Toward FTTH

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AUTORITÉ DE RÉGULATION des Communications électroniques et des Postes

1. **What lessons can we learn from broadband regulation in France?**

2. Toward very high-speed broadband

The retail broadband market is dynamic and competitive… thanks to innovative offers and productive efficiency

- Market dominated by DSL (94%) which covers 98.5% of households.
- Price of residential offers among the lowest in Europe: about €30/month for a triple-play bundle. Shift to the €30 triple-play as a standard (with TV/satellite used by France Telecom in unbundled areas for example), which was not foreseeable in 2004.

- On the **demand** side, 70% household penetration with:
  - boom of IP telephony, accounting for more than 50% of traffic. France is one of the only countries where there is no clear replacement of fixed telephony by mobile telephony;
  - IPTV boom (more than 7 million users);
  - as to theoretical speed, over 50% of the population have access to more than 10Mbps and 75% to more than 4Mbps.

- On the **supply** side, innovation is strong and steady. Moreover, operators have industrialized their processes and achieved productivity gains.

ideo
les Tout-en-un mobile et box
Bouygues Telecom

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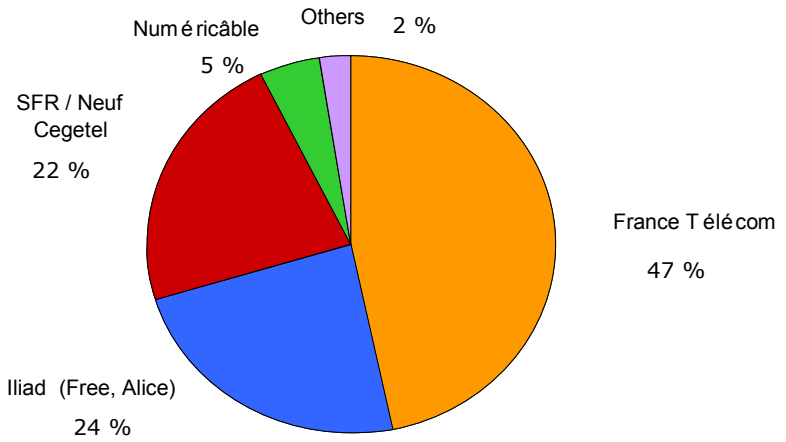
Despite concentration and a decline in growth rates, competition is still there.

- Despite the sector's concentration, competition is still going strong:
  - since 2008 the three main operators have had a more than 90% market share, and France Telecom alone just under 50%;
  - even if the growing market turns into

  a churn market, purchase rates vary widely;
  - new players (Bouygues, Darty);
  - diversity of the offers (quadruple play…).

Residential broadband market share, 1 July 2009



- The declining growth rate (+12% vs. 28% two years ago) forces quality of service to become key to the market momentum. Operators are expected to be offering the same Service Level Agreement (SLA) key performance indicators by mid-2010.
- Operators also working to improve quality of service:
  - at the wholesale level within multilateral groups;
  - at the retail level within multilateral groups to resolve unrequested ISP switching (slamming).

Business models have been defined by the market, with ARCEP promoting infrastructure-based competition for the consumer's benefit.

