

Determining the WACC for calculating the capital cost of access to civil engineering infrastructure services

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Management Summary

1. The French operator Iliad has asked WIK-Consult to provide an expert opinion on the issue of whether civil engineering infrastructure services have the same risk as other regulated and non-regulated telecommunications access services. Although Iliad has asked WIK-Consult to support its position in the regulatory process, this report is brought to the attention of ARCEP as an independent expert report.
2. In a corresponding market analysis ARCEP has come to the conclusion that there is a separate market for civil engineering infrastructure in France. Furthermore, ARCEP found Orange to have an SMP position in this market. ARCEP'S rationale of defining a separate market for physical infrastructure is strongly supported by the high attention which access to physical infrastructure has received in the context of the new EECC. Furthermore, it is supported by the great importance which duct and pole access has to enable co-invest, mutualization and infrastructure competition in France.
3. The same reasons which lead to define access to physical infrastructure as a separate market imply in our view and lead to the conclusion that physical infrastructure services have a lower risk than all other telecommunications wholesale and retail services. The lower risk related to physical infrastructure is reflected in the (properly determined) capital cost operators/investors face when investing in physical infrastructure. Investors request a relatively lower risk premium for investing in physical infrastructure. Therefore, the WACC to determine the capital cost as part of the regulated price for access to physical infrastructure should be lower than the WACC for other regulated services.
4. Our view on a lower WACC for physical infrastructure is consistent with and derived from finance theory. In finance theory the relevant risk is related to a project which can be an investment project or a business line of a company. The risk of a company then is derived from the risks of the business lines in which the company is active. Thus, the risk profile of a company is a composite of the individual risk profiles of its business lines. This holds for both risk related parameters of the WACC formula, namely the asset beta and the gearing. Both parameters vary positively with risk. Depending on how they affect it, the WACC for civil engineering should be derived with a lower beta and a higher gearing than the WACC for an integrated telco like Orange as a whole.
5. NRAs traditionally determine the WACC at a company-wide level. But there are important and relevant exemptions from this general practice. Since 2005 the British regulator Ofcom applies a WACC for copper unbundling and infrastructure access services provided by Openreach that is lower than that for other regulated services of BT. The lower WACC is derived from a lower asset beta stemming

from a utility peer group. Also ART applied service-specific WACCs some years ago.

6. Although the European Commission does in its recent Notice on capital cost not reflect the approach of differentiating the WACC according to service characteristics, it does not exclude this approach. The reflection of a risk premium for NGA services in the context of the NGA Recommendation is nothing else than applying a service differentiated WACC approach.
7. There are compelling reasons to reflect the lower risk of access to physical infrastructure in the capital cost to determine regulated prices for that service. Orange faces a significantly lower risk with regard to physical infrastructure than with other wholesale and retail services. From our analysis follows a lower beta and a higher gearing for that service. Given the utility nature of physical infrastructure, the relevant peers to determine beta and gearing should not only be infrastructure focussed companies in the telecom sector but also utilities from the energy and water business.

1 Introduction – Defining the agenda

8. As part of the corresponding public consultation the French regulator ARCEP has published a Draft Decision¹ on the definition of the market for wholesale access to the physical civil engineering local loop infrastructure², on the designation of an operator exercising significant market power on that market and on the obligations imposed on that operator in the market on 6 February 2020. In this market analysis ARCEP has come to the conclusion that there is a separate market for physical infrastructure in France. This newly defined market is upstream from the wholesale local access and business connectivity markets (Markets 3a and 4). Furthermore, ARCEP found Orange to have SMP on the market for civil engineering infrastructure. For the prices of civil engineering infrastructure ARCEP imposed the remedy of cost-oriented prices.³
9. On June 3, ARECP has published in parallel its Draft Decision⁴ on setting the rate of return on capital (WACC) employed for calculating the cost of regulated fixed and mobile services as of 2021. This Draft Decision presents, derives and analyses its approach to derive the relevant WACC and the parameters to determine the value of the WACC. ARCEP's approach is based on the principle to determine one uniform WACC to be applied for all regulated services of the SMP operator Orange and other operators designated as SMP operator. The relevant markets for which ARCEP intends to apply the newly determined WACC from 2021 onwards includes the market for civil engineering infrastructure.
10. The French operator Iliad has asked WIK-Consult to provide an economic expert opinion on the issue of whether civil engineering infrastructure services have the same risk as other regulated and non-regulated telecommunications access services. The analysis should be conducted on the assumption that there is a separate (regulated) market for wholesale access to civil engineering infrastructure. On the basis of the risk profile and other economic characteristics of civil engineering infrastructure the opinion shall address the question, whether a separate WACC for the calculation of the capital cost for civil engineering infrastructure which is different to the WACC of other regulated services of the SMP operator, is justified and needed. In case the expert opinion comes to the conclusion that a separate WACC is justified, relevant peers to determine the relevant beta in the WACC formula should be determined. Furthermore, the study should identify, whether further parameters of the WACC formula need adjustment .

¹ See ARCEP (2020a).

² We understand that a wider use of regulated access to physical infrastructure still is under discussion in France.

³ See ARCEP (2020a), Section 5.6.1.

⁴ See ARCEP (2020b).

11. Although Iliad has asked WIK-Consult to support its position in the regulatory process, this report is brought to the attention of ARCEP as an independent expert report.
12. This report is structured as follows. In Section 2 we will reflect the definition of a separate civil engineering infrastructure market. Section 3 identifies and analyses the economic characteristics of civil engineering infrastructure services in general and in the French market context. In Section 4 we present and analyse the rationale and the need for applying a service-specific WACC for civil engineering infrastructure services while in Section 5 we will analyse ARCEP's WACC approach.

2 Defining a separate civil engineering infrastructure market

2.1 ARCEP's rationale

13. In a recent consultation⁵ the French regulator ARCEP has presented its Draft Decision to define a separate market for wholesale access to the physical civil engineering local loop infrastructure for the first time. By this intention ARCEP follows in principle a line and direction which has already been applied by the UK regulator Ofcom since 2019⁶ and which is currently being considered by several other European NRAs.⁷ In the European Commission's review process of the recommendation on electronic communications product and service markets subject to ex-ante regulation, the question of whether the time is ripe to include a separate market for civil engineering infrastructure in the list of markets susceptible to ex-ante regulation is also discussed.
14. In line with BEREC's definition⁸ and the definition of the Broadband Cost Reduction Directive (BCRD) "physical infrastructure" refers to civil engineering infrastructure capable of accommodating electronic communications networks and includes ducts, chambers, manholes, and poles. Accordingly dark fibre and the unbundling of fibre or copper lines are not included in the scope of physical infrastructure. ARECP highlights that the transmission segment of the network is today almost exclusively underground, whereas in the distribution segment there is the use of underground as well as aerial infrastructure.⁹ With regard to the structure of the underground civil engineering network ARCEP differentiates between¹⁰

⁵ See ARCEP (2020a).

⁶ See Ofcom (2019) and Section 2.3 of this paper.

⁷ BEREC (2019) and Section 2.3 of this paper.

⁸ See BEREC (2019), p. 2.

⁹ See ARCEP (2020a) Section 1.3.

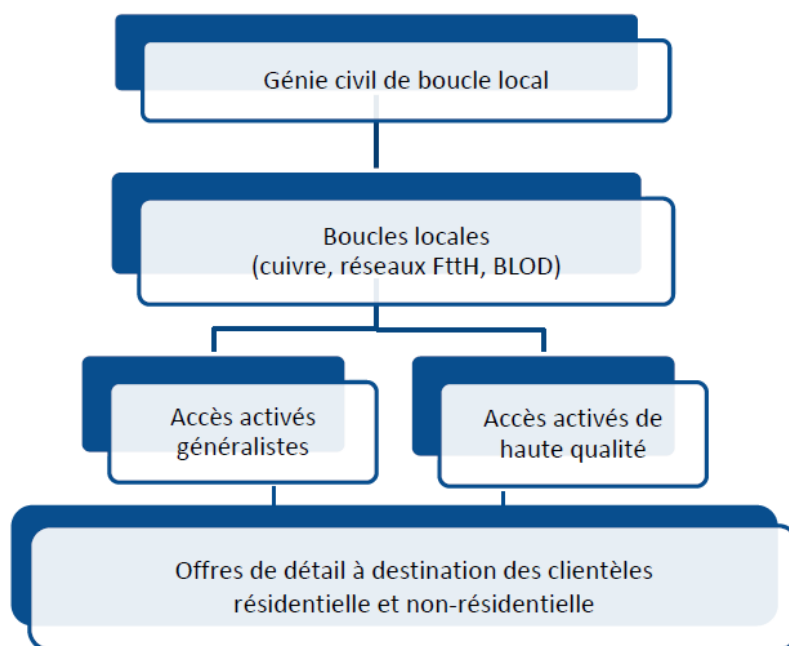
¹⁰ See ARCEP (2020a), Section 1.3.

