The MCA's New Bottom-up Cost Model for Fixed Networks and Proposed Interconnection Prices

Public Consultation and Proposed Decision

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1 Introduction

The Malta Communications Authority (hereinafter 'MCA') has commissioned Analysys Mason Limited ('Analysys Mason') to develop a bottom-up long-run incremental cost (BU-LRIC) model for the purpose of costing fixed core and access services in Malta. This model has been developed in 2012 and is hereinafter referred to as the BUCM 2.[1]

The public consultation document summarises the model structure, the main network configuration assumptions and issues encountered. The public consultation document also contains the results for fixed termination and origination rates calculated from BUCM 2. The model has been developed based on data provided by the operators, either specifically for this project or as part of the quarterly statistics, supplemented with data gathered by the MCA and assumptions made by Analysys Mason. This public consultation document does not contain any confidential inputs sourced from the operators.

In the remainder of this section, we provide:

- the background to the overall process;
- an explanation of the scope of this document;
- the structure of the report.

1.1 Background to the process

The MCA has developed a BU-LRIC model of fixed core and access networks in Malta.

The MCA sought to obtain various inputs from the main local network operators. The MCA engaged GO Plc (hereafter 'GO') in a technical consultation on the draft model in view of the extensiveness of the modelling undertaken as well as the significant confidential information required. The model has then been revised according to the aforementioned technical consultation. The MCA has also engaged Melita plc and Vodafone (Malta) Ltd separately in technical consultations on certain specific aspects.

1.2 Scope of the public consultation document

The scope of this document is to provide interested parties with a public description of the model in order to allow them to provide feedback on the modelling approach underpinning BUCM 2.

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1 The previous model prepared by the MCA in 2005 as refined in 2007 is referred to as BUCM or BUCM 1.

The purpose of BUCM2 is to model the services of a hypothetical efficient operator. In this respect, the MCA intends to use this model to set efficient regulated wholesale charges for the following services[2]:

- voice termination, on a *pure* LRIC basis in accordance with the 2009 Recommendation[3] from the European Commission (EC);
- voice origination;
- leased lines, including Ethernet connections.

However in order to manage price regulation of these aforementioned services, the MCA is proposing to split the price setting mechanism into two smaller blocks, namely a voice-related block and a data circuits counterpart.

In view that the Market analysis for leased lines (Market 6) is still under consultation, the MCA is also proposing to postpone the price-setting of the data-circuit block until the market analysis decision is issued. The MCA is of the opinion that this course of action affords more regulatory certainty to stakeholders.

For this reason, the pricing aspect of this consultation document will cover only the voice-related block, namely the rates for fixed voice termination and origination.

The MCA would like to invite interested parties to submit their comments regarding specific aspects covered in this document. Any information that will be provided in response to this consultation document will be evaluated by the MCA and, subject to the Authority's discretion, the BUCM 2 will be modified to factor in this feedback.

Consultation Question:

Interested parties are invited to comment on specific aspects covered throughout this Consultation Document.

For the sake of clarity and ease of understanding, the MCA encourages respondents to structure their comments in order and in line with the section numbers and sub-section numbers used throughout this document.

1.3 Structure of the document

The remainder of this document is structured as follows:

- Section 2 summarises the principles of long-run incremental costing;

[2] The MCA reserves the right to amend this list of regulated service in accordance with future exigencies and developments in the relevant markets.

[3] Commission of the European Communities, COMMISSION RECOMMENDATION of 7.5.2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU, 7 May 2009.

- Section 3 introduces the structure of the model;
- Section 4 explains the network configuration;
- Section 5 describes the Market module;
- Section 6 presents inputs common to the modules of the model;
- Section 7 describes the Service costing module;
- Section 8 includes the proposed pricing for fixed termination and origination;
- Section 9 presents the consultation framework.

2 Principles of long-run incremental costing

This section discusses the main concepts and principles underlying the long-run incremental costing methodology.

The following topics will be addressed in succession:

- concepts of competitiveness and efficient cost recovery, in Section 2.1;
- long-run costing, in Section 2.2;
- incremental costing, in Section 2.3;
- efficiently incurred costs, in Section 2.4;
- costs of supply using modern technology, in Section 2.5.

2.1 Competitiveness and efficient cost recovery

Long-run incremental costs (LRIC) reflect the level of costs that would occur in a competitive market. Competition ensures that operators achieve a normal profit and normal return over the lifetime of their investment (i.e. the long run). This also ensures that inefficiently incurred costs are not recoverable. Under *ex ante* regulation, remedies are imposed to mimic the outcome of competition in markets where significant market position (SMP) is found.

2.2 Long-run costs

Costs are incurred in an operator's business in response to the existence of, or change in, service demand, captured by the various cost drivers. Long-run costs include all the costs that will be incurred in supporting the relevant service demand, including the ongoing replacement of assets used. As such, the 'long run' duration can be considered at least as long as the network asset with the longest lifetime. Long-run costing also means that the size of the network deployed is reasonably matched to the level of demand it supports, and any over- or under-provisioning would be levelled out in the long run.

Consideration of costs over the long run can be seen to result in a reliable and inclusive representation of cost, since all the cost elements would be included for the service demand supported over the long-run duration, and averaged over time in some way.

On the other hand, short-run costs are those which are incurred at the time of the service output, and are typically characterised by large variations: for example, at a particular point in time, the launch of, or increase in, a service demand may cause the installation of a new capacity unit, giving rise to a high short-run unit cost, which then declines as the capacity unit becomes better utilised with growing demand.

Therefore, in a LRIC method, it is necessary to identify incremental costs as all cost elements, which are incurred over the long run to support the service demand of the increment.

2.3 Incremental costs

Incremental costs are incurred in the support of the increment of demand, assuming that other increments of demand remain unchanged. Put in another way, the incremental cost can also be calculated as the avoidable costs of not supporting the increment.

There is flexibility in the definition of the increment, or increments, to apply in a costing model, and the choice should be suitable for the specific application. Possible increment definitions include:

- the marginal unit of demand for a service;
- the total demand for a service;
- the total demand for a group of services;
- the total demand for all services in aggregate.

Figure 2.1 illustrates where the possible increment definitions interact with the costs that are incurred in a five-service business.

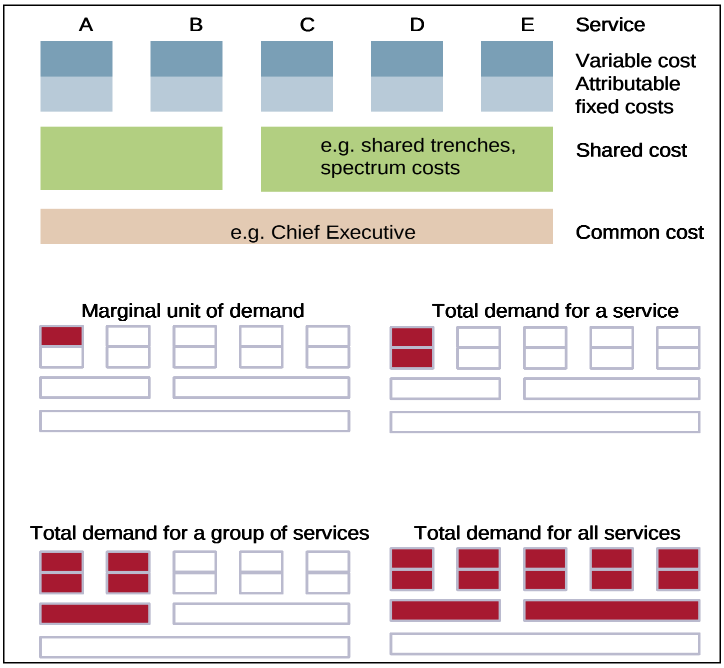


Figure 2.1: Possible increment definitions [Source: Analysys Mason, 2012]

Section 7.2 discusses the definition of the increments that have been used in the costing models in more detail.

