

Broadband Access Networks in Austria – Models of Cooperation and Financing for the Deployment of Next Generation Access Networks

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ABSTRACT

The Austrian regulator RTR defined “infrastructure and financing of broadband access networks” as one of the focal points of his work plan during 2009. The efforts are concentrated on investigating different scenarios for the expansion of fibre based broadband access networks in the sense of cooperation and financing. The project is also focusing to find out which stakeholders in Austria have corresponding infrastructure available and how to incorporate these stakeholders and their infrastructures for a geographically more extensive roll-out of broadband access networks.

For accomplishing this goal, the Austrian regulator (RTR GmbH) commissioned a study to SBR Juconomy Consulting at the beginning of 2009 starting with 18 interviews conducted with relevant persons and institutions in order to baseline the current situation with respect to the obstacles regarding broadband access network rollout from different perspectives. The next step was to organize and conduct two workshops in April and May 2009, the first concentrating on the topic of “Deployment and Cooperation Models for Access Infrastructure” and the second focusing on “Financing the Construction of Broadband Access Networks”. The inputs collected from the interviews, presentations and intensive discussions during the two workshops have been combined with international experience from a benchmark of several countries where the same issues became relevant in political and regulatory discussions. The study was presented during the regulatory workshop on 29 October 2009 in Vienna and published as a booklet in a series of RTR publications and be available on the regulator’s website (www.rtr.at).

The paper is organized as follows – Chapter one contains a short introduction outlining the main challenges and the goal of the study, followed by the second chapter which deals with the background of NGA deployment thereby covering issues like the challenges for network rollout, strengths and weaknesses of cooperative models as well as problems in financing such a rollout. In this context, three different concrete cooperation models are presented, which describe a possible basis for rolling out broadband access networks in a cooperative setting. Thereafter, chapter 3 describes the evaluation of the current situation in Austria. The fourth chapter is summarizing the results and presents an outlook on the issue

The main findings of the paper are:

- There is no way around fibre-roll-out in the access network. This next generation Access infrastructure will form the basis for fixed network services but also for wireless and cable networks.
- The replacement of copper by fibre in the access network requires considerable investment. New and more diversified business models will be needed to drive this investment.
- The applicability of regulatory tools like functional separation and new business models like open access and co-operations are discussed by the stakeholders. The analysis showed rather little awareness and controversial positions.
- The coverage of rural areas with broadband infrastructure is seen as a critical issue. There is an agreement that co-operation between municipalities and private enterprises is required.
- Stakeholders are rather skeptical about the applicability of Public-Private-Partnerships for wide coverage with fibre access networks.
- A discrepancy between expectations and willingness to invest has become obvious.

1 Introduction

Broadband infrastructures in access networks are fiber-based or hybrid cable infrastructures (Next Generation Access, NGA). They differ from copper-based access networks, which will not be capable of meeting user requirements even in the medium term. Hybrid networks, such as coax cable networks, comprise fiber and copper elements. They can be regarded as NGAs when operators implement the DOCSIS 3.0 standard¹ and thus offer bandwidth up to 50 Mbit/s connections.

NGA infrastructure is a major economic factor [e.g., Crandall et al. 2007; IDATE 2009; OECD 2009a, BNetzA 2010]. With the provision of services to residential users as well as business customers, it has become a key issue in economic and social policy discussions [e.g., Fornefeld et al. 2008; Katz et al. 2009; Roeller, Waverman 2001]. The main reasons are to be found in the impact such infrastructures and services offered via these infrastructures can have on the social and economic development of a country.

Even if partly publicly financed [e.g., Preston, Cawley 2008], rolling out NGA networks has, however, been difficult in terms of commercial justification, especially in rural areas [e.g., Preston et al. 2007; Wieck 2008]. Studies in preparation for the European Commission [see http://ec.europa.eu/information_society/policy/ecomm/doc/library/public_consult/universal_service2010/index_en.htm for a discussion on relevant issues although the study for the EU commission has not yet been published at the date of finalizing this paper] show that the current coverage of broadband networks in the EU in terms of the covered population amounts to 93 % but only 77 % in rural areas. The amount needed to make available connections of 2 Mbit/s bandwidth to every European household is estimated to be 13 bn. €.

Markets for telecommunications services are currently undergoing a transformation from previously copper-based Public Switched Telephone Network (PSTN) access networks to fiber-based NGA networks [Wieck 2009]. This transformation process requires substantial investments, which can hardly be undertaken by only one company on a national scale. Hence,

¹ DOCSIS stands for Data Over Cable Service Interface Specification. It is an international standard which defines the communications and operation support interface requirements for a data over cable system. It permits the addition of high-speed data transfer to an existing Cable TV system. It is employed by many cable television operators to provide Internet access over their existing hybrid fiber coaxial infrastructure. DOCSIS 3.0, released in August 2006, significantly increases transmissions speeds both upstream and downstream compared to earlier versions and introduced support for the Internet Protocol version 6 (IPv6).

different network cooperation concepts and financing strategies are likely to form the basis for the deployment of NGA infrastructures [e.g. Analysys Mason 2008; Doose et al. 2009].

