BELGIAN INSTITUTE FOR POSTAL SERVICES AND TELECOMMUNICATIONS

CONSULTATION OF THE BIPT COUNCIL

ON

BIPT OPINION

TO MINISTER V. VAN QUICKENBORNE

CONCERNING THE ACTIONS THAT MIGHT

CONTRIBUTE TO STIMULATE

FIBRE TO THE HOME

**OPINION BASED ON ARTICLE 14 §1 1°
OF THE ACT OF 17 JANUARY 2003**

To respond to this document

Deadline: until 30 June 2009
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Answers can only be sent by e-mail.
The document must clearly indicate what should be considered as confidential.
This consultation takes place according to Article 140 of the Act of 13 June 2005.

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1 INTRODUCTION

1.01 THE IMPORTANCE OF FTTH AS FAR AS NEW SERVICES ARE CONCERNED

For the last years consumers have been using more and more often broadband services requiring higher bandwidth like download, small online films as well as digital television.

Technology has therefore rapidly evolved to meet the increase in this bandwidth demand (see figure 1).
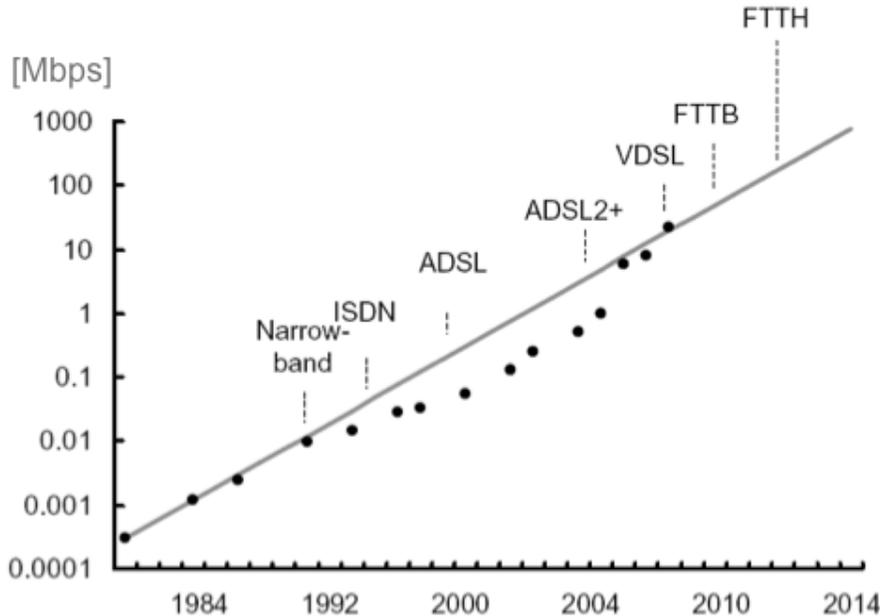

Figure 1. Overview of the evolution of xDSL technologies (Source: IEEE spectrum)

ADSL has been replaced by ADSL2+ from 2005 onwards and since 2008, VDSL2 has been available in Belgium to support HDTV, but it is already obvious now that Fibre to the Home (called hereafter "FTTH") is the next step within the framework of this evolution. The EuroDOCSIS standard used for cabled networks has also been upgraded from version 2.0 to 3.0, making it possible to obtain bandwidths higher than 100 Mbit/s thanks to channel bonding.

The demand for higher bandwidths will require Fibre to the Home roll-out in the next few years . We expect that the bandwidth demand will continue, like in the past, to double every 20 months (see figure). We can already mention now a certain number of services which will require higher bandwidths of this type and which will only become more popular in the future: watching and recording TV programmes through IPTV or Internet with image quality always better (from HD to super Hi-Vision) or in 3D, intelligent energy meters, the replacement of desktop applications by online applications, …
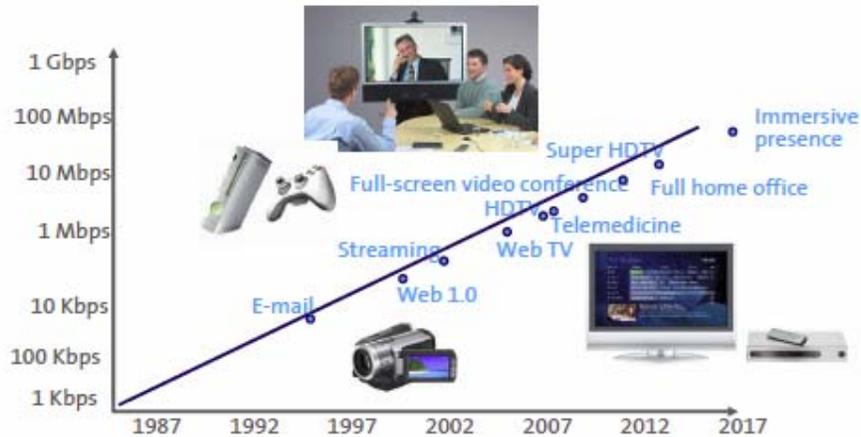
Figure 2. Doubling of the bandwidth demand every 20 months (Source: Swisscom)

1.02 EUROPEAN CONTEXT

Several authorities are dealing with this issue for the moment. ERG is drawing up a common opinion on the Next Generation Access (NGA) and its implementation. The European Commission is working on the review of the regulatory framework and a recommendation on NGA. All these issues can also have some impact on FTTH development. Some indication based on text drafts has already been given where it was relevant.

1.03 OBJECTIVE OF THIS CONSULTATION

This discussion paper aims at giving an overview of the fibre to the home status, identifying the problems encountered with fibre to the home roll-out and suggesting some actions that could be undertaken by public authorities in order to stimulate fibre to the home roll-out in Belgium.

BIPT itself has a certain number of competences based on the regulatory framework, where measures can be imposed on telecommunications operators with a market analysis. This paper does not aim at anticipating these future measures but rather at examining what the other authorities and public authorities can undertake in addition to these regulatory measures to stimulate fibre to the home roll-out as much as possible.

Therefore it is indicated to allow the different parties concerned to give their opinion on these possible actions thanks to this consultation.

2   WHAT IS FIBRE TO THE HOME (FTTH)?

The current access network where a copper cable or a coaxial cable links together the end-user and the exchange will completely change in the next years because bandwidth (download and upload speed) is limited by length and cable quality. To reach higher speed the current cable must therefore be entirely or partially replaced by optical fibre.

Some operators choose to directly install optical fibre in each living room (Fibre to the home FTTH) or each building (Fibre to the Building - FTTB), but because of the related high investment cost, many European operators opt for an intermediate scenario where optical fibre is installed up to the street cabinet and the 'last mile' between the street cabinet and the end-user is still made up of the copper cable or the coaxial cable already present (Fibre to the cabinet).

Belgian operators have picked this last scenario and have made these last years huge investment to lay optical fibre to street cabinets.

The copper access network
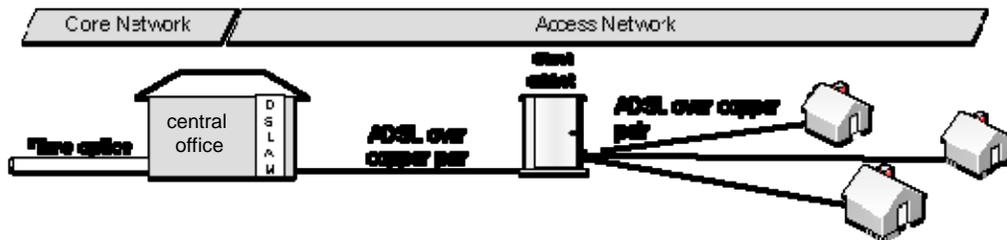
Fibre to the cabinet
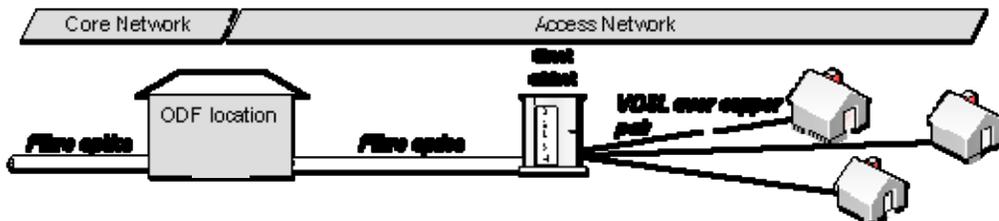
Fibre to the home/building

Figure 3. Overview of the evolution of an access network made of copper cable (Source: Cullen, 2007)

3   FTTC & FTTH ROLL-OUT

The FTTH market has experienced strong growth in 2008 according to an IDATE survey carried out for the FTTH Council Europe. At the end of December 2008 11.2 millions homes were equiped with optical fibre, i.e. 27% growth compared to June 2008.

