rural areas is likely to remain a substantial problem for the next few years. While mobile broadband makes good commercial sense using the currently available 2.1 GHz in areas of high population density, it is less viable in rural areas. Use of UHF spectrum, which increases cell sizes up to three times, makes rural broadband more viable. So the speed with

[37] Romtelecom offers both an attractively priced commercial broadband offering for low volume users and a social tariff for telephony

[38] We understand that the government in Romania has recognised this problem and has encouraged the development of an extensive network of Internet cafes in rural Romania

[39] The spectrum efficiency of LTE is seven times that of WCDMA according to *The broadband availability gap*, OBI Technical Paper 1, FCC, April 2010

[40] Based on Internet searches of second hand dealers and eBay in the UK

which UHF spectrum is made available for mobile broadband will have a significant impact on the affordability of broadband in rural communities over the next decade.

# 4 Possible measures to increase affordability

## 4.1 Introduction

There is a variety of options for making telecommunications services more affordable. We consider five main options in this section of the report. These are not mutually exclusive and policymakers might wish to consider combinations of them.

## 4.2 Option 1: raise incomes

***Option 1**: give more money, through social benefit payments, to low income households*

The best way to deal with affordability problems, if the objective is to maximise economic welfare, is simply to increase social benefit payments[41]. But this option may be rejected by policymakers on grounds of budgetary constraints. Or policy makers might take the view that it is important to guide consumption decisions. In other words policy makers see it as necessary to restrict a target group's freedom to spend government money as they wish (e.g. on drink, drugs, and gambling) and to direct it in other, more fruitful ways (e.g. on telecommunications).

Is there a clear case that a subsidy which is restricted to telecommunications is better than simply increasing benefits paid through the social security system? We might argue that targeted telecommunications subsidies promote e-inclusion and that this is an important social and economic objective for the EU. On the assumption that this case has been made, we consider further options for making telecommunications more affordable below.

## *4.3* Option 2: existing supply-side measures

**Option 2:** *continue with existing supply-side measures as set out in the Universal Service Directive*[42]

There is considerable literature on the relative merits of supply side and demand-side subsidy of essential services. But this analysis is service specific. Analysis of supply side, rather than demand side, subsidy of telecommunications services suggests that the former has few desirable properties. Supply side subsidy:

- May distort competition
- Generates high transaction costs in member states where universal service funds exist
- Is inefficient in directing funds to the target group
- May well be redundant, given the affordability of pay-as-you-go mobile

[41] *The economics of demand side financing*, Janssen, Maasland and Mendys-Kamphorst, March 2004, SEOR-ECRI

[42] In particular to provide users with a connection to the public telephone network at a fixed location and at an ***affordable*** price

## 4.4 Option 3: vouchers

***Option 3:*** *issue vouchers to low income households to pay for socially necessary use of telecommunications*

The literature on vouchers[43] suggests that, after Option 1, Option 3 offers the most economically efficient form of subsidy. Moreover telecommunications meets many of the criteria listed by Cave[44] for a successful voucher scheme ie:

- Competitive supply to and choice by users of the vouchers
- Easy to tie to intended purpose and prevent secondary trading in vouchers
- Low transaction costs if target recipients overlap strongly with existing benefit schemes
- Absence of capacity or rationing constraints.

However vouchers suffer from take-up problems, whatever essential service is being subsidised. There are both Type I errors, under which those eligible do not use the voucher, and Type II errors, under which ineligible people take advantage of the voucher.

On balance Option 3 appears more attractive than Option 2. But are vouchers needed? This is far from clear from the analysis of Chapter 2. The case for vouchers for voice telephony is especially weak. There is a stronger case for using vouchers to increase the affordability of broadband for low income households in the poorer member states. But even here alternatives such as Internet cafes and use of public WiFi hotspots might prove effective substitutes.

There may be exceptional cases for vouchers. For example there is a reasonable case for issuing vouchers to housebound older and disabled people to make fixed broadband affordable and so give these users affordable access to digital participation services[45] to avoid social isolation[46].

There may also be a good case for using vouchers to enable disabled people to purchase the equipment needed to make telecommunications services accessible to them. There is evidence that disabled people make significantly less use of telecommunications services than non-disabled people who enjoy the same income and education[47]. At the same time we observe a trend in which e-accessibility aids for the disabled are being implemented in software on mass-market smart phones and tablets rather than on specialised hardware[48]. Vouchers which enable disabled people to purchase such mass-market devices could help significantly in making assistive technologies for e-accessibility available to many disabled people.

