

How to use public-private partnerships for building Broadband networks in rural areas?

PPP4Broadband Project



Jointly for our common future



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Guidelines prepared by:

Vahta d.o.o., Slovenia
ICT Technology Network Institute, Slovenia

In co-operation with:

Agency for Innovation and European Cooperation, Slovakia
Technical University of Gabrovo, Bulgaria
INNOSKART Nonprofit Business Development Ltd., Hungary
Patras Municipal Enterprise for Planning and Development S.A., Greece
Region of Western Greece, Greece
National Institute for Research and Development in Informatics ICI - Bucharest, Romania
FH JOANNEUM University of Applied Sciences, Austria
Vojvodina ICT Cluster, Serbia
Center for Knowledge Management, Former Yugoslav Republic of Macedonia

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FOREWORD

Dear reader,

This document is the result of a joint effort of a group of experts who participated in PPP4Broadband, an EU project funded through South East Europe Transnational Cooperation Programme.

More about the PPP4Broadband project can be found at www.ppp4broadband.eu.

Within the project, this Guide and the correlated nine specific models that emerged through the group-work during one of the phases of the project have been created.

The creative efforts were led by the Slovenian partner of the project, ICT Technology Network Institute with Nina Sega and Stanko Šalamon, aided by the external partners Tomaž Živec and Goran Živec from the company Vahta d.o.o. (www.vahta.eu). The work was supervised by the project lead partner, Agency for Innovation and European Cooperation from Slovakia, mostly by Tina Igličar and Jan Kubalik. Great help and contribution was given also by all other partners that were involved in the process.

INTRODUCTION

Across the South-East European territory there are rural areas with a high percentage of people living with no or very weak broadband Internet coverage, representing a part of the broadband gap. It is proven and well known that the broadband gap has a negative impact on economic growth and social cohesion.

PPP4Broadband aims to improve the development of virtual accessibility in South-East European rural areas – using the PPP model – in order to increase rural economic and social development. The PPP concept envisages cooperation of public and private actors since the solution lies within their bilateral action. The need for proper broadband connectivity has been widely recognized also by local authorities in the areas that lack such services, and they are willing to take a lead role in order to ensure the development of rural areas.

However, the development of this kind of projects could pose a serious challenge to public partners as it involves a series of issues:

- the projects deal with building and managing a specific infrastructure (telecommunications), which requires some specific knowledge also on the public partner side;
- the projects usually involve knowledge of market activities (towards service providers and/or end users) which are usually provided or conducted by a private partner;
- the projects are sensitive to the issues of market distortion and public aid, as they usually border the areas where pure commercial telecommunications activities are conducted;
- the telecommunications market is regulated both by European and national rules;
- EU members are subject to certain specific recommendations from the EU Commission regarding the funding of broadband projects from public sources.

The aim of this Guide is to assist and to guide all the stakeholders, especially local authorities that want to participate in this kind of projects, to better understand and deploy broadband infrastructures in order to enable a better life to their citizens.

Through a better understanding of both the broadband specifics and the specifics related to the public-private partnerships and by following the instructions in the correlated PPP model documents, public partners will be enabled to develop a PPP broadband project frame from the initial pre-assessment to the beginning of the procurement process.

Obviously such projects can not be directly implemented as they have to be further tailored to specific national and territorial needs. During this phase, public partners will be able to get assistance from national Centers of Excellence for Broadband that will be also developed within the PPP4Broadband project.

This guide is composed of four parts:

1. the first part discusses topics related to broadband networks in connection to public financing;
2. the second part examines possible PPP models in relation to different broadband technology/capacity choices;
3. the third part discusses issues related to various possible business models;
4. the fourth part gives some recommendations about what could be the most suitable solutions in different scenarios.

The reader is free to consult the first or the second parts independently. However, since some specific terminology might be encountered, the third and the fourth parts should be read after the first two. A glossary of terms and definitions is included as Annex A to this document.

The guide can be taken as a self-standing document, but is meant to be used with the accompanying 9 PPP models developed for the purpose of the PPP4Broadband project.

This document discusses certain technical arguments that were developed and/or defined elsewhere. In such cases references are cited directly in the text or in Annex B.

We hope that the users will find this document readable and understandable.

1. WHAT IS BROADBAND?

Broadband is defined as a high bandwidth connection to the Internet and/or other experience rich contents or services. Broadband is easier and faster to use than the traditional telephone and modem as information can be sent and downloaded much quicker. The term represents the quantity, quality and rapidness of communication, the information obtained at local and global level, the currently minimal request for any community and the starting point for future development.

Broadband is a relative term understood according to its context. The wider (or broader) the bandwidth of a channel, the greater the information-carrying capacity, given the same channel quality. Depending on the country, there seems to be a wide agreement that capacities below 128kbps (or 256kbps in some states) are not considered broadband.

Broadband can be provided over your phone line, via cable or via satellite. It involves large volumes of information being carried at high speeds to your PC. This allows websites, text, graphics, music and videos to be experienced in real time.

Thus broadband has many useful features that can be utilized at home or in the office:

- The **connection** to the Internet is always on, allowing for constant Internet access and no need to dial up.
- The **phone line is unaffected**; this means that you can make telephone calls whilst the Internet is on.
- Normally you pay a **standard monthly fee for unlimited Internet access**, and you are not charged for the time you spend on the Internet. There are certain broadband products now that also offer pay-as-you-go access.
- Websites, music and videos can be **downloaded at a fast rate**.
- You can take advantage of instant messaging and online high speed interactive games.
- You can receive **uninterrupted real time services**, such as Internet radio, streaming video and voice-over-IP phone calls.

Broadband can make using the Internet at home much easier, faster and more efficient. Most businesses also take advantage of broadband to help them run the company. Working from home is now much more feasible thanks to the high speeds that broadband has to offer.

1.1. THE BENEFITS OF BROADBAND

Broadband has many key features that can make using the Internet more relaxing, enjoyable and useful. **By speeding up what you do online it can make a real difference in your everyday life**, be it at home or in the workplace.

Broadband makes the **Internet much faster** than the conventional dial-up connection. A 1Mb service can send and receive information up to 20 times faster than a dial-up connection. Large volumes of data can be transferred: with high bandwidths that broadband has to offer large amounts of data can be sent and received by your PC at a fast rate. **Your Internet is always on**, which means that you don't have the hassle of dialling up or logging on every time you want to access the Internet. **Your telephone line is unaffected**, so you can make phone calls from your landline whilst the Internet is running. There is **no need to disconnect the Internet** when you want to make a telephone call. There are no **surprise charges** as broadband providers usually charge a **standard monthly fee** depending on what package you take. This means that you can pay for unlimited Internet access and you do not get charged for the time you spend on the Internet. As websites download almost instantly, you can enjoy complex web pages with detailed graphics without having to wait for them to load up. You can download music and videos and avoid the queues at the shops by purchasing music and videos online. Downloads can be made online at a fast rate, and you don't even have to leave your house. Through instant messaging or online interactive games you can communicate in real time with friends and family around the world.

The fast speeds that broadband has to offer and increased volume of data transfer can be used to help run a business more rapidly, efficiently and productively.

Also in the field of teleworking broadband has enabled much faster and efficient communication. This has opened the opportunity for many people to work from home.

Some other benefits in related sectors are:

- **Education** – Bringing dynamic resources into the classroom while enabling seamless communication and partnering among teachers, students and parents.
- **Health Care** – Creating shared services that reduce operating costs and provide patients with a broader spectrum of enhanced services including remote diagnostics, administration, scheduling and electronic patient records.
- **Public Safety & Emergency Response** – Rapidly connecting response teams with vital information improves coordinated, timely reaction to accidents and disasters. Moreover, citizens gain access to the information and tools they need to make decisions and seek support.
- **Citizen and Social Services** – Online services enhance service coverage and quality, save valuable time and public money while improving overall efficiency through services such as smart grid technology and platforms to communicate and collaborate.
- **Economic & Workforce Development** – Enhancing productivity and competitiveness. Through broadband new business practices and models can be adopted to increase revenues, reduce costs and improve customer service. Being online allows businesses to be anywhere and serve customers everywhere.
- **Regional Development** – Attracting and retaining innovative businesses, allowing the local economy to become more diverse and resistant to economic shocks, as well as providing well-paying, high-quality jobs.

1.2. WHY IS BROADBAND ACCESS IMPORTANT?

The Digital Agenda for Europe 2020 states that by 2020 all Europeans should have access to the Internet of above 30 Megabits per second (Mbps) and 50% or more of European households should have subscriptions above 100Mbps.

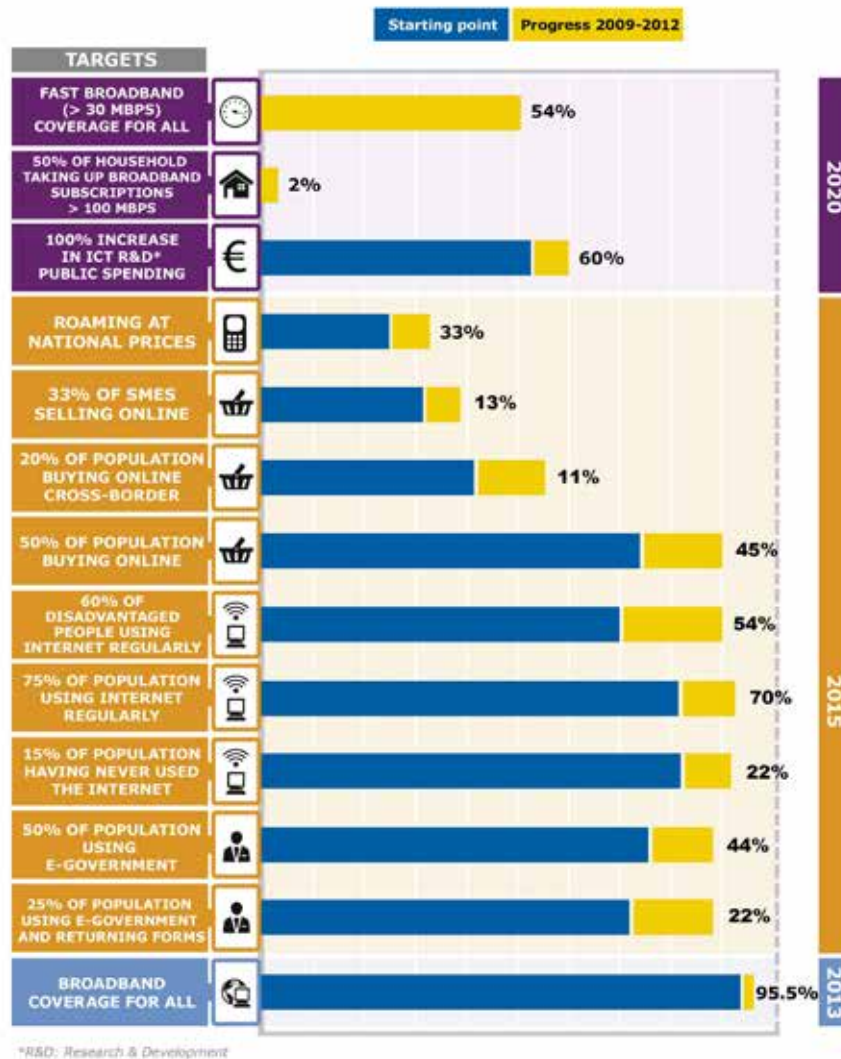
The DAE is not just about ticking-off items in a long list. It is about using technologies to make a real difference. The DAE contains 13 specific goals:

- the entire EU to be covered by broadband by 2013
- the entire EU to be covered by broadband above 30 Mbps by 2020
- 50 % of the EU to subscribe to broadband above 100 Mbps by 2020
- 50 % of the population to buy online by 2015
- 20 % of the population to buy online cross-border by 2015
- 33 % of SMEs to make online sales by 2015
- the difference between roaming and national tariffs to approach zero by 2015
- to increase regular Internet usage from 60 % to 75 % by 2015, and from 41 % to 60 % among disadvantaged people.
- to halve the proportion of the population that has never used the Internet from 30 % to 15 % by 2015
- 50 % of citizens to use eGovernment by 2015, with more than half returning completed e-forms
- all key cross-border public services agreed on by Member States in 2011 to be available online by 2015

- to double public investment in ICT R&D to € 11 bn by 2020
- to reduce energy use for lighting by 20% by 2020.

The progress against these targets is measured in the annual Digital Agenda Scoreboard where you can see how each Member State is achieving the goals.

The EU Commission presented a mid-term review of the Digital Agenda for Europe in December 2012.



Source: European Commission, Digital Agenda Scoreboard 2012

The Digital Agenda Scoreboard, where the progress of each single member state can be followed, can be found at <https://ec.europa.eu/digital-agenda/node/640>

The DAE 2020 target for fast and ultra-fast Internet access was chosen because of the central role it will play in economic recovery and in providing a platform to support innovation throughout the economy, as electricity and transport did in the past. The roll-out of ultra-fast open and competitive networks will stimulate a virtuous cycle in the development of the digital economy, allowing new bandwidth-hungry services to take off and fuelling growing citizen demand, which in turn will stimulate further demand for bandwidth.

World demand for bandwidth has been growing at roughly 50-60 % per year, driven by the extension of Internet use from simple email and text files (in the era of 56 Kbps dial-up Internet) to Internet surfing (with the advent of always-on broadband) followed by increased integration of graphical and audiovisual content on websites (supported by the current generation of ADSL which offers download speeds of 2 Mbps or more and uploads of 256 Kbps or more).

Not only download speeds are important in that context – higher symmetry (much higher upload speeds) and lower latency may also be required for innovative services and applications. There are already some services that depend on such connections: smart electrical grids that require low latency and can cut consumer expenditure and lower costs; real-time cloud computing services that require symmetrical upload and download speeds and can be used by small businesses to lower their costs; and intensive e-health services offered to remote hospitals and patients. Moreover, the OECD has recently concluded that the cost savings in only four sectors of the economy (transport, health, electricity and education) would justify the construction of a national fibre-to-the-home network (document DSTI/ICCP/CISP(2009)2/ FINAL and successive developments).