2.4 Efficiently incurred costs

In order to set the correct investment and operational incentives for regulated operators, it is necessary to allow only efficiently incurred expenditures in cost-based regulated prices. The specific application of this principle to a set of cost models depends significantly on a range of aspects:

- detail and comparability of information provided by comparator local individual operators;
- detail of modelling performed;
- the ability to uniquely identify inefficient expenditures;
- the stringency in the benchmark of efficiency which is being applied[4];
- whether efficiency can be distinguished from below-standard quality.

Cost inputs have been collected in the data collection phase and have been compared against available benchmark costs. Where possible in the model, bottom-up costs have been reconciled with top-down costs identified in operator accounts.

2.5 Costs of supply using modern technology

In a market, a new entrant that competes for the supply of a service would deploy modern technology to meet its needs – since this should be the efficient network choice. This implies four 'modern' aspects: the choice of network technology (e.g. TDM vs. IP), the capacity of the equipment, the price of purchasing that capacity, and the costs of operating and maintaining the equipment. Therefore, a LRIC model should be capable of capturing these aspects:

- The choice of technology should be efficient.

- Equipment capacity should reflect the modern standard. New generation switches may also be optimised to give improved capacity (e.g. VoIP call server performs *control-plane* switching, whilst the separate IP switches convey the *user-plane* voice traffic).

- The modern price for equipment represents the price at which the modern asset can be purchased over time. It should represent the outcome of a reasonably competitive tender for a typical supply contract in Malta.

- Operation and maintenance costs should correspond to the modern standard of equipment, and represent all the various facility, hardware and software maintenance costs relevant to the efficient operation of a modern standard network.

[4] For example: most efficient in Europe vs. most efficient in the world.

3 Model structure

This section summarises some fundamental modelling design and structure issues, in particular:

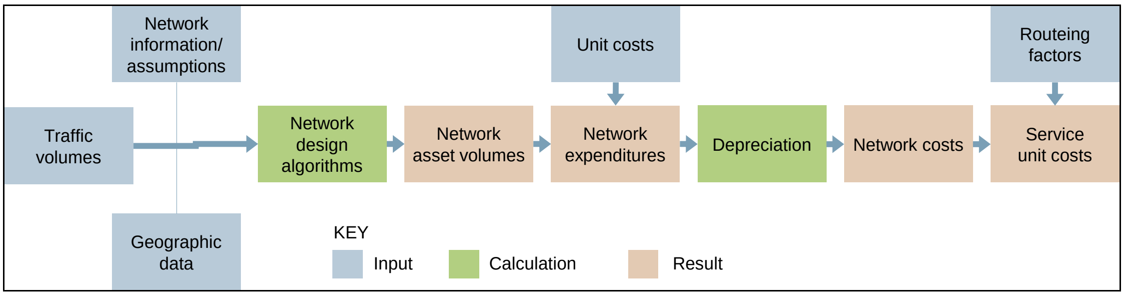
- the model type (Section 3.1);
- the modularity of the model (Section 3.2);
- the choice of operator and scale (Section 3.3);
- the footprint of the model (Section 3.4);
- the services modelled (Section 3.5).

3.1 Model type

The MCA's aim was to develop a bottom-up model of a fixed core and access network which meets the specification and principles of the 2009 EC Recommendation on wholesale termination and that on regulated access to NGN. For this purpose a bottom-up LRIC methodology was adopted.

This bottom-up LRIC model ('BUCM 2' hereafter) was built on a number of modelling/calculation steps, as shown in Figure 3.1 below.

Figure 3.1: Bottom-up cost model



The **Network information/assumptions** module considers which assets are required for the network and contains a database of their capacities and lifetimes. The **Geographic data** module consists of network locations or site classifications and their individual requirements which might be influenced by their remoteness and/or local topology. The traffic generated by these locations is calculated bottom-up in the **Traffic volumes** module. **Network design algorithms** then use this data to construct an efficient network and, having built it, produce the required **Network asset volumes**. These are then turned into yearly **Network expenditures** with inputs of their **Unit costs**.

The **Depreciation** module is a self-contained implementation of the selected depreciation method which depreciates each asset individually. The resulting annualised costs are then aggregated to calculate **Network costs.** Thereafter, **Routing factors** determine the allocation of the network costs to different **Service elements** on the basis of the network load generated by the individual services. These normally reflect the cost drivers used in the network design algorithms.

3.2 Model modularity

The model is built using a modular approach and is divided into:

- Three Calculation modules that map onto the network and whose outputs are the costs of service elements:
  - subscribers (and traffic)-driven access module ('Access module');
  - traffic-driven core module ('Core module');
  - voice-only core network systems and platforms module ('Voice module').
- An Input and Output module allowing the costing of full end-to-end products by combining outputs from the three modules.

This concept is highlighted in Figure 3.2.

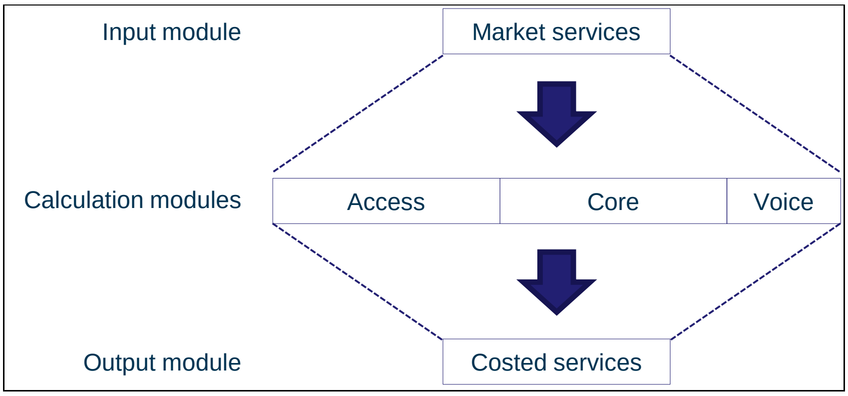


Figure 3.2: Overview of model flow

The **Access module** models the network from the local exchange MDF downwards.

The **Core module** models the traffic driven network from the local exchange MDF upwards, excluding those parts that are modelled in the Voice systems module.

The **Voice systems** module includes the costs of the specific voice systems and platforms such as Call servers, media gateways, interconnect gateways, VoIP service hardware and software.

The **Input and Output module**, hereafter referred to as the **Service costing module**, includes common inputs such as demand for services and WACC, and the calculation and representation of the cost of end-to-end services (through combining costs of service elements from the three calculation modules).

A separate **Market (or market services) module**, containing market data and forecasts, has also been developed. This provides inputs into the network dimensioning and service cost calculations in all modules.

3.3 Choice of operator and scale

The BUCM 2 uses GO's scale and scope as a proxy of the model's hypothetical efficient operator. The choice of GO as a proxy for the model's hypothetical efficient operator reflects the fact that, to date, the operator offers the majority of the regulated services under review (Leased Lines, Ethernet, fixed voice termination/origination, etc.), as well as having a significant presence in such markets.

3.4 Footprint of model

The MCA has not made any geographical differentiation in its regulation. The cost model therefore has a national footprint.

The footprint of the core network (and in some parts, fibre backhaul from cabinets) is shared with a variety of other activities reflecting the characteristics of fixed networks.

3.5 Services modelled

Economies of scope, arising from the provision of multiple services across a single infrastructure, will result in a lower unit cost for voice and data services. This is particularly true for networks built on a next-generation architecture, where voice, data and video services can be delivered via a single platform.

In order to ensure the correct allocation of costs, the model includes:

- **Specific services currently subject to regulation**: voice call termination and origination; certain classes of trunk segments of leased lines including Ethernet services and international trunks; terminating segments of leased lines including Ethernet services (over copper or fibre); and other access products.
- **Other network services** that are conveyed in the same network but which currently are not regulated, such as voice transit, Internet data (which will provide a significant proportion of the traffic), IPTV and VoD streams. This also implies that both end-user and wholesale voice services are modelled so that the voice platform is correctly dimensioned and costs are fully recovered from the applicable traffic volumes.

4 Network configuration

The technology choice is inherently linked with the concept of modern equivalent. The definition of modern equipment is a complex issue. Fixed operators around the world are at different stages of deploying fixed, next-generation, IP-based networks: from initial plans to fully deployed.

