

# Is Symmetric Access Regulation a Policy Choice?

## Evidence from the Deployment of NGA in Europe

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**Abstract:** Regulation in Europe has rested heavily on the historic monopolist asymmetrically providing its competitors with access to its own copper local loop. When the regulation of fibre loops was contemplated, the European Commission initially proposed in 2008 that Next Generation Access (NGA) regulation should rely on good access to passive infrastructure, in order to facilitate competitive network build-out; this would be accomplished by discouraging copper upgrades (vDSL) relative to fibre to the home (FTTH). By the time the 2010 Recommendation was promulgated, the Commission had changed its position dramatically, putting upgraded copper on an equal footing with FTTH and deciding that virtual access products should be available everywhere. Some countries notified their national regulatory decisions in the period between the two Commission positions. We identify France, Spain and Portugal as examples of countries which followed the Commission's initial position, and Belgium, Germany and the UK as adherents to the Commission's later approach.

The impact of the different regulatory approaches can now be assessed. Both approaches achieve the stated objectives of widely available NGA. However, from a wider policy perspective the two approaches differ significantly in the form of competition that evolves in upgraded copper and FTTH markets. The access-based competition observable on upgraded copper is completely dependent on the regulator granting a form of (usually) upgraded bitstream access and on the financial terms of such access. In FTTH countries by contrast, alternative operators have achieved independence through their investments, thereby laying the basis either for deregulation or for symmetrical regulation of local access networks. The availability of these outcomes is particularly important in the context of the forthcoming review of the EU Regulatory Framework.

**Key words:** telecommunications regulation, access regulation, FTTH, vDSL, symmetry.

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(\*) The views expressed belong to the authors alone.

The final frontier for deregulation in fixed telecommunications has been the local loop. In jurisdictions with a single wire passing every home, or where competition from a second, coaxial, cable is not considered adequate by itself to acquit the market of exhibiting significant market power, access to the loop has been the canonical example of one way access, a regime in which access seekers are obliged to buy service from a single regulated supplier - historically the custodian of the copper loop, now increasingly providing vDSL services.

This paper considers the feasibility and desirability of another outcome, involving the construction of two (or more) local fibre networks – an outcome which offers the prospect of symmetrical reciprocal access. We raise this possibility by studying the effects on European regulatory outcomes of two opposing strategies towards the implementation of next generation networks. The first involves an access policy, which essentially transfers to a (more) fibred world the mandatory access which characterised copper networks. The second involves a less generous access policy which requires the competitor(s) to build their own fibre-to-the-home (FTTH) networks at least in densely populated areas. The European Commission's 2010 NGA Recommendation – we suggest – adopts the former approach. But crucially it was preceded by an earlier draft in 2008 which adopted a policy much closer to the latter approach, and which was implemented in certain Member States. This created the conditions to compare and contrast the two policies and their outcomes. Thus in this article we review the consequences of adopting, in relation to the local loop, a) the conventional asymmetric or one-way access model, and b) the burgeoning alternative which potentially leads to symmetric two-way regulation and/or commercially agreed reciprocal access. The next Section sets out the background to fibre regulation. The following Section describes how the alternative regulatory approaches adopted in successive drafts of the 2010 NGA Recommendation led to diverse outcomes. The 4<sup>th</sup> Section describes the outcomes of these alternative policies. Then we conclude.

## ■ Competing visions of the fibre regulatory future

For some time before the Commission became active on the issue of NGA regulation in a more fibre-centric context, a number of events were taking place around the world, which cast the regulatory spotlight on the future evolution of fixed networks in Europe. Already in 2004, the FCC

indicated <sup>1</sup> that it was taking a different approach, based on forbearance, to regulating fibre-based networks than it had taken to existing copper networks. In essence, all fibre-based networks were to be released from third party access obligations previously set out in the Unbundled Network Elements (UNE) <sup>2</sup> framework in the US. The FCC did this because it regarded access regulation as a disincentive to investment in new networks.

This decision was expanded on 20 March 2006 when the FCC intentionally let a deadline pass for rejecting Verizon petition for forbearance from common carrier regulation of special access services. This extended the exemption from access obligations to all access lines.

Meanwhile in Asia, both Korea (ITU, 2005) and Japan (MICJ, 2008/2010) had implemented a model whereby the state became heavily involved in fibre deployment either through direct investment or indirectly in the form of tax rebates.

In Japan competition in the supply of ADSL, driven by low unbundling charges, was followed by competition in fibre, under the title "Next Generation Broadband Strategy 2010" (IDA, 2009). This allowed high fibre penetration to be established without government subsidy, which was largely confined to taking high speed broadband into rural areas.

In Europe, events were also underway which forced the Commission to adopt a position regarding the regulation of NGA. On 11 October 2005, the German regulatory authority, Bundesnetzagentur (BNetzA), notified to the Commission the market for wholesale broadband access. <sup>3</sup> The notification excluded vDSL (an upgraded copper product) from the defined market. Following opposition from the Commission, <sup>4</sup> BNetzA amended the notification to include vDSL in the defined market. In turn, the Commission withdrew its opposition. <sup>5</sup>

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<sup>1</sup> See FCC 04-254: [http://hraunfoss.fcc.gov/edocs\\_public/attachmatch/FCC-04-254A1.pdf](http://hraunfoss.fcc.gov/edocs_public/attachmatch/FCC-04-254A1.pdf)

<sup>2</sup> See: [http://www.fcc.gov/wcb/cpd/triennial\\_review/triennialremand.html](http://www.fcc.gov/wcb/cpd/triennial_review/triennialremand.html)

<sup>3</sup> DE/2005/0262 see: <http://circa.europa.eu/Public/irc/info/ecctf/library?l=/germany/registerednotifications/de20050262&vm=detailed&sb=Title>

<sup>4</sup> [http://circa.europa.eu/Public/irc/info/ecctf/library?l=/germany/registerednotifications/de20050262/2005\\_206128\\_enpdf/ EN\\_1.0\\_&a=d](http://circa.europa.eu/Public/irc/info/ecctf/library?l=/germany/registerednotifications/de20050262/2005_206128_enpdf/ EN_1.0_&a=d)

<sup>5</sup> [http://circa.europa.eu/Public/irc/info/ecctf/library?l=/germany/registerednotifications/de20050262/case-2005-0262-withdrawal/ EN\\_1.0\\_&a=d](http://circa.europa.eu/Public/irc/info/ecctf/library?l=/germany/registerednotifications/de20050262/case-2005-0262-withdrawal/ EN_1.0_&a=d)

At around this time an inconclusive general election in Germany led to a "grand coalition" which agreed to bring forward legislation which would in effect grant a "regulatory holiday" to fibre-based network investments in Germany. In October 2006, the Commission expressed its serious concerns about the draft law and announced infringement proceedings if the law were not brought in line with European law. Formal infringement proceedings were initiated on 26 February 2007.

