

23rd October 2019

Case 2018-18805

/CP&CW

Consultation note regarding Model Reference Paper

DBA started the consultation on the model reference paper (MRP) on 1st July 2019. By the end of the consultation period on 30th August 2019, DBA had received consultation responses from TDC, Dansk Energi Association (DEA), Telenor and Telia.

This document includes a verbatim copy of the comments provided by the stakeholders, along with responses from DBA to each comment separately. The accepted feedback to the draft MRP has been implemented into the final MRP.

Question 1: Do you agree with the cost standards to be considered to determine the cost base of the model? Do you agree with the list of assets in which the EC's 2013 recommendation shall be applied (i.e. in which asset valuation should account for fully depreciated assets)?

As a general response to the comments provided by the operators to this question, DBA would like to clarify its position to this point.

In particular, when designing a cost modelling methodology, it is essential to bear in mind the underlying objectives of the regulation, which could be broadly simplified as i) fostering investment and ii) promoting competition.

In this sense, as already reflected in the old MRP and the EC's recommendations, fostering investment is not considered to be a feasible objective in the case of copper networks, as no operator would currently decide to build a new copper network. Instead, DBA's prime objective should be to promote competition in such access networks by i) ensuring that the SMP operator is able to recover its costs while ii) avoiding to over-compensate the SMP by using the costs that a new entrant in the copper access market would be expected to face. This implies removing fully depreciated civil infrastructure assets from the

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calculation as mandated by the EC in its 2013 recommendation on non-discrimination practices and reflected in the EECC as well.

A similar situation would apply for HFC networks, as it is not expected that an alternative operator would nowadays deploy a parallel coaxial network to the one of the SMP operator. Consequently, the fully depreciated assets related to the coaxial access network will also be removed from the calculations. A subtle nuance in this regard is that, while current DOCSIS 3.1 networks may be able to compete (at a retail level) with fibre networks, this is only possible thanks to major upgrades that involve new investments (e.g. fibre deployment) in the network. These new investments in coax networks shall be valued at current costs, just like it will be for similar investments in copper networks.

On the other hand, DBA is convinced that there is a case for promoting both investment and competition in fibre access networks, as infrastructure-based competition could be achievable in this case. Therefore, the model should consider, at all times and for any modelled operator, the current cost of deploying a new fibre network.

In summary, DBA believes that, as noted through the consultation process, the references made by the EC in its 2013 Recommendation are not explicit and is subject to interpretation. Moreover, they raise concerns about what should be considered to be an NGA network and which assets should be considered to be reusable. While the previous paragraphs in this response are still coherent with the EC's Recommendation, we believe that they provide a more clear and concise description of the approach to be adopted in DBA's fixed LRAIC model. The approach, which will only apply to the access networks (this is, between the end-user and the central office) and not to core networks, could be summarised as:

- Copper networks: Fully depreciated civil infrastructure assets are to be removed from the calculations for the copper segment of the network.**
- Coax networks: Fully depreciated civil infrastructure assets are to be removed from the calculations for the coax segment of the network.**
- FTTH networks: Fully depreciated civil infrastructure assets are not to be removed from the calculations.**

The asset valuation approaches to follow in each network have been clarified in section “2.1.3.1. Summary of the asset valuation approaches” of the MRP.

TDC

TDC does not agree:

No development in market/regulatory situation support change in use of historical cost/asset base.

TDC agrees that the modelling approach in Denmark should be guided by the 2013 Recommendation. The recommendation states topics to be considered when the NRA is going to develop the LRAIC model. Among other thing the cost standard and replicability have to be considered. These topics are however not new. The current LRAIC model is based on the 2010 Recommendation where same topics were to be considered. DBA/TERA referred and considered these topics in the Model Reference paper of July 2013, page 12-13. With regards to replicability DBA wrote:

“Bottlenecks in the market represent a situation where new entrants cannot realistically replicate the network of an incumbent (no infrastructure-based competition likely to develop). For example, there might be areas where it is impractical for alternative operators to build another network of trenches next to the incumbent’s existing network.

Accordingly, alternative operators can only buy access to the incumbent’s network to compete in downstream markets, and it is therefore less relevant to wish to send a “build or buy” signal. In other words, the costs that were actually incurred to the owner of the bottleneck are more relevant than those that would be faced by a new entrant.”

With regards to reusable assets DBA wrote in the paper:

“In its 2010 NGA recommendation, the European Commission considers that the historical costs effectively borne by the operators should be considered for the pricing of the civil engineering (e.g. ducts). Also, in the context of regulated access to Next Generation Access Network, the European Commission has confirmed these principles and specified that costs derived from the accounts can be relevant for reusable legacy civil engineering assets¹⁸.

As a consequence, in some instances, the use of historic cost information can be useful. Even if this draft MRP focuses on the LRAIC method, it is necessary to state that the new LRAIC model should include the ability to use historic cost information for some assets.”

This guidance in the 2010 Recommendation lead to the current Criterion 1 in the Model Reference Paper of July 2013 stating that:

“The LRAIC model should include the ability to use historic cost information for some assets.”

Even though the criterium allows use of historical cost information DBA chose not to use historical cost in the final LRAIC model used for pricing from 2015 and onwards.

TDC sees no material differences in the analyses/considerations DBA are to perform based on the 2013 Recommendation compared to the 2010 Recommendation on these topics and TDC sees no trends in the market development after the last LRAIC revision that supports the conclusions in Axons illustration 2.3. In contrary build-or-buy signal are more important than ever, since an abundant of fibre infrastructure have emerge in parallel to the legacy networks in the last years.

No market development shows lack of replicability

On page 13 Axon refers to 2013 Recommendation chapter 33:

“...civil engineering assets (for example ducts, trenches and poles) are assets that are unlikely to be replicated. Technological change and the level of competition and retail demand are not expected to allow alternative operators to deploy a parallel civil engineering infrastructure...”

Based on this statement and with no further analysis of the actual market development Axon concludes:

“Based on the previous directives and recommendations from the European Commission, it becomes apparent that current costs should be used to reflect the regulatory value of most assets. Nevertheless, the EC’s 2013 Recommendation provides room for adjustments to account for the accumulated depreciation of the reusable civil engineering assets. This is derived from the EC’s understanding that, unlike active equipment and the transmission medium (e.g. fibre), civil infrastructure assets are unlikely to be replicated”

The Commissions guidance are intended to be used on e.g. copper network where no replicability is expected in the future. Here, the build-or-buy approach has no effect and the copper net could be costed using historical cost/RAB instead of LRAIC that support build-or-buy.

The above described situation is however not the situation in Denmark. As DBA knows, the amount of copper lines declines dramatically since the copper net is replicated by parallel fibre networks (even where TDC has upgraded with remote DSLAMs/VDSL). TDC expects this development to continue and to intensify. Since the copper network is replicated and since migration to fibre are to be stimulated to support the political priorities of Very High Capacity Networks it is of importance to sustain investment incentives and therefore build-or-buy signals using LRAIC pricing on copper - no matter if parts of the copper network has been upgraded with remote DSLAMs in the past.

If Axons approach is implemented the worse but realistic case is a low-priced copper net supporting low but adequate bandwidth at low price for a large part of the population. Hereby a migration barrier is established by the regulation where the migration from the low-priced (RAB) copper to e.g. the home passed (but not activated) fibre is unattractive due to a high price spread.

Same arguments count for coax, where TDC experience that fibre deployment and migration in coax areas is accelerating. Despite better bandwidth properties of coax than copper and almost similar properties compared to fibre, the end-user has a better perception of fibre. Hence the coax networks are now replicated like the copper net.

Definition of relevant NGA network

TDC only finds fibre can be defined as NGA network in a costing methodology approach. In the draft, Axon describes an upgraded copper network partly equipped with fibre as a potential NGA network. It should be stressed that only network compliant to the Digital Agenda criteria (30 Mbps to 100% population, 100 Mbps to minimum 50% population in year 2020) can be perceived as a NGA network, where reusable assets should be considered, see the 2013 Recommendation paragraph 32.

TDC's upgraded network consist of fibre to remote DSLAMs where typically VDSL technology is deployed. However, this network does not comply with the Digital Agenda requirement: Only 40% of the copper network consist of VDSL and of these connections only 57% has a downstream speed above 30

Mbit/s and less than 2% has 100 Mbit/s in eoy 2018 according to the Danish Tele Statistics. Thus, TDC's VDSL network cannot be seen as a NGA network, where reuse of assets should be considered.

Axon should further be aware that regulatory relief can be done for NGA-network where the NRA identifies competition according to the 2013 Recommendation. In Denmark, DBA has made regulatory reliefs by removing the pricing obligation in certain postal area where DBA has identified competition. However, the relief only counts for fibre, while VDSL network in these areas are still fully regulated. Thus, DBA has not perceived VDSL as NGA network.

Axon should further note that VDSL is not a technology to be considered as a potential VHCN network, since VDSL is not a part of the list of network technologies that BEREC is currently considering to be defined as VHCN in addition to pure fibre networks¹.

With regards to Axon illustration 2.2, where a FTTC network is drawn, TDC has made field trials with G.Fast network, as DBA has been informed about in DBA's so called NGA-forum. Experiences from these trials have not lead TDC to roll out G.Fast, instead TDC is now deploying fibre network. Thus, it has been verified that FTTC is not a realistic network to deploy and hence not able to reuse TDC's legacy network.

As shown above, fibre network is the only relevant NGA network, where reuse of assets from the legacy network should be considered.

Reused assets – migration savings

With regards to fibre, TDC agrees that *if* civil infrastructure is reused from legacy network the valuation should take into account fully depreciated assets in order to align with the 2013 Recommendation². However, the analysis should be done on the actual deployed fibre network and not be based on model assumption. It is TDC's experience that e.g. reuse of fibre between the central

¹ See email of March 11, 2019 from DBA sent by Christian Poulsen to Danish operators regarding "BEREC Guidelines on Very High Capacity Networks - Call for initial Stakeholder Input: Comment on DRAFT Questionnaires", where VDSL is not a part of the list in the attached document.

² Though the reuse of fibre from a legacy network is not consistent with Criteria 2. See TDC's comment.

office and a deployed remote DSLAM cannot always be done in practice for fibre deployment even though this would have been preferable due to cost savings.

In conclusion TDC sees no arguments or analyses that supports Axon suggestion of changing from the GRC-regime, so fare used. Only for a small part of the fibre network established between the remote DSLAM and the central office it makes sense to consider potential reusability.