- the transport segment which has a large number of sleeves with drawing chambers every two to three hundred meters and
- the distribution segment which has a more limited number of sleeves with drawing chambers approximately every fifty meter.

Aerial civil engineering infrastructure includes heterogeneous elements like poles, bollards, anchoring supports, building façade supports.

- As Figure 2-1 exhibits, access to ducts, poles and associated infrastructure is the most upstream service to be used as an input to other wholesale services indirectly to the next layer of wholesale and retail services. Access to civil engineering services contributes and may even be a prerequisite to the development of infrastructure competition. Wholesale access to such services facilitates the deployment of fixed access infrastructures to consumers as well as businesses.

Figure 2-1: Hierarchy of markets upstream of the fixed retail market*



Source: ARCEP (2020a).

- Duct and pole access has been mandated under SMP regulation in the vast majority of European countries. PIA (= physical infrastructure access) has traditionally been mandated as a remedy in the context of the wholesale local access market or included in a wider market as a substitute for other forms of wholesale physical access as in France.

17. As Ofcom argues for the UK market environment for PIA, ARCEP concludes that ducts provided by utilities, such as those available in the sewers of Paris and some other French cities, do not provide a substitute for telecom ducts. ARCEP argues that sewers were used by operators at a time before duct and pole access from Orange was available. Sewer ducts are subject to constraints arising from saturation of some segments and security requirements which make them more costly to use compared to telecom ducts. ARCEP further argues that access to other utility infrastructure does not substitute for access to telecom duct and pole infrastructure. Power cables are often simply buried in the ground without being ducted. ARCEP also observes that it is difficult and (too) costly to install fibre cables within water and gas pipes. This analysis leads to the overall conclusion that there is a distinct market for telecom civil engineering infrastructure which does not include infrastructure from other utility infrastructures.
18. Despite the multi-purpose use of ducts and poles infrastructure, ARCEP defines the relevant market susceptible for ex ante regulation as the market of access to aerial and underground civil engineering infrastructure that can be used for the deployment of optical local loops and are marketed by telecom operators, local authorities or Enedis.
19. The distinct market for access to civil engineering infrastructure for the deployment of optical local loops is defined as a national market.
20. The infrastructure market as defined by ARCEP meets the three criteria test. Civil engineering infrastructure is characterized by a rather high proportion of upfront investment. Thus, civil engineering infrastructure constitute very high barriers to entry and can de facto not be replicated. Orange has a preponderant share of civil engineering infrastructure with 540,000 km of underground ducts and 13 million aerial supports. There is no parallel infrastructure to that in France. ARCEP estimates that an investment of several billion Euros would be needed to replicate this infrastructure.
21. Because the cost drivers for civil engineering are relatively stable over time with a tendency to increase, it is not likely that the market tends towards (effective) competition in the medium term. ARCEP also is not aware of technological developments which could become an alternative to Orange's civil engineering infrastructure.
22. ARCEP observes a lot of advantages of asymmetric ex ante regulation to deal with the economic constraints and failures of this market. Competition law tools cannot properly deal with the market failure in this market. Thus, the three criteria test leads to the conclusion that the market for civil engineering infrastructure is susceptible to ex ante regulation.

23. Compared to the volume of infrastructure controlled by Orange cable operators control just a few tens of thousands of kilometres of their own underground infrastructure. Local authorities control civil engineering infrastructure only in a limited number of municipalities. In a large majority of areas, Orange is the only operator with civil engineering infrastructure that allows local loop deployment. As a result, ARCEP considers Orange to exercise significant market power for the wholesale supply of access to civil engineering infrastructure.
24. For controlling Orange's prices for access to civil engineering infrastructure, ARCEP proposes a cost-based pricing remedy.¹¹ The Decision does not specify a specific measure or tool to achieve cost-based prices. The potential measures include benchmarking, dynamic price cap regulation or cost models to calculate efficient cost. The determination of the relevant cost of capital for physical infrastructure is not further specified in this context. ARCEP, however, is referring to previous decisions.

2.2 EU approach

25. The EC currently is in the (final stage) of revising the existing and preparing a new recommendation on relevant markets subject to ex ante regulation. The currently prevailing recommendation on relevant market does not define a separate market for physical infrastructure. Instead, it enables NRAs to impose duct and pole access as a remedy within the wholesale local access market (and/or eventually other markets). Nevertheless, the new European Electronic Communications Code (EECC) provides some new propositions relating to access to physical infrastructure which indicate that access to physical infrastructure will be treated more explicit in the upcoming revised recommendation including the option of defining physical infrastructure as a separate market.
26. Promotion of efficient investment is at the forefront of the legislative reform agenda of the EECC for the next decade. To support this aim the EECC contains a number of measures intended to promote access to physical infrastructure. These measures intend to overcome an essential barrier to entry for network deployment recognising that physical infrastructure effectively is not technically and economically replicable.
27. Article 72 on access to civil engineering provides for the imposition of remedies regarding access to civil engineering infrastructure to be considered in advance of imposing obligations of access to specific network elements. This approach does not require access to physical infrastructure to be treated as a standalone remedy or as a separate market. A separate physical infrastructure market would, however, facilitate and support this regulatory approach.

¹¹ See ARCEP (2020a), Section 5.6.

28. Article 73 further specifies that before imposing specific access obligations, NRAs shall analyse whether other forms of access to wholesale inputs would be sufficient to address the identified competition problems.
29. Article 74 (Price control and cost accounting obligations) also provides some identifications on the (regulated) prices of access to physical infrastructure:

“In determining whether price control obligations would be appropriate, national regulatory authorities shall take into account the need to promote competition and long-term end-user interests related to the deployment and take-up of next-generation networks, and in particular of very high capacity networks. In particular, to encourage investments by the operator, including in next-generation networks, national regulatory authorities shall take into account the investment made by the operator. Where the national regulatory authority consider price control obligations to be appropriate, they shall allow the undertaking a reasonable rate of return on adequate capital employed, taking into account any risks specific to a particular new investment network project.”

30. Article 72 enables NRAs to impose access to physical infrastructure in the most comprehensive way:

“national regulatory authority may [...] impose obligations on undertakings to meet reasonable requests for access to, and use of, civil engineering including, but not limited to, buildings or entries to buildings, building cables, including wiring, antennae, towers and other supporting constructions, poles, masts, ducts, conduits, inspection chambers, manholes, and cabinets, in situations where, having considered the market analysis, the national regulatory authority concludes that denial of access or access given under unreasonable terms and conditions having a similar effect would hinder the emergence of a sustainable competitive market and would not be in the end-user’s interest”.

The only constraints on the scope of an physical infrastructure remedy follow from the market analysis representing the specific national circumstances.

31. In a recently published study which WIK-Consult has conducted for the EC¹² in preparing the review of the Recommendation on relevant markets the authors made a set of recommendations regarding the market for access to physical infrastructure which are important in the present context:
 - (a) Access to physical infrastructure is likely to be more effectively implemented through SMP regulation than through enforcement via the BCRD.

¹² See WIK-Consult (2020).

- (b) Defining a separate PIA market will likely be necessary (at least in the medium term) to reflect the characteristics of PIA and facilitate downstream deregulation in countries where the SMP PIA is the primary enabler of infrastructure competition and new entry. This may hold in particular in countries in which there is a ubiquitous or wide-reaching network from a single player that is suitable for the deployment of alternative infrastructure.
- (c) Alternative approaches to separate a PIA market in the context of SMP regulation may be suitable in countries where the supply or demand-side conditions do not allow to define a distinct PIA market, e.g. where major parts of the infrastructure is directly buried.
- (d) The study does not support to limit PIA only for the use of certain network layers or uses. Access to physical infrastructure is considered as a product market that is upstream to both the current markets 3a/b and 4 and could be used for multiple purposes.¹³

2.3 Approaches of other NRAs

- 32. The European regulatory body BEREC has developed a common view on access to physical infrastructure in a 2019 report. According to BEREC (2019) “physical infrastructure” refers to civil engineering infrastructure capable of accommodating communications networks such as ducts, chambers, manholes and poles. Dark fibre and unbundling are not included in the scope of physical infrastructure. Following the multi-purpose use of physical infrastructure for various telecom networks and various layers of telecom networks, BEREC does not separate the physical infrastructure according to its use or constrains its use to specific telecom networks or specific network layers. To identify the focal product BEREC argues *“local access to the physical infrastructure of telecommunications operators is likely to be a natural candidate. It can then be analysed whether it would be necessary and appropriate ... to also include other parts beyond the access segment in the market definition”*.¹⁴
- 33. BEREC has conducted a survey among NRAs to depict the different approaches taken regarding the regulation of access to physical infrastructure. Of the 34 NRAs participating in the survey, 26 regulate access to physical infrastructure, while 8 NRAs do not impose physical infrastructure remedies on any relevant market. Almost all NRAs dealing with access to physical infrastructure in their market analyses (25 out of 26) indicated that access to physical infrastructure is regulated under Market 3a, while three also regulate it under Market 3b (in addition to 3a) and two NRAs also regulate it under Market 4. Only the British regula-

¹³ See WIK-Consult (2020), p. 152.

