
# Principles for the costing methodology for services supplied by the National Broadband Network of the Kingdom of Bahrain

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Purpose: to identify and discuss the key features and principles to support the development, implementation and use of an appropriate pricing framework for regulated wholesale services provided over the National Broadband Network.

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# List of acronyms and definitions

| | |
|---|---|
| ACCC | Australian Competition and Consumer Commission |
| ADM | Add-Drop Multiplexer |
| Batelco | Bahrain Telecommunications Company B.S.C |
| BBM | Building Block Model |
| BD | Bahraini Dinar |
| BRE | Batelco Retail Entity |
| BU | Bottom Up |
| BU-LRIC | Bottom Up Long Run Incremental Cost |
| CAPEX | Capital Expenditure |
| CCA | Current Cost Accounting |
| DS | Data Service |
| EC | European Commission |
| EU | European Union |
| FAC | Fully Allocated Cost |
| FAS | Facilities access services |
| FFS | Fibre Fronthaul Service |
| HCA | Historical Cost Accounting |
| Kbps | Kilobits per second |
| KPI | Key Performance Indicator |
| LRAIC | Long Run Average Incremental Cost |
| LRIC | Long Run Incremental Cost |
| MB | Megabytes |
| Mbps | Megabits per second |
| MBS | Mobile Backhaul Service |
| MCD | Market and Competition Department |
| MEA | Modern Equivalent Asset |
| NBN | National Broadband Network |
| NERF | New Economic Regulatory Framework |
| NPV | Net Present Value |
| NRA | National Regulator Agency |
| NTP4 | fourth National Telecommunications Plan |
| ODF | Optical Distribution Frame |
| OLO | Other Licensed Operator |
| OPEX | Operating Expenditure |
| RAB | Regulatory Asset Base |
| RO | Reference Offer |
| SE | Separated Entity |
| SMP | Significant Market Power |

| | |
|---|---|
| TRA | Telecommunications Regulatory Authority of the Kingdom of Bahrain |
| TSLRIC | Total Service Long Run Incremental Cost |
| UMPB | Unbundled Metallic Path Backhaul |
| WBS | Wholesale Bitstream Service |
| WCA | Wholesale Central Access |
| WDC | Wholesale Data Connection |
| WLA | Wholesale Local Access |

# Introduction

1. In 2019, Batelco established BNet as the separate entity responsible for deploying and managing Bahrain's National Broadband Network. BNet was established following the legal separation of Bahrain Telecommunications Company (Batelco), in line with the policy set out in the Fourth National Telecommunications Plan (NTP4),[1] and as set out in the Separation Guidelines,[2] the Compliance Monitoring Regime,[3] and the principles established in the New Economic Regulatory Framework (the "NERF").[4] BNet is the sole provider of fixed wholesale broadband and domestic connectivity services to the retail arm of Batelco, referred to in the present paper as Batelco Retail ("BRE") and to Other Licensed Operators ("OLOs").
2. The purpose of this Position Paper is to identify and discuss the key features and principles of the framework that will be used to determine the price of services offered by BNet.
3. Section 1 sets out the context and purpose of developing the pricing framework. This includes:
    a. a summary of the legal framework within which the Authority operates;
    b. the economic background, including the role and objectives of the Authority; and
    c. a discussion on the purpose of implementing a pricing framework.
4. Section 2 compares two candidate pricing frameworks, the Building Block Model ("BBM") and the Bottom Up Long Run Incremental Cost ("BU-LRIC") approach.[5] It sets out the Authority's preference for using, when conditions are favourable, the BBM as its preferred pricing framework and, in the meanwhile, to implement a transitional BU-LRIC approach for the next regulatory period, in light of the current (separation) context in Bahrain.
5. Section 3 discusses the services to be considered within the scope of the regulatory pricing framework, and why this entails the development of two distinct cost models, namely a fixed access network cost model and a fixed core network cost model.
6. Section 4 addresses some aspects related to price setting. This includes examples of how BU-LRIC models are likely to be used by the Authority to inform its pricing decisions.

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1 The Fourth National Telecommunications Plan, available at https://www.tra.org.bh/Media/images/National%20Telecommunications%20Plans/NTP4_EnglishTranslation_May20161.pdf

2 Separation of Batelco, August 2018, Ref: LAD/0818/198

3 Regime for Monitoring of Separation of Batelco and NBN Compliance, August 2018, Ref: LAD/0818/199

4 Report on the New Telecommunications Economic Regulatory Framework for the Kingdom of Bahrain, April 2018, Ref: MCD/02/18/005

5 These approaches were previously identified by the Authority as possible approaches. See the Report on the New Telecommunications Economic Regulatory Framework for the Kingdom of Bahrain, April 2018, Ref: MCD/02/18/005

7. Finally, Section 5 covers practical issues relating to the development of bottom-up cost models, including the key steps in model development and the involvement of licensees, in particular in relation to the provision of information and the validation of the cost models.

8. Annexe A provides additional information on some BBM pricing framework that have been implemented in the telecommunications sector.

# 1 Rationale and purpose

## 1.1 Legal context

9. Article 3 of the Telecommunications Law provides that the Authority has the duty to promote effective and fair competition between new and existing operators and to protect the interests of users with respect to tariffs, availability and quality of services offered.

10. The legal framework for the setting of interconnection and access tariffs is set out in Article 57 of the Telecommunications Law. According to Article 57(b), the Authority may set terms and conditions and tariffs for interconnection and access services supplied by a dominant operator, and

> *"such terms and conditions and tariffs shall be fair, reasonable and non-discriminatory and the tariffs shall be based on forward-looking incremental costs or by benchmarking such tariffs against tariffs in comparable Telecommunications markets."*

11. To assess whether tariffs meet those tests, the Authority has issued a number of instruments such as:

    a. The Accounting Separation Regulation (issued on 2 August 2004 and amended in March 2018) that requires licensed operators subject to such obligation to prepare FAC accounts on an annual basis;

    b. Reference Offer Orders (e.g. the Order bearing reference number LAD 0619 178[6]).

12. As discussed throughout this Position Paper, the Authority considers that cost models associated with a pricing framework represent an important additional tool that will complement the above regulatory instruments and will enable the Authority to undertake its duties under the Telecommunications Law in a more effective and transparent manner. Cost models will be used among other tools to set the pricing terms for regulated services. They may also be used in other contexts where costing information is necessary, such as investigations for anti-competitive behaviour.

13. The development of a pricing framework and related cost models is fully consistent with the Authority's duties to promote competition and protect the interest of end-users. The

[6] An Order issued by the Telecommunications Regulatory Authority on the Reference Offer of NBNetCo BSC(c), 03 June 2019, LAD 0619 178

models will assist the Authority in ensuring that regulated charges reflect the efficient cost of providing the wholesale regulated services to licensees. This is because, if access seekers had to bear wholesale services prices above their efficient costs, they would likely pass on these extra costs to their retail customers. Consequently, consumers would face higher than justified prices, leading to lower welfare. In that context, the development of cost models is critical since it will enable the setting of regulated charges based on efficient costs and hence consistent with Articles 57 and 58 of the Telecommunications Law.

## 1.2 Economic background

14. In October 2011, the Authority issued a Position Paper[7] that defined the key features and principles of a set of BU-LRIC Cost Models that were subsequently implemented and used by the Authority. One of the purposes of these cost models was to inform the Authority's decisions on the setting of appropriate tariffs for regulated wholesale services, including wholesale fixed network access products provided by Batelco to other licensed operators.

15. The fourth National Telecommunications Plan[8] ("NTP4"), which set out the Government's strategic plan and general policy for the telecommunications sector of the Kingdom of Bahrain was issued in May 2016. NTP4 set out, amongst other things, a clear policy for the development of an advanced broadband infrastructure and introduced a number of new objectives for the telecommunications market. Key policies set out in NTP4 included the following:

    a. Ultra-fast broadband products and services will be delivered over a single NBN infrastructure;[9]

    b. This single network will be owned by a separate legal entity, which will be legally and functionally separated from the Incumbent Operator (Batelco);[10]

    c. The new entity will only provide wholesale products and services, and it will provide these wholesale products and services exclusively to duly licensed operators within the Kingdom of Bahrain;[11] and

    d. The new entity will deliver NBN-based wholesale products and services to the Incumbent Operator's retail business unit(s) and its competitors on an "equivalence of inputs" basis.[12]

16. As regards the role of the Authority in the implementation of these policies, NTP4 provides that the Authority shall develop a framework that ensures that:

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7 The TRA, Development, implementation and use of bottom-up fixed and mobile network cost models in the Kingdom of Bahrain, Position Paper, 19 October 2011, Ref: MCD/10/11/144

8 Resolution No. (29) of the year 2016 Promulgating the Fourth National Telecommunications Plan, The Council of Ministers

9 NTP4, para. 20

10 Ibid.

11 Ibid., para. 24 d

12 Ibid., para. 24 f

a. the new entity will recover efficiently incurred costs, including a fair return on its investment; and

b. the new entity shall efficiently deploy the NBN infrastructure required to deliver on NTP4 targets.[13]

17. From an economic perspective, these decisions entail a fundamental change in the provision and regulation of fixed telecommunications services in Bahrain, with the market migrating from a model which enabled and sought to provide appropriate signals to incentivise infrastructure-based competition, to a model of (retail) service-based competition, where downstream operators (i.e. BRE and OLOs) use a single infrastructure on a non-discriminatory basis to provide their respective retail products and services.

18. This change of paradigm has in turn significant consequences from a regulatory perspective. Indeed, while the ultimate objectives of the Authority remain unchanged (i.e. to protect the interest of end-users by promoting competition at the retail level), its approach to achieve these objectives will now be different.

19. In telecommunications markets where regulatory intervention is driven by the promotion of infrastructure-based competition, price control aims to achieve the delicate balance of preventing excessive pricing while ensuring that alternative operators have sufficient incentives to invest in their own networks and climb the "ladder of investment".[14] In particular, when cost orientation obligations are imposed on the owner of an infrastructure, these controls are often designed to mimic the outcomes of competitive and contestable market[15]: prices are set to send a "build or buy" signal to alternative operators.

20. In a market where a single network infrastructure is legally authorized, "build or buy" signals are less relevant for market undertakings. In such case, regulatory authorities rather design their price control obligations to ensure the most efficient provision of wholesale services to downstream operators, at a certain quality of service level, including a reasonable return on efficiently incurred investment by the wholesale services provider.

21. In preparation for these structural market changes, the Authority issued a report on the New Telecommunications Economic Regulatory Framework ('the NERF') in April 2018. This report aimed at setting out how the Authority would implement NTP4 policies with respect to the delivery of ubiquitous ultrafast broadband infrastructure. Amongst other

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[13] Ibid., para. 24 e

[14] The ladder of investment is a regulatory approach proposed by Martin Cave and Ingo Vogelsang, which illustrates the pathway that new entrants in the telecommunications market can take to progress from 'service-based competition' to increasingly deeper infrastructure-based competition (or facility-based competition). Under the ladder of investment approach, the regulator grants market entrants access to different levels or 'rungs' of the incumbent's telecommunications infrastructure on reasonable terms, enabling a service-based competition in the short term and incentivizing entrants to move up the rungs of the ladder by investing in telecommunications infrastructure *via* an appropriate access regulation. In other words, under the ladder of investment, alternative operators are incentivized to seek the network access closest to the subscriber.

Martin Cave and Ingo Vogelsang, *How access pricing and entry interact*, Telecommunications Policy, vol. 27, issue 10 11, pages 717-727, 2003.

[15] A contestable market is defined by William Baumol as a market where firms faces zero entry and exit costs: with no barriers to entry and no barriers to exit, such as sunk costs and contractual agreements.

aspects, the NERF addressed the review of the regulatory pricing framework, in light of the issues mentioned in paragraphs 16-20.

22. The NERF identified three main objectives of the new regulatory pricing framework[16]:

    a. To promote efficiency in the supply of telecommunications products and services in the telecommunications market of Bahrain;

    b. To promote service-based competition in the telecommunications market that is fair, effective and sustainable;

    c. To support the development of a fibre-based National Broadband Network, including ensuring that the SE is able to recover its efficiently incurred costs and is allowed to earn a fair return on its investment.

## 1.3 Purpose of this position paper

23. The current framework for setting terms and conditions and tariffs for wholesale interconnection and access services in Bahrain is based on the submission of Reference Offers (ROs) to the Authority, who then assesses whether the tariffs and other terms and conditions proposed in the Reference Offers are fair, reasonable and non-discriminatory. In accordance with Article 57 of the Telecommunications Law, when the Authority considers that the proposed tariffs, and other terms and conditions are not fair, not reasonable or are discriminatory, the Authority may issue an Order in which it determines the tariffs as it considers appropriate in accordance with Article 57.

24. The Authority issued in June 2019 an Order on BNet's first Reference Offer (RO).[17] This set out the following objectives, consistent with the objectives presented in the NERF and recalled at paragraph 22, above, namely that the RO should:

    a. support the delivery of the NBN

    b. promote efficiency in the supply of telecommunications products and services in the telecommunications market in Bahrain

    c. promote service-based competition in the telecommunications market that is fair, effective and sustainable

    d. promote efficient investment and hence support the development of a sustainable, future-proof network.[18]

25. BNet's RO Order set the prices for its services, based on a "business case model"[19] approach, the structure of which is represented in the diagram below.

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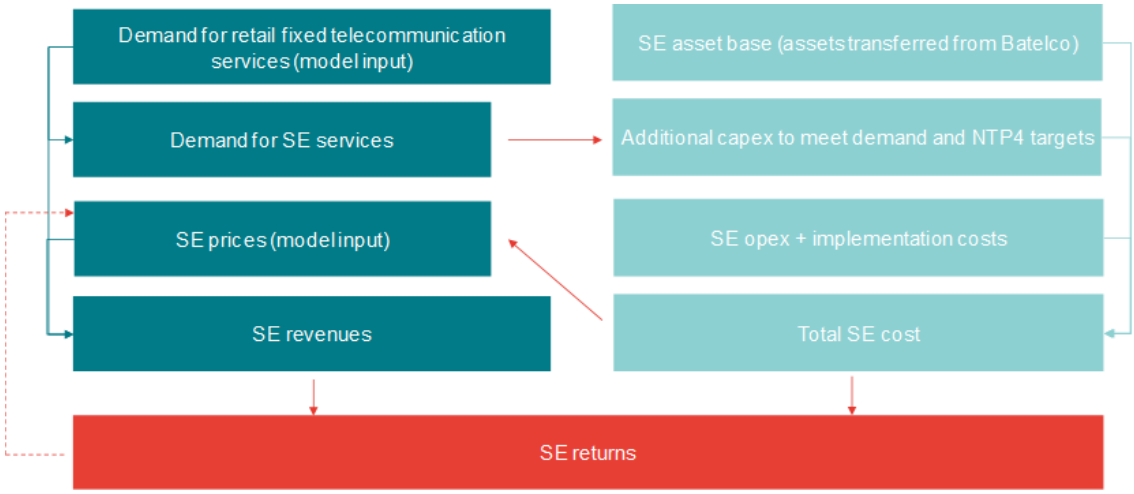
[16] Report on the New Telecommunications Economic Regulatory Framework for the Kingdom of Bahrain, 15 April 2018, MCD/02/18/005, p. 87

[17] An Order issued by the Telecommunications Regulatory Authority on the Reference Offer of NbNetCo BSC(c), 03 June 2019, Ref: LAD 0619 178

[18] Order issued by the Telecommunications Regulatory Authority on the Reference Offer of NbNetCo BSC(c), 03 June 2019, Ref: LAD 0619 178, para. 36.4.1

[19] An Order issued by the Telecommunications Regulatory Authority on the Reference Offer of NbNetCo BSC(c), 03 June 2019, Ref: LAD 0619 178, p.44

**Figure 1: Structure of the "Business case model" approach**




Source: The Authority

26. As set out by the Authority in the Order, under this approach, the business case aims to compute an expected return for BNet, under certain input assumptions in terms of unit prices, unit costs and service demand. This then allowed the Authority to determine reasonable price terms for the RO services which would enable BNet to have the opportunity to recover its costs, including a reasonable return on capital.