Cooperation and financing scenarios are at the core of many NGA roll-out scenarios. Cooperation has become a relevant topic as the interplay between different players in the market can lower the hurdle for market entry and reduce the investment burden [e.g., Federal Ministry of Commerce in Germany 2009]. Financing is an issue especially where business plans show that a NGA network roll-out may not be economically feasible.

Consequently, a discussion over so-called 'white spots' has been initiated in many countries and different policy approaches have been discussed and taken to enable NGA network roll-out in these areas [Buellingen et al. 2006; Federal Ministry of Economics and Technology 2009].

Here, this paper aims to make a contribution. It investigates NGA roll-out approaches focusing on cooperation and financing issues. To this end, the paper also presents a case from Austria focusing on cooperation concepts and financing options.

2 Research Background: NGA Deployment

2.1 Cooperation Concepts

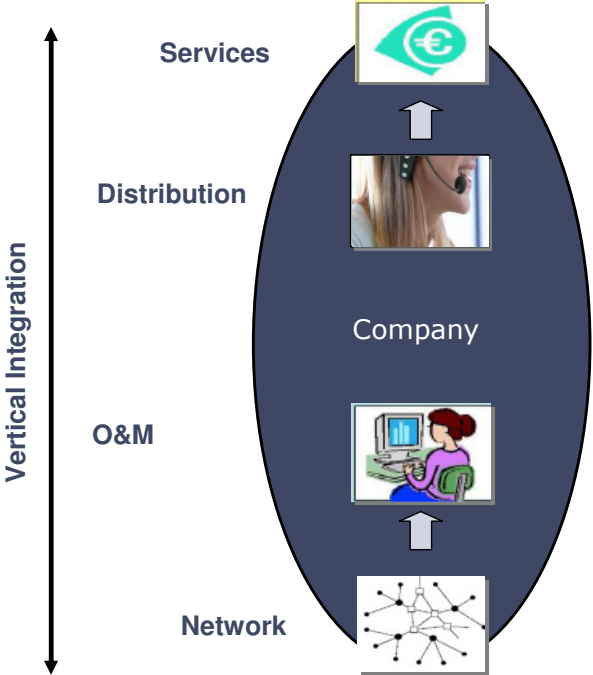
Concerning the discussion of deployment and roll-out of access networks, particularly the *cooperation* either among enterprises in the telecommunications sector (infrastructure operators and service providers) or between enterprises from in the telecommunications sector and companies from other sectors is gaining importance. The reason is that high-quality networks require significant investments and bear economic risks with respect to technical and legal implications, future demand, and the availability of services and applications. Accordingly, such risks lead enterprises and investors in the telecommunications sector to consolidation and cooperation efforts that base any action on individual economic assessments and national economic analyses [Noam 2006]. From an individual perspective, cost savings and time to market are important evaluation points; from a national economic perspective avoiding duplicate infrastructures is at the core even though concerns regarding anti-trust laws still exist [e.g., Bundeskartellamt 2010]. In the following, we present three cooperation concepts, which would allow to benefit from competitive advantages of different stakeholders. The implementation of these forms has not yet taken place on a broader scale due to various uncertainties (risks) in the market. Reluctance of operators and other stakeholders to enter into cooperative arrangements still needs to be overcome.

Before going into the details of potential cooperation models of different stakeholders in the market, it should be taken into consideration that such possible cooperation have to deal with the strength and weaknesses respectively the combination of assets and features of different stakeholders. Many aspects of cooperation are related to the value chain of broadband networks which comprised of different elements / steps which need to be combined in a specific manner. Many discussions currently focus on the term “open access” [BNetzA 2010]. Thereby, the main topic is whether and how a provider of network infrastructure makes this network infrastructure available, e.g. on the level of passive and / or active infrastructure to others and to which degree this allows for competition for example in downstream markets. This is related to the cooperation models described below because it relates to the question of which stakeholder is in possession of which network elements and assets and can make available to others. In the literature [see BNetzA 2010, pp. 20] a differentiation of open access definitions and models is covering the following aspects:

- Open access on the basis of voluntary functional separation – this approach applies to vertically integrated operators which deploy networks, operate them and offer services
- Other open access models in absence of significant market power - this approach would encompass a network owner or operators granting non-discriminatory access to one or several levels of the value chain to other stakeholders in a vertically disaggregated business model environment.
- Open access as a remedy in terms of competition law or state aid regulations for non-dominant operators
 - Open access in connection with cooperation projects
 - Open access in the state aid regulations²
- Access in case of need for regulation and the existence of significant market power.