From a technology perspective, the status of the services under consideration is different. In the case of voice services, different operators are using different strategies. On the other hand, traditional leased lines services are by definition provided over legacy SDH equipment, whilst Ethernet connections are provided using IP equipment.

The EC Recommendation[5] also states that the efficient technological choice for fixed termination is an NGN-based network.

As a result, the MCA has modelled in detail two distinct scenarios:

- an ***'As-Is'* scenario** based on the latest financial year for which full year data is available (2011);
- an ***'FTTC NGA and all-IP NGN'*** scenario expected to reflect the modern efficient technological choice that meets the requirements of the EC Recommendation.

The differences between the scenarios can be summarised as follows:

- *Network architecture*: the '*As-Is*' and the '*FTTC NGA and all-IP NGN*' scenarios are both based on a full FTTC architecture.

- *Voice systems*: the *As-Is* configuration will simulate a network in which voice is still provided using legacy technology. In the *FTTC NGA and all-IP NGN* scenario, voice will instead be provided over a converged all-IP network.

- *Transmission protocols:* in addition to an IP-based network, the *As-Is* configuration includes a (parallel) legacy SDH network for the provision of leased lines and for backhaul of voice traffic from local exchanges. The *FTTC NGA and all-IP NGN* configuration instead models only one full IP-based network.

For the active equipment dimensioning, the modelling of the *As-Is* legacy SDH network relies on some of the previous calculations applied in the current BUCM.

5 Commission Of The European Communities, *COMMISSION RECOMMENDATION of 7.5.2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU*, 7 May 2009.

The network has been modelled according to a scorched-node configuration based on:

- exchange sites in which main distribution frames (MDFs) are deployed. These sites are the perimeter points between the access network and the core network. Each one of them serves the lines in a pre-determined area (MDF area).

- a number of cross-connect cabinet locations that are located in the MDF areas. Lines with short local loops are served directly from the MDF site.

4.1 Access network configuration

A residential fibre-to-the cabinet (FTTC) access network in which all cross-connect cabinets are complemented with adjacent cabinets hosting active equipment has been modelled. xDSL data services are provided over this network in both the short term and the long term. Voice services instead continue to be served from the local exchanges (using the primary copper cables) for all lines.

It was assumed that:

- the routes between the local exchanges and the cabinets that are hosting primary copper cables and FTTC fibre cables are equipped with ducts;
- the secondary copper cables and final drops connecting the cabinets to the end-user premises are deployed aerially.

Lines served through FTTC cabinets are connected by final drop cables and secondary copper cables to the cross-connect cabinets. From there, the copper connections are patched to the FTTC cabinets deployed in close proximity to the cross-connect cabinets. The FTTC cabinets include a splitter that separates the voice signal from the xDSL signal, these are then treated separately.

In terms of the access network, the main difference between the *As-Is* scenario and the *FTTC NGA and all-IP NGN* scenario is in the treatment of the voice signal from this point onwards.

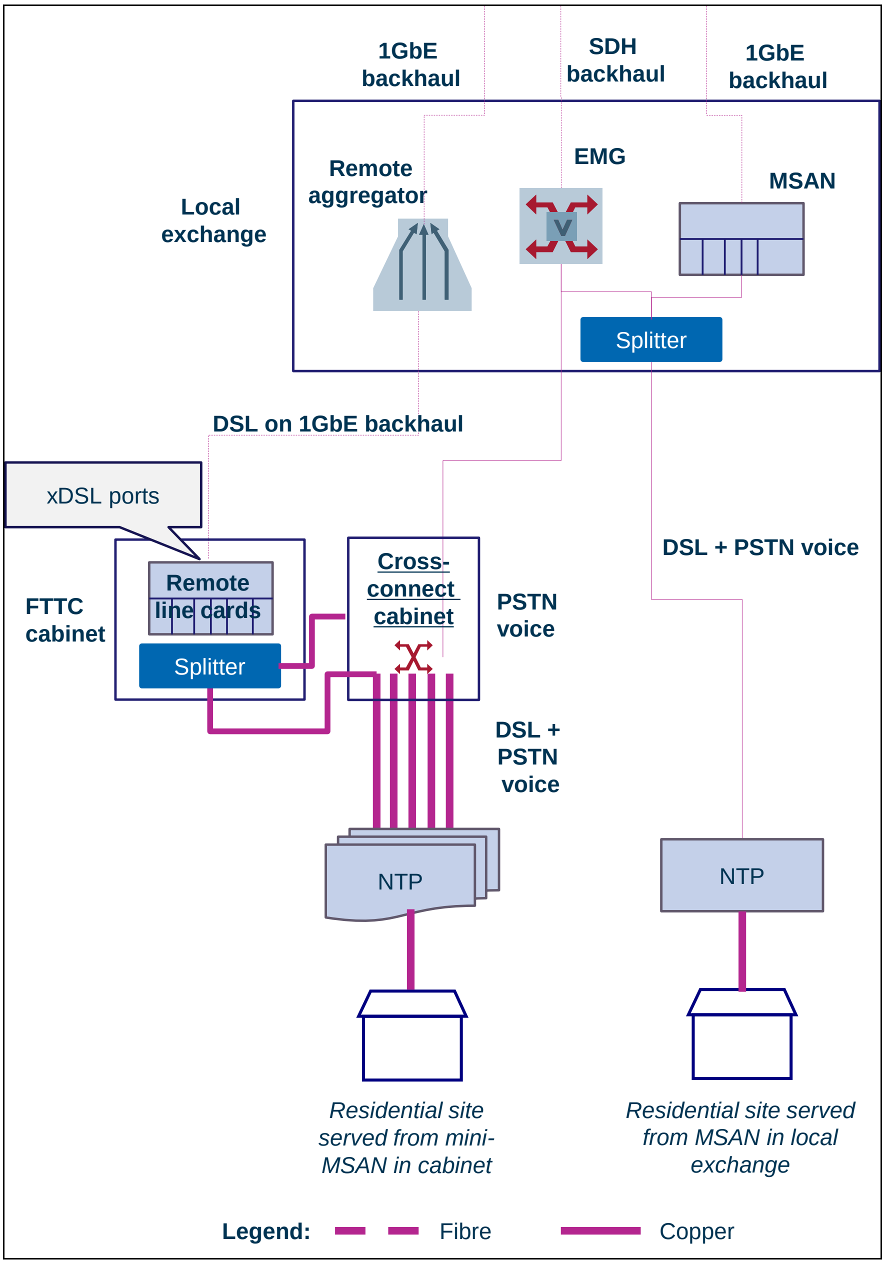
As-Is scenario

- Voice: In the *As-Is* scenario, voice services are, both for subscribers connected to the cabinet and for those directly connected to local exchanges, provided over the legacy EMG/RSS situated in the local exchanges.

  Data: the xDSL data signals are routed to the remote line cards (also referred to as mini-MSANs) in the FTTC cabinets. From there they are delivered to remote aggregators over 1GbE interfaces. The connections between the FTTC cabinets and the local exchanges are over fibre.

This set-up is shown in the figure 4.1 below.