27. The Authority recognised that the current business case approach allows BNet to earn a return above the current cost of capital. This was considered justified to ensure BNet's financial sustainability and price stability in the short term. However, it does not ensure that prices for the different services are set at efficient and forward-looking cost-oriented levels, and therefore provides limited incentives for long-term cost optimization.

28. The purpose of the present Position Paper is therefore to set out the pricing framework on which the Authority will base its reviews of future BNet ROs, and discuss the key features and principles to support the development, implementation and use of candidate models consistent with this pricing framework.

# 2 Pricing framework

29. In this section, the Authority focuses on two candidate pricing frameworks that were identified and preliminarily discussed in the NERF:

    a. the Bottom Up Long Run Incremental Cost (BU-LRIC)[20] approach; and

[20] In the NERF, the Authority did not discuss the particular merit of the BU-LRIC approach as such, but referred to the broader LRIC approach, regardless of the Top Down or Bottom Up nature of its implementation. However, the most common implementation of the LRIC approach worldwide is the BU-LRIC, which was also the approach followed by the Authority during the previous regulatory period. The Authority therefore considers appropriate to examine BU-LRIC as the most suitable alternative candidate approach to the BBM.

b. the Building Block Model (BBM).

30. The following sections provide more details on these approaches and their relative merits in light of the Authority's objectives and constraints.

## 2.1 The BU-LRIC approach

### 2.1.1 Description of the BU-LRIC approach

31. The BU-LRIC approach follows a Bottom-Up (BU) logic: demand data for telecommunications services is combined with specific engineering rules to dimension a network that satisfies the input demand for these services. This means that the inventory of assets that is considered (and then valued) in a BU-LRIC approach is the outcome of a dimensioning process rather than a direct input.

32. This approach has therefore more of an "engineering-based nature" than the top-down approach (which is more "accounting-based") as it starts by dimensioning and building a hypothetical network and identifies all costs components at a granular level.

33. A consequence of this difference is that under a BU approach, the modelled network is never exactly that of the modelled operator. However, it provides a large degree of flexibility as regards the level of efficiency to be considered for the modelled operator. Depending on the rules used in the dimensioning process, the model will reflect:

    a. a fully efficient hypothetical operator's network, though providing the same services at the same level of demand as the modelled operator (scorched earth approach);

    b. a network very close to the operator's in terms of structure and characteristics (scorched node approach);

    c. Any hypothetical network within these two extremities, with a specified degree of efficiency (optimised scorched node approach).

34. Once the inventory of assets has been established, these are usually valued at their current cost, consistent with the "forward looking" nature of the BU-LRIC approach. However, under certain circumstances, other valuation methods can also be considered (see section 2.1.2).

35. Typically, the inventory of assets and their valuation follow the "Modern Equivalent Asset" (MEA) logic, which implies dimensioning and valuing a network using the best available technology (in terms of capacity and cost efficiency) to meet the target demand. This approach is based on the idea that in many cases, new technologies may have been developed since the modelled operator's existing assets were installed. It may also be that existing assets cannot, or would no longer, be purchased. Provided that new technologies can perform functions carried out by the existing asset with the same or enhanced quality, the modern equivalent asset (MEA) may therefore be an asset using the new technology.

For example, the European Commission recommended calculating costs for the copper local loop based on the costs of a modern efficient network.[21]

36. Finally, a LRIC approach implies calculating the cost of a given increment of products or services, whereby the LRIC of a product or service is the difference between the total costs of producing all products offered by the regulated entity and the total costs incurred in an alternative scenario where the product under consideration is not produced, all else being equal. Consequently, the outputs of an LRIC model in terms of costs per services depend on the choice of the increment. LRIC is therefore a broad approach which can be further refined, according to the increment considered and the treatment of overhead costs. The 'pure LRIC' and the LRIC+ versions are the most commonly used.

### 2.1.2 Key economic features of the BU-LRIC approach

**Transparency, flexibility, efficiency and "build or buy" signal**

37. Over the last decades, the determination of regulated access charges in the telecommunications sector was dominated by the BU-LRIC approach, for several reasons.

38. First, a BU-LRIC approach offers regulatory authorities a clear understanding of telecommunication services cost drivers. This was considered for a long time as an important feature of BU-LRIC models for regulatory authorities. When opening up markets to competition was regulatory authorities' main objective, BU-LRIC models, which do not rely purely on regulated entities' data but rather on public and transparent engineering and allocation rules, provided a powerful tool to reduce information asymmetries with the regulated entity, propose objective efficiency adjustments, adapt to structural changes and take into account future evolutions in the cost of services.

39. Second, the LRIC approach was considered as particularly suited to the telecommunication sector. Most other regulated sectors are commonly characterized by the provision of homogeneous goods over an infrastructure (e.g. utilities, airports, railroad transportation). By contrast, in the telecommunications sector, a large number of heterogeneous products can be offered over a single network infrastructure. The LRIC approach provides a consistent and economically transparent approach to allocate indirect network costs to each product or service using the network.

40. Third, the use of forward-looking costs to revalue the assets in each regulatory period based on their optimised replacement costs was believed to be the most suitable approach to promote infrastructure-based competition. By capturing the efficiency improvements brought by technical developments, this approach determines the costs that new entrants would incur by deploying their own infrastructure. The BU-LRIC approach was therefore praised for sending appropriate "build-or-buy" signals to access seekers.

41. In addition, the use of current costs associated with an economic depreciation pattern ensures that the annual charges associated with a given asset evolve in the same way as

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[21] European Commission, Recommendation, on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment, 11th September 2013, C(2013) 5761, article 31.

the price of the asset, regardless of investment cycles. This feature is particularly interesting as it ensures the stability of regulated prices over time.

42. For all these reasons, the BU-LRIC approach has been widely used and encouraged by the European regulatory framework, with the EC repeatedly outlining its benefits in several essential publications.

    a. In its 2009 Recommendation on Termination Rates, the European Commission recommended that "the evaluation of efficient costs is based on current cost and the use of a bottom-up modelling approach using long-run incremental costs (LRIC) as the relevant cost methodology"[22], on the basis that this approach "*promotes efficient production and consumption and minimises potential competitive distortions.*"[23]

    b. In its 2013 Recommendation on broadband costing methodologies, the European Commission considered that "*the BU LRIC+ costing methodology best meets* [the Commission's] *objectives for setting prices of the regulated wholesale access services*."[24] These objectives were defined as follow:

        i. replicate as much as possible the access prices expected in an effectively competitive market;

        ii. reflect the need for stable and predictable wholesale prices over time, which avoid significant fluctuations and shocks, in order to provide a clear framework for investment;

        iii. ensure that operators can cover costs that are efficiently incurred and receive an appropriate return on invested capital.[25]

43. BU-LRIC models are still considered worldwide as an essential tool to support robust and evidenced-based regulation. However, their use was mostly motivated by the promotion of infrastructure-based competition. The Authority notes this is not relevant in the present context in the Kingdom.

44. In addition, the BU-LRIC approach also has potential limitations.

**Regulatory uncertainty and limited investment incentives**

45. First, since the BU-LRIC approach estimates the costs of an efficiently dimensioned network operated by a hypothetical efficient operator, this approach bears a risk of over-optimizing the modelled network. Although this risk can be mitigated by a reconciliation process of the BU-LRIC outcomes with the operator's operational KPIs and accounts, this

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[22] European Commission Recommendation of 7 May 2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU (2009/396/EC), art. 2

[23] Ibid., recital 13

[24] European Commission, Recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment C(2013) 5761, recital 29

[25] Ibid. recitals 25 and 26.

could lead the regulated firm to prioritise cost reduction at the expense of investment, innovation and quality of service.

46. Second, the BU-LRIC approach typically relies on long-term forecast assumptions: as a current cost approach, the recovery of a given asset cost is achieved over its lifetime through the annuities, which depends on its initial valuation and price trend. However, under a BU-LRIC approach, at the beginning of each regulatory period, regulators typically review each asset's purchase price and associated price trend. Whenever the latest purchase price of a given asset is not consistent with the purchase price considered for the previous regulatory period (adjusted for the previously determined price trend), the cost recovery of that asset may not be ensured.

47. This situation is particularly likely to happen since the BU-LRIC approach commonly relies on an MEA approach: whenever new technologies appear, or when existing assets are not available anymore, the modelled assets are likely to be different from those effectively deployed by the regulated entity.'

48. In such situations, regulated entities' incentives to invest may be relatively weak, since there is no guarantee that sunk investment costs can be recovered, and with a fair return. Thus, the regulated entity may have to absorb the risks of cost under-recovery. While this may help to ensure that investment plans are prudent, investment incentives overall may be reduced.

49. Finally, another common criticism of BU-LRIC models is that they are designed to send "build or buy" market signals, which are particularly suited to ensure efficient market entry, but are less relevant in circumstances where a particular asset (or set of assets) is not economically replicable or in any other situation where infrastructure-based competition is not relevant. Indeed, the BU-LRIC approach, by calculating the replacement cost of the assets, does not account for the cumulated depreciation of the regulated entity's assets. In situations where such assets are not likely to be replicated by alternative operators, this is likely to allow the regulated entity to over recover the cost of fully depreciated assets which are still in use in the long term.

50. This criticism, however, can be tackled in a BU-LRIC approach, by accounting for assets' cumulated depreciation in their current valuation. For example, in its 2013 Recommendation, the European Commission recommended that "*NRAs should value all assets constituting the RAB of the modelled network on the basis of replacement costs, except for reusable legacy civil engineering assets*."[26] According to the Commission, reusable assets, for which a build or buy signal is not relevant, should not reflect their replacement cost.

> *"the 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. This approach sends efficient market entry signals for build or buy decisions and avoids the risk of a cost over-recovery for reusable legacy civil infrastructure. An over-*

[26] European Commission, Recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment C(2013) 5761, Art. 33

> *recovery of costs would not be justified to ensure efficient entry and preserve the incentives to invest because the build option is not economically feasible for this asset category."*[27]

51. The European Commission explicitly refers to civil work assets as reusable assets, consistent with its objective of promoting infrastructure-based competition in the European Union. However, this approach could be extended to other types of assets which would not be subject to potential replicability, due to local circumstances. For example, in Denmark, the regulatory authority recently considered that copper cables and coaxial cables should also be considered as reusable assets and costed accordingly, pursuant to the EC Recommendation.[28]

## 2.2 The BBM approach

### 2.2.1 Description of the BBM approach

52. The BBM is a pricing framework under which a regulated entity is allowed to earn a maximum revenue over the regulatory period for the provision of a given set of services. This maximum allowable revenue is called the revenue cap, which cannot exceed the "revenue requirement".

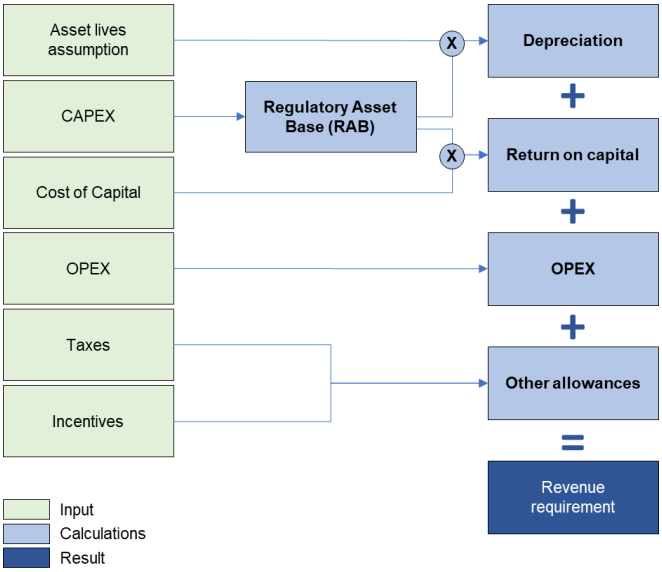
53. The revenue requirement represents the income that an efficient company would need to earn to meet the cost of running its regulated business and deliver on its agreed investment programme.

54. The revenue requirement typically consists of several 'building block' cost components: OPEX, return on capital, depreciation allowances, as well as any applicable tax allowances and various incentive components (revaluation gains).

**Figure 2: "Building Block" components of the revenue requirement**

[27] European Commission, Recommendation of 11.9.2013 on consistent non-discrimination obligations and costing methodologies to promote competition and enhance the broadband investment environment C(2013) 5761, Recital 35

[28] DBA, Development of the Danish LRAIC model for fixed networks Model Reference Paper – Consultation Document, 1 July 2019, page 16: *"In practice, the deployment of copper cables itself would not be replicable, as it is highly unlikely that the economics of these networks would allow cost-recovery if they were built today. Therefore, it could be concluded that copper access cables are not replicable by access seekers."*




Source: The Authority

55. In setting a total revenue cap aligned with the regulated entity's efficient revenue requirement, this pricing framework aims to ensure that wholesale prices overall are not higher than the level needed to compensate an efficiently run operator, whilst providing a fair return on its investment. Consequently, investment incentives should be preserved whilst constraining the ability of a regulated entity to use its market power to set excessive prices.

56. In practice, the determination of the total revenue requirement over a given regulatory period is achieved in four steps:

    - estimating the regulatory asset base (RAB) at the start of the regulatory period;
    - defining the allowed rate of return on allowed investment;
    - defining the allowed depreciation (recovery of capital); and
    - forecasting the expected efficient CAPEX and OPEX over the regulatory period.

57. Once these steps are achieved, prices are sets to meet the revenue cap, by:

    a. forecasting the quantities of outputs that are expected to be supplied over the period; and then

    b. setting a profile of prices such that the present value of expected revenues equals the present value of expected costs, using the allowed rate of return as the discount rate for calculating the present values ('NPV=0' principle).

58. The Regulatory Asset Base (RAB) is a key element of the revenue requirement determination. It can be defined as the value of assets within the regulated entity necessary to carry out the functions of the business.[29]

[29] Helm, D. (2009). 'Utility regulation, the RAB and the cost of capital.' Competition Commission Spring Lecture, 3.

59. Described this way, the BBM may look at first quite similar to the BU-LRIC approach. A key feature of the BBM, however, is that the initial RAB is "locked in" and then "rolled forward" from one regulatory period to the next, as described below (paragraph 63).

