
Delivering High Capacity Broadband for France

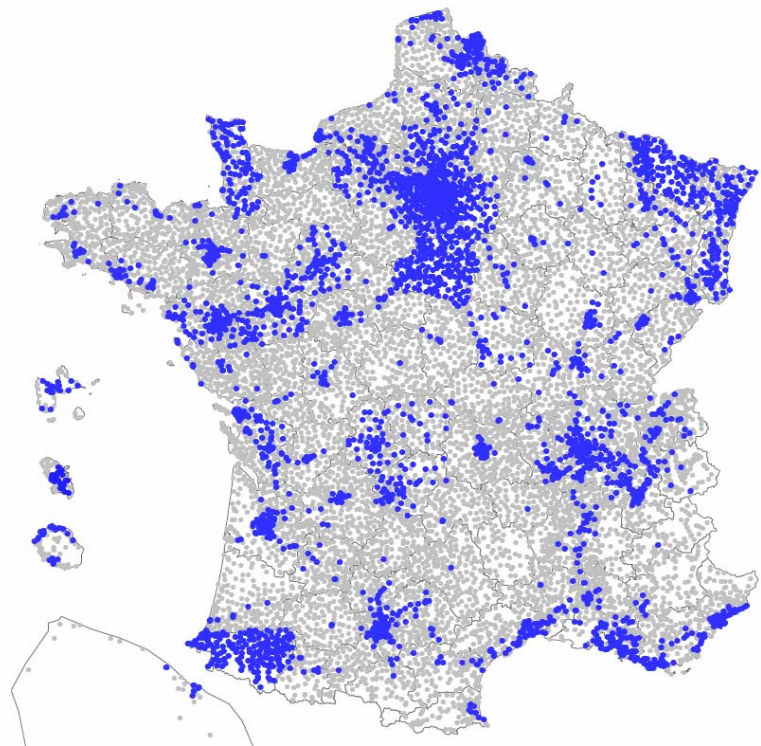
Regulatory Challenges on NGA

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The regulation of broadband has encouraged investment by all operators

- Competition through active infrastructures is the main driver behind the development of broadband:
 - The geographic extension of local loop unbundling has encouraged France Telecom to equip all of its MDF (Metallic Distribution Frames) for ADSL
 - France has joined European leaders in terms of penetration...
 - ...and is in first place for "triple play" and VOIP
- Regulation has made this increase in investments possible
 - Local loop unbundling gives operators technical and economic control
 - "Bitstream" serves as a geographic complement
- Local authorities intervention has been crucial in the expansion of LLU footprint



● MDF with only FT
● MDF with FT and at least one altnet based on LLU

Very high bandwidth opens a new investment cycle : which infrastructure competition on NGA ?

- No doubt very high bandwidth is the technological evolution in the medium term
 - To meet growing demand for content
 - To assist the concomitant rise in speeds
- Major players have announced fibre deployments
 - With respect to other European countries, the challenge here is to bring the fibre as close to the subscriber as possible (right to the base of the house or building)
- Investments are significant and will need to be spread over several years
 - Several hundred euros per connectable home
 - At a rate of one to two million homes per year
- The concern is to ensure that this investment is borne by all operators as much as possible, on the active part of the network as much as possible
- Objectives of ARCEP are :
 - To promote investments
 - To prevent regression of competition and irreversible foreclosure of the market



Alternative operators require access to civil engineering

- Operators are not on an equal footing for 3 main reasons:
 - Size of customers' base to convert
 - Investment capacities
 - Access to ducts
- France Telecom's ducts are an essential infrastructure:
 - Alternative operators can roll out only in limited cases like Paris, where sewers can be visited and pass under every building
 - France Telecom deploys optical fibre in its civil engineering ducts inherited from the former monopoly
 - Numericable is progressively replacing coaxial cable with optical fibre
- Access to France Telecom's civil engineering must be guaranteed to allow all operators to invest