Figure 4.1: Modelled current (As-Is scenario) residential access network [Source: Analysys Mason]



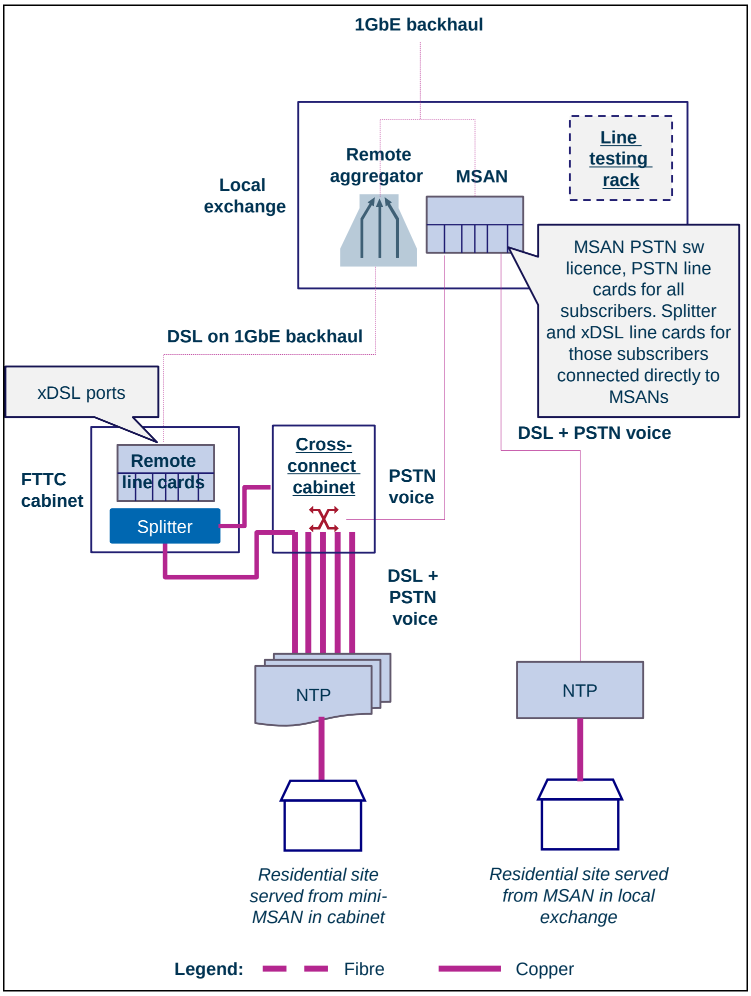
FTTC NGA and all-IP NGN scenario:

- Voice: the PSTN voice signal is routed back to the cross-connect cabinets and then patched through to the local exchanges over the primary copper cables. At the local exchanges, voice is handled by PSTN line cards in multi-service access nodes (MSANs).

- Data: the xDSL data signals are routed to the remote line cards (also referred to as mini-MSANs) in the FTTC cabinets. From there they are delivered to remote aggregators over 1GbE interfaces. The connections between the FTTC cabinets and the local exchanges are over fibre.

These MSANs thus provide xDSL data and PSTN voice services for the direct lines and PSTN voice services for the FTTC lines. The model has therefore taken into account also line testing racks and PSTN software licences at the MSAN sites. A schematic overview of the modelled network is provided in Figure 4.2.

Figure 4.2: Modelled future (FTTC NGA and all-IP NGN scenario) residential access network [Source: Analysys Mason]



In both the *As-Is* and the *FTTC NGA and all-IP NGN* scenarios, in parallel to the copper/FTTC network, separate fibre connections have been modelled from the local exchanges to specific end-user sites for the provision of leased lines, Ethernet connections or PRA multi-channel voice connections.

4.2 Core and aggregation network configuration

The model includes both traditional and next-generation network (NGN) core architectures. An NGN core is defined as a converged IP-based platform, which will carry all services on the same platform. Both core architectures are explained in further detailed hereunder:

IP core and aggregation network

The modelled modern IP core and aggregation network includes all of the MDF sites that are connected via fibre connections and can be delineated as follows:

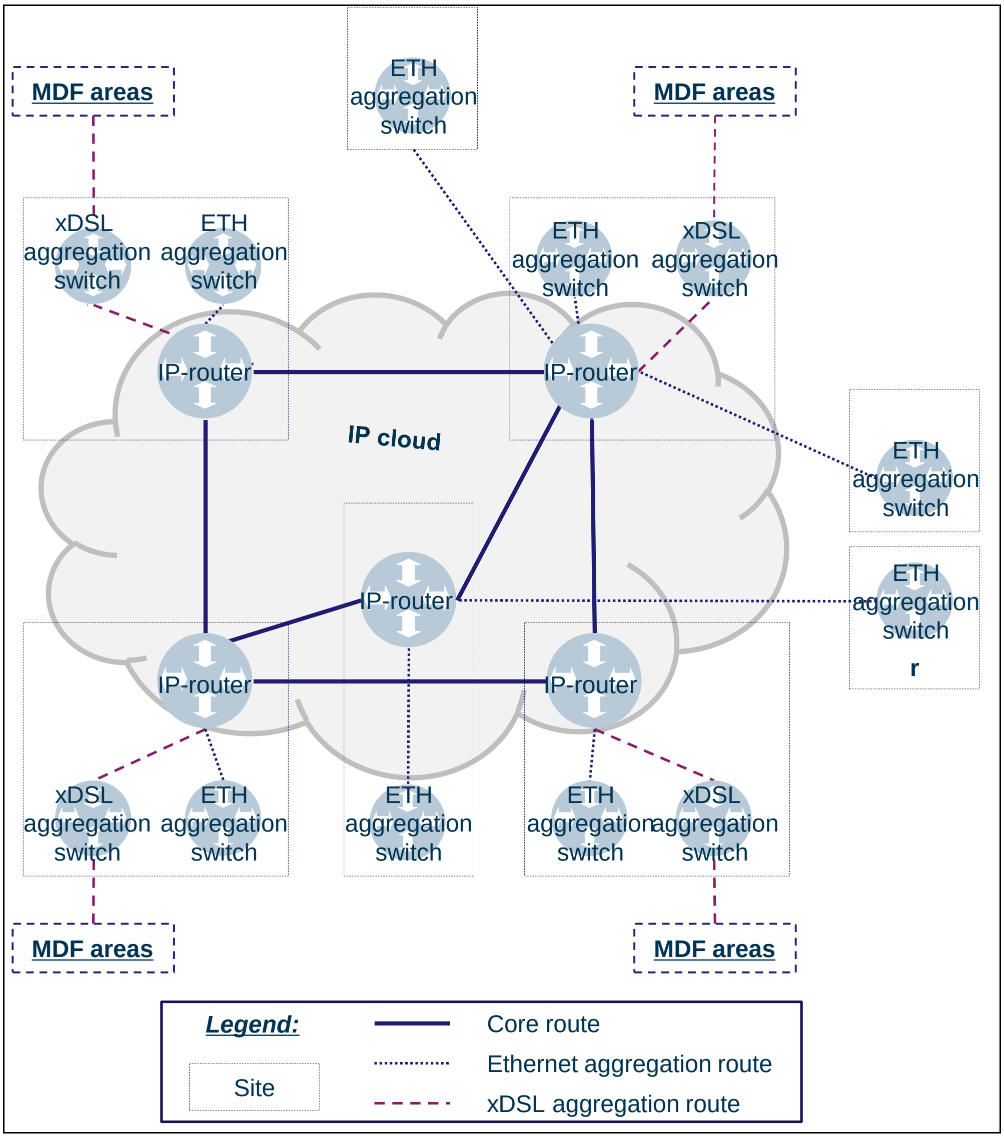
- **An IP core network**: The IP core network comprises IP core routers in a number of core sites connected in a ring topology (see Figure 4.3). The network also comprises various service platforms, including voice platforms in the *FTTC NGA and all-IP NGN* scenario, which are situated in various core nodes, as well as connections to international gateways in a subset of these core nodes. The core network is configured with multiprotocol label switching (MPLS) in order to allow the configuration of virtual private networks (VPNs) and thus to guarantee service levels and capacity e.g. for voice and Ethernet connections. A DWDM layer is also included to ensure resilience.

- **Two logically separate aggregation networks** (see Figure 4.3):
  - — one connecting xDSL subscriber facing equipment in each one of the MDF sites to the aggregation switches in the core sites and from there to the IP core routers;
  - — one connecting Ethernet switches connections with aggregation switches in a number of nodes and from there to the IP core routers.

  The aggregation networks are not provided with MPLS but are instead provided as Ethernet connections (1GbE or 10GbE depending on capacity need). Quality of service is instead provided by over-provisioning and by the separation of the business Ethernet and residential xDSL aggregation networks.

An overview of this network is provided in Figure 4.3.

Figure 4.3: Schematic overview of the modelled IP core and aggregation networks [Source: Analysys Mason]



The modern IP core and aggregation networks are used for the provision of data services (xDSL, IPTV/VoD and Ethernet connections), in both the *As-Is* and the *FTTC NGA and all-IP NGN* scenario. It was assumed that none of the above-mentioned data services are provided using ATM technology, which is considered a legacy technology in the process of being phased out. The IP core and aggregation networks are also used for the provision of voice services in the *FTTC NGA and all-IP NGN* scenario (see Section 4.3).

