



Bundesnetzagentur

**Issues relating to the determination of prices
for the shared use of public supply networks
and the coordination of civil works
based on the Act to facilitate the deployment of
high-speed digital networks (Gesetz zur
Erleichterung des Ausbaus digitaler
Hochgeschwindigkeitsnetze (DigiNetzG))**

– Consultation document –

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1 Preliminary remarks

Because of the increase in global digitisation communication and interconnectedness are playing an ever more important role in the economy and society. They have the capacity to change the everyday lives of citizens, to trigger productivity enhancements in companies and to increase economic growth. Nationwide availability of high-quality telecommunications network infrastructures is needed in this respect to ensure that Germany remains competitive as a business location in the future.

In order to create the prerequisites for this, the availability and efficiency of the digital infrastructure in the Federal Republic needs to be further enhanced both by the Federal Government's medium-term goal to ensure that there is nationwide coverage with 50 Mbit/s by the end of 2018, and its long-term focus on a gigabit optical fibre network (*Digital Strategy 2025* launched by the Federal Ministry of Economics and Technology) and on creating a converging, gigabit-ready infrastructure by 2025 (*Gigabit Germany Initiative for the Future* launched by the Network Alliance at the Federal Ministry of Transport and Digital Infrastructure). The deployment of optical fibre-based telecommunications networks which has been relatively slow up to now is characterised by high investment costs on the one hand and currently low demand among retail customers on the other. The costs of civil engineering work per household connected are high particularly in rural areas that have a low population density. Against this backdrop, by creating the relevant statutory and regulatory environment, an attempt is being made to support the market-driven expansion of gigabit-ready networks as effectively as possible and – wherever this appears unlikely in the long term from the economic perspective - to supplement this with public funds.

Against this backdrop, the Federal Government transposed Directive 2014/61/EU of the European Parliament and of the Council of 15 May 2014 on measures to reduce the cost of deploying high-speed electronic communications network (Cost Reduction Directive) into national law when the Act to facilitate the deployment of high-speed digital networks (Gesetz zur Erleichterung des Ausbaus digitaler Hochgeschwindigkeitsnetze (DigiNetzG)) entered into force on 10 November 2016. The prime goal of the Cost Reduction Directive and of the DigiNetzG is to reduce the costs associated with nationwide broadband expansion by utilizing synergies in regards to sharing already existing passive network infrastructures¹ as well as in regards to civil works that are carried out anyway. Since the general regulatory aims and principles set forth in Article 2 of the Telecommunications Act (Telekommunikationsgesetz (TKG)) will continue to apply, the provisions set forth in the DigiNetzG can be classified as new and more specific rights and obligations within the general goals of the Telecommunications Act.

¹ In this consultation document, the term "passive network infrastructures", similar to the legal text, refers exclusively to "any element of a network which is intended to host other elements of a network without becoming itself an active element of the network. [...] cables, including dark fibre, are not passive network infrastructures." (cf. § 3 Nr. 17b TKG).

Given that civil engineering works² regularly account for up to 80 percent of the overall roll-out costs of projects involving the deployment of high-speed electronic communications networks³, it seems to make sense to prevent construction work that is inefficient in macroeconomic terms and to enhance coordination between various supply network operators and network infrastructure owners with a view to accomplishing the goals pursued by the Federal Government. The cost savings this may generate are intended to ensure that from the business point of view network expansion becomes worthwhile for telecommunications companies in places where it would not be economically feasible otherwise by leveraging synergy potential. The Federal Government assumes that up to 25 percent of the costs incurred by the nationwide deployment of high-speed digital networks could be saved if synergy potentials were leveraged.⁴

This consultation document is intended to fuel a discussion about the determination of prices for entitlement to sharing of infrastructure and co-ordinated co-deployment standardised in the DigiNetzG. The term "co-deployment" will be used in the following, as is customary in the market, for the coordination of construction work within the meaning of section 77i(1 to 5) TKG; i.e. integrating network infrastructures of different network operators as part of civil engineering work regardless of whether one or both parties are involved in actually carrying out the work. The aim of the consultation document is to foster the general understanding among all stakeholders of the criteria and principles that apply and to initiate as structured and targeted a dialogue as possible. In respect of co-ordinated deployment, the legislator explicitly instructed the Bundesnetzagentur to publish principles governing the allocation and distribution of costs in accordance with section 77i(4) TKG. This consultation is intended to serve as a starting point in this regard as well.

Since all newly-regulated application scenarios call for a high level of cooperation both among private companies and between private companies and the public sector, basic issues and pricing alternatives will be discussed in this consultation in relation to the determination of prices. In this respect, the principles can provide guidance for as many future negotiating solutions as possible that have the potential to significantly reduce both the macroeconomic costs of nationwide deployment of high-speed telecommunications networks and the need for dispute resolution.

If in exceptional cases, involved parties are unable to reach a negotiating solution regarding a request for shared use of infrastructure or for co-deployment, they can refer the matter to the Bundesnetzagentur which acts as a national dispute settlement body. It shall issue binding decisions on entitlement to and terms and conditions for requested shared use of

² Later on in this document, reference will mainly be made to civil engineering work that accounts for a large proportion of the relevant deployment costs although this includes structural engineering work as per preamble (cf. Bill drawn up by the Federal Government, Bundestag-Drucksache 18/8332, page 1).

³ cf. preamble of the Federal Government's bill, Bundestag-Drucksache 18/8332, page 1.

⁴ cf. *ibid.*, page 32. The EU Commission estimates that a 20 to 30 percent reduction in the cost share of civil engineering work can be achieved in the nationwide deployment of high-speed telecommunications networks. As it is estimated that civil engineering costs account for approx. 80 percent of overall deployment costs, this could correspond to savings of between €3bn and €19bn if the overall costs of deployment were between €20 and €80bn or up to 25 percent of the total deployment costs accordingly. The resulting values are calculated by multiplying the minimum or maximum values with the proportion of costs accounted for by civil engineering work (for instance, €80bn x 30 percent x 80 percent = €19bn).

infrastructure and for co-deployment within the framework of legally prescribed time periods. This consultation process and the discussion it will fuel are intended to pave the way for developing principles governing pricing criteria that can be applied on a case-by case basis and, if applicable, may need to be further specified in the decisions taken by the dispute settlement body. Furthermore, this consultation document will examine how the pricing criteria defined in the DigiNetzG reflect the general regulatory principles of the TKG and how these pricing criteria relate to the principles of the asymmetric regulation practice as well as to the requirements of state aid at European and national level.

This consultation document will focus on issues relating to the determination of prices in cases involving shared use of infrastructure and co-deployment pursuant to section 77d TKG and section 77i TKG in conjunction with section 77n TKG. It seems wise to make a basic distinction between these two application cases, which are outlined in the DigiNetzG, within the framework of this consultation too. It also seems logical from an economic perspective to make a basic distinction within the framework of sharing of infrastructure and co-deployment between supply network owners and operators asked to grant access to their infrastructure based on their respective business segment. There is a systematic difference between the implications such requests for access have vis-à-vis *telecommunications network* owners and operators and the owners and operators of *other supply networks* such as electricity, gas or sewerage networks. In the latter case, requests by telecommunications network owners and operators to share infrastructure or co-deploy do not usually affect the supply network owners' and operators' actual field of activity. By contrast, when telecommunications network owners and operators are asked to grant access, the obligation to share their infrastructure or to co-deploy can, in principle, also affect their actual line of business since they will generally be competing directly or indirectly with the company requesting access.

This consultation document will be structured as follows. First, the basic issues relating to the determination of prices in scenarios involving the shared use of infrastructure pursuant to section 77d TKG will be discussed (Chapter 2). Then scenarios involving the coordination of civil works and co-deployment pursuant to 77i(1 to 5) TKG will be discussed (Chapter 3). As such, the focus will be placed in particular on the extent to which, from an economic perspective, issues arising from co-deployment resemble the issues arising from scenarios involving shared use of infrastructure. In both chapters, a distinction will be made in relation to the business segment in which the access provider operates owing to the problems mentioned in the foregoing. In cases of co-deployment where, unlike scenarios involving shared use of infrastructure⁵, the law does not specify that any such distinction needs to be made, the structure of this consultation and the underlying interpretation does not predetermine the cost distribution principles to be published pursuant to section 77i(4) TKG nor is it prejudicial to the approach to be taken by the national dispute settlement body in specific individual cases. On the contrary, it is intended to foster the understanding of the relevant economic rationale, particularly with a view to the general regulatory goals defined in the TKG. This consultation will focus specifically on how the pricing criteria defined in the DigiNetzG should be applied in order to maintain incentives for initial investments, to foster

⁵ cf. Section 77n(2 and 3) TKG on the above-mentioned distinction made within the framework of entitlements to sharing of infrastructure.

fair and sustainable competition and to safeguard consistency with other regulatory decisions and with provisions set forth in legislation on state aid.

The Bundesnetzagentur explicitly reserves the right to put forward for consultation at a later date any issues and aspects of the implementation of the DigiNetzG that have not been addressed in this consultation document, for instance, with regard to the network infrastructure of buildings pursuant to section 77k TKG.

2 Pricing criteria in relation to the shared use of public supply networks

The shared use of public supply networks for hosting elements of high-speed digital networks is one option for leveraging existing synergy potential in relation to broadband roll-out. For instance, it may make more sense for telecommunications network owners and operators to share sewerage systems, cable conduits and ducts but also cabinets, street lamps or masts than to carry out the civil engineering work themselves.

The aim of this chapter is to initiate a discussion about the determination of fair and reasonable prices for shared use of infrastructure in the above-mentioned examples but also in other application areas. As such, one principle that must be observed in all scenarios is that the obligation of the respective supply network owner or operator to grant access to their infrastructure must not adversely affect their business.⁶

It would appear to be meaningful from an economic perspective, as outlined in the introduction, to make a distinction between the respective areas of business activity, i.e. the provision of telecommunications services or non-telecommunications services, of the company obliged to grant access, in respect of the determination of prices for shared use of infrastructure. In accordance with the Cost Reduction Directive, the German legislator has observed this distinction by defining two different criteria pursuant to section 77n(2) TKG and section 77n(3) TKG.

2.1 Case of shared use of infrastructure in relation to supply network owners and operators with no telecommunications business (section 77n(2) TKG)

In the following, focus will be placed initially on the principles governing the determination of prices in scenarios involving shared use of other supply networks rather than public telecommunications networks. The question of how the criterion of fair and reasonable prices for shared use of the infrastructure can be appropriately implemented is of central importance in this regard. In section 77n(2) TKG, the legislator specifies that " *[...] the additional costs which the owner of public supply network incurs by allowing another*

⁶ cf. Preamble to the bill drawn up by the Federal Government, Bundestag-Drucksache18/8332, page 78.

company to share its passive network infrastructure provide the basis for the level of charges levied for shared use of the infrastructure. Upon these costs, the Bundesnetzagentur adds a reasonable mark-up as an incentive for the owners and operators of public supply networks to grant access." This means that pursuant to section 77n(2) TKG, charges consist of two variable components, namely the additional costs arising from the shared use of infrastructure and a reasonable mark-up. This distinction made by the legislator will be observed in the following.

2.1.1 Components of additional costs

Pursuant to section 77n(2) TKG, the *additional* costs incurred by facilitating the sharing of infrastructure are to be taken as the basis for the pricing of the shared use of infrastructure. Prices are therefore not intended to cover the original investment costs, but initially solely the additional costs incurred by the access provider.⁷ For this reason, it needs to be examined on a case-by-case basis whether costs arise because of the access request by a telecommunications company or whether costs occur because of the actual business activity of the company obliged to grant access.

The legislator has identified the components of additional costs in the preamble to the bill although the following list provided in the preamble is not conclusive:⁸

- maintenance and adaptation costs,
- preventive safeguards to limit adverse impacts on network safety,
- specific liability arrangements in the event of damages.

From our point of view and based on the evidence available so far, the following could be given as examples of the above-mentioned cost components:

- insertion of a tube divider into a cable duct,
- opening and resealing a supply network,
- checking the impact shared use has on network security (at regular intervals),
- taking out specific liability insurance in order to minimise the commercial risks of damage to the supply networks during installation or operation of the telecommunications network infrastructure.

In this context, Question I.a., which follows this chapter, is intended to shed more light on the cost components to be expected as the relevant market players can identify additional components.

⁷"Any additional costs incurred by the infrastructure provider as an additional expense solely by having to share infrastructure are used as the basis for determining fair and reasonable prices for shared use of infrastructure. This makes it clear that any investment the infrastructure provider has to make anyway to develop the supply network infrastructure may not be incorporated into the prices for shared use." (cf. preamble to the bill drawn up by the Federal Government, Bundestag-Durcksache 18/8332, page 55).

⁸ cf. *ibid.*, page 55ff.

In principle, transaction costs such as the costs of the review and processing of the original request and subsequent contractual management could also be considered a further component of additional costs incurred. Although the legislator has identified some transaction costs as potential costs, it did not clearly specify whether transaction costs are part of additional costs to be borne by the company requesting the shared use of infrastructure.⁹ However, there is no reason why, in principle, the transaction costs incurred by the supply network owner or operator requested to share its infrastructure should not be invoiced or incorporated into the prices for shared use of infrastructure.

In principle, the interest on the capital used by the supply network owner or operator for the purpose of sharing infrastructure is only relevant if the non-recurrent additional costs include investments that tie the capital up for several years.¹⁰ Regardless of the issue of relevance, the reasonable interest on the capital used by the supply network owner or operator for the purpose of sharing infrastructure is deemed to be included in the costs incurred. This interpretation is incidentally based on the definition of the cost of efficient service provision in Subchapter 2 of the Telecommunications Act.

With a view to the cost components that need to be taken into account in specific cases, it is probably relevant to distinguish between different types of infrastructure representing the basis of the supply network owner's or operator's respective area of business. It is therefore assumed that some cost components will only apply to certain supply networks whereas other components may apply to all types of supply networks that are addressed by the DigiNetzG. When enabling the shared use of a gas supply network, for instance, safety measures and working steps need to be carried out, the likes of which would not need to be carried out in scenarios involving the shared use of an electricity supply network, for instance. In this respect, both the type and level of the respective cost components are considered to be very much dependent on the infrastructure type of the respective supply network.