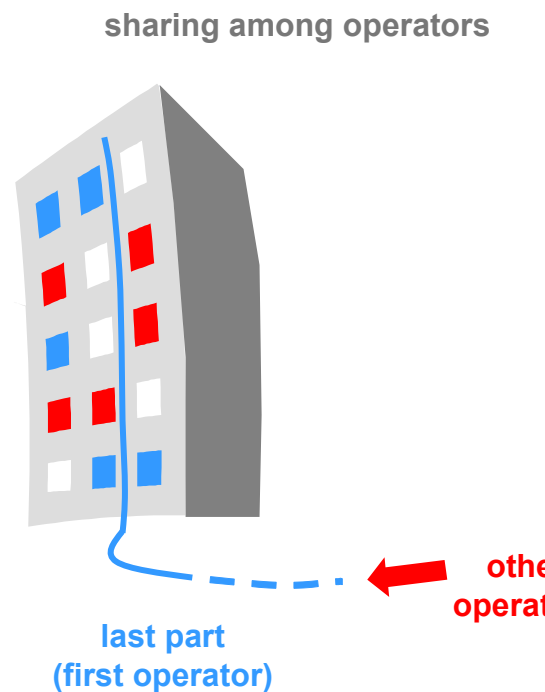


Regulation of France Telecom's ducts is effective

- The regulation framework is that of the market analysis
 - To guarantee access to the essential infrastructure: France Telecom's civil engineering
 - The new Commission recommendation includes ducts regulation through market 4
 - Asymmetrical regulation
- In its market analysis on broadband and very high broadband, which has been adopted on 24th July, ARCEP has proposed to regulate the access to France Télécom's ducts as a remedy to the SMP position of France Télécom.
- France Telecom has published its ducts reference offer on 15th September.
 - Operators have been experimenting the process of this offer since the beginning of 2008
- ARCEP will make sure that all operators, including France Télécom, have access quickly to civil works under equivalent conditions. It requires:
 - An equivalent information on the availability of space for all operators ;
 - To use appropriate engineering rules that optimize the available space and the use of the ducts ;
 - To have a transparent, non discriminatory, cost oriented access to the ducts ;
 - To share part of the capital costs by coordinating work (by sharing studies for availability e.g.).

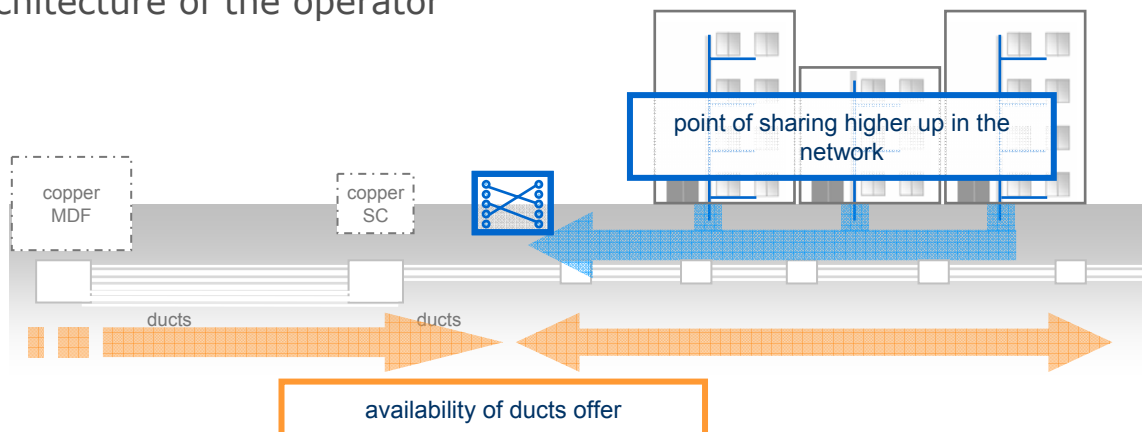
For all players, access to buildings is a crucial problem

- Fibre deployment to the home means that private properties have to be equipped
- Operators are prepared to bear the cost of this installation in the centres of major cities
- However, condominium owners, landlords and building managers fear that monopolies will be created by building or neighbourhood
 - They want to limit the number of agents in common areas...
 - ...but want to be able to choose their operator, without having to move house
- So, sharing among operators is necessary
 - Principle : the first operator installs the fibre in the building then gives other operators access to its network



Means of sharing must encourage competition through infrastructure while tackling economical and operational concerns

- Sharing of in-house wiring at the level of the building and access to ducts alone will not be sufficient to guarantee sustainable competition, even in dense areas.
 - It is useless and too costly to roll out serial networks inside and towards each building
 - The natural monopoly is not limited to the fiber within the building
 - Risk of an irreversible situation
- Having a point of sharing higher up in the network raises a few issues :
 - In terms of technology, it has to be compatible with different technologies : PON and point-to-point
 - The physical location of the point of sharing depends of the topography, of the density, of the architecture of the operator