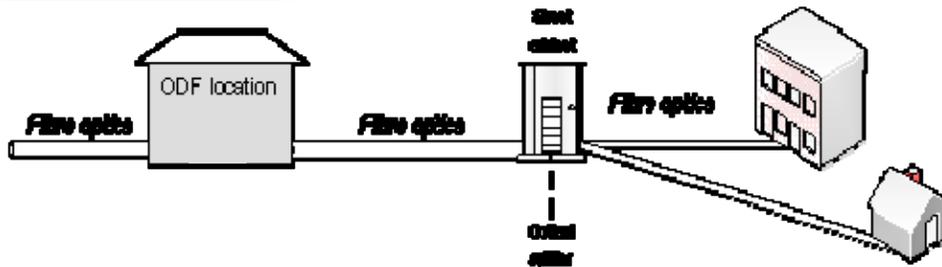A certain number of countries like the Netherlands and France occupy a role of pioneer within this framework. At the same time, Italy, Sweden, Norway, Denmark and Spain are actively busy with FFTH roll-out as shown by the figure below:
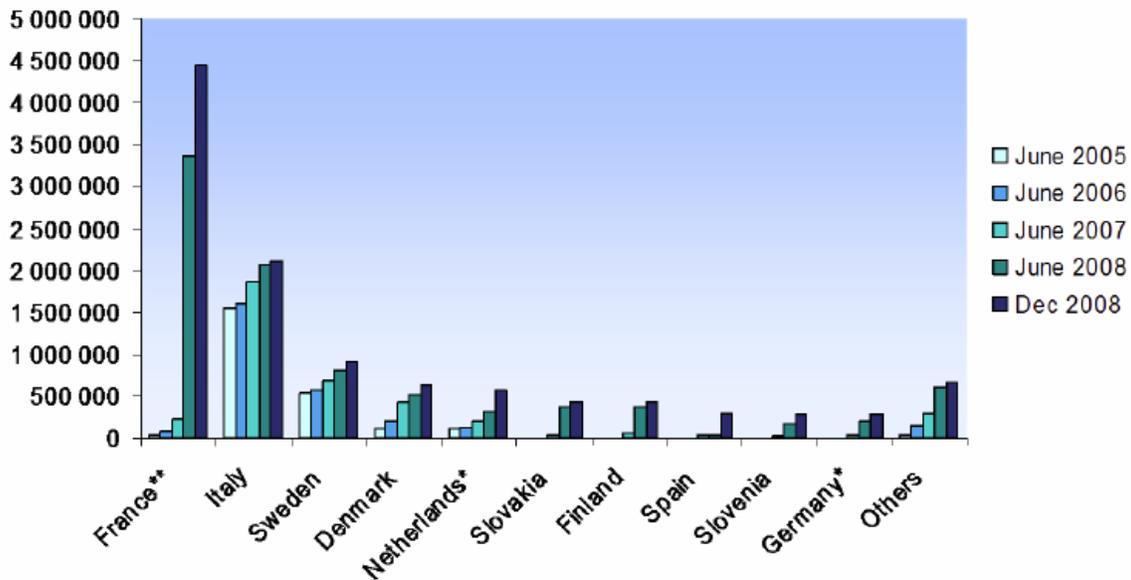
Figure 4. Evolution of the number of FTTH/B households (Source: IDATE)

Because of the high FTTH growth in the Netherlands and in France, these countries will be first closely examined in the next paragraphs before commenting the Belgian situation.

3.01   THE NETHERLANDS

In 2005 KPN had announced once again that it was going to migrate all his lines to VDSL2 until 2010. Currently KPN has only implemented VDSL2 in a limited number of test areas and would like to provide VDSL2 from the exchange.

Since 2005 Reggefiber has allied itself with a few other companies and municipalities to cover all the Netherlands with optical fibre networks. The company has plans in all the Netherlands to equip several cities and municipalities with optical fibre.

Since 2008 KPN's priorities have strongly changed, it focuses now on FFTH instead of VDSL2. Now it concerns more a mixed strategy FTTH/VDSL2. KPN is particularly wondering about the added commercial value of VDSL2 compared to ADSL2+ and to the limited possibilities of VDSL2 to stay competitive with cable.

Therefore in 2008 KPN grouped together its optical fibre activities with those of Reggefiber by creating a common company, under the name of Reggefiber FTTH. The telecommunications operator takes a minority interest of 41% in the optical fibre provider, which he might increase if collaboration is successful.

Figure 5. Reggefiber's plans

The Dutch NMa competition authority has agreed with this collaboration under certain conditions. These conditions are the same remedies that those imposed by the Dutch telecoms regulator OPTA in its LLU marekt decision of 19 December 2007 on the common company. OPTA and NMa want to give the necessary room for manœuvre and regulation security to both companies, but also want to see to it through price caps that KPN does not charge too high tariffs on its competitors to access optical fibre. This cap is based on the investment necessary to equip a house with optical fibre and varies according to the CAPEX area between 14.50 EUR and 17.50 EUR per line per month. Both parts are monitored by NMa with a 'maintenance procedure' and by OPTA based on its competences in accordance with the Act on telecommunications.

KPN points out that the future investment will only be made if it is justified at commercial level. "However a large scale installation of FTTH networks in the Netherlands is not planned yet". During the first half of 2009 KPN will equip five Dutch cities with optical fibre and will then carry out a business assessment.

In the market analysis of Market 4 (unbundling) OPTA imposed optical fibre unbundling and access to optical distribution frame (ODF) on KPN as fibre and seller belong to the same (physical) access market to network infrastructure. Analysys Mason examined, at the request of OPTA, the business case[1] of unbundled access to optical fibre in the Netherlands, which shows that Point-to-Point FTTH services are viable based on ODF access. Therefore OPTA considers that unbundling optical fibre is sufficient to boost competition and has therefore not imposed any bitstream offer on KPN through optical fibre.

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[1] http://opta.nl/nl/actueel/alle-publicaties/publicatie/?id=2815

3.02   FRANCE

Fibre to the home (FTTH) is rolled out by Orange (France Télécom), SFR, Free and Numéricâble in large cities where broadband penetration and population density are very high.   According to estimations 6 millions houses will be equipped with optical fibre in France by 2012.

The TV services offer is the driving force behind this FTTH roll-out as ADSL2+ does not offer enough bandwidth to provide such services.   France has not opted for VDSL2 for several reasons : on the one hand giving up this technology can be explained by a purely technical reason.   Indeed because of the great distance between the end-user and the street cabinet, VDSL2 in France does not allow to reach much higher speed than ADSL2+. On the other hand no alternative operator has wished to start VDSL2 and make new investment when the subject was broached in 2005/2006, and this all the more since Free announced its fibre roll-out in 2006.

Below the Institute would like to mention in detail what the French regulator ARCEP and the French government undertook in France in duct sharing and inside cable wiring to boost FTTH roll-out.

a) Duct sharing

ARCEP considers that access to the existing civil and technical infrastructure (cable channels and rooms) can considerably modify the FTTH business model as the costs for civil and technical rebuilding represent 50% to 80% of the total costs.

France Télécom sets its optical fibre in its conducts (cable channels) which are inherited from the previous monopoly. ARCEP considers that all operators must be able to access to the existing cable channels to encourage investment in new FFTH networks.

During the summer of 2007 ARCEP checked in collaboration with France Télécom in the 10 cities the spare capacity within these cable channels. It resulted from this verification that spare capacity was available in the cable channels of France Télécom but heterogeneously according to cities and areas (centre of town, suburban areas, recently built areas, etc.). This availability opened the possibility to deploy FTTH networks by several operators.

On 24 July 2008 ARCEP made a decision resulting from the market analysis on market 4 obliging France Télécom to give access to these cable channels to the operators requesting it at cost-oriented tariffs.   On 15 September 2008 France Télécom published an access reference offer to "civil engineering infrastructure for FTTx networks" which set engineering rules as well as this access rate.

The offer in cable channel access allows coordinating the fibre network roll-out of several operators enabling them to manage the operational steps of their installation on a non-discriminatory basis. Indeed France Télécom created a central platform where all steps linked to the roll-out process (card order, ground booking, checking of engineering rules, end of works files) are dealt with. Within this framework France Télécom has to impose the same ordering processes than other operators.

b) Inside cable wiring

Pursuant to the French Act of 6 August 2008[2] all operators equipped with an optical fibre network are obliged to meet all reasonable requests for access to inside cable wiring. According to this law access must be granted in a transparent and non-discriminatory way.

In its decision of 10 October 2008 ARCEP declared that the building operator is responsible for the whole inside cable wiring including the requests from third parties to equip additional flats in this building with optical fibre so that owners have a point of contact. ARCEP also imposes a standard contract[3] between building owners and telecommunications operators as laid down in the Act of 6 August 2008. Moreover there is also an obligation to inform third parties.

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[2] http://www.arcep.fr/fileadmin/reprise/textes/lois/LME-titre3chap1.pdf
[3] http://www.arcep.fr/fileadmin/reprise/dossiers/fibre/convention-type-ftth-1008.doc

Moreover in its decision of 10 October 2008 ARCEP has to decide in which case the concentration point can be situated in buildings. Locating this concentration point is linked to population density and building type. Currently decisions have been made only for dense areas (the concentration point is situated within large buildings). The regulatory framework should be defined before July 2009. For the moment works have begun for the (less dense and rural) other areas.

Orange (France Télécom) and SFR agreed in September 2008 to share among them optical fibre between buildings. Both operators mainly use GPON network architecture and a model sharing a fibre. Access is given to other operators through splitters that are installed as close as possible to buildings or even inside of them.

The fourth main actor in optical fibres, Free, first reacted vehemently to this agreement. If access points are put near buildings, Free will have to support higher costs, as it will have to put more splitters than necessary for the planned Point-to-Point network architecture.