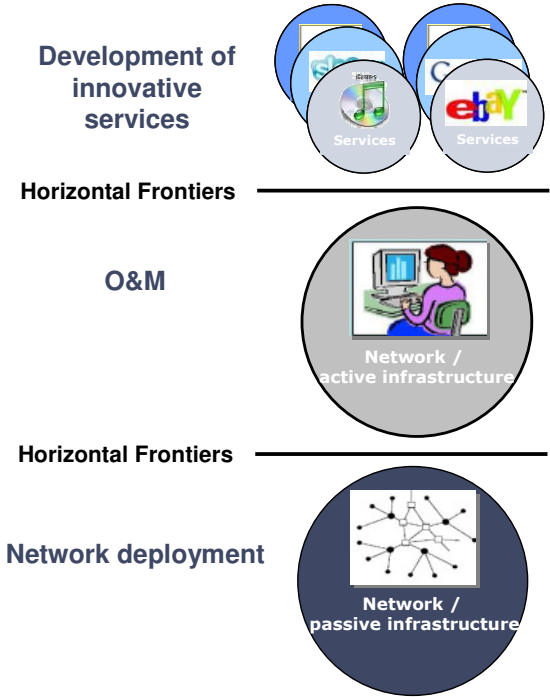
To exemplify the difference between vertical integration and open access, the following two graphs are useful. This first figure shows the “classical” business model in telecommunications with one operator active on all levels of the value chain.

² This is currently debated on EU level with respect to white spots and granting of state aid e.g. for the deployment of ducts or cabinets as elements of the passive infrastructure which is made available to third parties.



- Classical Network Operator
 - owns the infrastructure
 - administers / operates the network
 - provides services to end users
- Revenue from products/Services contribute to financing the infrastructure and the operation
- Wholesale possible on different levels
- Investors require short term ROI
- Different regulatory remedies

The second figure shows a disaggregated picture with separate players on all levels of the value chain and consequently (open) access to this infrastructure on every level



- Level 3: Retail Services
 - Each provider has (open) access at non-discriminatory conditions
 - Digital market place
- Level 2: Network operation (OpCo)
 - Lightening of the fibre and operation of active equipment
 - Wholesale products for service providers
 - **No retail services!**
 - Local utilities, Telecom operators
- Level 1: Infrastructure (NetCo)
 - Use of existing infrastructures (Dark Fiber, ducts, sewerage)
 - Optical fibre as natural monopoly?
 - Municipalities, Cities, Utilities

Especially with respect to cooperation models, discussions centre around the question as to how such cooperation models in connection with open access can be organised and to which degree they should be regulated or not. In its statement, BNetzA refers to a discussion in Germany where it is in the process together with the Cartel Office to define the principle regulatory and competition law issues with the companies that are in the process of conducting such cooperation. In reality the Cartel Office has started extensive investigations and in the moment of finalizing this paper the Federal Network Agency and the Cartel Office are obviously about to align their position and to publish a position paper on their assessment of cooperation for fibre network roll out in Germany.

This being said, the open access idea should be kept in mind with looking at the different possibilities of cooperation below. This comprises cooperation respectively value chain differentiations on the level of (1) passive infrastructure (including access possibilities for operators of active infrastructure), (2) open access on the level of active infrastructure with access possibilities for service providers as well as open access (3) on a service level. This differentiation takes account of the typical separation of different layers of the value chain regarding passive and active infrastructure on the one hand and a service level on the other hand.

Cooperation of Utilities and Service Providers: In countries such as Switzerland [see Sebben 2009], Scandinavian countries, and Germany, power utilities are regarded as suitable for supporting the provision of NGA infrastructure. Utility networks and telecommunications networks show a number of parallels. Many business strategies in those two sectors rely on the importance and relevance of customer relationship, billing systems, rights of way, and long-term investment policy. In the utility sector, the expectation regarding payback periods is geared towards longer timeframes. This allows utilities to expect payback later than telecommunications operators, who carry out their activities in a more dynamic market with shorter payback period expectations. Utilities have some know-how regarding telecommunications networks. At least, they have used such telecom networks for internal telecommunications services. They may even have used telecom networks also for additional services at the interface of energy and telecommunications such as for smart metering. Also, they are highly experienced in building and operating networks, especially with respect to the civil works connected to the deployment. Utilities, however, often lack experience in the provision of retail services, especially in dynamic markets where customer services are important. Therefore, in some countries utilities may prefer to invest in the physical infrastructure and poten-

tially also operate the networks, without necessarily offering services on the retail market. At the same time, a number of telecom service providers have the capability of offering services to a large number of users, but lack the ability to significantly invest in infrastructure. In those situations, we foresee utilities as financially strong enterprises with a long-term orientation to cooperate with customer-oriented Internet service providers for providing NGA infrastructures.