60. In practice, a regulatory authority may choose to define one single RAB or multiple RABs. Defining multiple RABs allow the regulatory authority to define several revenue requirements for specific products or baskets of products. However, in practice, most of the assets of a telecommunications network are common to the whole set of services provided. Defining multiple RABs would, therefore, require the regulator to apply various allocation factors to distribute the costs of the common assets over the different RABs. These factors can be complex to define and so this can increase the regulatory complexity of the BBM approach. Consequently, a single RAB approach was favoured in both Australia and New Zealand, two countries that use a BBM model.[30]

61. The valuation of the RAB plays an important role in:

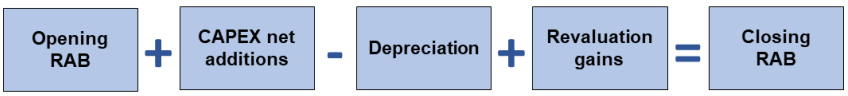
    a. incentivising investment, as the revenue requirement explicitly includes a return on the RAB;

    b. promoting efficiency, as the revenue requirement will depend on the efficiency of the costs of the assets included in the RAB.

62. As for the BU-LRIC approach, assets in a BBM approach can be valued either based on a CCA or HCA approach. In any case, a characteristic of the RAB in a BBM approach is that it accounts for capital which has already been recovered.

63. A specific factor in the BBM approach, compared to other costing approaches (and in particular the BU-LRIC approach) lies in the « lock in » of the initial RAB. In a BBM approach, assets are not revalued at each regulatory period. Instead, over the regulatory period, newly commissioned assets or assets disposals for each year are taken into account as net CAPEX additions The RAB is rolled-forward by adding these net CAPEX additions to the previous year's RAB, removing the yearly depreciation, and adjusting for potential revaluation gains or loss[31].

**Figure 3: "Roll Forward" mechanism under the BBM approach**




Source: The Authority

64. This "roll forward" mechanism is consistently maintained from one regulatory period to the next, therefore ensuring that at the beginning of each regulatory period, the RAB only

[30] See Annex A – BBM implementations worldwide

[31] Revaluation mechanisms allow adjustments for any observed deviation over time between CAPEX net additions (respectively OPEX) initially forecasted and CAPEXCPEX net additions (respectively OPEX) actually incurred.

deviates from the initially locked-in RAB because of CAPEX net additions and depreciations.

### 2.2.2 Key economic features of the BBM approach

**Regulatory certainty and investment incentives in non-competitive markets**

65. BBM-based pricing frameworks are widely used in Europe and elsewhere in the regulation of utilities, rail infrastructure, and airports[32].

66. In the telecommunications sector, BBM approaches were first introduced by the Australian regulator, who switched from an LRIC approach to a BBM approach in 2011. The ACCC justified its decision based on two recurrent issues observed over the 13-year period during which an LRIC approach was used:

    a. the revaluation of assets at their optimised replacement cost without considering their previous depreciation could lead to over recovery of costs when assets are fully depreciated.[33]

    b. finding appropriate MEA values to estimate forward looking costs can be a difficult and arbitrary task, as modern assets do not have the same technical characteristics as the modelled operator's assets.[34]

67. Overall, the ACCCs considered that the BBM approach offered more certainty and predictability than the former LRIC approach:

> *"The ACCC's adoption of this approach responds to industry demands for greater certainty over time in the ACCC's pricing framework and, in particular, in the value of the assets used to provide the declared fixed line services."*[35]

68. Telecommunications regulatory authorities are starting to take a growing interest in this type of regulation: in addition to Australia, a BBM approach is currently being implemented in New Zealand (9 years after the separation of the wholesale-regulated entity Chorus from the incumbent Telecom New Zealand that was achieved in 2011) and the UK regulatory authority has recently consulted on this approach, suggesting that it could be implemented in a short to medium term.[36]

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[32] For example, the Post Tax Revenue Model for electricity distribution in Australia (see here), or the pricing framework for water distribution in the UK (see here).

[33] Interim access determinations for the declared fixed line services, Statement of Reasons, ACCC, March 2011, page 6: "*The continual revaluation of network assets means that there has been ongoing uncertainty over the level of access prices*" ACCC

[34] Ibid.: "*Calculating forward looking costs involves estimating the cost of providing the relevant service using modern equivalent assets (MEAs). However, there is considerable debate and uncertainty over what constitutes MEAs*"

[35] Inquiry to make final access determinations for the declared fixed line services, Final Report, ACCC, July 2011, page 9

[36] Ofcom (UK), January 2020, Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26 (See details in annex A)

69. This increasing popularity can be attributed to the certainty that BBM provides to both access providers and access seekers. Assuming the initial value of the RAB is determined appropriately, locking-in that value prevents any over- or under- recovery of costs over time, particularly for legacy assets. This is, in turn, one step to promoting efficient investment decisions such that the regulated entity provides high quality services at fair prices to the consumers.

70. However, locking-in the RAB also implies that any overvaluation or undervaluation of the initial RAB will be difficult to correct later. If an asset is overvalued at the start, consumers will incur high prices for a long period (i.e. until the asset is fully depreciated and therefore no longer reflected in the RAB). Conversely, if an asset is undervalued at the start, its real cost may not be fully recovered.

**Pricing flexibility but limited ability for appropriate cost allocation to services**

71. The BBM approach estimates an overall revenue requirement for the set of services provided through the assets included in the RAB. However, it does not provide any way to appropriately allocate this revenue requirement over different services.

72. As mentioned above, BBM frameworks are widely used in utility sectors which provide homogeneous goods over a single infrastructure. In those circumstances, cost allocation raises fewer issues than, e.g. in the telecommunications sector.

73. In the telecommunications sector, where a range of heterogenous goods are provided over the network, this has particular implications.

    a. On the one hand, it provides the regulated entities with a high degree of flexibility in setting prices for different products or services, provided that overall, the revenue cap is not exceeded. From an economic perspective, this would allow the regulated entity to set prices based on the elasticity of demand, maximising take-up and therefore social welfare (Ramsey pricing[37]).

    b. However, such flexibility, if not checked, could lead to monopoly-type outcomes: since the regulated undertaking can achieve its revenue cap through various combinations of prices and quantities, it could therefore set high prices and supply low quantities, resulting overall in poorer allocative efficiency and lower social welfare (the so-called ‘deadweight loss’). In practice, however, such effects can be mitigated.

    c. In addition, in circumstances where the regulated entity has interests in the provision of a specific subset of regulated wholesale services, such flexibility may be used to the detriment of competition. It may allow the entity to cross subsidize between services, for example to favour particular downstream undertakings who may use certain wholesale services.

[37] Ramsey, Frank P. (1927). "A Contribution to the Theory of Taxation". The Economic Journal. 37: 47–61

74. While the definition of multiple RABs could in principle mitigate the risk of cross subsidization, in practice this raises multiple challenges, as set out in the NERF[38], that would limit the benefits of the BBM approach. Neither Australia nor New Zealand have adopted a multiple RAB approach.

75. Instead of defining multiple RABs, telecommunication regulators who have adopted the BBM approach addressed the issue of cross-subsidization by incorporating, into the regulatory framework, price control mechanisms such as anchor pricing for basic products or individual price caps. Examples include Australia where the regulatory framework supports a single maximum revenue cap with price caps for individual wholesale services, and New Zealand which proposes to introduce BBM style pricing regulation with a revenue cap combined with price caps for basic anchor services.

**Limited productive efficiency (static and dynamic)**

76. Whilst the BBM approach promotes network investment by ensuring investment recovery, it raises questions as regards its ability to ensure that these investments are efficiently incurred.

77. In contrast to a BU-LRIC approach, where the assets within the RAB are dimensioned and therefore allow for some efficiency adjustments, the BBM approach could incentivise inefficient investments, either through the initial RAB or forecasted capex, if such investments are not scrutinized by the regulator.

78. If all costs incurred in the provision of services are recoverable, the regulated entity would have incentives to invest and to develop new solutions and technologies. However, it could also provide strong incentives to invest in solutions that are more expensive and not necessarily the most efficient. Without or with little scrutiny, such inefficiencies would be passed on to consumers in the form of higher prices. The ability of the regulated entity to overinvest in its network would depend on how strict regulation would be in relation to: (i) what investments it is allowed to recover; and (ii) the ability of the regulator to fully assess and scrutinize investment decisions, particularly in relation to information asymmetry with the regulated entity.

79. The guaranteed rate of return inherent in the BBM model provides very strong incentives to invest in CAPEX, as opposed to OPEX (including outsourcing), even in situations where the latter would be more efficient. This incentive to build up excessive capital stock comes from the fact that additional CAPEX would increase the RAB (leading to additional revenue for the regulated entity), whereas OPEX would not.[39] The substitution towards capital-intensive business plans may result in an excessively high capital-labour ratio, which may represent an inefficient use of capital. In the UK water sector, for example, this has led to excess capacity with water companies building excessive water reservoirs and wastewater

[38] Report on the New Telecommunications Economic Regulatory Framework for the Kingdom of Bahrain, 15 April 2018, MCD/02/18/005, p. 106 and 107

[39] This is known as the Averch-Johnson effect. Averch, H., & Johnson, L. L. (1962). 'Behavior of the firm under regulatory constraint.' The American Economic Review, 1052-1069.

treatment capacities. The regulator has addressed this partly by being now tougher with approving investment decisions and by allowing some OPEX in the RAB.[40]

80. Without any additional efficiency assessment tool, the BBM approach bears a material risk that the regulated entity deliberately inflates its initial RAB and forecasted CAPEX / OPEX levels, thus providing limited incentives for productive efficiency.

## 2.3 Comparison of the two approaches

### 2.3.1 Suitability of the approaches in light of the Authority's objectives

81. As detailed in the previous sections, each approach has particular pros and cons, and can be adapted to fulfil certain objectives under certain circumstances. This explains why both approaches have been used by NRAs worldwide, depending on their respective objectives and market situation.

82. In the following subsections, the Authority compares the merits of the two approaches in light of its objectives, as highlighted in the NERF:

    a. To promote efficiency in the supply of telecommunications products and services in the telecommunications market of Bahrain;

    b. To promote service-based competition in the telecommunications market that is fair, effective and sustainable; and

    c. To support the development of a fibre-based National Broadband Network, including ensuring that the SE is able to recover its efficiently incurred costs and is allowed to earn a fair return on its investment.

**Promotion of efficiency**

83. The pricing framework should promote productive and allocative efficiency in the supply of telecommunications services, whilst promoting dynamic efficiency by incentivising investment and innovation over time.

84. With regard to productive efficiency, both LRIC-based and BBM models have the potential to provide strong incentives for BNet to minimise costs as it would be allowed to retain a proportion of its efficiency gains as profit.

85. In BBM models, cost efficiency incentives are delivered through determining the revenue-requirement on an ex-ante basis. When the operator incurs lower costs than its forecast level through cost efficiencies, it is typically allowed to keep some, or all, of the difference as profit. Conversely, when the operator incurs higher costs than allowed for, it may have to absorb a loss. However, as explained previously, without scrutiny of BNet's RAB and forecasts, the BBM approach could incentivise it to overstate its cost base and be remunerated for inefficient investments.

[40] Ofwat, Setting price controls for 2015-20 – framework and approach, A consultation, 2013, section 4.4

86. Under a BU-LRIC approach, the fact that prices are independent of actual costs means that BNet would have strong incentives to reduce its costs and be at least as efficient as the hypothetically efficient modelled operator. Otherwise, higher production costs from less efficient production may lead to losses. Furthermore, as a model that is based on an efficient network, BU-LRIC has strong productive efficiency attributes.

87. As regards allocative efficiency, the BU-LRIC approach is supposed to enable the regulatory authority to determine a cost per service and set a price based on that cost, while the BBM approach only allows it to set a revenue requirement across the whole set of products. Therefore, in relation to this specific aspect, the BBU-LRIC approach could achieve greater allocative efficiency than a BBM approach, where product-specific prices may not reflect costs and might lead to an overall loss of welfare. However, this could be compensated by the fact that, as explained earlier, the BBM approach allows for 'Ramsey' type pricing, which tends to increase allocative efficiency.

88. Overall, it is unclear whether a BU-LRIC approach would lead to higher or lower allocative than a BBM model. Moreover, the forward-looking nature of the BU-LRIC approach entails the risks that prices may be unrelated to actual costs as long-run costs are hypothetical and difficult to model. In contrast, the BBM promotes a degree of allocative efficiency by introducing price controls on some specific products (should regulators wish to strengthen the degree of allocative efficiency).

89. Finally, as regards dynamic efficiency, under a BBM pricing framework BNet would in theory have incentives to invest in new solutions that could lead to lower costs in the longer term, knowing that it will be allowed to recover efficiently incurred capital. However, as detailed above, this incentive could be offset by the (negative) incentive to overinvest in capital intensive solutions to generate more revenue. Under a BU-LRIC approach, dynamic efficiencies relate primarily to the promotion of infrastructure-based competition as LRIC prices can be used to convey 'build or buy' signals to potential market entrants, encouraging more cost-efficient operators to enter the market. However, this differs from the Authority's objectives for Bahrain's telecommunications sector.

90. The Authority's considers that both approaches are likely to promote efficiency in the telecommunications sector, although the BBM approach can require appropriate complementary tools.

**Promotion of competition**

91. Both BU-LRIC and BBM frameworks can promote effective service-based competition in the retail market, through preventing wholesale prices being set at inefficiently high levels.

92. By ensuring that the regulated firm will recover the costs included in the RAB, the BBM framework provides strong investment incentives while still constraining wholesale price levels to a certain extent through the overall revenue cap. In the long-run, this framework should promote sustainable retail competition and allow for a wide range of differentiated retail services on the basis of price and quality, both because of the high investment incentives and the possibility of Ramsey-type pricing.

93. In comparison, the BU-LRIC framework bases price controls on a theoretically efficient operator and may not reflect the regulated entity's actual costs. This could lead to a focus

on low wholesale prices at the expense of incentives for investment in higher quality of service for example. Therefore, while the BU-LRIC approach ensures fair and effective competition at the retail level, it entails a risk of reducing retail operator's ability to offer differentiated services, based on e.g. price and quality. However, additional regulatory measures regarding QoS can be enforced in order to tackle this issue.

94. Overall, the Authority considers that while both approaches can effectively promote service-based competition, the BBM seems better suited as minimise or even eliminate incentives for the regulated firm to under-invest, therefore preserving the quality of service and the ability of downstream operators to provide innovative and high-quality services at the retail level. However, this conclusion is more likely to hold true where:

    a. the regulatory authority has developed appropriate means of limiting the risk of the regulated entity undertaking inefficient investment. A BBM approach would otherwise likely lead to higher wholesale costs, which could limit the attractiveness of entry/expansion to retail operators in such markets as fibre broadband services where the willingness to pay of a significant customer segment may prevent take-up.

    b. The regulatory authority has put in place appropriate measures such as price cap mechanisms on individual products to ensure that the pricing flexibility afforded to the regulated undertaking for various regulated services does not favour any particular operator in the retail market.

**Promotion of investment in a fibre-based NBN**

95. To encourage fibre investment, the pricing framework needs to ensure that the regulated firm has the opportunity to recover its costs while providing adequate incentives for efficient investment.

96. By providing cost recovery certainty to BNet, the BBM approach is inherently designed to incentivise infrastructure investment. Indeed, the RAB "roll forward" from one regulatory period to the next ensures the recovery of initial investments over time.