¹⁴ BEREC (2019), p. 19.

tor Ofcom (so far) has defined physical infrastructure as a separate market. Other NRAs are in the process of considering this.

34. Cost orientation is the most prevalent pricing remedy which NRAs impose on physical infrastructure.¹⁵ Only two NRAs apply other pricing concepts. This remedy is accompanied by accounting separation.
35. The British regulator Ofcom (so far) is the only NRA which has defined physical infrastructure as a standalone market in its June 2019 decision.¹⁶ Ofcom had previously regulated access to physical infrastructure of BT by means of Market 3a regulation. This regulation did not allow access seekers to use BT's physical infrastructure purely for deployment of dedicated high capacity lines (Market 4). Also the use for those seeking to deploy mobile networks, business support, backhaul or any new innovative service was not allowed. Ofcom considered that it was a more robust market analysis to define markets at the level of value chain corresponding to the level of intervention. Furthermore, the separation of the physical infrastructure access market could enable or facilitate deregulation of downstream markets.
36. Physical infrastructure as defined by Ofcom refers to all parts of a network which can be used to host elements of a network. This includes pipes, masts, ducts, inspection chambers, manholes, cabinets, buildings or entries to buildings, antenna installations, towers and poles. Ofcom did not limit or focus the use of physical infrastructure to particular network layers or services as the previous physical infrastructure regulation did. Non-telecom infrastructure was excluded from the market.
37. In particular, Ofcom did not distinguish the use of physical infrastructure for access and backhaul, Ofcom argued, that "we do not think this would be practical or desirable because we cannot predict the full range of potential access seekers which may emerge in future, both in terms of the downstream provided over the network and the network architecture they desire."¹⁷ This unconstrained use of physical infrastructure of the incumbent by altnets is similar to the approach pursued by the NRA in Portugal.¹⁸
38. Notwithstanding the identification of competitive conditions in the four different geographical markets which Ofcom distinguished, Ofcom determined BT to enjoy SMP in all geographical markets. This analysis followed from the ubiquitous nature of BT's network and its consequential advantage in deployment cost. As a consequence of its analysis, Ofcom imposed an unrestricted duct and pole access remedy across the UK.

¹⁵ BEREC (2019), p. 10.

¹⁶ See Ofcom (2019).

¹⁷ Ofcom (2019), para 3.45.

¹⁸ See WIK-Consult (2020).

3 Economic characteristics of civil engineering infrastructure

3.1 General characteristics

39. Physical infrastructure assets represent the major part of the investment into telecommunications networks. Its investment share makes between 70 and 80% of all access network investment, if considered in a Greenfield context.
40. For technical and economic reasons it is hardly possible to profitably replicate physical infrastructure in the access networks. From a technical perspective it is often hard or even impossible to get the necessary permissions. Thus, civil engineering infrastructure represents very high barriers to entry and replication. This is evidenced by the limited degree to which altnets have replicated civil engineering infrastructure in countries and areas where duct and pole access is not available. If replication has occurred, it has been confined and limited to more highly densely populated areas. The market for PIA exhibits high and non-transitory barriers to entry. There are significant structural barriers to entry. Entry would require very high levels of investment. Such investment would take considerable time. The cost of conducting such investment would be mostly sunk. For those reasons replication is highly improbable.
41. The capacity of duct systems cannot efficiently be extended according to demand development. Given the high upfront investment cost to set up civil engineering infrastructure, duct systems are not dimensioned according to actual demand as of today. Efficient investment in these network elements are also dimensioned for future demand. In addition, contingencies for unforeseen demand determine capacity dimensioning. If these aspects of efficient dimensioning are taken care of, duct systems often exhibit significant overcapacity, at least as mirrored against actual demand. This relationship between actual and future demand, investment and capacity further contributes to the natural monopoly character of physical infrastructure.
42. As Figure 2-1 exhibits, access to physical infrastructure is considered the most upstream of the fixed telecommunications services. Physical infrastructure is directly or indirectly the central input to a variety of telecommunications services including but not limited to those of Market 3a and 4. Physical infrastructure is an essential facility in the sense that it cannot be substituted by any other service. Physical infrastructure is a key enabler of the competitive provision of services.
43. Telecom operators owning widespread physical infrastructure exercise significant market power. Access to ubiquitous available physical infrastructure offers integrated operators the advantage of lowest cost for deploying new network installations and/or upgrades. It enables to sustain, reinforce or gain market power in

downstream wholesale and retail services. In particular integrated operators are able to deploy fibre network at up to 50% lower cost than competitors.¹⁹ Market power in an essential facility like physical infrastructure can be used to leverage this market power in a variety of downstream markets. That is the conceptual basis for the widespread regulation of access to physical infrastructure. Access to physical infrastructure may significantly contribute to the development of infrastructure competition.

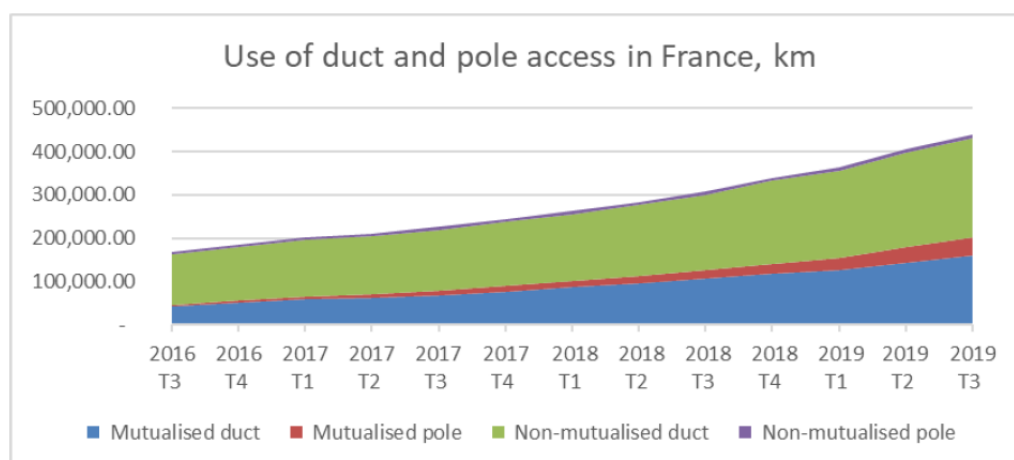
44. Physical infrastructure represents a multi-purpose infrastructure. It is used for a variety of network layers including local access, backhaul, aggregation, backbone. All types of telecom networks make use of the duct and pole infrastructure, namely fixed and mobile networks. Copper-based as well as fibre networks use the same duct and pole systems. Furthermore, there is joint use of the same duct system by various network layers (e.g. access and backhaul) or different technologies (e.g. copper and fibre). Physical infrastructure is jointly used by a variety of telecommunications services. Individual ducts are used for access and backhaul. Due to its very upstream nature, physical infrastructure assets are not service-specific but commonly used.

3.2 Civil engineering infrastructure in France today and tomorrow

45. Figure 3-1 shows that the market importance of access to physical infrastructure has grown significantly: Between 2016 and 2019 the use of duct and pole access for FTTH has nearly doubled in France. This holds in particular for duct access and to a lesser degree for pole access. Increased use occurred both in the “mutualized” segment and in the non-mutualized segment and for business access purposes. There is further use of duct and pole access for other networks and services.

¹⁹ See Ofcom (2019), p. 57.