A further aspect which is relevant for this cooperation model is that fibre optic networks also support energy utility providers to run their internal telecommunications / IT networks for internal telecommunication and network operation purposes and on the other hand that it allows them to develop new business areas and new products for end-users in their core business. One of these areas is smart metering but for those applications it is not necessary to have fibre networks. However, management of own communications networks plus additional services and applications require large bandwidths e.g. for home office work, educational purposes, e-health etc. can be realized by such networks. This combination of utility providers and service providers can combine the strengths of network deployment and financing with market and distribution advantages of service providers.

Cooperation with Real Estate Developers Combined with State Aid: In addition to NGA network roll-out on public grounds, in-house wiring is a crucial element of access networks [Yan, Xavier 2010]. Even in cases where fiber has been laid to the basement of multi-dwelling units, in-house cabling based on copper may lead to a reduction of the bandwidth and thus impair the quality of the access lines. In-house wiring is an economic asset that is hardly replicable. Hence, it may be promising to financially support fiber cabling in newly built houses. Project developers, real estate owners, and the recipients of such financial support would be obliged to offer open and non-discriminatory access to the modernized in-house cable. This would furnish incentives for developers and real estate owners as well as for network operators. Property would increase in value and network operators could offer high bandwidth products to the property owners or inhabitants. With such non-discriminatory access to in-house cabling, service providers could offer their services to the end users without having to invest and implement in-house cabling. It would thus reduce market entry barriers. Furthermore, the technical and economic bottleneck of in-house cabling could be overcome. To all relevant parties, however, investments in Fiber to the Building (FTTB) components,

even if lower than for Fiber to the Home (FTTH) ones, would be relevant. However, this approach is more relevant for multi-dwelling units than for single-family homes.

The issue of in-house wiring has gained permanent especially in France where regulations for new facilities / buildings have been made in order to equip them with fibre access. This brings the overall issue to the level of real estate developers in light of the possibilities to cooperatively deploy fibre optics in new built houses which is a relatively easy task in light of the overall costs / effort and which can be done by coordinating with the deployment work for other infrastructures which are needed in such new facilities. [see <http://www.arcep.fr/fileadmin/divers/CP-Fibre-commission.pdf>, see ARCEP 2010, p. 5; see Delaugerre 2010, pp. 3-7] The idea of “dig once” is also embedded in the national broadband plan of the FCC which was published in March 2010 [see FCC 2010, p. XII and pp. 109]. It should be taken into consideration such cooperative efforts to equip new built facilities that fibre optic access networks will also enhance the quality of the local community and therefore be of value to the municipality.

Cooperation of Telecommunications Operators with Co-Investing Enterprises: In the context of fixed networks, cooperation approaches have been mostly bound to an existing infrastructure, which had been in place before market opening and liberalization. A recurring payment was set for the infrastructure used. Further, the deployment of additional investment was subject to regulation and the access opportunities of alternative operators. Considering NGA networks in new connections, however, the idea of co-investors seems to be attractive. Alternative operators could participate in the planned investment of another telecom operator that deploys the infrastructure up front [see BNetzA, 2010]. As ‘compensation’ for participation in the investments, the cooperation partner receives long-term usage rights. Hence, instead of paying monthly rental fees for usage of the specific network element such as bitstream access or unbundled fiber loops, the co-investor would have guaranteed access to a certain share of the infrastructure. Such arrangement would not necessarily entail any legal cooperation or setting up a joint venture for any joint ownership. Needed, however, would be transparency in terms of network roll-out plans with regard to geographical coverage, investment volumes, and usage conditions. Each participating company could invite others to participate in co-investment. The co-investors take a share of the risk and therefore would be expected to have an interest in making the endeavour successful with many users. Such an arrangement would create “pressure” on all partners to be successful for the joint benefit

which could create a win-win-situation but on the other hand also entails the danger of potential anti-competitive behaviour, e.g. as regards a possible reluctance to grow the partnership by including further companies or by not offering wholesale products to third parties. Therefore, such arrangements of co-investment entail chances of a healthy market development free from regulation but also risks of later intervention.

2.2 Financing Strategies

The deployment of broadband infrastructures requires secured *financing* [Roeller, Waverman 2001]. However, standardized models for calculating investments in NGA infrastructures do not yet exist [Ruhle 2009, Thewanger 2009, p .11]. Such investments require very long pay-back periods, which in turn are dependent on long-term economic growth and stable competitive, economic, and financial conditions [e.g., Liebenau et al. 2009, Deutsche Bank Research 2010]. Apart from the 'classic' financing models via (savings) banks or private investments including venture capital, alternative ways of financing gain importance. Examples are Public-Private-Partnerships (PPP), where funding is provided by cities and municipalities, 'state aid programs' on national and federal level, and the European Union [e.g., Wieck 2009]. To receive and secure such financing, a sound business case is crucial, not only, but specifically to attract private investments and thus reduce the needed 'state aid' [e.g., Tep-payayon, Bohlin 2009]. Whether such a sustainable business case exists and thus sufficient "market value" can be generated from the perspective of the private investor is crucial. What is often overlooked, though, is the social value of such projects, i.e. the benefits of broadband networks for the overall economy. This "public view" is key for a decision of public spending for broadband roll out (OECD 2009c).