The European Commission was thus indicating that it would not follow the US route of forbearance from regulation of new networks as a means of stimulating investment.

## ■ The Commission's 2010 Recommendation <sup>6</sup>

Throughout 2005-2007, the European Commission was working internally on the development of proposals for the revision of the Regulatory Framework put in place in 2002. As part of that process, Commissioner Reding wrote to the European Regulators Group (ERG) in April 2007 asking for their opinion on the appropriate form of regulation concerning NGA. The opinion delivered was relatively technical in nature <sup>7</sup> and did not specify the form of regulation to be adopted. The Commission adjudged that it needed to act in the apparent vacuum and proposed, as part of the package of measures, to bring forward its own Recommendation on the regulation of NGA.

Thus on the 13 November 2007, the Commission announced <sup>8</sup> that it would bring forward, by summer 2008, a Recommendation based on Article 19 of the Framework Directive providing guidance to NRAs on the appropriate remedies to be applied in the context of NGA.

According to the two European Commissioners in charge of the process, the priorities were to achieve the joint aims of stimulating investment in fibre and of strengthening broadband competition. Their ambition was to reduce the scope for divergences of regulatory approaches across Europe in order

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<sup>6</sup> This section draws upon CAVE & SHORTALL (2011).

<sup>7</sup> [http://www.erg.eu.int/doc/publications/erg07\\_16rev2\\_opinion\\_on\\_nga.pdf](http://www.erg.eu.int/doc/publications/erg07_16rev2_opinion_on_nga.pdf)

<sup>8</sup> COM(2007) 696.

to give legal certainty; they noted that divergences could damage competition.<sup>9</sup>

### **The 1<sup>st</sup> draft**

In September 2008, the Commission brought forward a draft (the "1<sup>st</sup> draft") Recommendation<sup>10</sup> for public consultation. Already by this time a number of NRAs had notified decisions under the Article 7 process relating to the regulation of NGA.

The basic principle behind the Commission's 1<sup>st</sup> draft<sup>11</sup> was that NRAs should provide access to the networks of dominant operators at the lowest possible level in the network. In particular, they should mandate access to the ducts of the dominant operators allowing competitors to roll out their own fibre. NRAs were permitted to impose further physical access obligations (access to unlit fibre) beyond access to ducts where ducts are not available or the population density is too low for a sustainable business model. Access to active elements, such as bitstream, would be maintained wherever lower level remedies did not sufficiently address distortions of competition. There was a significant concern that virtual access products such as bitstream on NGA could undermine investment incentives if conditions were too lax, in an echo of US concerns.<sup>12</sup>

The 1<sup>st</sup> draft also provided a common approach to ensure non-discriminatory access, as well as a methodology for calculating a rate of return, including a risk premium.

The Commission clearly regarded upgraded copper (known as fibre to the cabinet – FTTC, or vDSL) to be essentially a network upgrade which should be dealt with in the same way as existing DSL-based networks, i.e., with broadly the same access products to be put in place, and was undeserving of a risk premium:

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<sup>9</sup> <http://europa.eu/rapid/pressReleasesAction.do?reference=IP/08/1370>

<sup>10</sup> [http://ec.europa.eu/information\\_society/policy/ecomm/doc/library/public\\_consult/nga/dr\\_recomm\\_nga.pdf](http://ec.europa.eu/information_society/policy/ecomm/doc/library/public_consult/nga/dr_recomm_nga.pdf)

<sup>11</sup> [http://ec.europa.eu/information\\_society/policy/ecomm/library/public\\_consult/nga/index\\_en.htm](http://ec.europa.eu/information_society/policy/ecomm/library/public_consult/nga/index_en.htm)

<sup>12</sup> See Berkman Centre (2010) for a summary of these issues.

"A risk premium should not be applied in the case of fibre backhaul from the street cabinets to FTTC (FTTN) the MDF or equivalent in an FTTN scenario. Such a scenario is considered in this context as a modernisation of the copper-based network, which should not encompass a higher risk remuneration than other modernisation and maintenance expenses."

The consultation finished in mid-November 2008. There was also enormous lobbying by both sides of the argument (network owners and access seekers, See for example WIK 2008/2011), but it seems likely that the main cause of the shift in position between the first and subsequent drafts of the NGA Recommendation was the global financial crisis: there was a genuine fear that alternative operators, which would have had to invest very significant sums to survive, would not have sufficient access to capital markets to build or co-build their urban networks. More than 6 months later, on 12<sup>th</sup> June 2009 the Commission issued a fundamentally revised 2<sup>nd</sup> draft Recommendation.<sup>13</sup>

### **The 2<sup>nd</sup> draft**

The basic principle of the Commission's 2<sup>nd</sup> draft was no longer that NRAs should provide access to the networks of dominant operators at the lowest possible level, but rather that all remedies should be available in all areas in the presence of a finding of SMP. While access to the ducts and other passive infrastructures remained, this was no longer a central theme of the 2<sup>nd</sup> draft. Nevertheless, the 2<sup>nd</sup> draft was clearer about concrete measures that should be taken to lower deployment costs (for example, on the need for reference offers for ducts and other passive infrastructures).

The 2<sup>nd</sup> draft also promoted cost-orientation as the preferred form of price control - almost to the exclusion of all other options - and sought to foster market-driven investment outside densely populated areas by encouraging co-investment schemes. In addition, the 2<sup>nd</sup> draft defined a series of conditions under which co-investment schemes could be deemed pro-competitive, avoiding (or limiting) the need for regulation.

FTTC was now viewed more favourably than in the 1<sup>st</sup> draft; such investments were no longer simple network upgrades but constituted NGA

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<sup>13</sup> [http://ec.europa.eu/information\\_society/policy/ecomm/doc/library/public\\_consult/nga\\_2/090611\\_nga\\_recommendation\\_spc.pdf](http://ec.europa.eu/information_society/policy/ecomm/doc/library/public_consult/nga_2/090611_nga_recommendation_spc.pdf)

as surely as if FTTH had been deployed, and the risk premium associated with the fibre investments was extended to them.

The approach proposed by the Commission in the 2<sup>nd</sup> draft seemed to be fundamentally re-orientated to ensure a seamless migration from copper- to fibre-based networks for third party network operators. Indeed the language surrounding the 2<sup>nd</sup> draft suggested that ensuring a "smooth transition" was now one of the primary motivators for the revised draft. <sup>14</sup>

### The final version

In the period between the second consultation and 20th September 2010 when the final NGA Recommendation <sup>15</sup> was released, ongoing discussion with the new BEREC <sup>16</sup> body took place, culminating in the publication of a BEREC opinion <sup>17</sup> in May 2010 regarding a (non-public) interim draft. A series of specific changes was sought by BEREC, mostly around granting greater flexibility to NRAs in relation to volume discounts, access charges, the need for geographically de-averaged access prices, the conduct of margin squeeze tests, and so on. <sup>18</sup> These were adopted virtually word <sup>19</sup> for word. Although the final NGA Recommendation had a renewed emphasis on sharing of passive infrastructures together with a greater emphasis on geographic differences, the primary basis of this regulation is to extend the current regulatory model of regulation onto the new networks.