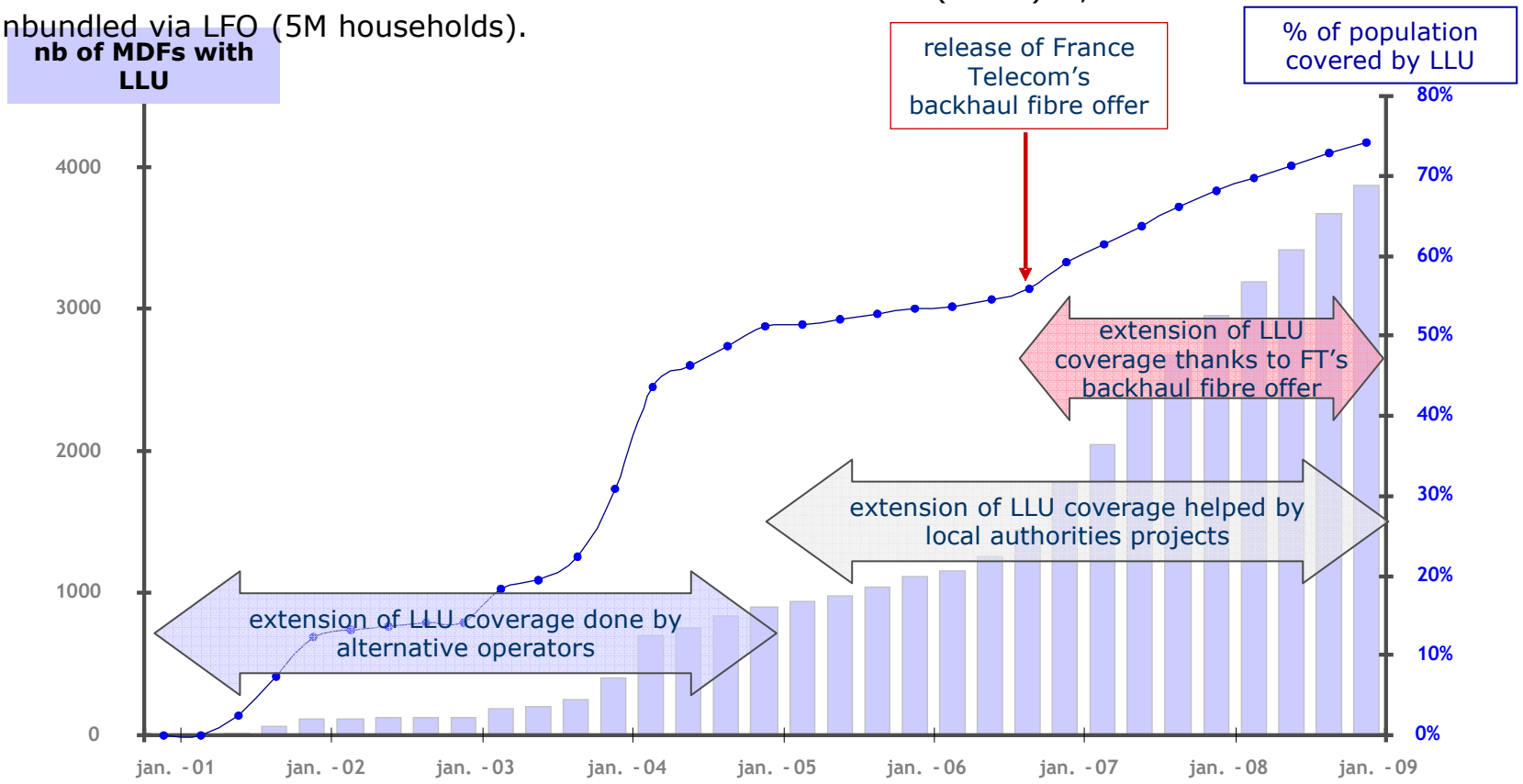
- It was not ARCEP's role to define business models for the broadband market. The regulator can only promote efficient investment for the benefit of consumers through regulation.

- Local Loop Unbundling has been the keystone of broadband regulation:
  - it enables alternative operators to climb the ladder of investment and offer new services (VoDSL, TVoDSL);
  - it encourages infrastructure-based competition which is necessary to ensure lasting competition in the retail market, lower prices and innovation;
  - from mid-2002 to 2005, 1,000 Main Distribution Frames (MDF) unbundled – covering 14.4M households;
  - bitstream is a complementary wholesale offer for LLU operators. Wholesale tariffs must give alternative operators an incentive to invest, to unbundle new central offices.