A number of aspects regarding financing demonstrate the complexity of the financing issue:

- The funding of the deployment of fibre optic networks by financial institutions and banks is characterized by relatively high costs of capital and the uncertainty of the financial markets over the last 12-42 months.
- Small and medium telecommunications providers have larger difficulties to access to debt and equity financing by banks.
- A purely privately financed fibre optic network roll out is usually not achievable respectively not possible.

- The sustainability of business models as precondition for financing by debt and equity is often difficult to bring across to investors.

Regarding the possibilities of financing it should also be kept in mind that for local projects there may be possibilities that local financial institutions such as savings banks may have possibilities to grant debt at favourable conditions which could ease the financing. Also the possibilities to conduct PPP projects and such a financing should not be left aside, although the PPP approach also encompasses significant difficulties and problems [see Rundfunk- und Telekom-Regulierungs GmbH / SBR Juconomy Consulting 2009].

	Supply of equity and / or debt	Provision of Infrastructure	Operation
Banks & Savings banks	Debt	NO	NO
Private Investments	Equity	NO	NO
„State Aid“ banks	Debt	NO	NO
Telecom operators	Equity	YES	YES
PPP-Models	Both	NO	YES
Public spending programs	Debt	NO	NO
Cities & Municipalities	Debt	YES	YES

The overview shows sources of financing and the roles that the possible stakeholders³ take on different levels of the value chain [see Rundfunk- und Telekom-Regulierungs GmbH / SBR Juconomy Consulting 2009, p.111]. For different forms of debt and equity as well as internal and external financing see Deutsche Bank Research 2010, pp. 7

³ By state aid banks we refer to public banks which have been created to support specific economic activities in the public interest such as Caisse des Depots in France and Kreditanstalt für Wiederaufbau (KfW) in Germany.

2.3 Legal and Regulatory Framework Conditions

Legal and regulatory framework conditions shape political and economic options with regard to NGA deployment [OECD 2009b; Wallsten 2009]. Regulatory issues like rights of way, state aid on different levels of the value chain, competition law, abusive behavior, and regulatory expectations are key [Kruse 2008].

It is important how the regulatory regime treats investments in the new networks [e.g., Hausman et al. 2008; Wieck 2008; Ruhle/Lundborg 2010; Bauer 2010]. Discussions center around 'regulatory holidays' for NGA networks. Such 'regulatory holidays' stand for a kind of guarantee that regulators will forebear from granting third parties access to those networks for a certain period of time. Discussion also cover the possibility that the regulatory regime could apply a higher weighted average cost of capital when calculating the prices of wholesale products in order to mitigate the high investments risks in the context of such infrastructures in a highly competitive environment. The regulatory debate also includes access to infrastructure for the purpose of sharing [Fornfeld et al. 2008].

Taking advantage of exiting in-house networks, owned by telecom operators or players from other industries such as energy or water, could lower the costs of network roll-out and thus facilitate the deployment of NGA networks [Yan, Xavier, 2010]. Any such arrangement raises the issue of a cooperative network roll-out, which in turn brings issues of competition law concerning the depth and the openness of such arrangements to the table (see above).

Deploying NGA networks may significantly change the traditional business models of vertically integrated network operators. A likely scenario is the disintegration of the vertical value chain with so called 'open access', i.e., the possibility of different players on each level of the value chain allowing for competition in the provision of services managed in a non-discriminatory manner [e.g., Picot, Wernick 2007, Goldstein 2008, BNetzA 2010]. Examples from the Netherlands, Switzerland, Germany, France, Australia, and the US demonstrate that value chain disintegration is a likely direction [e.g., Avenir Suisse 2009; Ruhle, Lundborg 2010; Rundfunk- und Telekom-Regulierungs GmbH / SBR Juconomy Consulting 2009]. The details of open access arrangements are subject to the legal and regulatory framework conditions.

The questions of legal and regulatory conditions as regards NGA deployment is increasingly becoming interrelated with classical issues of regulation. As networks are in the transforma-

tion process from copper-based infrastructure to fibre-based infrastructures, so is the regulation transforming. Main issues of discussions are the following:

