

Industry presentation

Conceptual approach for a mobile BU-LRIC model

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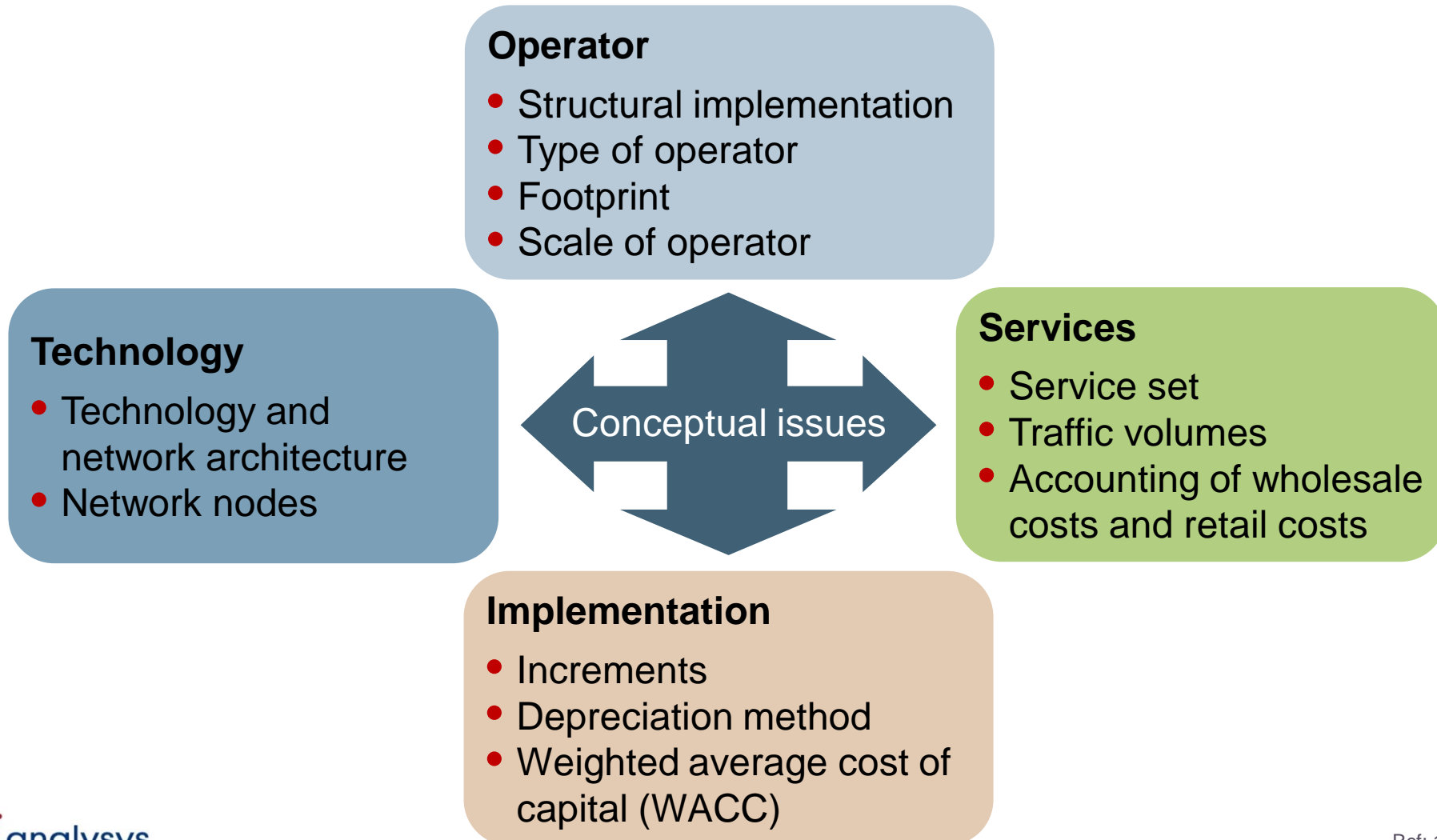
Project objectives [1/2]