DBA observes a number of points argued by the operator against the approach defined in the draft MRP:

Development in market/regulatory situation since the old MRP

Firstly, as TDC seems to agree with DBA, DBA has not changed significantly the treatment of reusable civil infrastructure assets in this draft MRP compared to the previous one. The modifications implemented arise from the new requirements set out in the “*EC’s Recommendation of 11 September 2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment*”³, which have been further reinforced in the European Electronics Communications Code⁴ (EECC). These requirements are gradually being adopted by all Member States, and DBA does not find any relevant particularities that could justify the adoption of any different approach.

Secondly, it is noteworthy that the removal of fully depreciated assets only will have a relevant weight in the determination of costs for copper and coax access networks, in which the argumentation of deploying new access network behind the build/buy decisions no longer apply.

Lack of replicability in the market

³ EC’s Recommendation 2013/466/EU.

Link: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32013H0466&from=EN>

⁴ European Electronics Communications Code

Link: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32018L1972&from=EN>

DBA acknowledges the fact that access fibre networks are mostly being deployed in parallel to the existing copper networks. Thus, we consider that concept of “reusable legacy civil infrastructure assets” does not apply between the different networks deployed in Denmark. Consistently, it should be expected that this criterion will mostly affect the determination of costs for the copper access networks, exerting a much lower relevance on coaxial networks and none of the fibre-based access networks.

In terms of the impact this could have on the market for copper-based DSL lines, DBA highlights that the impact should be assessed altogether with the other changes introduced to the old MRP (specifically, the “Main Criterion 8”, which presents that each access network technology should support its actual demand). As each change is expected to push the unit costs of copper-based access services either up or down, the final outcome is not predictable looking at only a subset of the criteria and will depend on the particularities of TDC’s network.

Regarding definition of NGA and VHCN networks

In DBA’s view, the decision not to apply remedies on fibre networks in some areas of Denmark is exclusively related to the market analysis of wholesale broadband markets. The objective of this project is no other than to analyse the costs of providing broadband services in Denmark based on the outcomes of such market analysis.

However, DBA would like to emphasize the modification presented at the beginning of this section with regard to the approach presented in the draft MRP, whereby the definition of what is considered to be NGA or VHCN is no longer relevant for the implementation of the suggested methodology. Instead, the implementation of EC’s Recommendation will be based on the applicability of build/buy decisions for each of the networks.

Migration savings

We agree with TDC’s remarks and consider that FTTH networks will be based on a current-cost approach, without removing reused legacy civil infrastructure assets. However, newly deployed civil infrastructure assets that are shared between more than one access network (e.g. copper and fibre) will split their costs between the networks in a similar manner to the allocation between core and access networks (See Main Criterion 17 of the MRP). The civil

infrastructure assets that are considered to share their cost between networks in the cost model, will be reconciled with actual data from the modelled operator.

TDC has raised the issue of cost occurring upon migrating customers from the copper to the fibre network. TDC believes this is not reflected in the cost model since migration to fibre will happen over time, while the passive copper network elements will become fully depreciated and not reinvested. However, if operators within reasonable time are able to provide adequate evidence to support the inclusion of these migration costs, DBA will take the information into consideration in the model.

DEA

We understand that DBA must take the EU recommendation into account. Excluding fully depreciated asset will lead to lower regulated prices. The consequence is, that it will be even harder for DEA's members to compete in areas where the regulated prices become unnatural low. Therefore, DBA should be careful when excluding fully depreciated assets in the cost base, as the consequence can be a slower roll out of fiber networks, if the price competition becomes too tough.

Furthermore, the existence of fully depreciated assets does not necessarily mean that the costs of these assets are recovered through prices. For instance, some of the fibre network companies have seen significant losses during the long period, where the companies have built up their organization and network. Given the uncertainty about the future, it has at the same time been necessary to make extraordinary write-offs of the assets. Therefore, DEA recommends that fully depreciated assets are not excluded when considering the relatively newer fibre network companies.

As reflected in the general response to this question, the fibre access networks of any modelled operator will be fully valued at current costs. No fully depreciated assets will be removed from the calculations for this access technology.

Detailed examples on the networks where the removal of fully depreciated assets is applicable are presented in section “2.1.3.1. Summary of the asset valuation approaches” of the MRP.

Telenor

Telenor does not disagree with the cost standards considered to determine the cost base. However, it should be considered to further clarify context and to expand the structure to enable a distinction and removal of investments which have been subsidized by public funding.

Illustration 2.3 distinguishes between existing and new civil infrastructure used to deploy fibre for copper and fibre networks. The definition of “new” and “existing” should be clarified. Fibre cables have been gradually deployed in copper and coax networks over many years. If the infrastructure (“new” or “existing”) is only used for copper or coax networks, the conclusion that it is a non-replicable asset where valuation should account for fully depreciated assets does not change. Same goes for the fibre cables. They are to be considered a non-repliable legacy asset unless use (and costs) are actually shared with a fibre access network.

When assessing costs, it should be taken into account that some fibre investments made by TDC and various utility companies is partially funded by the State (public funding aka Bredbåndspuljen). Telenor expects that the assessment of cost to allocate will also reflect the eventual public funding. If not, there is an eminent risk that costs are over-recovered.

Regarding the confusion between “existing” and “new” civil infrastructure assets, we have clarified this method of excluding fully depreciated civil infrastructure assets from the access networks of copper and coax. Thus, references to between “existing” and “new” civil infrastructure assets have been removed.

On the other hand, with regards to the subsidies (Bredbåndspuljen), DBA performed an assessment of the amounts received by the operators and identified that these could be considered to be relevant, especially with regards to the deployment in rural areas. The relevance of including subsidies will need to be further evaluated. However, we have adjusted the MRP to reflect that this public funding could be considered in the cost model.

Telia

Telia partially agrees. Considering that more networks have existed since the day of dawn one could easily argue that assets for example in the copper network is fully depreciated. Hence it should only be maintenance and new developments in the network that should be taken into consideration.

DSL copper lines should be way cheaper than they are today.

An option could be to give the other operators than the SMP a possibility to comment on the accumulated depreciation of assets that are not fully depreciated. Copper DSL prices has increased rapidly during that last years due to less users in that type of network.

In many cases the DSL solution is the only options when people are living outside the urban zones.

The accumulated depreciation of non-fully depreciated assets, even if they belong to the copper access network, will not be removed from the calculation, as this would not allow the SMP operator to recover its costs.

Question 2: Do you agree with the methodology described to implement the EC's recommendation to calculate the cost base of the reusable legacy assets?

TDC

TDC disagrees.

As described above TDC does not find basis for current cost valuation except for a minor part of the fibre network. Similar, DBA back in 2013-2014 found no basis for this in the modelling of the current model. Given that DBA intend to keep the criterion the wording should be changed so current cost valuation etc. should be stated as an *option* in the model but not a *requirement* – just like in the present criterion.

- Lack of cost recovery when changing to proposed method

In Axons support of the use of the SMP's asset base Axon refers to 2013 Recommendation, chapter 35:

“In the recommended costing methodology the Regulatory Asset Base (RAB) corresponding to the reusable legacy civil engineering assets is valued at current costs, taking account of the assets' elapsed economic life and thus of the costs already recovered by the regulated SMP operator....”(TDC's underscore)

This quote only make sense for civil engineering assets that so far has been priced commercially or has been regulated by Historical Cost or similar where the applied asset life corresponds to those used in the SMP's accounts. Here the

SMP's yearly depreciation is aligned with the yearly depreciation used in the regulated price that the SMP is allowed to charge. However, the Danish LRAIC models have systematically used longer lifetimes for copper, fibre and coax civil infrastructure than TDC uses in the accounts. E.g. TDC's accounting lifetime for the copper net is 20 years while it is 30 years in the current LRAIC model. For fibre it has 20-30 years in the books while it has been 35-40 years in the LRAIC models over the years.

- Example 1:

For a given fibre investment with lifetime of 25 years in TDC books (and assuming same GRC value in TDC accounting and in LRAIC model) TDC will first obtain cost recovery after 35 years given the LRAIC prices. If depreciation method is changed after 20 years another 15 years remain before cost recovery. However, the asset is depreciated down to 20% in the books. If Axon now wants to recover the remain book value over the remaining book lifetime (5 years), the SMP will not be cost recovered from the accumulating loss the former 20 years, where the LRAIC depreciation were lower than depreciation used in the books.

- Example 2:

For a given copper investment with lifetime of 20 years in TDC books (and assuming same GRC value in TDC accounting and in LRAIC model) TDC will first obtain cost recovery after 30 years given the LRAIC prices. If depreciation method is changed after 25 years, the asset (still in use) is at that time fully depreciated in the books and hence no further recovery is allowed according to Axons proposed method. However, since the copper has been LRAIC regulated, another 5 years of LRAIC pricing is missing before the initial investment is recovered.

As the above examples shows the use of remaining lifetime or the use of fully depreciated assets of the SMPs network in order to obtain cost recovery does not make sense in Denmark due to the regulatory history where the cost recovery is regulatory 'postponed' due to long lifetimes used in the LRAIC model. If Axon introduce the method intentionally, TDC will not obtain cost recovery – even from a regulatory perspective.

- Biased identification of fully depreciated asset

With regards to Axon's exclusion of fully depreciated assets, TDC finds the proposed approach biased. TDC's accounting lifetimes for a given type of assets reflects the average expected lifetime. In reality, some assets will break down before the average lifetime expires and some after. In fact almost no assets in the asset type will be replaced exactly after the duration of the average lifetime. If an asset breaks down before time a new asset is immediately installed with the same GBV as the old one (assuming zero price trend). The original broken asset is not yet full depreciated when removed and this has thus to be written down – incurring a loss for TDC.

In Axons approach a GRC value of zero is used for assets that has been in used longer than the average life time (and thus fully depreciated). This because TDC should not benefit of the ‘savings’ of using the asset longer time than the average lifetime. However, in this approach only the ‘savings’ are considered but not the equivalent cost/loss of assets that breaks before expired average lifetime. The approach is as such biased.

In summary TDC does not see that the proposed changes to costing method ensures cost recovery for the SMP.

The removal of fully depreciated assets is a key requirement to fulfil the EC's 2013 Recommendation and foster service-based competition in access networks where no infrastructure-based competition is expected. However, there are a number of points argued by the operator against the approach defined that we would like to comment on.

Regarding “Cost recovery when changing to proposed method”

DBA sees the merits of TDC's arguments. As a result, the draft MRP has been adjusted to reflect that the useful life considered for cost recovery under DBA's previous Bottom-Up models (in addition to the useful lives from TDC's financial statements) will also be taken into consideration in order to identify the fully depreciated assets.