Thus, smart, sustainable and inclusive growth as envisaged by the Europe 2020 strategy will very much depend on the efficient and effective use of the Internet, and the Internet access speed will be a key factor in achieving this. Internet access is provided by — generally private — network operators under a competitive regulatory framework and driven by commercial interests. Yet because of the critical role of the Internet, the benefits for society as a whole appear to be much greater than the private incentives to invest in faster networks. **Stimulating investment in fast Internet access beyond the current market-driven development**, taking into account the recent economic downturn, **is the key to achieving the broadband target**.

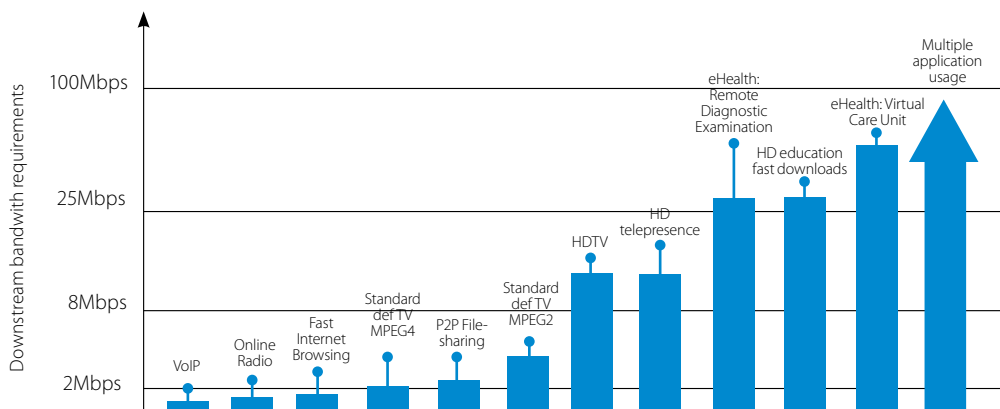
Investment in new open and competitive networks should be supported by the actions of national and local authorities aimed at lowering costs. The Commission has already assisted such actions through the adoption of its Guidelines for the application of state aid rules (2013/C 25/01). These lay down the conditions for public financial support on non-market terms for broadband and high-speed broadband deployment in areas where commercial investments are unlikely to take place in the foreseeable future. The main objective of the Communication from the Commission is to further assist the actions of national and local authorities. It is presented as a broadband package with the two other broadband commitments made by the Commission in the Digital Agenda action on fast and ultra-fast Internet.

These are:

- the Next Generation Access (NGA) Recommendation to provide regulatory guidance to national regulators and
- the Radio Spectrum Policy Programme to improve the coordination and management of radio spectrum and hence facilitate, among other things, the growth of wireless broadband.

1.3. TECHNOLOGY AND MARKET DEVELOPMENTS IN BROADBAND

Currently, broadband is predominantly delivered to home users through copper (e.g. telephone) or coaxial (e.g. cable TV) networks and/or wireless access networks such as 3G mobile communications or fixed wireless access. **There are about 124 million fixed and 25 million mobile broadband subscriber lines in the EU**, which is one of the world leaders in first-generation broadband deployment. Speeds on offer vary widely, but usually download speeds are in excess of 2 Mbps and upload speeds are above 256 Kbps. Speeds are increasing, and the chart below illustrates the functionality of different broadband speeds and likely future applications.



Source: Analysis based on Broadband Stakeholder Group

Outside the areas where they face infrastructure competition operators have been reluctant to move beyond their established ADSL business.

Most operators do not see a convincing business case for a large scale network upgrade to FTTH or other NGA or ultrafast technologies, also considering that there are not, as yet, enough attractive services available that would make customers pay a premium price. The NGA Recommendation and the application of the new regulatory framework will be crucial in this respect, as they will provide regulatory certainty thus promoting investment and competition.

Next-generation terrestrial wireless services can offer transfer rates of over 30 Mbps and therefore meet the broadband coverage target. They are particularly important in regions with difficult terrain where wired access is impractical. Wireless connections via satellite could also play a role in these regions, but further technological development will be needed if satellite is to contribute to universal coverage at the target speed of 30 Mbps by 2020.

1.3.1. Technical design of the output

Due to the requirements of technological neutrality, technical design of the outputs can only be defined as needed capacities (partly discussed in previous paragraph) and desired network topology (tree structure, mesh structure, ring structure, etc). Network delay (processing, queuing, transmission, propagation delays) or latency need to be defined, but again they are technology dependent.

Open access networks have numerous specifics deriving from the fact that many data traffic flows converge through the same active equipment, unless they are of collocation type.

QinQ capabilities, advanced multicast and strict VLAN isolation functionalities must be required. These techniques enable the network operator to strictly separate and manage broadband services offered by different service providers.

1.3.2. Quality of output

The quality of outputs results from two groups of factors:

- Design/topology/technology choices regarding the network (redundant connections, ring topology, failover software protections etc).
- Operational decisions (How many people will be assigned to problem solving? How fast they will respond? etc).

General requirements (such as 99.8% availability) can be discussed at the point where the desired quality is defined; however, we must be aware of the fact that higher availability induces higher operational costs. It is wiser to use anticipated availability of the network as one of the evaluation criteria. Different levels of service level agreements (SLA) are usually contractually granted on top of basic network performance. By defining network capacities (as defined in the overall specification) we do not necessarily grant the bandwidth, since it is common for telecommunication networks to have traffics with different quality of service (QoS) levels. It is important that the network supports QoS.

1.4. WHICH ARE MINIMAL REQUIREMENTS FOR THE MAPPING PROCESS?

The **mapping of existing broadband accessibility and of other public utility infrastructure** that could be used for deploying broadband infrastructure (such as electricity poles, sewage piping, etc.) **is required to reduce construction costs.**

The situation differs widely from one country to another. As a general rule, **do not try to minimise the problem and state clearly how the mapping process is carried out.** Ensure transparent and publicly accessible mapping.

Use the Geographic Information Systems (GIS) mapping to determine the location of rural communities – use the available GIS to collate demographic information, including the number of households, population spread, fixed-line availability, cellular coverage, broadband availability, electricity supply, etc.

Similar mapping, broadband coverage analysis and consultation with stakeholders have been undertaken by managing authorities in other broadband projects. For example, in Latvia the managing authority responsible for the RAIN project launched a public consultation with operators to collect information about their optical fibre networks and gathered information from local authorities on anticipated usage of broadband services, which was mapped against broadband penetration. As a result 363 areas were identified for a roll-out of a backhaul/core network.

Involve local authorities but investigate any claim to avoid future challenges over the mapping result. For several reasons (mainly lack of precise information) local authorities usually under-declare broadband availability, if compared to the infrastructure operators.

Member States should clearly identify which geographic areas will be covered by the support measure in question. By conducting a parallel analysis of the competitive conditions and the structure prevailing in the given area and by consulting all the stakeholders affected by the relevant measure, Member States will minimise distortion of competition with existing providers and with those who already have drawn up investment plans for the near future and enable these investors to plan their activities. Although not mentioned in the Broadband Guidelines, this condition implies that objections put forward by the interested parties should be taken into account.

Due care must be given during the mapping process not only to the existing infrastructures but also to the intentions of existing or new commercial operators to build telecommunication infrastructures with purely private economic investments. **The aim of the proper mapping process is to prevent market distortion due to public funding.**

Huge problems (which could lead to the demands to return the granted funds) could arise if private investors are neglected during the mapping process. Even in cases where national public aid schemes for broadband projects are approved by the EU Commission, the challenges may succeed if private investor interests are harmed above the approved market distortion levels.

In case of non EU members improper mapping could not result in such negative consequences, but maximum care is advised nonetheless.

1.5. OPEN ACCESS NETWORKS (OAN)

For the purposes of this document **Open Access networks (OAN) are defined as networks where the access to the network services is granted to any provider at the same and under fair and transparent conditions.** As required by the EU Commission this interpretation is mandatory for EU member states and is suggested as a solution also for others.

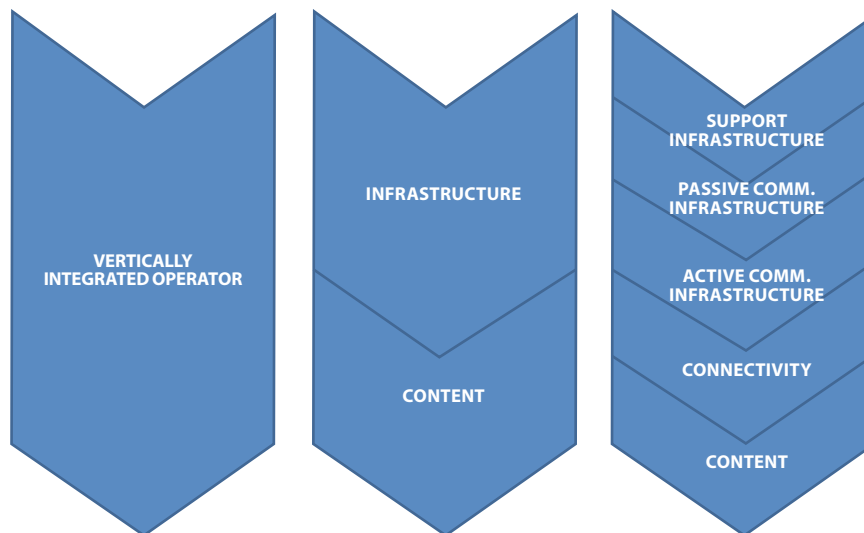
There can be different levels of openness, as presented in the picture below. The solution chosen for the project should reflect the existing conditions (such as the existing infrastructure etc.) and the desired capacity, coverage and level of competition that is planned after the execution of the build-out phase

1.5.1. How can open access models be divided?

Open access models can be divided in two groups: **collocation based** and **bit-stream based** open access models.

Collocation based or passive open access networks are further divided into two subgroups:

- **Passive cable duct networks**, where only passive ducts and accompanying manholes are built within the project and these capacities are rented to several operators who lay their own cables and install separate active equipment;
- **Passive optical networks**, where ducts and cables are laid within the PPP project and the cables are terminated in a few central locations (rooms or street cabinets). The space in this locations is rented to each operator to install their own active network equipment.



Bit-stream or active open access networks are further divided into three subgroups:

- **Layer 2 transparent networks**, where ducts, cables and Layer 2 transport equipment are provided by the project and the content providers provide the connectivity and services connected with their data streams. This subgroup can be further subdivided into several types. They differ in aspects of who provides the line terminal at the end users premises (the infrastructure or the content provider) and who provides connectivity among access nodes (if there is more than one in the network). They are also referred to as switched open access networks.
- **Layer 3 networks**, where besides the services described in the previous point the open access provider also ensures the connectivity layer, providing DHCP, security, traffic policing and other possible basic network services. The question of who provides network active equipment to the end user remains open. Backbone connectivity is usually a part of the network. Layer 3 networks are also referred to as routed open access networks.
- **Full service open access networks**, where the network operator provides, besides the services described in the previous point, some of or all end-user broadband services (like IP connectivity, VoIP and/or IP television content) as a wholesaler to the retail service providers. In this case, active equipment on the user's side is provided and/or managed by the OAN operator.

If underlying infrastructure is already present an open access project can be developed also from that point (for example pre-existing public lighting cable ducts that can be used for optical cables).

For the projects where solutions are foreseen obviously only active open access networks are usually considered despite the fact that based station poles and upstream infrastructure could also be managed as passive open access.

It is not necessary for the public partner to define the choice of the open access model in advance, but the risks are greater if fails to do so. The risks are mainly due to the fact that different OAN models could be proposed by different bidders in the tender process. This would make the choice of the best solution very hard, except in cases where evaluation criteria are well defined in relation to the mentioned issues.

The choice of the OAN model heavily impacts the capital and operational expenditure which both have great influence on the self-sustainability, financial and economic indicators that have to be calculated in the documents required to obtain the public funding for the project.

1.6. OPEN ACCESS IN NEXT GENERATION ACCESS (NGA) AND ULTRA-FAST NETWORKS

A key issue regarding new fibre networks is whether there will be sufficient infrastructure competition either from other fibre based networks or intermodal competition. While fibre based infrastructure competition has developed apace in some countries, such as Korea, Hong Kong or China, with open access applied only at places such as the basements of apartment buildings, it is less clear whether this model can be replicated in countries with different demographics. In areas where there may only be one (virtual monopoly) or at best two (virtual duopoly) fixed network providers, the question of how to best ensure sufficient competition will be at the forefront.

At the same time, to the extent that broadband wireless networks can provide a degree of this competition, they also require the use of fibre networks ever closer to their customers to efficiently offload traffic onto fixed networks.

As fibre networks play an increasing role in broadband service provision and fibre technology is deployed deeper in the network, moving closer to the premises (i.e. FTTH, FTTB, FTTC etc.), new challenges arise as to the need and feasibility of implementing open access policies for NGA networks.

These new networks have different technical and economic implications: wholesale access products are different for fibre technologies, network topologies may vary as well. In fact, new access products provide for a wide range of options available to entrants and may greatly differ from those available for copper networks. Those differences may be based on technology, cost, network topology and service differentiation. In most cases there is no direct correspondence between fibre and copper wholesale access products, although some analogies may be drawn.

For technical and/or economic reasons in an NGA environment it may no longer be feasible for LLU (local loop unbundling) to grant alternative service providers access to the physical infrastructure, i.e. copper wires, in order to provide services to the end user. For point-to-point (P2P) topologies, unbundling could be feasible at the optical distribution frame (ODF), in a similar way to how unbundling was implemented in DSL networks, while for fibre point-to-multipoint (P2MP) networks this solution becomes more challenging.