Legislative measures have been adopted to facilitate the roll out of fiber networks inside the buildings

- The LME (Loi de Modernisation de l'Economie) adopted this summer deals with the deployment of fiber and the sharing of the last part of the local loop among operators :
 - A "right to fiber" has been instituted, to facilitate the roll out of fiber networks inside the building
 - In return, any operator that rolls out fiber within a building has to give access to this fiber network to other operators : point of sharing is located outside the private property
 - ARCEP has the power to define the technical and tariff related terms of the shared access and guarantee operators respect them
 - In new buildings, pre-equipment standards have evolved to include fiber
- The LME sets the rule of symmetrical regulation, in anticipation of article 12 Framework Directive
- Access does not follow the same logic as LLU :
 - = differed "co-investment" on access
 - Risk sharing through IRU
 - On which footprint?

ARCEP just issued a preliminary recommendations

- These recommendations deal with :
 - Prior information of the eligible buildings
 - Location of the shared access point
 - Type of sharing the last part of the local loop (recommendation on the installation of additional last drop fiber...)
- ARCEP also published a sample agreement between property owners and operators dealing with the respective parties' responsibilities
- ARCEP encourages the signing of first private commercial agreements between operators on limited areas in a first stage.

Local Authorities have an important role to play

- In recent years, local authorities have played a key role in the digital development of their regions
 - Combining public action and competition, in partnership with operators
 - Through the roll out of backhaul fiber networks, which has facilitated the development of Local Loop Unbundling outside the main cities, equipment of business parks, and are crucial for wireless local loops and mobile broadband
- With NGA, there is a severe risk of digital gap even within dense areas.
- Their intervention can be just as essential on very high bandwidth, even more crucial :
 - By providing local information: site surveys and geographic information systems for public land
 - On civil engineering: by coordinating work, laying extra ducts and authorising lightweight civil engineering
 - On the last part: with social landlords, by authorising wiring on facades and encouraging pre-wiring in new buildings and major renovations
 - Promoting the choice of common passive optical loop topography by operators.

The evolution towards broadband mobile

- Mobile Broadband is a natural and geographical complement to wireline ultra BB
- Growing demand for high speed ubiquitous access to broadband services
- Mobile service has started its evolution with 3G UMTS technology offering up to 1 Mbps to the end user
- New mobile technologies known as 3G LTE or Wimax are being designed to offer up to 10 Mbps mobile access to the end user

Tomorrow's rural digital divide is at stake

- Broadband mobile services will be available tomorrow (first deployment in 2010) in urban areas using the 2.6GHz band
- In order to cover rural areas, low frequency bands beneath 1 GHz will be necessary (lower roll-out and better in-door penetration)
- The 900 MHz band is not sufficient for higher bitrates and already accommodates 2G (GSM) and 3G (UMTS) mobile services
- Unless a low frequency sub-band is made available for broadband mobile in rural areas, a considerable part of the European population will be deprived of tomorrow's innovative services
- This is unacceptable to most countries

What services for broadband mobile

- Ubiquitous access to the internet, in Japan for instance, mobile access to the internet has become more popular than fixed access
- Mobile video



worldwide historical opportunity

- Digital broadcasting will replace analog broadcasting in most countries by next decade and, being six times more efficient, will release a considerable quantity of spectrum known as the “digital dividend”
- WRC 07 has identified part of the UHF band, the sub-band 790-862 MHz, in region 1 (Europe, Africa and Middle East) for broadband mobile
- This sub-band is narrow as compared to the identifications for region 2 (America) and 3 (Asia) and very narrow as compared to the telecommunication market needs. This illustrates the need for a better European coordination in these international forums
- However, this identification is a very important milestone toward a European solution for the broadband mobile services expected for the next decade

worldwide historical opportunity

- The 2.6 GHz band has already been attributed to telecommunication market in some Scandinavian countries, and will be soon in UK and Germany, with deployments starting in 2010.
- In the US, with a different and wider digital dividend sub-band (known as the 700 MHz band) attributed recently, deployments are expected to start in 2010.
- In Europe
 - Sweden and UK have declared their intention to attribute the 790-862 MHz sub-band (with some restrictions concerning UK) in the next two years.
 - European-wide technical harmonization should enable the industry to develop the equipment in 790-862 MHz