In December 2008 large operators (Free, Numéricable, Orange & SFR) agreed to develop together a common inside cable wiring method. An experimentation period has been launched since January 2009 to test compatibility between monofibre and multifibre. In the second scenario each operator would have his own fibre, which might facilitate migration. A better practice will be drawn up based upon this test.
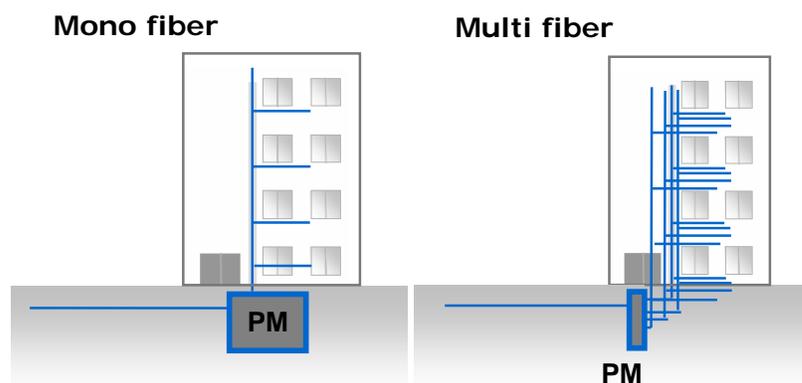
Figure 6. Mono fibre & Multi fibre scenario [4]

The situation was first assessed on 7 April 2009 following the different experimentations. A public consultation[5] requesting operators to respond to several proposals is currently available on the site. ARCEP suggests among others the supernumerary fibre concept (the building operator is obliged to ask before cabling the building whether other operators are interested by additional fibre at their expense).

Three decrees laying out rules on FTTH roll-out in new buildings protecting owners against bad intentions of FTTH operators and authorising tenants to ask for a FTTH connection were published on 17 January 2009.

3.03   SWITZERLAND

In Switzerland, Swisscom, cable operators and electricity suppliers developed a multifibre model to deploy FTTH:

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[4] The PM notation in the figure refers to the concentration point
[5] http://www.arcep.fr/uploads/tx_gspublication/orientations-fibre-thd-070409.pdf

At the start of each project operators interested in investment make themselves known and the number of fibres installed directly depend on it (maximum 4). Each network operator uses his own technology on the optical fibre network and decides where to locate the interconnection point of his own infrastructure with the shared infrastructure. Operators accept to co-invest with co-ownership where co-building gave right to IRU and not to property right or a combination of both.

Co-investing operators remain in competition with other network operators and suggest wholesale services to them. Swisscom suggests as well leasing dark fibre, as layer 2 network service and layer 3 bitstream service ; other operators are free to do so.

The end-customer receives an adaptor trailing socket (no more cumbersome than a single socket) per house or accommodation, as the change of operator is made by moving the inside fibre from one connector to the other.

A study of Prof. Katz, Columbia Institute, and Polynomics Switzerland sees the following advantages in the multifibre model:
-    prices for customers tending to decrease, while companies can operate with benefit
-    thanks to this cooperation the country can benefit from a more rapid and advantageous building of an optical fibre network
-    a greater possibility of reinvestment in the so-called suburban areas

Parties signed a declaration of intent to build together a multifibre optical fibre network. Parties are achieving a pilot project in the city of Fribourg (Torry) and Neyruz. Parties will provide services (included a network « open access" service) to other operators without infrastructure. (8) Parties   are striving to develop a common building wiring standard.
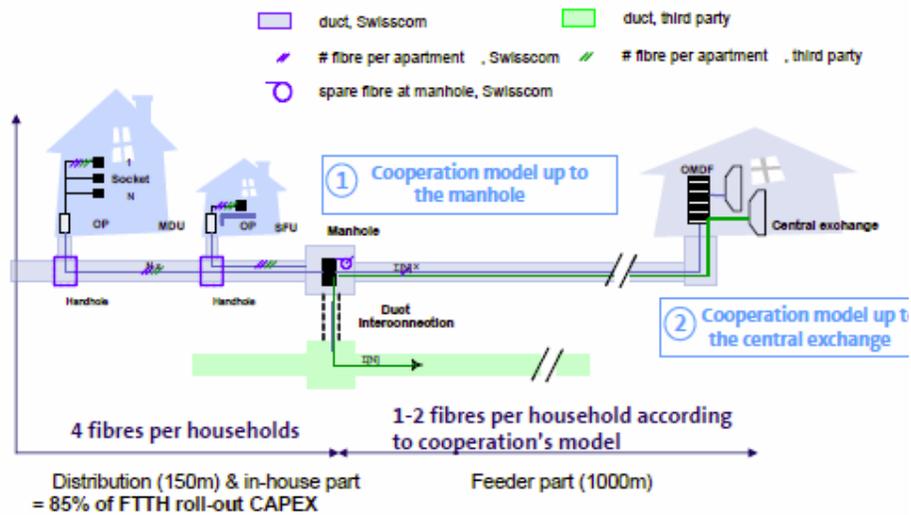

Figure 7. Multifibre scenario in Switzerland (Source: Swisscom)

3.04   BELGIUM

In April 2008 Belgacom launched a VDSL2 retail offer (Fibre to the Cabinet). The decisive factor in installation is competition with the cable operators' television services, because VDSL2 makes it possible to have an HD and SD television channel simultaneously. For the moment Belgacom has 66% in coverage with VDSL2 and offers with this technology speed up to 20Mbps. By the year 2011 Belgacom would like to reach 80% of the population through VDSL2.

For the moment the VDSL2 specification indicates a maximum speed of 100 Mbps on a 500 meter distance. Thanks to cable wiring Ericsson has managed to reach 500 Mbps of transit speed through copper cable on very short distances. It is however very unlikely that improved VDSL technology will be used on a large scale in Belgium as most of the houses only have one or two copper lines and that in consequence several copper lines can be linked to reach this speed.   It is more logical to lay optical fibre in the last mile instead of laying additional copper cables.

In Belgium Belgacom is carrying out a FTTH test on a restricted scale to make a certain number of technological choices. Effective FTTH roll-out in Belgium is not on the agenda yet but if we take VDSL2 roll-out into account as well it turns out that Belgium is at the top of the world ranking of very high speed Internet coverage as showed by the figure below:
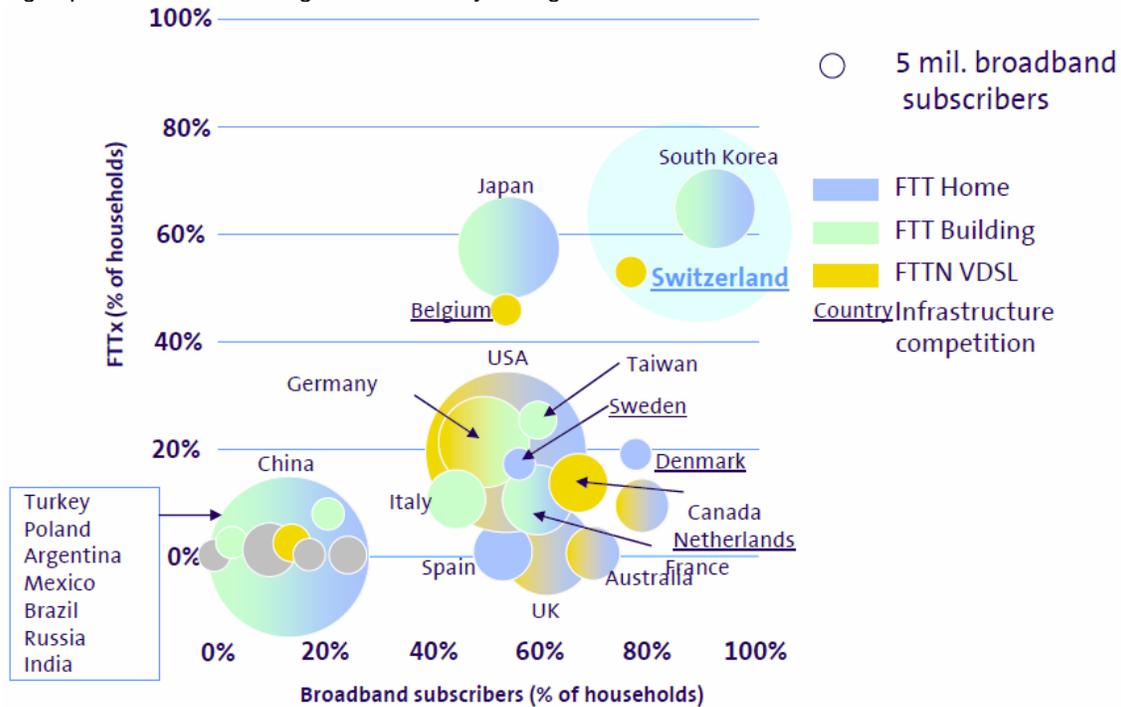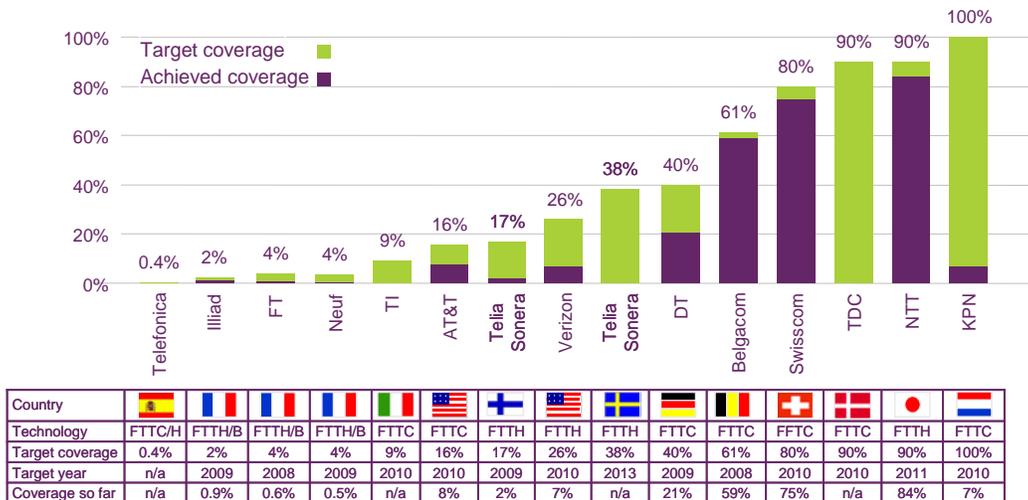

Figure 8. FTTx Coverage – end of 2007 (Source: Alcatel Lucent, Swisscom)

It is also important to stress that compared to other countries, Belgacom has never had a tendency to make big announcements in advance on the future covering and roll-out, but has however succeeded in deploying and launching VDSL2 on a large scale.

