Dictionary

Difference of NGA, FTTH based, with legacy

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Black/ White/ Grey areas	The copper network is national by nature - FTTH deployments are, on the contrary, extremely focused and limited in reach.	See Geographical Segmentation - Black areas (market driven): **(i**) at least 2 NGA networks and one operator providing services over unbundling of the local loop or wholesale NGA (II) White areas (policy driven): no case for facilities based competition. No spontaneous private sector investment can be expected. (III) Grey areas: intermediate areas identified for example by the presence of at least one existing LLU operator.	Black areas: no ex ante regulation to fiber, but wholesale access should be enabled. White area: need for State Aid. Grey Areas: probably the most important areas at the beginning. Need for a hierarchy of remedies to ensure the application of the regulation at the lowest possible level in order to promote an effective take off of infrastructure competition
Criteria for Facility Based Operators competition	Facilities or infrastructure based competition means competition between providers of the same or similar services, but delivered by different networks. So far, competition has mainly relied on the unbundling of the legacy copper network. Investment in other infrastructures are hampered by lack of investor confidence, due to regulatory uncertainty and it impact on pricing and the sustainability of new business models.	All operators should have the incentives to build a FTTH network: New relationships due to the high cost of passive infrastructure renovation Co-investment requirements to justify business modeles Long term investment strategy directly conditioned by long term policy and regulatory certainty Vision based on local/regional and national broadband upgrade policies	At least two access networks and one operator providing services over unbundling of the local loop are needed.
Duct sharing	Duct sharing has not been mandated for existing copper infrastructure but left as an optional measure (e.g. “access to essential facilities”), however similar practice is wide spread in other communications sectors such as mobile mast/site sharing, especially in	FTTH deployments neutralize today’s multi-dimensional ECN competition models by harmonizing at the highest level of performance all wireline access alternatives. As a direct consequence, duct sharing becomes one of the most efficient mechanisms for building a longstanding competitive environment in NGA	Reliance on duct sharing as one of the major key enabler for FTTH deployments requires a holistic approach: (I) Where copper cables are replaced in ducts by fibre, there is strong economic potential through recuperation and recycling of the stranded copper. The scrap value of the copper

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	underserved areas (due to economic constraints comparable to those of upfront infrastructure renovation costs). Different approaches to "open access" or essential facility sharing obligations for passive infrastructure have been introduced in certain Member states, under varying conditions (DK, AT, IT, PT and more recently DE).	based on FTTH. Duct sharing is located at the lowest common denominator of all actors/technologies involved in facilities based competition, and extends over the largest scope of potential investors (construction companies, passive infrastructure, public sector, and all types of ECN investors…) .	can contribute significant economic savings and the consequent freeing up of duct space can also have a positive impact on any strategy for duct sharing. (II) Instead of approaching duct sharing as an ancillary service, the Council supports creation of a new market for physical passive infrastructure (which would focus regulation on the main bottleneck asset). (III) duct sharing as a regulatory measure also reopens the debate on symmetric remedies. Duct sharing requires organizing the access to ducts as well as their maintenance in a technically consistent way.