On the other hand an SDH core and aggregation network is used for the provision of voice services and traditional leased lines in the *As-Is* scenario. This network is detailed hereunder.

SDH core and aggregation networks

An SDH core and aggregation network that is (logically) separate from the IP core and aggregation network has been modelled for the provision of traditional leased line and voice services solely in the *As-Is* scenario of the model. For the *FTTC NGA and all-IP NGN* scenario, it is assumed that voice services will be migrated to an all IP-based platform whereas traditional leased lines will be phased out and migrated onto Ethernet connections.

The SDH network has been assumed to be the same as that used in the BUCM1.

4.3 Voice network and systems configuration

In the model there is a clear distinction in the treatment of the voice service between the *As-Is* scenario and the *FTTC NGA and all-IP NGN* scenario. This is dealt with in further detail in the following sub-sections.

As-Is Scenario

The current 2011 (*As-Is*) network is modelled according to the same methodology used in BUCM1. EMGs/RSS' are thus installed in each of the local exchanges. From there, traffic is carried over the SDH network to one of the media gateways, which are interconnected with each other over ATM protocol. These media gateways are grouped in domains, with each domain controlled by a Telephony Server. Interconnection can be performed at each of the media gateways and alternative operators are required to interconnect in at least one site in each domain.

FTTC NGA and all-IP NGN scenario

In the *FTTC NGA and all-IP NGN* scenario, voice signals are carried over IP in the converged core and aggregation networks (the treatment of voice in the access network is described in Section 4.1).

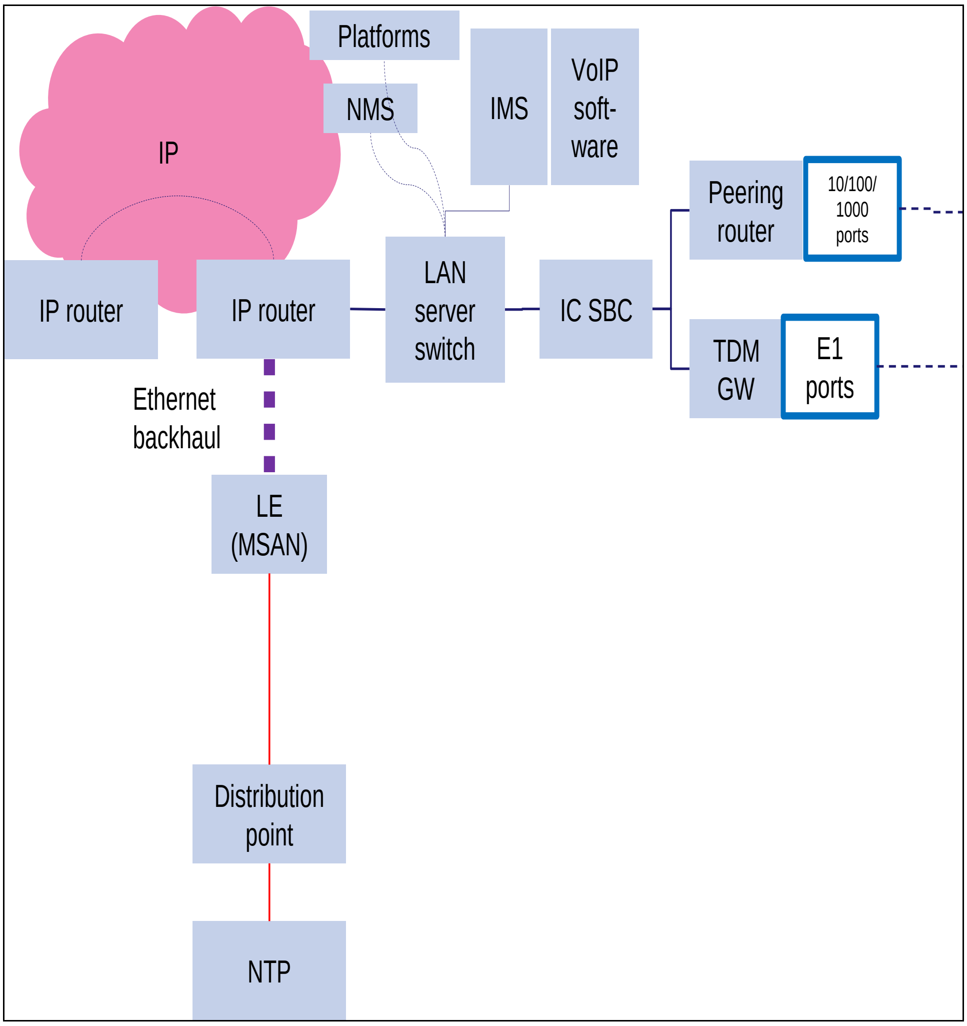
The conversion from the PSTN access protocol to IP is done by the MSAN line cards at the local exchanges. Voice signalling and call handling is provided by call servers over an IP multimedia subsystem (IMS) hosted in the core nodes.

The entire network is handled as one single domain with interconnection provided in two locations in order to provide redundancy. Interconnection is carried out over TDM protocol through IP-TDM interconnect gateways (one in each interconnection point) that translate incoming and outgoing traffic between IP and TDM.

Session border controllers (SBCs) are also included in the network in order to control the edge between network-facing IP and the OAO-facing TDM.

In addition, the network also includes peering routers to allow IP interconnect, e.g. for international calls. The network configuration is shown in more detail in Figure 4.4 below.

Figure 4.4: Overview of the voice network configuration [Source: Analysys Mason]



5 Market module

The model has been based on a market-led approach. For the *As-Is* scenario this is done based on 2011 actual data. The modelling of the forward-looking *FTTC NGA and all-IP NGN* scenario however requires the development of forecasts for the various services modelled in order to take into account anticipated changes in market conditions and the usage of specific services. The development of such forecasts is done in the Market Module. The *FTTC NGA and all-IP NGN* scenario can then be run with the inputs for a selected year.

The Market module uses demand data for the Maltese market from various sources such as:

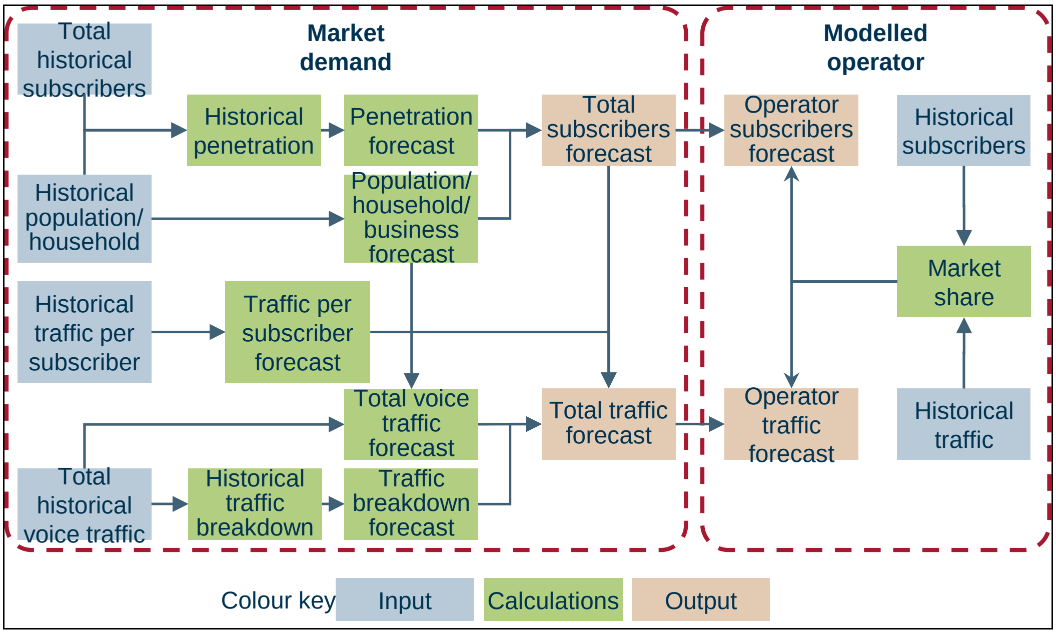
- MCA statistics: This includes data submitted by the Maltese operators to the MCA on a regular basis as part of the MCA's ongoing market monitoring activities and includes data for the following segments:
  - fixed voice traffic and subscribers;
  - mobile voice traffic and subscribers;
  - Internet subscribers;
  - TV subscribers;
  - leased line subscribers.