A further categorisation of individual cost components can be made by determining the respective way in which costs arise. Individual cost components can be characterised as non-recurrent and/or recurrent. It is also possible to make a further distinction between costs that occur as fixed costs (based on the length and amount of infrastructure shared) and variable costs (regardless of the length and amount of infrastructure shared). The respective cost components can therefore be broken down into these two dimensions in the following matrix:

Figure 1: Matrix for the categorisation of cost components.

Cost feature	Variable	Fixed
Non-recurrent
Recurrent

⁹ cf. the information on compliance costs for businesses within the framework of the bill drawn up by the Federal Government, Bundestag-Drucksache 18/8332, page 3.

¹⁰ cf. in this regard also discussion in 2.1.3.

It is, for instance, possible to allocate the cost components (maintenance and adaptation costs, preventive safeguards, specific liability arrangements in the event of damages) referred to in the preamble. As such, it is evident that, in theory, all four potential combinations of the cost features displayed in the above matrix can apply to each cost component. This suggests that regarding preventive safeguards to be adopted in order to limit adverse effects on network safety, it is anything but simple to unequivocally classify costs as variable and fixed costs or as non-recurrent and recurrent costs, meaning they need to be analysed on a case-by-case basis.

Notwithstanding this, specific cost combinations can be relevant primarily for selected cost components. The *adaptation costs* incurred, will, for instance, generally involve non-recurrent, variable costs. By contrast, *maintenance costs* will above all involve recurrent, variable costs. Given that *liability arrangements in the event of damages* in the broader sense involve insurable benefits, it can be assumed, in principle, that they are of a recurrent nature. Generally speaking, these arrangements do not just apply to a specific period but as a rule to the entire duration of the shared use of infrastructure. This fact suggests that the costs incurred are recurrent costs within the meaning of insurance premiums. Furthermore, this cost component can vary greatly with the respective type of infrastructure and can involve both fixed and variable costs. *Costs of contractual management*, and to a lesser extent also the superordinate category of *transaction costs* can be classified as recurrent and, by and large, as fixed costs. In this regard, however, a large proportion of the transaction costs and in particular of the costs of contract design are incurred when the agreement on shared use is concluded, meaning they are non-recurrent.

In relation to the above-mentioned differentiation and categorisation of cost components, Questions I.b and I.c. posed after this chapter are intended to prompt the market players to submit their assessments and specific comments.

2.1.2 Reasonable mark-up as an incentive

In order to enhance the economic incentives for supply network owners and operators obliged to give access to conclude agreements on shared use of their infrastructure, the legislator has made provision for a reasonable mark-up to be added to charges for shared use of the infrastructure based on the costs incurred.¹¹ This is ultimately intended to further increase the number of agreements on shared use of infrastructure concluded and hence the level of costs saving hoped to be generated with the deployment of a nationwide high-speed network. The determination of the mark-up must also be based on the criterion of fair and reasonable prices enshrined in section 77n (2) TKG.

As the additional costs incurred by sharing of infrastructure are already covered, the reasonable mark-up is not intended to provide compensation of actual costs incurred. In particular, it is not intended to cover the original investment costs.¹² The additional costs

¹¹ It is outlined in the preamble that "[b]y allowing a reasonable mark-up to be levied [...] this also [creates] an incentive for infrastructure operators to grant other companies access to their infrastructure." (cf. bill drawn up by the Federal Government, Bundestag-Drucksache 18/8332, page 56).

¹² cf. quotation from the preamble in footnote no. 7.

incurred only include interest – in accordance with the information provided in Chapter 2.1.1 – if they include investments that tie up capital for several years. This may not be relevant in many scenarios. The reasonable mark-up that is intended to create an incentive to share infrastructure above and beyond compensation for any (additional) costs incurred, therefore cannot correspond to the interest. In the final analysis, considering the mark-up to be equivalent with interest is not compatible with the definition of the term "interest". Generally speaking, interest helps to cover the employment of capital, i.e. the capital costs. By contrast, the mark-up is intended to act as an incentive, meaning it must do more than *cover* costs – including the capital costs – that can be achieved pursuant to section 77n(3) sentence 2 TKG.¹³

The mark-up can hence be regarded as an incentive for access providers to tolerate infringement of their property.¹⁴ By contrast, from an economic perspective, there might not be the need to add a mark-up in respect of infrastructures owned by public authorities or public administrations. It seems reasonable that the most efficient and, if applicable, multiple use be made of subsidised infrastructure – also in view of the fact that the public authorities are committed to statutory goals in a special way. This explains why there should be no need to create additional incentives to provide access to the infrastructure voluntarily in any such scenarios.

However, there could potentially be cause for tension when the national dispute settlement body determines actual reasonable mark-ups for scenarios involving shared use of a privately-owned network infrastructure. On the one hand, approving that a mark-up be levied on a cost-based charge could be an incentive to provide access to passive network infrastructure. This means the mark-up for granting voluntary access to the infrastructure should be as high as possible from the infrastructure owner's and operator's perspective. On the other hand, approving an (excessively high) mark-up could counteract the general goals of the DigiNetzG, particularly the cost-effective and affordable deployment of high-speed networks. In individual cases, a high mark-up could, for instance, make planned coverage of certain areas unprofitable and tie up capital for further investment in other projects. It therefore needs to be carefully considered on a case-by-case basis what weighting should be given to these aspects in determining a reasonable mark-up in the interest of accomplishing these two goals.

In principle, the actual creation of the additional incentive can be based on a number of implementation principles. The determination of the reasonable mark-up could be based, inter alia, on an *absolute* value (method A), a *relative* value (method B) or the "value" of shared use (method C) as a benchmark. The advantages and disadvantages of the individual methods will be outlined in the following. As such, it needs to be discussed how

¹³ In section 77n(3) sentence 2 TKG it says: "[I]t [the Bundesnetzagentur] takes into account [...] beyond the additional costs incurred and a reasonable interest in accordance with para. 2." The legislator may have worded the reasonable interest explicitly beside ("and") the additional costs to indicate the relevant *recurrent* nature of charges for shared use of the infrastructure (and hence interest that only then becomes relevant) in scenarios involving shared use of telecommunications network owners' or operators' infrastructure.

¹⁴ Alternatively, the surcharge within the meaning of a "safety surcharge" added to the additional costs can also ensure that any uncertainties or imponderabilities will certainly lead to costs being covered when the additional costs are determined.

incentives with similar levels can be created across a wide range of projects involving shared use of infrastructure for supply network owners and operators to grant voluntary access to their infrastructure.

Re A) Determining a flat-rate amount or absolute amount is not based on a specific reference value and is therefore not dependent on additional costs or other cost variables. This would represent a relatively simple and transparent method of determining the incentive. At the same time, however, the fact that the amount is not based on a specific reference value can be seen as problematic considering both the level of additional costs incurred in absolute terms and the "value" of shared use of the infrastructure can vary greatly depending on the type, length and other individual specifics of the shared infrastructure. This means that in terms of the intention to create an incentive to grant access to infrastructure, in absolute terms a fixed mark-up could be excessively high or low. In this regard, this method is unlikely to ensure that a fixed, general mark-up would create an equally reasonable incentive covering all scenarios involving shared use of infrastructure – regardless of the varying scope of the project involved.

Re B) In addition, a mark-up could also be determined as a percentage of additional costs, which were determined before. This means the level of the mark-up would be based on the level of additional costs incurred and would generally correspond to the length and amount of the infrastructure to be shared. However, if a relative mark-up was applied to additional costs that are low anyway, this would mean the mark-up would also be low.¹⁵ It is therefore not clear in this case scenario how a standardised mark-up on the additional costs incurred could ensure a fair and reasonable incentive across all scenarios.

Re C) Owing to the weaknesses of the above-mentioned methods A and B, potential alternative benchmarks that, for instance, employ the "value" of shared use of the infrastructure as a benchmark need to be discussed to determine a reasonable mark-up. Any such benchmark could represent the synergy potential of sharing of infrastructure. This would result from the difference between the additional costs of shared use of the infrastructure incurred and the hypothetical investment the access seeker would need to make to create its own passive infrastructure (stand-alone costs)¹⁶. Taking the "value" of shared use of the infrastructure into account in this way could potentially meet the criterion of reasonableness more effectively than strictly applying the absolute amount or the percentage share of the additional costs incurred. One of the main reasons for this is that this method is more suitable for creating similar incentives across all scenarios involving sharing of infrastructure.

One possibility would be, for instance, to define a specific proportion of the synergy potential as a reasonable mark-up. This would also enable supply network owners and operators to benefit from any cost savings generated by the access seeker. However, from our perspective, and against the backdrop of the desired cost savings to be achieved for the

¹⁵ This could in any case only be avoided if surcharges of three or four digit percentages were used; however, it would be most difficult to justify any such surcharge.

¹⁶ As a rule, the national dispute settlement body will not be familiar with the stand-alone costs a priori, meaning they would typically need to be estimated.

development and deployment of high-speed digital networks, this proportion of the synergy potential should be kept relatively low.¹⁷

In the final analysis, another option would be to refer to the intrinsic value of the infrastructure to be shared based on the original investment costs incurred by the infrastructure owner. However, this could lead to major differences in prices between various types of infrastructure (for instance, between sewerage networks and gas networks) which would not reflect the actual "value" of the shared use of infrastructure. However, one aspect in favour of using this benchmark is that in this scenario the determination could be based on actual and frequently known costs, meaning no assumptions would need to be made on the hypothetical stand-alone costs potentially incurred by the access seekers.

Questions I.d. to I.i at the end of this chapter deal with how the reasonable mark-up can be implemented and in particular how an incentive can be consistently created for supply network owners and operators obliged to grant access to their facilities in the light of the above-mentioned trade-off.

2.1.3 Pricing structure

As described at the beginning of this chapter, the price for shared use of infrastructure pursuant to section 77n(2) TKG consists of the additional costs incurred and a reasonable mark-up. The respective price structure will probably be heterogeneous to a large extent, at the very least in relation to the additional costs incurred. This means scenarios may arise with both non-recurrent and recurrent cost components that could, in turn, be characterised as fixed and variable.

In this regard, the question arises how the above-mentioned components and their characteristics should be "translated" into prices for the shared use of infrastructure. They too can consist of recurrent and non-recurrent, fixed and variable components. It may be wise to apply the respective structure of the individual *cost* components to the *pricing* structure as well. Bearing this in mind, it could regularly make sense to consider charging flat-rates in order to simplify what can be very a complex pricing structure in some scenarios. Costs that are, for instance, recurrent but relatively low could be combined with a larger one-off cost item into a non-recurrent price. This could help above all to reduce the administrative costs for the stakeholders and potentially also to establish a certain level of comparability between various scenarios involving the shared use of infrastructure. In order to be able to determine any such flat rate, it would be appropriate to make reasonable assumptions about calculation options in some scenarios, such as the anticipated duration of use or the return on capital invested.

¹⁷ However, the mark-up could be excessively low or high even if any such (relative) method was used in respect of very small or very large projects involving shared use of infrastructure. This problem could possibly be solved by having a minimum or maximum amount or a staggered percentage share in order to be able to achieve the same intended incentive. In principle, it would be possible to specify any such additional terms and conditions for method A and B; yet it would be essential to define a suitable benchmark for any such minimum and maximum amounts and staggered shares. The "value" of the shared used of the infrastructure could, for instance, fulfil this task.

Against this backdrop, it would be helpful if the market could provide detailed feedback on preferences regarding the following questions about the pricing structure (I.j. and I.k.).

Questions

I. How should pricing criteria be defined in relation to the sharing of infrastructure in cases in which supply network owners and operators who provide non-telecommunications services are obliged to grant access pursuant to section 77n(2) TKG?

Components of additional costs

- a. What cost components in addition to the above-mentioned components can be classified as part of additional costs? What components can be explicitly ruled out?
- b. Do you think it is helpful to categorise cost components according to the cost features indicated in Figure 1? If so, which of the cost components provided as examples can be allocated to the individual categories? Can other components referred to in Question I.a. also be allocated to these categories?
- c. Does it make sense to distinguish cost components according to the type of infrastructure? What features would any such differentiated view of the different types of infrastructure be based on? Which of these features represent basic cost drivers in the respective scenario involving shared use of infrastructure?

Reasonable mark-up as an incentive

- d. How would criteria for determining a reasonable mark-up be defined in order to accomplish the legally required goal of creating an incentive for infrastructure owners and operators to grant access to their infrastructure? What approach should be taken in determining the mark-up with the above-mentioned trade-off between the desired incentive to grant access on the one hand and achieving the greatest possible cost savings in network expansion on the other?
- e. Should a mark-up be approved as an incentive even for requests to share publicly-owned infrastructure, contrary to what has been outlined in the previous chapter? On what grounds would it be reasonable to do so?
- f. What reasons can be given for and against the use of an absolute amount (method A)? What speaks for or against the use of a relative (percentage) mark-up (method B)?

- g. Should the reasonable incentive be based on the "value" of the shared use of infrastructure (method C) instead? Which of the above-mentioned reference points (synergy potential and investment costs incurred by the infrastructure owner and operator) appear to be more reasonable?
- h. What other reference values could be considered for method C? What advantages and disadvantages would these bring along?
- i. If it makes more sense to use the "value" of the sharing of infrastructure as the reference value (method C) to determine the reasonable mark-up, what percentage of this reference should be used? Should a minimum or maximum amount be determined or should the percentage be staggered for various levels of the reference point?

Pricing structure

- j. Is it meaningful to transfer the structure of the respective cost components to relevant price components or should a generalisation or simplification be made in cases involving several components?
- k. On what basis could any such simplification be made? What assumptions should be made about duration of use, interest rate and other variables, for instance, in order to facilitate the transfer of recurrent costs to non-recurrent charges for the shared use of infrastructure and vice versa for the transfer of non-recurrent costs to recurring charges?