Several things are clear from this account. The first is that the Commission's final NGA Recommendation did not give advice which differed from then existing practice for copper networks.

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<sup>14</sup> <http://europa.eu/rapid/pressReleasesAction.do?reference=MEMO/09/274&format=HTML&aged=0&language=EN&guiLanguage=en>

<sup>15</sup> C(2010) 6223/3.

<sup>16</sup> The successor to the European Regulators Group (ERG).

<sup>17</sup> [http://bereg.europa.eu/doc/bereg/bor\\_10\\_25.pdf](http://bereg.europa.eu/doc/bereg/bor_10_25.pdf)

<sup>18</sup> The oddest of these was the opening up of opportunities for the NRA to conduct a margin squeeze test on the basis of either of two cost tests, the "equally efficient operator" test or the "reasonably efficient operator" test. Despite the general principle that ECS regulation would converge to European competition law, the latter test is preferred in this *ex ante* context despite its express rejection by the Court of First Instance in the well-known Deutsche Telekom case.

<sup>19</sup> Based on previous precedent, this deference to their opinions would have come as a surprise to the regulators, reminding them of the adage: "be careful what you wish for".

But some exceptions are worth noting. The first exception is the requirement to unbundle regardless of the architecture of the fibre network. In the past, NRAs had taken a view in specific instances that it is not viable to require network unbundling. Cable networks, which would clearly be very difficult to unbundle physically from both a technical and economic perspective, have generally relied for protection from access obligations on the invocation of a Commission principle that puts cable access outside the market for unbundled loops. While certain FTTH topologies may resemble a cable network more closely, the opposite route of mandatory unbundling was proposed. Reality has since caught up with this assertion and an enhanced bitstream product, virtual unbundled local access or VULA, is the preferred local access product in upgraded copper networks (CAVE, 2010).

The second clear change was the requirement to make full bitstream access available from the very start of the regulatory process. In relation to NGA, many NRAs had already decided for a variety of reasons either not to require bitstream access or to limit its availability. In particular, France and Portugal each avoided imposing a bitstream remedy in respect of their FTTH deployments and, although each has been roundly criticised on this ground, it remains the current practice <sup>20</sup>. In the case of Spain, access to NGA-based bitstream was mandated, but access was limited to a maximum capacity of 30Mbs.

In relation to pricing of access products, NRAs are broadly instructed to carry on as they did anyway. In setting access prices and determining the allowed rate of return for a price-controlled service, NRAs already included an appropriate risk premium (normally through the CAPM aspect of WACC calculation). The Commission advice in this area subsequently became more detailed and prescriptive. <sup>21</sup>

In the next section we look at some of the data on outcomes, and seek to draw some conclusions for policy makers.

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<sup>20</sup> Both France and Portugal indicated they would bring forward a remedy at some point in the future.

<sup>21</sup> See for example the Commission Recommendation on Pricing 2013/466/EU



## ■ The light of experience <sup>22</sup>

At least three countries can be said to have acted in a manner consistent with 1<sup>st</sup> draft of the NGA Recommendation (though it is arguable which of the two factors – the country strategy or the Recommendation – was the cause and which the effect, since these countries' strategies informed the Commission's early thinking). These countries are Portugal, Spain and France. The essence of this strategy is as follows:

- Virtual access was signalled to be unavailable on FTTH infrastructure into the future at least in urban areas. In practice this meant that once copper network capacity was overtaken by fibre, entrants would not survive on unbundled loops. Spain was the exception because it did grant access to the fibre network but capped that capacity at copper performance. France indicated it was too early and Portugal also proposed to deal with it "later".
- Significant emphasis was placed in ensuring that access to passive network elements (ducts, trenching etc.) was best in class and that a regime existed to deal with in-building access to cabling.
- An urban/rural divide was central to the approach; thus while urban areas were subject to the "build your own" approach indicated above, rural areas had a much easier access regime. While Portugal went for a straight urban/rural geographic segmentation, France opted for a division based on building density; but the net impact was essentially the same.

While all three countries had different starting positions they all took actions to address weaknesses. For instance, Spain, which had a relatively weak regime in place to give alternative operators control of LLU lines and had an, at best, "nascent" passive access regime, quickly took action to lower copper prices in 2008 and to establish a passive access regime. A 20% drop in LLU prices led to a significant increase in take-up by alternative operators, from a base of approximately 700,000 lines in mid-2008 to 1.5 million in mid-2009 and 2 million lines by early 2010 – thereby creating a strong competitive base upon which to build. At the same time, the Spanish government started to put measures in place, which encouraged sharing of passive infrastructures as well as measures to enable in-building deployments. It became more like Portugal and France in terms of lowering

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<sup>22</sup> A useful general survey of the development of broadband markets in many EU Member States can be found in LEMSTRA & MELODY (2014).

the costs of deployment and increasing the speed at which networks could be deployed (albeit a couple of years later than those countries).

What was significant in each country was that there was a clear decision to deploy FTTH, even if that was a slower and more expensive infrastructure to deploy. Significant debates took place also on the form of FTTH to be deployed in terms of topology and technology. A point-to-point (P2P) network would look almost exactly like an existing copper network and would allow LLU to continue for third party access seekers. Point-to-multipoint (P2MP) deployments meant that third party operators would have limited chances to take physical access and would need to take a form of virtual access – thereby losing technological independence to a large extent. Even P2MP deployments allowed the prospect of P2P access when lightwaves could be split through wavelength-division multiplexing (WDM), thus restoring the technological independence of third party access seekers. The transition to lightwave unbundling is greatly facilitated by the form of P2MP deployed. Spliced deployments do not facilitate an easy transition. Interestingly, those countries facing the strongest cable competitors seem to avoid splicing - which may suggest that WDM is in their development paths.<sup>23</sup>