Regarding “Biased identification of fully depreciated assets”

DBA also sees the merits of the point raised by TDC regarding this issue. In order to perform an accurate assessment of this matter, we request further information on the relevant assets that have been written-off. When the necessary information is provided by TDC, a detailed treatment of this issue will be performed in the cost model (e.g. a 10% mark-up on the useful life may be

considered to avoid the undesirable outcome due to the dispersion of an asset's duration around the financial useful life).

DEA

DEA would like to state, that transparency is important when calculating the cost base of the reusable assets. It shall be possible to trace the calculation down to the specific assets, i.e. the calculation shall not be based on assumptions, average factors, etc. It is important, that the reusable assets are reusable in reality and not just in theory.

Can DBA please confirm, that the use of reusable legacy assets is only relevant for operators who transform their copper and coax networks to NGA networks, i.e. not relevant for operators deploying fiber from the beginning.

We will in general provide as much transparency as possible. However, when the calculations are based on confidential financial information from the operators, it will not be feasible to disclose this information in any way, not direct or indirect.

In the case of FTTH networks, the model will calculate the costs of deploying such networks today (without removing fully depreciated civil infrastructure assets), regardless of the modelled operator.

We can confirm, as introduced in our general answer to Question 1, that the removal of fully depreciated assets will only be applicable for copper and coax access networks (i.e. wherever build or buy decisions are not as such applicable anymore).

Telenor

The methodology in itself seems appropriate in an isolated static setting.

It is, however, not clear how to apply and combine this methodology with the economic depreciation method in an appropriate asset-by-asset manner based on aggregated financial asset registrations.

Further, it should be explained how to deal with multi-year pricing where the elapsed economic life of the assets - and thus the costs already recovered - will evolve. In particular, if the remaining accounting/financial life in 2018 is 2 years for some assets, a continuation beyond 2020 of depreciations "*as it has*

been over the last years in the operator's financial statements" will not be correct.

The depreciation methodology implemented in the cost model will only be applied to the assets dimensioned in the model, not on an asset-by-asset basis from the financial accounts of the modelled operator. In practice, this means that all assets included in the model will start with a full useful life, as the costs already recovered (in the form of fully depreciated assets), will have been removed from the calculation beforehand.

In addition, as the modelling timeframe of the model will be lower than the useful life of the civil infrastructure assets, these assets will not have to be replaced in the calculations. However, it is worth clarifying that additional civil infrastructure assets required to cope with increasing demand/coverage calculated by the dimensioning algorithms will be valued at their current costs.

Telia

Telia agrees. As mentioned under question 1 we have concerns about TDC's valuation of fully depreciated assets still in use and accumulated depreciation of assets that are not fully depreciated.

DBA takes note of Telia's response. Please, see DBA's response to Telia's response to question 1.

Question 3: Do you agree with the need for the model to produce results for the period between 2018 and 2028?

Based on the industry feedback received regarding this question, we will adjust the period for which the model makes a detailed network dimensioning based on additional data requested from the operators (second data request).

In general, we agree that, including additional years may provide a more accurate representation of the costs borne by the modelled operator. However, including additional years will require further information from the operators:

- Including additional years at the beginning of the modelling period (e.g. starting in 2005 instead of 2018), would require additional historical data for demand, coverage, unit costs and financial information.

- Including additional years at the end of the modelling period (e.g. ending in 2038 instead of 2028), would require demand and coverage forecasts up until this year.

Gathering this information is one of the main objectives of the secondary data request process. **If the operators can provide this additional information for the years requested, then the modelling time period will be defined from 2005 to 2038.** Otherwise, the time period will be defined according to the years for which data has been received, with a minimum timeframe of ten years from 2018 to 2028.

TDC

TDC does not find the modelling period adequate. The periods used should be determined by the context of each technology and its maturity in the technology life cycle.

With regards to fibre modelling, infrastructure providers have invested and rolled out fibre network in the last decade. In this period the utilisation of the initial (but necessary) network equipment is low due to limited uptake of customers in the early years. If modelling starts in 2018 the utilisation of the network equipment in this year is higher even though the network is not yet fully deployed. A modelled 2018 network will therefore not be able to recover the initial higher cost of the smaller fibre network in the first decade. In order to model the lack of scale economy and low customer uptake in the beginning of the network lifetime the modelling should start no later than 2008 for the fibre network.

With regards to copper and coax TDC finds it too early to end the modelling in 2028. For both technologies a declining demand must be expected in the future with lower utilisation of the network as a result. If the modelling stops in 2028 the demand and network size at that time will be ‘frozen’ in the following years where Economic Depreciation is applied. This means that the model will not capture the lack of scale economy and lower customer base the years after 2028 where the customer base declines further. Hence the model will not ensure cost recovery.

In order to ensure cost recovery for copper and coax TDC requests Axon to end the modelling period for these technologies at 2038.

See general response to all operators regarding above

DEA

DEA does not agree with the suggested time frame. It seems like DBA only had TDC in consideration when writing main criteria 3, and the supporting text:

Fixed networks have been well-established in Denmark for many years, covering the vast majority of the population. In order to take into consideration, the existing roll-out of fixed networks, obtain a precise valuation of civil infrastructure assets, and to be able to calibrate the model, it is deemed necessary that the time frame considered shall begin in the past. Nevertheless, DBA does not consider it essential to go back to the take-up stages of fixed networks, as it would add complexity to the modelling process. On the contrary, DBA considers that a time frame starting in the year 2018 would suffice to achieve the objectives previously described.

It is true that TDC has been well-established in Denmark for many years, covering the vast majority of the population. But it is another case for the members of the DEA. They started deploying fiber in the nineties. They are still deploying fiber to achieve a broader coverage in their geographical areas. So, they are still struggling to be well-established covering the vast majority of the population in their area. This means that DEA finds it essential to include the take-up stages in the model. Building a new network is extremely expensive, especially until a “critical mass” customer base has been achieved. The investment per active customer is really high in the initial of a network’s lifetime. It is important that the model is able to take the initial years into consideration, so that the model can calculate prices that ensures that operators achieve a normal profit and normal return over the lifetime of their investments.

If DEA members’ fiber networks shall be modelled in the LRAIC model, the model shall include the initial years, i.e. the time frame shall begin approx. year 2005.

It is DBA’s intension that the model shall produce results for the period 2018-2028. DEA would like to stress that results for future years will be highly dependent on forecasts.

Especially for the DEA members the future demand is highly uncertain, as the saturation curve for new players is more uncertain than for established operators that have reached peak in customer take-up. Therefore, there is a high risk that possible regulated wholesale prices for the new fibre networks based on

this method will lead to under-recovery of costs, if the demand forecast is too high. Therefore, DBA should apply a principle of caution when forecasting demand for new players.

As presented in the general response to this question, we will adjust the time period to be modelled based on the outcomes of the second data request process to consider the effect of lower uptake levels at the beginning of the deployment of the FTTH networks.

We understand DEA's concerns with regards to the definition of long-term forecasts under the usage of an economic depreciation methodology. In this case, we would like to emphasize that these forecasts will be based on the data to be provided by operators and potential alternative scenarios may be defined to understand the reasonable range of the results and facilitate price setting decisions.

Telenor

Agree

DBA takes note of Telenor's response.

Telia

We partially agree.

However, a concern is that TDC's total number of users on their infrastructure are declining.

This is caused by the utility companies fiber infrastructure.

Less users in TDC's network will mean higher wholesale prices.

The problem is that utility companies benchmark their prices from the given LRAIC model.

So the consequence of end users moving their connection to a utility provider will be higher prices.

A way around this could be to incorporate the utility companies in the LRAIC model so if the DSL market decreases in volume and fiber in a total market

perspective increases the fiber prices should decrease with the same rate as the copper DSL prices increase.

One of the reasons behind the new LRAIC model is the current model's unintentional effect of increased copper network cost due to a combination of 1) customer migration from TDC networks (copper, coax and fibre) to networks of other operators. 2) modelling of country wide TDC networks for both copper, coax and fibre. Hereby a copper customer could migrate to a fibre line that was – illustratively put - expected in a modelling context to be a TDC fibre line but in reality would be a fibre line owned by another network operator.

Therefore, the future model will be based on a) economic depreciation, considering demand (customers) over a longer time span for the given SMP operator and b) network modelling that reflects the *actual* network coverage of the given SMP operator.

This will generally increase cost stability in the model compared to the current model. In the current model yearly fluctuations in the number of TDC customers has a significant effect on cost.

As stated above the issue of increasing line cost in TDC network is a combination of two modelling features, that can create a problem in specific situations, even though the two features on their own merits is not an issue. So instead of - as proposed by Telia – trying to change the demand modelling by including *all* broadband customers across operators in the demand when calculating the cost of an SMP operator, DBA has chosen to address the national network modelling by modelling actual SMP network and on top on that introduced economic depreciation to address the specific issue on copper. This approach should give a more refined result for the SMP operator leading to the correct cost recovery of the SMP operator, not the least an SMP operator based on copper. Wholesale price setting requires the SMP operator to be allowed to recover its costs. This objective could potentially not be fulfilled if Telia's comments were as such adopted by DBA.

Finally, the adoption of the criteria defined in the MRP (notably main criteria 1 and 13) is designed to i) avoid an over-recovery of the copper network's cost by the SMP and ii) avoid price increases in the copper access prices due to a reduction of demand.

Question 4: Do you agree that the model should include a time-frame up to 2070 to ensure a proper implementation of the economic depreciation methodology?

TDC

TDC agrees. The time-frame should be at least one lifetime longer than the asset with the longest lifetime in order to ensure correct implementation. DBA should however be aware that a long time span makes the modelled cost more sensitive to deviations from the assumed forecasts. See TDC's answer to question 15.

We agree that the additional timeframe for economic depreciation should be one lifetime more than the longest lifetime of the modelled assets, which is ensured by including up to the year 2070 in the model.

DEA

DEA find it difficult to answer this question, before we see the model and its assumptions about forecast, etc. As we understand, the model will be based on 2028 volumes from 2029 – 2070. It is our understanding, that if the demand from 2029-2070 will be lower than the 2028 demand, then the model result for the years 2020-2028 was set so low that the expected return of the investment will not be achieved.

At the workshop held in week 33, it was argued that 2029-2070 wouldn't have much impact on the 2018-2028 results because of discounted values. Despite of that, DEA suggest that the model will be constructed, so that the model can calculate and show the impact of a yearly decrease in demand from 2029 – 2070 of e.g. 5 percent per year.

The model will be able to handle different forecasting scenarios beyond 2028. Therefore, if operators can provide forecasts for the time period beyond 2028, we may consider them in the cost model as long as they are duly justified and are consistent with past trends. However, in the absence of such projections (which have been requested in the secondary data request process) stakeholders should assume that DBA will consider a flat trend beyond 2028.

Telenor

Agree

DBA takes note of Telenor's response.