2.2 Case of shared use of infrastructure in relation to telecommunications network owners or operators (section 77n(3) TKG)

Section 77n(3) TKG sets forth the arrangement for shared use with telecommunications network owners or operators that are obliged to grant access. As this subsection is *lex specialis* in relation to section 77n(2) TKG, it provides the Bundesnetzagentur with specific operating principles to be able to meet the general regulatory objectives and, in particular, to protect investment incentives. In this respect, the legislator has provided in section 77n(3) TKG that *"the Bundesnetzagentur shall take subsection 2 into account as well as the regulatory objectives referred to in section 2(2). In so doing the Bundesnetzagentur shall ensure that owners and operators of the public telecommunications network to be shared have the possibility to recover their costs; as well as the additional costs and the reasonable interest referred to in subsection 2, the Bundesnetzagentur shall take into account the impact of the requested shared use on their business plan including investments made in the shared public telecommunications network."*

The following subchapters essentially deal with the issue of how pricing criteria can be designed as fair and reasonable in the case of telecommunications network owners or operators that are requested to provide shared use. First of all, a conceptual distinction from shared use under section 77n(2) TKG is made, in order to clarify the additional aspects that have to be taken into consideration when determining prices or pricing principles. For this purpose, the prices will be broken down into the additional costs of shared use, which already have to be considered under section 77n(2) TKG, and one further element, which takes account of repercussions for the business plan. Finally, any possible overlap with other regulatory decisions of the Bundesnetzagentur and with state aid for rollout projects will be analysed. Here the focus will be placed more strongly on ensuring a consistent implementation of the pricing criteria set out in the DigiNetzG in view of the complexity of the topics as set out above.

2.2.1 Conceptual distinction from section 77n(2) TKG

The fundamental objective of the DigiNetzG – leveraging potential synergies in the rollout of telecommunications networks with high-speed capability – also holds for the potential shared use of passive telecommunications infrastructure. Therefore, such cases of shared use are generally desirable, especially if this shared use can be achieved through negotiation between the parties involved. Contrary to the shared use of other supply networks, however, in the case of the possible granting of shared use of a telecommunications network, the actual business area of the party obliged to share is affected directly; hence it can be supposed that the shared use of passive infrastructure would directly impact that party's business case. For this reason the DigiNetzG makes a distinction between the shared use with telecommunications network owners or operators and the shared use with supply network owners that do not have any telecommunications business.

In the following it will be assumed that an activity in a telecommunications business area can take on many forms; however, as a general rule, this should lead to it being treated in accordance with section 77n(3) TKG. From an economic point of view, the relevant criterion for deciding whether subsection 2 or subsection 3 has to be applied when determining prices

for shared use should be the impact on the business case of the supply network owner or operator obliged to provide access. A conclusive legal distinction between these two types, however, will only be set in a specific individual case by the national dispute settlement body.

With respect to the regulatory objectives that are to be taken explicitly into account in accordance with section 77n(3) first sentence TKG, in the present context there are two particular objectives that should be considered: firstly, the objective of ensuring fair competition and promoting sustainable competitive markets in telecommunications (para 2); and, secondly, the objective of expediting the rollout of high-speed next-generation public telecommunications networks (para 5).

The shared use of passive telecommunications infrastructure would appear at first sight to be beneficial for both objectives by strengthening competition through a second (or third) network infrastructure and at the same time by expediting the rollout of high-speed telecommunications networks. As, firstly, the laying of (additional) telecommunications infrastructures in the shared infrastructure – without duplicating civil engineering works – would offer the prospect of sustainable competitive markets. While, secondly, expediting the deployment of high-speed infrastructures would also be achieved if the shared use of passive infrastructure served this rollout, for instance through a fibre network in those areas where a comparable telecommunications network with high-speed capability is currently not available.

However, upon closer inspection, the obligation to grant shared use could potentially reduce investment incentives for future rollout projects. Telecommunications companies that invest in the rollout of high-speed infrastructures are faced with high costs (in particular for civil engineering works) and, at the present time, with a relatively low willingness to pay for the related products on the part of the customer. Nevertheless, it is conceivable that demand and the willingness to pay for such retail products will rise; the utilisation of the infrastructure that is achievable in the medium to long-term – taking account of the expected competitive situation in the rollout territory – and the earnings achievable with the customers that can be connected are decisive parameters in an investment decision.

Both the degree of utilisation as well as the pricing structure options could change significantly, however, if another company were to join in and share the use of passive infrastructures. Hence incentives to invest in the rollout may possibly be lost if it can be assumed that there is a risk of adversely affecting the original business plan through shared use charges that are incompatible with incentives. To this extent there are conflicting interests: the regulatory objectives for promoting sustainable competitive markets on the one side and promoting an expedited rollout on the other, which become exacerbated in the case of shared use of passive telecommunications infrastructures. Given this background, a balance must be found by determining fair and reasonable terms.

Therefore, when determining the terms that are intended to adequately compensate the initial-investing telecommunications company for the impact of shared use on its original calculation, it must be ensured that any desired rollout efforts regarding future prospective infrastructure is not negatively influenced. The pricing criterion to be applied should guarantee the company obliged to share that it will not be worse off through the shared use

in respect of the amortisation of rollout costs, nor in respect of the achievable and originally calculated profits or return on investment, when a common competition scenario for the rollout territory is taken into consideration. In this way it will be possible to ensure that the rollout incentives for the first investors, who already contribute directly towards achieving the objective of the broadest possible connectivity, will not be reduced.

In this respect, section 77n(3) TKG sets out that the Bundesnetzagentur shall determine the terms of the charges in such a way that *"owners and operators of the public telecommunications network to be shared have the possibility to recover their costs"*. Ensuring the possibility of recovering costs is also a direct result of taking the general regulatory objectives into account in accordance with section 2(2) TKG. The legislator further specifies with a view to the "recovery of costs" that *"as well as the additional costs and the appropriate interest referred to in subsection 2, the Bundesnetzagentur shall take into account the impact of the requested shared use on their business plan including investments made in the shared public telecommunications network"*. The two price elements of cost recovery – the additional costs incurred as the result of shared use and the impact on the business plan – will be considered in detail in the following.

The issues listed at the end of this chapter (II.a to II.d.) provide an opportunity to comment on the distinction between the shared use cases of telecommunications and non-telecommunications infrastructures and on the conflict areas of the regulatory objectives outlined.

2.2.2 Components of additional costs

First of all, the additional costs¹⁸ incurred by shared use of the infrastructure will be discussed. As in scenarios involving sharing of infrastructure pursuant to section 77n(2) TKG outlined in the foregoing, the telecommunications owner or operator seeking access bears all the additional costs incurred by shared use of the infrastructure. The additional costs incurred by a *telecommunications* company obliged to grant access to its infrastructure may comprise the cost components mentioned in Chapter 2.1.1. Given that telecommunications networks merely involve a specific type of supply network, it seems likely that the cost components will be similar in terms of occurrence and structure in this specific scenario. Specific geographical and project-related specifics may continue to have a major impact on the level of the respective cost components.

After this chapter, Question II.e will examine whether major differences exist between components of the additional costs in scenarios involving shared use of telecommunications infrastructures and non-telecommunications infrastructures.

¹⁸ The reasonable interest explicitly mentioned in section 77n(3) TKG is deemed to be part of the additional costs incurred – as outlined in Chapters 2.1.1 and 2.1.2.

2.2.3 Implications for the business plan

Unlike scenarios involving the shared use of other supply networks, the costs of developing the infrastructure to be shared by telecommunications companies seeking access are not costs that are incurred anyway (and hence primarily for the provision of services unrelated to telecommunications) but costs that are incurred specifically for the provision of telecommunications services. The regulatory goals are taken into account by considering the implications the sharing of infrastructure is likely to have for the business plan. One particular benefit of this is that it maintains the investment incentives for network expansion.

Pursuant to section 77g(2) TKG, in principle, telecommunications network owners and operators who are being asked to share their infrastructure have the option of rejecting the request to share the passive infrastructure under certain conditions. The legislator has made provision for several grounds for refusal. In particular, the provision of their own suitable wholesale products for high-speed digital networks on fair and reasonable terms and conditions can dispense with the obligation to share infrastructure. This applies similarly – and regardless of who is offering the access – if non-discriminatory and open network access to already existing optical fibre networks is already available in the envisaged deployment area. If any of these grounds for refusal exist leading to refusal of the request to share infrastructure, the issues relating to incentive-based determination of prices do not arise in the first place. However, if these grounds for refusal cannot be put forward, the pricing criteria of the DigiNetzG for access to the passive infrastructure must ensure that the company obliged to share the infrastructure receives can amortise its investment depending on its business plan and therefore that the incentives for future investment are fully maintained.

In the preamble to the bill, the legislator has drawn up a list of criteria that can be used to take the business plan into account. Any access obligation should take fully into account the economic viability of those investments *"based on their risk profile, any time schedule for the return on investment, any impact of access on downstream competition and consequently on prices and return on investment, any depreciation of the network assets at the time of the access request, any business case underpinning the investment (in particular in the physical infrastructures used for the provision of high-speed electronic communications services), and any possibility previously offered to the access seeker to co-deploy."*¹⁹

In order to be able to take the implications the sharing of infrastructure is likely to have for the business plan fully into account, it is ultimately necessary to typically consider the original calculations over the entire "life cycle" of the investment. In this context, it seems necessary in particular to take the risk profile of the investment into account as well as the time schedule for the return on investment mentioned in the preamble. Potentially, a large proportion of the amortisation and the anticipated return on the investment project will not be generated until a later stage of the project. That is why any time schedule for revenue and profits should be taken into account when prices for shared use of the infrastructure are determined and why revenue streams at the time the access request is made, when revenue tends to be lower, should not form the basis of plans covering the entire project duration.

¹⁹ cf. preamble to the bill drawn up by the Federal Government, Bundestag-Drucksache 18/8332, page 57.

Furthermore, the terms and conditions for sharing of infrastructure should take the relevant depreciation into account in scenarios in which the infrastructure to be shared and potentially even the investment as a whole have already been depreciated. Against this backdrop, it is relevant for determining the prices for shared use of infrastructure whether and to what extent the original business plan has already been realised.

According to the preamble, any co-deployment possibility previously offered to the access seeker should be taken into account. However, it is questionable how any such offer could be taken into account in a non-discriminatory way, for instance, in the form of different prices for the sharing of infrastructure for a company that has rejected an offer of co-deployment. In principle, however, it needs to be ensured – regardless of what approach needs to be adopted in cases in which a company has rejected an offer of co-deployment – that no incentives are created for strategic decisions as a result of inconsistent prices being charged for shared use of infrastructure or co-deployment. In this respect, the aim is to prevent the creation of incentives for telecommunications companies to reject an offer of co-deployment solely because they are hoping to retroactively benefit from shared use of the infrastructure at a more affordable price.²⁰

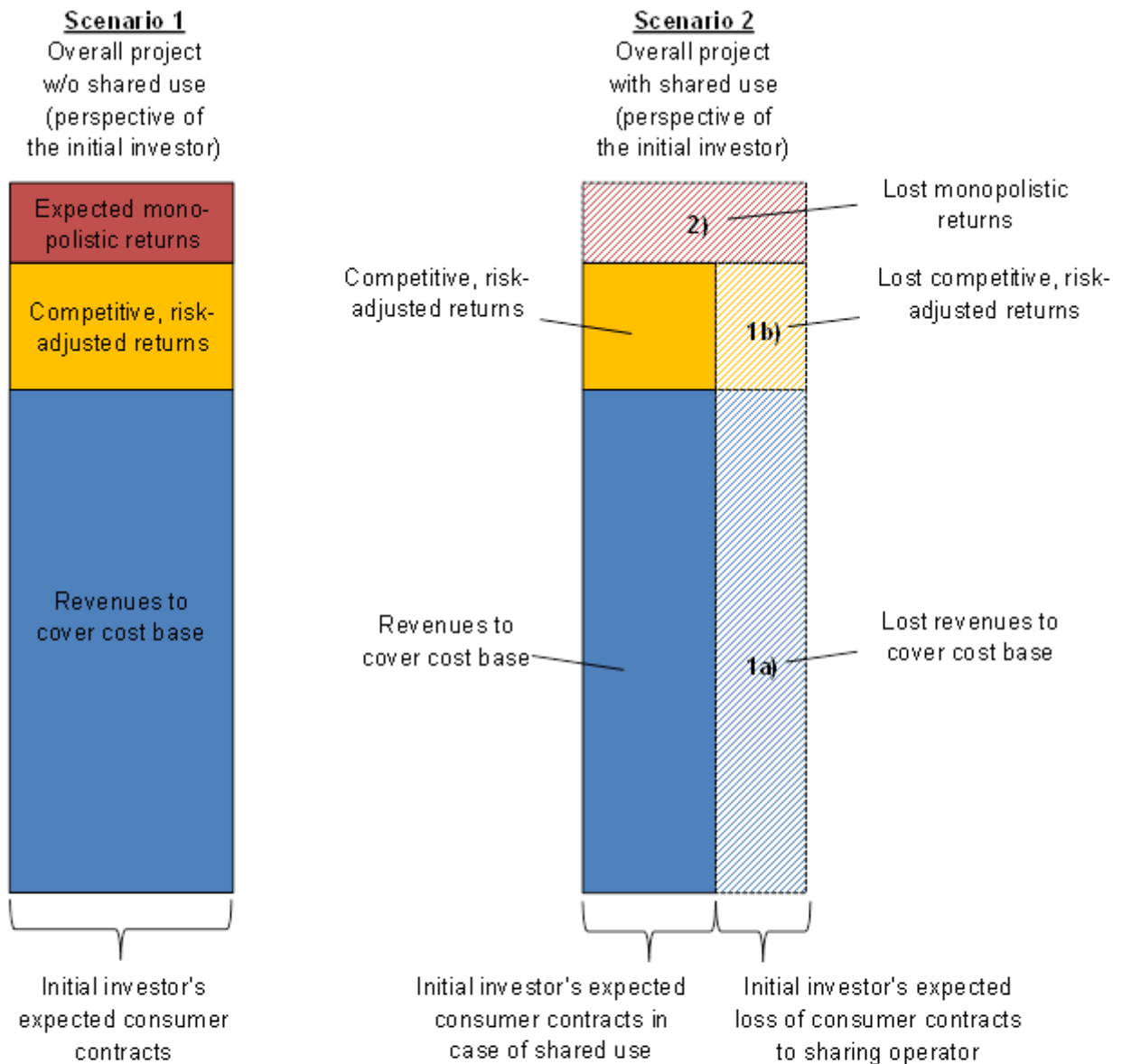
The specification "*any impact of access on downstream competition and consequently on prices and return on investment*"²¹ definitely plays a role, or probably even the key role, in taking the implications for the business plan into account. The preamble provides a clear indication here that the impact on the revenue potential of the network owner or network operator obliged to provide access must be taken into account. For the advent of a competitor on the basis of sharing of infrastructure changes the competitive situation and therefore the business plan for the company requested to grant access compared to a scenario in which the infrastructure is not shared. From an economic perspective, the opportunity cost principle can be used to illustrate what implications shared use of infrastructure can have. Generally speaking, opportunity costs describe the potential revenue that is forfeited when a company does not or is unable to invest in a specific option. By applying this opportunity cost principle to the specific scenario involving sharing of infrastructure pursuant to section 77n(3) TKG, an attempt is made to quantify the potential loss of benefit and revenue to the initial investor obliged to grant access to its infrastructure. These opportunity costs can subsequently be used, if applicable, to determine fair and reasonable prices for the shared use of infrastructure.