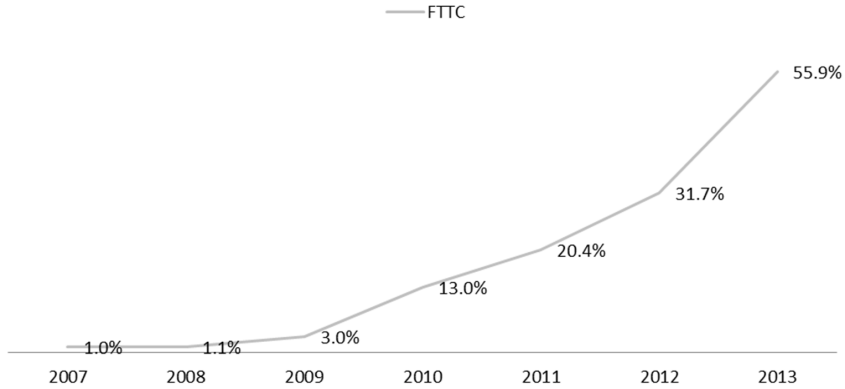
The 2<sup>nd</sup> draft NGA Recommendation in 2009 had made it clear that vDSL would be treated exactly the same as FTTH (a position that the Commission confirmed in its subsequent 2013 Recommendation on Non-Discrimination and Costing Methodologies).<sup>24</sup> vDSL investments, rather than being penalised (as in the 2008 draft Recommendation), were to be rewarded as if the whole investment were new, a policy which the Commission later reinforced with its open position on what constitutes a modern equivalent asset in its 2013 Recommendation. The impact of this shift in policy was profound and relatively rapid; the revised 2009 draft NGA Recommendation acted almost as a starting pistol for network operators to invest in upgrading copper, as shown in figure 1 below.

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<sup>23</sup> See SHORTALL (2012) for a discussion on the different deployment options.

<sup>24</sup> Commission Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment - C(2013) 5761.

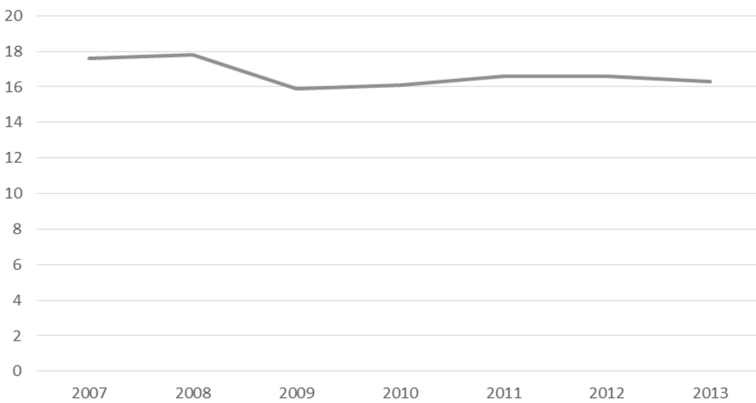
**Figure 1 - Evolution of upgraded copper in Europe – Homes passed**



Source: BCE Study for the Commission, IDATE data for FTTH Council Europe

On the other hand, it has become increasingly clear that the Commission was correct in the view expressed in the 1<sup>st</sup> draft Recommendation that copper upgrades do not need any special treatment. The relatively low cost for upgraded copper taken, together with the fact that significant operational costs are moved into capital expenditures, <sup>25</sup> meant that the actual level of investment in this period of rapid network "upgrade" did not increase at all.

**Figure 2 - ETNO members fixed capex 2007-2013 (€Bn)**



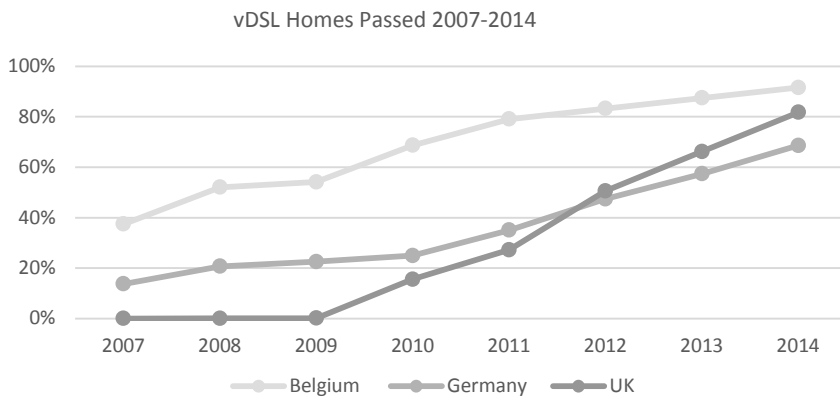
Source: ETNO Economic Reports 2010, 2011, 2012, 2013

<sup>25</sup> An upgraded copper line often overlaps with or displaces day-to-day repair and maintenance work on the network.

In fact, Figure 2 above shows that over the period in question, fixed capital expenditures by incumbent members of ETNO actually fell. The notion that incentives were needed to elicit increased investment in copper upgrades appears to have been misplaced.

The regulated responses in the three countries favouring vDSL are worth noting for comparison purposes. Operators in the UK, Germany and Belgium all clearly embraced upgraded copper. While both BT and DT initially claimed to be prepared to make a proportion of their network upgrades FTTH, those undertakings have largely dissipated over time.<sup>26</sup> Belgium was an early adopter of vDSL having already made significant investments as early as 2004. In all three countries, vDSL investments have been supplemented with higher rewards: in the case of the UK – BT was awarded very significant public money to extend the vDSL network by the Broadband Delivery UK (BDUK) fund; in Germany, access conditions were not overly onerous; while Belgium went so far as to withdraw the sub-loop unbundling (SLU) obligation on the incumbent Proximus in order to facilitate vectoring (a further technology increment on vDSL).

**Figure 3 - Copper upgrades in Belgium, Germany and UK**



The extent of the overlap between DT's vDSL network and Vodafone's vDSL network is not indicated, so significant double counting may (or may not) arise.

*Source: IDATE data for FTTH Council Europe and BCE - Broadband Coverage in Europe 2012*

<sup>26</sup> According to the 2014 IDATE data for FTTH Council Europe, less than 3% of DT's upgraded access lines are FTTH while less than 1% BT's upgraded access lines are FTTH.

The overall impact has been quite dramatic in all three Member States despite the significant differences in trajectory visible in figure 3 above. What is remarkable is the speed and low cost with which copper upgrades can be made when the decision is taken to go this route. The UK was a late convert to the need to upgrade (with the exception of a few local initiatives); yet, from a standing start in 2009, it had 4 million homes passed with upgraded copper by 2010, 13 million in 2012, and 21 million by the end of 2014.

Not all countries which chose the FTTH route had similar starting points. Portugal had an incumbent that had owned the largest cable operator but divested it in 2007. That Portuguese cable operator had benefitted from the most comprehensive duct sharing regime in place at that time, which was held up as a model in the 2008 version of the NGA Recommendation. France had also mandated duct access and was working on finalising in-building wireline access regime in 2008, while Spain was somewhat behind in its passive infrastructure sharing regime.