97. On the contrary, the BU-LRIC framework relies on the design of an efficient network and on price trend forecasts which might be reviewed from one regulatory period to the next, creating uncertainty regarding cost recovery over the assets' lifetime. In response to such uncertainty, BNet could opt not to invest or not respect its investment schedule in order to reduce its costs.

98. Overall, the Authority considers that the BBM approach is better suited to promote BNet investment in the NBN.

**Overall assessment**

99. In light of the considerations presented above, the Authority is of the view that the BBM is better suited than the BU-LRIC approach to eventually achieve its objectives a set out in the NTP4.

    a. Both approaches are suited to promoting efficiency although the BBM approach may require appropriate complementary tools.

b. In terms of promotion of competition, the BBM approach is better suited than the BU-LRIC framework, provided again that appropriate tools ensure the provision of efficient wholesale services and limit the level of pricing flexibility afforded to the regulated entity;

c. In terms of promotion of investment in the NBN, the BBM approach is better suited than the BU-LRIC framework, as it provides a greater level of certainty to the regulated entity that it will recover its initial costs.

100. However, the suitability of these approaches must also be assessed considering their practical feasibility, in light of the current context and the Authority's regulatory schedule.

### 2.3.2 Consideration of specific constraints in Bahrain

#### A recent and still on-going legal separation process

101. While significant milestones towards the effective legal separation of Batelco have already been achieved, the separation process is still ongoing.

102. For example, separated accounts are still to be issued by BNet and Batelco. In the absence of such documents, the Authority's understanding of the nature and value of BNet's assets base remains limited.

103. The implementation of a BBM approach would mostly rely on data provided by BNet, both in terms of the current asset base and CAPEX/OPEX forecasts, which the Authority would be not able to properly review. In other words, the Authority considers that the current asymmetry of information with BNet is too high to allow it to conduct any appropriate efficiency assessment of the cost inputs that BNet would have to provide under a BBM approach. Even when separate accounting will start being issued, it will take time before the Authority is satisfied by the reliability and consistency of the separate entities' data and that it can use it confidently for the purpose of regulating BNet's revenues.

104. In addition, Equivalence of Inputs has not been achieved yet. In the absence of such safeguard against non-discrimination, the Authority considers that the flexibility which would be allowed to BNet in terms of price setting under a BBM approach could allow BNet to engage in cross subsidisation between different services and to set wholesale prices in a way that favours Batelco's interests in the retail market, at the expense of OLOs.

105. On the contrary, the BU-LRIC approach presents the advantage of being less dependent on BNet accounting data, thus ensuring greater transparency and objectivity. Similarly, this approach also allows the Authority to determine a cost per service, therefore reducing the risk of cross subsidisation mentioned above.

106. The Authority also considers that under a BU-LRIC approach, Regulatory Accounts could still be used, once finalized, as a complementary tool to calibrate the model(s).

#### Timing considerations

107. A major obstacle at this stage to the selection of a BBM approach, regardless of any economic consideration, is the fact that this could raise inconsistencies with Article 57 of

the current Telecommunications Law, which provides that tariffs for interconnection and access services "*shall be based on forward-looking incremental costs or by benchmarking such tariffs against tariffs in comparable Telecommunications markets*"[41].

108. In addition to any potential legal matter that could arise, the adoption of a BBM pricing framework requires to define and consult on a number of methodological inputs, which entails a material risk that the BBM framework would not be ready for the coming RO reviews.

109. To illustrate this risk, the Authority highlights that in New Zealand, the project to migrate from a BU-LRIC to a BBM regulatory pricing framework started in November 2018 and is supposed to be completed in September 2020 for the methodological part. Considering the time required to build the BBM model after the issuance of the final methodology inputs, the BBM approach is likely not to be implemented before end of 2021[42].

110. In addition, in New Zealand, the structural separation of the wholesale-regulated entity Chorus from the incumbent Telecom New Zealand was achieved in 2011. In the following regulatory period, the regulator maintained a BU-LRIC approach to set wholesale prices services for the regulated entity before considering migrating towards a BBM approach.

### 2.3.3 Assessment of the most suitable option

111. In light of the above comparison, the Authority believes that from a pure economic perspective, the BBM approach would support its regulatory objectives in the long term while reflecting the latest best practices in terms of NBN pricing regulation.

112. However, the Authority considers that there are limitations to the development and use of a BBM based cost model in the short term:

    a. The absence of verified BNet separated accounts, due to the on-going implementation of the separation implementation between BNet and Batelco, particularly puts at risk the development of a BBM model, since these are critical inputs under the BBM approach.

    b. The experience of countries that adopted the BBM approach shows that it has taken a significant amount of time to be implemented.

113. For the above reasons, the Authority believes that BU-LRIC remains the best pricing framework for the forthcoming regulatory period. This is consistent with the NERF conclusions, which considered the BBM approach to be "*best suited to achieving the regulatory objectives in the long term*", but highlighted the need for a "*transitional period*" to build the conditions for an optimal implementation of the BBM[43].

114. The Authority therefore intends to implement a BU-LRIC approach for the forthcoming regulatory period for the above reasons, and consistent with best practices observed in the

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41 The Telecommunications Law Of The Kingdom Of Bahrain, Legislative Decree No. 48 Of 2002 Promulgating The Telecommunications Law

42 See Annex A – BBM implementations worldwide

43 Report on the New Telecommunications Economic Regulatory Framework for the Kingdom of Bahrain, 15 April 2018, MCD/02/18/005, paragraphs 370 to 372.

regulatory period that follows the legal separation in relevant countries. The Authority will follow the evolution in the market and remains open to considering a potential BBM framework once the conditions become more favourable for its implementation.

115. The BU-LRIC model will not only allow the Authority to overcome the limitations of the BBM model for the time being but will also ensure a smooth transition to the latter. BU-LRIC outputs can then be used by the Authority as data points to assess and eventually challenge inputs provided by BNet under a BBM framework, therefore ensuring that the initial RAB is efficiently determined.

**Q1. Do you share the Authority's view regarding the pricing framework approach?**

## Summary and assessment of consultation responses

| **In this table, the Authority provides a summary of and a response to stakeholders' comments in relation to question 1.** | |
|---|---|
| **Summary of stakeholders' submissions** | **The Authority's analysis and response** |
| **Batelco**<br>A fully updated BNet RO should be implemented as an utmost priority.<br>All services offering download speeds below 100 Mbps should be removed, as it would ensure a better end-user experience, better place Bahrain in broadband speeds international comparisons, and enhance Bahrain's ICT reputation.<br>The new BNet RO should fully reflects the post-separation structure of the telecommunications sector in Bahrain, the expectations of today's consumers, international broadband benchmarks for advanced countries, and the wider social and economic advancement of the Kingdom and its citizens.<br>The Authority should not take a firm decision yet on whether to eventually transition to a BBM: if a BU-LRIC model is to be adopted anyway, it would be opportune to assess how well it performs.<br>Determining the most suitable approach therefore requires a comprehensive review, with particular regard to the local market structure and operators in that market, though while also noting that a new BNet RO should be adopted and implemented as soon as possible. | The Authority takes note of Batelco's request for an urgent review of BNet Reference Offer. As regards the content of the BNet Reference Offer, the Authority reiterates that this will be discussed as part of a dedicated consultation.<br>The Authority will decide in due time, when conditions are met, to switch to a BBM approach, based on a thorough assessment of market conditions and of the BU-LRIC approach performance in light of the Authority's regulatory objectives.<br>The Authority has taken utmost account of the local specificities in assessing the suitability of each suggested approach. |

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| Bottom-up pricing models, with other methods or in silo, require a detailed understanding of the wider issues affecting the relevant markets. Batelco requests that the Authority, at the earliest possible stage of its model development, provide operators with sufficient time to assess and challenge the various variables, inputs, assumptions and other factors that would have a major impact on the model's outcomes and prices. This submission is made with particular regard to any BU-LRIC model as may be adopted but also applies to any other future model as may be considered. | As mentioned in section 5 of the Position Paper, the Authority intends to involve the operators at various stages of the model development process, with sufficient time for them to gather, assess and challenge all the required information. |
| BNet accounting data will not be available for some time. Since a new BNet RO is urgently needed, Batelco does not favour the option of proceeding directly to a BMM. | Noted |
| **BNet**<br>BNet agrees, in principle, with the Authority's conclusion that the BBM approach would better support the Authority's regulatory objectives in the long term, and thus should be adopted as the long-term costing approach. | Noted |
| However, BNet believes that the BBM approach is mischaracterised in certain places in the Consultation Document, leading to mistaken reasoning about the relative merits of BBM and BU-LRIC+, especially related to the objective of 'Promotion of efficiency'. | |
| The Authority seems to imply that the BBM approach only allows for an overall revenue cap across regulated services without service-specific price caps. However, BNet clarifies that it is feasible to use a BBM approach and allocate costs to specific services, setting price caps by services, if it is indeed required. | Regarding the feasibility of setting price caps per service in a BBM approach, the Authority agrees with BNet that additional mechanisms can be implemented in a BBM approach to provide for a more granular price control, as mentioned in the Draft Position Paper (see para. 87 and 106). However, the implementation of such mechanisms requires to be able to allocate properly common network costs between services, which a BU-LRIC model inherently does. In addition, the Authority underlines that there are other elements supporting the Authority's choice of BU-LRIC approach for the forthcoming regulatory cycle, as explained at para. 124 and 125 of the Draft Position Paper. |
| The nature of the incentives provided by a BBM model depend on how the WACC compares to the actual cost of financing of BNet. If the WACC is too low, then capex may be disincentivised. If the WACC is too high, then there would arguably | With respect to the incentives to overstate the cost base provided by the BBM to BNet, The Authority maintains its preliminary view, which is that as long as the WACC equals BNet's cost of financing, the BBM provides strong incentives to invest in CAPEX. |

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| be an incentive towards excessive capex. Subject to the required regulatory oversight being present and as long as the WACC is equal to its cost of financing, BNet disagrees with the claim of Paragraph 91 stating that "The guaranteed rate of return inherent in the BBM model provides very strong incentives to invest in CAPEX, as opposed to OPEX (including outsourcing), even in situations where the latter would be more efficient". | The purpose of the regulatory oversight is indeed to mitigate this incentive, as explained in paragraphs 90 and 92 of the Draft Position Paper. |
| In BNet's view, price caps are not needed; BNet does not accept that there is or will be any cross-subsidy and note that EoI will be provided according to the timetable agreed with the Authority. Should there be a need for limits to pricing flexibility, BNet views price caps on a small number of anchor services as being a pragmatic solution. | The Authority will assess the relevance of setting individual price caps or any other mechanism for individual price control in due time, when conditions for migration from a BU-LRIC model to a BBM are met. |
| BNet believes that BBM is well suited to serve the Authority's objective of promoting allocative efficiency as the revenue cap allows pricing freedom which will allow BNet to seek allocatively efficient solutions maximising welfare.<br>BNet believes that BBM is well suited to serve the Authority's objective of promoting productive efficiency as oversight of forecast capex can prevent any over-investment and by determining revenue requirement on an ex-ante basis (based on forecast opex and capex).<br>BNet strongly disagrees with the use of a BU-LRIC+ cost model during the transitional period, as suggested by the Authority.<br>- BU-LRIC+ requires 2-3 years to be fully implemented based on experience from other markets. Thus, the use of BU-LRIC+ as an interim approach relies on an unrealistic timeframe of implementation, which may not be feasible in reality (or may cause the BU-LRIC+ model to be unrealistic).<br>- The development of a bottom-up costing model is complex and require many interactions with the industry to exchange data and verify inputs/outputs including the efficiency of the network modelled. This is thus likely to cause significant costs and effort to be incurred, both from the Authority and industry's side, for the benefit of a relatively short transition period. In turn, such costs are | The Authority does not deny the merits of the BBM model, which are well detailed in the Consultation and which have led the Authority to consider the BBM to be best suited in the long term.<br>However, the Authority has also clearly explained why the implementation of a BBM was not appropriate in the short term (see section 2.3.2). Therefore, the Authority needs to rely on an interim approach.<br>Based on this statement, the choice of the BU-LRIC approach present significant benefits, as the Authority intends to build on its BU-LRIC model to assess the efficiency of the initial RAB and further CAPEX additions, once the BBM approach is implemented. In this view, the Authority considers the interim BU-LRIC approach as a prerequisite to the BBM implementation. The BU-LRIC model could also be used for any competition investigation that could arise.<br>Consequently:<br>- The Authority disagrees with the assumption that having two different approaches would require a shift of priorities over time, as the BU-LRIC will ensure a smooth transition towards BBM;<br>- While the Authority acknowledges that the implementation of a BU-LRIC approach will require costs and efforts from both the Authority and the industry, such cost should not be measured only against the transition period duration (which is still unknown, and will mostly depend on BNet ability to provide robust |

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| likely to be passed on to the consumers in the form of higher wholesale and retail prices.<br>- The development of two very different approaches, BU-LRIC+ and BBM, which do not directly support each other, one after the other, would require the Authority to shift priorities over time, risking its ability to concentrate on the long-term preferred choice. Instead, BNet believes that it would be more beneficial for the industry to focus its attention on implementing the preferred long-term approach from the early stages of the process<br>BNet also disagrees with the Authority's stance that the "BU-LRIC model will not only allow the Authority to overcome the limitations of the BBM model for the time being but will also ensure a smooth transition to the latter". A shift from BU-LRIC+ to BBM could induce step changes to the prices.<br><br>BNet strongly recommends the use of a forward-looking fully-allocated cost (FAC) model using forecast demand and costs for the short to medium term, as the most appropriate approach during the interim period – until the long-term approach is implemented. BNet is implementing a 'FAC' model and is suggesting that this same model be used as part of the pricing framework, for the forthcoming regulatory period.<br>If the Authority wishes to stick rigidly to the current wording of Article 57 for the interim pricing framework, then BNet considers that the use of price benchmarking is a superior approach because of its much shorter implementation timeline and lower cost compared to the BU-LRIC+ approach.<br><br>**Ongoing evolution of the current legal framework**<br>BNet highlights that Art. 57 and 58 of the Telecommunications Law, which regulate the pricing framework for BNet's fibre wholesale services, have not been updated in light of the new structure in the market arising from the New Economic Regulatory Framework (NERF) and the legal/functional separation of Batelco. BNet believes that the legal framework needs to be carefully revisited, in particular in order to cater | separated accounts), but also taking into account its benefits regarding the BBM implementation.<br>- The Authority does not believe that the incremental cost (if any) of choosing a BU-LRIC approach rather than any other interim approach should result in a significant increase in wholesale/retail prices, should it be passed on to customers.<br>BU-LRIC models can be implemented and operational for price control purposes in a much more limited timeframe than the 2 to 3 years mentioned by BNet. In other countries, a much-reduced period was observed (less than one year). The total timeframe for a full BU-LRIC approach implementation mainly depends on local operational processes which vary from one country to another, such as the time granted to operators to provide the requested data, the number of public consultations planned and the time given to stakeholders to respond.<br><br>As regards to BNet recommendation to use a FAC model, the Authority has clearly explained in the consultation why such approach cannot be retained, in particular:<br>- The absence of verified BNet separated accounts;<br>- The need for the Authority to cope with existing asymmetry which currently prevent from any efficient assessment of BNet data;<br>Finally, the Authority underlines that the BBM approach will include an efficiency assessment and might rely on different CAPEX annualization methods than the BU-LRIC. Therefore, it is hardly predictable to which extent the migration from a BU-LRIC to a BBM will induce an increase or a decrease in prices. In any case, if significant price evolution were to appear, it could be tackled through ad hoc glide paths mechanisms<br><br>**Regarding the legal and regulatory framework**<br>The need to adjust the legal framework in order to implement a BBM approach was identified by the Authority in the draft Position Paper (para. 119). This issue will be handled by the Authority in due time.<br>The Authority does not consider that there was a departure from the strict application of the sequential regulatory process.<br>The purpose of this Position Paper is to present the Authority's opinion on how it will handle the review of future BNet Reference Offer from a pricing |