- ANACOM has commissioned Analysys Mason Limited ('Analysys Mason') to develop a bottom-up long-run incremental cost (LRIC) model to understand the cost of mobile voice termination in Portugal
- The model will be used by ANACOM to inform its market analysis for mobile termination:
 - we will adopt a pure LRIC approach following the EC Recommendation* on wholesale termination costing as requested by ANACOM
- Throughout this process, ANACOM and Analysys Mason have been seeking the input from mobile operators and other industry players

Project objectives [2/2]

- As part of this effort, ANACOM is conducting a public consultation with the industry to obtain input on the principles used in the model:
 - we discuss those principles in the following slides
 - the concepts presented in the ‘Conceptual approach for a mobile BU-LRIC model’ attached to ANACOM’s consultation are marked with the symbol **N** in the top-right corner of each slide

The cost model will be designed according to four key dimensions



Introduction

Proposed conceptual approach

We have considered a range of operators to model

- We have considered a range of operators:
 - **average operator** – players in the mobile market are averaged to define a ‘typical’ operator
 - **hypothetical existing operator** – based on actual operators, except for specific aspects, e.g. date of market entry
 - **hypothetical new entrant** – an operator entering the market now with today’s modern network deployment

<i>Characteristic</i>	<i>Discussion points</i>
Date of entry	<ul style="list-style-type: none"> • Different for all operators, therefore the average date of market entry is not meaningful
Technology	<ul style="list-style-type: none"> • Technology migration is apparent for the access network, but more difficult to define in the core network
Efficiency	<ul style="list-style-type: none"> • An average operator may include inefficient costs
Transparency	<ul style="list-style-type: none"> • Making a clearer technology choice enables transparency
Reconciliation	<ul style="list-style-type: none"> • Data for a new-entrant operator cannot be reconciled with top-down accounts as there are no new entrants in Portugal

We propose to model a hypothetical existing operator

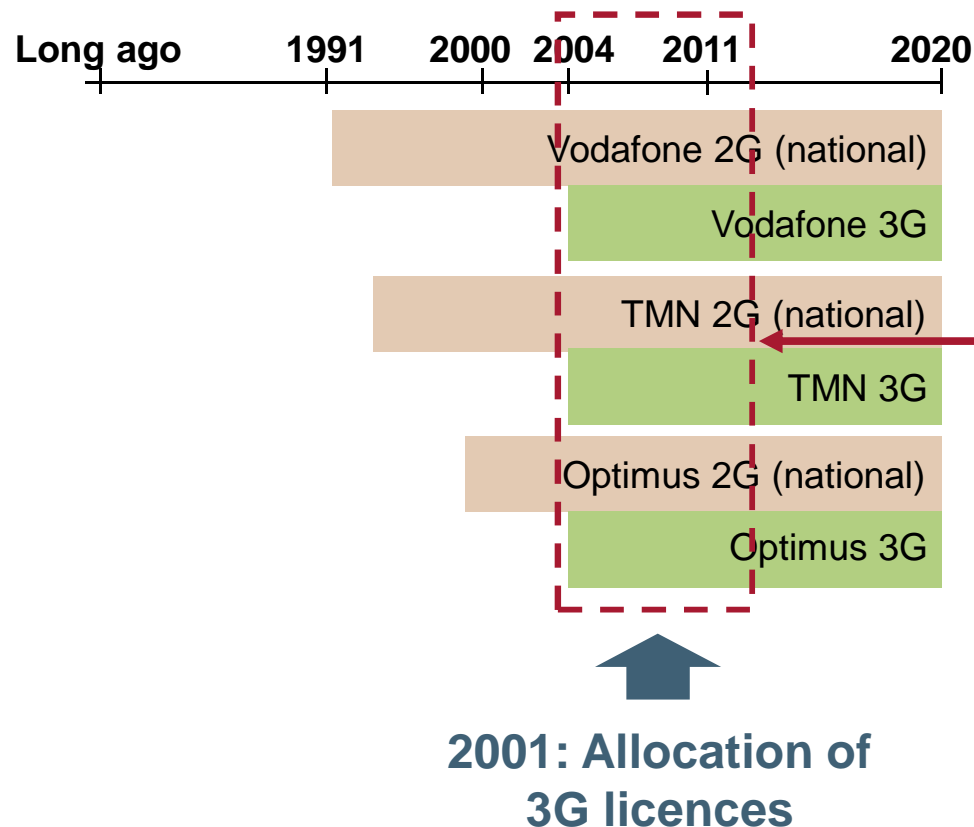
- This will enable us to calculate the costs that are based on those incurred by existing suppliers of mobile termination in Portugal
- The characteristics of an actual modern network can be taken into account
- The costs associated with the deployment of network nodes will be calculated using a modified scorched-node approach, which will ensure a network design that is modern and reasonably efficient