Telia

The question is here if the copper DSL network exist in 2070? I have my doubt.

I also have my concerns about TDC wholesales data input to such a model will be objectively hence it would be a fair consideration to give the other operators a possibility to look into the information from TDC, on which the new LRAIC model will be build.

See response to DEA above.

Question 5: Do you agree that a single increment comprising the demand of all the modelled services should be considered?

TDC

As long as the model uses correct drivers for the network element, TDC foresee no practical problems in including the increments in one model. TDC however finds that the approach principally is not aligned with the EU recommendations.

DBA takes note of TDC's agreement from a practical perspective. DBA sees no inconsistencies with the EU Recommendations, as these only mandate the use of a LRIC+ methodology, without any specific requirement with regards to the specific increments to be set.

DEA

DEA do agree that cost of ancillary services can be calculated as stand alone. It is difficult to judge the impact of going to a model with a single increment, but we do not believe that it will have major impact.

DBA takes note of DEA's response

Telenor

Agree

DBA takes note of Telenor's response

Telia

We agree.

However, in Telia's opinion that most of the street cabinets for DSLs must have been depreciated a long time ago. In Telia's view only newer acquisitions from TDC should be considered.

DBA takes note of Telia's response

Please see the answers to questions 1 and 2 with regards to the treatment of fully depreciated assets.

Question 6: Do you agree that copper (copper-only and FTTC), FTTH (PON and PTP) and coax (FTTN and FTTC) access networks should be modelled?

TDC

In general, the modelled technologies should reflect the technologies used by the regulated SMP and the potential future SMP networks. As such the suggested technologies seem appropriate. However, for coax the network should reflect the separate network topology used for MDU and SDU rather than focusing on FTTN/FTTC.

FTTN/FTTC for coax network is a matter of definition and the wholesale access is only available on the BSA level anyway. The model should therefore focus on modelling the actual SMP network rather than the naming.

We agree with the general comment that the model should consider the technologies used by the present and future SMP operators. For coax networks, the model will consider the different topologies for MDU and SDU in a similar manner as they currently are in the existing model.

DEA

No comment provided.

DBA takes note of Dansk Energi's response

Telenor

Agree

DBA takes note of Telenor's response

Telia

We agree.

However, we would like to have insights into how long a period the depreciations of TDCs investments covers for the access configurations, when they were implemented and what value they have.

Confidential information from the operators will not be disclosed. Only TDC's data that is already available to all stakeholders will be as such disclosed in the public version of the model to be shared with the different parties.

Question 7: Do you agree that only civil infrastructure and coax cable related costs should be allocated to subscribers' access services in coax networks?

TDC

TDC does not agree in the wording. A part of the civil infrastructure and cabling are not related/driven by the number of lines but are share infrastructure with cost allocated by e.g. spectrum usage. TDC finds the drivers used in the current model appropriate. It is not clear to TDC if Axon are to change these by the supporting criterion 1 on page 28. If this is the case Axon should argue why the current principles are no longer appropriate and eventually have a dialog with the relevant SMP.

The aim of the modifications introduced to this criterion when compared to its definition in the old MRP was to clarify that, for some operators, some elements used in the coax access networks (e.g. amplifiers and splitters) are not only dependant on the number of lines but also on the spectrum reserved for the provision of each service. This aspect was actually already partly reflected in the LRAIC cost model developed under the old MRP.

Nonetheless, we have further improved the wording of this criterion to ensure clarity and outline that a similar approach to the one currently implemented in

the cost model will be followed. Particularly, we have clarified in the MRP that the model will apply different allocation rules for the network elements depending on whether they are dimensioned based on the number of lines (such as the civil infrastructure and the cables) or dependent on the spectrum reserved for each service.

DEA

No comment provided.

DBA takes note of Dansk Energi's response

Telenor

Agree

DBA takes note of Telenor's response

Telia

We agree.

DBA takes note of Telia's response

Question 8: Do you agree that the modelled operator should be defined in accordance to the SMP operator(s) in markets 3a and 3b?

TDC

TDC in general support the approach of a model able to model present and future SMPs. Axon should with this approach be aware that future regulation will consist of heterogeneous modelled regional operators modelled with specific demands, topology, geo-zones and degree of asset sharing leading to variation of fibre pricing across the country.

TDC suggest reducing the complexity in the modelling by modelling one hypothetical fibre operator covering a share of the national demand and reflecting costs in relevant geo-zones.

We agree that the future regulation of wholesale broadband markets lead to modelling complexities and presumably different cost per SMP operator.

However, we believe that the proposed approach will provide DBA with the required tools to make a well-informed decision when it comes to wholesale price-setting independently of the number of SMP operators at any moment in time, because the model will be able to provide cost references for different operators. Each modelled operator will be based on the specific network topology of the real-life operator it mimics.

DEA

DEA agree that the modelled operator shall be TDC. If other operators should be modelled in the future (because they become SMP), it is important to take into account their economy of scale, scorched node, bargaining power, etc. And as mentioned above; it is important to include the initial years in the calculation.

The model will be a generic model able to calculate the cost of any given SMP
 DBA agrees with DEA and clarify that the actual and relevant characteristics of any future SMP operators will be reflected in the modelling exercise when the time comes. Regarding the time span of the detailed modelling, DBA will refer to DBA's response under question 3.

Telenor

Agree

DBA takes note of Telenor's response

Telia

It is not only the SMP operator(s) that can be obliged to give access to its network to regulated prices. The model should also be able to model/assess cost for operators who have been imposed symmetric regulation.

DBA does not know if and if so what kind of networks that will be subject to symmetric regulation and possibly a price control obligation. DBA therefore cannot take into account symmetric access in the LRAIC-modelling. However, if a network operator is imposed with a price obligation under symmetric access regulation and that network operator's network can be modelled in the LRAIC-model – "fit into the model" so to say - then the LRAIC-model can be used for the setting prices for access to that network.

Question 9: Do you agree that all the relevant access, broadband, TV, leased lines, and transmission services for each technology should be included in the cost model?

TDC

It should be specified that only the wholesale part of the specified products should be included in the modelling. For e.g. TV only the multicast part on fibre/copper should be modelled – not the overlaying platforms used to receive/aggregate etc. the TV signals, which is not provided on the wholesale level.

TDC finds that a distinction between network services for internal and external use should be done in the service modelling in order to allocate wholesale cost properly.

The demand of retail and wholesale services from the modelled operator must be considered in order to have a comprehensive view of the total demand supported by the network. However, network elements that are not used in the provision of wholesale services (such as the TV platforms) should not be included in the cost model.

The model will ensure an allocation of wholesale costs between the so-called internal and external services.

Please see DBA's response to Telia for additional clarification.

DEA

DEA find a contradiction in the two questions – all relevant services should be included, except from the ones that shouldn't be included. Despite the contradiction we can accept the proposal.

DBA takes note of DEA's response.

Telenor

Agree

DBA takes note of Telenor's response.

Telia

We agree.

But only were its relevant. TV On DSL yes - TV on Coax no.

As presented in the response to TDC to this same question, network elements that are not used in the provision of wholesale services (e.g. TV platforms) should not be included in the cost model.

However, the model will consider the relevant services provided by the modelled operator. This includes all wholesale services plus the relevant retail services that contribute to recovering the common and joint network costs. In this particular case pointed out by Telia, both DSL and Coax TV materially contribute to the recovery of common and joint network costs (e.g. in the transmission network), therefore, they should both be included in the model.

Question 10: Do you agree that voice services do not need to be included in the model?.

TDC

No comment provided

DEA

No comment provided

Telenor

There is a reference to an analysis showing that between 0.5 per cent and 0.8 per cent of common cost should be allocated to voice services.

This clearly supports that there is a right decision (allocate between 0.5 per cent and 0.8 per cent of common cost to voice services) and a wrong decision (ignore issue).

Telenor does not agree that the impact of ignoring this issue is negligible or that applying such an allocation if based on a benchmark will complicate the model to a relevant extend.

After careful consideration, DBA has decided to agree with Telenor and allocate a reasonable percentage of the common costs (i.e. between 0.5 per cent and 0.8 percent) to voice services. This percentage will be based on an analysis of voice costs in the existing LRAIC model from DBA.

Telia

We agree.

DBA takes note Telia's response.

Question 11: Do you agree that demand levels considered in the dimensioning of each access network should satisfy the actual demand for that specific network?

TDC

TDC finds that the modelling should take into account the time needed to purchase and install equipment before the expected forecasted demand is reached. Equipment expenses should be modelled e.g. a half year before taken into use. Alternatively, the life time should be reduced.

TDC finds that cost should include all relevant cost necessary to build and operate the network, incl. e.g. an appropriately dimensioned stock of spare parts (i.e. related to the number of parts in the production network), excess capacity in the production network caused by imperfect utilisation of modular equipment: waste, spare lengths, cleaning, operating and much more. Furthermore, a test network for testing new services, testing new hardware and debugging hardware/software failures experienced in the production network, an independent backdoor network providing out of band management access to all network equipment in case of network failures, etc.

Although directly related to the actual demand levels considered, we would like to clarify that the model will include a security margin, to be defined based on the data collected from operators, to dimension the network assets of the modelled operator. This security margin will account both for the preventive deployment of new equipment and the excess capacity that needs to be reserved for proper functioning.

DEA

DEA suggest a rewording of the criteria to make it more specific, and it should reflect that an efficient operator will have more premises connected than premises with active subscriptions. This will be in line with supporting criteria 12. The model should also reflect, that DEA's members networks are built to meet the futures demand, e.g. technical houses are dimensioned to be able to cover the expected demand in the future. Furthermore, it should be clear, that it is the demand that the SMP operator face in the specific geographic area. The criteria could be changed to:

The LRAIC model should assume that each access network technology supports the SMP operators actual demand. The model should reflect, that an efficient operator will have more premises connected than the number of active subscriptions. The model should reflect that many networks are built to meet the futures demand, when the network is fully deployed.

We agree that, by default, there will be more homes connected than homes with active subscriptions, in line with "Main Criteria 12". In addition, we also agree that the model should be built to meet future demand. Therefore, the modelled network will be dimensioned to ensure it is able to cover expected demand in the future.

Telenor

The main reason for the current LRAIC review process has been the inability of the present model to deal appropriately and consistently with the impact of declining volumes caused by the transition from copper to fibre network and in particular to fibre networks not owned by the designated SMP-operator.

With utilization ratios dipping way below 40% on the nationwide copper network – and much lower in NGA areas - this has in the terminology used in the 2013 Commission Recommendation resulted in significant yearly "*artificial increases*" in wholesale copper access prices in Denmark.

Despite this primary aim of the process, this issues it not being directly addressed when discussing network demand and network coverage costs.