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| for the adoption of a BBM approach as it is the long-term preferred approach.<br><br>BNet notes that the Authority has temporarily departed from a strict and sequential application of the ongoing legal framework, as the Authority has not established that BNet was a dominant undertaking before imposing price control, and the Authority is now seeking to impose cost-based price control remedies before it has established that BNet's tariffs are not fair, not reasonable or discriminatory.<br><br>The transition requires a broad rethinking of the regulatory framework rather than the successive, possibly incoherent, updates to old regulation, no longer fit for purpose. Such a coherent approach focused on the long-term objectives will naturally ensure that the Authority defines and implements a consistent legal and regulatory framework with a concerted and smooth transition. | perspective, as regards services which will be identified as requiring a cost orientation obligation (as part of the market review process). The present Position Paper does not draw any preliminary conclusion on the fair, reasonable and non-discriminatory nature of the ROs tariffs.<br><br>This Position Paper does therefore not specify which markets should be regulated, and which services should be cost oriented, as this will be the outcome of the market review process. The list of services mentioned in the table at para. 128 of the draft Position Paper refers to the services included in the current BNet RO, for information purpose only. The Authority's view is that the scope of the model should include all services provided by BNet, without drawing any conclusion on the outcome of the market review process.<br><br>Finally, the Authority would like to outline that the Position Paper was designed precisely to provide a consistent approach to tariffs regulation to cope with both the Authority's long-term objectives and its short-term constraints. |
| **BNet's continuous efforts for service innovation will require a certain degree of service and pricing flexibility**<br><br>Fostering innovation is a key objective as mentioned in the NERF. To meet this policy objective, BNet's service portfolio and thus its reference offer (RO) needs to evolve continuously. For example, BNet needs to offer higher-bandwidth services to adapt to changing market demand. The Authority should not lose sight of this overarching long-term objective and be overly focused on regulating tariffs through the pricing framework.<br><br>BNet thus requests the Authority to permit a degree of flexibility both in terms of service portfolio evolution (by easing the process for updating the RO) as well as pricing. This will ensure that BNet remains agile, stays relevant to the needs of the retail market, and is able to maximise allocative efficiency and consumer welfare. Overly narrow regulatory constraints setting the prices of specific services will not reflect end users' needs as closely as can be achieved by BNet. | **Regarding the need for flexibility**<br><br>The Authority recognizes the need for a certain degree of flexibility for BNet in order to adapt to changing market demand, in relation to certain products or speeds, subject to some conditions (such as notice period, non-discrimination).<br><br>As regards the flexibility in terms of services to include in the RO, this is not part of the scope covered in the Consultation but rather to be discussed as part of BNet forthcoming Reference Offer review.<br><br>As regards the pricing flexibility for regulated services, the Authority considers that such flexibility should remain limited, in light of the current asymmetry of information, and in the absence of separated accounts. The level of flexibility to be granted to BNet shall be discussed as part of the Reference Offer review, in the determination of appropriate price control remedies. |

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| **The fibre pricing framework needs to be coordinated closely with the copper pricing framework as well as the market review**<br>The fibre pricing framework needs to be coordinated closely with other concurrent processes, such as the copper pricing framework as well as the market review. It is important to define the pricing framework for copper at the earliest opportunity. The copper pricing framework should be simple (as copper is a technology in decline), should ideally be consistent with the framework for fibre (especially if the Authority proposes modelling copper) and should incentivise migration from copper to fibre, in line with the Authority's objective.<br>Additionally, consistency and timeliness will require that the market review and fibre pricing framework processes are coordinated closely. | **Regarding the coordination between fibre and copper pricing framework**<br>The Authority is of the view that the pricing framework described in the Draft Position Paper applies to both fibre and copper wholesale access services.<br>However, the Authority might take particular modelling decisions as regards copper, in order to ensure a smooth transition towards fibre and a smooth copper withdrawal. These options will be discussed as part of a dedicated public consultation. |
| **Zain**<br><br>**Considerations regarding a BBM implementation**<br>There are critical challenges to the implementation of a BBM which are still prevalent, which will impede its successful introduction:<br>**Regulatory Asset Base:** as noted by the Authority, the separation process between Batelco and BNet is still ongoing, leading to no certainty concerning an optimised Regulatory Asset Base on which to base the BBM model.<br>- Accelerated steps are required to facilitate separation between Batelco and BNet to establish an appropriate RAB.<br>- A thorough audit of the RAB must be undertaken by an independent third-party and in consultation with the industry to ensure that the asset base transferred to BNet does not include assets that are unnecessary for the performance of its role.<br>**Rate of Return:** The Authority last undertook cost-of-capital analysis in 2013, market conditions have significantly changed over the last seven years, and BNet's infrastructure and asset profile necessitate a recalculation of appropriate rates of return<br>**Completeness of Product Set:** The provision of dark fibre as an access product is a necessary to support 5G roll out, and enable operators to backhaul their respective international IP traffic from the drop-off point of BNet to the POP of the | The Authority overall agrees with the challenges raised by Zain, which were identified in the Consultation as some reasons for the choice of an interim BU-LRIC approach before the implementation of the BBM approach, when conditions are more favourable, as stated at para. 126 of the draft Position Paper.<br>The Authority recalls that the transition towards a BBM approach will only happen when all conditions to build a proper BBM model are met. This includes, in particular, a revision of the Telecom Law and the finalization of the separation process with valid separated accounts.<br>As regards the challenges raised by Zain, in more details:<br>- **Regulatory Asset Base:** The RAB valuation is indeed a key step of the BBM, especially considering the lock in of the RAB in time. Appropriate RAB setting and valuation shall mainly rely on the finalized separated account.<br>- **Rate of Return:** The Authority is of the view that the WACC update is not a BBM related issue as it would impact any pricing approach, including BU-LRIC. That said, the update of the WACC and its appropriate value is out of scope of the present consultation. Any update will be subject to a dedicated decision from the Authority. |

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| OLOs. The introduction of dark fibre has been identified in the recently published Fifth National Telecom Plan (NTP-5) as a possible remedy.<br><br>**Equivalence of Inputs:** The early introduction of BBM, without having achieved the equivalence of inputs, would be problematic.<br><br>There are also some externalities which the Authority has not considered:<br><br>**cross subsidisation of products and the implications on 5G**: In the product set offered by BNet, MBS is an inelastic-demand product, while WBS (used to provide FTTH) is an elastic-demand product. BNet may elect to set a higher charge than necessary for MBS product vs WBS product in a bid to maximise allocative efficiency (leading to cross-subsidise WBS with MBS). Implications are critical for MNOs, who could face high OPEX while FTTH services would be reduced. This could put at risk the take-up of 5G services (positioned as fibre-replacement products for speeds less than 100Mb/s) if customers are faced with similar pricing for FTTH and 5G, given the perceived superiority of fibre-based broadband services relative to the nascent 5G.Ultimately, 5G operators would be constrained to offer 5G services at discounted prices putting at risk any future 5G investments, including spectrum acquisitions and roll-out (millimetre wave, mid-band) contemplated by the Authority, with consequential loss of revenue to the state treasury.<br><br>**Information Asymmetry Between the Authority and BNet on RAB**: It is imperative that over-recovery (and under-recovery) of investments be avoided and that BNet's infrastructure acquisition plans and deployment are indeed efficient. It is necessary for the Authority to be fully aware of and cognizant with BNet's planned infrastructure roll-out, network design approaches and to be in a position to challenge the introduction of unnecessary and inefficient systems. This activity is an arduous task. It is currently unclear how the Authority intends to approach this, nor is it clear on the level of engagement of the industry Equivalence Compliance and Technical Committee (ECTC) or the involvement of external third-party support.<br><br>**Quality Standards**: Within the context of the use of BBM, one way a regulated fibre supplier may seek to cut its costs and increase profitability is to | - **Completeness of product set:** The Authority intends to include all BNet services in the cost model, as there is no final decision on which services will be cost oriented and also in order to capture all economies of scale and scope. The inclusion of VULA and dark fibre services in the scope of the model should rather be discussed as part of a consultation on BNet Reference Offer review than in the present consultation.<br><br>As regards the externalities raised by Zain:<br><br>- **Cross subsidisation:** The Authority has raised the risk of cross subsidization between products in a BBM approach, which was one of the reasons for the choice of an interim BU-LRIC approach (para. 116 of the draft Position Paper).<br>- **Information Asymmetry:** As mentioned at para. 115 of the draft Position Paper, asymmetry of information is a concern for the Authority. The BU-LRIC model developed for the interim framework, along with proper separated accounts, will enable the Authority to cope with this issue.<br>- **Quality Standards:** The Authority does not consider the QoS issue as specifically related to the BBM approach. In all cases, the Authority will continue monitoring BNet services QoS and take appropriate actions if deemed necessary.<br>- **Failure to meet revenue cap due to lack of market demand**: If the revenue cap is not met, BNet could indeed provide discounted services to promote the use of its network. Whether this discount would apply to FTTH related wholesale services or to other services (Mobile-related wholesale services for example) raises the question of price demand elasticity and which services would better react to a discount policy. Therefore, this issue is the same as the cross subsidization discussed above. Besides, the Authority notes that rather than discounting its services to encourage take up, BNet could also raise its prices on some services to recover its costs. Again, the underlying issue is the cross subsidization between services. |

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| decrease quality of service—for example, by reducing maintenance costs which may lead to more frequent outages. It is therefore vital for the Authority to set price-quality paths which also include quality standards.<br><br>**Failure to meet revenue cap due to lack of market demand:** Such a situation may create an opportunity for BNet to undertake actions (e.g. heavy discounting of one product or higher pricing on another product) in bid to boost revenues but which may harm the market in the long-term. For example, very substantial promotional discount would accelerate the take-up of FTTH services; but by the very nature of fibre services which have a long customer lock-in period, it may prevent the growth of other services such as 5G. | |
| **Considerations on BU-LRIC adoption**<br><br>The absence of verified BNet separated accounts represents a key concern as the deduction of an accurate Regulatory Asset Base is fundamental.<br><br>With the implementation of a BU-LRIC model with top-down reconciliation, the lack of separated accounts would prove problematic.<br><br>With the scorched node approach, BNet's topology would be the basis of the network dimensioning in a BU-LRIC model. However, as the separation of BNet and Batelco is still ongoing, the asymmetry of information still exists. So, there is a probability that there will be over dimensioning, leading to high unit costs.<br><br>The Authority could elect to build a scorched earth model, with unit costs based on a fully efficient hypothetical operator's network, in order to reduce the risk of over-optimising the modelled network that will underestimate costs and hinder future investments.<br><br>The Authority could customise the current scorched-node BU-LRIC for fixed services model with most inefficiencies eliminated on a best endeavours' basis.<br><br>BBM can be defined as a hybrid HCA/CCA Fully Allocated Model ("FAC"). Consequently, the migration from BU-LRIC to BBM will undoubtedly increase the wholesale prices that will disrupt access seekers business models.<br><br>In summary, Zain advocates for the use of BBM as the primary price-setting mechanism but with continued use of a BU-LRIC model with top-down reconciliation to serve as a check on the outputs | The Authority agrees with the critical nature of the need for an accurate Regulatory Asset Base.<br><br>The details of the implementation of the BU-LRIC model will be subject to a dedicated consultation. Yet, the Authority wishes to underline that the reconciliation can be carried out at various levels: on the accounts, but also at an operational level (in terms of assets inventory). In any case, absent sufficient data regarding BNet accounts and/or asset base, the Authority can also rely on benchmark data to calibrate its BU model, as well as on Batelco accounts and inventory data.<br><br>In addition, the Authority underlines that the existing model for setting wholesale prices was developed in 2010 and might require a significant update not only in terms of inputs (geographic inputs, cost inputs), but also in terms of engineering rules (network architecture, network equipment) considered in the inventory assessment.<br><br>As regards the risk of price increase during the migration to BBM, this issue shall be discussed in due time when the Authority considers that conditions are met to migrate to a BBM approach. Nevertheless, the Authority considers that the BBM approach provides for an efficiency assessment and might rely on different CAPEX annualization methods. Therefore, outcomes of a BBM approach compared to a BU-LRIC are hardly predictable at this stage.<br><br>The Authority agrees with Zain conclusion regarding the benefits of a BBM with continued use of a BU- |

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| produced by BBM, and for the setting of a glide-path if BBM based unit costs are higher or lower than BU-LRIC based unit costs.<br>As it will take some time to complete the BBM model, the transitional BU-LRIC model must be robust as it will likely be in use for a few years. | LRIC model, as well as the setting of a glide path if necessary. |
| **STC**<br>STC Bahrain agrees with the Authority that BU-LRIC models are still considered worldwide as an essential tool to support robust and evidence-based regulation. STC Bahrain notes that the legal separation process is ongoing and that key milestones for establishment of a single national broadband network remain to be met. STC Bahrain expects there are still multiple tasks to be completed, BNet costing methodology being one of many parts.<br>The last RO assessment greatly favoured BNet. This does not only affect downstream service providers, but it deviates from the tried and tested FRAND assessment approach underpinned by Article 57 Telecommunications Law.<br>STC Bahrain notes that in respect of available accounting information generated by Batelco and BNet under the revised accounting separation regulation, there is a costing "black-out" period from 2019 onwards until the asset register and split is resolved, which will require significant ongoing resources and time. On the premise that telecommunications costs fall over time, such a delay suits the very people entrusted with producing revised accounts.<br>Until the information gap is resolved, the TRA should use interim pricing approaches with the latest accounting information available, or in the absence of credible and robust information, benchmarks, as is consistent with Article 57 Telecommunications Law.<br>When all the conditions are met (Complete NBN implementation, benefits outweighing the costs, the separation process BNet/Batelco is complete, a more settled asset base, more persuasive evidence that BBM is more suited than BU-LRIC), the transition to BBM could be considered. | While the Authority agrees that the last BNet Reference Offer prices assessment was based on a business case approach, this assessment was made in the view of ensuring fair, effective and sustainable downstream competition, while supporting efficient investment.<br>The Authority is aware that the separation process is still in progress which is one of the reasons for which the Authority suggests to rely on a BU-LRIC+ approach until conditions are met to switch to a BBM. The Authority considers that the proposed approach would limit any incentive of BNet, as suggested by STC, to delay the production of its revised accounts as the proposed approach does not rely on these accounts but on demand data and engineering rules which can be cross-checked with international standard data.<br>As regards the 'black out' period mentioned by STC, the Authority recalls that it requested Batelco to include all BNet services cost stack as part of Accounting Procedure Manual and regulatory accounts to avoid such issue. |
| **AWS**<br>AWS considers that the BBM is and will continue to be inappropriate approach for the pricing of access and interconnection products in Bahrain for several reasons: it is not compliant with the | While the Authority agrees with the observation that BBM is not suited yet in light of the current context, the Authority maintains that in the long term, when all |