- Data provided by operators specifically for this project.

- Population, household and business sites statistics sourced from the Maltese National Statistics Office and from Euromonitor.

Based on this data, a forecast for the development of the entire Maltese market has been devised covering the period up to 2025. The demand for the modelled operator is then derived from this total demand based on the market shares applied. Figure 5.1 shows an overview of the logical flow in the Market module.

Figure 5.1: Logical flow of the Market module



The methodology used for the market demand depends on the forecast unit:

- Subscribers' forecasts are typically based on penetration and then multiplied by extrapolations of population or household numbers. Where penetration numbers provide little guidance (such as leased lines or Ethernet connections), these were forecasted directly.
- Voice traffic is forecasted separately (and then cross-checked against subscriber usage).
- Data traffic is forecasted on a per-subscriber basis. Total traffic is then derived by multiplying by the number of subscribers of the given service.

5.1 Market forecasts

The Market module generates forecasts at the market level for the following services:

Subscribers and connections
Voice subscribers • mobile • fixed
Internet subscribers • retail • Bitstream
Leased lines • by technology (Traditional vs. Ethernet)

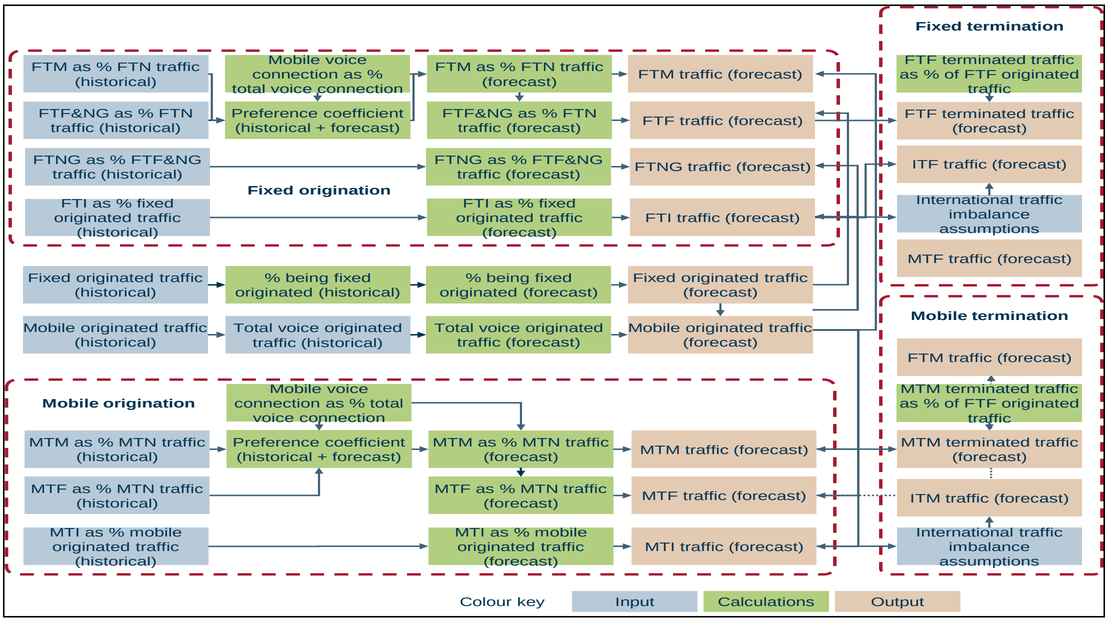
Figure 5.2: Market services modelled

• by capacity (64bit/s, 2Mbit/s, etc.)
Pay-TV subscribers • by type (linear broadcast, video on demand)
Service usage
Voice traffic • Fixed-to-fixed (incoming/outgoing) • fixed-to-mobile and mobile-to-fixed • fixed-to-international and international-to-fixed • mobile-to-mobile • mobile-to-international and international-to-mobile • international transit
Data throughput • pay TV • Internet traffic

Mobile subscribers and traffic are included in order to estimate traffic from fixed to mobile networks and vice versa.

The methodology for forecasting fixed (and mobile) wholesale termination traffic is shown in Figure 5.3.

Figure 5.3: Methodology for forecast of fixed (and mobile) wholesale termination traffic[6]



[6] FTI = fixed to international, FTN = fixed to national, FTM = fixed to mobile, FTF&NG = fixed to fixed and non-geographic numbers, FTF = fixed to fixed, FTNG = fixed to non-geographic numbers, MTI = mobile to international, MTN = mobile to national, MTM = mobile to mobile, MTF = mobile to fixed, ITF = international to fixed

Fixed originated and mobile originated traffic is split and forecasted separately. Both types of traffic are then divided into subcategories in order to allow a more granular forecast. The relevant traffic types are then summed up in order to calculate the fixed termination traffic, this includes fixed-to-fixed (FTF) and mobile-to-fixed (MTF). International-to-fixed (ITF) and fixed-to-international (FTI) traffic are correlated – people who frequently make international calls are also more likely to receive calls from foreign destinations. Hence, an 'international traffic imbalance' factor, defined as the ratio of ITF-to-FTI traffic, is assumed to estimate ITF traffic from the FTI traffic determined earlier.

5.2 Operator forecasts

The model has been calibrated to actual market shares. For this purpose, the 2011 market shares have been used for all future years. Mobile forecasts for the operator are not used in the fixed model as the scope is limited to fixed network services. National transit has been derived at the operator level to avoid double-counting in the market level and has been forecasted to remain relatively stable as a share of total market traffic (fixed and mobile originated traffic).

5.3 Conversion into modelled services

For traditional leased lines and Ethernet connections, the modelled services are somewhat different from the market services. The model distinguishes between terminating, trunk and international segments, as opposed to the national and international connections that are sold in the market. For this purpose, it has been assumed that:

- all national lines, except interconnection paths, have two terminating segments and one trunk segment;
- interconnection paths have one terminating segment and one trunk segment;
- international lines have one terminating segment, one trunk segment and one international segment.

All connections or lines are converted into Average of Period connections in order to allow for cost recovery calculations. Average of period connections for the year *n* are calculated as the average of the End of period connections in year *n-1* and year *n*.

6 Common inputs

This section introduces a number of inputs that are common across all modules.

6.1 Weighted average cost of capital

In September, the MCA published a consultation document on the review of the weighted average cost of capital (WACC)[7]. Once the process is finalised, the model will be updated with the new WACC. Pending finalisation of that process, the model uses the current WACC rate for the fixed market i.e. 12.56% (pre-tax, nominal).

Since this consultation is being carried out in parallel with the WACC consultation, for the sake of clarity and without prejudice to the outcome of the WACC consultation process, the MCA is, where relevant, providing the corresponding values using the WACC rate proposed in the September consultation for the fixed market (i.e. 9.65%).

6.2 Valuation and depreciation methodologies

The model must take account of the valuation, and the depreciation of that asset value over its lifetime.

The model is built around the concept of **Gross replacement cost** i.e. what it would cost to replace the whole network asset base according to the current price of assets 'today'. The gross replacement cost (GRC) may also consider modifications for the relevant *modern-equivalent* assets.

Having established the capital value of assets to be considered, the model is capable of calculating four different depreciation methods for recovering those values with a discount factor for the cost of capital employed:

- **standard annuities** described in Section 6.2.2;
- **'traditional' tilted annuities**, which are described in Section 6.2.3;
- **modified tilted annuities**, which are described in Section 6.2.4;
- **straight-line depreciation** with the assumption that the assets are on average 50% (or some other estimated percentage to be defined) depreciated. The methodology is included in the model but is not applied for any element.