The French situation and decisions to come

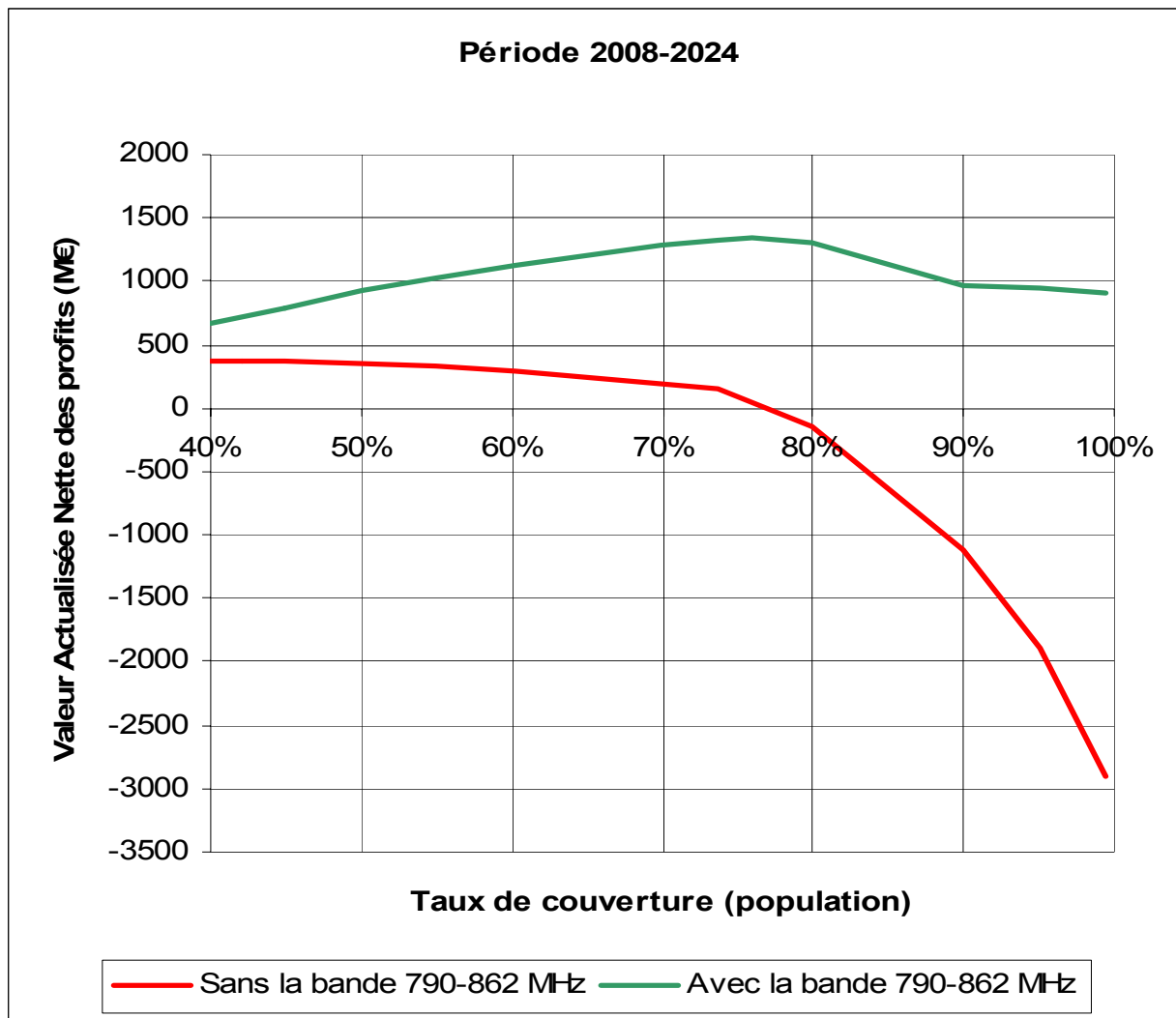
- Allocating the sub-band 790-862 MHz to broadband mobile picks up only 40 MHz of the band used for broadcast. Indeed, the sub-band 830-862 MHz is currently used for military purposes which could be satisfied by other frequency bands.
- Releasing these 40 MHz would not prevent the development of new broadcasting services, as technical studies have shown :
 - Up to 12 DTT multiplexes and up to 2 mobile broadcast multiplexes could still be accommodated in the UHF band, with a very high population coverage
 - This would allow all current DTT channels (30) to switch to HD and still leave some room for new channels.
- Decisions are necessary now to start border negotiations and to anticipate the future allocations.