Figure 3-1: Use of duct and pole access in France, km



Source: ARCEP observatory

46. France has achieved an impressive 50% fibre homes passed coverage by the end of 2019.²⁰ In most of the fibre coverage areas even up to four operators compete within the competitive model of mutualisation and co-invest. Duct and pole access has been highly instrumental in achieving this high level of infrastructure competition. According to ARCEP's fibre cost model the duplication of physical infrastructure is only viable for 3.2 million or 10% of all households.²¹ For 90% of homes to be passed infrastructure competition is only viable on the basis of duct and pole access. While Orange's fibre networks cover about two third of all homes passed; altnets altogether cover another third of all homes passed. Duct and pole access was in particular instrumental of infrastructure competition in less dense areas.

3.3 Risk profile of civil engineering infrastructure as compared to other telecom services

47. Already from the general characteristics of civil engineering infrastructure and from its position and use in the French market important implications on the risk profile of PIA service follow. These features generate a risk profile which is different to other telecommunications wholesale and retail services.
48. Access to physical infrastructure is the most upstream service. The service is directly or indirectly an input in the service value chain of effectively all telecommunications operators, the incumbent operator Orange as well as all fixed-line com-

²⁰ See ARCEP (2020c).

²¹ Neumann et al. (2020), p. 17ff.

petitors. Even cable and mobile operators make use of this essential facility. Physical infrastructure does not represent a minor but a major cost share even for telecommunications (network) services at the upper end of the value chain. The universal use of Orange's physical infrastructure by all operators and (nearly) all (fixed-line) services is further strengthened by the de facto non-replicability of this infrastructure by other operators. As ARCEP's market analysis shows, this universal and dominant market position of (Orange's) physical infrastructure will not be challenged by any substitute in the foreseeable future. These features make physical infrastructure the utility of the whole telecom sector.

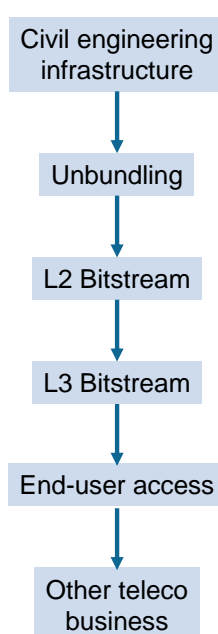
49. Civil engineering infrastructure is handled in ARCEP's regulatory cost accounting approach such that there is no demand risk for Orange. In its November 2010 Decision²² ARCEP fixed a new approach on the allocation of civil engineering infrastructure cost (ducts and poles). At that time fibre has already been deployed to a relevant degree as a new access technology. The copper and the new fibre access networks used the same duct system. The relevant cost had to be allocated between both access technologies. ARCEP decided that the full physical infrastructure costs as determined from Orange's regulatory accounts had to be allocated between copper and fibre according to the relative number of customers that obtain access over copper or fibre. By that allocation approach Orange got the guarantee that the full cost of the duct and pole system was covered. Over time in line with the progressively growing number of (active) fibre lines, a relatively higher share of cost will be allocated to fibre. Orange would not face stranded invest due to the declining demand for copper-based services.
50. There is de facto no risk of asset stranding towards physical infrastructure. The duct and pole system basically provides the infrastructure for telecommunications access to buildings. The building structure in a country like France represents a rather stable infrastructure of fixed locations. There is a certain degree of growth of buildings which then are directly connected to the expanded duct and pole infrastructure. Only to a rather minor degree, existing building locations are no longer used such that the duct and pole system will also no longer be used. Thus, there is no risk of stranding of duct and pole assets. There is also no risk related to the expansion of the duct system when new buildings or developments are to be connected. The only risk factor which remains follows from users who do not use the fixed network at all. Such users either do not use telecommunications at all (very minor number) or only use mobile networks for their communication needs.
51. There is also no technological risk related to physical infrastructure. If ducts and pole systems are meeting certain basic engineering and dimensioning standards, different cable systems like copper cables, fibre cables and coax cables can use

²² See ARCEP (2010).

the same duct system. This is reflected in the economic lifetime of physical infrastructure. In 2012, ARCEP extended the economic lifetime of civil engineering infrastructure from 40 to 50 years.²³ The lifetime of poles remained at 25 years. In the actual network a relevant amount of ducts has even exceeded its economic lifetime and are still in use.

52. On the basis of analysing the risk profile we conclude that the risk profile of services follows the value chain of their production.

Figure 3-2: Value chain of telecoms



Source: WIK-C

The lowest risk is associated with physical infrastructure. Different to physical infrastructure, unbundling faces already a demand risk due to the migration from copper to fibre access. This risk is related to the copper cable asset. For this reason, ARCEP reduced the lifetime of copper cables from 25 years to 13 years in 2012.²⁴ This decision also reflects a certain view and expectation on the switch off of the copper network. The bitstream layers face a competitive risk which is not present for unbundling. That is basically the risk of technological change. A significant higher risk (including that of competition from other infrastructures) is related to the end-user access market.

²³ Decision No. 2012-0007 of 17 January 2012.

²⁴ See ARCEP Decision No. 2012-0007 of 17 January 2012.

53. These service-related risk factors translate into company related risk factors depending on the business model of the company and its degree of integrating business along the telecom value chain. The lowest risk occurs for a company specialising in the provision of physical infrastructure. A service provider only active in the retail business represents the highest risk.
54. The company risk of an integrated operator present in all layers of the telecom value chain is to be determined from a composite of the risks of the businesses in all layers of the value chain. The weighting factors for the composite risk would be represented by the share of the value added of each step of the value chain. In view of this, the internal use of the services as an input of producing services at the next layer will have to be properly reflected.
55. For practical reasons of determining Betas to determine the risk profile of a specific service class, it may be difficult (or impossible) to find proper peer groups for each service layer represented in Figure 3-2. In that case, it may become necessary to aggregate several steps of the value chain.

4 A WACC for civil engineering infrastructure

56. In this section we address the question of how the WACC, as one important element in the pricing of civil engineering infrastructure, should be determined given the risk characteristics of its market. A central question is whether in this determination a different risk profile than that for the whole company should be taken into consideration. The principles that underlie the answer to this question are addressed in the first subsection. The results derived there provide compelling arguments for the derivation of a separate WACC based on a distinct risk profile of the market for civil engineering infrastructure. We then discuss the possibility of deriving estimates of the parameters reflecting this risk from a suitable selection of peer group companies.

4.1 Investment principles from the finance literature

57. This subsection is about business risk at the appropriate level of the value chain. In a rough and ready way, one may distinguish for this between the level of the whole company, the level of a service or business field encompassing several elements of the value chain, and the level of a single element of the value chain. When invoking below the lessons of the finance literature, the terminology then used is that of this literature. The argumentation is in terms of a "project" which may either mean a service or business field or a single element of the value chain.

58. The finance literature is clear about this. When a company decides about an investment, it should take into account the specific risk of the particular project under consideration. One finds this rule developed in the academic literature as well as in the more practically oriented guidelines of learning institutes involved in training financing managers.²⁵
59. An investment decision is usually taken on the basis of the discounted sum of the projected net cash flow of the project, for which as discount factor the relevant WACC is used. Now it is pointed out that it would be wrong to use the company-wide WACC for this calculation if the systematic risk of the project differs from that of the company as a whole. Instead a WACC should be used that reflects the specific risk of the project as expressed through its asset beta. This rule does not only hold if the project risk is higher than the company-wide risk but equally if it is lower.
60. It is then usually shown that using the wrong WACC could lead to wrong investment decisions, i.e. that projects that do not deserve it might be undertaken or on the contrary worthwhile projects are rejected. In the current context it is particularly relevant to consider what happens when investment decisions are actually taken on the basis of a wrong WACC which in the following leads to further wrong business decisions. When a project with higher than average risk is selected, this would tend to lead to losses since prices would on the basis of the company-wide WACC be set too low. When a project with lower than average risk is accepted, this would lead to prices that on the basis of the higher company-wide WACC are set too high, thereby depressing demand.²⁶
61. In the following we want to make the impact of risk on the WACC more precise by showing how it is determined. Below we show the standard formulas on the basis of which the WACC is derived. First we state the formula for the WACC:

$$WACC = \frac{Ke*(1-g)}{1-t} + Kd * g \quad (1)$$

in which Ke and Kd stand for the cost of equity capital and the cost of debt, respectively, g for the debt ratio or gearing and t for the corporate tax rate. There are two variables of interest here, the cost of equity and gearing. Of these two, gearing g is usually treated as a parameter. As regards the cost of equity, it is derived according the capital asset (CAPM) pricing model as follows:

$$Ke = RFR + \beta e * ERP \quad (2)$$

²⁵ One of the best known academic sources is Brealey et al. (2008). A complete but concise discussion is J. Tucker (2009). A practice oriented example is Corporate Finance Institute (2020).