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Geographical segmentation	In legacy networks, market segmentation is coherent with underlying ECNs, offering identical network and service capacities (fixed, catv, mobile) over vertically integrated network solutions. The geographic reference for regulatory use is the MDF which serves as the cornerstone for implementation of LLU over copper. In this context, broadband take-up depends essentially on user demand and high ARPU areas which tend to concentrate broadband access competition to well identified areas delimited by customer profiles, whereas less attractive areas (rural, isolated) require public sector intervention (e.g. financing of collocated DSLAMs) to either attract incumbent investments or competitive players. NGA exacerbates the distinction between market driven, policy driven and risk (or incentive) geographic areas.	The progressive penetration of fibre networks will be based on the competitive regional landscape (geographical segmentation) where higher speed broadband take up will develop at different speeds and based on contrasting investment scenarios, depending on the characteristics of any geographic area. The incumbents face regulatory uncertainty as the specifics of ex ante regulation may significantly damage their business case, while the alternative operators that have invested in the unbundling of the local loop are disadvantaged by the passive infrastructure assets already owned by incumbents, and their ULL investments might become obsolete as incumbent pursue FTTC or FTTH strategies. Moreover, new geographic area segmentation is introduced by local/regional public sector FTTx projects that often alter the competitive market conditions, particularly in grey areas.	To address such a new scenario, there is no one-fits-all solution at national level. The regulatory measures should present a view taking into account the competitive regional landscape, including area attractiveness, density, FTTH scenarios are by definition “progressive” and “capillary” (from feeder and distribution networks to end user premises).
Hierarchy of remedies	The set of remedies is particularly vast and is not harmonised at EU level	The deployment of a new network is an opportunity to establish a clear set of remedies paving the way to an effective facilities based competition	In the geographical markets (grey areas), the remedies will be modulated based on underlying competition. (i) Ducts/Dark Fibre/ and (ii) cost oriented vs. non cost oriented bitstream
Identification of competition issues	Competition between fixed and mobile networks, especially as regards broadband markets, was founded on vertically separated market definitions where competing service bundle offers are specific to the underlying ECN.	In an all IP/all fibre environment, the market definition issues of convergence, higher value chain competition between applications and realignment of business models adjusting to the impact of infrastructure renovation deeply transform market analysis parameters. Examples:	In the all-IP FTTH environment, competition extends both higher and lower than today's ECN/ECS value chain. For the FTTH Council, the regulatory approach must become three-pronged:

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	Examples: Fixed voice interconnection, mobile voice interconnection, FMC, VoIP, NP	Access to ducts, dark fibre and indoor SDU/MDU cabling, multi-stream SLA and peering arrangements, CPE addressing and home networking remote management.	(1) mechanisms that ensure competition over passive infrastructure (2) more focused mechanisms addressing remnant competitive issues in between the active networks (ECNs) and (3) a redefinition of ECS related mechanisms accounting notably for non-facilities based application providers offering equivalence of service to that of facilities based providers.
In-door cabling	Ownership of the indoor cabling varies (social housing, housing developments, PPPs, private residential condominiums…). Its inclusion in the definition of the unbundling of the local loop did not have major regulatory impact as regards already installed copper - but the paradigm changes completely in the case of FTTH where new rollouts are required for all drop segments to end user premises.	FTTH requires at least one fibre per end user unit (in MDUs) usually with spares (1:n redundancies inside vertical cabling) and dual fibres to single residential/business units. Technical and deployment decisions include: reuse of existing facilities (rise ducts), copper stranding or parallel installation, collective concentration points (e.g. in basements of MDUs).	Indoor cabling in fibre is a specifically complex challenge for industry (landlord resistance, complex access rules, lack of guidelines, lack of awareness). Three important measures are required in order to boost indoor cabling momentum while lowering overall costs: (1) operators: definition of multi-operator access/sharing rules for access to new fibre drop lines (possibly industry lead, hosted by NRA/ERG). (2) landowners: creation of a Euro-wide quality label for multimedia end to end connectivity to build awareness, value and security for real estate and landowner interests (e.g. US FTTH Council model). (3) end users: tax incentives (similar to ICT equipment incentives) to encourage end user take up (similar to energy savings incentives).