- Allocation of the newly established infrastructures to a specific market in relation to market analysis and determination of significant market power: This topic plays a crucial role because the question has to be answered whether and to which degree such infrastructures have to be regulated, on which level of the value chain (passive, active, services) and depending on whether the relevant player has significant market power or not. A preparatory question that it needs to be answered is whether and to which market the new next generation networks have to be allocated.
- Regulation (or not) of open access: Here, telecommunications regulation and competition law become interrelated due to the fact that the definition of open access models and their acceptance on sector-specific regulation and competition law needs to be answered (see above).
- Regulation on different levels on NGA infrastructures: As the literature points out [BEREC 2010], there are many different technological solutions (cable networks, FTTC, FTTB, FTTH and different sub-technologies (PON, P2P)) and all of them offer different possibilities for wholesale regulation and access products. Depending on the different solutions regulation needs to answer the question whether and how to intervene. Thereby, potential conflicts can be foreseen as regards technological neutrality.
- New infrastructures are required for voice as well as data products. Internet access and different forms of data production become more and more important. The legal and regulatory framework has so far been rather voice-centric and now needs to come up with solutions as regards other products. Especially it needs to be answered how costs in such networks are allocated between voice and data products in order to find the right wholesale prices.
- The legal and regulatory framework so far has focussed on business models in the copper-based world and also been rather focussing on voice products. Again, this process is under significant change and regulation will need to answer the questions how business models will look like in the future and how a neutral approach to these business models can look like.

Some of these issues of relevance as well as others are also described by Noam [Noam, 2010].

3 The Case of Austria

3.1 Research Approach

This paper is based on a project conducted together with the Austrian regulatory authority. In 2009, the authority launched a project called 'Infrastructure and Financing'. The main goal of the project was to initiate a dialogue between market participants and the authority in order to define scenarios for the roll-out of broadband infrastructures. The project aimed at an infrastructure solution, which was compatible with competition law and financially feasible.⁴ For the project, we analyzed Austrian market data provided by a number of companies and the Austrian regulatory authority. In addition, we investigated market and policy data on international developments from Australia, Singapore, Switzerland, the Netherlands, and France. Further, we conducted nineteen in-depth interviews with Austrian stakeholders including the incumbent telecommunications operator, alternative operators, cable operators, utilities, public institutions, banks, experts, and market analysts.

3.2 Broadband Market Situation

The Austrian broadband market has been characterized by dynamic development since the market opening in 1998. Since 2000, it has shown a strong growth of broadband connections based on DSL and the use of cable networks. Especially since 2006, mobile network operators have launched broadband products at competitive prices and managed to reap the largest share of market growth compared to fixed line providers.

Mobile Broadband has grown to become the largest single technology for broadband access, and has surpassed cable as well as DSL. Table 1 shows the development of Austrian broadband connections by type of technology.

⁴ See www.rtr.at/de/tk/Infrastruktur.

TABLE 1 DEVELOPMENT OF BROADBAND ACCESS MARKETS BY TECHNOLOGIES [AUSTRIAN RUNDfunk- & TELEKOM-REGULIERUNGS GMBH 2009, P. 44]

	Number of Broadband Connections (in Thd.)											
	2006		2007				2008				2009	
	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
DSL via Copper Cable	549	572	598	602	604	643	723	738	766	818	872	895
Bitstream Access	121	123	124	122	119	108	92	89	69	67	63	63
Unbundling	148	17	20	223	229	234	241	244	241	265	255	248
Cable TV	514	538	557	547	550	569	5670	5720	574	563	564	564
FWA	19	20	21	40	40	41	39	38	37	37	37	35
Mobile Broadband	168	216	273	362	505	607	665	731	813	970	1,044	1,088
Others	8	8	8	12	12	13	13	12	12	12	19	19

The growth of mobile broadband has been the dominant trend since Q3 2006 (Figure 1). Efforts undertaken by the mobile operators did not pass unnoticed by the fixed operators. A significant decrease in broadband access prices occurred. As of December 2007, the incumbent Telekom Austria started to offer a telephony, broadband access, IP-TV (Triple Play) and a mobile option at very competitive rates. The triple play offer helped to stop the negative trend for the incumbent. The 'turnaround' of the decline in fixed lines was reported by Telekom Austria at the end of 2009. Nevertheless, the market share of the incumbent in the broadband market is rather low in a European comparison (Figure 2).