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| Telecom Law, it does not support competition and efficiency.<br>The BBM approach is not based on forward-looking incremental costs and, as such, is conflicting with the Telecom Law.<br>BBM does not support competition as it encourages discriminatory pricing of identical products in the absence of safeguards. BBM allows flexibility in the pricing of regulated products, which has permitted operators in Bahrain to sell identical connectivity products with price differences of 100%<br>The Equivalence of Inputs, once established, will ensure that all downstream retail entities have access to equivalent inputs from the National Broadband Network. EoI will prevent cross subsidies between inputs, which could lead to discrimination<br>BBM does not support efficiency as it encourages Capex investments that may not be based on the needs and the demand in the market, even more so if the rate of return allowed is above the WACC – which we understand has been the case so far. It also provides an incentive to invest in network assets that are more expensive rather than those that are the best suited.<br>Regarding efficiency, AWS agrees that the issue may be addressed at least partially with regulatory scrutiny, but disagrees with the TRA's appraisal of BBM and BU-LRIC as two equivalent approaches. Necessary regulatory scrutiny would require the TRA to incorporate a BU-LRIC methodology in addition to the BBM model which would be a highly subjective, complex, and time-consuming exercise. | conditions are met, BBM is the best approach in light of the Authorities objectives.<br>The Authority is aware of the conflict issue with the Telecom Law in the Position Paper: amending the Telecom Law is one of the conditions to be met to switch to a BBM approach. However, the Authority considers that this is a legal issue and is not informative about the suitability (current or future) of the BBM as a relevant pricing framework in Bahrain.<br>The Authority does not share AWS view that the BBM allows to discriminate between identical products. The BBM provides the flexibility to set different prices to distinct products. If similar technical products have been distinguished in the RO as distinct products, then it provides indeed a possibility to cross subsidy. However, this would be an issue with the way products are defined in the RO, not an issue of price discrimination between identical products. The issue of the products that the RO should comprise will be further discussed in a dedicated consultation on BNet RO.<br>The Authorities agrees that BBM entails some risks of over investments, which is the reason why the Authority considered that appropriate tools should complement the BBM, when conditions for migration towards such approach are met. The Authority agrees that the BU-LRIC model could be one of such tools. As mentioned in the Position Paper, one benefit of implementing a BU-LRIC approach for the forthcoming period is to build such tool which will remain available when switching to a BBM (when other conditions are met), therefore allowing a smooth transition. |

### The Authority's final decision

The Authority maintains its initial view that the BBM approach is better suited to support its regulatory objectives in the long term, while the BU-LRIC remains the best pricing framework for the forthcoming regulatory period.

# 3 Services to be modelled and implications on cost model development

## 3.1 Services to be modelled

116. In accordance with the objectives of the NTP4, the wholesale services listed in Table 1 below are designed to enable all OLOs and BRE to purchase access to any connectivity link (be it access, backhaul, aggregation or transmission link) within the Kingdom of Bahrain, for the provision of both fixed and mobile retail services to their end customers.

**Table 1: Wholesale services included in BNet RO**

| Services |
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| Mobile Backhaul Service (MBS) |
| Data Service (DS) |
| Wholesale Data Connection (WDC) |
| Wholesale Bitstream Service (WBS) |
| Optical Wavelength Service (OWS) |
| Fibre Fronthaul Service (FFS) |
| Facilities access services (FAS) |
| Unbundled Metallic Path Backhaul (UMPB) |

Source: The Authority

117. In other words, all Licensed Operators should be able to connect their own active equipment to the BNet's network regardless of the actual location of these equipment, and to reach any required national network termination point, be it a fixed residential customer, a fixed business customer or a wireless site.

118. The purpose of the cost modelling exercise is to calculate costs for a given set of regulated services. Therefore, the model should include at least all regulated services for which a cost orientation obligation is imposed by the Authority. However, the Authority is currently proceeding to a review of its markets, to take into account market changes, in light of the recent separation of Batelco and the creation of BNet. Since the final outcome of the reviews are not yet known, the authority will decide on the services to be cost oriented once the market review is completed, as part of the RO review.

119. This approach also allows to capture the appropriate level of economies of scale and economies of scope of providing various services on a single network infrastructure, in line with international best practices.

120. This may include services not yet commercially launched by BNet at the beginning of the regulation period, but for which technical specifications (e.g. routing) are already known at the time of the modelling. This will require appropriate demand forecasts to be performed.

121. The Authority however reserves the right to adjust the model when needed if new services making use of the network are launched and significantly change the economic fundamentals of the network.

## 3.2 Implications for the cost models to be developed

122. From a costing perspective, the choice of a BU-LRIC approach implies dimensioning BNet's network assets based on the respective demand for the different services. To this end, and in light of the different purpose of the wholesale services listed above, the Authority considers that two distinct cost models should be developed: a 'fixed access network' cost model and a 'fixed core network' cost model.

123. For the sake of clarity, the following terminology is further adopted in this position paper:

    a. The fixed access network refers to the part of BNet's network which connects end users (residential, businesses and wireless sites) to BNet local exchanges;

    b. The fixed core network refers to the part of BNet's network, which starts from BNet's OLTs/Transmission access devices in its local exchanges and connect all OLOs' and BRE's respective core network equipment (including fixed or mobile core equipment).

124. The development of distinct cost models for fixed access and fixed core services will ensure that the wholesale services will be efficiently costed based on appropriate capacity and coverage needs arising from both fixed and mobile retail services.

**Q2. Do you share the Authority's view regarding the scope of services to be modelled and regarding the development of two distinct cost models for fixed access and fixed core network services?**

## Summary and assessment of consultation responses

| **In this table, the Authority provides a summary of and a response to stakeholders' comments in relation to question 2.** | |
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| **Summary of stakeholders' submissions** | **The Authority's analysis and responses** |
| **Batelco**<br>Batelco agrees on the scope of services to be modelled. Sufficient flexibility ought to be built into any wholesale pricing model so that it can adjust to any services that are launched or otherwise adjust to any significant changes in the technical or economic fundamentals of the network infrastructure. | Noted |
| **BNet**<br>BNet would like to highlight the importance of the market having full visibility of the set of services that will be regulated at an early stage of this process. Such visibility would allow BNet to have | While the Authority understands the request to have an early visibility of which services will be regulated or not, the Authority notes that this is a distinct and independent issue from the one at stake here, since |

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| better clarity in terms of the potential impact on its service set and overall revenue. Also, this will allow the downstream market to be able to plan for potential changes. | the Authority intends to include all BNet services in the cost model. |
| The Authority has not provided any clarity on the detail of the services to be modelled, which is important (e.g. whether the model is calculating the cost of an entire service group, or for specific service speeds). | The model will allow to calculate a cost per service. The level of flexibility to be granted to BNet shall be discussed as part of the BNet Reference Offer review, in the determination of appropriate price control remedies. |
| BNet agrees with the implementation of two distinct models (access, core) if a BU-LRIC+ model is implemented. For BBM and FAC approaches, especially those with an overall revenue cap, it would be reasonable and consistent with best practice to develop a single cost model. | The methodology for distributing costs within a service group will be discussed in a distinct consultation, once the Authority has issued its final decision on the pricing approach to be considered in the forthcoming regulatory period. |
| **STC** | |
| The omission of a standard dark fibre product leaves a significant bottleneck in the supply chain for ultrafast broadband service and poses significant issue for mobile backhaul, given the practical limitations on operators to provide their own fibre. | As mentioned in the consultation, the Authority intends to include all BNet services in the cost model, as there is no final decision on which services will be cost oriented and also in order to capture all economies of scale and scope. |
| STC Bahrain contend that the inclusion of VULA would enable operators to differentiate their retail products with consequential benefit to consumers in Bahrain | Therefore, STC's request to include VULA and dark fibre services in the scope of the model should rather be discussed within the consultation on BNet Reference Offer review than in the present consultation. |
| The inclusion of dark fibre and VULA services would promote investment in infrastructure, promote competition, contribute in cost reduction and in the release of the 5G potential. | In addition, and as stated in the draft Position Paper, the Authority reserves its right to adjust the model when needed if new services making use of the network are launched. Therefore, the Authority will ensure that the model is flexible enough to add any new regulated service in the future. |
| **Zain** | |
| The range of services should include dark fibre to introduce some flexibility for the operators to design their backhaul with the right scalable capacity. | As mentioned in the consultation, the Authority intends to include all BNet services in the cost model, as there is no final decision on which services will be cost oriented and also in order to capture all economies of scale and scope. |
| The scope should include virtual unbundled local access "VULA" products. | Therefore, Zain's request to include VULA and dark fibre services in the scope of the model should rather be discussed as part of a consultation on BNet RO review than in the present consultation. |
| The provision of these products (i.e. Dark fibre and VULA) on a regulated basis is necessary as operators expand their 5G networks. | In addition, and as stated in the draft Position Paper, the Authority reserves its right to adjust the model when needed if new services making use of the network are launched. Therefore, the Authority will ensure that the model is flexible enough to add any new regulated service in the future. |

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| **AWS**<br>AWS shares the Authority's view. | Noted |

### The Authority's final decision

The Authority maintains its initial view to model all services provided by BNet in its cost model, and to develop two distinct cost models for fixed access and fixed core network services.

The Authority takes note of the request from various respondents for specific wholesale services such as dark fibre or VULA. This topic will be addressed separately by the Authority.

# 4 Use of the models for pricing purposes

## 4.1 Cost recovery

125. Cost recovery is a key principle in a costing methodology. It ensures that operators can cover costs that are efficiently incurred and receive an appropriate return on invested capital.

126. From a pricing perspective, the costs incurred for a given service shall be recovered from the effective demand for this service.

127. In particular, the model shall identify the assets that are not to be recovered by the service recurrent charge (if any). For instance, costs incurred at line activation by the access seeker or connections fees paid by the end-user (upfront payments) shall be excluded from the cost base or be compensated by a corresponding charge.

128. In addition, the model shall identify the share of indirect and common costs that are to be recovered from regulated services.

**Q3. Do you share the Authority's view regarding the cost recovery principle?**

### Summary and assessment of consultation responses

| **In this table, the Authority provides a summary of and a response to stakeholders' comments in relation to question 3** | |
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| **Summary of stakeholders' submissions** | **The Authority's analysis and responses** |
| **Batelco**<br>Batelco agrees with the Authority's overall view that cost recovery is a key principle of any costing | Noted |

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| methodology as it ensures that operators can recover costs that are efficiently incurred and receive an appropriate return on invested capital. | |
| **BNet**<br><br>International best practices follow the capital asset pricing model (CAPM) methodology to calculate an appropriate rate of return for cost recovery, based on the WACC of the regulated entity. We recommend that the same methodology should be adopted for this framework.<br><br>BNet notes that if the WACC determined by the Authority (regulatory WACC) is lower than the actual cost of financing of BNet (company WACC), then this will allow no incentive for BNet to invest in network and service innovation. It is thus critical for the Authority and BNet to align on the WACC used in the pricing framework in a timely manner.<br><br>The Authority should consider the inclusion of a risk premium to take into account the additional risk (both systematic and non-systematic risk) of investment in fibre networks.<br><br>In Paragraph 138 of the Consultation Document, the Authority states that "From a pricing perspective, the costs incurred for a given service shall be recovered from the effective demand for this service". BNet notes that the pricing of new services must allow for demand for the service to grow, which implies that pricing should not necessarily reflect the unit cost of the initial years (when unit costs will be very high because of initial low demand/take-up). Similar concerns apply to services where demand is falling (such as copper services).<br><br>One possible approach to deal with misalignment between cost profile and demand profile within models is to use non-linear depreciation methods, such as economic depreciation or the use of demand-trend-adjusted tilted annuities.<br><br>In the case where the Authority decides to implement BU-LRIC+, we therefore urge the Authority to conduct additional validation to verify that approximations and assumptions made in the construction of the bottom-up model are aligned with reality:<br><br>a. the network design/topology assumptions should not 'cut corners' from real deployments (comparing with BNet's assets on the ground) | The Authority shares BNet's opinion on the importance of setting a WACC that reflects its cost of financing. However, the principles for the WACC determination will be subject to a dedicated consultation.<br><br>Some CAPEX annualization methods rely on costs and demand forecasts to ensure unit cost stability overtime, and are particularly suited to emerging products (economic depreciation or adjusted tilted annuity, as mentioned by BNet). However, the Authority intends to discuss the pricing approach implementation principle in a dedicated consultation.<br><br>The Authority shares BNet's opinion on the importance of setting assumptions and engineering rules in the bottom up model that do not lead to a significant departure from BNet's real data (in particular in terms of asset inventory, as accounts are still to be validated), except if such departure is based on duly justified efficiency adjustment.<br><br>The Authority intends to discuss the pricing approach implementation principle in a dedicated consultation. |

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| b. the asset quantities and unit costs should be in line with the actual network and realistic price points in the Kingdom of Bahrain.<br>Since, at this point in time, BNet only provides regulated services, it follows that all (100%) of BNet's indirect and common costs should be recovered from the regulated services.<br>BNet believes that it should be allowed pricing flexibility as regards the allocation of common costs to service groups, because a simplistic approach to common cost allocation (without taking retail price gradient or retail demand elasticity into account) will be detrimental to consumer welfare in the Kingdom of Bahrain. | The Authority does not deny the merits of granting BNet a certain flexibility to set distinct prices within product groups, for example through the allocation of different shares of common costs to different products within a product group, to reflect particular demand characteristics at the retail level. Such flexibility shall be discussed during the BNet Reference Offer review. |
| **STC**<br>STC Bahrain supports cost recovery as a principle, providing the costs are efficiently incurred. However, the return on capital employed should be within a reasonable range. A WACC of 9,5% for a NBN is generous and excessive. | The WACC determination will be addressed by the Authority in a separate decision. |
| **Zain**<br>It is imperative that alongside the revenue cap instituted for cost recovery, precise controls need to be put in place to avoid cross-subsidisation of a set of products with elastic demand through higher pricing of products with inelastic demand (Ramsey pricing). Cross-subsidisation could have unintended consequences in a parallel market such as 5G retail services. | The Authority has raised the risk of cross subsidization between products in a BBM approach, and has identified the need for additional mechanisms to avoid such possibility. When a BBM approach will be implemented, the Authority will pay utmost attention to this concern. |
| **AWS**<br>AWS shares the Authority's view. | Noted. |

### The Authority's final decision

The Authority maintains its initial view regarding cost recovery principles, and in particular regarding the allocation of a share of indirect and common costs to each service. The Authority notes that some flexibility could be granted to BNet in this allocation, within defined product groups. This shall be further discussed as part of the BNet Reference Offer review.

## 4.2 Setting regulated prices

129. This section addresses how the model will be used by the Authority to set regulated prices, along with BNet regulated accounts.

**Charging units**

130. Several charging bases can be used to price a given service. These charging units may include:

    a. BD per event;

    b. BD per packet;

    c. BD per kbps (capacity-based charging) etc.

131. For each service, the charging basis must be selected in order to provide the different stakeholders with the appropriate incentives. It is also preferable for the charging basis to be consistent with the cost drivers of the service. For instance, if internet access was priced on a 'per minute' basis, it would not be in line with cost drivers (capacity). In addition, the charging basis has to be compliant with the applicable legal and regulatory provisions.