Figure 2 uses a simplified example to highlight how the implications for the business plan within the meaning of the opportunity cost principle can be taken into account.

²⁰ cf. in this regard also Chapter 2.2.7 and the relevant questions posed in II.q. and II.r.

²¹ cf. preamble to the bill drawn up by the Federal Government, Bundestag-Drucksache 18/8332, page 57.

Figure 2: Diagram illustrating what implications the shared use of infrastructure could potentially have for the initial investor's business plan.



Explanation:

- i) The sum of the hatched areas 1a), 1b) und 2) corresponds to the initial investor's opportunity costs.
- ii) The competitive, risk-adjusted returns should be interpreted as a project-related variable, which depicts the specific part of the project returns that can be achieved in typical competitive situations. Economically, this variable should be differentiated from monopolistic returns.
- iii) The parts of the project returns that are non-competitive, and which are denoted as monopolistic returns for reasons of simplicity, can only be achieved in a monopolistic market or a market with a comparably insufficient market or competition structure.

In Scenario 1, a (vertically-integrated) telecommunications company that is planning to invest in the deployment of telecommunications infrastructures – and particularly in civil engineering work – and to sell relevant retail products²², is relying on certain costs, revenues and a relevant return on its investment for an exemplary project. As such, it works out the revenue

²² If applicable, any such telecommunications company would also base its calculations on the sale of active and/or passive access products. In order to simplify matters, however, this has not been taken into account in Scenario 1.

it expects to achieve from the utilisation of capacity and retail prices it will charge. In this scenario, the telecommunications company making the investment assumes that the revenue it will generate from the deployment project will exceed the overall cost base of the project. As such, the cost base describes the actual investment costs (civil engineering work, network construction, sales etc.) incurred for the provision of retail products specifically for this project. In this scenario, the revenue exceeding the cost base corresponds to the sum total comprising a return on investment reflecting the risks involved that could be generated in a competitive market (if applicable, including a first mover advantage), and, if applicable, any further expectation of monopoly returns that could potentially be generated if the company was the sole provider of services in the project-related area.²³

Scenario 2 illustrates how the shared use of passive infrastructure by a competitor intending to provide retail customers with its own connection services²⁴ can potentially affect the initial investor's original plans. Some of the implications the shared use of infrastructure may have include the possibility on the one hand that some of the anticipated retail customer contracts and the relevant (competitive) retail revenue may be lost to the competitor²⁵ over the entire life cycle of the investment plan. On the other hand, the additional network infrastructure this would create has the potential to boost competition in the retail market meaning that it may not be possible to generate the monopoly return originally anticipated. From the network owner's or network operator's perspective, the revenue losses they generate compared to the original plans in this case are equivalent to the opportunity costs incurred by the shared use of infrastructure.

This loss of revenue and hence the opportunity costs that could be incurred by the shared use of infrastructure comprise the three components 1a), 1b) und 2) illustrated in the example provided in Figure 2:

²³ It needs to be emphasised at this point that a review of the business plan and the implications of the shared use of infrastructure for the business plan outlined in this consultation document and specifically in Figure 2 are based on the principles of investment planning and capital budgeting. The terms used within the meaning of capital budgeting refer exclusively to project-related variables. This means that strictly speaking, reference should be made to project-related payments (for the term costs), project-related deposits (for revenue) and project returns or project interest (for revenue) in Figure 2 and in the subsequent discussion.

From our perspective, the terms costs, revenue and return on investment that may have a different meaning in other specialised areas of business administration should be used because they are more commonly used in everyday language which makes them easier to understand.

²⁴ The telecommunications company sharing infrastructure may also be planning not just to provide retail products directly but indirectly via the sale of active access products on the basis of the shared, passive infrastructure.

²⁵ In order to simplify this example, the analysis of Scenario 2 does not consider that the telecommunications company sharing infrastructure may potentially acquire not just retail customers who the initial investor expected to cater for using its own infrastructure but also additional retail customers that do not switch with the initial investor, thereby increasing the utilisation of network capacity as a whole. Figure 2 therefore does not show the *macroeconomic* perspective of the advantages and disadvantages of sharing the existing passive telecommunications infrastructure but focuses on the *business* implications of sharing infrastructure for the initial investor. It is also assumed in Scenario 2 that the initial investor will not incur any additional costs by facilitating the shared use of infrastructure or if it does, that these costs would be borne by the telecommunications company sharing the infrastructure.

1) Contrary to its original plans, the initial investor may not be able to generate any revenue at retail level for retail customers who have switched to the competitor. These revenue losses can be broken down into the areas 1a) and 1b) as follows:

1a) Loss of revenue at retail level that would have contributed towards covering the cost base of the overall project according to original plans.

1b) Loss of revenue and profit at retail level corresponding to competitive project returns reflecting the risks involved that the initial investor could have expected to generate in the retail market.

2) There would be a loss of monopoly revenue both for retail customers who stay with the initial investor and for retail customers who switched from the initial investor to the competitor.

Against the backdrop of the criterion that the basic obligation to share infrastructure must not affect future investment incentives, the question arises at this point whether fair and reasonable prices for the shared use of infrastructure beyond covering the actual investment costs (1a) would need to ensure that as a rule compensation is offered for lost profits (1b and 2). In a second step, it would need to be examined whether it would make sense to use the initial investor's opportunity costs as a benchmark for determining prices for the shared use of infrastructure in order to maintain investment incentives.

This is where the above-mentioned distinction comes into play. Although it may be a wise move to offer compensation for lost revenue, in principle, it is questionable whether the prices for the shared use of infrastructure should offer compensation for all aspects of lost profits. This applies at the very least to profits that are based on the assumption that the markets are non-competitive (so-called monopoly returns). When taking the implications for the business plan into account, it therefore needs to be examined whether and to what extent the shared use of infrastructure might affect the business plan above and beyond the extent that is *inherent in competition*. As per Figure 2, it needs to be examined what return on investment the initial investor expected to receive with the project can be classified as competitive and reflecting the risks involved for the retail market (1b). These project returns should be reflected in the relevant prices for the shared use of infrastructure in addition to the loss of revenue needed to cover the cost base (1a). Any profits generated beyond this would be deemed monopoly returns (2) and so it is extremely doubtful they would be eligible for compensation.

In order to determine what return on investment would be subject to compensation, one of the assumptions which Figure 2 is based on needs to be modified in the next step. It was initially assumed in Scenario 2 that it would not be possible to generate cost savings, inter alia, with retail market sales meaning that granting access to competitors would not lower the costs base of the overall project for the initial investor. However, if it is assumed that the initial investor can actually generate cost savings owing to the fact that it has to limit itself partially to providing passive and/or active access products rather than retail products, the

question also arises *to what extent* the initial investor should be compensated for project return losses resulting from the shared use of infrastructure – area 1b) in Figure 2.²⁶

In this context, Figure 3 illustrates a number of ways in which project returns lost in relation to retail customers who switched from the initial investor to the company sharing infrastructure can be gauged. Three alternative compensation mechanisms of lost return on investment are illustrated as examples for each of the three levels of the value chain, namely retail products, active access products²⁷ and passive access products. As assumed, the levels of the value chain differ according to their respective cost base (blue area) required for the provision of the respective retail or wholesale product.²⁸

Another assumption on which Figure 3 is based is that, in principle, the respective competitive return on investment reflecting the risks involved can potentially be different between the three levels of the value chain.²⁹ This means, for instance, that a telecommunications company intending to provide retail customers with telecommunications services independently can, as a rule, expect to generate a higher return on investment in relative terms than a company that will merely provide these retail services indirectly by offering passive access products or that may potentially be limited to providing passive access products as a result of the shared use of infrastructure. However, considering that there are typically more companies competing in the retail market, vertically-integrated companies face greater uncertainty regarding customer acquisition and customer retention than mere infrastructure owners. However, this increased risk is juxtaposed by higher earning opportunities since they have the option of offering innovative services on the retail market. This could make it necessary to set different return targets particularly from the investors' perspective.

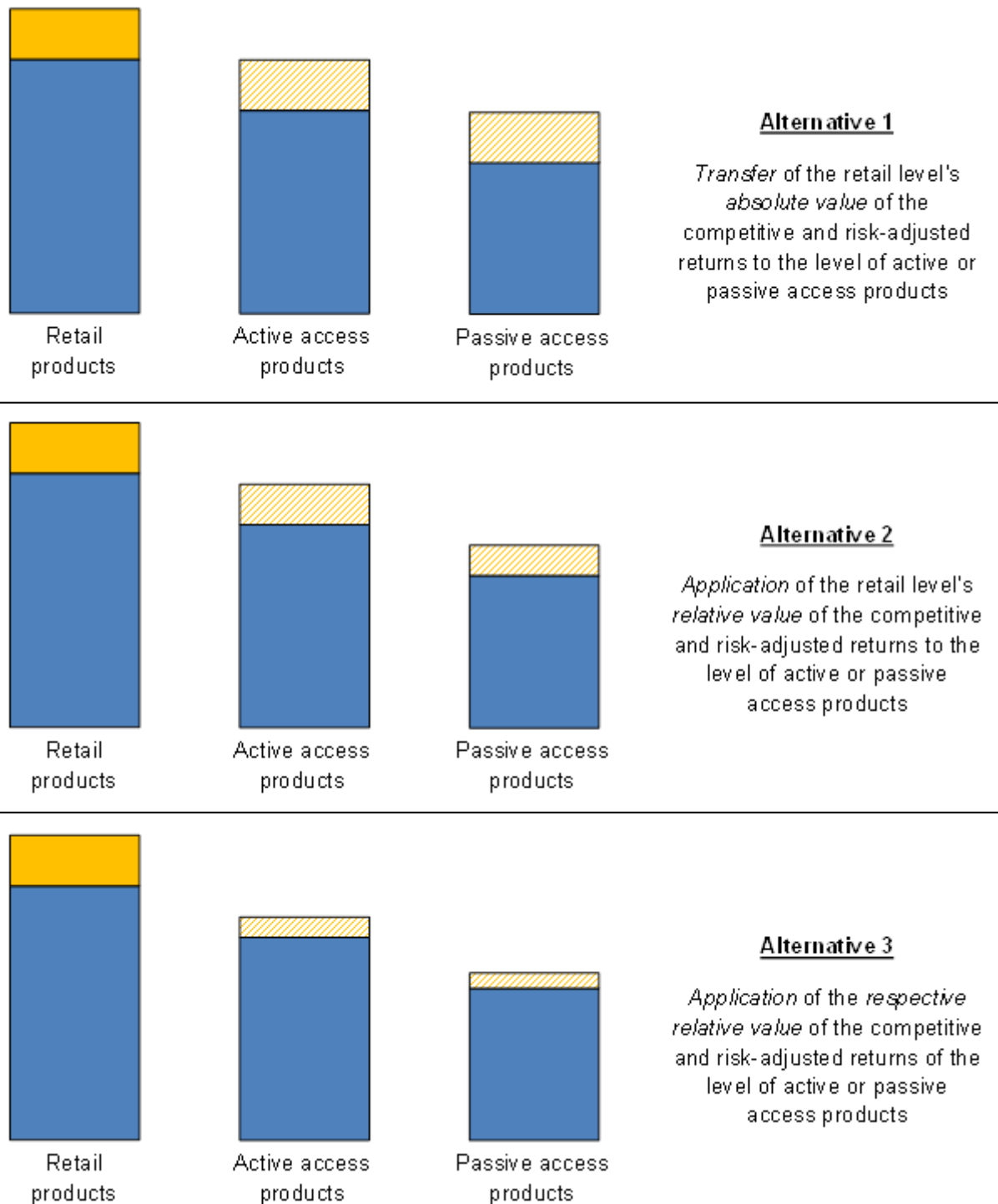
²⁶ The level of any such cost savings is likely to be relatively low in the short term as a large proportion of the costs incurred by the provision of retail products is generally classified as fixed costs, at least in the short term, meaning that the loss of a single customer or group of customers would not necessarily result in a proportionate reduction in costs. In terms of perspective, replacing retail business with the sale of passive and/or active access products can also be classified as a (partial) transition to a different business model. This means it might be possible to generate cost savings in the longer term.

²⁷ The relevance of active access products is not immediately apparent when taking into account what implications sharing of infrastructure might have for the business case as it exclusively involves the use of passive network elements. However, pursuant to section 77g(2) para 6 TKG, it is possible to refuse a request for the shared use of infrastructure if viable alternatives are offered, which allow "*shared use under fair and reasonable terms and conditions*". The information provided in the following may therefore apply – in the event that a request for the shared use of infrastructure is denied and alternative products are offered – also in relation to assessing "*fair and reasonable*" terms and conditions, including wholesale prices for these alternative, active access products. In addition, it is possible that an initial investor was relying on providing active access products that it could now replace (in part) by leasing passive access products as a result of the shared use of infrastructure. In any such scenarios, compensation for revenue generated at the stage of the value-added process of active access products is also relevant.

²⁸ Given that the cost base is identical, the application of the *level* of the return on investment in the retail market would be identical in *relative and absolute terms* to the return on investment eligible for compensation in Figure 2. Different values only emerge if potential cost savings are taken into account.

²⁹ It is worth noting that in this scenario even if the respective percentage of the competitive return on investment reflecting the risks involved is no different *in relative terms* in the three levels of the value chain, there would certainly be a difference in the compensation in accordance with Alternative 1 and the identical Alternatives 2 and 3. It would therefore appear to make sense to discuss reasonable compensation mechanisms in these scenarios too.

Figure 3: Diagram illustrating the return on investment (at different levels of the value chain) and potential compensation mechanisms.



Against this backdrop, Figure 3 illustrates three alternative compensation mechanisms that will be described in detail in the following.