The **main criterion 8** states that the LRAIC model should assume that each access network technology supports its actual demand and **supporting criterion 12** simply states that the cost of passing all the premises within an area should

be modelled and that drop wires should be deployed in the model based on the strategies followed by SMP-operator(s).

When considering how to model a legacy copper network with demand in sharp decline, these criteria does not seem to give a clear and proper direction.

In a given street or area where there is access to both NGA network(s) and a copper access network, the demand for copper access will be low and gradually approach zero over the next 5-10 years. Assuming that each access technology shall support its actual demand seems to indicate that costing of this access will continue to be based on a fully supporting copper network including drop wires to all premises. And this even though the resulting unit cost per copper access will be much higher than the access cost of instead utilizing the NGA network(s) in place.

Clearly, the only reason why there is still access to copper in such areas is because real world capex are sunk, scrap value is negative and opex are negligible for the SMP-operator.

In general, this demand issue regarding in particular the copper network needs to be addressed much more comprehensively in the MRP. The arguably single most important topic deserves more than just a few general and ambiguous remarks and criteria.

If the LRAIC model should assume that each access network technology supports its actual demand, at a minimum this must be accompanied with a constraint which secures that no single copper access can be costed higher than the best alternative e.g. NGA including quality/functionality adjustments.

If not for the - in this context - irrelevant legacy reason – no efficient operator would choose to roll out a new high cost copper network in demand decline if there exist a cheaper NGA alternative. And this will apply regardless of the ownership of this particular NGA.

As described throughout this document and the draft MRP (particularly, to question 1 and the upcoming question 13), the methodological approach suggested with regards to the costing of the copper access networks aims at i) ensuring the SMP operator can recover its costs, ii) avoiding the SMP operator is over-compensated for its investments in the copper access network and iii) ensuring price stability throughout the modelled period. These three objectives

are only met when the actual demand of the modelled operator in copper access networks is taken into consideration.

DBA therefore disagrees with the arguments and conclusion put forward by Telenor regarding that the declining customer base of an SMP operator needs to be more comprehensively addressed in the MRP. DBA will refer to the response made to Telia regarding question 3.

Telia

We agree

DBA takes note of Telia's response.

Question 12: Do you agree that operating costs should be calculated using a bottom-up assessment based on a percentage of capital costs?

In general, DBA sees the merits of the comments provided by the operators and will take two lines of action to address them:

- First, a secondary data request to operators to obtain the absolute unit OpEx figures associated to each network element. These absolute values may be considered with some adjustments for different operators based on their scale.
- Second, DBA would like to emphasize that the figures from the cost model (including total OpEx) will be reconciled with top-down information from the modelled operator(s).

DBA wants to highlight that a second data request has been sent to the industry, in which we ask for more detailed information regarding the assessment of OpEx. This is done so DBA can obtain sufficient data to assess the OpEx, as it has been suggested that the legacy copper network might have above average OpEx due to fewer customers spread out on the network in the future.

TDC

TDC disagrees. The amount of opex has no relation to capital cost and might not change correctly when capital cost changes due to changes in demand. Further, TDC does not agree that there is a "broad consensus in the industry on the

common range OpEx should be represented over CapEx”, which Axon use as supporting argument on page 47.

Opex should be modelled with a combination of method depending on which kind of opex measures that are available from the input providers and should not be limited by principal decisions in a model criterion.

This methodology is already used in DBA’s existing LRAIC access model.

Nonetheless, as presented in the general response to this question we have requested additional information from operators in order to perform a more accurate assessment of operational costs.

DEA

DBA suggest calculating the operating cost by using a bottom-up assessment, based on a percentage of capital costs. DBA suggest using suppliers estimates of the annual operating costs.

Bottom-up models tends to show less costs than top-down models. The main reason for that is probably that the bottom-up approach is too optimistic and forget or neglect some costs. As operating cost is a competitive factor, suppliers also have an interest in showing optimistic operating costs.

The suggested approach can be a starting point for the calculation of operating costs, but in DEAs’ opinion it cannot be a stand-alone approach. DEA suggest that a thorough top down reconciliation shall be performed, where the reasons for the difference in the figures will be identified. If the reason for the difference is inefficiencies it is fair enough to adjust the top down figures. But where the difference is caused by too optimistic figures, forgotten, or neglected costs, then the model should reflect the top down figures.

It is also important to take into account that operating costs is not fully scalable with the capital costs. It may be reasonable to assume full scalability “locally” when considering smaller changes with regard to the scale of an operator. This however is not very likely to be the case “globally” because of economies of scale and scope (elements of fixed costs, different organization setups etc.). Therefore, when considering fundamentally different sizes of operators, the opex/capex ratios is not likely to be the same. If the model is to model the fibre companies, the opex/capex ratios should be recalculated, based on figures for these operators.

DBA find that a top-down reconciliation is the approach best fit as it will corroborate the reasonability of the model's cost base.

Further, DBA agree that economies of scale and scope play a role in the operational costs of the modelled operator, which should already be reflected in the data provided by each operator in the data collection process. Such factors are going to be assessed when reviewing the data collected and setting the appropriate inputs for the model.

Telenor

Telenor agrees that in practice this approach may be the best option.

However, this requires a high degree of transparency and due diligence from ERST.

For instance, the division between opex and capex in vendor contracts which include subsequent support may typically be tailor made in accordance with customer demands.

Further, it is always important to sanity check implied aggregate opex for all asset classes.

The inputs considered in the cost model for the unit costs (both CapEx and OpEx) will be based on the information reported by the operators. The source of these inputs will be properly referenced in the model.

Telia

Telia agrees with a bottom-up assessment.

And we concur that the model considers a fixed number of FTE per station.

However, Telia would like to stress that when we look into the future, the salary on 500.000 is kept at the same level for future years as well. As we must assume that effectiveness due to technology in general makes it easier to maintain the stations so salary might increase but time spent on each station will be less.

It should be noted that, similarly to the current model, the new model will consider a "productivity gain" in the operating expenditures requiring man-work. We have explicitly stated this matter in the MRP

Question 13: Do you agree that both, tilted annuities and full economic depreciation should be implemented in the model? Do you also agree with the formulas presented to implement them?

TDC

TDC agrees.

With regard to tilted annuity, an extension of the formula should be considered to include the timespan between the purchase of the asset and the asset deployment.

With regard to Economic depreciation, TDC agrees in the principles. However, TDC might comment the method later on when the specific model implementation is presented.

In terms of the suggested adjustment of the tilted annuities formula, we refer to our response on the matters related to working capital (Question 14).

DEA

DEA does agree, that both tilted annuities and full economic depreciation should be implemented in the model, if it reflects how the deployment of the network is done from the beginning. The use of economic depreciation shall be seen in connection with our answer to question 3. As written in the EC 2013 Recommendation, cost recovery is a key principle in a costing methodology ensuring that operators can cover costs that are efficiently incurred and receive an appropriate return on invested capital. This means that the economic depreciation method will have to reflect the initial years, where the utilization of some assets is low. If the first year in economic depreciation is 2018, as suggested by DBA, it will not give DEA's members cost recovery.

After the workshop held August 14, 2019, Axon made an Excel example illustrating this issue. Axons scenario called option 2, shows the economic depreciation for a network operator starting to deploy its network in 2005, where the utilization (or output per asset) was low in the initial years. The result of this scenario clearly shows, that this will affect the cost of unit output in the entire lifetime of the network. This means that if the operator shall get cost recovery of its investment, the initial years must be considered.

If the LRAIC model should be used to model new operators, such as DEA's members, the model necessarily must cover the entire lifetime of the network.

i.e. the economic depreciation should be calculated from 2005 and forwards, reflecting, that the utilization is lower in the take-up stages.

DBA takes note of DEA's response. Regarding modelling period, DBA would like to refer to DBA's response to Question 3.

Telenor

Telenor agrees that both tilted annuities and economic depreciation are relevant options to include in the model.

Telenor supports profiling depreciations over time according to some production/demand projections. It is, however, difficult to judge specific formulas without fully understanding how they are supposed to be applied in practice.

In particular, it is not clear how a change in assumptions after x years is to be handled in the model. Clearly, any change in production projections or in WACC over time which was not foreseen upfront will impact not only all future economic depreciations but also what the "correct" depreciations in prior years should have been under perfect foresight. It is an issue which quickly turns into questions about how to handle the implied under/over recovery of investments and possibly about correctional measures which may lead to price instability.

It is important that such issues and including the likely magnitude are addressed up front by ERST.

All projections are by default uncertain and, therefore, different scenarios according to their likelihood may be considered by DBA in the price setting process that is to take place in 2020.

DBA is not (nor TDC, Telenor and Telia) unexperienced in changes to parameters, forecasts, etc. in economic depreciation models as the LRAIC mobile model is based on economic depreciation and the fixed model from 2011-2014 was based on economic depreciation.

Telia

For Copper DSL Telia disagrees.

The reason is that the PLC is declining rapidly.

And as Axon writes:

"However, the tilted annuity may not be a good proxy for economic depreciation when the volume of outputs produced by an asset is not stable."

The thing is that DSL copper connections is declining rapidly hence prices are going up per unit. This is not a problem if other technologies is available for the household, but if we look at the none urban areas Copper DSL is often the only solution.

Regardless of price level on DSL people will move towards fiber as it provides faster speeds and a more stable connection, so making an argument that it will motivate people to move to fiber is not a sound reason.

Instead the standard annuity model should be considered used on Copper DSL.

Consider it this way - a technology that is declining should be way cheaper than the peaking one.

Let's say we regulate the market of Iphones the same way. An Iphone 4 would then cost the same or more then the newest model. That's not expedient.

Most of the Copper network was depreciated ages ago - hence using the WACC in this model keeps the prices artificial high which at the end of the day is only hurtful for the consumer.

We see an issue of using this model for DSL copper connections. Because the number of output is no longer stable. DSL has past the top of the PLC life cycle a long time ago. TDC knows this, therefor investments will be done in the fiber area.

Taken from the text:

So even if TDC doesn't make investments in DSL they will still get the same sum, because the WACC gives them the delta.

"However, the tilted annuity may not be a good proxy for economic depreciation when the volume of outputs produced by an asset is not stable. This may be the case for new products services (which have a logistic curve) or when demand is evolving fast (see example below)."

This will end in sky high prices per connection and again it will hit the none urban areas where DSL is the only solution.

Therefore, Telia can't concur on the tilted annuity and full economic depreciation model when it comes to copper DSL.

The inclusion of the two depreciation methodologies commented simply provides more references to DBA but does not link it to the adoption of the results under one alternative of the other when it comes to price setting. The outcomes obtained under each method will be assessed by DBA in due time.