²⁶ When either case happens under effective competition (too low or too high prices), the company would be losing out vis-à-vis its competitors. In the case, however, of a regulated company with SMP offering an essential service, which is here the relevant case, it is primarily the demanders of that service who are the ones that suffer, since they must pay higher prices, while the provider, having SMP, suffers hardly any consequences, if at all.

where RFR stand for the risk-free interest rate, ERP for the equity risk premium and β_e for the equity beta. The equity beta in turn obeys the following relationship with the asset beta β_a and the debt beta β_d :

$$\beta_a = g * \beta_d + (1 - g) * \beta_e \quad (3)$$

from which follows

$$\beta_e = \frac{\beta_a - \beta_d * g}{1 - g} \quad 4)$$

Equation (4) shows that the equity beta corresponds to the asset beta lifted to a higher level through the effect of gearing.

62. We can now pinpoint where exactly risk enters the determination of the WACC. It is through the asset beta β_a and through gearing g , both of which vary positively with risk. According to equation (4), these two variables determine the equity beta β_e which in equation (2) is a determinant of the cost of equity Ke . The latter then enters equation (1) which determines the WACC. In equation (1) also appears gearing g in that it determines both the shares of the cost of equity (negatively) and of the cost of debt (positively). Since the cost of debt is normally lower than the cost of equity, this is the route through which a higher gearing lowers the WACC. Note that through the positive effect of gearing on the equity beta, a higher level of gearing influences the WACC positively, which effect however is more than compensated through the effect it has through the capital structure.
63. Contrary to what holds for the asset beta, it is less recognized that gearing also varies with risk. In particular NRAs pay much less attention to this aspect. If one reads the relevant literature carefully, however, one notes that NRAs do recognize the existence of the relationship, they are however rarely prepared or willing to act on it. The reasons for this are often not clear. We rest the discussion on the topic for the moment, referring to the following subsections in which we take it up again.

4.2 A separate WACC for civil engineering infrastructure

64. NRAs traditionally determine the WACC at a company-wide level. The typical reason for this approach is that NRAs tend to view companies at the aggregate level, since the necessary information for estimating the parameter values needed for deriving the WACC are readily available only at this level. Another reason consists in the underdeveloped sensibility of many NRAs to the problems that may arise when a company-wide WACC is used in the pricing of products whose market dynamics are different from those of the whole company.
65. In contrast to the above, the discussion in the preceding section suggests a view of a company which is composed of a diverse collection of projects or business

fields, each of which with its own risk profile that could in each case be the basis for an individual WACC. It appears that most NRAs when approached regarding the advisability of assessing the cost of capital at a project or business field level, shy away from this notion due its apparent complexity and the perceived risk of possible wrong decisions

66. There are, however, exceptions, and the British regulatory authority, Ofcom, is currently the most prominent one in this respect. In a Consultation on its approach to risk published in 2005,²⁷ it devotes a whole section to the question of how to deal with variations of risk within a company. To give an impression of the result of this discussion it is best to provide the following quote from this document: "Ofcom believes that, under certain circumstances, it may be appropriate to reflect differences in risk within corporate groups in its financial analysis. In the context of systematic risk, this would mean allowing different costs of capital on different projects. One way to achieve this in practice would be to vary, or "disaggregate", the beta, the parameter that reflects the systematic risk of a particular company in the CAPM". We see from this quote that our position in the preceding section, i.e. that a project's WACC should be derived on the basis of the asset beta of a particular project or business field, is fully consistent with Ofcom's approach. It should be noted that when Ofcom determined the WACC used in pricing copper access and ducts and poles (DAP)²⁸ offered by Openreach, it follows the approach developed in this publication.
67. As regards the other variable, i.e. gearing, that we have identified as also varying with risk, Ofcom recognizes it in principle but then rejects its actual application. It is however of interest to note also here the arguments that Ofcom develops while discussing the topic: "Ofcom does not propose to model variations in systematic risk across projects by means of varying project gearing ratios. Viewing a company as an aggregation of individual projects, one would expect the project gearing ratio for low-risk projects to be higher, and hence ... the project cost of capital lower. However while it is empirically observed that firms with relatively low asset betas tend to raise capital using a relatively high proportion of debt, as opposed to equity, Ofcom is not aware of any established formulaic relationship between the two; ... Ofcom's view is therefore that it is not appropriate at this time to attempt to model variations in risk via different gearing ratio".²⁹ Thus, as we already men-

²⁷ See Ofcom (2005a).

²⁸ When in 2005 Ofcom started out in its effort to disaggregate the WACC, this applied to copper access and the rest of BT. In 2018, in the context of its Wholesale Local Access Market Review [see Ofcom (2018a)] ducts and poles were added to copper access. There appears to have been no discussion regarding why these two were joined to form one segment for which to provide the same WACC.

²⁹ See Ofcom (2005b).

tioned, Ofcom recognizes the principle but in order to be cautious it abstains from applying it.³⁰

68. We believe that Ofcom is too cautious in rejecting out of hand the possibility of adapting the gearing level to the level of risk. When the accepted company-wide gearing level is quite low, as is for example the case for BT Group, then applying that same level to a low risk business such as civil engineering infrastructure appears to be unwarranted. Without trying to reach a truly optimal level, the NRA should in such a case well be in a position to apply an adjustment that would be both reasonable and cautious.
69. Note that, while the above discussion focusses on Ofcom and its current approach to copper access and DAP, since it provides the most vivid description of how to deal with the issue, we might as well have referred to decisions by the predecessor of ARCEP In 2001. In this year ART decreed that distinct levels of risk were to be applied for each of France Telecom's different activities. Accordingly, ART determined for example a WACC for the unbundled local loop which is lower than the one for the total of fixed telephony, given that the risk of the former be lower than that of the latter.³¹
70. Pulling together the above arguments, there emerges a compelling case for the French NRA to derive and use a specific WACC for the pricing of the services of civil engineering infrastructure. The discussion in the Ofcom publication as just discussed could provide the guidance for dealing with the complications and challenges that such an approach would entail. The objections to a specific WACC that ARCEP cites in its recent Public Consultation are not convincing (see the review in Section 5.2). There also appear to be no reasons according to which it would technically not be feasible to derive such a specific WACC.
71. Applying a specific WACC in the pricing of civil engineering infrastructure would have the following positive consequences:
 - Since the risk of civil engineering infrastructure is expected to be lower than an telecommunications operator's company-wide risk, a specific WACC would lead to lower prices.

30 In addition to what we have noted regarding Ofcom's position on gearing, we believe that the following references in the regulatory literature are also of interest. Ofwat (2008) describes the case where according to its view regulated water companies have increased their gearing beyond that what Ofwat itself considers as prudent, which indicates that these companies are more confident about the advisability of such higher gearing rates than the regulator. In a submission to the Queensland Competition Authority, the Australian consulting firm SFG Consulting argues, that SFG's relatively low estimate of the asset beta of its client Aurizon, compared to other railroads, is consistent with its relatively high target gearing. In other words it is claimed that if the asset beta were higher Aurizon would tend to have a lower gearing. See SFG Consulting (2014).