It is assumed in Alternative 1 that *in absolute terms* the level of competitive project returns at retail level (orange area) reflecting the risks involved could also be transferred to the provision of passive and/or wholesale products (shaded areas). This approach would yield higher compensation in terms of lost return on investment compared to the other two mechanisms since lost revenue, assuming this does not distort competition, would be fully compensated. Any such determination would therefore be based on the premise that the level of return on investment *in absolute terms* calculated by the initial investor in the original plans for the deployment project should also be used *in the same amount* for compensation against the backdrop of the shared use of infrastructure.

Alternative 2 assumes that the level of returns at retail level reflecting the risks involved should be applied to the level of the value chain of passive and/or active access products in *relative terms* rather than *in absolute terms*. This would lead to compensation for the return on investment that would admittedly be lower *in absolute terms* than in the initial investor's original plan, but it would not change *in relative terms* in relation to the lower cost base of the lower level of the value chain. This alternative takes the notion into account that the initial investor would actually be generating cost savings compared to the original plan for the overall project. This means that although compensation based on the original plan may be appropriate, contrary to Alternative 1, it would need to be calculated in *relative terms* rather than in *absolute terms*.

Alternative 3 does not refer to the return on investment at retail level *in absolute terms* or *in relative terms* but applies the respective competitive return on investment of the individual levels of the value chain reflecting the risks involved *in relative terms* precisely to the retail level. This means that the return on investment that could be generated for the provision of passive or active access products in a competitive environment would need to be applied to the pertinent cost base of the relevant level of the value chain. In this regard, it is conceivable that owing to the above-mentioned differences in the investment risks involved in the three levels of the value chain, the *respective* competitive return on investment of the individual level of the value chain reflecting the risks involved may also differ *in relative terms*. This could, for instance, be reflected in a 20 percent return on investment for the provision of retail products and a 10 percent return on investment for the provision of active or passive access products. A compensation mechanism that applies these *different* values to the respective level of the value chain would be based on the rationale that the usual adequate return on investment for pure infrastructure owners is also appropriate when offering shared use of infrastructure owing to the reduced cost base. This means the initial investor's original plans for the return on investment based on the provision of retail products would be, by and large, disregarded.

In a nutshell, maintaining the incentive for initial investments can be defined as the prime objective for taking the implications of shared use of infrastructure for the business plan into account. However, the practical implementation of this goal seems to be not trivial in the light of all that has been discussed in the foregoing. In this respect, a typifying review of the plausibility and competitiveness of business plans could prevent investors from receiving

compensation retroactively by charging excessively high, unfair and unreasonable prices for the shared use of infrastructure just because they made inaccurate assumptions about achievable take-up-rates and retail prices.

In a second step, it would appear to be necessary to take into account the market share companies can realise after they have begun sharing infrastructure in a competitive environment in order to be able to estimate the profits and hence the opportunity costs the telecommunications network owner and operator will have lost compared to the original business plan after giving the other company access to its infrastructure. As such potential parallel infrastructures – for instance, existing copper or cable networks – and their substitutability from the retail customer perspective play an important role alongside the high-speed network being developed. It is also questionable in this regard whether it is viable to consider all the respective scenarios of initial investors and customers on a case-by-case basis. It would therefore seem appropriate to apply as high a level of objectification as possible when determining what implications the shared use of infrastructure is likely to have by taking basic parameters of business plans into account. This can be implemented, for instance, by means of creating clusters cases based on common regional or competitive features.

Despite the difficulties involved in the practical implementation of statutory requirements for determining fair and reasonable prices for the shared use of infrastructure outlined in the foregoing, the goal of maintaining incentives for initial investments can be accomplished in particular if the economic viability of investments that are likely to be impacted by the shared use of infrastructure and hence the respective business plans are taken fully into account.

In this respect, the concrete implementation suggestions and in particular the implementation proposal based on the opportunity cost principle will be discussed within the framework of the questions II.f. to II.k. posed.

2.2.4 Pricing structure

The question also arises as to how the relevant prices should be structured in scenarios involving the shared use of infrastructure pursuant to section 77n(3) TKG. Similar to sharing of infrastructure pursuant to section 77n(2) TKG, additional costs are a component of prices for the shared use of infrastructure meaning that similar considerations regarding non-recurrent charges are also relevant in this scenario. Notwithstanding this, the prices for shared use of infrastructure pursuant to section 77n(2) and section 77n(3) TKG differ above all insofar as in cases of obliged telecommunications network owners and operators the prices take into account the implications the shared use has for the business plan.

This price component that could be implemented by offering compensation for the opportunity costs incurred by the sharing of infrastructure is of key importance and should generally determine the price level and in particular, to a large extent, also the price structure. Bearing in mind that the opportunity costs should be considered to be relevant over the entire "life cycle" of the investment, it would appear to make sense to define a recurrent cost item and thus also price item. In principle however, another alternative would be to pay the present value of the opportunity costs in the form of a non-recurrent payment.

Question II.l of the list of questions at the end of this chapter gives market players the opportunity to comment on the role compensation of the opportunity costs plays within the framework of determining the pricing structure.

2.2.5 Consistency with other regulatory decisions

Pursuant to section 27(2) TKG, the Bundesnetzagentur is responsible for coordinating price regulation measures, thereby establishing consistent regulatory practise. It is true that decisions by the national dispute settlement body do not come under market regulation or price regulation. However, the consistency requirement that is enshrined in the Telecommunications Act should be taken into account with regard to prices determined in accordance with section 77n TKG and in the Bundesnetzagentur's general decision-making practise.

For this reason, it seems important to examine potential correlations with the Bundesnetzagentur's general market regulation practise and also with broadband funding through state aid that will be discussed in Chapter 2.2.6. A discussion of pricing criteria in relation to the DigiNetzG that fails to take these issues into account could otherwise disregard relevant correlations, thereby causing market players to make decisions that distort competition. Questions II.m and II.n are intended to give market players the opportunity to comment in particular on aspects that may need to be taken into account in this respect.

In order to prevent market distortions, the legislator explicitly points out in the preamble that prices and tariffs in particular that have already been regulated by a Bundesnetzagentur decision and apply to wholesale products overlapping with the requested sharing of infrastructure are to be used as a benchmark.³⁰ The benchmark enables the national dispute settlement body to take any information that is available regarding investment structures and cost structures from other proceedings into account on the one hand and to endeavour to achieve the greatest possible level of consistency in determining prices on the other.

However, regulated access entitlement to the cable conduits of any company that has significant market power³¹ shows that the assumptions made can only be transferred to a very limited extent and that for this reason, in many cases these kinds of regulatory decisions (or the concrete decisions on prices) cannot be used as a comparison. There are three assumptions and features of the decisions taken by the Ruling Chamber in the proceedings BK 3a-16/006 that speak against using cable conduit prices as a benchmark for scenarios in which prices are to be determined in accordance with the DigiNetzG:

- Cable conduit prices are calculated on the basis of the specific assumption and cost documents of a nationwide telecommunications network that is modelled for an efficient competitor. It is not possible to adequately map regional cost differentials that exist because of geographical features in the respective deployment area or different cost structures or economies of scale the telecommunications network owner or operator may have.

³⁰ cf. Preamble to the bill drawn up by the Federal Government, Bundestag-Drucksache 18/8332, page 56.

³¹ cf. The relevant decision by Ruling Chamber 3 (reference number: BK 3a-16/006).

- A large section of Deutsche Telekom AG's passive infrastructure had already been depreciated at the time the decision was taken so was therefore not included in the cable conduit prices. Generally, this assumption does not apply to other telecommunications infrastructures developed for the purpose of creating a high-speed-ready telecommunications network.
- Regulated access entitlement with the relevant prices apply exclusively as an ancillary service to access to the street cabinet for the local loop and only to a clearly defined section of this local loop, specifically the section between the main distribution frame und street cabinet. A nationwide average value is derived from the modelling of efficient use of individual ducts on this section of the network and the relevant distribution of costs based on a specific configuration of active network infrastructure the likes of which would potentially not be available in other scenarios involving the shared use of infrastructure.

2.2.6 Correlation with public funding

As already outlined in Chapter 2.2.3, it is anticipated that access entitlements according to the DigiNetzG to passive infrastructure developed specifically for the purpose of developing a telecommunications network will, as a rule, have implications for the initial investor's business plan. In principle, this also applies with a view to access entitlements exercised for subsidised telecommunications infrastructures pursuant to the DigiNetzG. When assessing the implications for the business plan, there is, however, one special aspect that needs to be taken into account, namely that access must be given to the active and passive infrastructure by virtue of provisions set forth in legislation on state aid. This means that the provision of wholesale products should already be anticipated when the original business plan is drawn up. The extent to which the access demand for active and passive wholesale products is taken into account should be based on the (maximum) number of competitors who can operate sustainably in the specific deployment area, taking economic aspects into account. Against this backdrop, any access requests pursuant to the DigiNetzG would merely replace in part (or in full) the demand for access to wholesale products already envisaged in the original business plan.

In this regard, relevant prices for the shared use of infrastructure pursuant to the DigiNetzG would need to compensate for the loss of revenue originally expected to be generated by access as per legislation on state aid. This approach would take the implications for the original business plan into account and follow the opportunity cost principle referred to in Chapter 2.2.3. Against this backdrop, this should, in the final analysis, not lead to any *substantive* changes to the calculation of profitability in any such scenario, meaning that fair and reasonable charges for the shared use of infrastructure specified in the DigiNetzG should basically ensure that any obligation to share subsidised telecommunications infrastructures would not have any *additional* impact.

The pricing criteria to be applied are of paramount importance owing to the entitlements to sharing of infrastructure that exist in parallel under the DigiNetzG and state aid legislation. Compensation within the meaning of the opportunity costs principle is facilitated at this point if there is as little differential as possible between access prices pursuant to provisions set forth in state aid legislation on the one hand and the DigiNetzG on the other. The information

provided in this chapter is therefore intended to highlight the respective pricing criteria for these access entitlements and to contribute towards the consistent application of these two criteria. Some aspects are also highlighted that need to be taken into account with invitations to tender and when awarding contracts for subsidised projects in order to ensure these pricing criteria are implemented consistently.

In principle, the expansion of broadband infrastructures in the EU Member States can only be funded if this complies with the General Block Exemption Regulation³² and the EU Guidelines for the application of state aid rules in relation to the rapid deployment of broadband networks³³ containing the specific details. Both sets of rules explicitly envisage granting open access to subsidised networks at wholesale level.³⁴ In Germany, a large proportion of subsidised projects come under so-called framework schemes; notification and approval of such framework schemes vis-à-vis and by the EU Commission dispenses with the need for individual notification of projects covered by the respective framework scheme. In addition to the NGA framework scheme³⁵ that has applied nationwide since June 2015, there are some funding framework schemes in place in a few of the Federal Länder. In the following, focus will, however, be placed on the requirements and criteria of the NGA framework scheme. Although the wording of European and country-specific requirements may differ in individual cases; there is no substantive difference in the regulatory concept.

In accordance with the NGA framework scheme, the provision of open and non-discriminatory network access, including access to ducts and other downstream wholesale products, is mandatory.³⁶ This means that both telecommunications network owners and operators and public authorities should take the impact future pressure from competition by customers with a demand for active and passive wholesale products is likely to have into account in the original plans in respect of subsidised deployment projects. Regardless of this, the DigiNetzG has implemented additional entitlements to sharing of passive telecommunications infrastructures.

The question arises in this regard whether the pricing criteria defined in legislation on state aid for access to ducts to subsidised infrastructures, that will be explained in more detail in the following, is compatible with the pricing criteria defined in the DigiNetzG, namely fair and reasonable terms and conditions. If the terms and conditions were inconsistent, access seekers could possibly file a request for access under the relevant state aid provisions or under the DigiNetzG depending on which they think will be more beneficial to them. It therefore seems important to ensure comparable and consistent criteria and methods apply in respect of prices for the shared use of passive infrastructures – in the context of state aid on the one hand and the DigiNetzG on the other.

³² cf. Commission Regulation (EU) No 651/2014 of 17 June 2014 declaring certain categories of aid compatible with the internal market in application of Articles 107 and 108 of the Treaty Text with EEA relevance.

³³ cf. Communication from the Commission — EU Guidelines for the application of state aid rules in relation to the rapid deployment of broadband networks (2013/C 25/01).

³⁴ cf. Article 52 para 5 der General Block Exemption Regulation as well as clause 78g of the EU Guidelines for the application of State aid rules in relation to the rapid deployment of broadband networks.

³⁵ cf. Framework scheme of the Federal Republic of Germany in support of the roll-out of nationwide Next Generation Access (NGA) broadband coverage of 15 June 2015.

³⁶ cf. NGA framework scheme, section 7(2).

The wholesale prices to be paid for access to subsidised infrastructures – in particular also for access to ducts – are, pursuant to section 7(5) of the NGA framework scheme (1) in principle, to be based on prices charged for identical or comparable access services in more competitive regions. If it is not possible to make any such benchmark comparison, prices (2) should be based on wholesale prices that have been specified or approved by the Bundesnetzagentur for identical or comparable access services. In the event that no prices have been fixed for either alternative, section 7(6) of the NGA framework scheme says that (3) *"the wholesale prices [shall be] agreed between the operator and the access seeker. If it is not possible to reach an agreement, the public sector shall be obliged to fix the wholesale prices. To this end, the Bundesnetzagentur shall be consulted. It shall issue binding proposals for the fixing on wholesale prices within the framework of a statement within four weeks."* Additional restrictions regarding the criteria to be applied by the Bundesnetzagentur are not addressed so it can be assumed there is a certain amount of room for manoeuvre.

It is crucial for assessing the consistency between the pricing criteria of the first two mechanisms (pursuant to section 7(5) of the NGA framework scheme) and those of the DigiNetzG to establish whether the access services from more competitive regions are comparable to those based on decisions taken by the Bundesnetzagentur. This only seems to be the case if prices take regional cost differentials and project-related risks adequately into account. If the conclusion is drawn in individual cases that any such benchmark comparison can be drawn or prices fixed by the Bundesnetzagentur can be used as a benchmark, it seems possible that, in principle, consistency can be established with the pricing criteria defined in the DigiNetzG. For when the criteria defined in the DigiNetzG are used to determine prices, the parameters of the investment project are taken into account in a similar way.