So what happened to the class of 2008 where FTTH was targeted? The data are shown in Figure 4 below. Even though Spain had an effective LLU take-up rate behind that of France at the end of 2008 when it started on its regulatory regime and even though it had a passive infrastructure that was less developed than Portugal's, it continued to improve in each of these facets of its performance. While the NRA in Spain (CMT) clearly knew what measures it intended to take to support its approach so that the ability to perform a forward looking assessment was asymmetric, it is still remarkable how static or myopic the Commission's analysis was. In its comments on the Spanish approach (which the Commission initially sought to block but which CMT effectively sidestepped by varying the remedies which it was entitled to impose), the Commission commented:

"In this regard, the Commission draws attention to the fact that the prospects for enhanced infrastructure-based competition do not appear to be particularly strong in Spain. First, as indicated by the Commission in its response to the CMT's notification of the wholesale physical infrastructure market, there is yet neither a reference offer nor a price obligation for access to the physical network infrastructure in place. Secondly, even if access to the physical infrastructure of TESAU [Telefónica de España] would turn out to be an effective remedy, it may take considerable time for operators to roll-out their own networks. Thirdly, alternative operators have still a weak position in the Spanish retail broadband market. Against this background, and in particular as it is not foreseeable that entrants could match the large-scale fibre deployment plans of Telefónica in the near future, there is a risk that, with a fibre-based wholesale broadband access product which is limited in speed, Telefónica could pre-empt the market for retail

broadband services during the period in which the deployment of fibre is taken up in Spain. Therefore, and in view of already present indications of a trend towards higher speeds, the Commission is compelled to maintain its concerns regarding the risk that the competitive process in Spain will be hindered due to the lack of a bitstream offer above 30Mb/s." <sup>27</sup>

Portugal was even more explicit in its regulatory commitment by virtue of its geographic market segmentation of the wholesale broadband access market. <sup>28</sup> Spain sought to pursue the same path but was blocked by the European Commission. <sup>29</sup> Despite this, over time, its regulatory commitment was also demonstrated to the market by CMT's resistance to pressure from the Commission to adjust its regulatory approach to bring it into line with the final version of the NGA Recommendation adopted in 2010. A slow build up in Spain was followed by a rapid acceleration whilst an early network expansion in Portugal in 2008 was built upon over the subsequent years.

France was an early leader, but it has subsequently stalled somewhat relative to other FTTH countries. The relatively slow roll-out of FTTH in France may have been related to the market turmoil disruption and diversion of resources created by France's remarkably disruptive mobile entrant. But it is also the case that the fibre roll-out in France is the most organised and orchestrated of the three countries. Whereas in Spain and Portugal, after the gun was fired to start the race to invest, the process relied upon the animal spirits of the operators, the investment plan in France is much more structured and controlled than in either of the other countries. Recent reports from France suggest that a significant acceleration is underway with Orange <sup>30</sup> indicating its intent to cover 12m households by 2018 and 22m households by 2022. Altice <sup>31</sup> has indicated its intent to cover 15m

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<sup>27</sup> Case ES/2008/805: Wholesale Broadband Access ("WBA") in Spain - Withdrawal of serious doubts and comments pursuant to Article 7(3) of Directive 2002/21/EC1, 26-12-2008.

<sup>28</sup> Anacom split the Portugese market into a competitive area (where both cable and LLU operators were present) and non-competitive areas. The 61% of households in the competitive areas had virtual access remedies removed. See Case PT/2008/0851: Wholesale broadband access. Greater regulatory commitment was evident because reversing from separate geographic markets is a much more involved process than simply adjusting remedies under the Article 7 procedures.

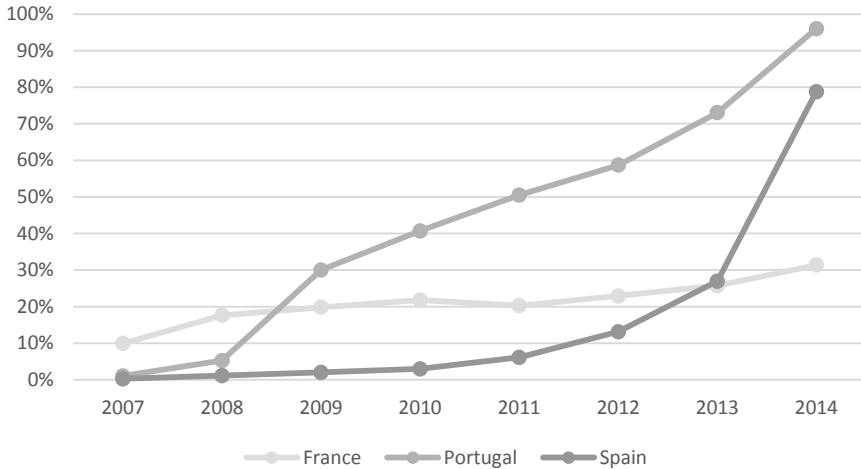
<sup>29</sup> In its initial submission the then CMT sought to geographically segment the market but under the threat of veto from the Commission the measures were administered on a national basis but with virtual access remedies confined to 30mbps access which was considered consistent with that available over copper.

<sup>30</sup> [http://www.orange.com/en/content/download/30065/837949/version/5/file/CP%20100%25%20Fibre\\_VA.pdf](http://www.orange.com/en/content/download/30065/837949/version/5/file/CP%20100%25%20Fibre_VA.pdf)

<sup>31</sup> <http://altice.net/wp-content/uploads/2015/04/150305-pr-altice.pdf>

households by 2020 suggesting a similar rate of deployment. If these plans were adhered to, we would see France close the gap on Spain and Portugal within 5 years.

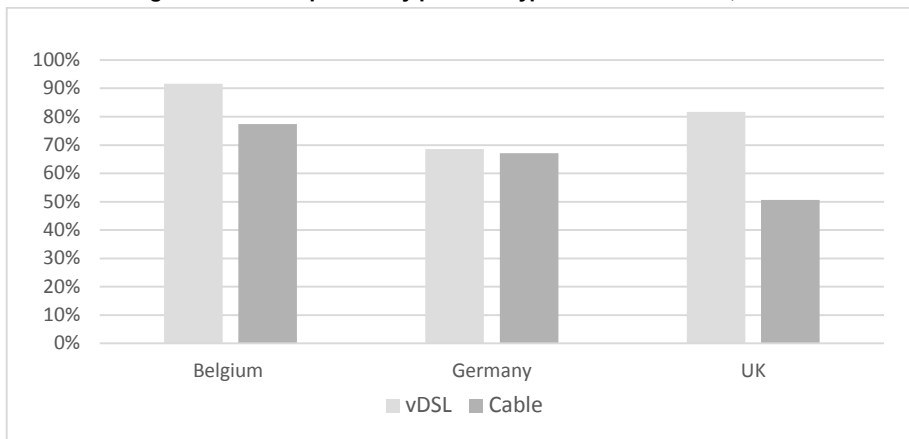
**Figure 4 - FTTH homes passed in France, Spain and Portugal, 2007-2014**