Mobile network

- Rolling out 2G in 2005/2006
- Launching service in 2006/2007
- Adding capacity with 1800MHz
- Adding overlay with 2100MHz
- Operating 2G and 3G networks in the long term
- Progressive migration from 2G to 3G

- We propose to model an hypothetical existing operator
- The model will use a **time series of 45 years** – three 15-year spectrum licences – to calculate the costs of long-lived assets

Market entry and deployed technologies are key inputs to the model ...



Although the initial date of market entry and technology migration varies among Portuguese operators, a consistent picture has emerged from 2004 onwards

... as well as coverage and long-run market share

- Coverage (footprint) of the network will be a key input to the model:
 - the degree to which investments precede demand has an impact on the unit cost of traffic
- In order to reflect reality, the modelled operator should offer national coverage:
 - >99% of population for 2G
 - >80% of population for 3G

EC Recommendation on wholesale termination costing:*
20% market share for an operator with efficient scale



Hypothetical mobile operator that:

- rolls out a national network
- achieves a market share of 20% in the long term

The mobile radio technology is a mix of GSM900/1800 and UMTS2100

- Current spectrum allocation is similarly distributed:
 - operators own similar amounts of spectrum in 900MHz
 - the allocation of 1800MHz and 2100MHz paired spectrum is symmetric
- It is therefore assumed that forward-looking spectrum and coverage costs are symmetrical
- GSM/UMTS seems to be the current efficient technology mix:
 - all existing operators use a GSM/UMTS mix
 - they operate in a competitive market, thus stimulating the efficient use of technology
 - it is recommended by the EC
- 4G is unlikely to be used to deliver large volumes of voice termination in the short term

We will assume that the modelled operator has similar amounts of spectrum as the existing operators (**2×8MHz of GSM, 2×6MHz DCS and 2×20MHz of UMTS frequencies**)