However, there is reason to assume it will only be possible to use prices from comparable benchmark regions where competition is stiffer to determine prices for access to the passive infrastructure in accordance with legislation on state aid in very few cases, at least in the short to medium term. Even regulated wholesale prices and wholesale prices otherwise determined by the Bundesnetzagentur for identical access services or access services similar to those provided via empty ducts can only be referred to in rare cases. As a rule, it is difficult to apply already existing prices and charges to other funding projects owing to the above-mentioned parameters that vary from case to case.

This means that as a rule, the operator and access seeker will need to negotiate wholesale prices for subsidised infrastructures in the short to medium term.

In accordance with the Guidelines for the application of state aid rules in relation to the rapid deployment of broadband networks³⁷, it needs to be ensured, also in respect of the funding measures of the NGA framework scheme, that the wholesale prices comply with the principles of cost orientation, taking the local conditions into account. As such, any state aid granted must also be taken into account. The Bundesnetzagentur has pointed this out in the

³⁷ cf. Guidelines for the application of state aid rules in relation to the rapid deployment of broadband networks (2013/C 25/01), Rn. 78 lit. h.

information it has provided about contractual arrangements under the NGA framework scheme.³⁸

Companies that have been identified by the Bundesnetzagentur as having significant market power are incidentally not permitted to charge any prices other than those approved by the Bundesnetzagentur for wholesale access services subject to price approval as per Part 2 of the Telecommunications Act. This is relevant in particular for determining prices for active access products and for access to the unbundled local loop. At present, this would only apply to access to the passive infrastructure under very specific conditions.³⁹

If the operator and access seeker fail to reach an agreement, the NGA framework scheme makes provision for the public sector to determine the wholesale prices. In this respect, it seems possible, in principle, given the broad discretionary scope, for the public sector to select suitable principles in order to establish consistency between the pricing criteria under legislation on state aid and the DigiNetzG.

By ensuring the pricing criteria are consistent, the aim is to create an environment that basically prevents potential distortion of competition arising from entitlements to sharing of infrastructure under the DigiNetzG. However, in order to ensure pricing is ultimately consistent, even the contracting parties (beneficiaries and operators of subsidised infrastructures) of public funding projects must help to prevent distortion of competition. In this respect, it would need to be ensured that individual network operators – regardless of whether they are access providers or access seekers – do not have an unfair advantage vis-à-vis other operators involved, as outlined in the foregoing. To this end, it needs to be ensured, as mentioned before, that all competitors benefit equally from state funding and have the same opportunities for success and revenue in the retail market.⁴⁰

Against this backdrop, the proportion of deployment costs already covered by state funding should be taken into account when prices for the shared use of infrastructure are determined pursuant to the DigiNetzG – similar to the determination of prices in accordance with legislation on state aid. In this scenario, prices for the shared use should be reduced by the deployment costs borne by the public sector in order to prevent telecommunications companies sharing infrastructure and their retail customers from having to pay civil engineering costs twice.

Furthermore, it is particularly relevant to ensure the lease agreement concluded between the local network owner and the respective network operator offers sufficient flexibility in terms of the network rental to be paid when the operator model⁴¹ is selected as the funding

³⁸ Information about the organisation of access obligations under the NGA framework scheme; published at www.bundesnetzagentur.de/nga-rr-hinweise.

³⁹ cf. in this context, the discussion about regulated cable conduit charges in 2.2.5.

⁴⁰ Competitors sharing infrastructure would, however, have to compensate the initial investor for cost disadvantages as they would be required to bear any additional costs incurred by the shared use of infrastructure from a macroeconomic perspective. This encompasses both direct additional costs incurred by the sharing of infrastructure as well as additional costs of providing services of their own (for instance, for active network components or the marketing of retail customer products).

⁴¹ With the operator model, the respective telecommunications company plays the role of network operator exclusively while the local authority retains ownership of the passive infrastructure. Both parties conclude a lease agreement prior to commissioning of the infrastructure.

mechanism, bearing in mind the need to ensure prices for the shared use of infrastructure are consistent. Otherwise, it would not be possible to ensure the network lessor is not at a disadvantage vis-à-vis the telecommunications network operator requesting access if the potentially consistent network rental covered a larger proportion of the original deployment costs than the prices for the shared use of infrastructure which the competitors have to pay. By contrast, flexible contractual arrangements defining the network rental to be paid based on the number of contracts actually concluded with retail customers can contribute significantly to ensuring that the prices for the shared use of infrastructure limit the implications for the network operator's original plans to an extent that is inherent in competition in accordance with section 77n(3) 3 TKG.⁴²

Although it was pointed out in this chapter that there is some overlapping between the provisions set forth in the DigiNetzG and public funding of projects for high-speed-ready telecommunications networks, it is not anticipated that there will be any fundamental changes in the funding scene or the pertinent incentives for investment of private industry or the public sector. All things considered, consistency in pricing for the shared use of infrastructure will ensure that the incentives for investment in the deployment of high-speed-ready networks will not be affected by sharing of infrastructure under legislation on state aid or under the DigiNetzG. If further considerations of market players happen to be relevant in this regard, they will have the opportunity to comment in Questions II.o. and II.p.

2.2.7 Correlation with co-deployment pursuant to section 77i(1 to 5) TKG

In order to ensure there is consistency between the various regulatory decisions taken by the Bundesnetzagentur, but also with the general objective of the Telecommunications Act, it is important in addition to the above-mentioned aspects, that there is a meaningful gradation between the different levels of the value chain. This means that the scenario involving co-deployment to be discussed in Chapter 3 should be also be taken into account in respect of the determination of prices for the shared use of infrastructure. This indicates that it is not possible to make a generalisation as to whether the shared use of existing, passive infrastructure or the co-deployment of newly-developed infrastructure would be more expedient for minimising the macroeconomic costs of nationwide deployment of high-speed networks and sustainably competitive telecommunications markets. Yet a consistent determination of prices – as discussed in Chapter 2.2.3 – should at the very least ensure that from a business perspective, strategic waiting for competitors to make initial investments becomes less profitable than deployment endeavours based on the spirit of cooperation. The consistency between the shared use of infrastructure and co-deployment can be discussed in the following list of questions (Questions II.q. and II.r.).

⁴² In principle, this also applies to the profitability gap model, although the contractual relations differ considerably from those with the operator model; owners and operators form a single entity here so that as a rule, network leasing agreements are irrelevant.

Questions

II. How should pricing criteria for sharing of infrastructure be defined in scenarios involving telecommunications owners and operators obliged to give access pursuant to section 77n(3) TKG?

Conceptual distinction from section 77n(2) TKG

- a. To what extent do the companies or public bodies deploying infrastructure have legitimate interests in relation to "sovereignty" over the level of maximum depth of added value competitors can achieve in scenarios involving the shared use of network components by competitors? How is the future obligation to grant access to infrastructure likely to affect the current incentives for initial investment?
- b. What contribution can the existence of a second (or third) parallel high-speed-ready infrastructure without the inefficient duplication of civil engineering work make towards sustainable competition on the retail customer market?
- c. What role can (for instance, active) wholesale products play as an alternative to the shared use of passive infrastructures in terms of safeguarding fair competition? What requirements would alternative access products need to meet – also in accordance with the grounds for refusal ensuing from 77g(2) TKG – in order to be able to play any such role?
- d. How can a balance be struck between the regulatory goals of promoting competitive markets and expediting broadband roll-out? What aspects should be taken into special consideration?

Components of additional costs

- e. Are there any other components of additional costs apart from the cost components discussed in Chapter 2.1.1 that might be relevant for supply network owners and operators who are not involved in the telecommunications industry that may arise in the specific scenario involving the shared use of a passive telecommunications infrastructure?

Implications for the business plan

- f. How can pricing criteria be defined in the area of tension between maintaining incentives for investment and boosting infrastructure competition described in the foregoing?
- g. What parameters of a business plan⁴³ above and beyond the list of criteria defined in Chapter 2.2.3 and what parameters of a business plan or what specifications of these aspects are deemed to be relevant for determining prices within the framework of shared use of infrastructure?
- h. Should any previous refusal of an offer of co-deployment be taken into account when prices for shared use of the infrastructure are determined? If so, in what way?
- i. Is it appropriate to take the implications for the business plan into account via lost revenue or the opportunity cost principle, as outlined in Chapter 2.2.3 and illustrated in Figures 2 and 3? In what other ways might these implications be taken into account?
- j. To what extent should initial investors be compensated by prices for the shared use of infrastructure against the backdrop of the application of the opportunity cost principle? Which of the above-mentioned alternatives for determining the lost return on investment – transfer of the amount of return on investment at retail level in absolute terms, application of the relative return on investment at retail level or application of the relative return on investment at passive access product level – is the most expedient in this regard?
- k. Should initial investors also be compensated, above and beyond this, for monopoly returns that could be realised by foreclosing competitors and possibly be planned for prior to granting access to the infrastructure?

Pricing structure

- l. Do the basic considerations in relation to the pricing structure in scenarios involving the shared use of infrastructure referred to in section 77n(3) TKG differ from the scenarios involving the shared use of infrastructure referred to in section 77n(2) TKG that were discussed in Chapter 2.1.3? If so, are they more likely to involve recurrent prices that could take implications for the business plan into account?

⁴³ The Preamble says the following "Hence, any access obligation should fully take into account the economic viability of those investments based on their risk profile, any time schedule for the return on investment, any impact of access on downstream competition and consequently on prices and return on investment, any depreciation of the network assets at the time of the access request, any business case underpinning the investment, in particular in the physical infrastructures used for the provision of high-speed electronic communications services, and any possibility previously offered to the access seeker to co-deploy [...]." (cf. Preamble to the bill drawn up by the Federal Government, Bundestag-Drucksache 18/8332, page 57).

Consistency with other regulatory decisions

- m. What special aspects need to be observed in order to ensure the decision-making practice of the national dispute settlement body is consistent with regard to market regulation? What regulatory decisions taken so far should special focus be placed on in this regard?
- n. What are the similarities and differences, for instance, between the sharing of infrastructure pursuant to section 77d TKG discussed in the foregoing and access to the cable conduit of the company with significant market power?

Correlation with public funding

- o. Is the potential sharing of infrastructure under the DigiNetzG expected to have any *additional* impact on the revenue and depreciation plans of subsidised deployment projects – contrary to the result of the discussion in Chapter 2.2.6? If so, what distinguishes the obligations ensuing from the DigiNetzG and the obligations to grant access to the passive infrastructure already ensuing from legislation on state aid?
- p. Are the pricing criteria of legislation on state aid referred to in the foregoing compatible with the pricing criteria defined in the DigiNetzG or do fundamental reservations exist about these criteria being consistently applied?

Correlation with co-deployment pursuant to section 77i TKG

- q. What determines in each individual case whether preference should be given to co-deployment or sharing of infrastructure from a macroeconomic perspective?
- r. What aspects need to be taken particularly into account from a market perspective in order to ensure there is consistency between co-deployment and sharing of infrastructure?

3 Pricing criteria in relation to the coordination of civil works

The second alternative the DigiNetzG provides to the use of synergies during the roll-out of high-speed digital networks is the co-deployment of telecommunications infrastructure in those instances where civil works are already being carried out and are partially or entirely financed by public means. This new legislative provision can ensure that the network roll-out is more efficiently organised because the co-deployment of telecommunications infrastructure and the additional costs arising from the necessary coordination with the initial builders are usually to be expected to be relatively low. In light of this, coordinating civil works that are being done anyway to maintain or install another supply network or coordinating work being done on traffic routes can be conducive in a number of ways to the regulatory objectives of the Telecommunications Act. Firstly, this coordination can, for example, make establishing high-speed networks in a region for the first time cost-effective from a market-based point of view. Secondly, it can enable the efficient building of parallel telecommunications infrastructures because it avoids inefficient duplication of civil engineering works.

With regard to the principles which are to apply to the allocation of the costs of coordinating construction measures to the requesting telecommunications undertakings, section 77i (4) of the Telecommunications Act provides that the Bundesnetzagentur specify these principles. This chapter aims to provide a starting point for a discussion of these principles. It must be noted in this connection that, by defining fair and non-discriminatory conditions including the prices set forth in the coordination agreement, the decision of the Dispute Settlement Body in cases under section 77n (5) of the Telecommunications Act covers not only the coordination as such but also the allocation of the costs of the actual shared civil works.

From an economic standpoint, there are also arguments for differentiating by type of obligated supply network owner or operator in the case of co-deployment and thus differentiate between telecommunications network owners or operators on the one hand and other supply network owners or operators without telecommunications business on the other. Looking at the former, the obligation to coordinate civil works probably affects the actual area of business and the respective investment plan in many cases, whereas with the latter, coordinated deployment probably has no direct impact on the respective business interests. This document assumes – for the purpose of accurately identifying possible consequences of such a differentiation and to clearly present them – that the aforementioned differentiation applies. This is without prejudice to the principles/ guidelines that are to be published pursuant to section 77i (4) of the Telecommunications Act, which determine how the costs of co-deployment to be allocated to the requesting telecommunications undertaking.

A differentiation by field of business, as put forward for discussion in this consultation paper, follows a similar line of reasoning which provides the basis for the shared use case and, in contrast to co-deployment, is explicitly laid down as a rule in law (section 77n (2) and (3) of the Telecommunications Act). As already explained in detail in chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**, from an economic standpoint, when assessing fair and reasonable conditions for the right to shared use under the DigiNetzG, it is necessary to take into account additional aspects when the underlying investment has been made for telecommunications purposes. This derives primarily from the consideration to be

given to the regulatory objectives set forth in section 2 (2) of the Telecommunications Act. If it were not possible to take these objectives into account, distorted market results and, particularly, the risk that investment decisions are affected would go hand in hand with the existing right to access set forth in the DigiNetzG. This would – as also described in chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** – negatively impact efforts to achieve the regulatory objectives.

From an economic standpoint, investment decisions would be similarly impacted in the case of co-deployment as well when the regulatory objectives are not taken into account. This is not the case for obligated supply network owners or operators that do not conduct telecommunications business. In this regard, the National Dispute Settlement Body pointed out in the first decisions regarding planned co-deployment projects that in order to avoid negatively impacting incentives to be the first undertaking to develop an area *"the repercussions on the incentives to roll-out high-speed networks nationwide [must be] taken into account when specifying the terms for co-deployment as regards telecommunications network operators or owners."*⁴⁴

On the basis of these considerations, a fundamental differentiation between these two types of cases will also be applied in the following chapter to enable a systematic and comprehensive examination of the economic rationale and the issues arising from this differentiation. In the case of questions III.a and III.b, which can be found at the end of chapter 3.1, there is the opportunity to comment on the differentiation applied in cases of co-deployment.