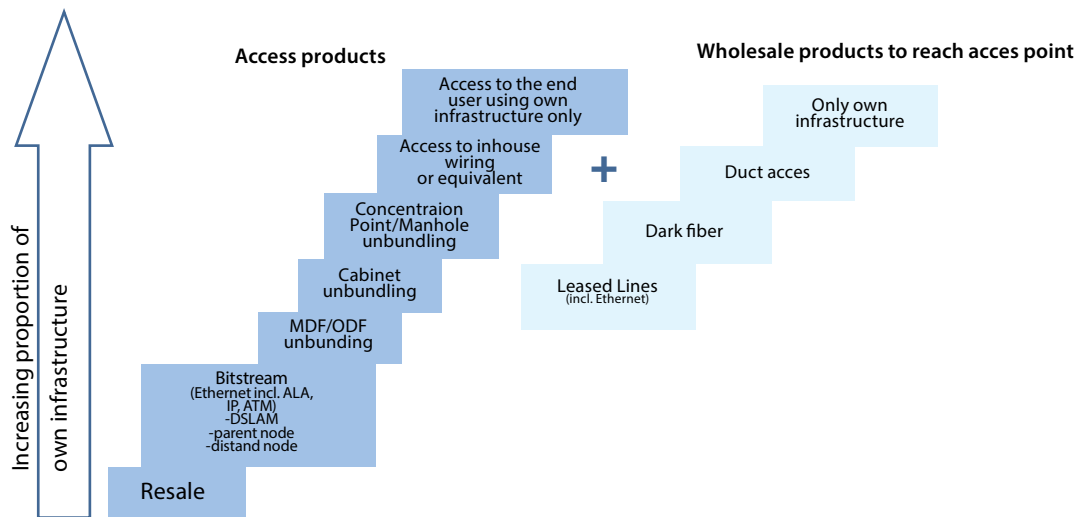


Figure: NGA ladder of investment

Source: OECD (2013), "Broadband Networks and Open Access", OECD Digital Economy Papers, No. 218, OECD Publishing. <http://dx.doi.org/10.1787/5k49qgz7c1mr-en>

Although different unbundling options could exist for P2MP fibre networks, these might not be economically viable for entrants (e.g. subloop/splitter unbundling) or they are not yet technologically proven (WDM - wavelength division multiplexing). Therefore, it is likely that any form of wholesale access will have to be provided through indirect access obligations, as is the case in cable networks. Some of these remedies may be based on "bitstream" or WDM.

BEREC – Body of European Regulators for Electronic Communications (<http://berec.europa.eu/>) has discussed extensively wholesale products for NGA access and analysed different possibilities and implications of these access products depicted above (BEREC, 2010). All the products may not be relevant in all cases, as some are specific to given roll-out scenarios (FTTH, FTTB, FTTC) and to topologies (point to point or point to multi-point: P2P and P2MP). This report does not intend to address these access products and scenarios in detail.

Unbundling at the “concentration point” – aggregation node – is relevant for some FTTH scenarios, being the concentration point located between the cabinet and the end-user or between the ODF and the cabinet. Depending on the location of the concentration point, alternative operators may be interested in unbundled access at this network level, even though some may prefer unbundled access at the cabinet or the ODF, depending on their network topology and associated economics.

Unbundling at the ODF (comparable to local loop unbundling for copper networks) may be done for P2P networks, and it does not pose any major challenges. Cabinet unbundling, which requires a lot more capital infrastructure – and therefore higher investments – from alternative operators, is mostly used for FTTC scenarios. Cabinet, concentration point and ODF unbundling are all Layer 1 products. Finally, bitstream products are possible for all topologies and fibre technologies and can be provided at Layer 2 (ATM, Ethernet) or Layer 3 (IP). As is the case in cable networks, the higher the layer, the lower the technological independence for the alternative operator, which may have implications for competition in areas such as innovation.

Cooperation between the telecommunications industry, regulators and public partners therefore represents good practice for defining the most suitable requirements for openness.

The deployment of NGA infrastructure differs fundamentally from the regulation of copper: in most cases it is a newly built infrastructure and not a legacy network. Therefore, incentives for investment may play a more important role than they did for copper networks. When imposing access obligations on NGA infrastructure providers, regulators should take into consideration the balance between investment incentives and the promotion of competition. In that regard they should consider appropriate costing methodologies, incentives that reward risks and/or uncertainty and investment recovery profiles.

In its recent Guidelines for financing broadband infrastructure the EU Commission, recommended the openness (or wholesale access) for networks that are (co)financed with public funds:

“Wholesale access: Due to the economics of NGAs, it is of outmost importance to ensure effective wholesale access for third-party operators. Especially in areas in which there are already competing basic broadband operators, in which it has to be ensured that the competitive market situation which existed before the intervention is preserved.

...

*The subsidised network must therefore offer access under fair and non-discriminatory conditions to all operators who request it and will provide them with the possibility of effective and full unbundling. Moreover, third-party operators must have access to passive and not only active network infrastructure. Apart from bitstream access and unbundled access to the local loop and sub-loop, **the access obligation should therefore also include the right to use ducts and poles, dark fibre or street cabinets.** Effective wholesale access should be granted for at least 7 years and the right of access to ducts or poles should not be limited in time. This is without prejudice to any similar regulatory obligations that may be imposed by the NRA in the specific market concerned in order to foster effective competition or measures adopted during or after the expiry of that period.*

It may be the case that in areas with low population density, where there are limited broadband services, or for small local companies, the imposition of all types of access products might disproportionately increase investment costs without delivering significant benefits in terms of increased competition. In such a situation, one may envisage that access products requiring costly interventions on the subsidised infrastructure not otherwise foreseen (e.g. co-location in intermediary distribution points) be offered only in case of a reasonable demand from a third-party operator.

The demand is considered reasonable if:

- *the access seeker provides a coherent business plan which justifies the development of the product on the subsidised network and*
- *no comparable access product is already offered in the same geographic area by another operator at equivalent prices to those of more densely populated areas.*

By contrast, the preceding paragraph cannot be invoked in more densely populated areas where one may expect infrastructure competition to develop. Therefore, in such areas, the subsidised network should satisfy all types of network access products that operators may seek.”⁽¹⁾

Even though we will not attempt to address the issue of open access for NGAs in depth, it should be noted that some stakeholders, especially incumbent (big national telecoms) operators, argue that open access obligations would discourage investment in NGA infrastructures, whereas others, e.g. alternative operators, feel that lowering regulated prices for copper would provide an incentive for incumbents to deploy NGA networks. This is obviously true only in cases of asymmetrical unbundling where the national regulation bodies force open access only upon the incumbent network. In case of symmetrical regulation, open access is demanded from all operators on the market. In the latter case, the opposite behaviour is to be expected, as small operators oppose strongly to open their networks. This is especially true for cable network operators who claim all kinds of technical impossibilities.

1.7. COMMON ELEMENTS OF OPEN ACCESS POLICIES

According to an OECD study on open access policies **the term “open access” for broadband networks can be linked to the following properties or common characteristics** that are usually present in those arrangements.

1.7.1. Wholesale access

There is a widespread agreement among stakeholders in the telecommunications industry and across all types of technologies that “open access” refers to wholesale access. Nonetheless, (ex-ante) regulated wholesale access is only one area where open (wholesale) access can take place, as open access may also happen as a result of a voluntary decision of a single network to provide it.

1.7.2. Effectiveness

Wholesale access branded as “open access” needs to be effective. In the context of regulated open access, most of the concerns arise when an obligation for incumbent operators is not actually fulfilled or it is not effectively enforced. Deficient quality of service, delays in the provision of wholesale products or discrimination against non-affiliated retail providers have often been alleged as being the reason why open access policies have not performed efficiently in some OECD countries. Countries that took the decision to implement functional or structural separation of the incumbent operator did so based on concerns about the actual enforcement of regulatory wholesale access obligations, in economic literature known as “sabotage”. To conclude, wholesale access has to be provided effectively if it is to be designated as open access.

1.7.3. Transparency

Transparency is another key feature of open access. The terms for any open access arrangement have to be transparent. If not publicly available, sufficient information about the terms of any open access arrangement must be made available to any interested parties, so that any access seeker may be aware of access terms and conditions.

⁽¹⁾ *(the bold and underlined text is emphasized for the purposes of this document)*

Source: EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks (2013/C 25/01)

Transparency may be implemented by means of a reference offer or by another mechanism that provides enough information to requesting parties. Transparency, where referring to NGA networks, may also be required for migration/transition plans from legacy networks to new fibre networks. The party leasing the copper has to make its migration plans public and advertise within a given delay that it intends to decommission its copper network.

1.7.4. Non-discrimination

Any open access arrangement has to be non-discriminatory. That is the reason why purely commercial negotiations, which do not apply the same access conditions to all interested players or, at least, do not have clearly established policies as to which conditions apply depending on potential access seekers, may not be classified as open access agreements. Non-discriminatory conditions should be considered as an integral part of every arrangement termed “open access”.

Clearly, non-discrimination may not be achieved solely relying upon the non-discriminatory behaviour of the incumbent operators. In the context of regulated wholesale access, where incumbent operator(s) have the incentive to discriminate against alternative operators, a whole set of enforcement, monitoring and control measures have been set by regulators.

An alternative to imposing fair and reasonable access conditions on the parties offering access is to ensure that the incentives for discrimination are not present. This is generally the case for IXPs (infrastructure providers) that are usually operated by non-for-profit organisations unrelated to any of the access seekers nor to the incumbent operators, with some exceptions.

1.7.5. Fairness/reasonableness and price control obligations

Finally, any non-discriminatory, transparent and effective wholesale access must have some degree of fairness and reasonableness. For example, fair and reasonable requests for access should be given due course. Typically, disputes over the fairness of requests relate to the prices charged or the requested and offered technical characteristics of access requests. Even though there is no widespread agreement about the implication of fairness/reasonableness, these terms frequently appear in the context of regulated wholesale access. In this regard, debates about fair access can hardly be separated from the discussion of price control obligations. In fact, price control obligations in whatever form they may be – price caps, retail-minus, cost orientation – are pivotal to guaranteeing one of the properties that open access should comply with – that of “effectiveness”.

As a necessary means to ensure effective open access, virtually every form of mandated open access entails some price-related obligations. As the resulting regulated price level is often subject to cost-orientation principles, gathering evidence about the costs incurred by the wholesale service providers is necessary. This usually involves a large degree of subject-matter knowledge and methodological challenges related to cost-accounting methodology, the willingness of operators to disclose accounting data and the cost-accounting models used to allocate costs. This work is in most OECD countries usually undertaken by telecommunication regulators and requires specialised staff and significant work in co-operation with operators.

1.7.6. Mandated vs. voluntary open access and private vs. public initiative

Voluntary open access in the context of access and backhaul networks remains relatively rare. Moreover, most of these cases are linked to the public ownership of the party offering open access whose aim is to fulfil public service obligations and public policy objectives. Purely private open access initiatives remain rare although some, wholesale-only proposed models, could be considered open access depending on the final conditions offered to requesting operators. They are, however, more likely to be classified as purely commercial agreements.

The same considerations may well be derived for backbone infrastructure including undersea cables. There may be little incentive to allow for open access when the infrastructure has been deployed by private market players,

especially if they are backed by monopoly power in interconnecting networks. Most, if not all, of the initiatives which entail open access to undersea cables result from the dominant position of telecommunication operators running these cables and from the lack of openness in accessing these infrastructures. That is the reason why public or semi-public initiatives were launched with open access policies in some regions.

Perhaps infrastructure service providers (IXP) are one of the few exceptions to this pattern in that they offer effective, transparent and non-discriminatory conditions for new members to adhere. It could be argued that IXPs are not purely private players, as most of them are non-for-profit organisations or are in a small number of cases associated with public authorities. It can also be argued that they do not provide open access, as they only provide interconnection among peers. On the other hand, it could be contended that an IXP is an infrastructure that any interested player may access on an open basis, and therefore it fully falls under the concept of open access.

1.7.7. Wired vs. wireless

Traditionally, the open access debate only concerned fixed networks. These networks suffered from economic bottlenecks, such as access to the local loop, which made the case for open access policies in the form of regulated access extremely compelling.

With the advent of mobile networks and, more markedly, after the increasing spectrum needs for wireless broadband networks, wireless networks have also been confronted with an economic bottleneck: limited spectrum resources. Lower costs of deployment for mobile networks may render wholesale-only models more feasible than they have been for fixed networks, although there is little evidence to date of wholesale-only mobile operators enjoying commercial success. Infrastructure sharing agreements appear to be gaining importance and this may be the trend in many countries for the deployment of LTE networks – in this case we talk about open access wireless networks

1.7.8. The role of open access in developing competition dynamics

The importance of open access policies – mostly in the form of regulated access – should not be underestimated. The role of local loop unbundling in developing competition in numerous OECD countries has been significant. Success stories such as France or the United Kingdom in Europe or Japan and Korea in Asia are partly, if not mostly, the outcome of well implemented open access policies. While the debate over levels of investment, innovation, competition and so forth is an on-going one it is likely to become even more critical as NGAs are further developed.

The role of open access policies for undersea cables, publicly funded broadband networks and backbone networks also has to be recognised. Market failure has often been tackled through open access policies, usually in the form of mandated open access or private-public partnerships for investing in facilities where private initiative has not been found to be in line with public policy objectives.

1.7.9. Harmonising open access regimes

One of the challenges in dealing with open access policies from many different perspectives are the possible inconsistencies in implementation, regulatory uncertainty or incoherent obligations imposed by different regimes which may create methodological and/or practical differences in implementing open access policies or may even result in inconsistent obligations for telecommunication providers.

In this respect, **formal and informal co-operation between different authorities, e.g. competition authorities, telecommunication regulators and public funding agencies, should be strengthened.** As ex-ante regulatory authorities usually have well-developed subject-matter expertise on wholesale regulation, cost-accounting methodologies and implementation/enforcement issues surrounding open access policies, these authorities should be involved by means of consultation in the process of laying down the conditions attached to open access broadband networks.