Source: IDATE data for FTTH Council Europe, data at December 2014

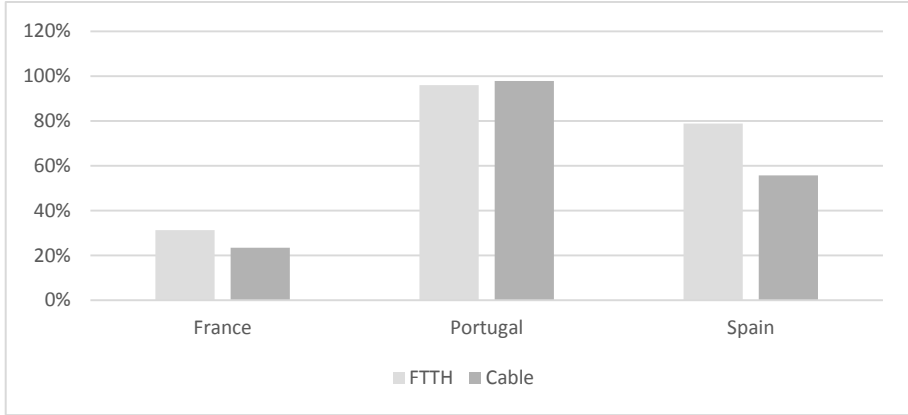
While it is clear that all three Member States achieved very significant FTTH coverage over the same period, what is particularly striking is the relative position of alternative operators in each of these markets.

**Figure 5 - Homes passed by platform type - vDSL countries, 2014**



Source: IDATE data for FTTH Council Europe, data at December 2014

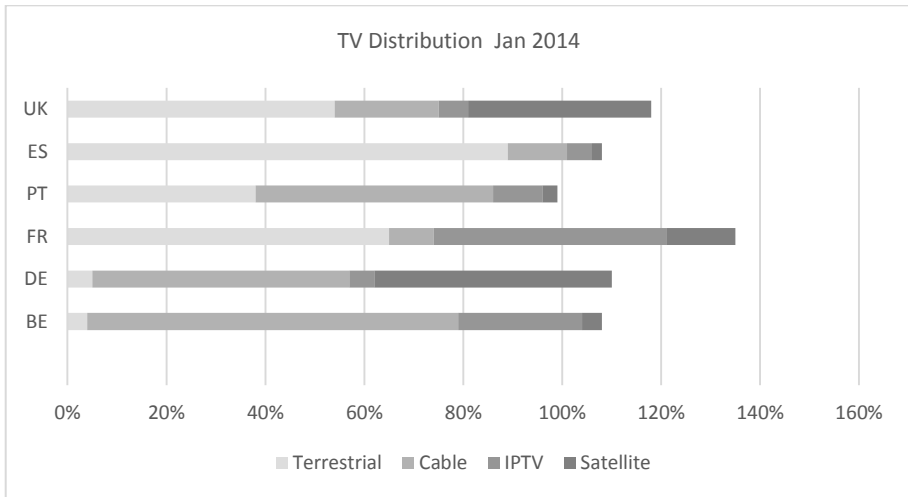
**Figure 6 - Homes passed by platform type - FTTH countries, 2014**



Source: IDATE data for FTTH Council Europe, data at December 2014

The difference does not lie in the penetration of cable, which is a strong feature in all six countries – in both vDSL markets and FTTH markets – as figures 5 and 6 show.

**Figure 7 - TV distribution in sample countries, January 2014**



Source: Eurobarometer 414

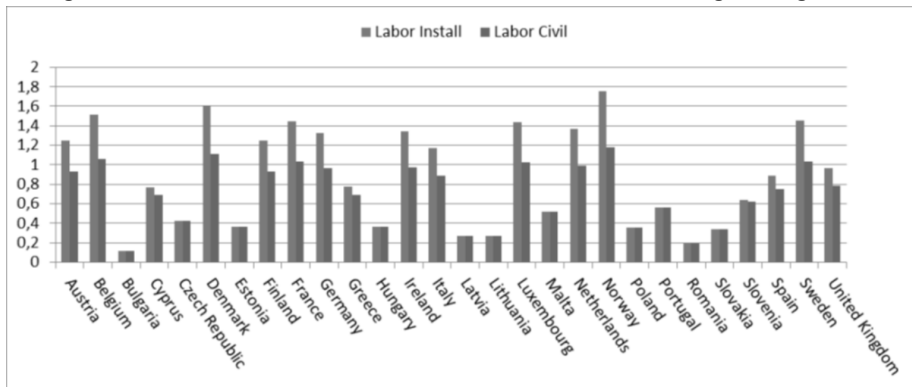
Another possible difference, which could be important, is the form of TV distribution in the country under examination. Here the evidence suggests significant differences in distribution across the six countries but no specific pattern. Significant paid TV distribution exists in both groups, strong



terrestrial distribution is not confined to one group only, as shown in figure 7.<sup>32</sup>

Labour costs of installing networks are another possible source of differences in fibre strategy across countries, but again, no discernible pattern is obvious. Previous cost modelling efforts took average earnings as a proxy for labour costs for installation work (which assumed language and cultural knowledge) and then adjusted for circumstances where such skills are not necessary (civil engineering works) to derive figure 8 below.

**Figure 8 - The labour cost index for labour installation and civil engineering works**



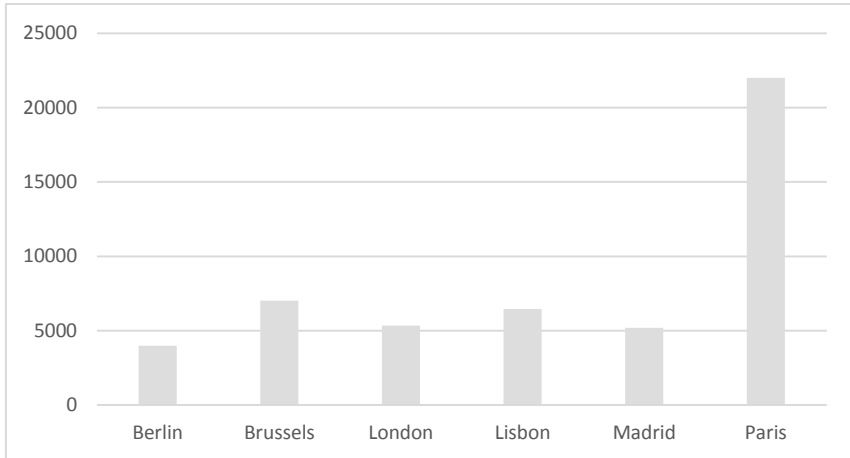
Source: *The Cost of Meeting Europe's Network Needs - FTTH Council Europe, July 2012*  
[http://www.ftthcouncil.eu/documents/Reports/2012/Cost\\_Model\\_Report\\_Full\\_Version.pdf](http://www.ftthcouncil.eu/documents/Reports/2012/Cost_Model_Report_Full_Version.pdf)

Population density is also a significant factor in unit costs of FTTH deployment. This explains the emphasis being placed on geographical differentiation in the 2014 revision of the Recommendation on Relevant Markets<sup>33</sup> from the European Commission: the structure of Competition has been (under LLU) and is likely to be (at least for FTTH) very different in urban and rural settings. The countries in question have differing density profiles. However, looking at major population centres, no clear pattern emerges – see figure 9. Paris is an outlier but there is little differentiation among the remaining cities.