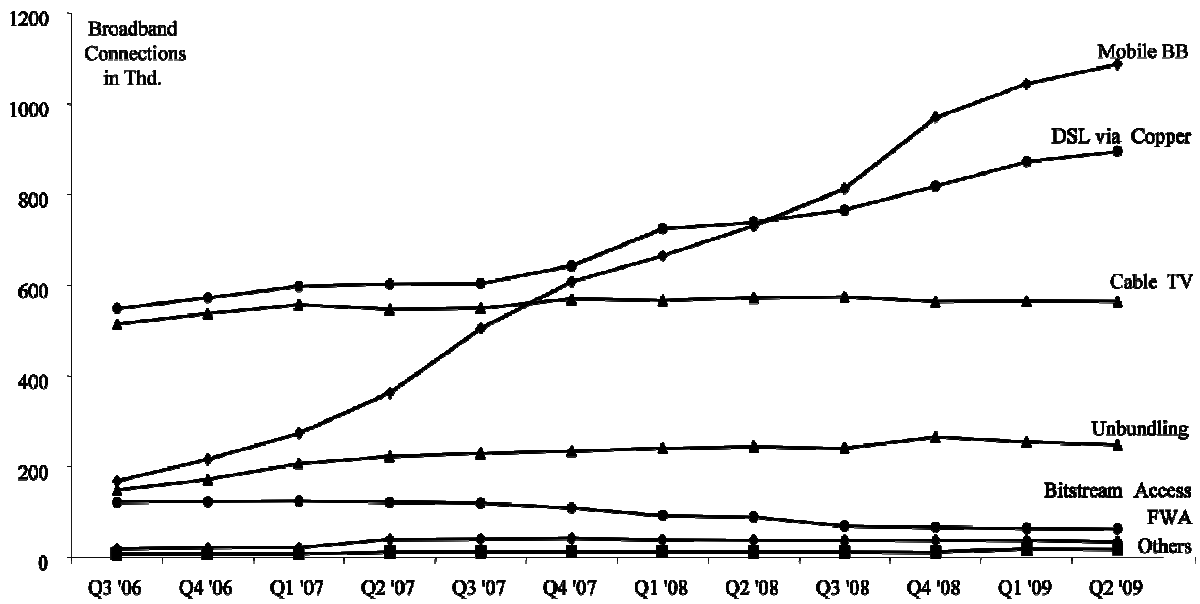


Figure 1. Growth of mobile broadband in Austria [Austrian Rundfunk- & Telekom-Regulierungs GmbH 2009, p. 34]

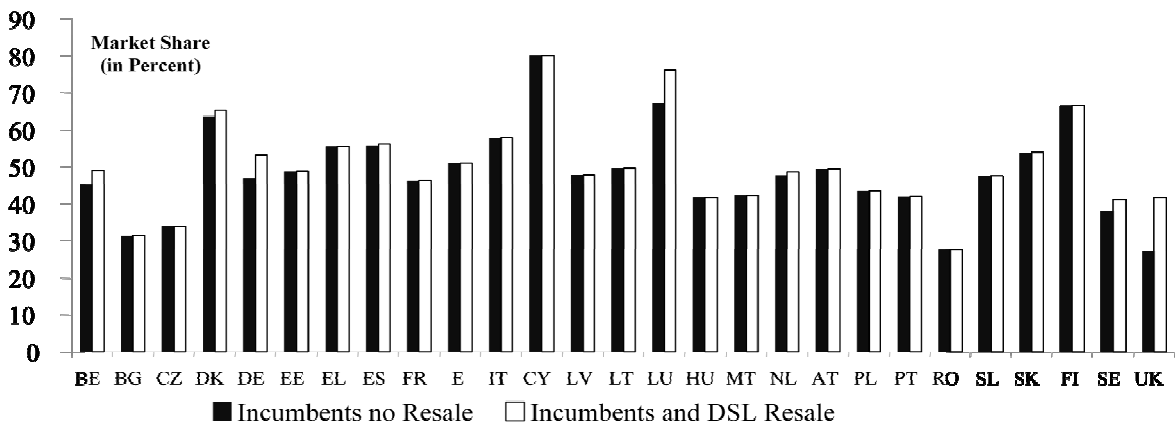


Figure 2. Market shares of incumbents for broadband access [EU Commission 2009, p. 12].

3.3 NGA Deployment

Generally speaking, fiber technology is considered to be the most relevant, sustainable, and future-proof technology. In Austria however, according to our interviews, mobile technology and other technologies such as cable TV will also play a complementing role in a national roll-out. To meet the required significant investments new business models are expected to enter the market and lead to stronger diversification of the value chain. The potential disintegration of the value chain and the likely model of 'open access' has caused a controversial

debate also covering the functional separation of the incumbent. Seemingly, the incumbent is willing to enter into cooperative models with enterprises on different levels of the value chain in order to overcome the situation of insufficient investment in access networks. However, the willingness of representatives from different industry sectors to cooperate is still not sufficient in order to promise significant investment in the short term. Further, cooperation between public institutions and the private sector, for instance through PPP arrangements, is seen skeptically.⁵ Especially the connection of rural areas is still unclear. Although the latter is considered politically crucial, the necessary coordination of local policy initiatives and / or municipalities in combination with the private sector is still lacking. The degree to which the incumbent really is willing to undertake joint approaches is unclear, though. In 2010, the incumbent announced specific FTTH and FTTB projects and certain pilots where the technology was going to be deployed and tested. Alternative carriers who publicly stated their interest to participate in the network rollout were referred to an e-mail address of the wholesale department of the incumbent operator to place their interest in cooperating.

Overall, the low demand for NGA infrastructures in the fixed network together with an economic situation characterized by the financial and economic crisis in 2009 has not yet led to substantial NGA investments in Austria comparable to those already realized and initiated in other countries. The case of Austria shows a large discrepancy between the potential of cooperations and the expectations regarding financing strategies as well as their implementations.