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[43] Again see *The economics of demand side financing*, Janssen, Maasland and Mendys-Kamphorst, March 2004, SEOR-ECRI

[44] *Voucher programmes and their role in delivering public services*, Martin Cave, OECD, 2001

[45] Broadband services involving entertainment, education, and social connectivity. These services involve a high level of video communications for which prepay mobile broadband services are not suitable

[46] See *Assisted living technologies for older and disabled people in 2030*, Plum for Ofcom, June 2010 for a discussion on this point

[47] A m*ultidimensional analysis of the disability digital divide: some evidence for Internet use*, Vincente and Lopez, 2010

[48] *Communications technologies for assisted living*, Plum for Ofcom, June 2010

## 4.5 Option 4: services to redistribute the cost of calls

***Option 4:*** *implement services to redistribute the cost of calls and/or make prepaid credit balances recoverable*

Examples of such services include:

- A *Call Me SMS service* in which a low-income user texts (for free) to a richer correspondent with a request to be called. Such a service is popular in many low and middle income countries e.g. South Africa
- *Balance transfer services* in which mobile subscribers can transfer credit balances for a small fee. Such services improve affordability, both by allowing poorer households to receive credits from richer family and friends, and by reducing effective minimum top-up fees. Again such services are used successfully in middle and low income countries such as Egypt
- *Free calls from mobiles* to selected help lines. In general our analysis suggests that prepay mobile services are substantially more affordable than fixed services. But in a few member states, such as the UK, the price of calls to help lines from a mobile prepay service is significantly more than from a fixed service. Eliminating these additional charges[49] for calls to help lines which are important to low income households[50] would significantly enhance the value of prepay mobile services for low income users.

## 4.6 Option 5: no frills prepay packages

***Option 5****: require mobile operators to offer "no frills" prepay voice telephony and broadband packages*

The usage conditions associated with prepay mobile packages vary substantially across the EU. In some voice telephony credits expire after ***seven*** days; in others credits expire after ***180*** days. Some mobile operators offer prepaid mobile broadband at ***€10*** per GB; others price it at ***€67*** per GB. It is highly unlikely that such variations reflect underlying differences in cost. But these differences have a very significant impact on the affordability of prepay mobile services.

One option to deal with this problem is for NRAs to require or encourage mobile operators to offer at least one *no-frills* prepay package for both voice telephony and broadband. These packages might have some or all of the following characteristics:

- Expiry of credits after 90 days or more
- Modest minimum top-up fees e.g. €5
- Simple means for determining the current credit balance
- A requirement for SMSs or emails to warn of impending deactivation of a rarely used SIM and of sudden surges in use of data services which might lead to bill shocks
- The ability to receive inbound calls, and to make free calls, when the phone is out of credit
- A requirement to include a service-only option which will work with the customer's own equipment

[49] Or enabling such calls to be made from mobiles at no additional charge

[50] Such as government social security offices and the billing help lines of utilities

- A requirement to inform users when their volume of use would make it beneficial for them to move from the *no frills* package to another tariff plan.

# 5 Changes in affordability over the next five years

## 5.1 Introduction

There are a number of regulatory developments and market/technology trends which could change the current position on affordability of telecommunications over the next five years. We consider these changes under four headings - economic trends, changes affecting voice telephony, changes affecting broadband, and the move from household to personal communications

## 5.2 Economic trends

Over the past 10 years the affordability of a given set of telecommunications services has risen substantially across the EU as:

- Household incomes have risen
- The prices for telecommunications services have dropped in real terms.

But this does not mean that economic changes will eliminate affordability issues over the next five years. In particular:

- It is likely that the current global economic crisis will reverse, slow or halt increases in household income for many over the next few years
- Rising consumer expectations, and the way a wide range of goods and services are now delivered to consumers, means that the scope of socially necessary use of telecommunications is widening. Five years ago broadband was not considered socially necessary. But in a recent survey, the Joseph Rowntree Foundation found that broadband is now regarded by the UK population as an essential service[51].