If a public authority grants some funds for the deployment of an open access broadband network, it would be highly advisable that it gathers advice from the telecommunication regulator and ensures that open access conditions are coherent with existing or future ex-ante obligations for this area or that, at a minimum, some rationale is provided on the relationship between both sets of measures.

With respect to the coherence of open access conditions imposed by competition authorities, again they should observe the approach taken by national regulatory authorities and, if these measures are to be qualified as complementary - either by jurisdictional issues or by new findings - they should acknowledge and provide the rationale for such measures to be taken.

If enforcement measures relating to open access networks are not directly overseen by the regulatory authority, some co-operation mechanism must be implemented in order to guarantee that this implementation benefits from the subject-matter knowledge that the national regulatory authority has in dealing with mandated regulated access. ⁽²⁾

⁽²⁾Source: OECD (2013), "Broadband Networks and Open Access", OECD Digital Economy Papers, No. 218, OECD Publishing. <http://dx.doi.org/10.1787/5k49qgz7c1mr-en>

2. WHAT IS PPP?

The term PPP (Public Private partnership) refers to a long-term, contractually regulated cooperation between the public and private sector for the efficient fulfilment of public tasks in combining the necessary resources (e.g. knowhow, operational funds, capital, personnel) of the partners and distributing existing project risks appropriately according to the risk management competence of the project partners which is carried out by using the conditions laid down by the law.

There is a great variety of definitions for PPP available worldwide. The contents and objectives may vary according to the country specific background and the specific interests of the individual author. Some academic and industrial practitioners still regard the definition of PPP as being very ambiguous. In some cases, the term public-private partnership describes a wide range of arrangements whereby government responsibilities are outsourced to commercial partners, and risk is shared between the public and private sectors to bring about desired outcomes in areas associated with public policy.

As one example, the official definition of PPP by the “Federal Report on PPP in Public Real Estate, Part I: Guideline”, commissioned by the German Federal Department of Transportation, Construction and Real Estate (BMVBW) in 2003, is as follows:

“The term PPP refers to a long-term, contractually regulated cooperation between the public and private sector for the efficient fulfilment of public tasks in combining the necessary resources (e.g. knowhow, operational funds, capital, personnel) of the partners and distributing existing project risks appropriately according to the risk management competence of the project partners”.

In addition, there are **four main characteristics of PPP**:

- **efficiency** gained through appropriate **sharing of risks and responsibilities**; the public sector retains mainly sovereign tasks and the private sector bears those for implementation;
- **lifecycle and private investment** as crucial elements of PPP’s incentive structures;
- **long term contractual relationship**; and
- **innovation**, in particular through output specification, service levels and payment mechanisms, as a new way of describing the services to be supplied.

One of the major objectives of PPP is to transfer tasks and responsibility for the provision of infrastructure to the private sector, in order to gain efficiency, cost reliability and financial security. The traditional procurement of public infrastructure and its related services has given way to the private sector assuming responsibility for design, construction, operation, management, maintenance and finance, with the public sector as the customer or, sometimes, as the direct user, paying for the provision of a service. **The public sector, nevertheless, should not lose its sovereign task such as assessing and determining infrastructure needs, monitoring and supervising an efficient and competitive procurement system, and assuring all the required environmental and safety standards in the service delivery.**

The principal aim of PPP is to involve the private sector in the provision of public services, shifting the role of the public sector from the owner and provider to purchaser and guardian of the interests of the public. It is driven by the belief that the public sector should focus on its core functions, leaving the private sector to perform those functions which it can often do more cost effectively and efficiently. One of the key political drivers behind the PPP is the desire to improve the nation’s infrastructure and to support public services without placing undue strain on scarce public funds and without having to increase taxation.

There is no widely accepted definition of public-private partnerships. Broadly, PPP refers to arrangements between the public and private sectors whereby part of the services or works that fall under the responsibilities of the public sector are provided by the private sector, with clear agreement on shared objectives for delivery of public infrastructure and/ or public services.⁽³⁾

A public private partnership (PPP) may include financing, design, construction, operation and/or maintenance of infrastructure and/or provision of services by the private sector, which are usually procured and provided by the public sector. The PPP model yields benefits for both sides, provided that there is an effective combination of goals of the public and the private sector. It is important to recognise the circumstances where a PPP might be the best method for the delivery of a particular service or the construction of infrastructure in comparison to other traditional public procurement methods.

In many projects it is possible to use private sector funds and its management experience in the provision of services and the construction of infrastructure which would traditionally be funded and managed by the public sector. The basic concept of any public private partnership is simple: instead of funding and building a distribution network, kindergarten, public garage or other facilities and infrastructure on its own, which is followed by operation, maintenance and the provision of end services, the public sector concludes a long-term contract with the private sector which then performs all or part of the activities in place of the public sector that retains only its regulatory and supervisory function (such as the laying down of standards for the services rendered and the surveillance of conformity). This relationship could be executed as purely contractual, or in the form of a jointly owned separate legal entity. On the other hand, the private sector may collect a fee for the services rendered directly from the end user (and bear the risk of market demand) or from the public sector in the form of rent and the like (and bear the risk of availability of the facility/infrastructure). The private sector usually also undertakes the tasks such as maintenance, operation and similar tasks, and assumes the risks which the private sector can manage better.

Public private partnership is complementary to the conclusion of a contract between the public and the private sector which does not have as its objective the provision of public services. The objective of the latter is the privatisation of public goods or the encouragement of direct investments in market-oriented projects, therefore those two terms need to be distinguished.

Public private partnerships open up opportunities for private investments which can result in the realisation of projects that would otherwise – based on the classic (budgetary) funding – not be possible or that would require much longer periods of time for implementation, which is often not acceptable where certain public services or their adequate level should be provided promptly.

PPPs enable the private sector to use financial, business and other types of knowledge and skills and an innovative entrepreneurial approach in project implementation and management, which is sometimes the main reason to use the PPP model.

Preparation and implementation of PPPs is a lengthy and expensive process. Hence, the PPP model should be used only if the distribution of risk provides the public sector with lower aggregate costs over the entire agreed term of the project (greater value for money), or access to knowledge, skills and the like, which would otherwise not be available and which contribute significantly to the level of public services rendered. In order to fulfil the above criteria a series of preliminary studies (such as market research, investigative work to select locations, feasibility studies, sustainability studies, etc.) and the criteria for justifying the use of the PPP model should be drawn up.

⁽³⁾ Source: <http://ppp.worldbank.org/public-private-partnership/>
⁽⁴⁾ Source: <https://www.econstor.eu/dspace/bitstream/10419/56429/1/630589232.pdf>
Public-Private Partnership in Infrastructure Development Case Studies from Asia and Europe; pages 9-11.

2.1. WHY DOES IT MAKE SENSE TO ESTABLISH PUBLIC-PRIVATE PARTNERSHIPS?

It is increasingly clear that governments cannot meet the constantly growing demand for services by acting on their own, and that there is a need to look for support from other sectors of society. During periods of slow growth, government revenues are frequently not sufficient to meet spending demands, thus necessitating painful spending cuts or tax increases. Partnerships can provide a continued or improved level of service at reduced costs. By developing partnerships with private-sector entities, governments can maintain quality services despite budget limitations.

The public-private partnership (PPP) is one of the most promising forms of such collaboration. It is based on the recognition that both public and private sectors can benefit from pooling their financial resources, know-how and expertise to improve the delivery of basic services to all citizens.

2.2. WHAT ARE POTENTIAL SOCIAL BENEFITS OF USING PPP?

If properly designed and implemented, PPPs can bring real **benefits in terms of helping governments to finance infrastructure investment in a more efficient way, freeing up scarce resources to allocate them to other national spending priorities** (e.g. meeting citizen's basic needs in education or health care) and obtaining better value for money.

Important social benefits may be incorporated into a project. These can include quality criteria such as the frequency or cleanliness of services to be provided to citizens, or safety conditions, or measures to tailor the project to the specific needs of local or national communities. **It is up to the contracting authority to define in the contractual terms the results and social objectives it wishes to achieve.** Specifically for broadband, some examples of these objectives are discussed in the first part of this document.

2.3. ADVANTAGES OF PPP

The advantages of PPP in a competitive environment are considered as follows:

- to remove the responsibility of funding the investment from the government's balance sheet;
- to **introduce competition**;
- to adopt managerial **practices and experience of the private sector**;
- to restructure public sector service by embracing private sector capital and practices; and
- to achieve greater **efficiency** than traditional methods of providing public services. ⁽⁴⁾

Besides collective benefits in terms of management efficiency, quality of interventions and effectiveness of provided services, resorting to PPP can also enable the parties to overcome public spending and budget constraints induced by the European Monetary Union membership (extended at local level by the Stability and Growth Pact).

Furthermore, private partners' intervention in the financing and management of public projects enables the pursuing further aims such as:

- a) **upgrading and fine-tuning** of project evaluation methodologies via whole life costing techniques (i.e. infrastructure whole lifecycle) which enable the optimisation of capital account expenses;
- b) rigorous **estimate of benefits** that public operators can attain via partnership solutions alternative to traditional public financing (i.e. Value for Money); and
- c) the possibility to **transfer part of project** risks to private sectors in line with transparent, proportionate and ad-hoc patterns.

In PPP projects cooperation with the private sector can offer a number of advantages including:

- **Efficiency and higher quality process** of construction and operation of the infrastructure and provision of required services by entities of the private sector, compared with the public sector entities; usually the projected costs are not exceeded and the given deadlines are met;
- **Solution for limited disposable sources** of the public sector, where the capital power of the private sector entities can be sensibly used for the implementation of projects whose execution would not be possible without their partnership;
- **Acceleration of infrastructure provision** – PPPs often allow the public sector to translate upfront capital expenditure into a flow of ongoing service payments. This enables projects to proceed when the availability of public capital may be constrained (either by public spending caps or annual budgeting cycles), thus bringing forward much needed investment;
- **Strengthening public administration** resulting from the entrance of new purposively and economically thinking partners into the provision of public services to meet public interests and needs, thus shortening the process of decision-making and diminishing the rate of bureaucracy;
- **Faster implementation** – the allocation of design and construction responsibility to the private sector combined with payments linked to the availability of a service provides significant incentives for the private sector to deliver capital projects within shorter construction timeframes;
- **Reduced whole life costs** – PPP projects which require operational and maintenance service provision provide the private sector with strong incentives to minimize costs over the whole life of a project, something that is inherently difficult to achieve within the constraints of traditional public sector budgeting;
- **Better risk allocation** – a core principle of any PPP is the allocation of risk to the party best able to manage it at the lowest costs. The aim is to optimize rather than maximize the risk transfer to ensure that best value is achieved;
- **Better incentives to perform** – the allocation of project risk should incentivize a private sector contractor to improve its management and performance on any given project. Under most PPP projects, the full payment to the private sector contractor will only be made if the required service standards are being met on an ongoing basis;
- **Improved quality of service** – international experiences suggest that the quality of service achieved under a PPP is often better than that achieved by traditional procurement. This may reflect better integration of services with supporting assets, improved economies of scale, the introduction of innovation in service delivery, or the performance incentives and penalties typically included within a PPP contract;
- **Generation of additional revenues** – the private sector may be able to generate additional revenues from third parties, thereby reducing the cost of any public sector subvention required. Additional revenue may be generated through the use of spare capacity or the disposal of surplus assets;
- **Enhanced public management** – by transferring responsibility for providing public services government officials will act as regulators and will focus upon service planning and performance monitoring instead of the management of day-to-day delivery of public services. In addition, by exposing public services to competition, PPPs enable the cost of public services to be benchmarked against market standards to ensure that the very best value for money is achieved;
- **More benefits and satisfaction for the citizens** resulting from the utilization of private companies' know-how in applicable operational areas and from their distinct motivation generated by the possibility of long-term income while meeting all contractual terms and conditions concerning the quality of the provided services, whereby the required standard is continuously evaluated and controlled by the public sector;

From the macro-economic point of view the application of this type of projects means that a substantial part of the risk is transferred to the private entity, thus eliminating the need for state securities and enabling the decrease of the government budget deficit and public debt.

2.4. DISADVANTAGES OF PPP

There are also some disadvantages related to PPP projects:

- **slow preparation** of individual PPP projects, which may take up to two years if the preparation of the project is to be of a high standard;
- **absence of preliminary verifications** on PPP's actual convenience in terms of optimisation of Public Administration costs;
- Public Administrations' **inadequate capacity to report and interact with the private partner**, both in identifying respective contractual obligations and monitoring contract execution;
- **PPP projects prefer the economic aspects** of the project to the social, environmental or other aspects;
- **excessive trust in PPP solving capacity** as an alternative to poor availability of public resources;
- considerably **negative financial impacts** in case the partnership has to be cancelled;
- possible **transfer of risks** from the private sector to the public sector, e.g. risk of bankruptcy;

From the macro-economic point of view a substantial disadvantage lies in the fact that as a consequence of the long-term character of these projects mandatory expenses grow and the hidden debt arises. Since this debt will exist for many years it can affect negatively the fighting power of the future governments and burden significantly the future generations.

In general, **the most common misunderstanding about PPP is that it can be used for the projects that for economic reasons cannot be financed solely with public funding**. The contrary is true: PPPs require higher returns on investment since private investors demand returns that are measurable in direct financial results while some pure public investments are never financially repaid or they have positive effects on a wider economic and social tissue which cannot be attributed directly to a single beneficiary.

One of the often overseen risks is the lack of definition of the procedures to be undertaken in case of mis-behaviour by the private partner. In many cases, especially when private investments are involved, it is extremely difficult to protect the public interest if protection mechanisms are not built in the initial agreement terms.

The public partner should consider questions such as:

- What happens with the network if the private partner files for bankruptcy (as a part of the infrastructure is privately owned)?
- What can the public partner do in case the private partner doesn't maintain the promised performance levels?