Country	🇪🇸	🇫🇷	🇫🇷	🇫🇷	🇮🇹	🇺🇸	🇫🇮	🇺🇸	🇸🇪	🇩🇪	🇧🇪	🇨🇭	🇩🇰	🇯🇵	🇳🇱
Technology	FTTC/H	FTTH/B	FTTH/B	FTTH/B	FTTC	FTTC	FTTH	FTTC	FTTH	FTTC	FTTC	FFTC	FTTC	FTTH	FTTC
Target coverage	0.4%	2%	4%	4%	9%	16%	17%	26%	38%	40%	61%	80%	90%	90%	100%
Target year	n/a	2009	2008	2009	2010	2010	2009	2010	2013	2009	2008	2010	2010	2011	2010
Coverage so far	n/a	0.9%	0.6%	0.5%	n/a	8%	2%	7%	n/a	21%	59%	75%	n/a	84%	7%

Figure 9. Target coverage & achieved coverage - July 2008 (Source: Ofcom)

The Institute considers that Belgacom will tend within the framework of competition with cable operators to invest in FTTH, because VDSL2 will make it impossible for Belgacom to reach the same speed than with EURODOCSIS 3. Considering than currently 66% of the street cabinets are already equipped with optical fibre, this roll-out could take place quickly if the necessary actions are undertaken to facilitate the last mile roll-out at financial and operationnal level.

The Institute expects that cable operators will follow as soon as Belgacom will start deploying fibre to the home to remain competitive in the future.

Currently FTTH is still in its early stages with a test project of Belgacom in Rochefort and a recently announced project of Alcatel-Lucent with the city of Courtrai. To boost FTTH roll-out a certain number of additional actions and initiatives of the public authorities are therefore necessary. Before going deeper into the subject and seeing which actions are recommended FTTH roll-out costs are first examined.

4   FFTH ROLL-OUT COSTS

For the last years of its collaboration with the Interdisciplinary Institute for Broadband Technology, the University of Ghent (UGent) has carried out several studies on the optical fibre roll-out.

4.01   ROLL-OUT ON THE WHOLE TERRITORY

In 2006 UGent examined the Belgian costs for the Fibre to The Home roll-out for several scenarios, distinguishing first fibre to the curb (FFTC) and then only to the living room (Fibre to the Home : FTTH) or direct investment in FTTH.

	Approach	Access network	Evolution
1	Revolution	DSL	ADSL → FTTH
2	Evolution	DSL	ADSL → VDSL 1000m → VDSL 300m → FTTH
3	Revolution	Cable	Cable → FTTH
4	Evolution	Cable	Cable → smaller area & EuroDOCSIS 3 → FTTH

Figure 10. Various scenarios examined by UGent

The survey[6] shows that initial costs are lower if optical fibre is first deployed up to the street corner (scenarios 2 and 4), but that implementation total costs in several steps are eventually far higher as it is necessary to dig more and more equipment is necessary than when FTTH is directly rolled out (scenarios 1 and 3).
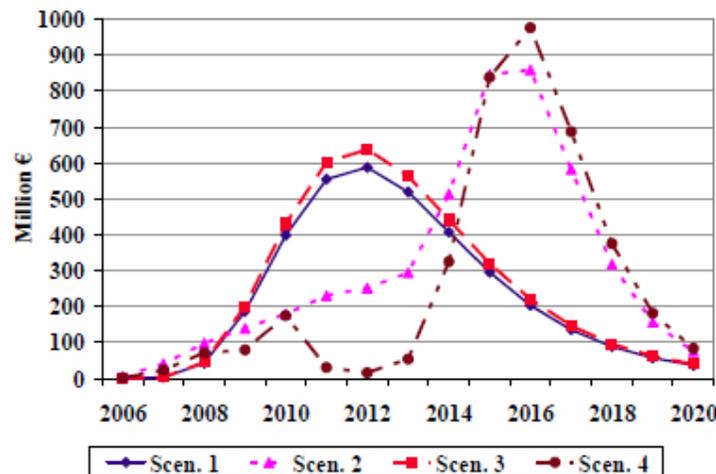

Figure 11. Total annual CAPEX costs for the various scenarios
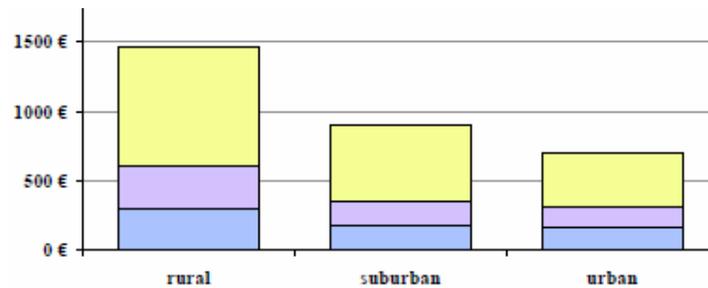**(Source: UGent-Intec/IBBT)**

Scenario 1 will have the cheapest total costs of all scenarios. However the approach in several steps is preferable because of the spread investment costs and the decrease in the fund value as they yield interest.   The decrease's effect must not be underestimated as shown in the table below where the decrease in the money's value was taken into account when calculating the total CAPEX costs for FTTH roll-out:

(M€)	Scen.1	Scen.2	Scen.3	Scen.4
Total cost	3 517	4 589	3 809	3 918
Discounted	1 889	2 043	2 045	1 634

Figure 12. Total CAPEX costs for the various scenarios in case of roll-out
**on the whole Belgian territory (Source: UGent-Intec/IBBT)**

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[6] B. Lannoo et al., "The evolution of fixed access networks in Belgium: the road to fibre to the home, an economic assessment", Broadband Europe, 2006

There are great differences between urban and rural areas as one has to dig on greater distance in rural areas to reach customers, which will considerably increase trenching costs. These differences are displayed in the figure below:

Figure 13. Total CAPEX costs per house in scenario 2 distinguishing the different areas (Source: UGent-Intec/IBBT)

UGent concludes in its study that FTTH roll-out on the whole Belgian territory is unrealistic. Viable business case will only be possible if roll-out takes place in urban areas and trenching costs can be reduced. Timing & FTTH execution rate are essential factors at that level to be successful with FTTH. The figure below also shows limited viability as well as increasing costs per family outside of urban areas.
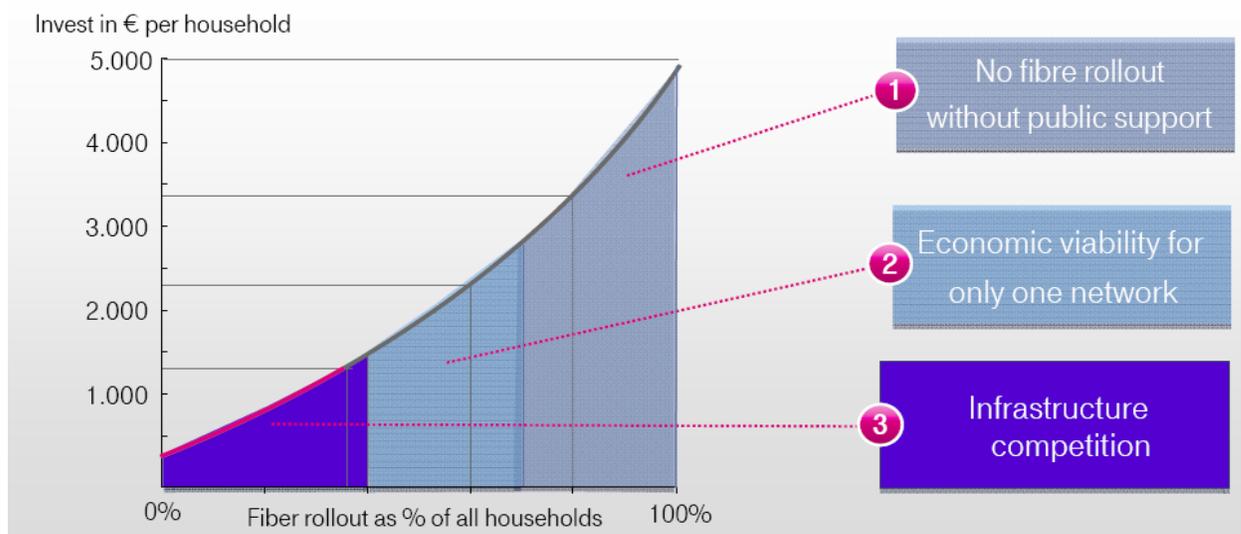

Figure 14. Viability of optical fibre investment according to FTTH penetration (Source : Deutsche Telekom)

4.02   ROLL-OUT IN RURAL AREAS

UGent then examined thoroughly FTTH roll-out in a middle sized city of 10000 inhabitants (Zele)[7] and in a large part of the city of Ghent[8] (43000 families and 222 companies).