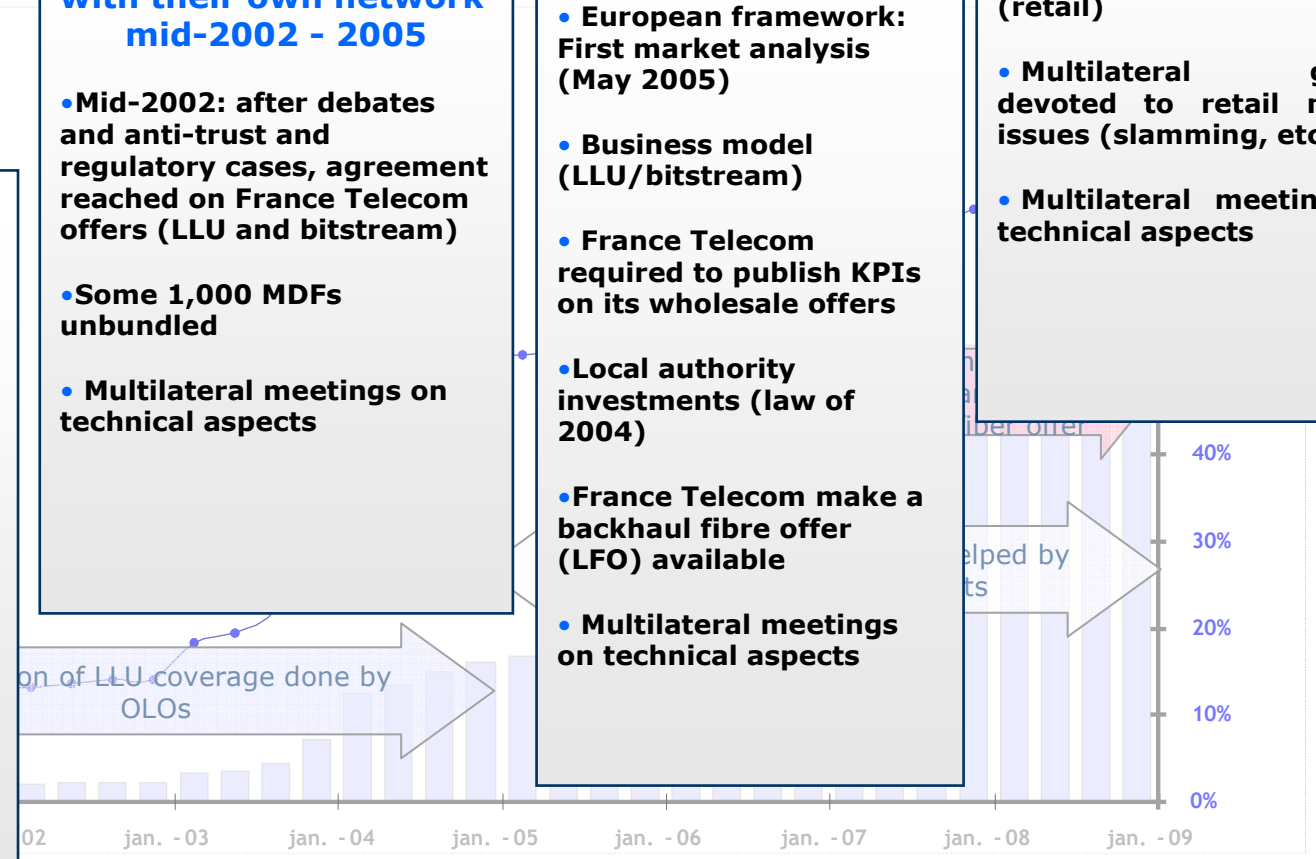
- Extending LLU coverage was enabled by:
  - local authorities' projects (backhaul networks): the law passed in 2004 allows local authorities to act as operators;
  - France Telecom's commercial backhaul fibre offer ("LFO") which enables alternative operators to unbundle new exchanges via LFO.

Chronology and extension of LLU coverage

- Thanks to local authorities' projects, backhaul networks were developed in more sparsely populated areas. Around half of the 2.1 billion euros invested came from public financing. 1,420 new exchanges have been unbundled by alternative operators (4.6M households).
- Thanks to France Telecom's commercial backhaul fibre offer ("LFO") 1,260 new central offices have been unbundled via LFO (5M households).



Regulation evolves apace with market dynamics (demand, supply, productive efficiency)



1. Preliminary work 2000 - mid-2002

- European rules on LLU (late 2000)
- Multilateral work (based on trials) devoted to:
  - tariffs
  - engineering
  - technical aspects
- First offer from France Telecom
- Multilateral meetings on technical and financial aspects

2. LLU: first rollout by alternative operators with their own network mid-2002 - 2005

- Mid-2002: after debates and anti-trust and regulatory cases, agreement reached on France Telecom offers (LLU and bitstream)
- Some 1,000 MDFs unbundled
- Multilateral meetings on technical aspects

3. Expansion of LLU 2005 - 2009

- European framework: First market analysis (May 2005)
- Business model (LLU/bitstream)
- France Telecom required to publish KPIs on its wholesale offers
- Local authority investments (law of 2004)
- France Telecom make a backhaul fibre offer (LFO) available
- Multilateral meetings on technical aspects

4. Towards a churn market…

- Publication of SLA KPIs (retail)
- Multilateral groups devoted to retail market issues (slamming, etc.)
- Multilateral meetings on technical aspects

The degree of LLU extension was not foreseeable

1. What lessons can we learn from broadband regulation in France?

2. Toward very high-speed broadband

There is no single model for very high-speed broadband network rollouts

- The business model for NGA networks varies from one country to another and depends on:
  - the level of broadband market competition, which itself depends notably on the existence of a cable network, LLU and bitstream offers, the quality of the copper network;
  - the geo-economic organization of the country (population density, distribution);
  - public authority action;
  - And, last but not least… market players' plans and goals.
- Within the same country, costs and rate of return depends on geo-economic characteristics. As a result, very high-speed network rollouts will also take place under different conditions:
  - technology, degree of competition, public investment…