Usually these issues can be resolved in contractual agreements, but they must be foreseen at the very beginning.

2.5. WHAT EXPERTISE IS REQUIRED FROM THE PUBLIC PARTNER TO EXECUTE A PPP?

Most PPP projects require a level of technical, financial and legal expertise not available through municipal staff. Therefore, as "EPEC Guide to PPP" suggests, **it is important to attract experts from different fields of expertise** who can provide guidance and information that allows informed decision-making (consultants often have the advantage of experience with similar projects and circumstances and can "steer" a client away from pitfalls). They also **provide independent advice, considering both the public and private perspective**.

This is valuable in setting attainable goals, preparing the request for proposal, carrying out contract negotiations and in dispute resolution. Perhaps most significantly, consultants provide the expertise necessary to achieve an even playing field in discussions and negotiations with the proposers who thus obtain sophisticated and highly experienced assistance.

2.6. HOW TO IDENTIFY A SUITABLE PPP PROJECT?

PPP is a method of procuring more effective investment and service delivery, not just for public services but also for the operations of the public administration. However, not all areas of investment in public service improvement are susceptible to the PPP methodology.

Experiences of EU countries have shown that potential PPP projects should conform to the following characteristics:

- The **investment** required – in particular for pilot projects – should not be of a small amount. This is because the complexity and expenses involved in launching such projects using proper public procurement procedures are only justified for larger-scale projects. Expenses related to PPPs differ from case to case, but based on direct experience the lowest reasonable value for a PPP to be viable is around 100.000 EUR.
- The **assets and services** required should be those that the private sector is capable of supplying, and there should be an actual or potential competitive market for such supply, for example public lighting projects, tunnels, bridges and telecommunication networks.
- Projects should **not** have a **high technology content** nor require technology that is not readily available on a competitive basis.
- The **Public Authority** proposing a PPP **should be able to specify in output or outcome** terms the scope and scale of its needs for the life of the project, or to choose the most appropriate public procurement process to clarify the scope and scale in this process before assigning the contract (for example by using the competitive dialogue).

The project proposal should be justified by a detailed analysis of needs and arguments for the suitability of the PPP approach. This is frequently called the Business Case. It is essential that the Business Case is well argued and receives the formal approval of senior governmental/political authorities before a PPP project be put out to the formal tender.

Considerations for choosing the PPP route rather than the conventional one should include:

- **Previous experience** in any similar projects under conventional procurement (especially performance shortfalls, cost or time overruns)
- Analysis of quantifiable and unquantifiable costs and benefits of possible solutions to the investment need (including a “do minimum” option)
- The **level of investment required** at the outset and how it is likely to be funded under a PPP
- The **required performance standards** and how these will address the project’s objectives and how they will be measured
- The **flexibility** required of both assets and services over time
- Whether any **technology** that will have to be deployed is subject to rapid change or is in restricted supply
- Whether any **user charges** are to be levied, and if so how they will be set and collected
- The proposed **term of the PPP** contract and the relative advantages/disadvantages of shorter or longer terms. ⁽⁵⁾

⁽⁵⁾ **Note:** the EU Public procurement act poses some limits (or prescribes other types of processes) to the possibilities to use PPP which are transferred also to national regulations. <http://www.pppcentralunit.mof.gov.sg/SiteCollectionDocuments/PPPCU/Site/General/Chapter1.pdf>

2.7. HOW TO MAKE THE BUSINESS CASE FOR A PPP INVESTMENT?

The **Business Case** should be the formal analysis document that justifies the project and the PPP procurement route. It is likely to be presented to sponsoring and budgetary ministries as well as to political authorities. It will be a document of record, potentially subject to audit scrutiny. Its existence and approval at the appropriate governmental level will be a key factor for encouraging potential partners to tender for projects.

The **Business Case** is a detailed exercise which is likely to take some months of careful preparation and will frequently require input from external experts. **It should address the following:**

- The need for and nature of the proposed investment
- Options for investment and why the PPP route is proposed
- The risks and implications of the project as a PPP
- Estimates of annual cost and considerations of affordability
- Timing and preparedness for PPP procurement.

As part of the business case, the income to the public partner from the project is an issue to be carefully addressed.

For the EU members, no profit (or net revenue, as mentioned in other EU documents on the matter) **should be generated by a project where public funding has been used** (currently as per Article 55 of EU Regulation 1083/2006). In this regard reasonable profit is admissible, depending on the industry within which the project is executed.

Similarly, the public partner should not generate excessive incomes from the project (also because the claw-back mechanism would be applied in such cases).

There should however be at least some return to the public partner:

- In case of successive investments needed from the public partner to maintain the infrastructure operative and efficient (e.g. in case where the active network equipment is owned by the public partner and this equipment must be replaced every 7 years), the income to the public partner should cover at least the depreciation of such equipment (to enable enough resources to be generated from the operation and thus avoid external public funding);
- The income may be requested also for VAT (value added tax) reasons. VAT is usually non-refundable by public sources if it can be re-collected through the VAT system. As telecommunications are a commercial activity, in most cases the public partner should apply to enter the VAT system to avoid market distortion. In this way, during the investment phase VAT is not a financial expenditure as it can be directly compensated through the VAT system, but this could be done only if the economic activity on the public partner's side is to be performed with the funded infrastructure. And the economic activity means that income to the public partner should be granted.

2.8. WHAT IS THE DIFFERENCE BETWEEN CONVENTIONAL AND PPP PROCUREMENT?

2.8.1. Conventional procurement is based on input specification

Under conventional procurement, a public sector institution prepares detailed specifications that describe the works required to deliver the necessary **goods or services**. The works are then put out to tender in order to get the most competitive priced bid. Once the contract is awarded, the client (or its representative) closely supervises the works carried out by the successful partner in order to ensure compliance with the specifications. Thus the client assumes the responsibility for designing and planning the project, fulfilling all statutory requirements (such as environmental permits, heritage approvals, town planning requirements, etc.) and covering any additional

costs that may arise due to unforeseen circumstances or elements that were omitted from the tender. The partner is responsible for the construction of the works in accordance with the tender documentation and is thus only responsible for matters covered in the tender documentation or those which could reasonably have been foreseen from the tender documents. Conventional procurement is based on input specification where the Institution decides what it wants in order to deliver a service and takes full responsibility for all works related to the delivery of the service.

2.8.2. PPP procurement is based on output specifications

When assessing a project through a PPP process it is crucial to define the **desired functionality or result** for procurement **on the basis of output specifications. Here, the client defines the service that is required.** These output specifications are then included in a financial model to allow for comparability between the two forms of procurement: public and private. Should the PPP option be preferred, the client leaves certain design stages of the works necessary to deliver that service up to the partner that will be selected through the bidding process. In some circumstances, due to policy or strategic reasons the design requirements may not be left entirely to the discretion of the partner and in these cases the client may specify some inputs. The preferred approach however is to ensure that projects are driven substantially to the private party and thereby ensure greater value for money for the Government.

2.9. DIFFERENT PPP MODELS

According to the EPEC PPP Guide, we can divide the PPP projects into five different models:

- Public DBO (Design, Build, Operate);
- Private DBO;
- GOCO (Government Owned, Contractor Operated);
- Joint-venture;
- Bottom-up.

2.9.1. PRIVATE DBO

Short description

The private design, build and operate (DBO) model involves a private sector organisation receiving some level of public funding (often a grant) to assist in its deployment of a new network offering open wholesale access. Critically, in this model the public sector has no specific role in the ownership or running of the network, but it may impose obligations relating to either of these in return for the funding.

Advantages of private DBO model

It is more suitable for funding widespread deployments than the bottom-up model, as the public funding (grant) can be given to an established commercial operator to deploy and operate the network.

It imposes only a limited burden on the public sector, which is not involved in the running of the network. This in turn can lead to faster deployments than other funding models.

The cooperative or partnership organizations are unlikely to have specific expertise in telecommunication networks, and so high-cost turnkey solutions may be required.

It has a number of advantages for the private operator, particularly because ownership of the network assets is likely to prove valuable in the long term.

Disadvantages of private DBO model

It is essential that the available funding is sufficient to attract interest from private operators, as significant funding may be required to make a viable business case for deployment, especially in rural areas.

As the Managing Authority has limited on-going control, the social benefit that the public sector is looking to create may be restricted if the private operator has little interest in delivering social benefit and instead focuses on generating a financial return (although this can be offset by the terms of the agreement).

public sector continues to have more of a stake), the private entity continues to share some portion of financial exposure with the public sector throughout the project. An additional risk premium will be included by potential private partners when they determine the funding requirements for the project.

Overall, the private DBO model should be used for larger-scale investments than the bottom-up model, where sufficient funding is available to attract interest from operators to work in rural areas, and where the operations (and risk) of the network can be effectively transferred to an operator with little on-going control from the Managing Authority.⁽⁶⁾

2.9.2. PUBLIC DBO

Short description

A public DBO model involves the Managing Authority operating without any private sector intervention, except at a service provider level (involving either wholesale or retail service providers). All aspects of network deployment and operation are managed by the public sector. A network company is formed by the Managing Authority and typically offers wholesale services, with the potential to offer retail services (although this is not common).

Advantages of public DBO model

This model allows the Managing Authority to retain the property and the control of the network and may have benefits such as: ensuring that social capital targets are given a high priority, ensuring that there are no conflicts of interest in achieving effective competition, and enforcing common technical standards.

This model is also suitable when the Managing Authority does not have confidence in the available legal mechanisms (e.g. competition regulations) for ensuring effective competition.

Disadvantages of public DBO model

Sole ownership of the network by the Managing Authority increases its exposure to the risk of a failed venture. Organisations set up in this manner may struggle to meet targets (e.g. for coverage and take-up), which may be due to a lack of commercial and technical expertise (which few public sector organisations possess). The public will be aware that its money is being spent, and if any failings receive substantial publicity this could result in a loss of confidence in the project.

Networks deployed under this model may be limited in size and scope due to the finite amount of expertise held within the Managing Authority. Therefore the ability for investment under this model to provide widespread network coverage may be reliant upon the network providing a catalyst for other investments.

The model may potentially exclude certain aspects of private sector expertise, which could be valuable in ensuring the efficient deployment and operation of the network. More broadly, this model does not exploit the economies of scale and scope that private sector operators can bring.

Overall, the public DBO model should be used where a Managing Authority needs to have absolute control over the operations of the network (perhaps to ensure competition), or where the Managing Authority is confident that a targeted public DBO investment will inspire investment from other sources.

Although examples of the public DBO investment model can be found across Europe, its primary use appears to be for relatively small-scale deployments (e.g. those confined to a single city or to provide core/backhaul connections between different towns).⁽⁷⁾

⁽⁶⁾ Source: http://ec.europa.eu/regional_policy/sources/docgener/presenta/broadband2011/broadband2011_en.pdf
Guide to broadband investment 2011, pages 42-47

⁽⁷⁾ Source: http://ec.europa.eu/regional_policy/sources/docgener/presenta/broadband2011/broadband2011_en.pdf
Guide to broadband investment 2011, pages 42-47

2.9.3. GOCO

Short description

Government-owned-contractor-operated (Public outsourcing). Under a public outsourcing model a single contract is awarded to a private sector organisation, covering all aspects of the design or construction of the network. The key characteristic of this model is that the network is built and operated by the private sector, but the public sector retains ownership and some control of the network.

Advantages of public outsourcing model

It is able to leverage the stability of the Managing Authority and the commercial and technical acumen of the private sector on an on-going basis.

The public sector retains ownership of, and a large degree of control over, the network infrastructure.

Disadvantages of public outsourcing model

Next-generation broadband networks can typically take 10 to 15 years or more to achieve return on investment, and the fact that public network outsourcing agreements typically revert to public operational control after 10 or 20 years (or at least must be outsourced again under a new contract) could reduce the incentive for some private companies to invest.

The outsourcing relationship can create an added layer of bureaucracy between the private operator and the Managing Authority.

Depending on whether the public outsourcing arrangement is facilitated by a legal framework, the provisions of that framework may impose unfavourable constraints on the operation of the project (e.g. constraining investment in the future).

Overall, the public outsourcing model should be used for widespread deployments where the Managing Authority requires a high level of control over the network, and where the private operator prefers the risk profile of greater financial stability but a lower potential return than that offered by the private DBO model.⁽⁸⁾

2.9.4. PPP JOINT VENTURE

Short description

A joint venture is any agreement where ownership of the network is split between the public and private sector. Construction and operational functions are likely to be undertaken by a private sector organisation.

Advantages of joint venture model

A joint venture has a number of advantages over a public outsourcing arrangement as both parties are able to maintain a long-term financial stake in the network. Some Managing Authorities may be reluctant to relinquish full ownership of the network as they may see long-term strategic value in owning the assets.

The joint venture model offers the ability to broadly balance the interests of the public and private sectors and also balance the sharing of risk. Indeed some forms of joint venture have required the private partner to increase its stake in the project when certain key performance indicators are achieved (such as take-up), which represents a form of risk-sharing arrangement.

This model often features the creation of special-purpose vehicles (SPVs). These SPVs can be of almost any size, which makes the model very scalable (i.e. from local communities to sub-national regions). The SPV mechanism also allows investment to be gathered from comparatively innovative sources, such as institutional investors.

Disadvantages of joint venture model

With two stakeholders in the network each with different interests, it may be difficult to align those interests and set up and/or continue the operation of the joint venture. Overall, the joint venture model should be used only where the interests of the public and private sectors can be closely aligned.⁽⁹⁾

2.9.5. THE BOTTOM UP APPROACH

Short description

The bottom-up, or local community, model involves a group of end users (comprising local residents and/or businesses) organising themselves into a jointly owned and democratically controlled organisational group (frequently a co-operative) capable of overseeing the contract to build their own local network. In this model it is likely that the public sector has no role in owning or running the project, but rather passes the funding to the group itself to oversee the investment project. Given the composition of the local group it is likely that the day-to-day running of the network will be outsourced to a telecoms operator with the necessary expertise. We have identified example projects which have implemented bottom-up models from both a local point of view and also as part of larger-scale (regional) initiatives. Bottom-up funded projects tend to be of a smaller scale than projects that use the other funding models outlined below.