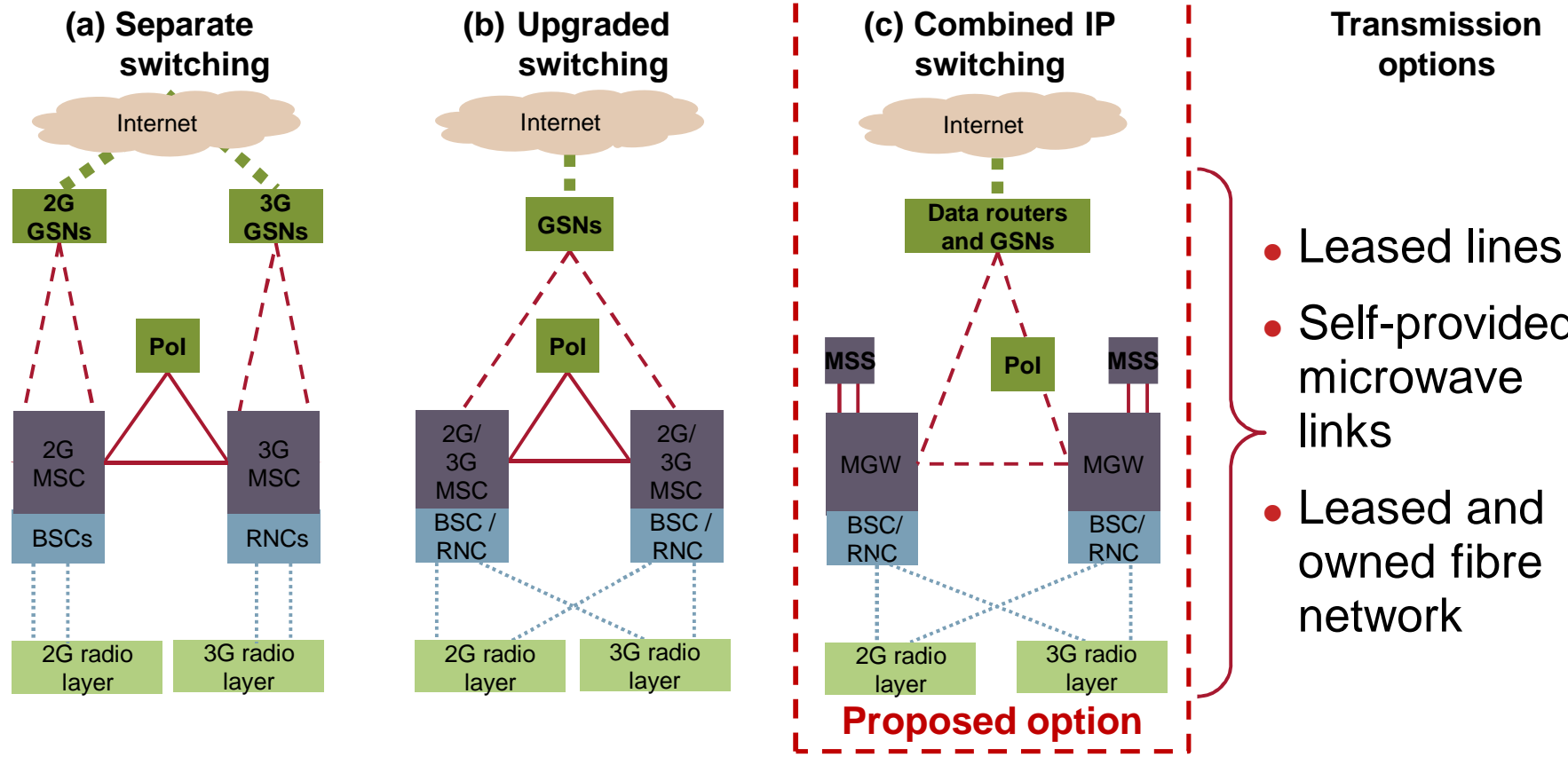
We will use both GSM900/1800 and UMTS2100 radio technology in the long term, with UMTS as an overlay

Mobile spectrum fees will also need to be defined

- Spectrum fees have historically been assigned by different mechanisms (e.g. auction, allocation, extension, trade)
- According to the EC Recommendation, only additional spectrum acquired to provide the wholesale termination service should be taken into account:
 - 3G spectrum shall not be considered incremental in the pure LRIC model
 - 2G spectrum will be analysed based on its sensitivity for wholesale traffic termination
- For all spectrum:
 - yearly fees that take into account the change from the pre-2009 to post-2009 calculation method, taking into account the migration period 2009–2011
- For 40MHz of 2100MHz:
 - initial fee paid by operators of PTE20 billion per licence

We propose to use the actual amounts paid for spectrum by Portuguese operators as input to the model

For the mobile core network, there are 3 similar plausible architectural options



Option (c) 'Combined IP switching' represents the most modern switching technology that an efficient operator would have deployed in recent years

The model needs to consider more services than just voice termination

- The aim of the model is to understand the costs of mobile voice termination
- However, mobile networks typically provide a wide range of services, leading to:
 - economies of scale and scope
 - a lower unit cost for voice and data services
- A full list of services needs to be used in the model:
 - this will allow allocation of shared and network common costs