## 5.3 The affordability of voice telephony

There are a number of trends which will affect the affordability of voice telephony services over the next five years:

- There is now strong regulatory pressure to reduce mobile termination rates near to zero. This could lead mobile operators to tighten credit expiry conditions and increase minimum top-up fees for prepay services so as to preserve the profitability of low volume customers. Such changes would make prepay mobile services less affordable. Work is needed here to consider whether such changes are inevitable or whether mobile operators could maintain profitability without damaging the affordability of prepay services – for example by introducing receiving party pays based packages or mechanisms for reversing or transferring call charges such as are discussed in Chapter 4

[51] A recent Joseph Rowntree Foundation study shows that home internet access is now regarded as a basic essential in the UK for everyone of working age. http://www.jrf.org.uk/publications/minimum-income-standard-2010

- The move to mobile only households for voice telephony will, almost certainly, continue, especially among low-income households. This will raise the proportion of households for which the incremental cost of adding fixed broadband is both the broadband subscription fee and the basic line rental. Such a trend is likely to strengthen the position of mobile prepay broadband packages as the affordable choice of low income households
- In the long run voice telephony will just become another application offered over broadband. This offers a way for low income households to cut their telecommunications bills. Already Skype to Skype calls are free and Skype Out charges €0.015 per minute for calls worldwide, compared to €0.12 per minute for national calls in typical packages from Figure 2-10. It is unlikely that voice over broadband will become the dominant form of voice telephony by 2015, especially for mobile services. But this trend does suggest that policy on affordability should focus on broadband rather than voice telephony in future.

## 5.4 The affordability of broadband services

We have identified four main trends which might impact the affordability of broadband services in the EU over the next five years:

- By 2015 a great majority of households will use broadband - whether fixed, mobile or both. In many cases they will use smartphones and/or tablets rather than conventional PCs. The main unconnected households are likely to be those where older people live. Statistics on Internet take-up suggest that this segment of the population, many of whom are on low incomes, will never use broadband in their lifetime[52]. As the proportion of broadband households rises so too will the importance of affordability for those who remain unconnected
- The socially necessary volume of broadband downloads will grow significantly. Cisco predicts a threefold growth in downloads per household for socially necessary use[53] such as web and data applications and VoIP by 2015[54]. This might raise the monthly cost of socially necessary broadband use above the affordability limits. Offsetting this trend is a likely substantial reduction in the unit costs of supplying mobile broadband. There are two main effects. Over the next five years the supply of 3G and 4G spectrum will grow three fold or more while spectrum efficiency will more than double as new mobile broadband technologies such as LTE are rolled out
- By 2015 use of mobile broadband by households in the BRICI[55] countries will have a strong impact on the global supply of devices, applications and services. The markets for telecommunications in BRICI are now the biggest and fastest growing in the world[56] and, as such, are attractive to global suppliers. We can reasonably expect the demand from BRICI will:
  - Strengthen the importance of mobile, rather than fixed, services and devices
  - Increase the importance and availability of mobile oriented Internet applications

[52] *Demand-side measures to stimulate Internet and broadband take-up*, Plum Consulting in *Developing Government objectives for broadband*, Vodafone Policy Paper Series, Number 10, March 2010,

[53] We have excluded video based entertainment services, Internet gaming, and music file sharing as being discretionary activities rather than socially necessary

[54] *Cisco Visual Networking Index; forecast and methodology, 2009-2014*, Cisco, June 2010

[55] Brazil, Russia, India, China and Indonesia

[56] See for example *The Internet's New Billion*, Aguiar et al, Boston Consulting Group, September 2010

– Bring strong pressure for the supply of simple-to-use, relatively low-priced, smartphones and tablets.

Such developments should have a positive effect in improving both the affordability and ease of use of mobile broadband devices in the EU

- Implementation of the current Digital Agenda targets for broadband could start to have a strong negative impact on affordability by 2015. The problem is as follows. The European Commission has set two universal broadband targets – one for basic broadband for all by 2013 and another for 30 Mbps (or higher) download speeds for all by 2020. Achieving the latter target redefines what is meant by basic broadband and substantially raises the cost of providing it. This in turn means a substantial increase in the price of supplying basic broadband and a substantial increase in the number of EU citizens for whom broadband is too expensive.
- We might reasonably expect the emergence of new kinds of mobile broadband price plans in which multiple devices share a single pooled data allowance. Such plans could be attractive to those on low incomes, especially if they are bundled with use of public WiFi hotspots.

## 5.5 The move to personal communications

We have considered affordability of telecommunications by household. But the move to mobile services for both voice telephony and broadband implies a move from household to personal communications. So at some point we might need to consider affordability at the personal rather than the household level. Equally we might also see the emergence of innovative tariff packages in which mobile operators sell inclusive packages to a number of household members. We understand that such packages are beginning to emerge in the US.