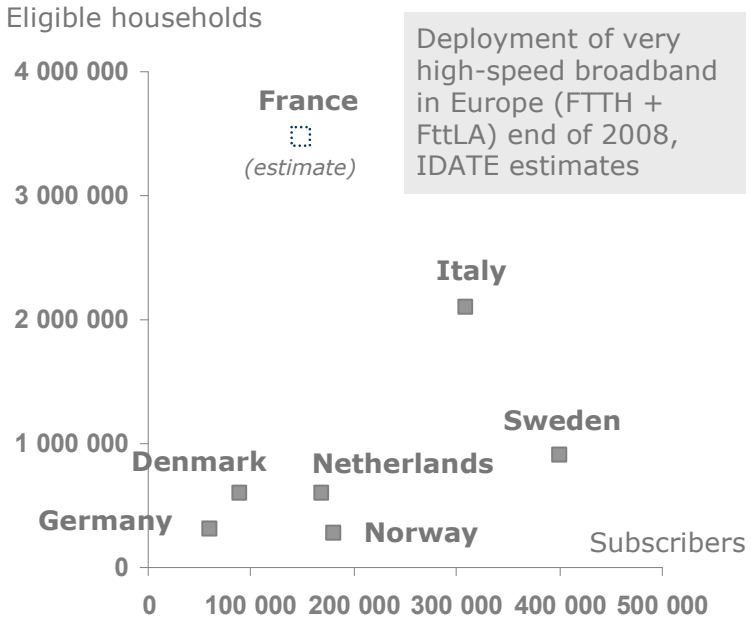
ARCEP aims to help spur a rollout momentum

- Infrastructure-based competition must prevail over a significant geographic footprint, in areas where dynamic competition exists.
  - Regulatory framework has to be clear and provide incentives to invest in those areas.
  - These first rollouts will help measure consumers' willingness to pay for new services, and enable the industrialization of rollout processes.
- At the same time, rollouts in less densely populated areas must be prepared by promoting:
  - shared investment;
  - the deployment of networks open to all operators;
  - local authority involvement when private investment doesn't suffice.

Status of very high-speed broadband in France (June 2009)

- The deployment of fibre optics in the horizontal portion has begun:
  - more than 4.5 million households located close to a fibre optic network,
  - 3.5 million households eligible for FttLA fibre offers with coaxial cable termination.

- The equipment of building with fibre optics is progressing:
  - 33,300 buildings equipped with fibre optics and connected to at least one operator,
  - 650,000 households located in these buildings and eligible for FTTH services.



Deployment of very high-speed broadband in Europe (FTTH + FttLA) end of 2008, IDATE estimates

- However, the number of very high-speed subscribers is still low:
  - All technologies combined, they total around 230,000, including 180,000 subscribers with coaxial cable termination (FttLA), and 50,000 with fibre to the home (FTTH).

- A clear regulatory framework is needed to allow these figures to rise. For the moment, infrastructure sharing is only just beginning in test areas (with about 5,000 eligible households).

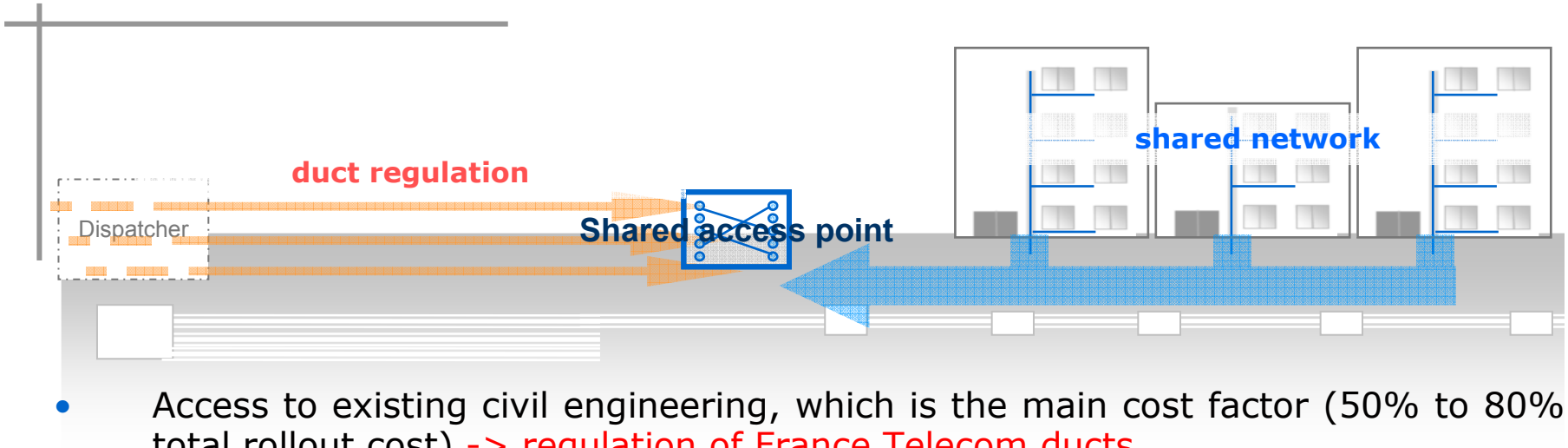
Objectives and tools for very high-speed broadband regulation