Retail costs will be excluded – a ‘network share’ of business overheads (e.g. Chief Executive Officer) will be specified

The model must capture all common services (at a network* volume)

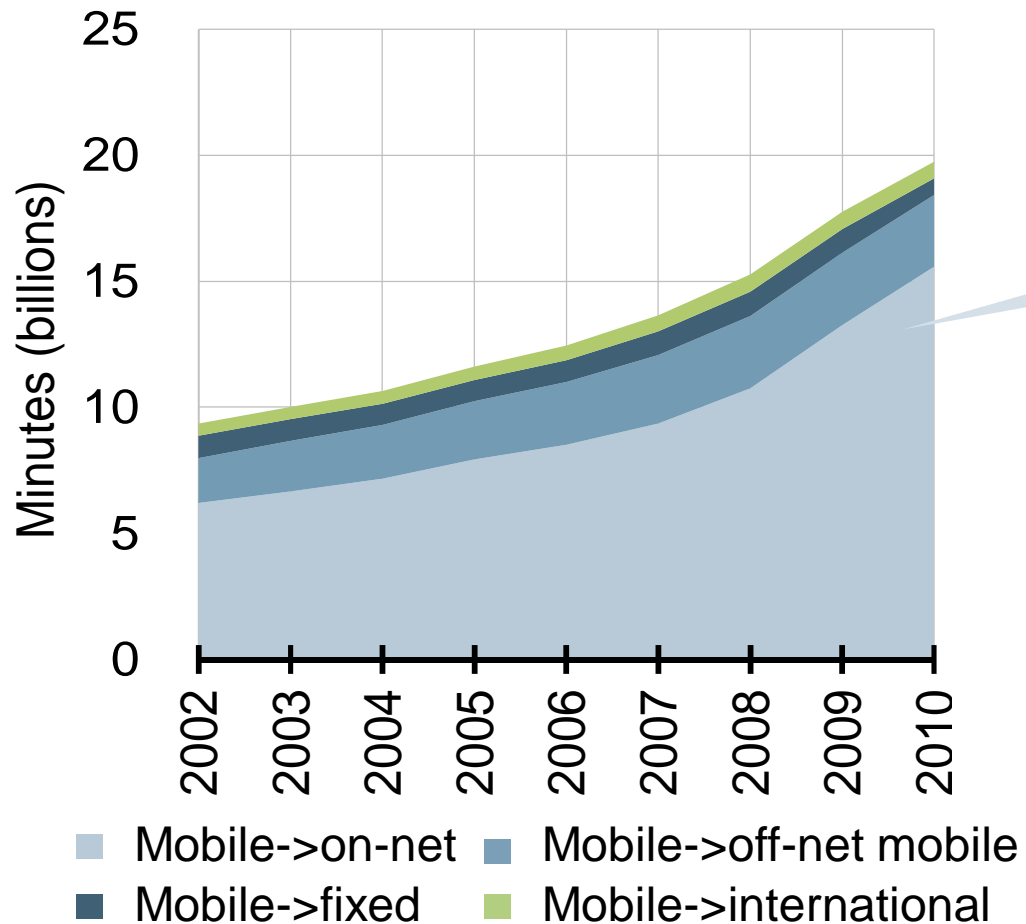
Mobile services

- On-net calls
- Outgoing to international, fixed and other mobile operators
- Incoming to international, fixed and other mobile operators
- Roaming in origination and termination
- SMS on-net, outgoing and incoming
- 2G packet data
- Low-speed 3G packet data (Release-99)
- High-speed 3G packet data (HSPA)

The model will capture all common services

A traffic forecast based on current market averages will feed the model

Mobile voice traffic in Portugal (2002–2010)



Price competition in Portugal has led to very low on-net tariffs that have driven the main growth in traffic