31 See ART (2001a, 2001b).

- A lower price for this input would enhance the prospects of the operators that depend on it.
- Having a price for a product correctly determined on the basis of its actual underlying supply conditions (a product's risk is one of these conditions), enhances overall efficiency in the economy-

4.3 Investor behavior

72. We can currently observe as a market trend that pension funds, insurance companies, investment funds and infrastructure funds are investing billions of Euros in telecommunications, in particular in fibre networks. These entities do not invest in integrated telcos. They are only interested in investing in the passive infrastructure of fibre networks. This is predominantly the civil engineering infrastructure, the duct system, the dark fibres and the passive elements of the PoPs. These financing institutions do then either invest into pure play infrastructure companies which are only active in a Layer1 business model or they require that the passive fibre network infrastructure elements of an integrated company are separated and they only invest in the separated infrastructure entity. In other financing (model infrastructure leasing) models, these financing entities take ownership rights on the passive network infrastructure to provide debt or lease financing.
73. The financing institutions mentioned above are investing into passive network infrastructure and not in integrated telcos, because they intend to invest into long-term stable business models and assets, with low risks and low but steady returns. This return/risk profile they find in physical fibre network infrastructures and not in integrated telecom businesses. Accordingly, their rate of return expectations for investing in physical infrastructure are lower than for investing in listed multi-product telcos integrated in all levels of the value chain. The behavior of these investors reflects their perception of the low risk inherent in this type of infrastructure, which also applies to the civil engineering infrastructure we are dealing with in the present report. This is thus an additional peg in the support of the position we are developing.
74. A variety of transactions in the French and in other European markets underline this investor-specific treatment of physical infrastructure. At the end of 2018, SFR created a company, SFR FTTH, to expand its infrastructure operator business and sold nearly half of its capital to a consortium of pension funds and banks. In December 2018, Bouygues Telecom, Axiome and Mirova created CityFast, which takes over the FTTH infrastructure in very dense areas. Iliad has entered into a partnership with the investment fund InfraVia through the creation of IFT. In the mobile sector, most operators in France and in Europe have sold their towers to specialized tower companies. Bouygues Telecom sold 200 towers to Cellnex in

2016 and then nearly 1,800 towers in 2017. SFR sold 10,000 towers to SFR TowerCo. and then to Hivory (Altice and KKR) in December 2018. Iliad sold 5,700 towers in France and 2,200 sites in Italy to Cellnex in May 2019. Similar movements can be observed elsewhere in Europe. For example, Altice Europe sold a 49.99% minority stake in its infrastructure division Altice Portugal FTTH at the end of 2019.

4.4 Relevant peers for determining the asset beta

75. As discussed in Section 3.1, it is Orange that markets the largest share of the civil engineering infrastructure, for which this is an operation of one of its business fields among many others. To determine the risk of this business field and to be able to derive the relevant beta, one would need observations on it from the capital market. Obviously, there are no such observations available, since through the capital market only the total risk of a company can be assessed.
76. In comparable situations, NRAs look for peer group operators that offer the service in question as pure players and the beta estimates of which could be used as substitutes. There are, however, no pure-play providers of telecom civil engineering infrastructure so that this option is also not available. The next possibility is then attempting to identify operators offering services that come close to the services of telecom civil engineering infrastructure.
77. This is actually the approach that UK's NRA Ofcom has chosen. In its most recent market review,³² it presents an asset beta for copper access and DAP for which it uses betas estimated for UK network utilities. There are asset beta estimates for seven such utilities ranging between 0.17 and 0.75 averaging to 0.39.³³ Ofcom then takes the midpoint between this average and the asset beta of BT Group which is 0.68. We are not commenting here on why Ofcom chooses to mitigate the impact of relying on betas from utilities by upping their average value towards the BT Group value, the important insight is that there are providers of civil engineering infrastructure services that are close in the relevant characteristics to those used in the telecom industry, and that for these providers asset beta values can readily be estimated. This avenue should then also be open in respect of the asset beta reflecting the risk of civil engineering infrastructure in France.
78. We note that there are also peer groups in the telecom industry, providing services that consist mostly of services of civil engineering infrastructure, although of

³² See Ofcom (2020), Annex 20.

³³ The list of utilities contains the following companies; National Grid Transco, Scottish & Southern Energy, Centria, United Utilities (all multi utility or various), Scottish Power (electricity), Severn Trent, Kelda Group (both water); see Ofcom (2005a). The extreme values 0.17 and 0.75 are both outliers. The other estimates all hover around the average; see Ofcom (2005a). The extreme values 0.17 and 0.75 are both outliers. The other estimates all hover around the average.

a different type than ducts and poles . We are referring to tower companies and satellite operators. These companies are also considered to face relatively low business risk and would thus in this respect be comparable to the providers of the civil engineering infrastructure as considered here. In a 2019 study for the New Zealand Commerce Commission the British-Australian consulting company CEPA reports estimates of asset betas of tower companies ranging between 0.25 and 0.40 and averaging 0.35, and of satellite operators ranging between 0.35 and 0.37 and thus averaging 0.36.³⁴

79. It thus appears that the value of the asset beta that would be relevant for civil engineering infrastructure, and that would be used in the derivation of its WACC, might be close to 0.40.
80. The scope of this expert opinion did not allow to search for additional peer groups that could be used for the estimation of an asset beta, standing in for that of civil engineering infrastructure. But it is reasonable to expect that across Europe there are, for example, listed utilities that, like those in the UK and comparable to the peer group used by BEREK to determine company-wide parameters (see Section 5.1.1), would be suitable candidates, so that estimates on their basis could make the conclusion under the preceding cipher regarding the value of the asset beta - and the one regarding gearing in the following section - more robust.

4.5 Approach to gearing

81. It is true, as claimed by Ofcom in its June 2005 document on risk, that there is no well-established conceptual approach, comparable to the CAPM for the beta, on the basis of which to derive an optimal level of gearing that corresponds to the observed level of risk. What is left as alternative is observing actual levels of companies that served as peers and compare those to the levels that NRAs consider as relevant. When doing this, one must keep in mind that risk may not be the only factor that determines the gearing level for a company or project.

³⁴ CEPA reports results from a range of regressions covering different periods and econometric specifications. We report the ones for the most recent period and the most plausible econometric specification.

82. Table 5-1 shows the gearing levels of the peer group companies used for deriving the asset betas reported in Section 4.3.

Table 4-1: Observed values for gearing

Peer group	Source	Average values of gearing level	Comment
UK utilities	Ofcom (2005a)	39%	Extreme value of 1% removed
UK water utilities	Ofwat (2008)	47% in 2000/01 62% in 2006/07	Considered unreasonably high by Ofwat; however ratings by rating agencies are comfortable
Tower companies	CEPA	27%	
Satellite operators	CEPA	32%	

83. The results are a mixed bag. The gearing levels shown for the UK utilities, as reported by Ofcom and Ofwat, correspond to the levels one might expect, given the assumed lower risk of utilities and given that the levels set by the NRAs for BT (by Ofcom) and Orange (by ARCEP) are around 30%. The levels shown for the tower companies and satellite operators are not consistent with the expectations. The reason may be, as mentioned as a possibility above, that other factors than the observed risk are responsible for the low levels.
84. Based on the gearing levels observed for the UK utilities, we would tentatively conclude that a gearing level around 40% might be the appropriate value to be used for a WACC for civil engineering infrastructure.

5 The WACC as (to be) determined by ARCEP

85. In this section we address how in its Public Consultation of 3 February 2020 ARCEP deals with the possibility of a different WACC for civil engineering infrastructure and provide an assessment of this treatment in view of the discussion in Section 4. Further we ask how this approach compares with that used by the UK's Ofcom and that under consideration by Ireland's ComReg, each time for a comparable product. Since with this Consultation ARCEP aims to adopt the methodology laid down in the European Commission's Notice of 6 November 2019, we will first take up the EU framework, focusing on the Notice and the NGA Recommendation to find out to what extent it would allow to consider a different WACC for civil engineering infrastructure.

5.1 The European framework

5.1.1 The Notice on capital cost³⁵

86. In this Notice the Commission aims to establish a harmonized approach to be followed by NRAs for, as the title indicates, the setting of the cost of capital for legacy networks. The exposition in the Notice essentially consists of the derivation of the standard set of formulas for determining the WACC. Given the diversity of legacy networks, one might have expected that in the course of presenting its approach it would also address how differences in operators' business fields could justify different parameterizations of these formulas thereby enabling the determination of different WACCs for these different business fields. This is, however not the case.
87. By the standard approach to the WACC referred to above we mean the set of equations that we outlined in Section 4.1. We recapitulate it here for reference purposes:

$$WACC = \frac{K_e * (1 - t)}{1 - t} + K_d * g \quad (1)$$

$$K_e = RFR + \beta_e * ERP \quad (2)$$

$$\beta_a = g * \beta_d + (1 - g) * \beta_e \quad (3)$$

$$\beta_e = \frac{\beta_a - \beta_d * g}{1 - g} \quad (4)$$

where K_e and K_d stand for the cost of equity capital and the cost of debt, respectively, g for the debt ratio, t for the corporate tax rate, RFR for the risk-free interest rate, ERP for the equity risk premium, β_e for the equity beta, β_a for the asset beta and β_d for the debt beta

88. As far as determination of the WACC parameters is concerned, BEREC has been asked by the Commission to estimate these and publish them on an annual basis. Regarding company-specific parameters, such as the asset beta and gearing, BEREC is to identify a list of companies that could serve a peer group, for each of which it would estimate the corresponding values.
89. We pointed out in Section 4.1 that differences in the degree of risk of a business project or a business field is expressed primarily through the asset beta β_a but also through the level of gearing g that a company engages in, both of which according to the equations shown above are determinants of the WACC.