The figure below shows the allocation of the FTTH roll-out costs in Zele. The results show that trenching and ducting account for the largest part of investment costs (generally 60 to 80%).
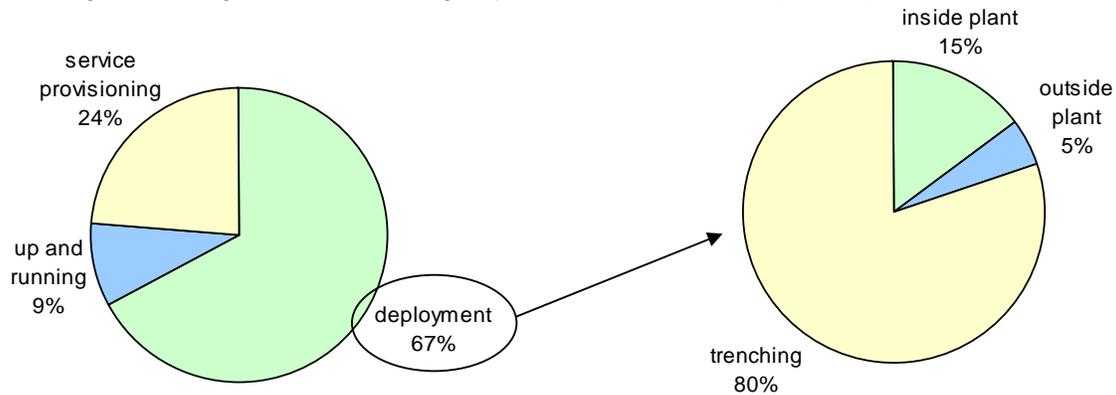

Figure 15. FTTH cost allocation in Zele (Source: UGent-Intec/IBBT)

The study of Ghent has distinguished three roll-out scenarios :
- A 'slow' scenario where deployment is carried out for 15 years on a small area (5 zones).
- A 'moderate' scenario where deployment is carried out for 13 years on a larger area (8 zones). These 8 areas include 43,000 households spread over 20 km^2.
- A 'fast' scenario where deployment is carried out on the same area than the moderate scenario but during 7 years.
It should be pointed out that the cost difference between the moderate scenario and the fast scenario is a direct consequence from slower deployment (consequence from price erosion over the years + discount following a report in time).
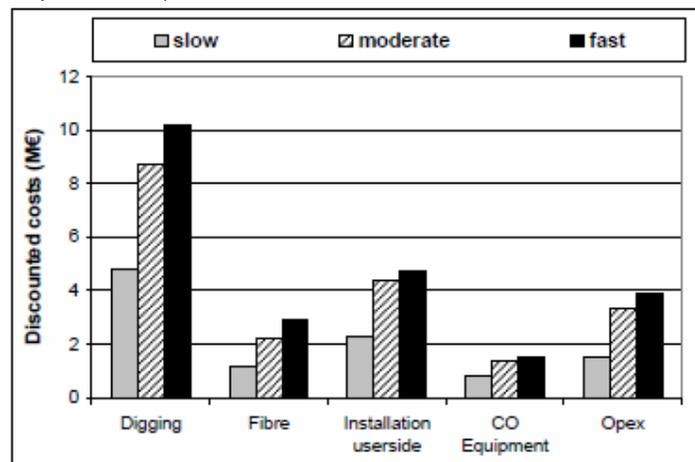
|	Slow	Moderate	Fast	Non-municipality
Cost per home passed (€)	735	765	794	800
Cost per home connected (€)	1324	1233	1237	1290

[7] K. Casier et al., "A clear and balanced view on FTTH deployment costs", The Journal of The Institute of Telecommunications Professionals, 2008
[8] B. Lannoo et al., "Economic Benefits of a Community Driven Fiber to the Home Rollout" , 5th International Conference on Broadband Communications, Networks and Systems, 2008

Figure 16. FTTH deployment costs in Ghent for three deployment rates (Source: UGent-Intec/IBBT)

Without municipal advantages it comes to € 800 / Home Passed (HP) at a moderate deployment rate of 13 years and while charging equipment cost which decreases over the years (75% reduction over 10 years).   It only concerns the CAPEX part (equipment + installation), but generally without the costs at the user's home (like for the modem) which amount to EUR 150 to 200.

It concerns the cost per HP, not per Home Connected (HC), in other words, there will be « homes passed » (which can be certainly easily connected with ONU purchase, local connection works and CO adaptation) which are not connected to the network.   Only HC generate revenues. 800€ per HP correspond to about € 1290 / HC
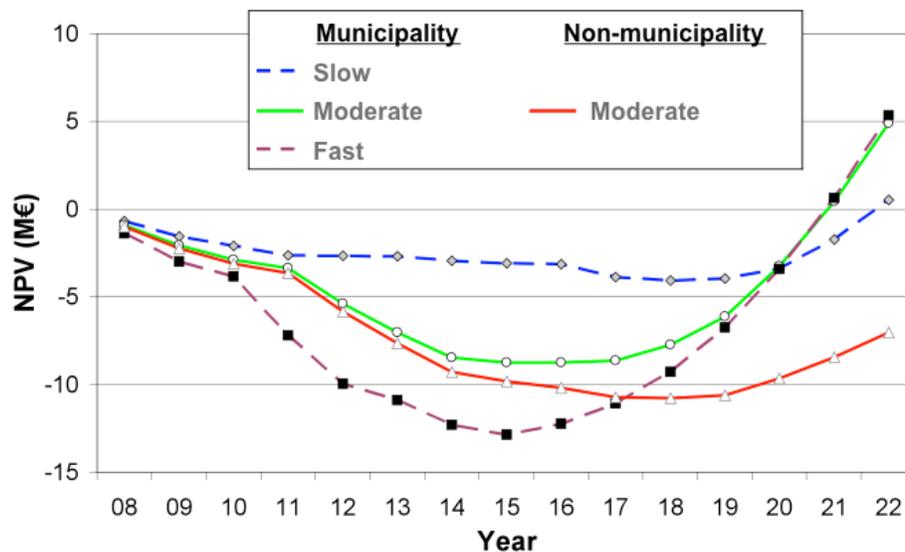
Figure 17. Net Present Value (NPV) for the different FTTH deployment scenarios in Ghent (Source: UGent-Intec/IBBT)[9]

The survey of UGent indicates that municipalities are given a larger advantage in the event of slower deployment because there are then more possibilities to set ducts at the same time than road work, which highly reduces costs. However it is important to find a good balance, because rolling out too fast leads to too high investment costs, while in a too slow scenario, the operator can loose many market shares to competition and it gives a lower Net Present value. Moreover it is unrealistic to let customers wait for new services for 30 to 40 years.

In its conclusions UGent states that a drastic reduction in trenching costs plays an essential part in FTTH viability. Pollsters recommend combining this trenching works with planned road work to reduce costs, using the existing infrastructure (ducts already present, sewer system, …) or setting optical fibre through house frontages and posts.

Besides pollsters also underline that for municipalities other indirect advantages are linked to FTTH roll-out: *"The higher bandwidth will enable advanced opportunities and cost reductions for healthcare, education and other public services. The higher bandwidth at comparable prices might also attract more (high-tech) facilities."*

Finally pollsters point out that the fibre to the home deployment stimulation gives an important role to the authorities and the regulator.

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[9] The word "non-municipality" concerns every other player who is not a municipality and who would like to roll out FTTH (including telecoms operators).

5   PUBLIC-PRIVATE COLLABORATIONS

Public-private collaborations play an important part in Europe to boost optical fibre roll-out. Indeed municipalities are often the first ones to start rolling out FTTH and are then followed by traditional players (e.g. The Netherlands).

The table below shows that FTTH projects are mainly initiated by municipalities:

	Dec/08		Jun/06	
Incumbents	22	9,8%	12	8,6%
Municipalities / Power Utilities	**131**	**58,5%**	**92**	**66,2%**
Alternative operators / ISPs	61	27,2%	20	14,4%
Housing Companies & Other	10	4,5%	15	10,8%

Figure 18. Projects FTTH/B in Europe (Source: IDATE – FTTH Council Europe)

Municipalities benefit from a certain number of advantages to roll out FTTH. On the one hand they already have one part of the infrastructure, because they already have set previously other ducts in the ground to other ends and moreover they can use existing buildings as exchange. On the other hand they can also combine roll-out with the planned road work to reduce costs. At last indirect effects as quoted by UGent can play an important part in their strategic choice to roll out optical fibre.

However public-private collaborations between municipalities and commercial companies have to be approved by competition authorities at national and European level.

5.01   THE COMPETITION COUNCIL

The Competition Council has to see to it that competition is not hindered in case of optical fibre companies take-over purchases or when individuals and public authorities are cooperating to deploy optical fibre together.

To contribute to the establishment of collaborations and to speed up the approving process of it, the Competition Council could consider writing down already in advance a certain number of instructions to be met by this type of collaboration. In addition to the competition authority's directives the authority can perhaps also consider drawing up an instructions leaflet stating all necessary steps to undertake to develop and approve such cooperation.

Moreover the Competition Council has a unique opportunity to take measures to boost competition measures at every collaboration or taking-over, that are going further than what might be imposed by the telecommunications regulator through market analyses.   For example during the collaboration between KPN and Reggefiber, the Dutch competition authority obliged to open this network and tariff caps were determined to that end.   This opportunity only happens once and can give rise to more competition and security for the whole sector.

5.02   THE EUROPEAN COMMISSION

Member States have to notify all collaboration to the Commission pursuant to Article 87 of the EU Treaty. This article forbids every kind of State aid provoking distortion to competition by favouring some companies or the production of certain products. State aid is however authorised by the article providing that it is necessary for an economy operating well and that it is justified.