3.4 Towards a National Broadband Plan

Developing legal and regulatory framework conditions in line with competition law⁶, i.e. a national broadband plan for Austria, could lead to a coherent goal in the medium term agreed upon or at least accepted by the major players. Such a plan should reflect the political agreement between coalition parties and the national government to offer NGA of 25 MBit/s for all Austrians by 2013. It should also outline the overall terms of timing and financing. Co-investments would probably lower the investment risks and may thus lead to accelerated investments on the part of the industry which in turn would also have positive implications for

⁵ Regarding this matter and the chances and options arising from PPP models, see [Ehrler et al. 2009].

⁶ For instance, in Germany, the Cartel Office published a position paper on the topic, see [Bundeskartellamt 2010].

Austria as a location for economic activity. Integrating the national broadband plan into the overall ICT / information society master plan should further secure long term efforts [see Internetoffensive.at 2010]. To safeguard competition in the context of still vertically integrated network operators, the plan should stipulate specific rules or obligations to foster initiatives and financing from private sector. The plan could limit financial support through public spending for rolling out NGA infrastructures to underserved or non-served areas where market-oriented roll-out is unattractive.

Further, the national plan should promote 'open access' projects, which have repeatedly shown to be more successful, especially when undertaken on a non-discriminatory basis to allow later entrants to participate in the infrastructure. Such 'open access' projects need less public funding and may lead to a better use of resources via cooperation. However, a 'functional' separation, i.e., a separation of infrastructure operation and service provision, may raise issues regarding the time needed to implement such solution. In some countries, it has led to a national network company that offers infrastructure in a non-discriminatory way to all service providers. In Italy, Sweden, UK, and other countries outside Europe, such separation has been implemented as 'voluntary solution'. EU member states will have to implement this instrument as a possible 'remedy of last resort' according following article 13a of the 'Better Regulation Directive' and according to article 13b of that directive as a possible voluntary solution. However, it is likely to raise issues regarding the time needed to set up such a solution.

Finally, financing such projects through a universal service fund and making NGA a universal service is not recommended – although this idea has been presented in Sweden and the UK. The definition of universal service does not cover such NGA infrastructures. Financing via universal service funds would only mean a reallocation of investments and financing within the telecommunications sector. The issues of broadband as an element of universal service policy has also been discussed in a consultation of the EU commission, see http://ec.europa.eu/information_society/policy/ecommm/library/public_consult/universal_service_2010/index_en.htm#Public_workshop.

4 Conclusion and Outlook

In this paper, we have presented roll-out approaches for NGA networks tackling cooperation and financing issues. Paying tribute to the political relevance and the enormous economic impact [e.g., Lehr et al. 2006; Waverman 2009], on the one hand and the high costs involved on the other hand, we have focused on cooperation concepts complemented by thoughts on financing strategies, and legal and regulatory framework conditions. Concerning cooperation concepts, we have outlined three scenarios involving a variety of different stakeholders and examined the case of the Austrian broadband market, its NGA business models, and the corresponding legal and regulatory framework. We found that, depending on local or national context factors, all three approaches should support the roll-out of NGA networks. As the infrastructure varies from country to country, different platforms such as utilities or cable networks may or may not be available for further NGA roll-out plans. Further, the relative strength or weakness of different potential cooperation partners will certainly shape specific cooperation arrangements and financing strategies.

The deployment of next generation networks is a challenging task not only as regards the realization of such investments and the availability of such networks but also to find the right policy framework. The study for Austria showed some principles and led to some conclusions which can be generalized. These are:

- In order to find a coordination mechanism to match the (potential) demand for such networks and services and the supply side which is developing less dynamically, a national broadband plan could be a useful tool in order to make all stakeholders on the supply and on the demand side aware of the political priorities and to show a path by which investors are convinced that financial investments into such activities are useful.
- Such a national broadband plan could be useful if it is integrated and embedded into an overall ICT strategy.
- Where vertically integrated network operators (originating from the telecommunications world) are active with their investments today and try to foster their existing model of vertical integration encompassing network roll out operations and service provision, a market analysis and an overview on the developments are necessary. It

needs to be reviewed whether such a model is developing in a competitive environment or whether the market situation displays a tendency to significant market power which could require regulatory intervention.

- Financing currently is and probably remains a problem. Different solutions should be reviewed thereby realising that a purely privately financed activity will not be the solution for all cases whereas likewise a purely publicly financed program (such as in Australia) probably cannot be matched in other countries. Therefore, a mix of different measures of public and private investment and the possibilities of different stakeholders to contribute to this development should be analysed.
- Fostering open access models seems to be a good idea in order to allow different stakeholders to participate in the market and to be acted on different levels of the value chain. However, a number of questions have to be answered in the definition of such models and their regulatory and competition law applicability.
- Functional or structural separation remains an issue which is also relevant for the deployment of next generation networks. However, in the European Union it has most recently been introduced as “remedy of last resort” and therefore it is not simply the appropriate solution right from the beginning.

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