# 6 Conclusions and recommendations

## 6.1 Introduction

Affordability for all has long been an objective of the EU's approach to universal service in telecommunications, but it has never been centrally defined. Instead it has been left to Member States to pursue in the light of national conditions. In the context of overall falling prices and rising penetration, affordability has received little systematic study or regulatory attention.

This report has defined affordability of telecommunications in a way that focuses attention on sustainable and controllable spending on telecommunications by households in the lowest income decile in each Member State. To do this we have taken a view on levels of usage which may be regarded as socially necessary.

## 6.2 Conclusions on the affordability of voice telephony services

Our overall analysis indicates that:

- Voice telephony services delivered using commercial prepay mobile packages are now affordable to the average household in the lowest income decile across the EU - in low income as well as high income member states
- For virtually all of the EU's population, there is no longer a need for the traditional universal service obligations to supply telephony services at a fixed location. Commercial prepay mobile services meet this need for all but a small proportion of the population[57] in remote rural areas where mobile coverage is inadequate. Taking steps to enable such coverage is likely to be a more cost effective way of ensuring universal service than current arrangements.

The more detailed findings which lead us to reach these overall conclusions are summarised below.

By the beginning of 2010 a significant proportion of households in low-income member states, such as Poland, Portugal and Romania, remained unconnected to the basic telephone network. As far as we can tell lack of affordable service, rather than lack of geographical availability, is a principal cause of this situation. There are far fewer unconnected households in high income member states.

In these low-income member states, the proportion of unconnected households is falling. As unconnected households become connected, they largely use prepay mobile services.

Voice telephony services delivered using commercial prepay mobile tariffs are significantly more affordable than those using fixed network tariffs - even social tariffs where they exist. Prepay mobile packages allow low-income households to control their expenditure on telecommunications better, because the minimum unavoidable costs are several times smaller, and generate monthly costs for socially necessary use which are lower than, or the same as, fixed packages.

Prepay mobile telephony packages generate total monthly costs for socially necessary use which are below affordability limits[58] in all five study countries. Affordability problems are greatest in Romania,

[57] Now 1% or less in virtually all member states

[58] Defined as 4% of average expenditure by households in the lowest income decile for telephony and 6% for telephony plus broadband

where the monthly cost for 60 minutes of outbound use is at 58% of the affordability limit. This is the study country where the proportion of unconnected households was greatest at the beginning of 2010.

Problems of affordability largely reflect differences in the weekly budget available to a low income household. For example in the UK a low income household has a budget which is 4.5 times bigger than in Romania. But conditions on expiry of prepay credits and minimum top up fees are also important in determining the minimum cost of socially necessary use by low income households - whether for telephony or broadband services. These conditions vary considerably across member states. In some member states credits associated with the smallest top-up fees expire after seven days; in others after 90 days.

Given our definition of affordability, voice telephony services delivered using commercial prepay mobile services are now affordable for by low income households across the EU - in low-income as well as high income member states. Where problems remain, they relate to the rural coverage of mobile networks and the resistance of many older people to using mobile phones.

Looking forward, the regulated reduction of mobile termination rates towards zero might lead mobile operators to tighten credit expiry conditions and raise top up fees over the next few years. This could substantially reduce the affordability of basic telephony services.

## 6.3 Conclusions on the affordability of broadband services

The number of households without a broadband connection is falling steadily. But it is still substantial. In the poorer households of low-income member states it is currently over 90%.

Affordability is only one of five major barriers to take-up of the broadband Internet[59]. But affordability is growing in importance as a barrier, and may become the main barrier to take-up over the next few years.

For many households mobile broadband is a complement to fixed broadband. But for those making only socially necessary use[60] it is likely to be a substitute.

For such households prepay mobile broadband (together with prepay mobile telephony) is likely to be significantly more affordable than fixed broadband. Our analysis shows that:

- The minimum unavoidable costs are several times lower for mobile than for fixed packages. As a result mobile prepay packages make it easier to control household expenditure on telecommunications
- The monthly cost for socially necessary use of mobile prepay packages is similar to, or lower than, the current cost of fixed packages.