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Investment sharing for passive infrastructure	At the basic level, incumbents already-existing ducts' can be shared, and in this regard the street cabinets should be taken into account as well. Investment sharing should refer also to in-building cabling, where ducts' extra-space can be shared through leasing, thereby accelerating ROI.	Newcomers' incentive to enter NGA is supported if the new investment in NGA can be reduced and the risk can be shared. This can involve sharing the physical infrastructure investment between local communities and the private sector (PPP), where the municipalities enjoy accelerated deployment rate, and the private sector secures some of the investment. The result is co-owned passive - and possibly active – NGA infrastructure.	
Ladder of investment	The current wording allows for regulatory approaches that can vary considerably between Member States.	Deployment of NGA FTTH networks is an opportunity to set a vision focusing the regulation at the lowest level in the network where it is likely to be effective and sustainable: Passive infrastructure (20 years RoI) – lowest level ECN active infrastructure (5-7 year RoI) ECS/application platforms (6 months – 2 year RoI) End user feature markets (up to 6 month RoI) – highest level	Regulation mandating access to existing networks serves as a transitional measure and should incentivize the deployment of infrastructure competition. The ladder of investment concept should apply on a market basis and not on a per operator basis. This will probably require the operators to largely share their investments in the passive infrastructure.
Local Loop	In the PSTN context, the local loop is hybrid in nature, requiring multiple technical transitions (modems, signalling conversions) while using combined families of heterogeneous technologies (copper, fiber and hybrid cable segments, interconnecting digital, analogue, DOCSIS and CATV equipment, using different signalling systems).	In NGA, the local loop is that part of the network from the customer to the first aggregation point - there is a unique loop from a unique entity (new actors, niche or target markets), resulting in: a) chaotic development based on user demand for connectivity b) convergence of passive facilities to meet national objectives/policy - tradeoffs between sharing the cost of and access to new ducts versus connectivity.	The use of fiber and not copper to build the feeder, distribution and drop segments from the Central Offices to the customer can be leveraged. While any access infrastructure topology will parallel the roadway system, the much higher independence of fiber to distance compared to copper should lead to a paradigm shift in the way "local loop" is defined. In addition, the uniqueness of the local loop will

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	In a full FTTH environment, fibre will provide seamless equivalence of QoS and performance end to end (all IP, all optical components). This fundamental change also impacts the definition of the local loop, given the potential redistribution of access nodes in such a homogeneous environment, the multiplicity of distribution network alternatives (P2P, PON...) and the replacement of the last mile/meters/drop copper segment of access lines by individual fibers per end user.		be challenged as business plans, infrastructure deployment roadmaps or greenfield opportunities could lead to fragmented and overlapping fiber infrastructure topology. Public authorities should intervene to coordinate those local loops build-outs in the most coherent way.
Network separation in NGA - Functional Separation	The demarcation between Access and Core is different in a PSTN and a NGA network. Typically, the frontier of the PSTN access network is the local exchange, where subscriber access equipment (boards and lines) can be clearly identified and operated separately from backhaul and transmission/switching equipment (as practiced in local loop unbundling). In the NGA based on FTTH, active network equipment spreads between the new network's edge, access nodes and line terminals, combining subscriber access, service profiling as well as optical network component operations, all vertically integrated end-to-end. "Functional" separation is not an "end in itself" but only a potential remedy among others in response to a clearly	In the case of NGA, the all FTTH optical access network is (a) not homogeneous (e.g. different architectures/technologies can coexist - even without compatibility issues (e.g. DSL families) (b) the CO can be "decomposed" into independent functional/operational blocks restructured elsewhere and differently from the PSTN hierarchy (line concentrator - mux/access - switch - transmission...) (c) functions (of interest to "separation") can be "blurred" across the access line (PON quite different from P2P / fibre transmission techniques using different bundling profiles...) (d) Operation can be distributed (e) yet overall end to end net management is vertically integrated (e.g. including views of home devices) - right from the start	The functional separation may be a response to ensure non-discriminatory use of the current copper legacy network. However, in the context of NGA, this model is not responding to the critical issue related to the incentive for further up-grades of the access network such as fiber in access.