Up to now the Commission has compared more than 30 State aids for broadband services and networks to the community rules applicable to State aids. When State aid is justified because the market would not offer the service supported as such, like in the countryside with low population density, State aid is generally considered as compatible.

The Commission is more cautious when public authorities bring their support in large cities areas, like Amsterdam, where broadband business services are already available under competitive conditions. This kind of support can indeed oust existing and future investment by market players. In this case it is important for the municipality to invest under conditions complying with the market and that the different private partners take a large part in the project investment. It these conditions are not met there is a high risk that the European Commission might not approve the collaboration in question as shown by the examples below.

The European Commissionner Neelie Kroes who is competent for competition declared in March 2009 that the EU wants to adapt and simplify the rules of State aid concerning ICT to boost the roll-out of NGN broadband networks in EU countries within the framework of the EU recovery plan.

The European Commission will publish in the course of May 2009 a document giving more details on the public-private collaboration rules within the FTTH roll-out framework.

a) Optical fibre network of Amsterdam

Together with other shareholders the city of Amsterdam is investing in a company building a FTTH network connecting 37,000 households in Amsterdam. The Amsterdam municipality owns one third of the shares, two private investors, ING Real Estate and Reggefiber together another third, while five housing corporations own the remaining third. The wholesale operator of the new fibre network was selected through a tender procedure and will provide open, non-discriminatory access to retail operators which offer TV, broadband and telephony services.

The European Commission approved this collaboration on 11 December 2007[10], because Amsterdam is taking part in the project under the same conditions than those of any investor in market economy. In particular, all investing parties would have to support any losses in the event of an underperforming business. The structure of the new company ensures that the private investors have significant stakes in the project in a setup where no single shareholder can exert sole control over the company.

Moreover the Commission underlines that the market conformity of a public investment has to be demonstrated thoroughly, in general by a sound business plan and significant private investment in a project. In addition, the private parties would have to assume the commercial risk linked to the investment under the same terms and conditions as the public investor.

a) Optical fibre network of Appingedam

The municipality of Appingedam was planning to co-finance the installation of a FTTH network. On 19 July 2006[11], the Commission considered that the area was already served by broadband networks where the project had to be carried out and that the aid was not necessary to remedy either a market failure or unaffordable prices for broadband services. The Commission considered that the planned aid would distort competition and harm private investment to an extent which would outweigh the positive effects of the project.

The European Commissionner Kroes declared on this subject: *"Public support for broadband can bring benefits to citizens and businesses in regions where fast Internet access is not available on reasonable conditions." However, state aid for the planned network in Appingedam is neither justified nor proportionate as broadband services are already provided by several private operators".*

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[10] http://europa.eu/rapid/pressReleasesAction.do?reference=IP/07/1889
[11] http://europa.eu/rapid/pressReleasesAction.do?reference=IP/06/1013

6   MEASURES AIMING AT STIMULATING FTTH ROLL-OUT

6.01   HARMONISING RIGHTS OF WAY IN THE PUBLIC DOMAIN

As stressed by the Consultative Committee on Telecommunications and ECTA, there is a need for harmonising access and passive infrastructure sharing to stimulate investment in FTTH networks. Harmonisation is particularly important to boost the future possible implementation of NGA and to facilitate infrastructure development in less populated areas.

There is an identified need of common procedures concerning the telecommunication rights of way. According to ECTA the opinion on Belgium is that Belgium is particularly inefficient concerning the harmonisation of rights of way as there are several procedures from one region to another and from one city to another. Several cities laid down rules per sector code (telecoms, water, gas, etc.) for the public domain use. Many of these procedures are similar but not identical, which is considered as a hinder to investment. In this context it is recommended to follow, given the distribution of powers to communities, a procedure focused on harmonisation and simplification of the processes and price categories for rights of way (possibly through a common point of contact). For that purpose consultation will be necessary between the different communities as they are competent in this matter.

It is therefore advised to first list the access rules and then coordinate them.

Question 1. Do you have a satisfying overview of the rights of way existing for the moment and/or do you have some suggestions to express on how these rights of way could be better harmonised?

6.02   STIMULATING INFRASTRUCTURE SHARING

A number of possible actions could be contemplated to make infrastructure sharing easier, in particular to share telecommunications cable channels. These actions need to be supported by authorities as well as by local authorities.

a) Inventory & publication of the available passive infrastructure (e.g. ducts)

Like in France, United-Kingdom, Portugal, … an inventory could be made of the present passive infrastructure that could be used to deploy optical fibre. Here, it concerns not only cable channels (ducts) that are placed in the ground by telecommunications operators but also ducts of other companies, sewer systems, tunnels (tram, underground) and others that could possibly be used as well to that end.
After the inventory of this infrastructure and the remaining space for additional optical fibre, it is also essential to publish this information for the attention of the operators wishing to roll out FTTH.

It is advised to impose this database access at cost-oriented tariffs to avoid distortion to competition and to boost FTTH development. The regulator can develop the qualitative and quantitative aspects of this database access type.

Question 2. Do you consider that there already are now database giving information on the presence of such infrastructure.   If no, are there database to which information can be easily added and which are currently already used by operators to other ends?
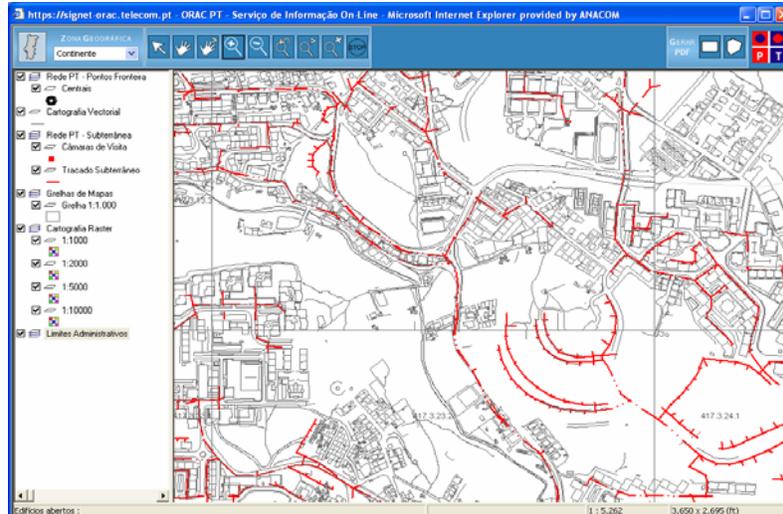
Figure 18. Example of the database of the Portuguese ducts (Source: Anacom)

b) Implementation of new passive infrastructure

During all road works, either on an applicant's initiative (for example replacement of old pipes or new infrastructure placing) or on the road manager's initiative (for example draining works or full renewing) it could be imposed to lay cable channels for fibre as well as the necessary manholes.

In general the road works initiator has to question all applicants to suggest them carrying out joint works and costs are spread in proportion to the occupation of the dug trench. The Institute notes that there are currently numerous large-scale works of this type without that any operator seizes the opportunity to install passive infrastructure for the future and infers from it that the average cost investment is probably still too high in comparison to and/or the deadline to obtain a consistent network that can be commercially exploited based on a deployment of which geographical planning is not under control.

The infrastructure ownership (see section 5) and its operation can be split up; below an example of organisation

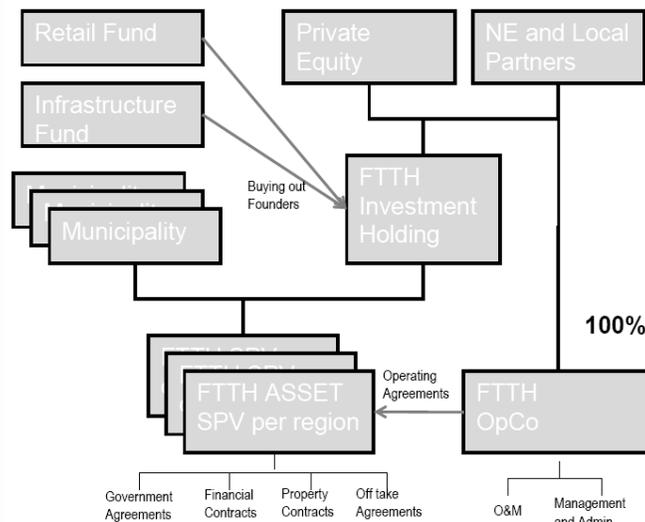**Figure 19. Example of partnerships. (Source: Network Economy Group)**

Question 3. In this context, the following questions are asked:
a. a. Is it interesting to carry out such an independent deployment accessible to all operators?

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b. Which entity could be entrusted with the definition of the network structure to make and see to the installation follow-up and the information necessary to its future installation?
c. Which entity could see to the running of this passive infrastructure as far as provision to operators is concerned?
d. Who could be the owner of the created infrastructure?
e. Can a laying with marginal and non average costs be imposed on the work initiator when the owner gives infrastructure access to any operator?

c) Concrete cable channel between the street and the curb

There are also curbs which integrate a cable channel that can be used for FFTH installation. However residents are the ones responsible for curbs and a priori they should bear the additional cost of it.

Figure 20. Concrete cable channel between the street and the curb. (Source: UGent)

Question 4. In your opinion is it useful to impose this kind of curb for every new curb installation and what could be the financing middles of the corresponding additional cost?

d) Providing access to the existing passive structure through the legislative framework

Like in France public authorities could consider imposing a symmetrical obligation on telecoms operators or on duct owners in general (thus also non telecom ducts) to open cable channels to competition.