French Study by Analysys and Hogan&Hartson for ARCEP

- A French Study by Analysys and Hogan&Hartson for ARCEP was based on the 72 MHz sub band and compared its allocation to broadband mobile with the status quo
- It shows that the incremental value of the sub-band for broadcast is very small whereas it is very high for broadband mobile
 - 48 instead of 40 HD TV channels*versus*
 - Broadband mobile services available for 99% of the French population instead of only in urban areas (30% of the population)
- As a conclusion, the allocation of the sub-band to broadband mobile generates an extra value (consumer plus producer surplus) of about €27 billion over 12 years (2012-2024).

French Study Analysis and Hogan&Hartson for ARCEP

As shown on the graphic, without the digital dividend sub-band, broadband mobile cannot be available to more than 79% of the population



What conditions and fees for licensees

- Since the digital dividend frequencies have a very good propagation capacity, the coverage obligations within the licenses will undoubtedly be very high
- On the one hand, there should be several licensees so as to ensure competition to the benefit of consumers
- On the other hand, a sufficient quantity of spectrum must be allocated to each licensee in order to provide sufficient throughput for the services expected for next decade (10 MHz duplex appears as a minimum).
- Since all actors might not be able to have access to these frequencies, some kind of infrastructure sharing or co-investment must be studied and set up as an obligation for the licensees.

What conditions and fees for licensees

- Spectrum fees shall be determined by the Government. They will of course take into account the high coverage obligations imposed to the licensees.
- The choice between pure auction and so called “beauty contest” will be made with the constraints listed above (coverage obligations, competition and equitable access to spectrum) and considering the other frequency bands soon available for broadband mobile services : remaining 2.1 GHz frequencies, 2.6 GHz and 3.6 GHz bands.
- The fees can be made of a fixed part paid in advance and another part that depends on the licensee’s income and that is paid for each year.

Content and net-neutrality issues

Balance has to be found between three different points of view.

- **The end-user**
 - wants to access or provide contents, services applications of his choice
 - on any device
 - without discrimination relating to the source, destination, content or application
 - wants at least be aware and informed in a transparent way of any technical limitations
- The content provider :
 - wants to provide services, applications and contents to a maximum part of the population
- The electronic communication network or service provider wants to
 - finance capital intensive NGA networks expansions
 - be able to manage traffic and optimize backbone investments.

Main concerns today

- Unbalanced share of the value between contents and networks
 - Content related ARPU not sufficient today (3€/month/subscriber for dsl)
 - VOD catalogue too limited and costly
- Which is an incentive for network providers to:
 - Provide their own integrated contents and acquire exclusive rights
 - Provide their own distribution platforms
 - Provide their own device
- Vertical integration problems arise
 - When an operator with significant market power has a distribution exclusivity of premium content
 - Tends to discriminate in a non transparent way between its any content and other providers' contents.

raft directives deal with Net Neutrality issues

- Article 2 of access directive and article 20 of framework directives will give NRA competencies to resolve dispute between “content providers” and undertakings providing electronic communications networks or services.
 - “In the event of a dispute between service providers arising in connection with existing obligations arising under this Directive or the Specific Directives between where one of the parties is an undertakings providing electronic communications networks or services, in a Member State, or between such undertakings and undertakings providing content”
- Articles 21 and 22 of universal service directive protect the end user
 - “Inform subscribers of any change to any restrictions imposed by the undertaking on their ability to access, use or distribute lawful content or run lawful applications and services of their choice”
 - “In order to prevent degradation of service and hindering or slowing of traffic over networks, Member States shall ensure that national regulatory authorities are able to set minimum quality of service requirements on undertakings providing public communications networks”

Conclusion for regulation

- Promote transparency to end users and fair information
 - On minimum quality
 - On traffic prioritization
- Promote a win-win relationship between operators, distributors and rights holders:
 - Fair revenue sharing
 - Be careful of exclusive distribution rights and vertical integration (especially for premium contents)
- NGA must be seen not as a threat but as a new opportunity to increase in the value of contents