<sup>32</sup> The numbers in figure 7 add up to more than 1 because some households rely on two or more forms of distribution.

<sup>33</sup> <https://ec.europa.eu/digital-agenda/en/news/commission-recommendation-relevant-product-and-service-markets-within-electronic-communications>

Figure 9 - Density of principal cities



Source: Eurostat

The principal difference between the two groups in terms of market structure is the performance of alternative telecommunications operators (i.e. excluding cable TV network operators). See figure 10 below, which shows the owner of an access path whether FTTH/B/C – although a FTTC path continues to rely on the incumbent's copper sub-loop. Alternative vDSL operators have close to zero coverage in the UK and Belgium. Vodafone has done some significant build outs in Germany but it still relies on regulated access to the DT network in order to connect to the end user. Its own vDSL base is perhaps 10% of the total.

Conversely, the performance of alternative operators' in FTTH markets is remarkable in the context of European telecoms and the history of fixed telecoms to date.

It is clear from Figure 10 that alternative operators have invested massively in their own FTTH networks in those countries that adhered more closely to the 2008 draft of the NGA regulatory framework. By lowering deployment costs through an in-building and passive access regime several virtuous effects appear to have resulted. First, costs were lower and speed of deployment increased, effectively lowering barriers to entry. Second, strong access competitors using LLU, realising that their future could not be guaranteed with virtual access, started to build out their own networks. Third, incumbent operators perceived the threat and reacted. Telefonica in Spain seems to have spotted this trend early judging by the rapidity with which it ultimately reacted once its competitors started to achieve scale.

The result of these interactions is a very large number of access paths, which are completely independent of the incumbent operator. It should be noted that in general there is little or no overlap in these FTTH networks.<sup>34</sup> The typical pattern is of independent deployment, followed by the striking by network owners of deals, which were commercial or not conventionally regulated, once a critical mass has been achieved. While these might be viewed as geographical monopolies it does point to an access regime which might survive independently of long term *ex ante* access regulation (one of the stated goals of the 2002 Regulatory Framework). As noted above, current indications are that significant FTTH overbuild is happening or is planned to happen, which would address the local monopoly issue. With the retirement of copper, cable and more than one FTTH network will often co-exist. Even in the absence of significant overbuild, with regional networks in national markets some form of sharing can be anticipated and is already observed today. Whether such arrangements raise concerns around geographic segmentation of markets, lead to joint dominance, or whether some more competitive dynamic will emerge is an issue which will exist, and will deserve, careful future analysis.<sup>35</sup>

As network construction proceeds in each of these markets, we also observe that operators are swapping access lines on a long term basis to extend the reach of their networks. For example Portugal Telecom describes its agreement with Vodafone as follows:

"MEO [the commercial brand of Portugal Telecom] through PT Portugal, SGPS, S.A., entered into an agreement to deploy, swap capacity and share its Fibre Network with Vodafone Portugal. This agreement includes sharing of dark fibre in circa 900 thousand homes, in which each party shares approximately 450 thousand homes. The sharing model is materialised with the acquisition of Indefeasible Rights of Use (IRU), through a 25 year contract. The sharing model allows MEO to reach additional 450 thousand homes with fibre to the home technology (FTTH), thus increasing the potential penetration of its products and services across various market segments, namely consumer and enterprise.

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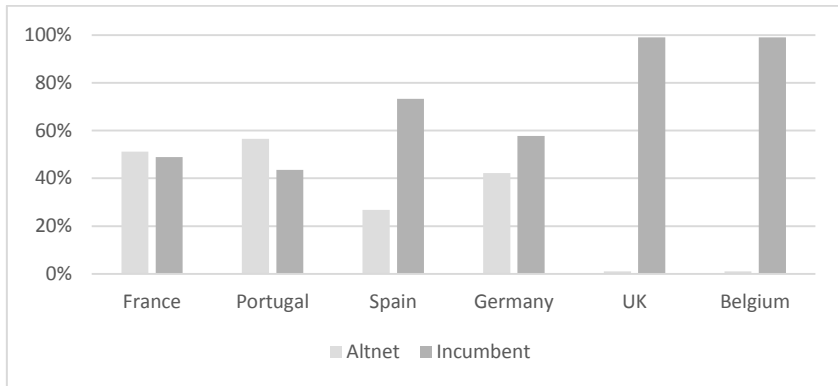
<sup>34</sup> This is certainly true in the first wave of investment but there is some evidence that over time more significant overbuilds have taken place or will take place. For instance Orange intends to match Telefonica's footprint in Spain: <http://www.orange.com/en/investors/financial-presentations/financial-press-releases/Essentials2020-Orange-s-new-strategic-plan>, while Altice suggests similar ambitions in France with Orange: <http://altice.net/wp-content/uploads/2015/04/140319-pr-altice.pdf>.

<sup>35</sup> A report by Opta (2006) considers how cable and a single telecom operator might compete in broadband markets.

Given the swap of capacity and sharing model adopted, both entities will maintain total autonomy and flexibility designing their retail offers, including the provision of RF (analogue) TV signal, guaranteeing the complete confidentiality of customer information. Therefore, this agreement enables a higher dynamism in the retail market through an enhanced ability to distribute broadband and TV offers with high speeds and quality, thus benefiting all citizens and companies." <sup>36</sup>

Agreements in Spain were a combination of co-investment and IRU <sup>37</sup> while the French operators are likely to operate in a more tightly controlled IRU model at least outside the denser areas <sup>38</sup> with strong in-building regimes for sharing infrastructure, see for example Arcep (2009).

**Figure 10 - Telecom network operator type across countries in 2014**



Alternative operators in France are Bouygues, SFR, Iliad, local authorities. Alternative operators in Portugal are Vodafone, Sonaecom and about 14 smaller operators. Alternative operators in Spain are Jazztel and Orange as well as some local initiatives. In Germany, Vodafone is an alternative vDSL provider that relies on DT's sub-loops. There is no meaningful alternative competition in the UK or Belgium.