DBA further notes that it does not expect any major differences in the results produced under a standard annuity compared to a tilted annuity, and it would neither contribute to minimizing the impact of decreasing demand in the unit cost results (only the economic depreciation methodology would serve this purpose). Therefore, DBA does not see a good reason to include the standard annuity methodology to the model.

Question 14: Do you agree that working capital should not be considered in the cost model?

Even though, so far, no operators have quantitatively proven the existence of any working capital for the modelled operator, given the broad preference to include it in the model, the MRP has been adjusted to indicate that, if the existence of working capital for the modelled operator is quantitatively proven, then it will be included in the model when calculating the cost result.

In all cases, the model will be ready to accommodate the introduction of working capital.

TDC

TDC agrees in the simplification of not modelling working capital.

To avoid misunderstanding TDC stresses that a time period reflecting the purchase of an asset and the actual deployment/installation should be modelled (see TDC's response to question 11). This is not a part of the working capital – working capital occurs when the time of purchase differs from the time-of-payment terms in the contract.

The comment provided is indeed related to working capital, as such investments are likely to be registered as current assets until the date in which they become fully operational (when they are migrated to the fixed asset register).

Therefore, the approach presented at the introduction of this question is to be followed.

DEA

DEA recommend that the model include working capital. It seems like the decision about not including working capital is based on an analysis of TDC's financial data. If the model will be used for other operators than TDC, then it should have the possibility to reflect that specific operator regarding working capital. A thorough investigation of all potential SMP operators working capital should be performed by DBA.

The working capital will be defined separately for each modelled operator (when there is more than one SMP in wholesale broadband). Therefore, we will assess the consideration of working capital for any modelled operator that provides quantitative evidence.

Telenor

Telenor does not agree to the notion that there is no clear cost of working capital associated to the provision of the services.

Today the large majority of net payments are related to rental fees (copper/fibre) with 3 months upfront payments.

If working capital is not to be considered in the model, ERST needs to complement this with a specific decision setting a tight boundary for upfront payment to SMP-operators.

The situation highlighted should be reflected in the current assets of the operator, which shall be taken as the starting point for any quantitative assessment of the working capital.

Telia

Telia disagrees.

It is crucial taking the cost of working capital into consideration.

Bear in mind that TDC Wholesale bills their subscriptions 3 months ahead and most likely have 60 payment days towards their suppliers, giving them a huge

advantage. So by adding the working capital to the WACC, the model would show a more fair evaluation of the current market situation.

Bear in mind that we as operators cannot bill our end customers 3 months in advance.

The situation highlighted should be reflected in the current assets of the operator, which shall be taken as the starting point for any quantitative assessment of the working capital.

Question 15: Do you agree that the model should include demand forecasts until 2028?

In line with the response provided to Question 3, based on the feedback received from operators, the time frame of the model may be extended until 2038 if enough robust data is provided in the second consultation process. In that case, demand forecasts shall also be extended until 2038.

TDC

TDC, agrees in using forecast given that the model is to produce results in the same specified period. TDC does not agree in the time and length of the period, see comments on question 3.

DBA should be aware about the unforeseen impact a forecast that is not fulfilled will have on the operator's business. E.g. a model with an aggressive uptake of customers will result in lower unit prices due to higher demand over time. If the operator is not able to obtain the foreseen uptake the operator is double punished by low demand and low unit prices. In the opposite case the operator is double rewarded with more than expected customers and with higher unit prices than justified by a model with the correct forecast.

This non-stabilising entity of using long term forecast was DBA not able to mitigate last time a forecast (used for Economic Depreciation) was used for fibre modelling in the period 2011-2014. DBA was at that time reluctant to adjust the forecast despite they over the years could see that TDC's uptake was not able to match the aggressive forecast used in the model.

On this background TDC recommends DBA to consider what kind of regulatory tools to be used in order to mitigate the future impact on the regulated operator and the sector if the forecast deviates from realised numbers.

As explained in the general response to this question, if enough information is provided during the second data request process, we will adjust the modelled time period until 2038. We acknowledge that TDC has already provided demand forecasts for access services until 2038.

Further, we note the operators concerns regarding the uncertainty of the forecasts and its implications in the cost levels output by the cost model under an economic depreciation scheme. In order to mitigate this matter, in the pricing stage of the LRAIC project (scheduled for 2020), different forecasting scenarios may be considered by DBA in order to understand their impact on the final results.

DEA

DBA suggest the model calculation to be based on demand forecasts until 2028. With the suggested economic depreciation method, the demand in future years, will have an impact on the calculated regulatory prices in 2021. i.e. if the demand in 2028 increases, the regulated price in 2021 will decrease. The impact of wrong forecast can be very serious for the SMP operators. DEA does not support the idea of a model that is totally dependent on forecast until 2028. No one can predict the demand in 2028. If DBA insists in economic depreciations based on forecasts until 2028, then they must be extremely conservative in their demand forecasts.

DBA takes note of DEA's response. Different forecasting scenarios may be considered by DBA in order to understand their impact on the final results. The results under the tilted annuities methodology will also be observed by DBA to understand the differences in the cost outputs under both methodologies.

Telenor

Given that the modelled network will develop over time, it is important that the process is transparent and reviewable over time.

The forecasts (with some potential adjustments to avoid disclosing confidential data) will be circulated to operators in the public consultation of the model.

Telia

Telia agrees.

We think this is very valuable.

Volume forecasts should be collected from all market operators and included in the model.

Volume forecasts have been requested from all operators in the secondary data request process.

Question 16: Do you agree with the proposed allocation mechanism to split the costs of shared assets between access and core networks?

TDC

In the current model, criteria 50 also allowed an allocation principle using number of cable in the trench/duct. TDC suggest this principle as an option too.

Axon should further clarify how the ‘surface of the cable’ is defined if such allocation principles is to be included in the model. TDC had similar reservation to this proposed allocation method in the last MRP process.

The suggested approach, based on the surface of the cable, is referring to the cross-section of the cables. As we observe that the terminology may have led to misunderstandings, we have improved its definition in the MRP.

This approach is particularly convenient for ducts, which are usually priced based on their cross-section and, therefore, the allocation principle should be consistent with this driver to ensure cost causality. On the other hand, we acknowledge that this does not need to be the case for trenches, and a 50-50 allocation could be used instead. This has also been adjusted in the MRP.

DEA

The criteria suggest that cost of shared assets should be split based on *the surface (area) occupied by the cables*. Our interpretation of the criteria is that the cost should be split based on the volume of the cables. Please specify if that is correct. The amount of shared assets between access and core should be based on actual figures related to the modelled operator.

We confirm that the split is to be based on the volume of the cables (i.e. their cross-section multiplied by their length) as noted by DEA. DBA has clarified the definition in the MRP. Further, we confirm that the calculations are going to be based on the actual figures of the modelled operator. The resulting split between access and core networks will be crosschecked with top-down data from the modelled operator.

Telenor

Agree

DBA has noted Telenor's response.

Telia

Telia agrees.

DBA has noted Telia's response.

Question 17: Do you agree that the model should be able to provide results at different levels of disaggregation (geotype, regulated/deregulated areas, regions, single/multi dwelling units)?

TDC

TDC in general agrees in modelling at disaggregated levels. The modelled disaggregated levels should however not necessarily lead to pricing at disaggregated levels. The pricing principles are first to be discussed and settled at the pricing process in the second half of year 2020. The present and the former model also used a disaggregated modelling without necessarily leading to disaggregated pricing.

TDC does not see the point in disaggregating at regional level. Instead, a disaggregation corresponding to DBAs definition⁵ of city zones (byzoner), summerhouse areas (sommerhusområder) and rural zones (landzoner) would be

⁵ <https://planinfo.erhvervsstyrelsen.dk/zoneforhold>

interesting input to the coming pricing dialog. TDC suggests including this disaggregation in the model.

We confirm that the fact that the model produces results at different levels of disaggregation does not mean that pricing will be defined at these same levels.

In terms of the disaggregation by city zones, summerhouse areas and rural zones, DBA does not see the benefit of introducing this split and it will not be considered in the model. On the other hand, the model will indeed keep the regional disaggregation for an improved allocation of transmission costs.

DEA

DEA support that the model will provide results at different levels of disaggregation. We find it important that the model can be used even in smaller coverage areas, were an operator can be SMP.

DBA takes note of DEA's response.

Telenor

Agree

DBA has noted Telenor's response.

Telia

We agree

DBA has noted Telia's response.

Question 18: Do you agree with the remaining criteria defined in the MRP for which no specific questions have been asked to the industry?

Main criterion 3: The model will calculate the service provisioning costs from 2018 to 2028. 2018 will be the base year of the model. Additionally, it will incorporate a time-frame up to 2070 to properly implement the economic depreciation algorithms.

DEA

The model will calculate costs from 2018 to 2028. Can DBA be more specific about how to understand this? Will the model results be the regulated prices for the whole period 2021 to 2028? Or will the model be re-calculated every year, so that only the 2021 result will be used for setting regulated prices, while 2022-2028 results are only indicative?

The model will output cost references for the relevant services for a given timeframe. This timeframe will include historical years up until today and, also, forecasts for future years. The approach to the usage of the costing references for setting regulated prices will be discussed in 2020, along with other pricing matters.

Main criterion 10: Corporate overheads costs should be allocated on the basis of the EPMU⁶ approach.

DEA

DEA supports that corporate overhead costs should be allocated by using the EPMU approach. But it is important that the mark-up factor reflects that smaller operator face a relatively higher share of OPEX than bigger operators.

The mark-up factor will always be defined according to the characteristics of the modelled operator (i.e. if there are two SMP operators, a specific mark-up will be defined for each of them).

Main criterion 11: Prices used in the model should reflect those that an efficient operator would face.

DEA

In the supporting text related to MC 11, DBA writes that the model should take into account, that the operators bargaining power can depend on their scale.

⁶ Equal Proportional Mark-Up

DEA fully agrees with this statement. It is an important issue, so DEA would like MC 11 to reflect this, e.g. "*Prices used in the model should reflect those that an efficient operator would face, taking the operators scale into account*".

Furthermore, DEA would like to stress, that equipment prices should be based on brands and qualities, that actually is used in Danish networks. There have for example been a lot of debate about security issues related to Huawei. If operators choose not to use Huawei equipment, or other low-priced brands, then the equipment prices in the model shouldn't be based on Huawei equipment.

We agree and have adjusted the criterion to include this remark. However, it should be noted, that the modelled operator shall quantitatively demonstrate any differences with regards to the scale that may play a role in the unit costs before this can be considered in the model. With regards to the network equipment, please note that the unit costs included in the model will be based on the data reported by the operators, which should be based on the actual network elements deployed.