Overall, the bottom-up model should be used for targeting localised areas and for gaining the most benefit from small amounts of funding.

Advantages of bottom-up model

As the investment is generally undertaken by non-profit organisations comprising end users, it is usually considered on a long-term basis and so high-bandwidth infrastructure (such as fibre to the home) can be deployed which provides the highest level of future-proofing. Co-operative organisations have the effect of generating and aggregating demand in an area, which ensures that maximum social benefit is derived from the investment, even if only a small amount of funding is available.

Disadvantages of bottom-up model

This approach may not be suited to providing widespread coverage, as individual projects can be very localised. This may mean that some areas are missed out and those networks that are built have differing technical standards, which may mean that competition from other operators is limited.

The co-operative/partnership organisations are unlikely to have specific telecoms network expertise, and so high-cost 'turnkey' solutions may be required. If the funding is to come from the end users themselves, then producing this funding upfront may create a barrier. In this case, the public sector can help by guaranteeing or underwriting loans. Overall, the bottom-up model should be used for targeting localised areas and for gaining the most benefit from small amounts of funding.⁽¹⁰⁾

⁽⁸⁾ Source: http://ec.europa.eu/regional_policy/sources/docgener/presenta/broadband2011/broadband2011_en.pdf
Guide to broadband investment 2011, pages 42-47

⁽⁹⁾ Source: http://ec.europa.eu/regional_policy/sources/docgener/presenta/broadband2011/broadband2011_en.pdf
Guide to broadband investment 2011, pages 42-47

⁽¹⁰⁾ Sources: http://ec.europa.eu/regional_policy/sources/docgener/presenta/broadband2011/broadband2011_en.pdf
Guide to broadband investment 2011, pages 42-47, <http://www.eib.org/epec/q2q/>

2.10. WHAT ARE THE CHARACTERISTICS OF PROCUREMENT PROCEDURES?

The comparison of procurement procedures (aligned with the EU regulations):

	OPEN PROCEDURE	RESTRICTED PROCEDURE	NEGOTIATED PROCEDURE	COMPETITIVE DIALOGUE
POSSIBILITY TO LIMIT THE NUMBER OF BIDDERS	No prequalification or pre-selection is permitted. Any interested company may submit a bid.	The number of bidders may be limited to no less than five in accordance with criteria specified in the contract notice (prequalification and short listing permitted).	The number of bidders may be limited to no less than three in accordance with criteria specified in the contract notice (prequalification and short listing permitted).	The number of bidders may be limited to no less than three in accordance with criteria specified in the contract notice (prequalification and short listing permitted).
DISCUSSIONS DURING THE PROCESS	The specifications may not be changed during the bidding process, and no negotiations or dialogue may take place with the bidders. Clarification is permitted.	The specifications may not be changed during the bidding process, and no negotiations or dialogue may take place with the bidders. Clarification is permitted.	Negotiations are permitted throughout process. Successive stages can be used to reduce the number of bidders (further short-listing).	Dialogue with the bidders is permitted on all aspects (similar to negotiated procedure, including further short-listing). When the dialogue is concluded, final complete bids must be requested based on the solution(s) presented during the dialogue phase.
DISCUSSIONS AFTER THE FINAL BID IS SUBMITTED	No scope for negotiations with the bidder after bids are submitted.	No scope for negotiations with the bidder after bids are submitted.	Not relevant because the negotiations can continue until the contract is agreed. No 'final bid' as such is required.	Only permitted to clarify, fine tune or specify a bid. No changes are permitted to the basic features.
THE BASIS FOR AWARD	The lowest price or the most economically advantageous tender.	The lowest price or the most economically advantageous tender.	The lowest price or the most economically advantageous tender.	The most economically advantageous tender

The 5th methodology – that does not fall within public procurement by definition but is often used since telecommunication infrastructure can be seen as public utility service – is concession.

A concession gives an operator the long term right to use all utility assets conferred on the operator, including responsibility for all operation and investment. Asset ownership remains with the authority. Assets revert to the authority at the end of the concession period, including assets purchased by the operator. In a concession the operator typically obtains its revenues directly from the consumer and so it has a direct relationship with the consumer. A concession covers an entire infrastructure system (so it may include cases when the operator takes over existing assets or builds and operates new assets).

Specific characteristics of concession are:

A concession gives a **private operator responsibility** not only for operation and maintenance of the assets but also for financing and managing all the required investment.

The operator assumes the risks related to the condition of the assets and to the investment. A concession may be granted in relation to existing assets, an existing utility, or for extensive rehabilitation and extension of an existing asset (although often new build projects are called concessions). A concession is typically concluded for a period of 25 to 30 years (i.e. long enough at least to fully amortize major initial investments). Asset ownership typically rests with the awarding authority and all rights in respect to those assets revert to the awarding authority at the end of the concession.

General public is usually the customer and the source of revenue for the operator.

Often the operator will be operating the existing assets from the outset of the concession - and so there will be immediate cash flow available to pay the operator, set aside for investment, service debt, etc.

Unlike most management contracts, **concessions are focused on outputs**, i.e. the delivery of a service in accordance with performance standards. There is less focus on inputs, i.e. the service provider is left to determine how to achieve the agreed performance standards, although there may be some requirements regarding frequency of asset renewal and consultation with the awarding authority or regulator on such key features as maintenance and renewal of assets, increase in capacity and asset replacement towards the end of the concession term.

Some infrastructure services are deemed to be essential, and some are monopolies. Limits will probably be placed on the operator by law, through the contract or through regulation of tariff levels. The operator will need assurances that it will be able to finance its obligations and still maintain a profitable rate of return and so appropriate safeguards will need to be included in the concession agreement or in legislation.

In many countries there are sectors where the total collection of tariffs does not cover the cost of operation of the assets let alone further investment. In these cases, a clear basis of alternative cost recovery will need be set out in the concession, whether from general subsidies, from taxation or from loans from government or other sources. ⁽¹¹⁾

2.11. WHAT SHOULD A PPP CONTRACT CONTAIN?

As laid down in EU rules on concessions and public-private partnerships, a PPP draft contract shall contain at least the following topics:

- the **rights and obligations** of the parties;
- **risk allocation** (this is usually achieved through setting out events which give the PPP Company a right to some compensation);
- **service performance standards and targets** which need to be objective and measurable;
- the **procedure** for permitted modifications as well as their scope and nature;
- **payment mechanisms** (e.g. tariffs, subsidies, grants) and adjustments to payments in response to various contingencies;
- **penalties** (and possibly bonuses) which have financial consequences or give rise to warning notifications (eventually leading to termination of the PPP contract);
- **security and performance bonds**;
- **project insurances**;
- the **term** of the PPP contract;
- the **conditions for termination** (categorised by party and type of event) and compensation upon termination (for each type);
- **step-in rights** (both for lenders and, in emergency situations, the Authority);
- the definition and impact of **force majeure** and **changes in the law**;
- the **dispute resolution** procedure; and
- other rights, obligations and responsibilities of the parties.

⁽¹¹⁾Source: <http://ppp.worldbank.org/public-private-partnership/agreements/concessions-bots-dbos>

A PPP contract shall contain at least the following appendices concerning:

- Standards of the services,
- Table of risk allocation,
- Guarantee for execution of the contract,
- Guarantee of the parent company for the special purpose vehicle, and
- Financial model

Other provisions of a PPP contract which are not listed above can be freely agreed upon between the parties in accordance with the laws regulating contractual obligations.

If a concession has to be awarded for the purposes of implementing a PPP project, the contents of the PPP contract shall be also governed by the regulations on concession.

In the past, practice was often limited to including a summary of the main commercial terms of the PPP contract with the invitation to tender. Nowadays, it is considered best practice to prepare and issue a full draft PPP contract with the invitation to tender. To avoid repetition and manage market expectations, many jurisdictions have developed standard contracts which set out key contractual clauses and guidance for public authorities in drawing up PPP contracts. **Legal advisers should be involved at all stages in preparing the full draft PPP contract.**⁽¹²⁾

Basic criteria for the approval of a PPP project are:

- PPP project proposal shall be in **accordance with the definition of PPP**;
- Public body shall be authorized to propose PPP projects;
- Public Sector Comparator (PSC) shall express **positive value for money**;
- **Ownership of public body over public infrastructure**, which is the subject matter of PPP project, shall be provided;
- **Contractual term of 5 to 40 years**, or exceptionally longer, shall be provided. For telecommunications, the EU posed some recommendations in the recent Guide for broadband investment, that at list a 7 year period should be granted to the private partner (to give the possibility to repay the initial investment). Imposing a too short period could deter private partners, perhaps a good practice is to use this as one of evaluation criteria (shorter is better). Additional limitations about these terms are usually defined in national legislations regulating this field.

Other criteria for the approval of public private partnership proposal:

- PPP project proposal shall be in accordance with the documents of physical planning for the area in which the project is intended to be implemented;
- **Property-law relations** on the real estate on which the PPP project is intended to be implemented are solved or shall be solved in due time;
- **Compensation and revenues** derived from the performance of commercial activities, if such are envisaged, shall be **sufficient for the settlement of total costs and outflows** during the term of the contract, as expressed in the Public Sector Comparator (PSC)

⁽¹²⁾Source: http://ec.europa.eu/internal_market/publicprocurement/partnerships/public-private/index_en.htm

3. DEFINING THE RIGHT BUSINESS MODEL

Defining the most appropriate business model upon which to build a PPP is not an easy task. In general terms, it's a good practice not to impose one before consulting experts and/or potential private partners.

Most of the solutions are PPP/technology/case specific, but there are some issues that must be considered in any case.

3.1. RISK MITIGATION

As a general rule, in a PPP project, the **risk is distributed between the partners according to their participation in the investment**; however, as the public partner has none or only a small possibility to influence the private partner's decisions, this could pose some serious risks to the public side. Depending also on national regulations **maximum care must be taken for reducing and/or excluding the possibility for the public partner to claim operating debts**.

Other emerging risks from the partnership include:

- Risk of **losing property rights** - limitations on how the private partner can exercise property on the network must be set;
- Risk of **covering financial operating costs** – has to be defined in the PPP contract;
- Risks associated with the **financial capacity of the private partner** to service its overall operations, i.e. the private partner may become bankrupt. Special care must be given to this case (depends on national regulation). The procedures on how the concession for running the network will be re-assigned and what happens with the rights of the initial private partner (the rights of the private partner are considered immaterial assets) must be defined.

3.2. PROFIT GENERATING PROJECTS

Unfair market position of the private partner could result from the operation. There is extensive documentation at the EU level dealing with state aid and reasonable profit.

3.3. STATE AID ISSUES

As discussed above, public funding almost always includes issues concerning state aid. This problem should not be underestimated. **If a country decides to employ public funds the best solution is to do a national broadband state aid scheme. Attention: errors or incomplete statement of what is the intended operation** (what models, what risks, what costs and so on) **could lead to successive problems**, as someone could claim their rights because of market mechanism deviations.

3.4. (SELF) SUSTAINABILITY OF THE BUSINESS MODEL

Sustainability of the business model is the initial condition. Projects that are not sustainable cannot be initiated. Broadband projects in the EU have demonstrated a high level of creativity in terms of business models.

As a general rule, financial issues must be worked out, the financial frame must be set and the risk for the public partner must be as low as possible.

3.5. AFFORDABILITY PRE-ASSESSMENT

Affordability relates not only to the financial balance of the PPP arrangement, but also to public expenditure items in general. **A PPP project is considered to be affordable if the public expenditure associated with it can be accommodated within the public sector's budget ceiling over time.**

3.6. RISK ALLOCATION AND MANAGEMENT PRE-ASSESSMENT

At the project identification stage, in addition to assessing the sources of revenue linked with the affordability of the project, the public partner needs to undertake a broad assessment of the risks that arise from the project requirements in order to manage them.

3.7. BANKABILITY

A PPP project is considered bankable if lenders are willing to finance it.

3.8. BUSINESS MODEL PRE-ASSESSMENT

A robust and accurate business plan is needed in order to prove the viability and profitability of the project. Commission's (or other national public partner authorities for non-EU members) assessment will mainly consist in analysing whether the injected capital can allow for a normal market return. If capital injections by a public investor disregard any prospect of profitability, even in the long term, such an injection constitutes State aid within the meaning of Article 107 TFEU (and according to the concerned national legislation of the non-EU member countries)

Among other conditions, it is necessary to establish a pricing policy that is justified on commercial rather than on policy grounds envisaging a relevant participation of private partners in the venture on equal terms with the public investors.

In the specific Amsterdam case which has been described in the Guidelines for financing broadband projects, the Commission also pointed out that for pure infrastructure projects the appropriate repayment period might be longer and the return on investment might be lower than those required by the market for integrated telecom projects. The Commission accepts the principle that the business model of a 'utility' company involved in pure infrastructure provision would be different from that of a telecom operator investing in a network and providing electronic communications services to end-users.

A second distinctive element of the Amsterdam project emerges from the business plan related to a newly formed undertaking with no track record, acting in a new and innovative business segment (FttH technology, "three-layer model", where passive and active infrastructures are operated and managed separately with an open and non-discriminatory access offered to all retail operators). The assessment of a business plan of a newly formed entity like the one in the Amsterdam case is a necessity inevitably based on future market projections and hypotheses regarding the likely evolution of demand and supply of fibre-to-the-home services.

3.9. VALUE FOR MONEY PRE-ASSESSMENT

A PPP project yields value for money if it results in a net positive gain to society which is greater than that which could have been achieved through any alternative procurement route. It is a good practice to carry out a value for money analysis (essentially a cost-benefit analysis) as part of the initial preparation of the project, regardless of whether it is procured conventionally or a PPP is used.