*Source: IDATE data for FTTH Council Europe*

Meanwhile the dependence of entrants on continued access to copper products in non-FTTH countries has not gone unnoticed, and many vDSL countries as well as the Commission have spent enormous resources on establishing the appropriate copper price. Equal emphasis has been placed on setting appropriate *ex ante* margin squeeze tests, in the knowledge that

<sup>36</sup> [http://www.telecom.pt/NR/rdonlyres/44F99BF2-91C8-45E9-8DC5-C53C1334D040/1470883/FTTH\\_Wholesale\\_E.pdf](http://www.telecom.pt/NR/rdonlyres/44F99BF2-91C8-45E9-8DC5-C53C1334D040/1470883/FTTH_Wholesale_E.pdf)

<sup>37</sup> <http://inversores.bolsa.jazztel.com/documents/10156/219926/JAZZTEL+signs+a+Vertical+Infrastructure+Access+Agreement+with+Telef%C3%B3nica>

<sup>38</sup> [http://www.arcep.fr/uploads/tx\\_gspublication/consult-modele-tarifs-FttH-160514.pdf](http://www.arcep.fr/uploads/tx_gspublication/consult-modele-tarifs-FttH-160514.pdf)

should either the copper or the vDSL access element fail to function properly, a significant negative impact on competition would ensue<sup>39</sup>. Even in Germany where vDSL is quite developed by Vodafone, Vodafone remains more or less wholly dependent on DT's copper sub-loop, i.e. it is not a network that can exist autonomously. In the presence of vDSL networks, entrants survive on a much smaller proportion of the value chain, with the result that their continued presence in the market is more vulnerable even if they can do so without large scale investment. In countries which have aimed for FTTH, while the price of copper is still important, it is not determinative in any sense.

The Commission has also realised the importance of lowering deployment costs. It finally brought forward legislation to encourage and facilitate sharing of passive infrastructures and in-building wiring<sup>40</sup>. The 2013 Recommendation on Non-Discrimination and Costing also seeks to grant some respite from access conditions for parties that invest in NGA (but again with no distinction between copper upgrades and FTTH).<sup>41</sup> There is also a renewed emphasis on geographical differentiation in the revised Recommendation on Relevant Markets (European Commission, 2014a) and taking these collectively, one might expect to see more and more of a trend towards the outcomes foreshadowed in the 1<sup>st</sup> draft of the NGA Recommendation.<sup>42</sup>

Is it possible to interpret these developments as a very roundabout way of acknowledging, in a necessarily opaque fashion, the taking of a wrong turning in 2010? Judged against the Commission's own criteria of stimulating investment and strengthening competition, it may look, in retrospect, like a mistake to have moved from the 2008 draft Recommendation. In terms of investments made, the level of network upgrades in the FTTH networks has been comparable, but there is a world of difference in the nature of that upgrade between the autonomy of competitors investing in FTTH and the dependency of vDSL access seekers relying on the incumbent's sub-loops. In terms of the structure of competition in the market, those countries following the 2008 draft of the NGA Recommendation appear to be capable

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<sup>39</sup> See Commission Recommendation on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment - C(2013) 5761

<sup>40</sup> Directive 2014/61/CE on broadband cost reduction

<sup>41</sup> See fn. 24 above

<sup>42</sup> For instance the removal in geographical submarkets in Poland and other countries of virtual access remedies - previously prohibited - has now been allowed.

of achieving a level of network competition which may be self-sustaining, whilst other Member States that followed the final version appear to have ended up with weaker competitors which are likely to be wholly reliant on regulation for the foreseeable future.

This is in addition to the significant capacity and performance differences between the two networks, with FTTH having speed, latency and other quality of service indicators superior to those of vDSL.

A question, which needs to be considered is the extent to which local monopolies might emerge and the nature of competition that will evolve in an FTTH context. Certainly, in a first round of investment operators have avoided overlaps as much as possible, indications are that significant overlaps are planned.<sup>43</sup>

More broadly, this episode raises a critical issue for the Commission services in terms of harmonisation. Setting one set of rules and forcing every Member State to follow that approach will indeed harmonise the results, but when decisions are made under uncertainty, putting an end to experimentation carries the inevitable danger of harmonising around the wrong outcome. The cohort of adherents to the 2008 version have achieved good results in their countries by resisting the Commission's calls to change regulatory direction. Had they acceded to the Commission's request we could not compare the outcomes as we can today; comparative judgement would be precluded.

## ■ Conclusions

With the passage of time, the impact of the two regulatory approaches can provisionally be assessed, based on results achieved. Both approaches can gain the objective of making high speed broadband available. But policy makers faced a choice of what kind of network upgrade they want to achieve: a significant upgrade to FTTH or a more limited upgrade to the existing copper network.

A copper upgrade can be accomplished quickly and requires little additional investment. It enables a country to speedily meet the 30 Mbit/sec

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<sup>43</sup> See fn.34 above.

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target for broadband speeds, but it risks falling short of a future-proof solution, if the targets being set continue to evolve in unforeseen ways in the future (or even follow current trends). It is clear that if policy makers want to ensure the development of FTTH networks, they will have to be explicit about that desire and put measures in place to set the market towards that outcome.

But the second and perhaps more significant choice for policy makers, upon which this article focuses, concerns the different forms of competition that evolve in FTTH and vDSL markets. While an access-based competitor can exist on upgraded copper, it is completely dependent on the regulator granting that access (bitstream or upgraded bitstream products such as VULA) and the financial terms associated such access. In FTTH countries by contrast, alternative operators have achieved a level of independence through their investments in densely populated areas, and can exist without sector specific regulatory oversight for the most part. This permits an escape from a state of asymmetric regulation with permanently defined groups of "access providers" and "access seekers," each with diametrically opposed interests over price and other terms and conditions of access. The potential escape is towards a world more akin, in a very general sense, to that of two-way interconnection or roaming, with its larger universe of less conflicted (and less regulated) solutions.

The argument presented here, if accepted, has important implications for the forthcoming Regulatory Review. It is clear that the FTTH countries, unlike those relying on upgraded copper networks, are in a position in which they can contemplate the removal, at least partially, of current "command and control" forms of access regulation. This is an important step along the route inaugurated in the 2003 Regulatory Framework towards ever closer convergence to competition law, which does not prescribe a given outcome, but instead prohibits specified courses of conduct.

The contrast described also illustrates the potential detrimental effects of a harmonised regulation, which goes beyond the legitimate interests of promoting a digital single market by seeking to prescribe a single strategy in a sector characterised by high uncertainty. In the context of the forthcoming review of the Regulatory Framework, this aspect may deserve serious attention.

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