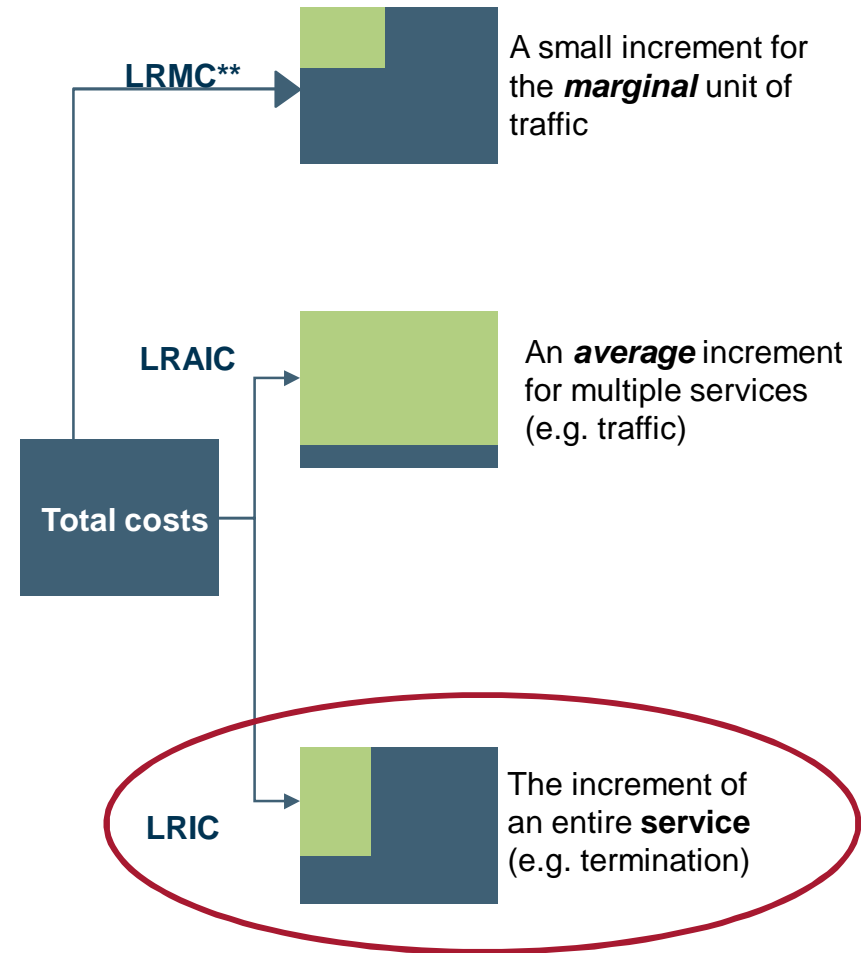
- The network will be dimensioned on the basis of both voice traffic and data traffic requirements
- Traffic is forecast to reach 1300 minutes per annum, of which 21% is wholesale termination traffic

A number of choices must be made when implementing a LRIC methodology

- A number of areas need to be considered:
 - 1 what size of increment?
 - e.g. marginal, service incremental or average incremental
 - 2 what depreciation method?
 - e.g. economic depreciation, accounting depreciation
 - 3 reasonable return on capital?
 - WACC