Supporting criterion 4: For PTP, both an unbundling product at the ODF and a BSA product will be modelled. For PON, both an unbundling product at the splitter and a BSA product will be modelled.

DEA

There is not always enough room for supplying an unbundled product at the splitter in PON networks. The model will have to take this into account. E.g. by adding equipment that can allow the unbundling, such as extra fibres and cabinets. Lack of space at the ODF can also be an issue for PTP networks. In general, the model should take the space requirements with regard to unbundling and BSA products into consideration.

Indeed, the model will perform the dimensioning of those elements that are dependent on the number of active or connected homes considering all demand, including retail and wholesale.

Supporting criterion 6: The model should show, for each service, routing factors or, if not possible, a consistent alternative measure of how, on average, each service uses the core network and the access network. The model should also be flexible enough to allow for changes in routing factors / alternative measures.

Telia

It's very important that objects are not counted in twice under both core and access.

Again insight in TDC wholesales cost objects for Sale Channels could be a good solution.

Network elements are not going to be double counted in the core and access networks.

Supporting criterion 10: The model should include both PTP and PON network architectures for FTTH networks.

TDC

The model should model the type of network the regulated SMP has rolled out and the area it covers. However, if DBA choose to model a hypothetical operator used to price current and future SMP as TDC suggest, it will be reasonable to limit the model to PON which seems to be the predominant technology looking forward.

The model will be based on the actual SMP operators and not a hypothetical operator, as reflected in our answer to question 8. However, we have included a remark in this supporting criterion to clarify that the selection of the technologies will reflect those used by the actual modelled operator.

DEA

DEA suggest clarifying SC10, by write it as:

The model should include both PTP and PON network architectures for FTTH networks, reflecting the actual modelled operator.

We agree with the wording suggestions for this criterion and have adjusted it accordingly.

Supporting criterion 11: The choice of technology and degree of optimisation is subject to the scorched-node assumption and the requirement that the modelled network as a minimum should be capable of providing comparable quality of service as currently available on the modelled operator's network, and be able to provide functionality comparable to that of the existing services.

DEA

DEA find it important to stress, that the scorched node assumption should reflect the actual modelled operator, and that the modelled equipment is placed at the actual node locations. This also applies to other operators, if these are to be modelled in the future.

As reflected in the MRP, the model will, to the extent possible, be based on a scorched node assumption that considers the locations of the nodes of the modelled operator(s).

Supporting criterion 12: The cost of passing all the premises within an area should be modelled. Drop wires should be deployed (or decommissioned) in the model based on the strategies followed by SMP operator(s), as long as these are considered to be representative of an efficient operator.

DEA

The model shall reflect that an operator will have a share of unused drop wires. All operators will face the fact, that an amount of connections will remain unused now and then, e.g. if the customer who ordered the connection moves to another location, and the new owner doesn't demand services based on that specific technology. This means that DEA supports the supporting criteria 12.

DEA believes, that the LRAIC model should reflect the common approach taken by the local and regional fibre operators on preparing the connections of future customers to full penetration in the passive part of the access network.

This approach is considered to be the most cost-efficient method in the longer term. The approach increases the initial investments, but subsequently lower the costs for connecting future customers. Nevertheless, the approach leads to a higher overall risk if expected demand fails.

The current proposed approach will consist in deploying the infrastructure up to the ODB⁷ for all passed homes. On the other hand, the link between the ODB and the customer's premise will only be dimensioned for the active/subscribed homes, considering a security margin based on potential churned customers.

In our view, this is the most cost-effective approach to deploy a network and is consistent with the existing methodology implemented in the cost model.

Supporting criterion 14: The LRAIC model should consider indirect costs, such as accommodation, costs of installation, support systems, power, and cooling.

DEA

DEA agree in SC14, but we would like to add, that the indirect costs categories should be shown separately in the model.

Indirect costs will not be disaggregated in the model due to the added complexity this would create in the data collection process, without contributing to an improvement in the accuracy of the model's results.

Supporting criterion 25: The LRAIC model should show the costs of a network with an efficient configuration operated by an efficient company, based on the latest proven technological solutions and an optimally structured organisation. However, the starting point should be the existing geographic network architecture in the modelled operator's network. This implies that equipment should be placed at the existing geographical

⁷ Optical Distribution Box

locations of the modelled operator's network nodes (the scorched node assumption).

TDC

TDC generally agrees in the interpretation. However, TDC finds that the newly deployed fibre networks must be perceived as efficiently deployed with newest technology. Axon therefore has the burden of proof, if the model deviates from the real-life network.

TDC emphasizes that the origin of the products modelled is the product definition stemming from the Standard agreement on the regulated markets. The pricing in the model should therefore correspond to the pricing structure in the Standard Agreements.

The pricing in the model should correspond to the needs of the current and future Standard Agreements.

Supporting criterion 28: The LRAIC cost model will be based on a database software and Microsoft Excel. The usage of database solutions will be limited to the geographical assessment of the access network to facilitate the review and understanding of the LRAIC model by stakeholders.

DEA

It is important that the database calculations will be performed in commonly known database software, which can be accessed by the operators, without buying a license for a specific database tool. It is important that the database calculations are well documented, to avoid that the database calculations will be a black box for the operators.

The main model will be based in MS Excel. Supporting calculations to handle large amounts of data related to the geographical analysis will be included in a separate model, built in R, which will also be made available to the industry (potentially, with sample data) and will be as transparent as possible.

The use of R is warranted due to the large amount of data at building level that is handled in the geographical analysis. R is preferred to other solutions (such as SQL) due to its i) its open-source nature, which ensures operators do not need to acquire a licence to use it and ii) the complexity of some calculations

(such as clustering algorithms) which are better handled through statistical solutions such as R rather than pure database solutions such as SQL.

Supporting criterion 35: The LRAIC model should identify infrastructure costs associated with the transmission network. The model should identify separately the costs of cable, duct and trenches.

DEA

The header 5.4.3 is called Core and transmission networks. The text in section 5.4.3.2 is changed from “core” to “transmission” network. Please describe your definition of “core” versus “transmission” network.

We have adjusted the wording in the MRP to ensure clarity. In any case, typically when we refer to Core, we refer to the part of the network where the main core platforms (e.g. voice, DNS, etc.) are located. The transmission network is responsible for interconnecting the access with the said core platforms.

Supporting criterion 39: The LRAIC model should identify cost categories such that there is only one exogenous cost driver for each. The model should aggregate, in a clear manner, the cost of network elements used in the modelled services such that it is clear how the overall cost of a particular service is comprised of the cost of individual network elements.

TDC

To reach every property in Denmark the access network needs to include a lot of private roads and roads in vacation areas, which due to their status as non-official roads often will not be included in GPS data.

Proper modelling should take town squares, roundabouts, backyards into account while calculating digging lengths.

In some areas cost of trenching in both roadsides would be lower than road crossings.

The model will consider the road database which is available from the DAR. Additional roads may be added as needed in order to fill the gaps. In the case

that TDC owns a database with the additional roads that should be considered, these could be taken into account. A reconciliation process will be performed between the geomodel's outcomes and the SMP operator's actual network to verify its accurate performance.

Supporting criterion 40: The LRAIC model should compute a cost per line for each geographical level by dividing the sum of the annualised capital expenditures and the operating costs by the appropriate number of present active lines.

DEA

DEA suggest specifying the criteria by changing "...number of present active lines" to "...number of present active lines in the modelled operator's network".

We clarify that only the demand of the modelled operator will be considered in the model. We have specified this in the MRP.

Supporting criterion 44: Information to aid a top-down validation will be requested from the modelled operator(s). The validation will include both a calibration of assets and a reconciliation of the cost base. For the avoidance of doubt, information to aid a top-down validation is limited to top-down asset information and cost data, which is distinct from a top-down cost model based on operator accounts.

DEA

DEA supports SC 44. One of the drawbacks of Bottom-up models is that they often forget or neglect costs. Furthermore, there is a risk that the assumptions are too optimistic. Therefore, we support that a detailed top down reconciliation will be performed on both CAPEX and OPEX, as well as on the dimensioning of the network (e.g. trench kilometers, number of nodes, equipment, etc.).

As previously stated, the model will include a full-reconciliation exercise with top-down data from the modelled operator.

Additional comments regarding present DONG modelling

TDC

TDC note that an explicit modelling of TDC's so called DONG network (where the modelling is heavily influenced by co-digging with utilities) is not mentioned in the criteria. TDC agrees in this 'normalisation' of the DONG modelling whereby the DONG area will be modelled like all other areas in Denmark. TDC in general finds the DONG modelling out of date, since:

- The roll out of fibre in Denmark pushed by utility companies has resulted in various strategies of fibre deployment with and without simultaneously co-digging of electricity cables.
- The fibre wholesale prices offered by other fibre infrastructure owners do not distinguish on co-digging areas or addresses.
- TDC wishes in the same way to offer wholesale prices independently of underlying co-digging.
- If the present DONG-regime is sustained, DBA – in order to ensure a consistent regulation – would have to model other operators network reflecting areas with and without co-digging. This will create a complex regulation and results in differentiated prices for retail customers depending on specific co-digging cases – cases that the retail customer has no information about and is beyond customers' control.

TDC therefore supports DBA's approach.

The model will not consider a separate fibre network for the DONG area. Nonetheless, the model will be able to calculate the costs of the DONG area, however DBA does not see this point as a necessity at the moment. In addition, please note the model will be able to reflect co-digging cases relevant to the modelled operator(s).

General comments

TDC

TDC welcome DBA's revision of the fibre modelling and the principals behind. Since the development of the current model in 2013-2014 the fibre deployment in Denmark has broaden and intensified. LRAIC pricing of fibre should ensure that fibre is attractive as an investment for the providers and ensure that all inhabitants eventually will benefit from high bandwidth networks – also subscriber in more remote areas where investments are higher. The current low LRAIC price fibre level does not support investment outside larger cities and suburbs.

It should be noted that DBA in the period 2011-2014 used a LRAIC model where fibre was priced by similar principles as suggested in the current draft MPR – by modelling future demand for each technology and using Economic Depreciation. TDC finds that this approach supports investment incentives in contrary to the present model, where these incentives are not stimulated. DBA could therefore preferably use the former model as a methodological reference when developing the new model.

Given that the fibre deployment is done by a multiplicity of infrastructure companies each focusing on specific regions in Denmark and since several of these infrastructure owners seems to obtain high regional market shares – thus being subject to LRAIC regulation in the future – TDC finds that a generic model reflecting a hypothetical, regional operator should be developed instead of models for each infrastructure. In this way the regulation will be simplified, future regulated prices will be transparent across infrastructure owners and the providers and the end users will not (on the wholesale level) be burden with cost differences stemming from operator-specific conditions (such as type of vendor, network topology etc.). DBA should be aware that LRAIC based wholesale-pricing not directly link to the specific operator's cost (as suggested by TDC) is also seen in the recently developed EU models concerning fixed and mobile termination.