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	identified market failure. So while in some markets functional separation may be a solution to resolve a particular bottleneck it would just be one remedy to respond to a particular problem or bottleneck but not something “good” in itself. In the UK, functional separation may have resolved the bottleneck in the copper access network and as a result both the provision of ULL and wholesale regulated products by BT is working better. However, the model is not necessarily replicable in all markets as we have very different markets and competitive dynamics in the various Member States.	(f) these new networking conditions have not at all been considered when addressing network separation to any horizontal extent	
Network topology underlying multiple access architectures	Traditional access infrastructure: copper loop (copper all the way from MDF/DSLAM, 25 Mb/s); There are different high speed access architectures possible: FTTCabinet (copper to SC/DSLAM, Optical fiber to MDF/ODF speed 40 Mb/s); FTTBuilding (optical fiber from ODF to distribution point in/close to building, copper to end-user, speed 100 Mb/s); FTTHome (optical fiber directly from ODF to end-user: speed 1000 Mb/s.) The choice of architecture is determined by business models, elements like copper local loop lengths, availability and quality and of copper and ducts, end-user density and competition in the geographic markets.	In an FTTH scenario, existing local exchange facilities may become redundant (delete: in FTTH access networks) as regards: site location (access nodes can be located at newly optimised sites, either closer to PoPs/Backhaul facilities or closer to end user density concentration points - or anywhere between), multiple access nodes sites depending on different operator deployment tactics, and, in certain scenarios, change in distribution requirements from centralised copper MDF to distributed fibre ODFs. Network topology planning has numerous options: reuse of existing copper plant ducts/trenches, creation of new outside plants (micro trenching), reuse of other available types of infrastructure (gas, water, electricity, sewers) - and any combination of these alternatives.	The main scenarios are likely to involve Fibre to the Cabinet and Fibre to the Home/Fibre to the Building, but in the long term, we expect FTTH/FTTB to be the sustainable solution. The FTTH Council has published a paper which aims to describe the different options for fibre networks, as well as provide an overview of infrastructure deployment technologies, common network materials and network infrastructure planning, operation and maintenance guidelines (available at: (http://www.europeftthcouncil.com/extra/Infrastructure_/WhitePaperFTTHInfra_DEF.pdf)

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NGA	An NGA is characterized by bringing fiber closer and closer to the customer providing higher bitrates. In some scenarios, less physical space is required to house passive and active elements of access networks; increased network intelligence allows operators to reconfigure networks; optimised access node distribution flattens traditional PSTN hierarchy.	In an FTTH scenario, end to end fibre reconfigures access models; reuse of any available infrastructure enhanced by new deployment techniques (micro trenching) and completely new infrastructure; new planning options and rollout opportunities due to fibre density, performance capacity and upgradeability potential; restructuring of the local loop much closer to end users (e.g. in the drop cable segment). New competition models vary greatly from today's service or facility based operator markets. In an FTTH context, OPEX reductions are realized from the operation of the fiber access network, which is less sensitive to weather conditions, electrical interferences and the like. Additionally, customers receive the bandwidth they ordered, independent of their distance from the central office, electrical interference and any other degradation. With NGA based on FTTH, high-speed symmetrical bandwidth can be proposed.	A key question which needs to be addressed at an early stage is whether the aim of NGA regulation should be to promote service based or facilities based competition. This question will need to consider how to approach and balance the issues of the ladder of investment, the value of investment at passive and active levels of the network as well as new investor and competitor profiles, the applicability of technology neutrality, in order to adapt market regulation to a full fibre connectivity environment.
PSTN migration	The technological and economic gap between NGN and legacy PSTN is comparable to the difference between analogue and digital networks, where digital technology allowed for considerable optimization of network elements, interconnection as well as overall network operations and maintenance. A similar amount of change is noted when migrating between GSM and UMTS/3G mobile access	In the wake of major trends such as home networking, growing value chain dependancy on content/interactivty (multi-HDTV) as well as the inevitable fixed-by-mobile and VoIP revenues substitution, FTTH in NGA will represent a new landmark in competitive market and technology maturity. Policy regarding migration must avoid undermining economic efficiencies - and take into account depreciation of legacy equipment - in order to facilitate rather than hinder decisions	The FTTH Council underlines examples given by the most advanced broadband countries in the EU where voluntary agreements between the regulator and regulated players are growingly based on negotiated terms and conditions agreed between the SMP and new entrants prior to taking any policy/regulatory decisions. Positive examples include: NL (All IP migration MoUs), FR (indoor cabling sharing rules), IT (SMP undertakings regarding open access to fibre deployments), AT, EI, ES,