In the case of a PPP model (any type of PPP model) it is essential that the CBA analysis of the project emphasises the need for a public investment that could justify public funds. The financial gap requirement thus substantially limits the influence of the net positive gain for the society in the CBA analysis. Nonetheless, public entities are strongly recommended to use quantified socio-economic analysis for the net positive gain to society.

3.10. WHAT IS CLAW-BACK MECHANISM

When the calculations of operating costs and revenues are done certain assumptions must be made. It is necessary to evaluate the prospective take-up rate (effectively connected users: all potentially connected users), the take-up speed (how fast we will get the users), churn rate (how many users will leave the network), demographic trends, etc. If these assumptions are proven wrong in a later phase of the project, there might be a case where effective net revenues of the project might be higher than the initially calculated ones. In these cases a claw-back mechanism is imposed by the EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks (2013/C 25/01).

The term is connected to the state aid concept and consists of procedures on how to recalculate the over-payment (due to higher net revenues than initially calculated) and return the unjustified sum to the funding authority.

There are some measures that can be used in the project preparation phase which can reduce the risk of the claw-back mechanism:

The first set of measures concerns the proper evaluation of the initial assumptions. The other extreme is even more dangerous, because overestimating net revenues might lead to non-sustainability of the project at a later stage.

Another set of measures for preventing the claw-back mechanism regards the pricing model for the OAN services, described in the first part of this document.

The claw-back issue must be considered with great care when defining the elements that impact revenues and all costs of the project. Depending on a PPP model and results following the model choice, only the real costs and revenues must be included in all the calculations. In some cases the income of the public funding beneficiary is limited only to the small part that is received from service providers. For example: in case of GOCO the income to be considered in the calculation is only the concession or the rent that the private partner pays for the use of the infrastructure.

3.11. WHAT DOES VALUE FOR MONEY STAND FOR?

The term Value for Money (VfM) stands for the optimal combination of overall project costs and the quality of provided services to meet the user's needs – i.e. achieving the set objectives through the optimal use of available resources. PPP VfM stands for the administration financial benefit resulting from such operation. VfM verification by Public Administration should be the assumption for a start-up of PPP operations. In such a context, before soliciting private investor's market, Public Administration should verify:

- whether PPP usage is more convenient than traditional procurement procedures;
- whether possible PPP proposals would actually optimise the costs borne by the public sector and, in the presence of various proposals, identify and select the most advantageous one.

PPPs should be used where they can offer superior value for money relative to other procurement methods. It should be noted that, as with other procurement methods, the lowest priced option does not necessarily represent the best value for money.

Value for money is determined through a comparative analysis of the benefits, costs and risks of the available procurement alternatives. Assessing the value of these variables requires a degree of judgment and the use of both quantitative and qualitative analysis. The PPP principles establish the parameters for conducting an appropriate analysis.

Value for money refers to the best available outcome after taking account of all benefits, costs and risks over the whole life of the procurement.

3.12. ECONOMIES OF SCALE AND PROJECT GROUPING

When it comes to projects of lower capital value, it is **good to consider the possibility of grouping several similar projects in one area or several similar projects in a wider area by including several public authorities (clients) to form a group of projects.** In this way the economies of scale result in lower unit costs of the investment. In this process it is necessary to coordinate the positions and interests of different public clients. In case of a relatively complex group of projects, a greater value of the investment will attract investors having greater technical, financial and logistical capacity, which will certainly increase the overall efficiency of the delivery of public infrastructure facilities. This efficiency can be divided within the community of public clients. Furthermore, the risks to be transferred to a private partner can easily be identified, and if a private partner who can effectively manage these risks is identified the PPP model will be suitable. If the standards of public services and risks cannot be easily defined and if there are assumptions that the transfer of risk would not achieve the optimum solution, the PPP model will not be suitable for delivery.

3.13. COMMERCIALIZATION POTENTIAL

It is certainly necessary to identify the potential commercialization of public infrastructure facility because a higher degree of commercialization decreases the total payments from the budget of the public client. Here the term additional commercialization involves the exploitation of the facility during the period not contracted for the delivery of basic public services. For example, it is useful to consider the possibility of using the premises of primary or secondary schools in the evening (after the delivery of all contracted educational services) for commercial purposes, e.g. different types of evening schools, education of the elderly, various commercial courses, using the leased sports gym according to specific scheduled terms etc. Here it is important to assess whether the effect of commercialization will be greater if it is managed by a public authority or a private partner.

3.14. MARKET POTENTIAL

It is of particular importance to realistically assess the market situation since that assessment is also used to assess the assumptions of the future projection of project activities. First of all, it is important to determine whether there are several investors interested in the investment and what are their skills and knowledge in managing specific project risks. A greater number of investors will result in a higher competition effect. Furthermore, it is important to assess the potential price of the funding sources (if the borrowing is performed by a public authority – traditional model, and if the borrowing is performed by a private partner – PPP model) and to gather information about the maturity of the funding sources and the contracted currency. In order to provide more efficient information about those parameters it is appropriate to **organize the so-called “Open Day” where the project and its deliverables are presented to the interested investors and creditors.** The questions asked at this stage can be of great importance during further project preparation and decision making on the model of delivery.

3.15. CAPACITY OF ASSUMING LONG-TERM COMMITMENTS

Every investment in public infrastructure facility obviously implies the acceptance of long-term commitments, regardless of whether it involves annuity (in case of traditional model) or compensation for utilization (in case of

PPP model). Therefore, at this stage it is especially **important to identify basic legal requirements associated with the capacity for assuming long-term commitments**. It is important to establish the capacity for assuming the commitments and to what extent it has already been utilized. Of course, for efficient management of long-term commitments it is not enough only to rely on legal debt capacity. It is important to calculate the economic and the actual capacity of assuming long-term commitments, i.e. the long-term payment capacity (Public Private Partnership Agency, 2012c). Depending on the result obtained attention can be focused on the selection of a delivery model.

4. CHOOSING A SUITABLE PPP MODEL

This section is the result of the work of a group of experts coming from 9 different countries, both EU and non-EU states.

After an intense period of group work and peer review of the work of the other colleagues it was agreed that out of the 15 possible cases, 9 were most plausible/applicable in practice.

PPP4Broadband Matrix	PRIVATE DBO	PUBLIC DBO	GOCO	PPP Joint-Venture	Bottom up
BASIC Broadband	X	X		X	
NGA Broadband		X		X	X
ULTRA FAST Broadband	X		X		

4.1. THE MODEL STRUCTURE

Based on the above information 9 specific PPP models were created (separate documents), each accompanied by a calculation in an excel spreadsheet. **The models must be adjusted to the specifics of national legislations and regulations.** Thus some parts of the structure are missing/empty, as they are mostly country-specific.

The models are built upon the “EPEC Guide to guidance; How to prepare, procure and deliver PPP projects” structure as follows:

4.1.1. Model definition and project identification

- PPP project output definition that includes:
 - Overall specification of the output;
 - Technical design of the output;
 - Quality of the output.
- Pre-Assessment Matrix that includes:
 - Affordability pre-assessment;
 - Risk allocation and management pre-assessment;
 - Business model pre-assessment;
 - Value for money pre-assessment.

4.1.2. PPP4Broadband model assessment

- PPP4Broadband model affordability (business model) template including:
 - a part for the investment financing
 - a part for operating and maintenance financing

A template for the calculation worksheets is also provided.

4.1.3. PPP4Broadband model Risk allocation

- Risk identification for the proposed PPP4Broadband model
- Risk assessment for the proposed PPP4Broadband model
- Risk allocation:
 - How to mitigate risks in a given PPP4B Model
 - How to monitor identified risks during PPP4B Implementation

4.1.4. PPP4Broadband model CBA

- The frame for Cost Benefit analysis customised for selected PPP4Broadband model including the tables for the Public Sector Comparator (PSC) of CBA.
- PPP4Broadband treatment based on ESA95

4.1.5. PPP Project tender preparation

- PPP4Broadband procurement model
- Procurement definition - Each PPP4B Model must use 1 single procurement procedure (from 4 possible: open restricted, negotiated, competitive dialog) + concession. We suggest some procedures that may be appropriate, but the public partner should make the choice on the basis of national specifics.
- PPP4Broadband detailed project timeframe
- Based on the selected procurement method and national legislation a detailed timeframe for the PPP project procurement will be developed by each partner. The project timeframe may vary from country to country while in some cases it may be the same for more PPP4Broadband models in one country.
- Broadband draft contract
- The contents are defined in the model, but the contracts must follow national legislation in (at least) the following aspects:

4.1.6. PPP procurement process

- The content of the procurement notice based on the EU directive for the selected procurement process is given in the model, to be further developed during national customisation.
- The draft content of the recommended technical qualification criteria which have to be fulfilled by shortlisted bidders to ensure that they possess the capacity to implement the PPP project is included in the model.
- Shortlisting
- Final pre-qualification report
- Procurement process
- The draft content necessary to set up the procurement process is included in the model. The exact structure and content is subject to national legislation.
- Final procurement report

4.2. RECOMMENDATIONS REGARDING THE MODELS

Our aim is to structure our recommendations based on the same logics as that used to distinguish the models. Which models are more suitable according to the capacity level?

The possible capacities have been divided into the following three groups in line with the recent EU Commission document:

- Basic networks with capacities up to 30Mbps,
- Next generation access networks (NGA) with capacities from 30Mbps to 100Mbps and
- Ultra-fast networks with capacities of 100Mbps and above.

4.2.1. The aspect of capacity

According to official development recommendations, public funding should be – as a general rule – increasingly focused on NGA and Ultrafast networks as only they enable the necessary performance for the future.

Furthermore, the draft Regulation that is being approved in the European Parliament (register.consilium.europa.eu/pdf/en/13/st10/st10201.en13.pdf) and more specifically deals with the definition of broadband for future BB projects that will be entitled to EU funds and other aid measures is based on the Connecting Europe Facility document that allows for the financing of only NGA and Ultrafast networks projects.

It defines broadband as follows:

“Broadband networks’ means wired and wireless access networks, ancillary infrastructure and core networks capable of delivering very high speed connectivity, thereby contributing to the broadband targets of the Digital Agenda for Europe”

Note the “very high speed” requirement. For further information regarding the reason for such a definition please read also the introductory explanations to the draft (at the beginning of the same document). Note also that “very high speed” is understood as “ultrafast” according to the definitions of the PPP4BB project.

“Lower speeds (albeit financed by other public sources) will be admissible only if able to technically proof to reach 30Mbps within 2020.”

This is not to say that public sources should not be used for lower capacities, but indicates a clear trend towards high capacity networks in Europe.

However, there could be cases of really low density populated and rural areas lacking even the most basic telecommunication services and where little or no commercial interest of service providers to build own networks exists. In such cases a pragmatic approach from the public partner should be taken and public (co) funding should not be excluded.

Especially in such cases the sharing of building costs (with other public infrastructure) and reusing of existing infrastructures (ducts, poles, etc.) is a must. Public DBO and Joint Ventures (with or without SPV) are the usual practice, but in cases an existing infrastructure operator (power utility for example) is also willing to develop a telecommunication network a private DBO could be the solution.

Regarding the NGA networks, the most typical deployment nowadays is the Joint Venture PPP, as projects usually are about shortening the local loop (telephone and/or cable TV networks) by pushing fiber to the cabinets. Another possibility is the Bottom-up PPP which is appropriate especially in rural areas where there is no sufficient access capacity so the residents organise themselves to build the “last mile”. In cases where there are significant market distortions the public partner may want to step in directly to grant indiscriminate possibilities to all citizens, so Public DBO might be the right solution.

The Ultra-fast networks have similar specifics as NGA regarding the Joint-Venture solution. Fiber is pushed all the way and the private partner usually contributes a consistent part of the investment. Moreover, in some cases/ countries where reuse of existing infrastructure is facilitated also to external operators and/or obligations related

to concurrent build-out of infrastructure is in place, a pure Private DBO can be the solution. Again, as in case of NGA, in market situations where significant market distortions exist the public partner might have to directly enter the market through a GOCO PPP. The last solution is similar to Public DBO, but as Ultra-fast networks usually bring more technical challenges it is thus less risky for the public partner to have them designed and operated by a private partner.

4.2.2. The aspect of PPP

Different PPP models are primarily distinguished in terms of the risk that the public partner assumes. On the other side, assuming more risks is usually connected with having more control over the operation.

The most common error the public partner might do in this regard is to underestimate the risks related to network and service management. It is easy to be blinded by the initial amount necessary for the deployment of the networks, but do not forget that the build-out period is usually much shorter than the period of overall operation.

The task of the public partner is to grant proper connectivity to citizens for an extended period!

Do not overemphasize the initial cost and neglect the operation during its lifetime. Remember that operational revenues and costs usually amount to a much higher overall figure than the initial building costs, as we are dealing with infrastructure that should be used for at least 20 years.

Therefore finding the right balance between public and private funding is the key to determining the most appropriate model. To that end the following questions should be considered:

- How rural is the area?
- How much economic interest in covering the area exists?
- What are the current and potential market distortions (some of them could also arise from choosing the improper PPP model)?
- How many financial resources does the public partner have?
- Will there be competition over the network/is infrastructure the only missing link to ignite competition on the market?

Regarding the last point, there is lively discussion, especially in smaller countries, about what is better – to pursue competition at any cost (even at the cost of not building proper connectivity) or to provide competition in services.

As a thumb rule the public partner should seek for solutions that:

- require **as low public financial commitment as possible**;
- grant as **much control as possible**;
- put as **little operational risk on the public partner as possible**.

It is obvious that all the previous points cannot be fulfilled altogether. In relation to this **beware of a potential private partner who states that all the bonuses will be given to and all the risks taken away from the public partner, as this surely indicates that there must be something wrong** (with the model, with the business case etc.).