- ARCEP aims to enable operators to invest in very high-speed broadband under equal conditions, which means:
  - access to existing infrastructure, especially civil engineering which is the largest cost item;
  - sharing new investments, especially in the last mile.

- Sharing the last mile allows:
  - operators to limit overall rollout costs;
  - only a single installation in buildings, instead of multiple ones by different operators;
  - the prevention of local monopolies;
  - building residents to have a choice of ISPs for their very high-speed services.

- To define the rules for very high-speed broadband regulation, different aspects have to be tackled in working groups with the players:
  - relations between property owners and network operators (sample agreement);
  - technical aspects (definition of the engineering rules for infrastructure sharing, based on the principle of technological neutrality);
  - assessing the cost of the different solutions;
  - establishing pricing principles.

Complementary rollout tools



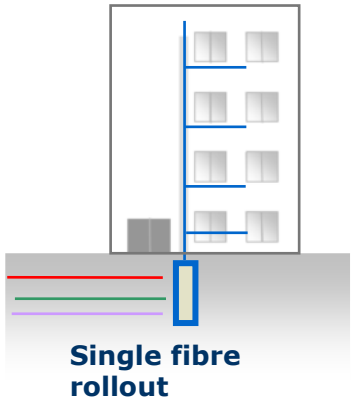
- Access to existing civil engineering, which is the main cost factor (50% to 80% of the total rollout cost) -> regulation of France Telecom ducts
  - In accordance with the market analysis decision of 2008, July 25th (markets 4 and 5), France Telecom must provide access to its civil engineering under transparent, non-discriminatory and cost-oriented conditions.
- Access/shared investment in the last mile -> sharing the last mile of the fibre network
  - The Law on Modernising the Economy (4 August 2008) sets out specific rules for providing access to the last mile of very high-speed broadband networks.
- Local authority actions in less densely populated areas: incentives to roll out networks opened to all operators,
- with key indicators to monitor fibre rollouts in France:
  - starting in April 2009, regular publication of a fixed very high-speed broadband scorecard that makes it possible to monitor fibre rollouts across the country, the use of France Telecom civil engineering offers and the implementation of FTTH network sharing by all operators

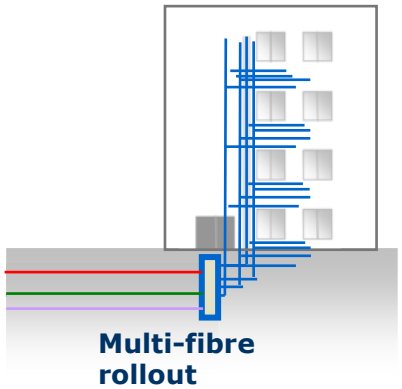
ARCEP is about to adopt a decision and a recommendation, to set the terms for last mile sharing in very densely populated areas where infrastructure-based competition is likely to exist

- Definition of very densely populated areas: about 20 metropolitan areas, 5.5M households, where rollout cost are the lowest.
- The shared access point can be located inside private property if the building has more than 12 units or if it is connected to visitable sewers.
- If, prior to the rollout, another operator requests a dedicated fibre, the building operator must provide it. The operators will share investment costs.
- The building operator must provide access to any operator at the shared access point. This access is passive, but can be active if four operators already have their own dedicated fibre.
- ARCEP plans to adopt this decision and this recommendation before the end of the year, to allow operators to invest within a clear regulatory framework. A great deal of effort was invested in defining the different rules (technical aspects, pricing principles…), with sharing trials carried out between operators.

Multi-fibre rollouts benefit competition and consumers

- On the one hand, multi-fibre rollout offer several advantages:
  - operators can be independent, having their own network from end to end, whereas sharing a fibre involves complex interaction;
  - operators can implement their own technology and differentiate themselves from one another;
  - consumers can have the choice of several offers from different ISPs, and churn costs should be reduced;





- On the other hand, the constraint this creates for the building operator seems reasonable, at least when the shared access point is located near or inside the building:
  - limited cost difference between a single and a multi-fibre rollout;
  - OPEX likely lower for a multi-fibre roll out, which is particularly significant as the infrastructure will be used for several decades.