³⁵ See European Commission (2019).

90. In respect of the asset beta, Section 5.2 of the Notice points out that its value is to be obtained on the basis of estimates of beta values from a suitably selected peer group of companies. There is no mention of the possibility that the betas from different peer groups might be relevant for different types of legacy networks. In particular, there is no reference to the fact that there are some NRAs having determined different WACCs for mobile and fixed networks, nor that for example Ofcom has been setting different values of the WACC for as many as four different types of services.
91. In respect of gearing, Section 4.3 states that "(t)he most common approach for estimating the gearing, which is considered appropriate for the purposes of this Notice, is to use the book value of a company's net debt, including the value of financial leases". In line with its general approach, the Notice does also here not recognize that in the case of differing types of business fields, there might be the need to also use different levels of gearing.
92. There is thus room for the criticism that the Commission in its endeavor to harmonize the approach to the determination of the cost of capital, neglects to point out that it would be consistent with this harmonization that in the case of marketing services form different of types business fields it would be legitimate to account for this with correspondingly different values of the relevant parameters that then would lead to different values of the WACC.
93. The Commission does not categorically rule out that the specific risk of a particular type of network service be reflected in the WACC. This is demonstrated by its approach to determining the WACC for the NGA, to which we now turn.

5.1.2 The NGA Recommendation³⁶

94. This Recommendation is relevant in the present context on two counts, (1) because it addresses the pricing of civil engineering infrastructure and (2) because it allows for the possibility that operators add an extra risk premium to the WACC for an NGA access service, on the condition that the operators can demonstrate that there is a higher risk. We base the following discussion on Annex I of the Recommendation that details the pricing principles to be applied in these cases
95. As regards civil engineering infrastructure, treated in Section 3 of the Annex, the main objective appears to be avoiding that any higher risk premium accorded NGA networks be also rolled into the prices of this infrastructure. This is made clear through stating that when determining the price for access to civil engineering infrastructure, NRAs should not consider the risk to be different from that of copper infrastructure.

³⁶ See European Commission (2010).

96. Besides that, however, it is stated that "NRAs should ensure that access prices [to civil engineering infrastructure] reflect the costs effectively borne by the SMP operator. NRAs should in particular take into account actual lifetimes of the relevant infrastructure and possible deployment economies of the SMP operator". This wording implies that a differentiated approach may be required in respect of some of the parameters that feed into the cost of that infrastructure. The parameters mentioned do not relate to risk, but if a differentiated approach is allowed regarding for example lifetimes of the assets, this might as well imply that a differentiated approach might also be applicable to the risk factor used in the determination of the WACC. It would surely be consistent with the flexibility that is shown in allowing operators an extra risk premium for the WACC that is used for determining the cost of the NGA.
97. As regards the higher risk premium for the NGA, Sections 4 states "(w)hen setting access prices to the unbundled fibre loop, NRAs should include a higher risk premium to reflect any additional and quantifiable investment risk incurred by the SMP operator". If one applies this logic to civil engineering infrastructure, the wording would have to be: When setting access prices to civil engineering infrastructure, NRAs should include a risk premium that reflects any lower and quantifiable investment risk incurred by the SMP operator. In general, there should a priori be no greater difficulty in determining the lower risk of civil engineering infrastructure than in determining the greater risk of NGA.
98. In Section 6, in which the criteria for the risk premium are specified, it is stated that "(i)vestment risk should be rewarded by means of a risk premium incorporated in the cost of capital". The reasons that may justify this premium are "(i) uncertainty relating to retail and wholesale demand; (ii) uncertainty relating to the costs of deployment, civil engineering infrastructure works and managerial execution; (iii) uncertainty relating to technological progress; (iv) uncertainty relating to market dynamics and the evolving competitive situation, such as the degree of infrastructure-based and/or cable competition; and (v) macroeconomic uncertainty".
99. All the above may be good reasons to justify this extra risk premium for NGA. But then there are even more compelling reasons for justifying a lower WACC for civil engineering infrastructure, reasons that are on the same argumentative level as the ones cited above for NGA. Comparable to (i) we have: lower uncertainty relating to wholesale demand; comparable to (ii); lower uncertainty relating to the costs of deployment and managerial execution; comparable to (iii): lower uncertainty relating to the technology; comparable to (iv): lower uncertainty relating to market dynamics and the competitive situation; and relating to (v): lower susceptibility to macroeconomic uncertainty. These reasons would definitely justify having for civil engineering infrastructure a WACC that is lower than the company-wide one.

100. The point is that in the case of the NGA the Commission considers it as appropriate to deviate from its standard methodology, whereas in the case of civil engineering infrastructure it apparently does not see any reason to do so; in this case it would insist that the standard approach to the WACC as applicable to all other services be implemented. ARCEP should not let itself be influenced by this neglect when considering whether there should be a different WACC for civil engineering infrastructure.

5.2 ARCEP's approach in the Consultation³⁷

101. In its Public Consultation of 3 February 2020, ARCEP among other sets out to describe its approach to determining the WACC which would be in conformity with the Commissions Notice of 6 November 2019.
102. Early on in the document there is a section in which it is laid out to what set of business fields the approach would apply. In particular the questions are addressed whether there should be a different WACC for civil engineering infrastructure and whether there should be different WACCs for fixed and mobile services. As regards the latter, the conclusion is that because of an advanced fixed-mobile convergence there has already been since 2017, and should continue to be, a single WACC for the two types of networks. As regards civil engineering infrastructure, a number of arguments are provided by ARCEP aiming to show that also for this market there should be no WACC that is different from that for the other services. In what follows we will assess each of these arguments.
103. We proceed by stating the argument provided by ARCEP followed each time by WIK's reaction:
- ARCEP: Civil engineering infrastructure assets after all serve primarily the principal activity of Orange which is the provision of electronic communication services.

WIK: This sentence would make sense if all the services of Orange had the same risk. In this case the market dynamic for civil engineering infrastructure could arguably be considered to be the same as for these services. But Orange's diverse services have different risks, for example when realized over copper vs. over the NGA, or when provided in a retail vs. wholesale market. Civil engineering infrastructure is an input to all these services and as such would be much less affected by the developments within and between these markets.

³⁷ See ARCEP (2020b).

- ARCEP: To show that the European Commission supports its position, it cites from the Commission's NGA Recommendation as follows: "When investments in non-replicable physical assets such as civil engineering infrastructure are not specific to the deployment of NGA networks (and do not entail a similar level of systematic risk), their risk profile should not be considered to be different from that of existing copper infrastructure".

WIK: The quote that ARCEP uses is from preamble 14 of the NGA Recommendation. When above discussing this Recommendation, we commented on a statement in its Annex 1 that expresses the same rule. i.e. that when "setting the price for access to civil engineering infrastructure, NRAs should not consider the risk profile to be different from that of copper infrastructure". In our comment we point out that the statement is meant to prevent providers of NGA access to roll into the cost of the attendant civil engineering infrastructure also the extra risk premium accorded NGA access. When the statement in this context refers to the risk profile of copper infrastructure, it does not necessarily imply that this would consist of one single risk profile for all the components going into that infrastructure. The statement means to say, whatever that risk profile is, it is this one that should be used for civil engineering infrastructure when it is a component of NGA access. In other words, the statement does not serve the purpose for which ARCEP intends to use it here.

- ARCEP: Similarly, it is argued that since the Commission in its Notice of 6 November 2019 presents a methodology for the WACC that does not distinguish between different regulated activities, this also implies that it could be used for determining one single WACC only for a company.

WIK: Strictly speaking, the methodology presented in the Notice is the methodology for deriving a generic WACC, where it is not excluded that by appropriately varying parameter values one could obtain different such WACCs, as for example one for civil engineering infrastructure and one for all other services. It is true that the Commission neglects to point out this latter option, and we have expressed the corresponding criticism when we discussed the Notice. But in any case, nothing would prevent ARCEP from using the methodology for different types of services with different parameter values, in particular since it did define a separate market for such a service, which is civil engineering infrastructure.

- ARCEP: Since the CAPM is used and since it allows for only one single level of systematic risk, it follows that on the basis of this systematic risk only one single WACC can be derived.

WIK: It is true that from a given beta estimated by way of the CAPM only one WACC can be derived. But this does not mean that the relationship expressed

by the CAPM may not hold separately for each business field of a company. As discussed in Section 4.3, the use of beta estimates from a peer group of companies that as pure players offer the services of that business field, or services whose characteristics are close enough, may then be used.