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	networks (e.g.: change of cell coverage characteristics, spectrum requirements).	in mass-market fibre availability at the earliest and largest coverage.	IT, SE, UK (NGA consultations) as well as the consultative approach adopted by the ERG further to the request of the Commission. Accordingly, mass-market migration from legacy PSTN to FTTH will require pro-active cooperation between policy makers and stakeholders in order to succeed in a reasonable timeframe. Mass-market fibre availability should be the priority objective influencing any migration policy.
Regulation migration	Many intrinsic aspects of NGA still fall outside the scope of the legacy networks' regulatory framework: civil works, infrastructure owned by non-licensed ECN/ECS operators, applications provided by unregulated new players. A major change regarding today's voice-focused regulatory approach will be the new exclusive use of voice over broadband, as a low revenue subcomponent of all-IP applications.	The migration to NGA FTTH introduces new business models, different cost structures, cooperative infrastructure investment requirements, new forms of "co-competition", public-private partnerships, as well as the complete integration of the video/broadcast component and interactive content into NGA/NGN configurations. FTTH business models, which transform today's technical boundaries between core, access and end user network elements encompassing CPE network terminations (e.g. home networking), will not depend on voice revenues.	The migration from the current ULL model to NGA will require long-term policy planning coherency. More work should be undertaken to explore the possible migration scenarios, their costs and their implications, including feasibility of sub-loop unbundling, redefinition of the local loop, and virtual unbundling in the unlimited bandwidth space. We also believe it would be more productive if industry sits together and tries to agree to optimized investment options, managed timeframes and voluntary commitments which could then be presented to the Regulator. Migration regulation should be constructed to accelerate the ultimate target of mass-market fibre and not to favour possible atomization of incremental steps towards that target (e.g. VDSL vs FTTH).

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Regulated return on investment	The legacy copper networks dating from the monopoly years are already amortized. NGA networks are risky investments and require huge up-front costs that alter the relationship between certain market remedies (e.g. ex ante tariff control) and the nature of investment (which is largely dependent on factors external to today's ECN/ECS market definitions, such as digging trenches, laying ducts or installing vertical indoor cabling).	Competition in an FTTH context changes the dimension of the "lowest level of the network" - from a purely horizontal market analysis definition to a more vertical approach (duct level underground, dark fibre or over poles). Moreover, specific to NGA FTTH in Europe when compared to leading fibre markets such as Japan or the US, environmental policy constraints generally constrain new fibre rollout projects to "underground" deployments, which are much more complex (e.g. in Rights of Way), costly and time-taking than the aerial deployments practiced in other regions.	In the context of NGA deployments in Grey areas, it is essential that new wholesale products be priced in a way to ensure a proper return on investment. Doing cost studies of new access networks is however potentially subject to significant market changes (e.g. local community decisions to deploy new fibre projects). Rather than imposing regulated prices, the Regulator should explore the possibility of encouraging mutually beneficial commercial negotiations in the context of new access networks with a fast track procedure to deal with any potential allegation of abusive prices. The lower the remedy is on the value chain, the more cost orientation will be appropriate for NGA investments.
Replicability	The ladder of investment principle, as adopted in legacy PSTN-based broadband markets, differs considerably in an FTTH context. Replicability in legacy mainly affects active network components, whereas the definition of replicability in NGA must distinguish between passive infrastructure evolution and active network deployments, while expanding full end user market replicability to take into account the level of higher network layers - often located at the application level.	As fibre grows deeper into access and closer to end users, the relevance of replicability changes in nature. The weight of upfront investment regarding mass market access to or renovation of duct outside plants is not comparable with the investment in optical access equipment. The former is far greater and has a different economic profile (prohibitive for any single player) while the latter actually reduces replicable network costs (attractive for all players). Moreover, the basic change to the NGA value chain reinstates "replicability" in new service domains (application bundles) open to new players without requiring direct investments in any access network components.	Three distinct approaches to replicability can be identified (1) passive infrastructure sharing/accessibility, (2) active network deployment options and (3) end-user access to replicable service offers based solely on IP bitstream wholesale. As detailed in geographical segmentation and hierarchy of remedies, priority should be given to (1) in order to ensure the effective implementation of the ladder of investment in order to boost (2). This implies an application of the regulation at the lowest possible level via a gradation (hierarchy) of the remedies, based upon underlying competition. Regulation should not simply target replication by competitors of the incumbent's deployment