The lifetime of the depreciation method is also important, as it establishes the rate of cost recovery. The options are:

- **accounting lifetimes;**

[7] http://www.mca.org.mt/consultation/consultation-and-proposed-decision-estimating-cost-capital-mcac12-1306

- **economic lifetimes;**
- **remaining lifetime.**

6.2.1 Asset valuation

The GRC is calculated by taking the number of network elements active in the network (in each year) and multiplying by the unit cost of the network element (in each year). The unit cost in each year changes with inflation and real-terms price trends.

6.2.2 Standard annuity

The standard annuity methodology calculates a fixed annual value including both capital charges and asset depreciation / amortisation using the formula shown below:

$$Annuity = GRC \times WACC \Big/ 1-\left(\frac{1}{1+WACC}\right)^{lifetime}$$ *Where:* *GRC = gross replacement cost of asset* *WACC = weighted average cost of capital* *lifetime = useful lifetime of asset*	*Figure 6.1: Formula used to calculate 'standard' annuity*

6.2.3 Traditional tilted annuity

For traditional tilted annuity calculations, a starting value for assets in the network is used. An annualised cost is then calculated using the formula shown in Figure 6.2.

$$Tilted\ Annuity = GRC \times WACC - tilt \Big/ 1-\left(\frac{1+tilt}{1+WACC}\right)^{lifetime}$$ *Where:* *GRC = gross replacement cost of asset* *tilt = annual change of annuity* *WACC = weighted average cost of capital* *lifetime = useful lifetime of asset*	*Figure 6.2: Formula used to calculate tilted annuity*

This traditional tilted annuity method factors only the asset changes over time in the tilt, allowing an increase or decrease in depreciation in the early years of an asset's lifetime.

This method is commonly used in telecoms cost models, and is favoured in contestable markets, where an operator has to reduce its prices based on the cost of its inputs in order to remain competitive with (potential) new entrants to the market.

6.2.4 Modified tilted annuity

The traditional approach to tilted annuity does not, however, factor in changes in demand. For this reason, we have included a forward-looking 'modified' tilted annuity calculation, which factors both usage and price trends into the tilt. With this methodology, the asset price trend and the increase in asset utilisation are combined into the tilt using the formula set out in Figure 6.3.

$$Tilt = (1+i)\times(1+p)\times {}^{1}\!/_{1+i\times z} - 1$$

Where:
i = projected increase in asset utilisation
p = asset price trend
z = share of fixed costs as a proportion of total asset costs[8]

Figure 6.3: Formula used to calculate the tilt [Source: Agcom[9]]

6.3 Valuation and depreciation methodologies used

The following methods are used within the BUCM 2.

Valuation and depreciation method	**Network elements with this depreciation method**
GRC Standard annuity Economic lifetime	Buildings
GRC Modified tilted annuity Economic lifetime	Currently used for most network elements
GRC Tilted annuity Economic lifetime	Currently used for some network elements (i.e. effectively those with a 0% utilisation trend)
GRC, 50% (or other %) depreciated Straight line Economic lifetime	Not yet adopted for any elements at the current time

Figure 6.4: Valuation and depreciation methods used in the BUCM 2

Modified tilted annuity is, as can be seen in the table above, the default option for the model. The assets for which 'traditional' tilted annuity is used are the following:

8 The z-value in the formula has been set to zero throughout our model as we consider the costs of all assets to be volume-dependent, even if they are sunk costs.

9 Published by Agcom e.g. in Delibera n. 251/08/CONS from 14 May 2008.

- all access module items
- the core and voice module items shown in Figure 6.5.

Asset	Module
Aggregator for remote line cards	Core
Access nodes: MSAN processor / rack	Core
Access nodes: MSAN core facing ports – 1GE ports	Core
Transmission SDH: T-Mux and Mux chassis	Core
Transmission SDH: T-Aggregate cards STM-1	Core
Transmission SDH: ADM STM-1	Core
Transmission SDH: ADM STM-4	Core
Transmission SDH: ADM STM-16	Core
Transmission SDH: cross-connect chassis	Core
Transmission SDH: STM-1 shared tributary cards	Core
Transmission SDH: STM-1 tributary cards for clients with ADM	Core
Transmission SDH: STM-4 aggregate cards	Core
Transmission SDH: STM-16 aggregate cards	Core
E1 Tributary cards	Core
SDH international equipment: STM-16 Tributary cards	Core
SDH international equipment: STM-1 Tributary cards	Core
IPTV and VoD platforms	Core
Clock and synchronisation equipment	Core
Network management system	Core
Network billing system	Core
IMS network management systems	Core
Common control layer (DIAMETER, HSS, Legal Intercept) for IMS	Core and voice
Call servers, including all call functions, ENUM, MRF	Voice
Voice application layer: software and IP interface	Voice

Figure 6.5: Assets for which the 'traditional' tilted annuity methodology is used

The BUCM2 is capable of handling other types of valuation such as CCA depreciation and HCA depreciation.[10] Although the MCA is proposing a GRC / modified tilted annuity

10 CCA or current cost accounting depreciation is based on net current value (what the net (i.e. remaining) value of the network is today, according to the current price of equivalent assets). Whereas HCA or historical cost accounting depreciation is based on Historical value

approach, it reserves the right to revert to other valuation/depreciation methods if market conditions require so in the future. This will in any case be done following consultation with interested parties.

The rest of this section summarises the features of the key decisions.

6.4 Geographic analysis

A top-down analysis for ducts and fibre, similar to that conducted for BUCM1, was carried out. In addition, a bottom-up geographical analysis has been conducted in order to allow a correct treatment of the future network in which there is no SDH network but instead possibly more IP connections.

The model therefore uses the top-down analysis for the *As-Is* scenario and the bottom-up analysis for the *FTTC NGA and all-IP NGN* scenario.

6.4.1 Top-down analysis

Calculation of cost inputs used in the analysis

For the top-down allocation, the values from GO's accounts were used as a starting point for deriving the network value. These have been adjusted for inflation from the date of installation to 2011 using inflation rates sourced from the National Statistics Office.

Subsequently the duct and fibre costs were allocated to relevant services in the model on the basis of their utilisation.

Allocation of duct costs between network segments

The ducts in the network are used as part of the:

- Core network: connecting core sites with other core sites.
- Aggregation network: connecting two network sites of which at least one is a MDF site and the other is either a MDF site or a core site.
- Access network, consisting of ducts:
  - connecting cross-connect cabinets to MDF sites: these ducts will host both copper and fibre cables;
  - connecting business and other sites to which fibres are deployed.

(what the net value of the network is today, according to the depreciated historical price paid).

Allocation of fibre costs

The fibre costs were divided between core, aggregation and access and mapped upon the services modelled in BUCM2 shown hereunder.

The following services are used in the BUCM2 model:

- core and aggregation fibres:
  - SDH: used for voice and leased lines trunk segments;
  - Ethernet business: (only aggregation layer as the core is assumed to be on the shared IP);
  - IP network: used for xDSL data in the aggregation layer and for business Ethernet and xDSL data in core layer;
  - Other: used for services not relevant to the modelled service set (including e.g. fibres utilised for internal testing purposes).

- access fibres:
  - Business connections (including traditional leased line and Ethernet terminating segments as well as PRA connections);
  - Cabinet backhaul;
  - Other: used for services not relevant to the modelled service set (including e.g. fibres utilised for internal testing purposes).

6.4.2 Bottom-up analysis

A bottom-up calculation has also been performed for the network. The purpose of this analysis is to allow a calculation of the amount of ducts and fibre to include in the *FTTC NGA and all-IP NGN* scenario in which the SDH network is turned off and a convergent core/aggregation network is used for all services, including Ethernet business connections (see Section 4).

Geographic analysis of ducts required to connect cabinets to MDF sites

The bottom-up calculation starts from a mapping of the cabinets that need to be covered in each MDF area.

A proprietary Analysys Mason network algorithm was used to estimate an access network linking the street cabinets back to their parent MDF in a tree structure. The algorithm produces an estimated tree network efficiently linking each street cabinet to its parent MDF based on geographical proximity.