TDC has - as the only national broadband infrastructure provider - still a need for three access technologies despite intensified fibre rollout. Due to the required combination of access technologies TDC does not obtain same scale economy compared to a national network based on one technology. TDC experience therefore increasing maintenance cost of the copper and coax platform. Furthermore, remaining customers on these platforms must carry higher shares

of the fixed and common cost that cannot be scaled down proportional to the customer churn. The cost development should be reflected in the model in order to ensure cost recovery. Furthermore, an appropriate price level for copper – with not a too high price span to fibre - ensures lower (regulatory) barriers to migrate from copper to fibre. If say copper prices are low, subscribers with moderate but adequate bandwidth will be reluctant to migrate to fibre thus hindering the political aims of higher bandwidth to the population. In addition, such slower uptake of fibre customers put pressure on the profitability of rolling out fibre network.

TDC in general support the reuse of existing criteria from the current model as long as these support the purposes of the new model. Some criteria have changed dramatically, and new criteria have been introduced. Despite TDC's below answers to Axons questions, some answers and comment might need further clarifications. Especially for the potential use of fully depreciated assets, it is TDC's opinion that further dialog is needed with Axon and DBA with regards to principles, methodology and data – here a single consultation will not ensure proper understanding for both parties.

We observe a number of points from TDC general comment:

Methodological consistency with previous MRPs

Regarding the use of the model from 2011-2014 as a reference, while we believe it is a relevant factor, the current model should try to maintain methodological consistency with the old MRP from July 2013 whenever possible.

Consideration of a hypothetical operator

Regarding the modelling of a hypothetical operator, the model will include the existing SMP operator(s) in each point in time, as described in the MRP and in the responses to this consultation.

Regarding the economies of scale of TDC, the model will consider the network of the modelled operator as it is and will ensure the total costs are reconciled with top-down information from the operator. This will ensure cost recovery from the modelled operator.

Costs of different network technologies

For treatment of increasing maintenance costs on the copper and coax platform, Please, see DBA's general comment to question 12.

We understand TDC's comments and agree that the decreasing number of customers in copper networks may imply an increasing cost in the services if the network cannot be scaled down accordingly. In this case, we stress that demand and coverage assumptions will be based on the realities reported by the modelled operator(s).

Regarding the price span between fibre and copper services, the approach to the usage of the costing references for setting regulated prices will be discussed in 2020, along with other pricing matters.

Consideration of further interaction with the industry

We have carefully assessed the operators' feedback to the draft MRP and have prepared a final MRP which considers the comments reported by the industry. In addition, the operators will be able to comment in the two consultation rounds regarding the cost model's inputs, algorithms and produced outcomes, which will bring full transparency to the process.

DEA

The Danish Energy Association (DEA) appreciates the invitation from the Danish Business Authority (DBA) to comment on the proposed Model Reference Paper (MRP) defining the principles and methodology that will drive the definition of the LRAIC model for fixed networks.

The MRP has been prepared on the existing methodological guidelines from the latest major update in 2013, with a small update in 2017 that made the model capable of excluding geographical areas from the cost calculation to allow the model to exclude areas where price regulation has been lifted.

One of the main regulatory inputs of the revised model will be the European Electronic Communications Code (EECC) which will be the regulatory framework for the upcoming market analysis and market decision by DBA (Markets 3a and 3b).

The new objectives of the EECC include the promotion of investments in 'very high capacity networks' (VHCN), such as optical fibre and 5G, requiring national regulatory authorities to take appropriate account of the risk incurred by the investing companies in VHCN.

In addition, DBA finds that the new MRP should be aligned with the EC Recommendation on consistent non-discriminatory obligations and costing

methodologies to promote competition and enhance the broadband investment, dated September 2013. The document was published shortly after the old MRP was finalized and stipulate the recommended costing methodology to promote investment in ‘next generation access networks’ (NGA) – which has been updated and concretized by the concept of VHCN in the EECC.

According to the 2013 Recommendation, cost recovery is a key principle in a costing methodology ensuring that operators can cover costs that are efficiently incurred and receive an appropriate return on invested capital.

The fibre network companies are in general relatively new players on the Danish market and are still expanding their network in new areas and growing the customer base. The situation for the fibre companies is in stark contrast to the incumbent operator, TDC, that has expanded the major part of their network over a very long historic period, covering more than 100 years and where the customer base has reached saturation.

DEA is very concerned that the way DBA is contemplating adapting the LRAIC model and subsequently using the LRAIC model in setting maximum regulated wholesale prices for the fibre network companies, will lead to wholesale prices that does not allow the fibre network companies to recover their efficiently incurred costs. DEA will meet with the European Commission and European Parliament in the near future to discuss this issue on an overall matter but strongly suggest that the model is adapted in consideration of the above-mentioned concern.

The comments from DEA below addresses the specific areas that could very well lead to under-recovery of costs, if the model is to be used in setting regulated maximum prices for the fibre network companies.

DEA has the following comments to relevant questions in the MRP:

We find the headings in the illustration 2.3 confusing. We believe that *Valuation should account for fully depreciated assets*, means *Valuation should exclude fully depreciated assets*. And we believe that *Valuation should not account for fully depreciated assets*, means that *Valuation should include fully depreciated assets*. If this interpretation is correct, we will suggest changing the wording in the headers.

As described in the draft MRP, one of its key principles is to allow cost recovery to any SMP operator to which a cost-orientation obligation for wholesale

prices has been imposed. It is unclear how DEA reaches the conclusion that the model will “*lead to wholesale prices that does not allow the fibre network companies to recover their efficiently incurred costs*”. On the other hand, it is noteworthy that, as outlined in the previous sections, a number of changes have been introduced in the draft MRP that aim to provide further clarity on the methodological approach to be adopted in the development of the model and address operators’ concerns.

Regarding the confusion with the wording “*Valuation should account for fully depreciated assets*”, we agree with the change suggested and will implement it in the final MRP. In this case, we would like to refer to our answers to question 1, which provide a wholistic perspective on how we suggest enhancing the clarity of the cost valuation principles to be adopted in the model.

Telia

TDC tilkendegav på workshoppen, at selskabet ikke mener, at fuldt afskrevet udstyr, som angivet i det af Axon udarbejdede excelark, skal medtages i modellen.

Telia skal bemærke, at det er Telias opfattelse, at der på udstyr ikke skal indgå ting, der allerede er afskrevet. Dette gælder både i forhold til TDC og fiberselskaberne. Da disse aktiver er afskrevet, kan det ikke retfærdiggøres, at disse omkostninger skal prisfastsættes i nettet/den nye LRAIC-model. Det er efter Telias opfattelse kun de elementer, der fortsat har en værdi, som skal indgå i modellen. Dermed er der også skabt incitament til nyinvesteringer.

På mødet blev det også anført, at modellens afskrivninger på CapEx skal begynde i 2005, hvor fiberselskaberne påbegyndte udrulningen af deres fibernet. Modellen skal tage højde for, at optaget af kunder i begyndelsen var lav, mens CapEx var relativ høj.

Telia skal bemærke, at det er selskabets opfattelse, at det ikke skal lægge de alternative selskaber til last, at en netudbyder f.eks. vælger at udbygge nettet i større omfang, end der er kundeoptag. Dette kan enten skyldes, at netejeren ikke har været god nok på salgssiden, eller at denne har valgt at udrulle i områder, hvor det ud fra et kundemæssigt perspektiv ikke har været den nødvendige efterspørgsel.

Ovenstående vil i givet fald få den uheldige effekt, at tidligere dårlige investeringer præmieres. Det har ikke tidligere været Erhvervsstyrelsens hensigt at

tage udgangspunkt i et ikke optimalt drevet net og selskab. Telia mener derfor, at det skal fastholdes, at dimensioneringen som angivet i Axons udkast til modelbeskrivelse påbegyndes i 2018. Som Axon skriver, betyder dette ikke, at der ikke tages højde for tidlige investeringer.

Afslutningsvis skal Telia bemærke, at det flere gange har været rejst, at den nuværende LRAIC-model ikke tager højde for den igangværende migrering fra DSL til NGA-net, som ikke nødvendigvis er ejet af TDC. Dette har den uheldige konsekvens, at mens kobberpriserne stiger, falder priserne for fiber ikke tilsvarende. Det er Telias opfattelse, at med den nuværende markedsudvikling bør alle aktive fiberforbindelser indgå i modellen, således at prissætningen ikke kun er baseret på TDC's kundebase og netværk. Prissættes fiber kun ud fra TDC's kundebase og netværk, vil det give kunstigt forhøjede engrospriser, når DSL basen langsomt nedskrives og flytter til forskellige selskaber end blot TDC.

We observe a number of points in this general comment from Telia

Consideration of written-off assets

As described in our answer to question 1, a buy or build decision will be fostered in the determination of wholesale prices except for the copper and coax access networks. This means that, in general, written-off assets will be considered in the CCA revaluation and, as such, will generate costs, as a ‘new entrant’ price reference is looked for.

However, written-off assets will not be taken into account (i.e. will not generate costs) when these relate to the civil infrastructure related to the copper and coax access networks.

Starting of year of the cost model

Based on a complete review of the comments received, we recognise the merits of including additional historical years in the modelling exercise, especially under an Economic Depreciation methodology. However, as described in the responses to Question 3, the timeframe of the model will only be extended if complete and robust information is provided by the relevant operators.

Demand of the modelled operator

As explained in our answers to Question 11, the demand considered will be the one supported by the network of the modelled operator, as the objective of the

model is to calculate the costs borne by the existing SMP operator(s) in wholesale broadband markets. Nonetheless, we emphasize that price-setting discussions and the analysis of the results obtained will be discussed in 2020.

Comments regarding list of ancillary services, page 83-88

TDC

The list and modelled ancillary services should only be services supporting the regulated LRAIC products. The present list contains services for products which is not LRAIC regulated or which is no longer regulated. TDC will provide Axon with a proposal for a revised list in September.

We have reviewed this section in the MRP to reflect that the model should be able to calculate all relevant ancillary services based on the up-to-date market decision determined by DBA.

Comment regarding co-location

TDC

TDC does not find any criteria covering co-location services. TDC requests Axon to inform, if these services are not to be modelled in the future.

As clarified in the response above, the model shall be able to calculate all relevant ancillary services (including co-location) based on the up-to-date market decision determined by DBA.