3.1 Case of co-deployment in relation to supply network owners or operators with no telecommunications business

As a rule, the costs of civil works that are carried out on a joint basis can be divided into two blocks. Independently of the co-deployment, costs are incurred for conducting the originally planned civil works, particularly for the civil engineering works. These costs differ from the costs that are incurred through coordination or co-deployment. For this reason, the elements of the additional costs will first be examined and then the basic principles for a possible allocation of the original costs for civil engineering work.

3.1.1 Components of additional costs

Looking at the *additional* costs arising as a result of co-deployment, it appears appropriate, in terms of the costs-by-cause principle, that the requesting undertaking bears these costs. Section 77i (3) second sentence, No. 1 of the Telecommunications Act states in this connection that request for co-deployment is reasonable particularly when the co-deployment does not generate any additional costs *for the originally planned civil works*. Therefore this criterion does not apply to additional costs in general but rather to those additional costs which would otherwise remain with the initial investor and consequently not be borne by the undertaking that requested the co-deployment.

⁴⁴ See margin note 97 et seq. on Ruling Chamber BK11-17/001 decision. A summary of the material aspects of this decision can be found on page 117 et seq. of the Bundesnetzagentur's 2016/2017 Telecommunications Activity Report (only available in German).

Additional costs for co-deployment can consist of the following components, to mention just a few:

- additional transaction or planning costs arising from the necessary adjustment of the original plan,
- additional civil engineering costs arising from the changes in the routing or the necessary widening or deepening of the trench,
- material and construction costs for additional safety measures owing to the additional occupancy of the trench.

The questions IV.a and IV.b, which can be found in the questions at the end of this chapter are aimed at helping further define the components of the additional costs. As in the case of shared use, it can be said with regard to the above examples that the type of infrastructure to be installed by the obligated supply network owner or operator can have a material influence on the type and amount of the additional coordination or co-deployment costs. For example, it can be assumed that the additional costs would be relatively low in the case of supply networks that require a trench depth and routing similar to those used for telecommunications infrastructure. In such cases, the additional planning and implementation costs would be manageable and changes in the location or depth of the trench would be unlikely.

The difference between shared use and co-deployment is greater with regard to the point in time when the costs are realised.⁴⁵ It can be assumed that additional costs for construction site coordination or co-deployment primarily arise at the time the civil works are carried out and are therefore to be characterised as one-off costs. However, also in the case of co-deployment, differentiating between the components based on whether they are the distance-based or non-distance-based additional costs remains relevant as well.

This applies with regard to the additional civil engineering works that are necessitated by changes in the routing or necessary changes in the width or depth of the trench. In this case – as well as for additional material and civil works costs for additional safety measures – such costs are clearly dependent on the length of the particular section of construction, which is probably reflected in the cost structure. In addition, there are cost components, such as the above-mentioned plan adjustments which are in some ways dependent on the geographic dimensions of the project, but by no means proportionately. In this respect, these costs should be described as *non*-distance-dependent.

3.1.2 Principles of possible cost sharing

Beyond the additional costs for coordination or co-deployment, it would be possible in principle when determining the prices for co-deployment to have the parties involved share the actual investment costs as well, particularly for the civil engineering works. The fact that both (or further) supply network owners or operators could enjoy the positive synergies arising from coordination would support this type of cost sharing. However, the obligation to

⁴⁵ Cf. the matrix shown in Figure 1 regarding the categorisation of cost components according to their characteristics.

coordinate applies only to those types of civil works that are financed entirely or partially using public means. Therefore, passing on part of the potential for synergies to the obligated supply network owner or operator does not appear to be necessary as a general rule. This is because public entities involved in the co-deployment or undertakings that benefit from the provision of public resources are particularly obligated to pursue the statutory objectives of facilitating the roll-out of high-speed-ready telecommunications networks.

In light of the similarities to shared use, limiting the price to the additional costs appears to be possibly more expedient. In contrast to shared use, the costs for building the infrastructure do not lie in the past, but have yet to be incurred due to the fact that civil works have to be carried out. Provided that the requesting undertaking bears the additional costs of the co-deployment, obligated supply network owners or operators with no telecommunications business - analogously to the case of shared use - should however want to carry out the construction project even without receiving (proportional) compensation for the investment costs. On the other hand, the possibility of cost sharing could reduce the number of, from the standpoint of the telecommunications network owners or operators, lucrative opportunities for co-deployment and thus partially stand in the way of the DigiNetzG's objectives, particularly the objective of reducing the costs for the nationwide roll-out of high-speed networks.⁴⁶

These considerations should possibly be followed by a discussion of whether, in order to achieve the general objective of the DigiNetzG even though it is not possible to apportion the investment costs, at least the payment of a mark-up would be suitable for creating an incentive. The fact that no additional incentive to allow co-deployment ought to be necessary due to the public-sector financing of the civil works would however militate against allowing this type of mark-up, based on consistency considerations in the context of shared use.

In the event that sharing investment costs were to be nevertheless viewed as appropriate (in deviation from the foregoing discussion), the question would arise which criteria should be used to allocate these costs. Numerous options would be conceivable here that can be broken down in principle into general cost-sharing rules on the one hand and rules based on technical characteristics on the other.

General cost sharing arrangements can, for example, split the costs equally, such as 50 percent per party when there are two parties involved or 33 percent per party in the case of three parties, or an equal division including an adjustment factor for the party that is in charge of the civil works. Such an adjustment factor can compensate the undertaking that assumes the supervision of the civil works; this is accomplished by reducing the share of the civil works costs it must bear. In practice, this type of arrangement with an adjustment factor frequently takes the form of cost sharing arrangements where 45 percent of the costs are assigned to the obligated undertaking which, in keeping with the underlying assumption,

⁴⁶ See also the study on the implementation of the Broadband Cost Reduction Directive conducted by WIK-Consult for the Federal Ministry of Transport and Digital Infrastructure (WIK-Consult, "Preissetzung für die Mitnutzung von Infrastrukturen - Umsetzung der Kostensenkungsrichtlinie [Setting prices for the shared use of infrastructure - Implementation of the Broadband Cost Reduction Directive], p. 34).

takes on the supervision of the civil works and 55 percent of the costs are assigned to the requesting undertaking.⁴⁷

Other methods for determining the share of the costs to be borne take into account the technical requirements for installing the respective supply network infrastructure. For example, the relative amount of space used within the trench, the necessary installation depth or a combination of these two parameters can be used as yardsticks for determining the respective incurred costs and costs to be borne.⁴⁸ One advantage of this type of apportionment rule is that the underlying technical characteristics are transparent and comprehensible for all parties involved.

Lastly, it is also possible to undertake a cost allocation based on the Shapley value. When using this method, it is first assumed that the undertakings involved will carry out the respective roll-out project independently of one another and corresponding stand-alone costs will arise for the civil engineering works. The ratio between these stand-alone costs then determines the actual apportionment of the costs arising from a joint roll-out between the coordinating network owners or operators.⁴⁹ The result of this hypothetical listing of separately incurred costs is based on similar parameters such as the previously mentioned method of apportioning costs based on installation depth and the amount of space utilised. Theoretically however other factors are also conceivable that could influence the determination of the stand-alone costs for a specific supply network owner or operator and thus the resulting Shapley value as well. It should be noted however that determining these costs on the basis of this value implicitly takes into account the aforementioned technical requirements.

Questions IV.c to IV.e provide market participants the opportunity to comment on the fundamental issue of cost sharing in this case and, if applicable, on the possible implementation of this type of cost sharing as well.

3.1.3 Pricing structure

Notwithstanding the discussion regarding the structure of shared use prices in chapter 2, there appear to be fewer options for different ways of pricing structures in the coordination and co-deployment agreement. It would be theoretically possible to specify recurrent payments. This would not however be particularly expedient due to the fact that the costs generally arise just once, largely at the time that the civil works are carried out. This applies not only to cases where the coordination or co-deployment price consists only of additional

⁴⁷ See WIK Discussion Paper No. 390 - "Kostensenkungspotenziale für Glasfaseranschlussnetze durch Mitverlegung mit Stromnetzen" [Potentials of cost reduction for fibre networks due to common construction with power lines], p. 7.

⁴⁸ See *ibid.*, p. 5ff.

⁴⁹ See also the energy guidelines for the installation of fibre cables when working on the electricity grid, p. 4f. ("Leitfaden der Bundesnetzagentur für Unternehmen in eigener Zuständigkeit zur Berücksichtigung der Mitverlegung von Glasfaserkabeln oder Leerrohren für den Telekommunikationsbreitbandbetrieb im Rahmen notwendiger Verlegungen von Stromleitungen") which Ruling Chamber 8 of the Bundesnetzagentur published in 2012.

costs but also to cases where the costs for civil engineering work are shared and are therefore part of the price that is to be specified.⁵⁰

Market participants can discuss in the subsequent question IV.f. whether applying the structure of the costs or other components to the prices in principle is to be viewed as expedient. Furthermore, this question can also be used to explain in which cases co-deployment prices should not consist of a one-off payment.

Questions

III. Preliminary questions

- a. Should the distinction made in the pricing criteria for shared use – i.e., between supply network owners or operators without telecommunications business on the one hand and owners and operators with telecommunications business on the other – also be applied to the coordination of civil works?
- b. Are there other reasons beyond this which would speak for or against applying the considerations regarding pricing criteria for the shared use of public supply networks to the pricing criteria for the coordination of civil works?

IV. How should pricing criteria be structured with regard to the coordination of civil works or co-deployment in cases involving obligated supply network owners or operators without telecommunications business as provided for in Section 77n (5) of the Telecommunications Act?

Components of additional costs

- a. Are the components of the additional costs that are mentioned as representative examples to be borne by the requesting telecommunications network owner or operator in all cases? If not, in which cases should they not be borne by the requesting telecommunications network owner or operator?
- b. Which additional components of the costs for co-deployment would be conceivable in connection with the coordination of civil works? Are these possibly dependent on the type of infrastructure being built?

⁵⁰ The effects that granting a reasonable mark-up within the meaning of section 77n (2) of the Telecommunications Act would have on the price structure are also to be assessed as small. The mark-up, should it be granted, would probably be largely orientated to the structure of the additional costs. Therefore, as a rule, when the additional costs are one-off costs, a one-off mark-up should be set. For more regarding the fundamental question of whether this type of mark-up should be part of the co-deployment price, please see the relevant remarks in chapter 3.1.2.

Principles of possible cost sharing

- c. Should fair and non-discriminatory conditions set forth in the coordination and co-deployment agreement fundamentally allow only for the compensation of the additionally incurred costs or, beyond that, provide for the sharing of the civil works costs? What are the reasons for or against this type of allocation?
- d. Assuming that the investment or civil works costs are not shared: Would it be fitting to allow a reasonable mark-up in order to establish incentives for coordinating civil works on a voluntary basis despite the special obligation vis-à-vis the law's objectives when the civil works are publicly financed? If yes, how or, rather, on which basis should the mark-up be determined?
- e. Which criterion should be selected for cost sharing when the principle of sharing civil works costs is deemed relevant? What are the reasons for or against the respective approaches outlined in the text?⁵¹ Beyond this, are there other cost sharing rules that are considered appropriate?

Pricing structure

- f. Does a structure for the coordination or co-deployment prices that deviates from a one-off payment appear to be sensible or useful? If yes, which structure and for what reasons? Are there reasons militating against directly applying the structure of the cost components to the price structure?

⁵¹ Cost sharing rules, based on a general approach, on technical characteristics or on the determination of the Shapley value, are conceivable here.

3.2 Case of co-deployment in relation to telecommunications network owners or operators

The right to co-deployment applies to telecommunications networks owners or operators also in the case of civil works that are *entirely or partially publicly financed* and were planned for the purpose of rolling out a *telecommunications* infrastructure. As in the case of the shared use of existing passive telecommunications network infrastructure, it is possible to avoid the inefficient doubling of civil works costs here as well. Enabling the co-deployment of a second (or third) passive network infrastructure allows the development of efficient infrastructure competition. This competition in turn can have a positive effect on choice, prices and quality in end customer markets. The potential benefits arising from this would probably exceed, at least in the long run in many cases, the (relatively low) additional costs incurred in connection with the co-deployment.

In contrast to the provisions for shared use, Germany's legislature did not provide for any grounds for refusal in the case of co-deployment which would permit the rejection of requests for co-deployment and allow pointing to viable alternatives (section 77g (2) No. 6 of the Telecommunications Act) or to construction on top of existing fibre networks (section 77g (2) No. 7 of the Telecommunications Act). Thus, in the case of obligated telecommunications undertakings, fair and non-discriminatory prices must be used to ensure by economic means that distortions of the market do not occur.⁵² First, it can be said that also in the case of coordinating civil works between two supply network owners or operators with telecommunications business, the total costs of the joint civil works consist of the additional costs for the co-deployment and the actual costs of the civil works for the originally planned installation. For this reason, the following section conducts a further breakdown by these cost components.

3.2.1 Components of additional costs

It can generally be assumed that the components mentioned in subchapter 3.1.1 are relevant to this case as well. Collaborating telecommunications network owners or operations can of course also be faced with deviations in the necessary routing or other parameters of the civil works. This can be due to differences in the technology used, or also to other company-specific requirements such as the connection with other, already developed areas. Since the civil works that are to be coordinated are, from a technical and planning standpoint, probably similar in large part the additional costs arising as a result of the co-deployment are generally to be estimated as relatively small.

Should there be, from the market participants' standpoint, fundamental differences regarding the components of the additional costs in comparison to the case of co-deployment with supply network owners or operators without telecommunications business, these differences can be cited and detailed under question V.a.

⁵² In this regard, this is analogous to shared use cases in which the obligated telecommunications undertakings want to grant applications for shared use or it is not possible for them to refer to the above-mentioned reasons for refusing the application.

3.2.2 Principles of cost sharing

As in the case of co-deployment involving supply network owners or operators without telecommunications business, it must likewise be discussed in the case of co-deployment with telecommunications network owners or operators whether, above and beyond the additional costs, a fundamental sharing of costs by the parties involved would be expedient. Since the line of business and, in most cases, the investment plans of the obligated telecommunications network owner or operator are probably affected by the co-deployment for which a request has been made, the discussion regarding cost sharing here differs from the previous case of co-deployment involving a supply network owner or operator without telecommunications business.