132. To enable each service to be priced based on the most appropriate charging basis, the architecture of the model will be sufficiently flexible to calculate tariffs based on different charging bases.

133. The default charging basis implemented in the cost model will reflect current market practices. However, if the charging basis were to change in the future, conversion factors would be used.

**Q4. Do you share the Authority's opinion regarding the charging unit's aspect of the cost model?**

## Summary and assessment of consultation responses

| **In this table, the Authority provides a summary of and a response to stakeholders' comments in relation to question 4.** | |
|---|---|
| **Summary of stakeholders' submissions** | **The Authority's analysis and responses** |
| **Batelco**<br>Batelco does not object to any of the Authority's views or intentions on the charging unit's aspects. | Noted. |
| **BNet**<br>in a fixed network, different parts of the network have very different cost drivers. In many cases, a specific service may not have one cost driver only or may not increase linearly with one cost driver only. Therefore, a certain degree of flexibility should be allowed in the way charging units affect the setting of prices, especially of specific services within a service group (e.g. different | The Authority agrees with BNet that services may have several cost drivers. The BU-LRIC model inherently takes into account the different cost drivers associated with the provision of each service.<br>The issue of the pricing flexibility to be granted to BNet within certain service groups is therefore not directly linked with the number and characteristic of cost drivers, but rather with the characteristics of the demand for such services. |

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| speed variations from the same service group), or in the definition of the charging units themselves. This will allow to reflect the reality of the retail price gradients. Limiting BNet's flexibility in setting wholesale prices may distort the market and adversely affect consumer welfare. | As previously mentioned, this level of flexibility will be discussed separately. |
| **STC**<br>The charging unit revision appears appropriate bearing in mind the product sets STC Bahrain expects BNet to provide. | Noted. |
| **Zain**<br>Zain shares the Authority's opinion regarding the charging unit's aspect of the cost model, but considers there are other issues to be dealt with beyond charging units, especially: identification of appropriate cost drivers per network equipment; routing factors measured in different units; various forms of facilities access (space, energy, ducts). | The concern raised by Zain are indeed at the core of any Bottom-Up costing approach. They will be taken into account in the BU-LRIC approach the Authority intends to follow, and discussed in the modelling principles document that the Authority will issue and submit to consultation. |
| **AWS**<br>AWS shares the Authority's view. | Noted. |

## The Authority's final decision

The Authority maintains its initial view to price each service based on the most appropriate charging basis and to design a cost model with an architecture sufficiently flexible to calculate tariffs based on different charging bases to reflect the most relevant cost drivers.

**Multi-year price control**

134. The Authority determines obligations on cost orientation and price regulation in regulatory decisions; including the prices BNet has to comply with. The basis for the published prices in the regulatory decisions are derived from cost outputs generated by the cost model and could be per year or for multi-year periods.

**Q5. Do you share the Authority's opinion that the model shall generate cost outputs for the determined pricing period, which may be one or several years and that the cost outputs generated by the model should be the basis for the prices of regulated products as determined by the regulatory decisions?**

## Summary and assessment of consultation responses

| **In this table, the Authority provides a summary of and a response to stakeholders' comments in relation to question 5.** | |
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| **Summary of stakeholders' submissions** | **The Authority's analysis and responses** |
| **Batelco**<br>As to whether the duration of the pricing period should be one or several years, Batelco has no view at this time as this decision would, amongst other factors, depend on the calibration of the model being used against the actual network infrastructure and the model's ability to change variables over any given period of time for changes in technology and infrastructure. | Noted. |
| **BNet**<br>From BNet's perspective, there should not be an over-simplistic or direct relationship between the output costs of such models and the regulated prices. This could lead to higher wholesale prices for low speeds. Thus, BNet requests the Authority to allow certain pricing flexibility to BNet to prevent such situations and to allow wholesale prices for services to reflect the retail price gradient and retail demand elasticity.<br>BNet faces competition from other technologies – copper and fixed-wireless access (FWA) services. If wholesale prices are set purely on the basis of outputs from the cost model and are disconnected from retail market realities, then fibre-based retail services may not be able to compete well with competing technologies, e.g. low-speed fibre services competing with FWA.<br>Recovery of a greater share of common costs from higher-speed services can be an important mechanism to support and even encourage the migration from copper to fibre-based broadband. This is desirable from a policy perspective for the whole Kingdom and also because it will reduce the total future costs of BNet of operating two networks.<br>BNet notes that non-uniform allocation of common costs is not considered to be 'cross-subsidy' from an economic perspective – that is, as long as services cover their incremental costs, then a potentially abusive economic cross-subsidy is not present.<br>BNet wants to highlight that EoI will be established by June 2021, as per the timeline set by the Authority. Thus, the argument for limiting | The outcome of the cost models will be the main input to inform the Authority's pricing decision. Yet, the Authority does not exclude to rely on other sources of information such as benchmark data to complement the cost model output.<br>As previously mentioned, the Authority recognised the benefits of granting BNet a certain flexibility in setting prices to adapt to changes in market demand. The Authority shares BNet's opinion that the application of a gradient at the wholesale level, which reflects retail demand elasticity, could constitute an appropriate method. Yet, the Authority intends to discuss this topic in a distinct consultation on pricing principles.<br>The Authority also agrees that such gradient could be used for example to allow for setting different levels of common costs recovery to different products.<br>That said, the Authority remains of the view that setting an overall revenue cap rather than price caps on individual products (or group of products) would provide BNet with a level of flexibility which appears too important in light of the risks for the market.<br>The Authority notes BNet's view that the model should provide results for several years, and agrees that appropriate forecasts should reflect expected roll outs and related costs. |

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| the pricing flexibility of BNet is based on an extremely short-term view of the market and should not drive decisions regarding the best long-term approach.<br>BNet recommends the use of an overall revenue cap, rather than price caps imposed on specific services (irrespective of the costing methodology). The Authority could use a revenue cap in the interim period and monitor the extent to which the pricing freedom was used to the benefit of end users. If (and only if) there were service groups where the Authority was able to demonstrate a genuine risk that BNet pricing would cause some kind of harm in the retail market, the Authority could if necessary, apply a price cap to a specific 'anchor' service in each service group.<br>From BNet's perspective, if a cost model is used for price control, then it should produce results for several years.<br>BNet would like to note that any forecasts used in the cost model need to properly reflect the roll-outs and the network costs incurred during the forecast period.<br>Should the Authority select a BU-LRIC+ model, even though the structure of the modelled network does not change over the modelling period, the model should still be able to provide results for multiple years, based on changing quantities of assets (e.g. by using suitable scaling factors for network assets due to future network infill and expansion), asset unit costs and demand in the forecasted future years. | |
| **STC**<br>BU-LRIC cost figures are one of several tools used to determine a FRAND wholesale price. The TRA for example will be expected to conduct benchmarks and consider audited FAC accounting information produced by BNet to construct a possible pricing range before making a final assessment.<br>Any decision to use BBM in the future would need to be supported by a decision on service price determination methodologies. | Noted . |
| **Zain**<br>Zain shares the Authority's views on the generation by the model of costs outputs for the set period and as the basis for the published prices of the regulated products in its decisions. | Noted. |

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| **AWS**<br>AWS shares the Authority's view. | Noted. |

## The Authority's final decision

The Authority maintains its initial view to use the model's outputs as the main cost reference in the determination of cost-oriented prices for regulated services, for one or several years. If needed, additional information could be used to inform the Authority's decision, in accordance with Art. 57 of the Telecommunication Law.

135. The introduction of prices applicable for multiple years would provide greater visibility and certainty to the regulated firm and the market, incentives for cost minimisation (as the regulated firm will be allowed to keep whatever profit it achieves during the period for which prices are set) and minimise regulatory cost (as regulatory intervention will be more focussed and there will not be a need to prepare an extensive annual RO submission).

136. While prices may be set for multiple years, it may be necessary to accommodate price adjustments in limited circumstances (especially due to exogenous factors such as a significant change in service usage).

**Q6. Do you share the Authority's opinion that a multi-year price control would ensure more stability for both BNet and the market?**

## Summary and assessment of consultation responses

| **In this table, the Authority provides a summary of and a response to stakeholders' comments in relation to question 6.** | |
|---|---|
| **Summary of stakeholders' submissions** | **The Authority's analysis and responses** |
| **Batelco**<br>Batelco agrees. However, sufficient flexibility should also be built into the pricing model so that wholesale prices can be adjusted as and when necessary, such as the example given of where there is a sudden significant change in service usage. | The Authority continuously monitors the market and reserves the right to adjust its framework within a given regulatory period if deemed necessary. |
| **BNet**<br>In principle, BNet agrees that a multi-year price control based on overall revenue cap is acceptable and preferred as it provides greater predictability, better certainty for investments, and reduces regulatory burden. | The Authority has no comment. |

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| The multi-year price control based on revenue cap applicable to BNet's fibre services should be consistent with the pricing framework for copper services (i.e. Incentivise for migration to fibre and calibrate the usage rate of copper and fibre networks to reflect the reality). | |
| **STC**<br>STC Bahrain recently supported a two-year reference offer submission cycle to replace the current (but not implemented) 6-month period set out in the regulation. Multi-year price control does not align with this approach, but we would suggest in the earlier years of BNet that more frequent scrutiny and adjustments will be required until the conditions are more stable. | The Authority continuously monitors the market and reserves the right to adjust its framework within a given regulatory period if deemed necessary. |
| **Zain**<br>Zain is of the view that a three-to-five-year period would be more appropriate with a yearly review if needed. So, for Zain, price adjustments circumstances should not be limited but let opened and be analysed on a case per case basis. | The Authority takes note of Zain's proposal and notes that the Authority continuously monitors the market and reserves the right to adjust its framework within a given regulatory period if deemed necessary. |
| **AWS**<br>AWS agrees that visibility on future pricing provides stability to the market, to the extent that pricing regulation remains agile and prices can be adjusted as new elements arise. | The Authority continuously monitors the market and reserves the right to adjust its framework within a given regulatory period if deemed necessary. |

## The Authority's final decision

The Authority maintain its initial view that a multi-year price control would provide more visibility and stability to stakeholders. However, the Authority will closely monitor the market during the multi-year period and reserves the right to review and adjust its decision at any time depending on market conditions evolution.

### Use of a glide path

137. A related issue to multi-year price control is the use of glide paths, which may be appropriate to consider in the event that the use of the bottom-up models results in cost-based prices that are significantly different from prevailing rates. This may also be the case when a service that was provided in the past with a given technology is now provided using a more cost-effective technology. For that purpose, a glide path can be used to ensure that a smooth transition occurs.

138. The glide path mechanism refers to successive adjustments over time from the current rates to a target value (typically the cost-oriented level). This allows operators more time to plan for the decreased revenue and offers greater stability than a one-off shock if there is a significant difference between the existing rates and newly calculated ones. Such

mechanism has been widely used by NRAs worldwide to set mobile and fixed termination rates, but can be applied to any wholesale service where there is significant difference between current rates and recommended rates.

139. The Authority is therefore of the view that in the event that there is a considerable difference between existing and the new rates, it may be appropriate to consider the use of a glide path as a transitional mechanism towards the appropriate cost-based level. However, the Authority is also mindful that the use of glide-paths also extends the period during which rates remain above cost and thereby defers the gains in consumer welfare that arise from cost-based prices. The Authority will take this into account when considering the appropriate duration of any glide-path.

**Q7. Do you share the Authority's opinion that a glide path mechanism should be considered in order to ensure a smooth transition in services' prices?**

## Summary and assessment of consultation responses

| **In this table, the Authority provides a summary of and a response to stakeholders' comments in relation to question 7.** | |
|---|---|
| **Summary of stakeholders' submissions** | **The Authority's analysis and responses** |
| **Batelco**<br>Batelco has no objections. However, the use of a glide-path depends on the specific circumstances and must be designed according to those circumstances, having regard to all relevant factors and weighing the foreseen advantages against the disadvantages and after consultation with stakeholders. | Any potential glide path duration for a given product will be assessed by the Authority on a case by case basis, based on particular market conditions for that product. |
| **BNet**<br>BNet wishes to understand the specifics of the suggested glide path including the duration of the glide path as well as the nature of the slope/path to the desired endpoint prices. Global precedents suggest a glide path of 3-5 years with linear path in between. We request that the Authority uses a similar glide path and duration for moving first to the interim prices and then to the long-term prices. | Any potential glide path duration for a given product will be assessed by the Authority on a case by case basis, based on particular market conditions for that product. |
| **STC**<br>BNet is over-recovering its costs at the moment because of the approach used in setting interim RO prices last year, use of an inflated WACC and the general project delay to implement EOI favouring the incumbent supplier and its parent | The glide path mechanism is used to ensure a smooth transition towards a pricing target, to avoid any sudden change (increase or decrease). The Authority does not believe it would be appropriate to apply glide paths in only one way. |

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| company. As there has been a surplus revenue, a glide-path should therefore be used only in cases where the proposed prices go upwards. | |
| **Zain**<br>The length of the glide-path shall be minimised to enable access seekers to enjoy cost-based prices<br>The length of any glide-path should be considered only once the results of the models are agreed and should not exceed three years. | The Authority takes note of Zain's proposal. Any potential glide path duration for a given product will be assessed by the Authority on a case by case basis, based on particular market conditions for that product. |
| **AWS**<br>AWS believes that the glide path should be accelerated for regulated products with existing pricing distortions, e.g. priced significantly above cost or subsidized by other products. Otherwise, the glide path will carry over several years an identified anticompetitive practice or inefficiency. | Any potential glide path duration for a given product will be assessed by the Authority on a case by case basis, based on particular market conditions for that product. |

### The Authority's final decision

The Authority maintains its initial view that a glide path mechanism should be considered whenever necessary in order to ensure a smooth transition in services' prices. The length and structure of the glide path will be defined on a case-by-case basis, based on particular market conditions for each product and on the gap between current prices and cost model's outputs.

**Pricing of copper-based services**

140. The Authority intends to discuss the principles of a copper-based services pricing framework, in a context of copper decommissioning and migration to fibre, in a dedicated publication.

141. While this is not the main purpose of the present Position Paper, the Authority highlights that relevant adjustments might be performed on the economic parameters of the fibre elements (adjustments to reflect the unit costs, price trends and asset lives of copper elements) in order to take into account copper specificities in an overall consistent framework, set a consistent price for copper and fibre, and incentivize migration from copper to fibre.

## 4.3 Geographical averaging

142. The Authority may derive geographically averaged cost results based on the costs that are generated by the footprint that corresponds to the deployment required to meet NTP4 targets, and enable the modelled operator to recover the costs.

143. The demand for the services should be based on the identified footprint and on the customer base for the modelled operator.