Overall our analysis indicates that commercial prepay mobile packages for broadband and voice telephony meet our definition of affordability across the EU. But, looking forward, there are potential problems:

- The volume of broadband downloads which are socially necessary will rise significantly over the next few years. Under current tariffs this will lead to total monthly costs for low-income

[59] Along with a lack of digital skills, of relevance of the Internet, of a credit or debit card and the limited geographic availability of broadband at functionally necessary speeds

[60] ie 1 GB or less of downloads per month

households which breach affordability limits. But there is a good chance that mobile broadband prices will fall with improvements in spectrum efficiency and a greater supply of spectrum for mobile broadband

- Terminal equipment which is both affordable and easy-to-use is lacking. The development of low-cost smartphones and tablets to meet demand for mobile broadband over the next few years in countries such as Brazil, Russia, India, Indonesia and China should help here
- Implementation of the Digital Agenda targets of 30 Mbps for all by 2020 could redefine basic broadband, raise cost based prices substantially, and lead to major problems with affordability
- Reasonable speeds for broadband are still not available to everyone. Availability of fixed broadband is limited in rural areas, especially in Central and Eastern European member states, and mobile broadband over 3G networks is typically not available to 10% to 20% of the population in most member states.
- Lack of availability of UHF spectrum could delay rollout of mobile broadband in rural areas. This would have a significant effect on the affordability of broadband in rural areas.

## 6.4 Options for improving affordability

The economically efficient way to improve affordability of telecommunications is to increase welfare payments. But this option is likely to be rejected by policymakers, partly on grounds of budget restrictions, and partly because they may believe it is important to encourage consumption of telecommunications instead of other items of household expenditure

In these circumstances demand side subsidies based on vouchers are more promising than existing supply-side subsidies. But our research indicates that, given the affordability of commercial prepay services, voucher schemes may be redundant except for small, well-defined, groups, such as groups with specific disabilities and housebound older people.

Measures which might do more to improve affordability include:

- Requiring or encouraging mobile operators to offer no-frills prepay packages which are designed specifically to meet the needs of low income households
- Encouraging the provision of mobile services, such as Call Me SMS, balance transfers and free calls to selected help lines, which transfer costs from low-income users to others.

## 6.5 Recommendations to policymakers

We can divide our recommendations to policy makers into two groups – those which affect general telecommunications policy in the EU and those which are specific to improving affordability.

### General policy recommendations

***Recommendation 1:*** *do not consider supply-side subsidy as a way of dealing with affordability issues in future.* Commercial prepay mobile services can, and do, deliver the same results without the need for regulation. At the same time supply side subsidy is a high cost way to deal with the problem and

can distort competition. At the moment there are fixed network, social, tariffs, often aimed at older people who are reluctant to switch to mobile services[61]. The rate at which it is appropriate to phase out such tariffs is member state-specific and we do not address it here.

***Recommendation 2**: concentrate any supply-side measures on ensuring geographic availability of mobile, rather than fixed, services*. Our research suggests that it is mobile, rather than fixed, services which are best able to deliver affordable telecommunications services to those on low incomes. Current trends strengthen this conclusion. There are currently significant gaps in 3G coverage. Many of them will disappear once UHF spectrum is generally available for 3G use across the EU[62]. But gaps in coverage will remain. Satellite services may be required, if it is decided to provide coverage in the most remote rural areas. But network sharing by mobile operators should deal with the bulk of the gap between commercially profitable areas and 100% population coverage. It would also strengthen the case for phasing out universal service requirements on the supply of payphones.

***Recommendation 3**: focus future policy on the affordability of broadband rather than telephony services*. There is considerable and growing evidence that both telephony and broadband services are now socially necessary. But lack of connectivity to broadband is a much bigger problem across the EU. Moreover, in the long term, voice telephony will become just another application on broadband.

***Recommendation 4**: focus policy on ensuring take-up of basic broadband services*. Affordability is an important and growing barrier to take-up of broadband Internet. But it is only one of five main barriers to take-up, which need to be dealt with in an holistic way. This includes the affordability of easy-to-use broadband ***devices*** as well as the affordability of broadband ***services***.

***Recommendation 5**: review the impact of the Digital Agenda targets for broadband in 2020 on the affordability of telecommunications services across the EU*. Implementation of these targets could redefine basic broadband, significantly raise its cost based price, and increase affordability problems substantially.

## Specific recommendations

***Recommendation 6**: collect better data at the EU level on unconnected households*. Such information is an important prerequisite to defining policy measures. The current data from Eurobarometer on how households access voice telephony services do not include information on household income. This makes it more difficult to determine whether the current policies on the affordability of telephony services in low income member states are working or not.