ARCEP has published a sample agreement between operators and building owners

- The Law on Modernising the Economy states that the building operator must sign an agreement with the owner of the building.
  - The agreement specifies the terms and conditions that apply to the deployment, maintenance and management of the fibre network in the building.
  - The deployment of the fibre inside the building is financed entirely by the operator (no cost to the owner).
  - Once the agreement is signed, the building operator has 6 months to deploy the network (except for the last mile which involves agreements with others).
  - The terms governing sharing between operators are not stipulated in this agreement, but rather in the agreements between operators.

CONVENTION D'INSTALLATION, GESTION ET MAINTENANCE DE LIGNES A TRES HAUT DEBIT EN FIBRE OPTIQUE

Entre les soussignés

Le Syndicat des copropriétaires dûment autorisé après délibération de l'Assemblée Générale datant du [...] et représenté le cas échéant par son syndic en exercice/ ou [L'OPH/ALM / la SA /HLM de ... représenté par son président dûment autorisé par décision du conseil d'administration en date du ...], ci-après le 'Propriétaire' d'une part (coordonnées ...)

et

La société X ci-après le 'Opérateur' d'autre part (coordonnées ...)

Il est convenu ce qui suit :

Article 1 - Objet

La présente convention, conclue sur le fondement de l'article L. 33-6 du CPCE, définit les conditions d'installation, mise en gestion, d'entretien et de remplacement de lignes de communications électroniques à très haut débit en fibre optique permettant de desservir un ou plusieurs utilisateurs finals dans un immeuble de logements ou à usage mixte.

Ces conditions ne font pas obstacles et sont compatibles avec la mise en œuvre de leur mutualisation prévue à l'article L. 34-8-3 du CPCE. L'Opérateur est ainsi responsable vis-à-vis du Propriétaire des opérations techniques nécessaires à l'installation, à la gestion, à l'entretien et au remplacement de l'ensemble des lignes, y compris celles mutualisées auprès d'opérateurs tiers.

La présente convention ne comporte en revanche aucune disposition fixant des conditions techniques ou tarifaires de la mutualisation.

En complément du présent document, des Conditions spécifiques décrivant notamment les modalités de mise en œuvre de certaines des stipulations prévue par la présente convention.

Les parties peuvent, le cas échéant, s'accorder dans un document distinct de la présente convention, sur les conditions techniques et financières de la fourniture de services de communications électroniques au bénéfice du Propriétaire ou de l'ensemble de ses occupants.

Article 2 - *Réalisation des travaux*

L'opérateur installe pour chaque logement ou utilisateur professionnel un chemin continu en fibre optique partant du point de raccordement en limite de propriété et allant jusqu'à la limite du logement ou du local de l'occupant. La fin des travaux à effectuer ne peut excéder 6 mois après la date de signature de la convention. Le câblage d'étage peut être réalisé après la date fin des travaux, notamment pour répondre à une demande de raccordement émise par un occupant ou à une demande d'accès pour desservir un tel logement ou local émise par un opérateur tiers.

Les modalités d'exécution des travaux d'installation des lignes de communications électroniques à très haut débit en fibre optique dans l'immeuble sont à la discrétion de l'opérateur. Celui-ci respecte néanmoins le règlement intérieur de la propriété ainsi que les normes applicables et les règles de l'art.

Le Propriétaire met à la disposition de l'Opérateur les infrastructures d'accueil ou l'espace nécessaire dans les locaux techniques de l'immeuble, pour permettre l'installation, la gestion et la maintenance des lignes à très haut débit en fibre optique. Lorsque de telles infrastructures d'accueil ne sont pas disponibles, l'Opérateur met en place des infrastructures d'accueil, en laissant un espace de manœuvre équivalent à celle dont il a besoin pour l'installation des lignes, depuis la limite de propriété de l'immeuble jusqu'aux locaux de chaque occupant.

Article 3 - *Gestion, maintenance et entretien*

La gestion, la maintenance et l'entretien de l'ensemble des lignes en fibre optique, des équipements et des infrastructures d'accueil dans l'immeuble sont assurées par l'Opérateur. Le Propriétaire autorise l'Opérateur à mettre à disposition de tout opérateur tiers les ressources nécessaires en pied d'immeuble au titre de la mutualisation. L'Opérateur est responsable de ces opérations et en informe le Propriétaire.

Article 4 - *Les modalités d'accès au bâtiment*

L'Opérateur respecte les modalités d'accès au bâtiment définies dans les conditions spécifiques à l'occasion de toute intervention nécessaire aux opérations d'installation, de gestion, de maintenance et d'entretien. Le propriétaire fait ses meilleurs efforts pour garantir cet accès.