Real cases have shown that Joint Venture (with all its possible variations) is the most used model for any type of network. Less public investment and less control over the networks is given with Private DBO and Bottom-up PPPs. More public investment and more control (and usually more risk for the public partner) is involved in GOCO and Public DBO.

The above models are discussed and presented in more detail in the 9 PPP models developed for the purpose of PPP4Broadband project.

ANNEX A: GLOSSARY OF TERMS USED IN THE PPP4BROADBAND PROJECT

4G: stands for “fourth generation.” It represents the next step in the increase of data transfer speed from 3G, which is typically limited to about 2 Mbit/s, to technologies that can in principle deliver up to 100 Mbit/s (4G). The dramatic decrease in the time necessary to download data is expected to significantly change the functionality of the Internet, stimulating the expanded use of multimedia and cloud computing.

ADSL: asymmetric Digital Subscriber Line. It enables speeds of up to 12 Mbit/s.

Backhaul: a hierarchical telecoms network. The backhaul portion of the network is the intermediate link between the core network and the small sub-networks at the “edge” of the entire hierarchical network.

Benchmarking: a process of comparing one's business processes and performance metrics to best cases in the industry or to best practices in other industries.

Broadband: a communications channel which carries traffic at a rate higher than dial-up communications. While there is no standard industry definition of broadband speed, the OECD defines broadband to have a minimum downstream bandwidth of 256 Kbit/s.

Competitive Dialogue: a step in the procurement process used in the award of complex contracts where there is a need to discuss all aspects of the proposed contract with suppliers. Such a dialogue would not be possible under open or restricted procedures. Procurement of public-private projects is often undertaken under a competitive dialogue.

Concession contract: a contract signed by the concession grantor on one hand and the concessionaire on the other hand, which includes provisions on mutual rights and obligations connected with the use of the concession.

Concession fee: a fee that the concessionaire pays pursuant to the concession contract.

Concession grantor: a body or legal person that is competent to grant a concession under the Concession Act.

Concessionaire: any natural or legal person with whom the concession grantor signs a concession contract.

Contractual public-private partnership: a PPP model where the mutual relationship between a public and a private partner is regulated by a contract on public-private partnership as a concession model or as an operative lease model.

Cost-benefit analysis: an economic analysis method that is used to compare and evaluate all advantages and disadvantages of an economic undertaking or project through an analysis of all costs and benefits. It is important for making the right decision and any project adjustments that might be necessary.

DAE: the Digital Agenda for Europe (DAE) aims to reboot Europe's economy and help European citizens and businesses to get the most out of digital technologies. It is the first of seven flagship initiatives under Europe 2020, the EU's strategy to deliver smart, sustainable and inclusive growth. <http://ec.europa.eu/digital-agenda/>

Depreciation: a method of calculation. Depreciation is a gradual decrease in the value of an undertaking's assets, and it is calculated annually according to the procedure laid down by law. As the amount of depreciation is deducted every year from the tax base, the method of depreciation affects the decision on the way of funding the procurement of equipment.

DHCP: a Dynamic Host Configuration Protocol (DHCP) is a network protocol used to configure devices that are connected to a network so they can communicate on that network using the Internet Protocol (IP).

Dial-up: A communications channel established between two modems to allow for the transmission of digital data across the PSTN at a rate of up to 56 Kbit/s

Discount factor or present value factor: a mathematical expression for calculating the discounted (present) value of an amount. It is also called the decumulation factor. It is the reciprocal value of the interest factor.

Duct and Pole Access: a duty of telecoms infrastructure owners to give other telcos access to the poles, ducts, conduits etc. at non-discriminatory rates.

ESA95: European system of national and regional accounts, abbreviated as ESA95 or sometimes 1995 ESA, which collects comparable, up-to-date and reliable information on the structure and developments of the economy of the EU Member States and their respective regions.

Ethernet: the family of networking technologies for local area networks

Feasibility study: a document that helps the investor decide on an investment by answering the question whether a particular project is feasible in terms of the market and financial situation. If the study shows that the project is feasible, it becomes the basis for drawing up an implementation study, that is, the operative project. The feasibility study consists of a market analysis, a technological-technical analysis, a location analysis, an organisational analysis, and an analysis of economic and financial indicators. The information collected is then used to make an assessment of the feasibility and effectiveness, i.e. the viability of implementation of a particular investment project.

Fiscal risk: a risk that the public sector will not be able to timely fulfil the obligations assumed (in case of a PPP this means the timely payment of the agreed obligations).

FTTx: a generic term for any broadband network architecture using optical fiber to provide all or part of the local loop used for last mile telecommunications. The term is a generalization for several configurations of fiber deployment, ranging from FTTN (fiber to the neighbourhood) to FTTD (fiber to the desktop).

GPON (Gigabit Passive Optical Network): the standard which has reduced the complexities of network layouts and delivered significant performance gains over earlier standards. The GPON standard has seen huge growth and has been chosen by a large number of providers around the world.

HSPA: High Speed Packet Access, a mobile broadband technology.

Institutionalised public private partnership: a PPP model based on the membership relationship between a public and a private partner in a jointly owned undertaking which is the competent authority responsible for the implementation of the PPP project.

Internal rate of return (IRR): a discount rate which reduces pure cash flows over the entire lifespan of effectuating an investment to the value of the initial cost of investment. It is also called the internal rate of profitability. The internal rate of profitability is the basic method of assessing the financial efficacy of investment opportunities (capital budgeting). It is the discount rate where the pure present value of an investment value equals zero. The internal rate of profitability is calculated by using the procedure of successive iterations, so that it gradually comes closer and closer to the required discount rate where the pure present value equals zero. In calculating it, the procedure of linear interpolation is often used. Within the meaning of the method of internal rate of profitability, an investment opportunity is efficient if the internal rate of profitability is greater or at least the same as the fixed discount rate, i.e. the investor's opportunity cost (market capitalisation rate).

LTE: stands for "Long Term Evolution," It is an approved standard for 4G mobile broadband using radio waves. LTE was developed as a long-term alternative to DSL, cable, and other wired forms of Internet.

Natura 2000: a centre piece of EU nature & biodiversity policy. It is an EU wide network of nature protection areas established under the 1992 Habitats Directive. The aim of the network is to assure the long-term survival of Europe's most valuable and threatened species and habitats.

Net present value (NPV): a basic quantitative concept in finance. It represents the present value of all future receipts in money reduced to the present value of all future costs in money, i.e. the present value of all future pure cash flows resulting from the operation of the enterprise or a project of the enterprise or an intended transaction.

Open access: network in which physical access is separated from service provision, shared by multiple service providers.

Optical Network Terminal (ONT): converts optical signals to electrical signals. The fibre optic cable plugs into the ONT that converts the signal to Ethernet which can then connect to a standard router.

PPP contract: a basic contract concluded between a public and a private partner, or a public partner and a Special Purpose Vehicle (hereinafter: SPV) which, for the purpose of implementation of the PPP project, regulates the rights and obligations of the parties to the contract.

Private partner: an economic operator selected on the basis of a completed public procurement procedure or the procedure for the selection of a concessionaire which is awarded a PPP contract by the public partner or which establishes a SPV for that purpose or which establishes a membership relationship in a joint undertaking with the public partner.

Procedure for the selection of a private partner: public procurement procedure laid down in the regulations governing the public procurement procedure or the concession award procedure laid down in the regulations governing concessions.

Public body: any body which is the contracting authority within the meaning of the regulations governing public procurement.

Public partner: one or more public bodies concluding a PPP contract with a SPV or a private partner, or one or more public bodies associated with a private partner through membership in a joint undertaking.

Public private partnership: a model of long-term contractual partnership relationship between a public and a private partner which may involve financing, design, construction, operation and/or maintenance of infrastructure and/or provision of services by the private partner, which are traditionally procured and provided by the public partner.

Public Sector Comparator (PSC): a comparison of the planned costs of the application of the public private partnership model versus the classic (budgetary) model of funding all costs of the implementation of the project over the whole proposed term of the contract.

QinQ: An expansion of the 802.1Q protocol, where the 802.1 protocol is the networking standard that supports a system of VLAN tagging on an Ethernet network. VLAN tagging inserts a VLAN identifier into a packet header in order to identify which VLAN the packet belongs to routing VLAN traffic without the risk of losing information.

Return on assets (ROA): a return on invested capital, an indicator of the profitability of assets.

SGEI: Services of general economic interest are economic activities that public authorities identify as being of particular importance to citizens and that would not be supplied (or would be supplied under different conditions) if there were no public intervention. Examples are transport networks, postal services and social services.

Special purpose vehicle (SPV): an undertaking which may be founded by a private partner for the purpose of concluding a PPP contract and/or implementing a PPP project.

The most economically advantageous tenderer: a tenderer who was selected as the most economically advantageous one in the selection process according to the selection criteria stated in the invitation to tender or in the tender documents.

Time value of money: a concept where money at present time is worth more and is preferred more than nominally the same amount of money at some future time. It is based on the possibility to invest money at present time to be increased in the future. It is also based on the fact that the tendency to spend money in present time is greater in comparison to the same volume of consumption in the future. Therefore, spending is delayed only if there is an opportunity to increase the volume of consumption in the future, i.e. to satisfy the needs more completely.

Value for money (VfM): about striking the best balance between the “three E’s” – economy, efficiency and effectiveness. It is not a tool or a method, but a way of thinking about the rational use of resources. In the United Kingdom it is often used as a framework for assessing cost effectiveness across the public sector. The fourth “E” equity – is now sometimes also used to ensure that the value-for-money analysis accounts for the importance of reaching different groups. (for more information see www.oecd.org/dac/effectiveness/49652541.pdf)

VDSL: very high bit rate digital subscriber line is a digital subscriber line technology that provides faster data transmission over copper wire and coaxial cable. VDSL is capable of supporting applications such as high definition TV as well as telephone services and general Internet access over a single connection.

VLAN: a broadcast domain created by switches. Normally, it is a router creating that broadcast domain. With VLAN a switch can create the broadcast domain.

White spots (areas): Defined by the EC as areas where high speed Internet networks do not exist at present and where they are not likely to be built and be fully operational in the near future (within 3 years).

WiMAX: Worldwide Interoperability for Microwave Access – a wireless industry coalition organised to advance IEEE 802.16 standards for broadband wireless access networks.

Unless stated otherwise the above definitions are taken from:

http://www.eib.org/epec/resources/epec_broadband_en.pdf pp 60-61

<http://www.ajpp.hr/home-page/publications.aspx> Step by step guide to PPP

ANNEX B: REFERENCES

1. http://europa.eu/legislation_summaries/internal_market/businesses/public_procurement/ EU Public Procurement Act; Summaries of EU legislation
2. http://www.unescap.org/ttdw/common/TPT/PPP/text/ppp_guidebook.pdf A guidebook on public-private partnership in infrastructure
3. <http://www.ajpp.hr/home-page.aspx> Agency of Public Private Partnership - Republic of Croatia
4. <http://www.eib.org/epec/g2g/> EPEC guide for PPP
5. <http://www.eib.org/epec/resources/guide-to-guidance-en.pdf> EPEC guide to guidance
6. <http://www.fcc.gov/guides/getting-broadband> Federal Communications Commission – What is Broadband
7. http://ec.europa.eu/information_society/activities/broadband/docs/bb_communication.pdf Communication from the Commission to the European parliament, the Council, the European economic and social committee and the Committee of the regions, European broadband: investing in digitally driven growth
8. <http://www.oecd-ilibrary.org/docserver/download/5k49qgz7crrm.pdf?expires=1379074426&id=id&acname=guest&checksum=AC5988F5C5A666AA4D7F35D5229461AC> OECD (2013), "Broadband Networks and Open Access", OECD Digital Economy Papers No. 218, OECD Publishing. <http://dx.doi.org/10.1787/5k49qgz7crrm-en>
9. http://ec.europa.eu/regional_policy/sources/docoffic/2007/working/wd4_cost_en.pdf Guidance on the methodology for carrying out cost-benefit analysis WD4, page 5-11
10. http://ec.europa.eu/regional_policy/sources/docgener/presenta/broadband2011/broadband2011_en.pdf Guide to broadband investment 2011, pp 42-47
11. <https://www.econstor.eu/dspace/bitstream/10419/56429/1/630589232.pdf> Public-Private Partnership in Infrastructure Development Case Studies from Asia and Europe; pp 9-11.
12. <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2013:025:0001:0026:EN:PDF> EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks (2013/C 25/01)
13. www.eib.org/epec/resources/guide-to-guidance-en.pdf The Guide to Guidance; How to Prepare, Procure and Deliver PPP Projects (EIB, EPEC)
14. www.jaspers-europa-info.org/images/stories/food/KEW_WORKINGPAPERS/Major_Projects_Application_Form_Annex_XXI_Broadband.pdf Guide for major projects (broadband) - Application Form / Annexe XXI, JASPERS Programme.
15. http://www.jaspers-europa-info.org/images/stories/food/KEW_WORKINGPAPERS/6_Broadband_Guidelines.pdf State aid in broadband infrastructures projects

Useful links for PPP project

International organizations

<http://www.unece.org/ceci/> UN Economic Commission for Europe (UNECE)
<http://www.undp.org/content/undp/en/home.html> UN Development Programme (UNDP)
<http://www.worldbank.org/> World Bank
<http://www.oecd.org/index.htm> Organisation for Economic Cooperation and Development (OECD)
<http://www.oecd.org/site/sigma/> SIGMA (Support for Improvement in Governance and Management)

European Institutions

<http://www.oecd.org/site/sigma/> European Commission - Internal market
<http://www.eib.org/> European Investment Bank (EIB)
<http://www.eib.org/epec/> European PPP Expertise Centre (EPEC)
<http://www.ebrd.com/pages/homepage.shtml> European Bank for Reconstruction and Development (EBRD)

Broadband



Jointly for our common future