In order to preserve the investment incentives for telecommunications network owners or operators even when an obligation to allow co-deployment exists, the pricing criteria to be defined for co-deployment must be consistent with the general regulatory objectives laid down in section 2(2) of the Telecommunications Act. Consequently having the requesting undertakings bear part of the civil works costs appears to be appropriate. Otherwise there would be a risk that it would no longer be possible to amortise the original investment even over the medium or long term. Therefore it must be ensured that the initial investor is not placed at a competitive disadvantage vis-à-vis the telecommunications undertakings involved in the co-deployment. In light of this, the repercussions for the business plan, including revenue opportunities, of the network owner or operator that begins the roll out should possibly also be taken into account in the case of co-deployment as well.

If the application of the opportunity cost principle when determining the prices for *shared use* pursuant to section 77n (3) of the Telecommunications were to be deemed appropriate, the opportunity costs could analogously serve as a reference value for taking into account the repercussions *co-deployment* has on the business plan. In light of the fact that consistency is to be maintained, there are good reasons to lay down the same criteria for both rights set forth in the DigiNetzG when determining the prices. As a result, the co-deployment prices would compensate not only part of the civil works costs but, beyond this, also revenues that could be lost due to the effects of the co-deployment of the competitor's passive infrastructure.⁵³

As in the case of shared use, it would also be necessary, where appropriate, to analyse whether the expectations regarding lost revenue which would not inherently serve to cover civil works costs are based on an assumed monopolistic supply of the particular area of deployment or whether this lost revenue corresponds to an anticipated return on the project that is achievable in competitive conditions and is commensurate with the level of risk involved. In this context, it would be extremely questionable if possible anticipated monopoly returns – in contrast to a reasonable anticipated return that is achievable in competitive conditions – should be compensated. With regard to the previously mentioned return, the same question arises here that also has to be answered in the case of shared use. In this

⁵³ For a detailed examination of the fundamental considerations, see Figure 2 and the corresponding chapter 2.2.3.

connection, it must be clarified which of the three suggested alternatives⁵⁴ appears to be appropriate for preserving the incentives for initial investments in the context of fair and non-discriminatory conditions.

However, in the event that the original investor is not to be compensated beyond the sharing of the civil works costs, the keys for splitting the civil works costs mentioned in chapter 3.1.2 could potentially be considered. As a result, general rules for splitting costs and thus dividing the costs by two or three, depending on how many telecommunications undertakings seek co-deployment, or even rules based on technical parameters could be applied. For example, the relative amount of space that the respective undertaking requires in the trench could be used as a technical parameter. The calculation of the Shapley value using the respective stand-alone costs of civil works that are conducted independently of one another and a key that is based on this for splitting the costs could also be used on a case-by-case basis.

Fundamentally however it appears doubtful if sharing the civil works costs is enough to preclude negative effects on the investment incentives. In this respect, questions V.b. to V.e. should give market participants and other interested parties the opportunity to comment on the statements and approaches to implementation presented here. Particularly important here is the question of whether it is possible to consistently apply the regulatory concept set forth in section 77n (3) of the Telecommunications Act and whether this should be done.

3.2.3 Consistency with regulatory objectives and state aid

As explained in the previous chapter, the general regulatory objectives of the Telecommunications Act should also be taken into account in the context of co-deployment because it would otherwise be difficult to achieve the desired consistency between different regulatory decisions and dispute settlement cases under section 77n of the Telecommunications Act. In this connection, please see the discussions in chapters **Fehler! Verweisquelle konnte nicht gefunden werden.** and 2.2.5 because larger differences between shared use and co-deployment cannot be found in the application of the objectives and principles of the Telecommunications Act.⁵⁵ One elementary difference does however exist in the fact that, in contrast to shared use, co-deployment does not generally constitute a direct interference in the ownership rights of the telecommunications network owner or operator. This potentially leads to another evaluation or weighting of the conflicting interests of requesting and obligated telecommunications network owners or operators.

Looking at aspects falling under state aid law, many of the previously mentioned points where public-sector funding and shared use intersect can also be applied to co-deployment.

⁵⁴ The alternatives (see Figure 3 and the corresponding discussion in chapter 2.2.3) for determining a reasonable return for the passive access product level are: Transferring the *absolute amount* of the return of the *end customer* level; using the *relative* return of the *end customer* level; and using the *relative* return of the *passive access product* level.

⁵⁵ It can be assumed that the comparability of other regulatory decisions such as regarding access to cable duct systems between the main distribution frame and the street cabinet – which is mentioned as an example in 2.2.5 – should be less in cases of co-deployment than of shared use. Nonetheless, the National Dispute Settlement Body can, in proceedings involving co-deployment, draw on existing cost models for civil works or on principles that have been developed in the course of other proceedings.

In the latter case as well, the cost effectiveness of the subsidised broadband roll-out should not be questioned since the right to access to passive infrastructure already exists under the conditions for the funding. This particularly applies when, in the case of obligated telecommunications network owners or operators, there is the possibility that not only should the principle of cost sharing be applied but also when a mechanism were to be implemented that is supposed to compensate the initial investor for its opportunity costs. However, it is also to be assumed that funding models were set up in individual cases in the past which did not take into account the possibility of short- or medium-term infrastructure competition. In these cases – in contrast to planning that assumed monopoly returns and is therefore not in conformance with competition law – negative effects on revenue or return must be expected as a rule.

By analogy with the case of shared use, when public-sector funding is involved, the coordination or co-deployment prices are to be reduced by the amount of the state aid received. This would also ensure that telecommunications undertakings which themselves use or share use of the planned infrastructure or the civil works for the passive infrastructure benefit to a comparable degree from the public-sector funding.

With the criteria presented in the last chapter for the fundamental cost sharing or the compensation of the initial investor's opportunity costs, the incentives to encourage telecommunications undertakings and local authorities to roll out high-speed networks should be retained in both the operator model and in the profitability gap model.

With respect to consistency with the general regulatory objectives of the Telecommunications Act or with the publicly funded roll-out, comments can be made under questions V.g. and V.h. regarding individual aspects and particularly regarding any differences with respect to the statements in the case of shared use.

Questions

V. How should pricing criteria be designed in compliance with section 77n (2) of the Telecommunications Act with regard to the coordination of civil works or to co-deployment in cases of obligated telecommunications network owners or operators?

Components of additional costs

- a. Do the components of the additional costs for co-deployment deviate from the previously discussed case 3.1.1.? If yes, are there components beyond this or components that are not relevant in this case that should be mentioned?

Principles of cost sharing

- b. Is it appropriate to make an economic differentiation with regard to the field of business of the obligated supply network owner or operator when determining fair and non-discriminatory charges? (See also question III.a.) Should, in the case of obligated telecommunications network owners or operators, the repercussions for the business plan therefore also be taken into account?
- c. In the event that it is appropriate to take these repercussions into account, should the price then be determined on the basis of the civil engineering costs or the loss of revenue (opportunity cost principle)? Which arguments speak in favour of the respective approach?
- d. When the opportunity costs of the initial investor are to provide the basis for the price of the coordination or co-deployment for reasons of consistency during co-deployment as well, are there material differences to the case of shared use when selecting one of the three alternatives for determining the project return to be compensated?⁵⁶
- e. In the event that the costs for the original civil engineering works are to be alternatively used as the reference for determining the price, which of the cost sharing rules cited in 3.1.2 should be favoured in this case or is there another approach that should be preferred?

Pricing structure

- f. With regard to the pricing structure for the coordination or co-deployment agreement, are there differences to the discussions in 3.1.3? When determining the co-deployment prices, what effects would the use of the opportunity cost principle have on their structure?

Consistency with regulatory objectives and state aid

- g. With respect to the regulatory objectives examined in 2.2.4 (particularly the promotion of sustainably competitive markets) what role does the fact that, in contrast to shared use, there is no interference in the infrastructure owner's property rights?
- h. What differences compared to the case of shared use arise in connection with co-deployment with respect to the observations made in chapter **Fehler!** **Verweisquelle konnte nicht gefunden werden.** regarding the thematic areas of the regulatory objectives or the public-sector funding? What effects does the fact that the obligation to grant access to passive infrastructure has been established in state aid law whereas no equivalent exists with regard to co-deployment?

⁵⁶ See footnote No. 54.

4 Final comments

It is clear from the statements in this consultation document that a central aspect of the discussion on fair, reasonable and non-discriminatory prices pursuant to the DigiNetzG is differentiation between cases on the basis of the business sector of the supply network owners or operators that are addressed with the DigiNetzG. In this context, cases where the owners or operators of telecommunications networks must allow shared use and/or co-deployment differ fundamentally from those cases in which the network owner or operator's business sector is not directly affected by the shared use or co-deployment.

With regard to telecommunications companies that are required to allow shared use or co-deployment, the considerations presented in this consultation document are aimed at ensuring that the profitability of existing business models is not negatively impacted. In the case of shared use, section 77n(3) of the Telecommunications Act requires the repercussions for the business plan of the obligated company to be taken into account. This opens up the possibility of making provisions, when setting prices, for compensation for revenues lost as a result of the shared use. Therefore, the DigiNetzG and the implementation of the shared use pricing criteria examined here do not result, in the context of the relationship between two telecommunications companies, in any cost-oriented access in the narrower sense to passive infrastructure. Rather, the legislature has created for these situations relatively far-reaching protective mechanisms for initial investors which can provide the basis for safeguarding investment incentives. Furthermore, applying this system to cases of co-deployment could keep incentives to invest in the rollout of telecommunications networks from also being diminished due to possible existing obligations to allow co-deployment.

This consultation document outlines, from an economic standpoint, possibilities in which neither planned shared use nor planned coordinated co-deployment adversely affects the original business plans or the associated profitability calculations. The underlying consideration here is to determine prices taking account of the repercussions that shared use or co-deployment have on potential revenue and thus determine them according to an opportunity cost principle. As a result, initial investors would – in addition to covering their actual investment costs – also receive in cases where they are required to allow shared use or co-deployment a competitive return on the project investment that is commensurate with the level of risk. Therefore only the compensation of applicable anticipated and, in cases of competition, no longer realisable monopoly returns is to be viewed in a critical light. Consequently, by setting fair, reasonable and non-discriminatory charges it is possible to ensure that the provisions of the DigiNetzG do not reduce the value of investments made and, as a result, the future broadband rollout will not be hampered either.

In the case of passive supply network infrastructures which were not or will not be built for the operation of a telecommunications network, shared use and co-deployment are less ambivalent from an economic standpoint and are to be evaluated positively without reservation as a rule because the question regarding possible effects on rollout efforts does not arise in these cases. In this context, the provisions of the DigiNetzG can enable the construction and rollout of high-speed-ready telecommunications networks at relatively low additional economic costs. In such cases, realising cost savings by using existing

infrastructure or by coordinating ongoing construction work would generally appear to be a sensible and efficient approach.

In cases involving supply network owners or operators that have no telecommunications business and are obliged to share use, setting a reasonable mark-up on a cost-oriented price plays a particularly important role in establishing fair and reasonable conditions. This mark-up increases the willingness to voluntarily make available capacity in existing passive network infrastructures and can thus lead to faster, more efficient negotiated solutions. In these cases fair and reasonable conditions are in line with the aim of rolling out high-speed telecommunications networks at the least possible cost as well as the aim of establishing incentives for companies that make infrastructure available. This consultation document contains several proposals for this which should now be assessed by market participants.

This document also addresses the question of how consistency between the DigiNetzG pricing criteria that are to be implemented, the Bundesnetzagentur's regulatory practice in the market, and the publicly funded broadband rollout on the one hand and the relevant aid rules on the other can be ensured. Consistency – including consistency between the cases of shared use and co-deployment – is also of particular importance in the DigiNetzG for avoiding possible distortive effects.

Given that consistency is to be ensured in several respects, the points where the DigiNetzG and state aid rules intersect with one another are of major importance because currently and in the near future a substantial part of the rollout of a nationwide fibre-optic infrastructure is being or will be supported by public means. Furthermore, the receipt of public funding for a rollout project pursuant to the provisions of the DigiNetzG usually entails an obligation to allow co-deployment because the construction work has been entirely or partially financed by public means. However, by setting fair, reasonable and non-discriminatory charges it will be possible to also ensure that the aided rollout of high-speed-ready telecommunications networks is not hampered.

In these cases, the use of public means goes hand in hand with far-reaching obligations to grant access to passive infrastructure. These obligations are laid down at European and national level in regulations governing state aid and therefore apply, irrespective of the provisions of the DigiNetzG. Thus, when new elements of passive infrastructure are funded, access rights exist at all levels of the value chain, including in particular the right to access duct infrastructure for an unlimited period. In this context, consistent implementation must be ensured in order to prevent distortions arising from the parallel existence of comparable access rights in the DigiNetzG and in state aid law with their respective pricing criteria. However, in light of the relatively substantial scope for interpretation of the state aid regulations with regard to their pricing criteria, this appears to be possible in principle.

In addition to ensuring that initial investors' business models are not negatively influenced, the DigiNetzG also enables (through co-deployment and, where applicable, also shared use) the possibility in many regions of establishing multiple, parallel passive infrastructures or fibre-optic infrastructures. One of the main reasons for this is that investments currently totalling several tens of billions would probably still have to be made in gigabit networks - particularly for the civil engineering works for the local access networks. As a result, parallel

installation would appear feasible in many projects. From a political or societal standpoint, stepping up the rollout of high-speed-ready networks will possibly be assigned a major role in the short to medium term. However, a longer-term view in light of the objective of promoting competitive markets could additionally make competition at infrastructure level a focus as well. Construction of fibre-optic infrastructures that is prompted by the DigiNetzG would enable infrastructure competition in relevant areas. This could result in more choice, lower prices and improved quality in the retail market in the long term. Ultimately, this could perhaps also lead to the emergence of self-sustaining competition which would require only few or no regulatory interventions in the future.

The question of how these different goal dimensions are to be assessed should be discussed during the course of this consultation process. In this connection, the opinions of the market participants and other interested groups – such as with respect to the issues examined here regarding the actual implementation of the DigiNetzG's pricing criteria – are likewise very important. This is because the most consistent, foreseeable and expedient interpretation of the legal provisions of the DigiNetzG can be achieved in a transparent way only in consultation with stakeholders.