**Q8. Do you share the Authority's opinion that the cost results for the access network should be nationally averaged or if appropriate geographically differentiated depending upon how regulated services are specified in regulatory decisions?**

## Summary and assessment of consultation responses

| **In this table, the Authority provides a summary of and a response to stakeholders' comments in relation to question 8.** | |
|---|---|
| **Summary of stakeholders' submissions** | **The Authority's analysis and responses** |
| **Batelco**<br>The Authority could conduct a study on the likely impact of nationally averaged costs results as opposed to geographically differentiated cost results. However, as downstream retail prices are national, it would seem reasonable that upstream wholesale costs should also be nationally averaged. | Noted. |
| **BNet**<br>BNet recognises that, given that retail prices are nationally averaged, it would make sense for wholesale prices to also be nationally averaged.<br>We suggest that the Authority should reflect as to how it will seek to maintain incentives for such future investments in areas of higher unit cost (e.g. by allowing prices to rise automatically should such areas be covered) before it adopts such a nationally averaged pricing policy. | Noted. |
| **STC**<br>STC Bahrain would support a continuation of geographically averaged prices even if regulatory markets were split into different geographic areas. | Noted. |
| **Zain**<br>Zain shares the Authority's opinion that the cost results for the access network should be nationally averaged and geographically differentiated-pricing should be avoided. | Noted. |
| **AWS** | Noted. |

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| AWS agrees that the costs for the regulated products should be nationally averaged. | |

### The Authority's final decision

The Authority will set nationally averaged cost-oriented prices.

# 5 Operational issues

144. The development and implementation of a BU-LRIC cost model involve many steps and interactions with stakeholders. The aim of this section is firstly to identify and discuss these main steps, and secondly to focus on key stages such as the data collection stage and the model validation.

## 5.1 Main steps of the BU-LRIC cost modelling process

145. The Authority will, after the issuance of this Position Paper, consult on the modelling principles and methodology that will serve as a basis to develop the BU-LRIC model. Following this, the Authority will proceed with the BU-LRIC model development and implementation following the sequencing elaborated in the following paragraph.

146. The Authority anticipates that the development and implementation of the BU-LRIC model will involve three main steps:

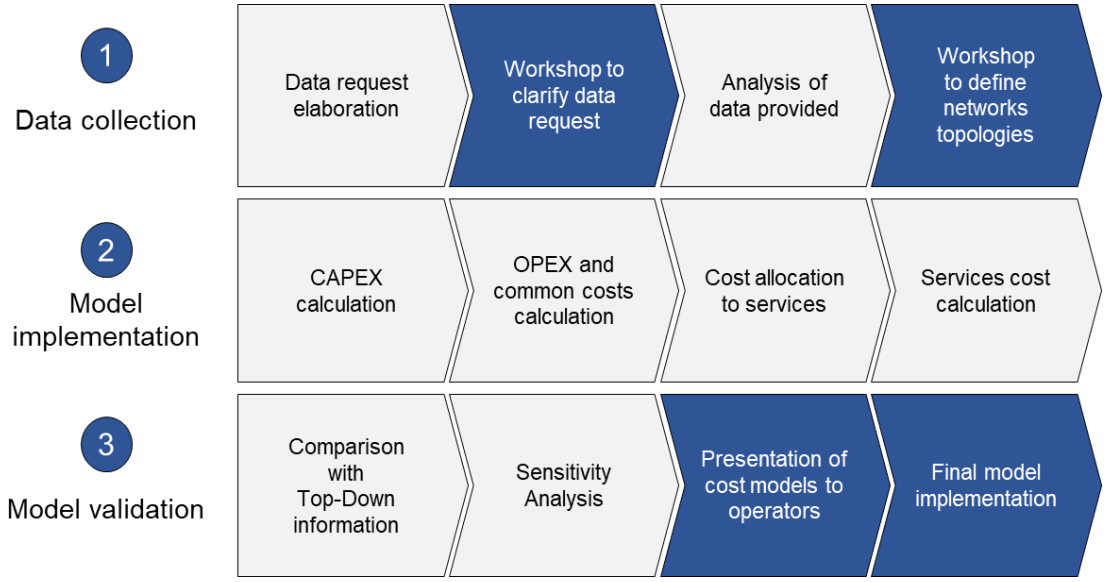
    a. Data collection is a major step to ensure that the modelled networks are representative of local conditions and current engineering rules – this step is further described in section 5.1.1;

    b. Once data is collected, the second step consists in developing and implementing the cost model;

    c. Once a first version of the models has been developed, the Authority will proceed to a model validation step to ensure that the models are sufficiently robust and realistic. This step is further described in section 5.1.2 below.

147. The figure below summarizes these three steps.

**Figure 4 - Anticipated steps for the development and implementation of the bottom-up cost models**




Source: The Authority

148. The Authority will start the data collection phase (step 1) and then proceed with the model implementation (step 2). Model validation (step 3) will follow these two steps to proceed with the model finalization.

### 5.1.1 Data collection

149. In order to develop the BU-LRIC cost model, it is necessary to collect data from the industry (BNet and OLOs). This step includes:

    a. the preparation of a comprehensive data request by the Authority;

    b. workshops with BNet and OLOs to discuss the data requests;

    c. workshops with BNet and OLOs to define the relevant network topologies and engineering rules; and

    d. analysis of the data provided by BNet and OLOs.

150. The set of data required will include at least the following:

    a. **Data about demand**: this is a key input to the model since the dimensioning of the modelled networks mainly relies on the demand. Where relevant, demand data should be provided for the past years and with associated forecasts (considering the recent creation of BNet, it is likely that a significant share of historical data will be provided directly by Batelco and other OLOs). Demand inputs include:

        i. active demand data, used to dimension network capacity and to derive unit costs. It mainly consists of traffic data (e.g. volumes of minutes, off-

net minutes, international minutes, etc.), customer data (e.g. number of broadband customers, voice customers, leased line customers, etc.);

ii. passive demand data, used to dimension fixed access network coverage. It mainly consists of demographic and geographic data (including the position of residential dwellings, businesses and wireless sites).

b. **Current unit prices** of network assets, used to calculate the amount of investment required in the modelled network. For example:

i. In the fixed access network: fibre cable price per type of fibre cable, trench price, pole price, ODF price, street cabinet price, jointing closures prices, etc.

ii. In the fixed core network: MSAN/OLT prices, ADM prices, fibre prices, MPLS switch prices, etc.

iii. Past unit costs may also be requested to infer price trends used in depreciation formulas.

c. **Networks topologies**, which is very important in a scorched node approach:

i. For the fixed access network, this includes for example number and location of exchanges, number of poles, kms of trenches, etc.

ii. For the fixed core network, this includes number and location of switches, and MSANs from all Licensed operators, number of servers, layers and structure of the switching network, layers and structure of the transmission network, etc.

d. **Network OPEX** per different OPEX categories and assets: energy, cooling, maintenance costs;

e. **Any other specific costs** related to the provision of wholesale services.

151. Information will be sought pursuant to Article 53 of the Telecommunications Law. The Authority will cross-check and/or complement the data based on benchmarks as appropriate.

152. The development, implementation and validation of BU-LRIC model is not a perfectly linear process and further information requests may be required at various stages.

### 5.1.2 Models development and validation steps

153. In order to develop, share and validate the models, the Authority anticipates that several interactions with the industry will be necessary. The Authority intends to develop a fully transparent and realistic model and for this reason, the involvement of relevant operators is critical. The Authority anticipates that the following workshops will be required:

a. Workshop with BNet and relevant OLOs to define the relevant network topologies and technologies to be modelled;

b. Workshop with BNet and relevant OLOs to present the model; and

c. Workshop with BNet and relevant OLOs to consider their final remarks.

154. At the validation stage, the Authority will release the models to BNet and relevant OLOs and will invite them to provide their views on the operation of the models. In this process, the Authority will ensure that no confidential information from any operator is provided to other operators. The validation step is likely to involve:

    a. The review of the models by the relevant operators to ensure that the models capture the relevant assets and costs, and operate in a valid and robust manner;

    b. A comparison of the model outputs with the top-down information and actual network data (e.g. number of kilometres of trenches, number of kilometres of cables, etc.) to identify the extent to which results differ and, if so, the likely drivers of those differences;

    c. Sensitivity analyses to test the functioning and the sensitivity of the models to key inputs (e.g. traffic at peak hour, allocation methodology, traffic forecast, price trends, etc.);

    d. The finalisation of the models following completion of the above tasks.

155. The final non confidential version of the models will be released to the relevant operators.

# ANNEX A - BBM implementations worldwide

### Australia

1. Australia has been the first country to introduce the BBM framework to enforce price controls in the telecom industry[44]. On the 1st of January 2011, the regulation of fixed line services moved from a TSLRIC+ costing approach (total service long-run incremental cost including a mark-up for common costs) to the BBM approach.
2. The main purpose for the Australian Regulatory Authority ("the ACCC") at the time was the long-term interest of end-users ("LTIE"). In the view of the ACCC, the BBM framework serves this goal through targeting four main areas:
    a. a fair rate of return on investment (cost recovery);
    b. incentives for efficiency and innovation;
    c. transparency and regulatory certainty;
    d. competitive pricing.
3. In the implementation of the BBM approach, the ACCC proposed to adopt a single RAB, from which infrastructure costs can then be allocated to services using cost allocation rules. The main reason behind going towards a single RAB approach is creating transparency for industry participants: a single RAB is simple and practical to implement and avoids the complexity associated with establishing and rolling forward multiple RABs.
4. Regarding asset valuation, the ACCC proposed to take the access provider's past compensation into account when setting the opening RAB. This minimises cost over-recovery or cost under-recovery over the long term by taking into account past depreciation as outlined in the accounts provided by the access provider. This ensures that access seekers, and ultimately end users, are not charged more than once for the access provider's costs of investing in the existing assets. As per the preferred valuation methodology, the ACCC opted for a depreciated actual cost (DAC)[45] methodology as it is in line with the LTIE objective and ensures that the access provider is able to achieve a commercial return on its actual investments.
5. Finally, regarding depreciation methods, the ACCC opted for a straight-line depreciation schedule. The ACCC is in the opinion that a straight-line depreciation allows the access provider to recover the cost of prudently incurred investment over the life of the asset. Moreover, it is likely to promote price stability for end users and thus greater certainty over the regulatory period.

[44] ACCC (Australia), September 2010, Review of the 1997 telecommunications access pricing principles for fixed line services

[45] DAC - adjusts the historic cost of an asset by the proportion that the costs have been recovered

**United Kingdom**

6. Ofcom, the British regulator, is intending to enforce a price control regulation on Openreach (BT's fixed access division) on the wholesale local access services related to fibre in areas where there is unlikely to be material commercial deployment by rival networks to Openreach[46]. It should cover the period 2021-2026 following a glide path.
7. Ofcom's main objectives through this regulation are to promote fibre deployment in non-competitive areas and to encourage a fair competition in the retail market whilst ensuring reasonable prices for consumers to access fibre services.
8. In order to achieve these goals, Ofcom opted for a RAB-based price control approach since it ensures benefits for both the regulated firm and consumers. It enables the regulated firm to recover all of its costs and the consumer to enjoy the service without paying excessive prices.
9. While the choice was set on RAB-based price control, two sub-approaches could meet Ofcom's goals: a forecast approach or a post-build approach:
    a. **The forecast approach** is basically a CPI-X form of price cap on fibre services, where the starting price is set based on the initial RAB and the forecast of all the different costs (Capex, Opex, etc) and where the evolution of the price over the regulatory period depends on the X-factor. The level of the X is set to allow the recovery of the investment costs based on Openreach's commitment. The issue raised by this approach is that there are no sufficient guaranties for Ofcom that Openreach will respect its commitments.
    b. **The post-build approach** is a CPI - X + K form of price cap on legacy copper services. In this approach, the RAB contains not only fibre assets, but also legacy services assets. However, there is a price cap set for the fibre services following a CPI - X and a price cap set for legacy copper services following a CPI - X + K. The K factor is set depending on the level of deployment in fibre assets reached by Openreach. It represents the mark-up to allow recovery of fibre investment costs. In other words, it is the level of price increase that Openreach is allowed to apply on its legacy copper services prices in order to recover a part of fibre investment costs through copper revenue.
10. Ofcom opted for a post-build RAB approach. Ofcom ensures that Openreach recovers its fibre costs partly through its legacy services revenue: it is a way to encourage investment in fibre. However, the increase in price of legacy services revenue - to help recover fibre costs - is set relatively to the level of fibre deployment: it is a way to make sure Openreach gets rewarded only after achieving concrete results, in order to overcome the potential asymmetry of information. Also, the fibre price is capped following CPI - X: this ensures efficiency and consumer welfare.
11. Ofcom admits that a forecast approach would have been preferable: it is relatively simple and transparent to implement and the most important aspect is the predictable price path that it offers *vis-à-vis* to consumers. However, the lack of guaranties to Ofcom regarding

[46] Ofcom (UK), January 2020, Promoting competition and investment in fibre networks: Wholesale Fixed Telecoms Market Review 2021-26

Openreach's commitments and the absence of incentives in this direction lead Ofcom to opt for a post-build approach and deal with the potential fluctuation of prices in the future.

**New Zealand**

12. ComCom, the New Zealand regulator, is planning to enforce a price control regulation on Chorus[47], the dominant player on the fixed access market, on all its Fixed Fibre Local Access Services (FFLAS) all over the country.
13. Through this regulation, ComCom aims to promote the long-term benefit of end-users in FFLAS's markets, to promote fair competition in the retail market and to encourage fibre deployment in New Zealand.
14. The approach chosen by ComCom to reach its goals is a forecast BBM approach. The RAB contains all FFLAS services' assets (copper assets are excluded). The allowed revenue generated by Chorus from these services are based on the assets making the RAB. This means that the allowed revenue for each year is set in a way to recover exactly the different costs of investments: The Capex (through the yearly depreciation), its yearly return on investment (through the WACC), the yearly Opex and any potential revaluation of the assets (due to inflation for example).
15. The control is therefore on the total revenue generated from FFLAS. Chorus has the freedom to set the prices for the different services as long as it remains compliant with the allowed total revenue. Also, in order to avoid any price shocks, the option of smoothing allowed revenue/prices over two or three regulatory periods is considered.
16. The main concern for ComCom whilst implementing a BBM approach is under-investment by Chorus compared to what has been forecasted in order to cut costs. To tackle this, ComCom suggest the following:
    a. If the under-investment impacts quality, apply an effective quality incentive scheme providing incremental returns to investment which enhances quality;
    b. If the under-investment relates to connecting end-users, include in the Chorus capex an extra expenditure category which can be adjusted mid-period to account for unanticipated growth.
17. In conclusion, in ComCom's opinion, the BBM approach is the most suitable approach because it ensures the alignment of the regulated firm's interests and the end-users' ones; and also ensure a fair and effective competition in the retail market:
    a. The regulated firm can recover its costs and ensure a return on investment (if the forecasts and the model are well implemented)
    b. The retail providers have an equal/fair access to the service
    c. The end-users benefit from a combination of the regulation of wholesale provider and the effective competition between the retail providers and therefore enjoy a good service (shall the quality of service be controlled) at a fair price.

[47] ComCom (NZ), November 2019, Fibre input methodologies

18. It is worth pointing that the implementation of the BBM framework was planned for the 1st of January 2020. However, ComCom has asked the minister of Broadcasting, Communications and Digital Media for a 2-year extension (i.e. 1st of January 2022 as a new implementation date).
19. ComCom needed a better involvement from stakeholders in order to deliver a reliable and robust regime.
20. According to ComCom, stakeholders' real engagements throughout the whole process is a key element to a durable and successful regulation. It guaranties obtaining reliable data (Model inputs), and reduces the risk of appeals on the final decision.

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