Article 5 - *Responsabilité et assurances*

L'Opérateur est responsable des dommages causés par les travaux d'installation, de gestion ou d'entretien de l'ensemble des lignes en fibre optique, et ce, tant à l'égard du Propriétaire que d'un tiers qui se trouverait dans la propriété privée au moment des travaux. Il contracte au préalable les assurances nécessaires pour couvrir les éventuels dommages.

Un état des lieux contradictoire est effectué avant et après les travaux. En cas de dégradations imputables aux travaux, l'opérateur assure la remise en état.

Article 6 - *Information du Propriétaire et des opérateurs tiers*

Afin d'informer le Propriétaire sur les lignes et équipements installés, l'Opérateur établit un plan de câblage qu'il tient à jour. Il informe le Propriétaire des modifications apportées aux installations établies dans le cadre de la présente convention.

Dans le mois suivant l'accord du propriétaire, l'Opérateur en informe les opérateurs tiers.

Les parties précisent dans les conditions spécifiques la date de raccordement de l'immeuble à un réseau de communications électroniques à très haut débit ouvert au public.

Article 7 - *Dispositions financières*

L'autorisation accordée par le Propriétaire à l'Opérateur d'installer ou d'utiliser des lignes de communications électroniques à très haut débit en fibre optique n'est assortie d'aucune contrepartie financière.

Les opérations d'installation, de gestion, de maintenance et de remplacement des dites lignes ne font pas frais de l'Opérateur. Ceci inclut notamment l'installation des câbles d'étages.

Article 8 - *Propriété*

Sauf dispositions contraires définies dans les conditions spécifiques, les équipements et les infrastructures d'accueil installées par l'Opérateur sont sa propriété pendant la durée de la présente convention.

Article 9 - *La durée de la convention et les conditions de son renouvellement ou de sa résiliation*

Sauf dispositions contraires définies dans les conditions spécifiques, la présente convention est conclue pour une durée de 15 ans à compter de la date de signature, renouvelable une fois tacitement sauf dénonciation par l'une des parties. En cas de changement d'opérateur, l'Opérateur fait ses meilleurs efforts pour assurer la continuité du service jusqu'à ce que la gestion et la maintenance des équipements installés soient transférées à un tiers.

Article 10 - *Conditions spécifiques*

Les Conditions spécifiques précisent :

- La date de raccordement de l'immeuble à un réseau de communications électroniques à très haut débit ouvert au public ;
- Les modalités d'accès à la propriété privée par l'Opérateur ;
- Le propriétaire des équipements, des fibres et, le cas échéant, des infrastructures d'accueil si il diffère de celui prévu à l'article 8 ;
- La durée de la convention et les conditions de son renouvellement si elles diffèrent de celles prévues à l'article 9 ;
- Les procédures et les cas de résiliations.

A ..... le .....

Pour le Propriétaire (Nom et Qualité) — Pour l'Opérateur

- A sample agreement has been drafted by ARCEP, in tandem with property owner representatives, building managers and operators. It was published on our website (www.arcep.fr) in June 2009.

What happens outside very densely populated areas? The draft decision already includes obligations applicable to all areas

- The access provided at the shared access point must be via a **passive** solution:
  - broadband market experience has shown that the existence of a passive offer (such as LLU) is the guarantor of competition and innovation;
  - in accordance with the draft decision, the building operator must provide passive access at the shared access point.
- The building operator must publish an access offer, which must specify:
  - the terms concerning the deployment of a dedicated fibre or a flexible access point (cross-connection device);
  - the terms for accessing the lines through a dedicated or shared fibre;
  - the terms of access to associated facilities.
- The building operator must supply prior information:
  - on the building already equipped with a fibre network;
  - on the shared access points.
- Pricing obligations:
  - access prices must be reasonable and must comply with the principles of non-discrimination, objectivity, efficiency and cost-orientation;
  - the rate of return on capital depends on the degree of risk taken, and gives the building operator a risk premium.

State of play

- In very densely populated areas, ARCEP and operators will be devoting their efforts to the terms that apply to infrastructure sharing outside private property for small buildings and houses.

- In more sparsely populated areas, the location of the shared access point upstream in the network creates complex issues (definition of the size of shared access points, definition of the areas, etc.). Arrangements for fibre rollouts in other areas are being examined in a working group that involves all of the stakeholders, exploring the possibilities of coordination between the players, network sharing and shared investment.