***Recommendations 7**: measure and monitor the affordability of telecommunications services in each member state using a common framework*. This study provides an initial analysis. But it covers only five of the 27 member states and looks only at those tariff packages which are most likely to generate

[61] Vodafone estimates that the take-up of such tariffs is around 500,000 in France, 250,000 in Spain, and 600,000 in the UK.

[62] As envisaged in the European Commission's proposal of September 2010 to the European Parliament and Council to establish a radio spectrum policy programme. See COM(2010) 471 final

the lowest costs for low income households. Each member state NRA might use the framework set out here to:

- Define affordability limits and socially necessary use. We suggest using a common definition across the EU to allow comparison
- Take account of credit expiry periods and minimum top up fees in calculating the total monthly cost of socially necessary use using prepay packages
- In addition to total monthly costs, measure expenditure control factors such as the upfront payments, minimum monthly payments, minimum long-term commitments and minimum contract terms
- Carry out cross-country comparisons on the affordability of telecommunications packages in other countries - either unilaterally or through cooperation with other NRAs.

Depending on the findings of this analysis, NRAs might then wish to consider Recommendations 8 and 9.

***Recommendations 8****: encourage mobile operators to provide services which enable low-income households to transfer usage costs to others.* Such services might include:

- Call Me SMS services
- Balance transfer services - which also allow more effective use of credits
- Free calls from mobiles to selected help lines.

***Recommendation 9****: require or encourage mobile operators to offer at least one no-frills prepay package to consumers for both telephony and broadband services.* Whilst many mobile operators offer commercial prepay packages which meet the needs of low-income households well, others do not. This package might have some or all of the following characteristics:

- Expiry of credits after 90 days or more
- Modest minimum top-up fees e.g. €5
- Simple means for determining the current credit balance
- A requirement for SMSs or emails to warn of impending deactivation of a rarely used SIM and of sudden surges in use of data services which might lead to bill shocks
- The ability to receive inbound calls, and to make free calls, when the phone is out of credit
- A requirement to inform users when their volume of use would make it beneficial for them to move from the *no frills* package to another tariff plan.
- A requirement to include a service-only option which will work with the customer's own equipment

A no-frills package which meets these conditions will, if our analysis is correct, make telecommunications services affordable to the ***average*** household in the lowest income decile. Equally importantly it will provide an opportunity for those on the lowest income within this decile to remain connected to the network so as to receive incoming calls, to make calls to numbers which are free of charge and, when the occasion requires, to make high-value, charged, outbound calls.

It is important that NRAs apply these conditions to a small subset of prepay packages rather than to all of them. There is a wide range of needs for prepay packages and applying the conditions listed above to all such packages would substantially reduce consumer choice.

***Recommendation 10:*** *carry out further work to consider the impact on affordability of regulating mobile termination rates towards zero*. Mobile operators might respond to such regulations by increasing the cost of prepay packages for voice telephony and so increase affordability problems. What are the options for maintaining the profitability of prepay telephony packages aimed at low-income households without making them unaffordable?

***Recommendation 11:*** *publicise affordability provisions to target groups.* An essential complement to any of the affordability provisions discussed above (including vouchers and suitable tariff packages) is to ensure that intended beneficiaries can take them up. This means that target groups must be aware of the provisions, understand their advantages (and disadvantages, if any), and be able to access the relevant distribution channels. NRAs might wish to take up this issue with organisations representing the interests of target low income groups.

# Annex A Tariff analysis - voice telephony

This annex compares the measures of expenditure control and total monthly end user costs for socially necessary use of fixed and mobile packages in the five study countries. It is based on tariff information supplied by Tariff Consultancy Ltd.

Na indicates where information was not found or was uncertain, following our enquires. These data points, all expenditure control parameters, were excluded from the averages of Figures 2-10 and 3-4.

Exchange rates used to convert to €: €1.2 per £ and €0.25 per PLN.

| | | |
|---|---|---|
| Country | **Finland** | |
| Service | **Voice telephony** | |
| Currency used | **€** | |
| | Fixed | Mobile |
| Package | Elisa Basic Interface | dna prepay |
| Eligibility requirements | na | None |
| Connection charge | na | 17 |
| Minimum commitment | 151 [3] | 17 |
| Minimum monthly payment | 12.55 | 0 |
| Cost of N call minutes per month | | |
| N = 0 | 12.55 | 0 |
| N = 30 | 17 | 3.3 [2] |
| N = 60 | 21.5 | 3.6 [2] |
| Marginal cost per added minute | 0.15 [1] | 0.06 |