For the moment the telecoms regulator can through the regulatory framework only impose on telecoms operators having significant market power the obligation to provide access to their ducts. Therefore an intervention from public authorities by a law modification or from the European Union by a modification of the regulatory framework is necessary to extend this obligation to all duct owners.

Within the framework of the review of article 12 of the Framework Directive by the European Commission, a proposal has currently been submitted enabling the telecoms operator to impose on every operator (even the non-SMPs') an infrastructure sharing obligation (like buildings, poles, antennas, manholes & street cabinets).

It can also be laid down that the regulator regulates the tariffs for this access and draws up the practical instructions that are written down in a reference offer. The European Commission intends giving a certain number of directives on that subject in the future NGA recommendation.

It could also be considered giving access to dark fibre at the places where no more free ducts are available. And if dark fibre is not available, sharing wavelengths on the same optical fibre is also an option that can be taken into account. The authorities and the regulator can determine rules on that subject. Authorities might also contemplate extending this obligation to all duct owners.

Finally the Institute would like to stress that the Belgian situation is very different from France as in the past, no standard ducts were laid to deploy copper cable or coaxial cable. The use of ducts to set cables has only become a general principle for the last years. In consequence in most of the cases, there are no ducts up to the houses and the impact of this measure is less important in Belgium than in some other countries. Therefore more attention should be paid to other measures which see to it that less expensive passive structure is set or that reduce roll-out cost.

6.03   LESS EXPENSIVE AND EASIEST MEASURES TO COVER THE LAST MILE

a) Less expensive ways to allow deployment

In addition to the use of cable channels to set optical fibre on the last mile, other types of less expensive installations can also be examined and approved.

- By the air

The UGent survey shows that the FTTH deployment costs can drop by 8% if 30% of the customers can be connected by the air. For the moment cable operators are already rolling out their coaxial cable via building frontages pursuant to the existing legislation.

Authorities can consequently check if the laying of optical fibre may be authorised via building frontages or with posts in all Belgium and publish clear rules for that purpose.

Figure 21 Optical fibre rolled out via posts. (Source: UGent)

Question 5. Do you consider that current rules of fastening & installation to frontages via posts are satisfactory?

- Microtrenching/minitrenching

Another solution consists in using microtrenching or minitrenching to avoid expensive trenching costs by not putting cable channels but by digging a thin trench not very deep with 10 to 20 cm in depth in which optical fibre is set.

Figure 22 Microtrenching

We still don't know if there is a demand for microtrenching and/or minitrenching from the sector, because a certain number of practical problems can arise when the street has to be replaced or when road surface has to be swollen. If operators are interested in this kind of deployment method, then authorities could check if the microtrenching and/or minitrenching technique may be authorised and

then being clear by specifying which rules are applying as far as microtrenching/minitrenching is concerned.

> **Question 6. Do you think that microtrenching or minitrenching is useful ?   If so**, what are the administrative obstacles to this technique application and which measures should be taken to overcome them?

b) Simplification of town planning regulations

FTTH could be rolled out faster if town planning regulations were simplified. Then for some small adaptations it could be contemplated suppressing the planning application obligation or making the planning application process more flexible. In the Netherlands for example it is not necessary to submit a planning application if an existing street cabinet is enlarged with maximum 20% (the famous "tolerance policy").

Within this framework it is necessary to consult with operators to know first of all which authorisations are necessary and which rules should be observed when installing FTTH and then receive suggestions on the way authorities might adapt town planning regulations to easen FTTH roll-out.

> **Question 7.** In your opinion which town planning regulations should be simplified ?

c) Reduced VAT rate for optical fibre laying

Authorities could consider imposing reduced VAT rate for optical fibre laying to lead to a drastic decrease in optical fibre roll-out costs and to boost FTTH roll-out.

d) Moratorium on all compensations for optical fibre networks

To boost FTTH roll-out authorities could consider publishing a 5 to 15 years moratorium for all compensations for basement use or street opening when laying optical fibre networks. The sector considers these possible compensations of local or regional authorities as a brake on investment and rural areas are especially the victim of it as compensations make FTTH business case less viable in those areas.

6.04   STIMULATING THE SHARING OF INSIDE CABLE WIRING

In addition to the installation problem of optical fibre up to the house, enough attention should be paid to inside cable wiring so as not creating a new barrier that might hinder FTTH roll-out or disturb competition.

The following actions could be undertaken concerning inside cable wiring.

a) Systematic installation of cable channels in the context of the building of a new house

To facilitate optical fibre roll-out to the living room, authorities could set down directives on the compulsory laying of cable channels or even optical fibre when building a new house or an apartment building.

b) Determining directives on optical fibre laying in existing houses

Following the example of France, authorities could contemplate setting down a certain number of decrees clarifying things on a number of problems that might appear when laying optical fibre in existing houses.

On the one hand it could be considered to impose a standard contract between the building owner and the optical fibre installer. Such a harmonisation would prevent that the owner of the house or the optical fibre installer has disproportionate requirements, where one of them is the fall guy and that FTTH roll-out is hindered or slowed down by dragging out contract negotiations.

On the other hand authorities can consider authorising a tenant having an optical fibre link set in the rented house even if the owner is opposed to it. If authorities do it, it is important to foresee an

exception clause authorising the owner to refuse if a deployment project common to the whole building is planned within 6 or 12 months.

c) Determining instructions on access provision to inside cable wiring

Authorities could lay down instructions in the act obliging telecoms operators to share inside cable wiring to avoid distortion to competition and the emergence of new monopolies.

For that purpose authorities could impose a symmetrical obligation on the existing optical fibre coming into the house and lay down that optical fibre must be shared from a given concentration point. The operator who sets the first optical fibre from the concentration point, remains the fibre owner and benefits from an allowance if another operator uses it. The leasing of these concentration points and the qualitative and quantitative directives to share these points can be drawn up by the regulator. The European Commission intends giving a certain number of directives on that subject in the future NGA recommendation.

Moreover it becomes more accessible for the end-user to change from operator when only a part of the optical fibre can be installed inside. By doing so it can be avoided to install another optical fibre link inside for each operator. Consequently inside cable wiring must not be adapted and there are no aesthetic problems caused by several connections. This can only boost competition.

If authorities decide, like in France, to lay down that the operator who is the first to set optical fibre in an apartment buidling is responsible for all connections in this building, this could provoke a race between telecoms operators to be the first ones to have as much apartment buildings as possible. This approach could boost FFTH roll-out more.

Question 9. What is in your opinion the best way to put this inside cable wiring at the disposal of operators rolling out FTTH ?

6.05   REGULATORY PRINCIPLES FOR FTTH ACCESS

For the last years alternative operators have complained about Belgacom's lack of transparency on its network upgrades and their impact on the wholesale services offer. BIPT and alternative operators were presented with the fait accompli of the announcements of the installation of the VDSL2 network and the closing downs of Belgacom's exchanges. This led to successive slowdowns in the introduction of appropriate regulatory measures in view of network laying.

In the light of these past experiences and their harmful impact on the market, it is important to see to having more transparency and visibility on the market as regards the future FTTH roll-out. This is the objective of the following suggested actions:

a) Showing transparency concerning FTTH plans

BIPT can consider requiring from each broadband operator in Belgium that he informs BIPT a few months before of his intention to install FTTH by describing the main choices in network infrastructure as well as the possible impact on the evolution of the existing and future broadband connections for other operators.

The regulatory intervention possibilities can indeed strongly vary according to the network architecture chosen to roll out FFTH:

- Fibre-to-the-home point-to-point is a fully-fledged optical fibre solution. Every customer has his own optical fibre to the optical distribution frame (ODF), just like a copper cable is now going to the exchange. In this type of architecture optical fibre can be easily unbundled from the ODF as the whole optical fibre capacity is reserved for one single customer.
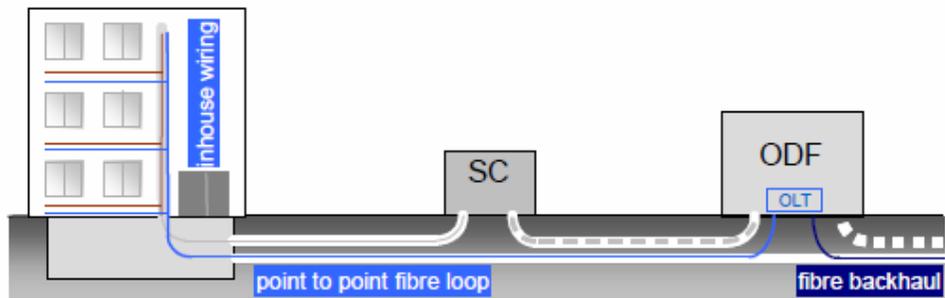
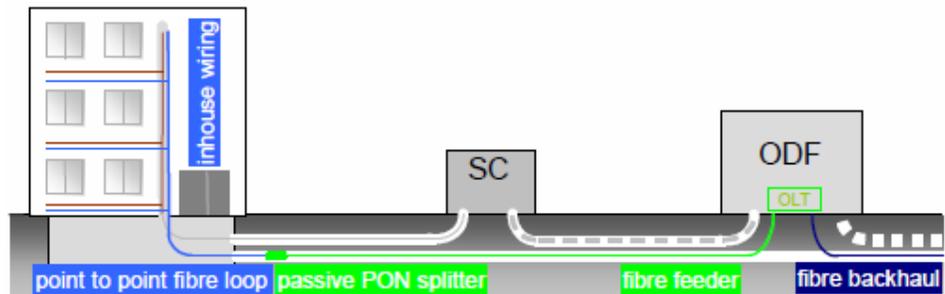**Figure 23 Point-to-Point FTTH scenario (Source: ERG)**

Figure 24 FTTH PON scenario (Source: ERG)

- Fibre-to-the-home passive optical network (PON) is a point to multipoint solution. One single feeder cable goes from the ODF to an optical splitter. This splitter makes it possible to distribute the capacity of one optical fibre to several optical fibres and creates a sort of tree structure from the exchange to the customer's home. Capacity is shared with other users and is less easy to unbundle. One option is unbundling from the splitter, which has a limited viability as subloop unbundling for VDSL2. Then unbundling the wavelength could be considered but for the moment it is neither imposed nor made operational in no other European country.