- ARCEP: According to its knowledge there is no other European regulator that sets a specific rate of remuneration for the activities provided by civil engineering infrastructure.

WIK: ARCEP is not correct here. There is the example of Ofcom's determination of a specific WACC for copper access and DAP, provided by BT's subsidiary Openreach (discussed in the following section). As this service includes ducts and poles, which correspond exactly to civil engineering infrastructure, it is a very relevant instance of a rate of remuneration for a particular service that is based on the specific degree of risk of this service.

104. It is apparent from above assessment of ARCEP's objections against a specific WACC for the civil engineering structure that they are not valid. It follows that ARCEP should actually feel compelled to implement a specific WACC as we proposed in Section 4.2. This would by the way be consistent with the approach that ART depended on in its decisions of 2001, already referred to above in Section 4.2, according to which separate levels of risk were applied to France Telecom's different activities.
105. For the company-wide WACC that ARCEP submits to stakeholders for consultation, it derives values for two variants. The difference between the variants comes about through different values for the risk-free rate and the equity risk premium. The one set of assumed parameter values (the lower ones) correspond to the Commission's suggestions, the second set to what ARCEP has been applying in the past. When carrying out the derivation, ARCEP follows closely the methodology presented in the Commission's Notice.
106. As far as the formal structure is concerned through which the derivation is realized, it corresponds exactly to the one expressed through the system of four equations we developed in Section 4.1 and recapitulated in Section 5.1.1. Table 5-2 shows all the parameter values that ARCEP has used and the two WAAC values resulting from them.

Table 5-1: Parameter values for ARCEP's company-wide WACC

WACC component	Variant	
	A	B
Risk-free interest (%)	0.57	1.48
Equity risk premium (%)	4.2	6.0
Debt premium (%)	1.12	1.12
Asset beta	0.53	0.53
Gearing (%)	32	32
Corporate tax rate (%)	28.4	28.4
Cost of equity (%)	5.1	8.2
Cost of debt (%)	1.7	2.6
Cost of equity (%)	4.0	6.4

107. As far as the two parameters of interest in the present context are concerned, they have values of 0.53 for the asset beta and 32% for gearing. Noteworthy is that, as a consequence of strictly applying to the corresponding rule in the Commission Notice, ARCEP decreased the level of gearing from a previously used level of 40%.
108. In the time since ARCEP released its Public Consultation, BEREC has published the results of its WACC parameter calculations (for which of course it also strictly applied the methodology of the Commission's Notice). Regarding the asset beta and gearing, BEREC presents the detailed results for the peer group that it uses. Taking each time the median values, as also ARCEP does for its calculation, one obtains a value 0.52 for the asset beta and 40% for gearing.³⁸ In respect of the asset beta, BEREC's and ARCEP's results are almost identical, in respect of gearing the BEREC results are eight percentage points higher. The difference may be due to the differences in the composition of the peer groups used. Of the 14 operators that BEREC's peer group contains, ARCEP excludes two of them, i.e. Telecom Italia and Telenet of Belgium.
109. If ARCEP had derived a differentiated value of the WACC for civil engineering infrastructure, one might have expected for the corresponding asset beta a value of at most 0.40 and for gearing a level of at least 40% (see our discussions in Sections 4.4 and 4.5). Using for the other parameters the values of Table 5-1, we would with the combination of 0.40 for the asset beta and 40% for gearing obtain values for the two variants of the WACC of 3.13% and 4.94%.

³⁸ Actually, in each case there are two median values as the total number of peer group member is even, which means that there is no single median. In the case of the asset beta, both have the same value, in the case of gearing the two values are 38.75% or 41.82%, of which we have taken the mid-point.

110. As regards obtaining robust estimates for the asset beta and the level of gearing applicable to civil engineering infrastructure, we refer back to Section 4.4 where we pointed out that it is reasonable to expect that across Europe there are listed utilities that could serve as peer group for which, like for the peer group that ARCEP used for the company-wide parameters, such estimates could be obtained.

5.3 Cases of a differentiated WACC

5.3.1 Ofcom's WACC for BT and Openreach

111. The position taken by ARCEP in its Consultation is that there should be one single WACC to be used when determining the prices of all the regulated services of a telecommunications operator, except in the case of NGA. While we have pointed out that already ART in 2001 acted differently, we want to highlight one prominent current example which demonstrates the contrary. It is the differentiated approach that Ofcom takes in determining the values of the WACC for Openreach and other BT activities.
112. On the initiation of Ofcom, Openreach was separated from the other businesses of BT in 2006. In a Strategic Review document,³⁹ Ofcom documents reasons that led to this breakup and the consequences that flowed from it:
- It is noted that "after twenty years of regulation had yet to overcome the problems of enduring economic bottlenecks combined with unequal access to these parts of the networks".
 - Ofcom wanted to ascertain that wholesale customers would have equal access to network services in which BT had SMP, meaning that they have access at the same conditions that BT offers to itself.
 - Ofcom considered it as necessary that there be organizational changes which involved changes in management structures, incentives, business processes and information flows necessary to support equal access at the product level, which in the end led to the spin-off of Openreach.
 - An important consequence of setting up Openreach was that for the determination of the cost of the bottleneck services, a different WACC was going to be applied. Ofcom considered that the equity beta it used for the cost of capital should be disaggregated meaning that the beta for BT's copper access and DAP assets would become lower, "because they are subject to

³⁹ See Ofcom (2005c).

less systematic risk than BT as a whole, and because they represent an enduring economic bottleneck".

113. While we cannot assess to what extent the arguments under the first three bullets (although of general interest) would in any way be relevant in the context of civil engineering infrastructure in France, the argument under the last bullet corresponds of course exactly with the one we have been developing. Given that copper access and DAP includes access to ducts and poles, this makes this service essentially comparable civil engineering infrastructure as offered in France. In any case, to make the point it is not necessary that the two services in question are 100% identical, the point is that Ofcom recognized that an infrastructure essential for competing operators be made available at prices that reflect the specific supply conditions of that service. Most important is that Ofcom acted on this insight.
114. In its latest decision⁴⁰ on the WACC, Ofcom applied for copper access and DAP from Openreach an asset beta of 0.55, while it applied for the BT Group (without Openreach) an asset beta of 0.68, which means that the one for copper access and DAP access is 19% lower than the one for BT Group. The corresponding WACC values are 7.1% and 8.3% where the one for copper access and DAP is 14% lower. When citing these rates, one should keep in mind that copper access and DAP, due to the inclusion of copper, has a somewhat higher risk than would duct and poles alone have, or for that matter civil engineering infrastructure,.
115. As regards the gearing that we also suggest should be set in accordance with the relevant risk of the service in question, Ofcom uses the same value for the WACC for copper access and DAP as for BT Group. As we discussed in Section 4.2, Ofcom has decided against using a level of gearing for copper access and DAP that is different from that of the rest of BT's services, since it believes that there exists no sufficiently solid basis on which to determine a level that would consistently correspond to the level of product risk. It will be recalled that above in Section 4.2 we expressed the opinion that Ofcom is too cautious in not admitting the possibility of reasonably adjusting the gearing level according to the degree of risk.

5.3.2 ComReg's Review of the WACC⁴¹

116. Besides Ofcom, the Irish NRA ComReg shows an interest in deriving a separate WACC for civil engineering infrastructure (CEI) that is provided by the incumbent operator Eircom. This is currently being addressed in the Review of the WACC launched by ComReg on 31 Mai 2019.

⁴⁰ See Ofcom (2018b).

⁴¹ See Commission for Communications Regulation (2019).

117. The background in this case is that the national broadband operator NBP uses CEI in the form of ducts and poles. These services have been priced the same as other regulated services of Eircom, but it is now suspected that their systematic risk is different from that of these other services and that they would therefore warrant different prices.
118. On 10 June 2020, ComReg published a draft decision on the WACCs for fixed line, broadcasting and mobile.⁴² Regarding a differentiated CEI, it points out that it has received comments from Eircom and NBI's which it will use to inform a separate upcoming consultation on CEI pricing. Since ComReg had previously stated that it is important to establish the principles for estimating a WACC associated with CEI assets, it may be surmised that ComReg is giving serious consideration to this question, also in view of the fact that it will initiate a specific consultation on it.
119. Both Ofcom's actual practice as well as ComReg's deliberations regarding this issue show that the idea of a separate pricing approach to civil engineering infrastructure is not that farfetched as ARCEP is inclined to make it.

⁴² See Commission for Communications Regulation (2020).

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