- Shared investment is consistent with infrastructure-based competition: the objective is to allow operators to have their own network by sharing the cost of the new local loop which could be viewed as an essential facility.

Local authority involvement in NGA networks is crucial

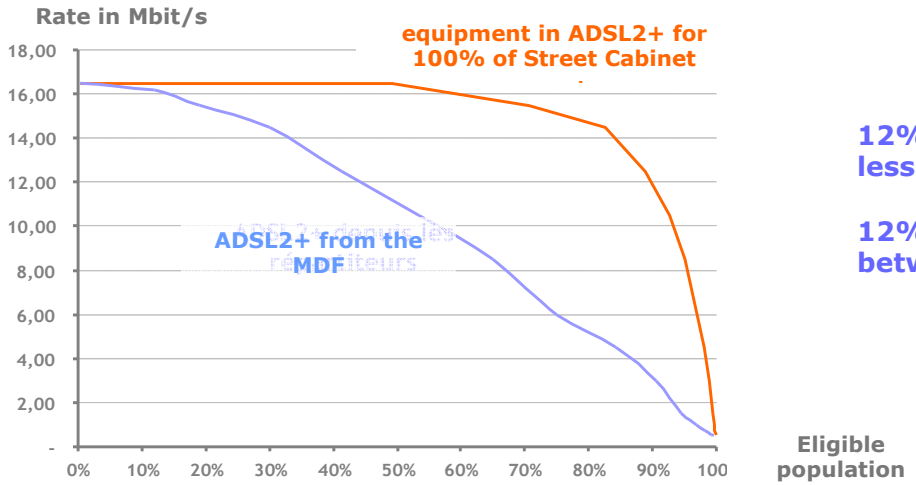
- Local authorities' financial contribution to FTTH rollouts in more sparsely populated areas could be decisive and depends on:
  - European Commission guidelines on State aid;
  - the role of the *Caisse des dépots* in fibre deployments;
  - the possibility of private-public partnerships with minority public funding in order to deploy fibre.

- Local authorities can also help operators' fibre rollouts:
  - with field studies identifying the best configurations and available infrastructure;
  - availability of civil engineering ducts or overhead infrastructure for fibre deployment and room to host the concentration points (NRO, etc.);
  - installation of additional ducts during road work;
  - authorizing the installation of cables on the façade of buildings; use of light engineering, installation of street cabinets, etc.

- Upgrading the copper network is another solution that could be examined for less densely populated areas, to pave the way for FTTH in the future.

Broadband upgrade (1/2)

- In less densely populated areas, deploying FTTH may be a medium-long term issue.
- But there is already demand for broadband upgrades, and it's become a major concern for a rising number of local authorities.
- As a result, upgrading broadband through "classic" sub loop unbundling may offer a first step toward FTTH, especially for less dense areas, and may lead to a real improvement in access speeds for customers:



12% of the population has less than 2Mbit/s

12% of the population has between 2 and 4Mbit/s

demand for upgraded broadband is strong and valid

- However, there are high risks in such a rollout for alternative operators:
  - sub loop unbundling could be a way for incumbent to gain back market share.

Broadband upgrade (2/2)

- Three solutions are being examined from both a competitive and technical point of view:
  - classic sub-loop access via shaping methods that allow operators to choose freely between staying with the Main Distribution Frame or unbundling the street cabinet;
  - transforming the street cabinet into an MDF, which is a solution that requires operators located at the "old" Main Distribution Frame to choose between wholesale access offers (bitstream) or switching to unbundling at the street cabinet /"new" MDF;
  - DSL multiplexing, which is a solution where all operators stay on the MDF, and active equipment linked with fibre is used between the Main Distribution Frame and the street cabinet to eradicate the distance.
- Broadband upgrades should pave the way for an FTTH rollout, and ARCEP will consult with operators over the way infrastructure is deployed at the street cabinet level, and how deployed fibre can be used to promote the FTTH network rollouts in more sparely populated areas.
  - A public consultation on the matter was launched on Friday, 23 October.

CONCLUSION:WORK IN PROGRESS

- Before the end of the year, ARCEP will give the first rules to rollout fiber in that zones, which should allow operators to invest with a clear regulatory framework. Many works have been necessary to define the different rules (technical aspects, tariffs principles,…), so as to:
  - promote infrastructure competition,
  - establish the principles for sharing the cost of last-mile installation,
  - guarantee technological neutrality (PON vs. P2P),
  - …ensure the benefit of consumers.

- The main broadband players are now working to prepare a sharing offer in accordance with these rules. They have announced in France plans to deploy fiber in dense areas.
- It is only a first step, but it is a crucial one for innovation, industrialization process and productivity gains, emergence and assessment of new demands.