The ERG common position on NGA takes a closer look at the problems of FTTH PON and the additional barriers that are created for competition by doing so:

Only the last segment of a PON solution, consisting of point-to-point optical fibre between the last passive optical splitter and the premises of the end user, could be unbundled. There is effectively no technical possibility to retrieve the traffic of one single end user at the level of the feeder (ODF) without active equipment: in the case of PON, the traffic sharing on the feeder segment implies that there is, per passive optical splitter, a bundle – consisting of the splitter, the feeder optical fibre and the active element –, which can not technically be unbundled at this point.

So that new entrants might have access not at the level of the last splitter but at the level of the ODF (e.g. at the CO), considering they don't roll-out their own fibres to the last passive optical splitters, it would be necessary to evaluate solutions enabling them to bring their traffic from the splitters to the ODF.

This could, among other remedies, be granted by imposing the SMP operator to provide, as ancillary services, both splitters and dark fibres on the feeder segment. If such remedies are mandated, the SMP operator would have to deploy extra dark fibres on the feeder segment and extra splitters, and an extra distribution frame at the level of the last splitter. However, this solution implies that all new entrants asking for access at the level of the ODF need to use the same PON technology as the SMP parties and commit to roll-out their own networks. To achieve this, the NRA may need to intervene in the SMP-parties' network design of a PON (e.g. number of splitters and fibres in the feeder segment). This requires a careful assessment of the proportionality of such an intervention, balancing on the one side the commercial freedom of the SMP party and on the other hand the objectives of regulation, mainly to promote and maintain competition. It may be justified on the grounds that otherwise the SMP party would foreclose the market and there is a danger of re-monopolization.

b) Clarifying the main principles of FTTH regulation

The main principles of the future FTTH regulation should be explained to give a better overview to the market. These principles should see to:

- encourage and protect investment in FTTH;
- avoid that FTTH roll-out lead again to the creation of an access monopoly where end-users connected by fibre cannot choose any other electronic communications service provider.

The need for transparency and the importance of an informed debate with beneficiaries is also stressed by the "ERG opinion on Regulatory Principles of NGA": *"Transparency can prompt an informed debate amongst communications providers on the potential characteristics and requirements of planned NGA deployments. Following such a debate the NRA can decide on its regulatory approach to any SMP operator found in the relevant markets and thereby provide certainty and predictability to market players and investors."*

BIPT will deliver regulatory principles within the framework of its current review of markets 4 and 5, especially concerning the potential access regulation. These principles could among others include instructions to locate and share concentration points which determine the minimum number of households served from a passive splitter location and provide for enough space in optical distribution frames (ODF) for the various operators, etc.

At last the Institute would like to point out that the European Commission is currently reviewing the regulatory framework and is working on a Recommendation on the Next Generation Access and the Next Generation Networks giving additionnal recommendations on the best way for the regulator to handle FTTH. Moreover ERG is working on a harmonised opinion on FTTH regulation. We don't know yet when these documents will be finalised and published. These documents can have an impact on BIPT 's regulatory decisions.

7 CONCLUSION

The business case for FTTH roll-out lasts more than 10 years with a number of inaccuracies (cost, implementation time, number of customers, regulations) and heavy preliminary costs because of infrastructure works and expensive equipment.

In addition to powers based on the regulatory framework a certain number of actions can be undertaken by BIPT, public authorities and other authorities to boost Fibre to the Home roll-out in Belgium.

1. Laying down instructions for public-private collaborations (§ 5.01)
2. Harmonising rights of way in the public domain (§ 6.01)
3. Stimulating infrastructure sharing
   a. Inventory & publication of available passive infrastructure (§ 6.02 a)
   b. Implementation of new passive infrastructure (§ 6.02 b)
   c. Concrete cable channel between the street and the curb (§ 6.02 c)
   d. Imposing a symmetrical obligation to grant access to the existing passive structure & developing directives for that purpose (§ 6.02 d)
4. Taking measures to reduce the deployment costs for the last mile
   a. Taking measures to reduce the deployment costs for the last mile by air or microtrenching (§ 6.03 a)
   b. Simplification of town planning regulations (§ 6.03 b)
   c. Reduced VAT rate for optical fibre laying (§ 6.03 c)
   d. Moratorium on all compensations for optical fibre networks (§ 6.03 d)
5. Stimulating the sharing of inside cable wiring
   a. Imposing the installation of cable channels when building a new house (§ 6.04 a)
   b. Determining instructions on the laying of optical fibre in the existing houses (§ 6.04 b)
   c. Determining instructions on the provision of access to inside cable wiring (§ 6.04 c)
6. Regulatory measures
   a. Establishing a transparency obligation on FTTH plans (§ 6.05 a)
   b. Clarifying FTTH regulation (§ 6.05 b)

These measures can be classified both according to their impact on the future FTTH roll-out and their difficulty of implementation.
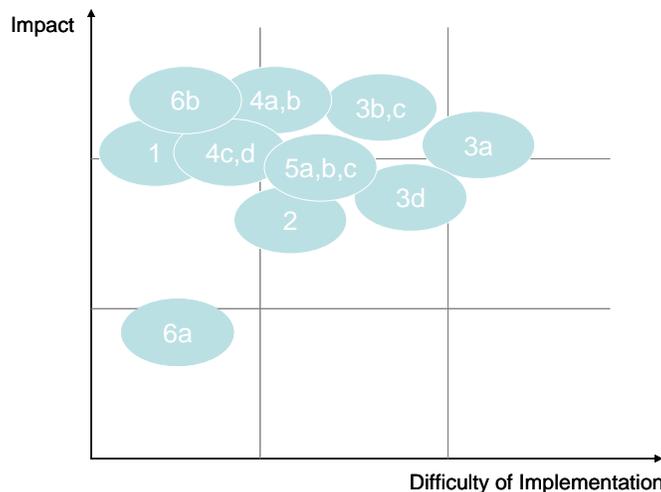
Figure 25 Classification of the measures proposed according to their impact and their difficulty of implementation

Question 10 Do you think that there are other actions that might contribute to efficient FTTH roll-out in Belgium ? Do you have other comments or suggestions to express?

8   ANNEX: GLOSSARY

ADSL (Asymmetric Digital Subscriber Line)
Variation on xDSL technology, which makes use of high and inaudible frequency ranges with a view to simultaneous transmission of voice and data (see xDSL).

Bandwidth
Indicates the transmission capacity of a transmission link and determines the amount of information (in bits per second) that can be transmitted simultaneously.

Bitstream
Digital transmission.

Broadband
The collective whole of technologies using either telephone or cable for high-speed data transmission.

Collocation
Principle according to which an alternative operator leases a room at the incumbent to install his own equipment.

EuroDOCSIS
Group of technologies offering high-speed transmission through coax cables by using very-high-frequency signals.

ERG (European Regulators Group)
Group bringing together the European Commission and regulators of 25 member states, for the purpose of furthering coordination and coherent application of the European regulatory framework.

FTTB (Fibre to the Building)
Access network where optical fibre is installed up to the basement of the building and the inside cable wiring already present (coax, copper cable) for the 'last mile' between the basement and the end-user.

FTTC/FTTCab (Fibre to the Curb/Fibre to the Cabinet)
Access network where optical fibre is installed up to the street cabinet and the copper or coax cable already present for the 'last mile' between the street cabinet and the end-user.

FTTH (Fibre to the Home)
Access network where optical fibre is installed up to the living room.

HDTV
High definition TV

Migration
The possibility of switching from one service to another.

Unbundling of the local loop (LLU)
In case of unbundling the alternative operator has access to the copper pair or the optical fibre of the end-user and links this cable with its own equipment.

Optical distribution frame (ODF)
Space towards which all optical fibres are converging and where connection can be established between several optical fibres.

NGA (Next Generation Access)
The current access network where a copper wire goes through between the end-user and the exchange (LEX or LDC) will be entirely or partly replaced by optical fibre in the next years.

NGN (Next Generation Network)
Next Generation Network (NGN) refers to the development of the current network infrastructure. The purpose of this network development is to reduce the operational costs and enable new high-speed innovative services for end-users.

Point-to-point network architecture
In a point-to-point network architecture a personal optical fibre goes from the exchange to the end-user. The optical fibre capacity is not shared with other users.

PON network architecture
PON means Passive Optical Network. Splitters make it possible to distribute the capacity of one optical fibre over several optical fibres and creates a sort of tree structure from the exchange to the customer's home. Capacity is shared with other users.

Retail
Sales to end consumers, whether private customers or companies.

SMP (Significant Market Power -) – operator having significant market power
BIPT analyses the level of competition in the market and designates itself the SMP players on that basis; it also sets out these SMP operators' obligations.

VDSL (Very High Rate DSL)
Transmission technology enabling very high speeds but over a shorter range than ADSL (see xDSL).

xDSL (Digital Subscriber Line)
Group of technologies enabling high-speed transmission through one or several pairs of copper wires by using very high frequency signals. xDSL breaks down into ADSL, SDSL, and VDSL. Each of these subgroups carries its own specific usage and characteristics.