1 Blended call rate assuming 50% calls to mobile, 50% peak time calls , 50% of mobile calls on-net
2 €10 per topup and 90 day expiry on credits
3 Assumes 12 months minimum contract

| | |
|---|---|
| Country | **Poland** |
| Service | **Voice telephony** |
| Currency used | **PLN** |

| | Fixed | Mobile |
|---|---|---|
| Package | TP Friendly | Orange Go |
| Eligibility requirements | Receiving benefits | None |
| Connection charge | 10 | 0 |
| Minimum commitment | 220 | 7 |
| Minimum monthly payment | 18.3 [1] | 0 |
| Cost of N call minutes per month | | |
| N = 0 | 18.3 | 0 |
| N = 30 | 26.4 | 25 [3][4] |
| N = 60 | 34.5 | 25 [3][4] |
| Marginal cost per added minute | 0.27 [2] | 0.29 [2] |

1 Includes 30 minutes of calls
2 Blended call rate assuming 50% calls to mobile, 50% peak time calls , 50% of mobile calls on-net
3 Assumes user buys PLN 25 top up with 30 day expiry
4 Credit expiry rules mean that unused minutes are lost at the end of the month

| | |
|---|---|
| Country | **Portugal** |
| Service | **Voice telephony** |
| Currency used | **€** |

| | Fixed | Mobile |
|---|---|---|
| Package | PT Economic | Vodafone Directo |
| Eligibility requirements | Income below minimum wage | None |
| Connection charge | 25 | na |
| Minimum commitment | 120 | na |
| Minimum monthly payment | 10 | 0 |
| Cost of N call minutes per month | | |
| N = 0 | 10 | 0 |
| N = 30 | 16 | 4.9 |
| N = 60 | 22 | 9.9 |
| Marginal cost per added minute | 0.2 [1] | 0.17 |

1 Blended call rate assuming 50% calls to mobile, 50% peak time calls , 50% of mobile calls on-net

| | |
|---|---|
| Country | **Romania** |
| Service | **Voice telephony** |
| Currency used | **€** |

| | Fixed | Fixed | Mobile |
|---|---|---|---|
| Package | Romtelecom voice fixed 100 | Romtelecom Voce Social | Cosmote Cartela |
| Eligibility requirements | na | Low income consumer | None |
| Connection charge | 24.8 | 20 | 0 |
| Minimum commitment | na | na | 5 |
| Minimum monthly payment | 8.6 | 4.9 | 0 |
| Cost of N call minutes per month | | | |
| N = 0 | 8.6 | 4.9 | 0 |
| N = 30 | 11.6 | 7 | 5 [2] |
| N = 60 | 14.6 | 9.1 | 5 [2] |
| Marginal cost per added minute | 0.1 [1] | 0.07 [1] | 0.16 [1] |

1 Blended call rate assuming 50% calls to mobile, 50% peak time calls , 50% of mobile calls on-net
2 €5 for 70 national minutes with 30 day expiry

| | |
|---|---|
| Country | **UK** |
| Service | **Voice telephony** |
| Currency used | **£** |

| | Fixed | Mobile |
|---|---|---|
| Package | BT Basic | Orange Racoon |
| Eligibility requirements | Receiving benefits | None |
| Connection charge | 128 [3] | 0 |
| Minimum commitment | 54 [1] | 5 |
| Minimum monthly payment | 4.5 [2] | 0 [5] |
| Cost of N call minutes per month | | |
| N = 0 | 4.5 | 0 |
| N = 30 | 6 [4] | 4.5 |
| N = 60 | 9 | 9 |
| Marginal cost per added minute | 0.11 | 0.15 |

1 £13.50 per quarter for 12 months
2 £13.50 per quarter
3 If no line to the premises
4 £4.50 includes 15 bundled minutes
5 No expiry of top up credits

# Annex B Tariff analysis – broadband

The tables in this annex measure the incremental costs of adding broadband to telephony. We provide estimates of the incremental cost of adding FBB to both fixed voice telephony and mobile only households because these costs are significantly different.

| | | | |
|---|---|---|---|
| Country | **Finland** | | |
| Service | **Broadband** | | |
| Currency used | **€** | | |

| | FBB added to | | MBB added |
|---|---|---|---|
| | Fixed VT HH | Mobile only HH | |
| Package | Elisa 1 Mbps | na | Sonera basic package |
| Eligibility requirements | na | na | None |
| Connection charge | 79 | na | 0 |
| Minimum commitment | na | na | 15 [1] |
| Minimum monthly payment | 26.9 | na | 0 |
| Cost of N GB per month | | | |
| N = 0 | 26.9 | na | 0 |
| N = 0.5 | 26.9 | na | 15 |
| N = 1 | 26.9 | na | 15 |
| Marginal cost per added GB | 0 [2] | na | 0 [2] |