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			strategy but rather focus on access to the passive infrastructure at the lowest level in order to offer to all interested operators the opportunity to deploy their own NGAs. This will probably require a sharing of the investments between operators and/or utilities and/or local/regional communities via PPP or State Aid. Finally, point (3) may be regulated on a temporary basis, while infrastructure competition is taking off but cost orientation should not apply in order to reward and incentives infrastructure investments.
State Aid	It is an established fact that the reach of universal service over the legacy copper network was made possible by substantial state aid in all Members of the Union. The approach to state aid in an FTTH context changes considerably due to three factors: (1) the fact that universal broadband access is not a component of the universal service obligation, public sector interests are piecemeal (local/regional), lacking nationwide objectives as regards policy in fibre, (2) FTTH projects benefiting from state aid are submitted to both competitive market rules (non distortion) and open access requirements, (3) motors driving state aid requests are heterogeneous (eg ICT-aware municipalities), geographically	As applied to end-to-end fibre projects, state aid needs to clearly set the most economically efficient frontier between passive and active infrastructure investment. In the context of FTTH, state aid rules are more easily applicable to geographically defined market areas (grey/white zones), recognised and accepted by all parties engaged.	Public policy initiative in the white and grey areas should have the aim of removing barriers to the development of facility-based competition. It is important that any intervention by public authorities is done in full respect of competition rules and structural funds guidelines and with high implication of the private sector, for example through private-public partnership. Instead of investing in active network, state aid should be redirected in creating a passive layer infrastructure on an open access model which addresses the biggest obstacle to fiber deployment (the civil works). From a practical point of view, it is important that local and regional authorities act in a coordinated way with central government and address the issue of connectivity and interoperability among the different publicly funded networks.

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	conditioned (isolated rural, regional economic competition constraints), utility-based initiatives and PPPs.		
Technology neutrality	It is questionable whether fibre and copper can be considered as technologies as applied to the active network elements currently addressed by the NRF. VDSL and FTTH are technologies. According to the text in the 1999 Communication Review, technology neutrality means that “the legislation should define the objectives to be achieved, and should neither impose, nor discriminate in favour of, the use of a particular type of technology to achieve these objectives”. The initial rationale for introducing this principle was non-discrimination. Further to the technology convergence, different sorts of content could be transmitted over various networks. Consequently, traditional telecommunications operators would directly be competing with broadcasting companies and the newly emerging internet providers. Since regulation had until then been sector-specific, competing companies found themselves under different regulatory regimes. The meaning of technology neutrality based on the rationale of non-discrimination is that regulation should not favour one	Technology neutrality in an all fibre environment will clash directly with the ladder of investment principle, if applied directly/solely to passive infrastructure elements such as dark fibre, regardless of existing infrastructure competition.	Currently, there is a tendency to extend the technology neutrality concept from the technology itself to the underlying passive infrastructure. Starting the NGA/FTTH discussions with the technology neutrality rationale, is already taking a bias. In such a context, it might be misapplied by simply transferring all the current regulation from the copper legacy network to the new investments. If this is due to happen, it will simply undermine the facility based rationale and the ladder of investment. The Commission and the ERG should first define and communicate how it intends to balance the infrastructure competition vs the service competition taking into account the regional competitive differences and the ladder of investment. In other words, there is an urgent need to set a vision that will orientate the implementation of the market analyses and the associated remedies in order to implement an effective infrastructure based competition.