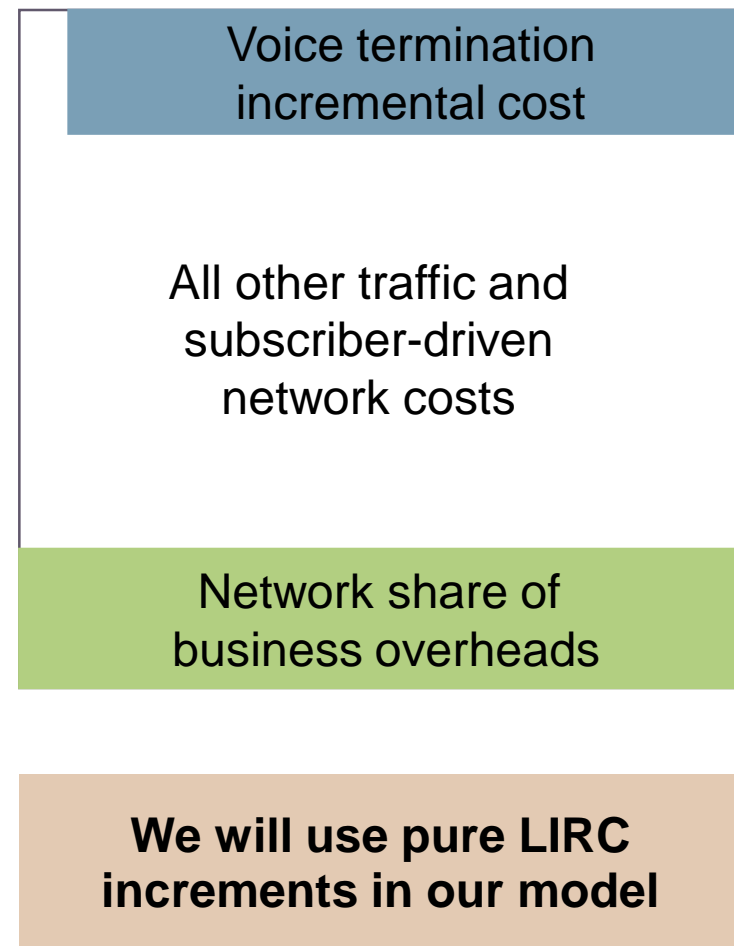
1 Pure LRIC will be applied, as recommended by the EC

- The increments used in models to calculate the cost of mobile termination have evolved over time, from LRMC to LRAIC, LRIC* and pure LRIC nowadays
- Pure LRIC defines the increment of an entire service and:
 - considers the increment to be all traffic of a single service
 - incremental costs are those avoided when not offering the wholesale termination service



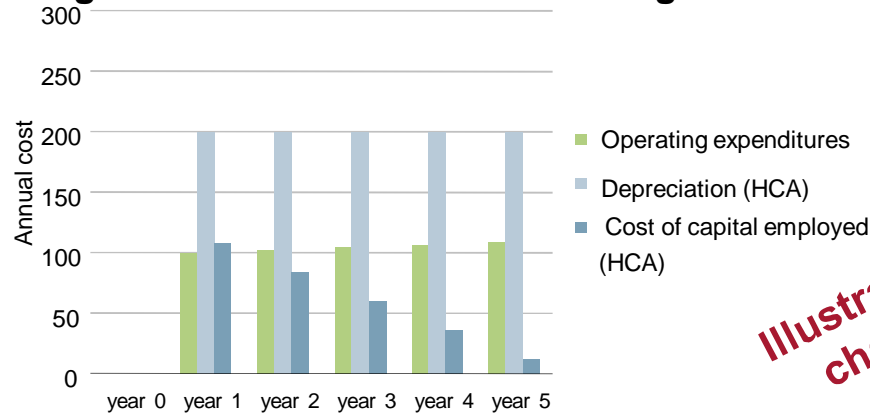
1 The pure BU-LRIC approach only includes incremental costs

- The model will use a pure BU-LRIC approach based on the EC Recommendation:
 - only the cost ‘that is avoided when not offering voice termination’ is allocated to this service
 - wholesale termination is treated as the ‘last’ service in the network
 - non traffic-related costs, such as subscriber costs, are not allocated
 - network common costs and business overheads are not allocated to the end result