1 Top up fee of €15 buys unlimited use. Assume 30 days credit expiry
2 Unlimited use

| | | | |
|---|---|---|---|
| Country | **Poland** | | |
| Service | **Broadband** | | |
| Currency used | **PLN** | | |

| | FBB added to | | MBB added |
|---|---|---|---|
| | Fixed VT HH | Mobile only HH | |
| Package | TP Neo 512 kbps | TP Neo 512 kbps | Orange pre pay |
| Eligibility requirements | na | na | None |
| Connection charge | 0 | 0 | 0 |
| Minimum commitment | 659 [1] | 878 [2] | 5 |
| Minimum monthly payment | 54.9 | 73 [2] | 0 |
| Cost of N GB per month | | | |
| N = 0 | 54.9 | 73 [2] | 0 |
| N = 0.5 | 54.9 | 73 [2] | 12.5 |
| N = 1 | 54.9 | 73 [2] | 25 |
| Marginal cost per added GB | 0 | 0 | 25 |

1 Assumes 12 month minimum contract as for fixed voice telephony
2 Assumes fixed voice telephony standing charges added

| | |
|---|---|
| Country | **Portugal** |
| Service | **Broadband** |
| Currency used | **€** |

| | FBB added to Fixed VT HH | FBB added to Mobile only HH | MBB added |
|---|---|---|---|
| Package | Sapo ADSL | Sapo ADSL | Optimus Time |
| Eligibility requirements | Income < minimum wage | na | None |
| Connection charge | 0 | na | 0 |
| Minimum commitment | 120 | 240 | 15 |
| Minimum monthly payment | 10 | 20 | 0 |
| Cost of N GB per month | | | |
| N = 0 | 10 | 20 | 0 |
| N = 0.5 | 10 | 20 | 10 [2] |
| N = 1 | 10 | 20 | 10 [2] |
| Marginal cost per added GB | 0 [1] | 0 [1] | 0 [1] |

1 Unlimited use
2 Assuming credits expire after one month

| | |
|---|---|
| Country | **Romania** |
| Service | **Broadband** |
| Currency used | **€** |

| | FBB added to Fixed VT HH | FBB added to Mobile only HH | MBB added |
|---|---|---|---|
| Package | Romtelecom Click Net Surf | Romtelecom Click Net Surf | Vodafone Cartela Internet |
| Eligibility requirements | na | na | None |
| Connection charge | 0 | 24.8 | 0 |
| Minimum commitment | 86 | 293 | 28 |
| Minimum monthly payment | 3.6 [1] | 12.2 [3] | 10 |
| Cost of N GB per month | | | |
| N = 0 | 3.6 | 12.2 | 0 |
| N = 0.5 | 3.6 | 12.2 | 10 [4] |
| N = 1 | 3.6 | 12.2 | 10 [4] |
| Marginal cost per added GB | 0 [2] | 0 [2] | 10 |

1 With 5 GB allowance
2 To 5GB
3 €3.6 for BB and 8.6 for the line rental
4 Top up fee of €10 buys 1GB of downloads with credits expiring after 30 days

| | |
|---|---|
| Country | **UK** |
| Service | **Broadband** |
| Currency used | **£** |

| | FBB added to Fixed VT HH | FBB added to Mobile only HH | MBB added |
|---|---|---|---|
| Package | BT Basic BB added to BT Basic | Talk Talk Essentials | Vodafone Top Up and Go [5] |
| Eligibility requirements | Receiving benefits | Credit checks | None |
| Connection charge | 90 | 70 | 0 |
| Minimum commitment | 192 | 333 | 15 [4] |
| Minimum monthly payment | 16 | 18.5 [2] | 0 |
| Cost of N GB per month | | | |
| N = 0 | 16 | 18.5 | 0 |
| N = 0.5 | 16 | 18.5 | 7.5 |
| N = 1 | 16 | 18.5 | 15 |
| Marginal cost per added GB | 0 [1] | 0 [3] | 15 |

1 To 10 GB per month
2 £11.50 for line rental and £7 for broadband
3 Up to 40 GB per month
4 Initial fee for dongle and 1 GB of use
5 This package is now not available to new users