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	technology over the other because this would distort competition.		
VDSL vs. FTTH	VDSL represents an enhanced xDSL technology while FTTH represents an entirely new end-to-end network. In FTTC and FTTB solutions, fiber runs to the street cabinet or the building, and services to the end user continue via VDSL over copper. In FTTH solutions, fiber runs all the way to the home. Choice of technology and deployments are determined by business models, existing or new network topologies and user demand / densities. FTTC, which typically uses VDSL as a transmission technology, and FTTB, using any available transmission options, can all be used in brownfield, lower density areas, while FTTH is already the best choice for greenfield, higher density areas. These are complementary technologies that in all likelihood will be used to provide comprehensive and flexible access solutions. Over time, developments will gravitate toward fiber all the way - the question is how much time and what is the impact of today's investments on tomorrow's NGA. The choice today between copper based enhancements (VDSL) or full fibre	If full end-to-end fibre connectivity is the acknowledged ultimate target for NGA, the main variable is the lapse of time (and relative amount of investment) required for complete migration. Migration depends on three fundamentals: user demand and usage patterns, public policy and priorities regarding broadband access, regulatory constraints affecting private sector investment strategies and operator behavior. Accordingly, NGA options and timeframes will differ greatly between operators, geographical areas, public sector approaches to infrastructure evolution, regulatory decisions regarding broadband wholesale markets in both the transitory and full (all-IP) NGA context. The main challenge specific to FTTH based NGA is how to put ubiquitous fibre into the most efficient policy/regulatory/market investment perspective - the best tradeoff translating the best policy.	VDSL (which is an upgrade of the legacy copper network) can be opposed to FTTH (which is built on a completely new access network) by how they address competitive market essentials: VDSL provisionally enhances broadband speeds, whereas FTTH ultimately removes the constraint of speed and decreases the number of possible bottlenecks, as it – for example – reduces the need for street mounted electronics Such change requires a new and more holistic regulatory and policy approach to optimise the conditions that can render fibre investment more pertinent time-wise, and ensure that today's choices do not hinder the major target for mass market fibre connectivity. However, the current application of the regulatory framework targets the possibility for the alternative carriers to replicate the deployment strategy of the incumbent. The regulatory framework should leave the choice of deployment to each operator, based on its business case. In such an environment, if an incumbent deploys a VDSL network, alternative operators may take the decision to deploy their own NGA in order to offer differentiated services and save on the costs of ULL rental. A VDSL deployment followed by an FTTH upgrade to achieve future speed demands is

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	deployments does not necessarily reflect economic efficiency.		only efficient if the FTTH investment begins after year 9. Therefore, it could be argued that operators deploying VDSL are likely to be doing so for reasons of speed of deployment, uncertainty over future regulation, or eventually because it is more difficult to replicate, but not for longer term reasons such as return on investment. In VDSL mass markets, access investment follows near term user demand and the incremental service model where RoI, service offers and investment are concomitant, whereas as mass market FTTH resides on security for mid/long term sustainable business models based on the stability of 30+ year fibre lifecycles, unlimited bandwidth performance and the new service frontiers opened by all optic end to end connectivity. FTTH leapfrogs a number of initially foreseen, intermediate steps to deploying fibre deeper in the access network (VDSL, FTTN, FTTC, FTTB). For the FTTH Council Europe, VDSL in particular, should not be considered an “intermediate step” by broadband policy strategists, as it can delay full fibre connectivity for almost a decade.