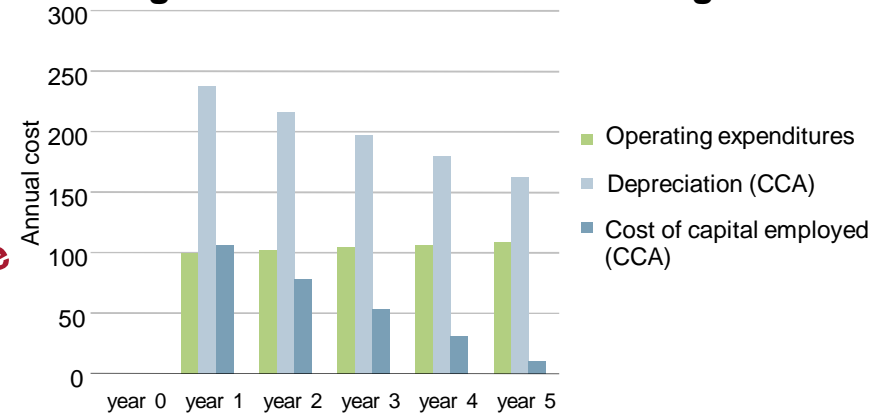


2 There are several approaches to depreciation in a cost model

Straight-line historical cost accounting

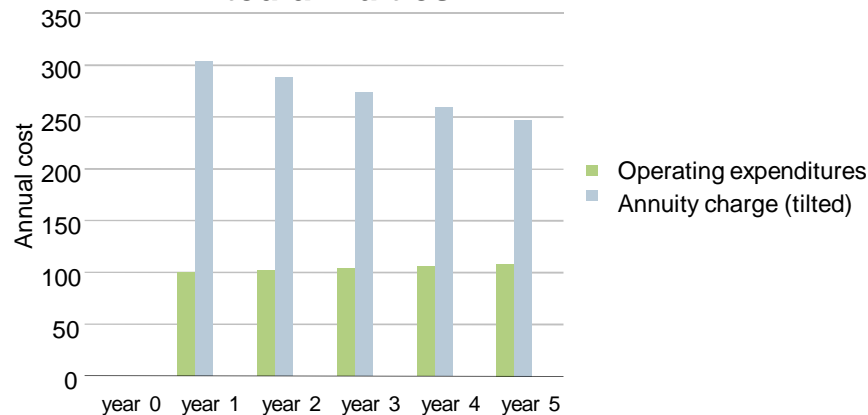


Straight-line current cost accounting

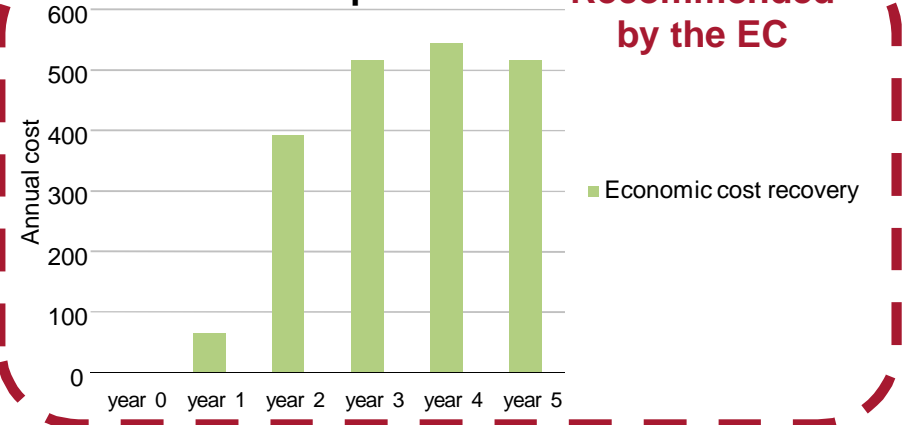


Illustrative charts

Tilted annuities



Economic depreciation



Recommended by the EC

In mobile networks, traffic volumes have grown significantly in recent years and mobile broadband volumes are growing strongly. Therefore, **economic depreciation is our proposed method**

3 Our WACC will work in real, pre-tax terms

- We will follow standard best practice for the WACC calculation
- A single WACC will be used in the model
- We will review the CMT list of 'pure play mobile' operators, such as MTS, Mobistar, Telenor, Teliasonera and Vodafone Group
- The model will work in real, pre-tax terms

- The model will express costs and revenues in real (inflation adjusted) terms, using the corresponding '**real terms**' **WACC**
- The model will apply a '**pre-tax**' **WACC** to pre-tax cashflows
- The 'pre-tax' WACC will be determined using an analogous methodology to that already set out by ANACOM for Portugal Telecom, adjusting its WACC to reflect the change from nominal to real terms



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