This produces crow-fly links that do not account for geographical obstructions or other limitations. This has been multiplied with a typical road-to-crow distance factor of 1.3 (based on Analysys Mason best practice).

Geographic analysis of ducts required to connect MDF sites to MDF sites

The core network has been manually plotted 'as the crow flies' and with an estimated equivalent road route. This was chosen taking into account possibilities for sharing between the core and access networks.

Sharing between core and access duct

The extent of sharing between the access and the core network was further estimated. This was done through a geographic analysis where the core and access links have been overlaid on the map in order to estimate the sharing.

Analysis of ducts required to connect to business sites

An estimate of the amount of incremental duct needed to cover business sites was also included.

Fibre cables deployed

The bottom-up analysis also estimated the fibre cables that need to be deployed throughout the network.

Allocation to services

The above steps allowed the estimate of the amount of ducts and fibre cables that are needed in the network and the related costs. These costs were then allocated to the different services.

6.5 Space occupancy

For each network item located in one of the MDF sites (including the core sites), we have estimated the floor space required for hosting such equipment. In addition to this equipment-specific space, an uplift of 125% for general space (e.g. corridors) and power facilities was added[11]. In addition, it was assumed that there is an initial 'common' space of $10m^2$ in each of the MDF sites for the purpose of e.g. entry/exit facilities.

In order to estimate total space costs, we have then associated:

- A capital expense cost that covers the acquisition and completion of the site.
- An operating expense cost to cover additional operating costs except power costs (see Section 6.6)

[11] If the equipment specific space is x, the total allocated space is thus (1+1.25)*x

6.6 Power costs

Power consumption was modelled individually for each active equipment item.

6.7 Working capital allowance

Working capital has not been modelled explicitly, but an allowance is included, defined as a fraction of yearly opex. This is estimated to be equivalent to 30 days of opex expenditure multiplied by the WACC.

7 Service costing

This section provides an overview on the calculation of the increments for services under review.

7.1 Overheads

An overhead reconciliation exercise was carried out whereby the total opex of the 2011 *As-Is* scenario was compared with the total opex, including overheads as accounted in GO's 2010 Regulatory Accounts. The difference identifies the estimated common costs of the network and accordingly this difference was accounted for as an overhead mark-up. This has been kept constant also for the *FTTC NGA and all-IP NGN* scenario.

7.2 Increments

What follows is a description of the two specific sets of incremental costs which are calculated by the model. The cost structure of the model is illustrated below.

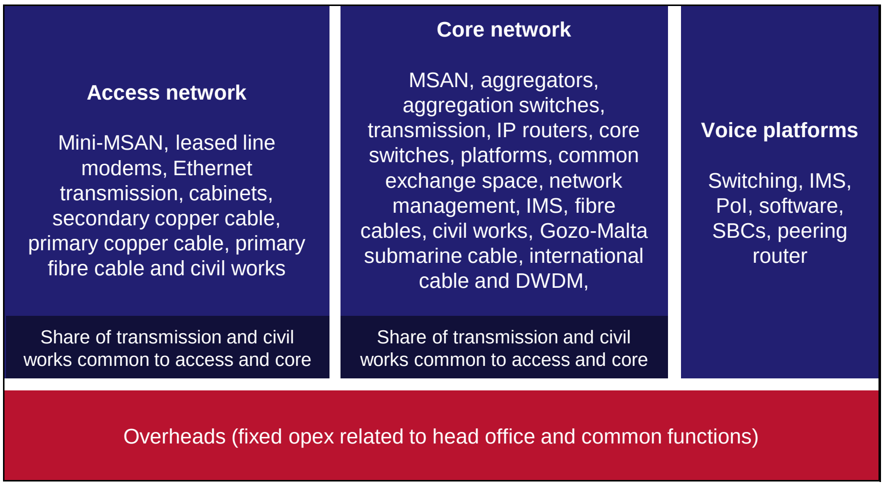


Figure 7.1: Illustration of cost structure

7.2.1 LRAIC+

The model produces the **long-run average incremental costs (LRAIC) plus a mark-up for common overheads costs** for all of the modelled services. These average incremental costs are obtained by applying service costing routing factors to the annualised costs of each network element, taking into account the total output (Mbit/s, minutes, connections, etc.) that is carried by the network element in the year.

The formula for this LRAIC unit cost per service calculation is:

$$Cost(Service_k) = \sum_{assets} cost\_per\_unit\_output(asset_i) \times RouteingFactor(asset_i, service_k)$$

Where:

- *Cost (Service$_k$)* = LRAIC of service *k*
- *Cost per unit output (asset$_i$)* = Annualised cost for asset *i* divided by total output carried in the year
- *RouteingFactor* is the matrix of service costing routing factors for each asset and service

The service costing routing factors applied to the annualised costs are identical to the network dimensioning routing factors except for the following important difference:

- In the network dimensioning, IPTV multi-cast traffic is replicated in the core and aggregation layers of the network, as the whole IPTV stream must be broadcast to each MSAN.
- In the LRAIC service costing calculation, a single IPTV multicast traffic stream (in Mbps) is factored in on the same basis as internet, voice and other data traffic (Mbps).

This means that the sharing of core network costs by traffic essentially is based upon the *service* traffic rather than the *aggregate network* traffic.

The LRAIC unit costs are illustrated in Figure 7.2.

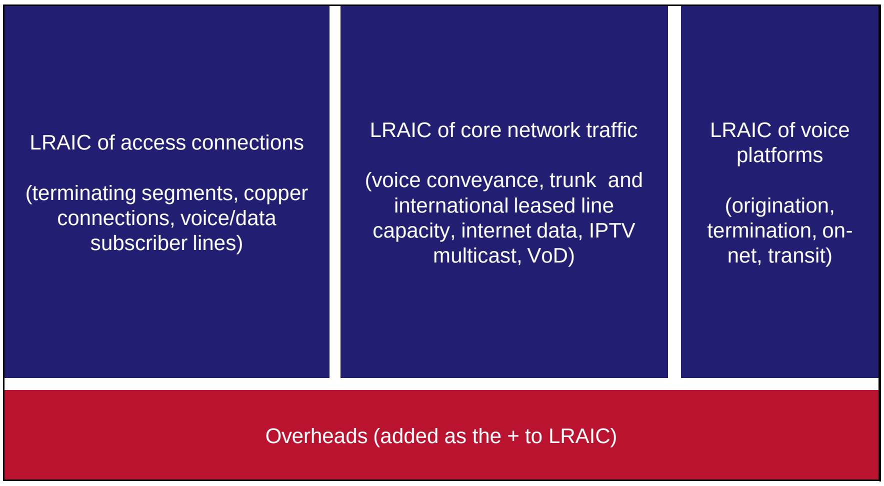


Figure 7.2: Overview of LRAIC unit costs

In the case of voice traffic, the total service cost must be combined from the core network and voice platform unit costs.

The overheads are marked up to the LRAIC using an equi-proportionate percentage.

7.2.2 Pure LRIC

As discussed in Section 1.1, one of the purposes of the model is to produce the pure LRIC of voice termination services. The modelling of a pure LRIC increment for the voice termination services is a requirement from the 2009 EC Recommendation for wholesale termination (2009/396/EC).

The pure LRIC increment differs from the LRAIC+ increment mainly in terms of the number of services or amount of traffic included in the increment volume applied in the model, and consequently the size of residual common costs remaining for the (optional) mark-up step.

Long-run *average* incremental costing is typically described as a large increment approach – all services which contribute to the economies of scale in the network are added together in a large increment; individual service costs are then identified by sharing out the large (traffic) incremental cost according to average resource consumption routeing factors. The adoption of a large increment – most likely some form of aggregate 'traffic' – means that all the services that are supplied are treated together and 'equally'. Where one of those services may be regulated, the regulated service neither bears, nor benefits excessively from, the lower costs arising from economies of scale. Conversely, the definition proposed by the EC is a small increment approach.

In the Recommendation, the incremental cost of **only the volume of wholesale termination**[12] is assessed 'at the margin' of the cost function. By building a bottom-up cost model containing network design algorithms, it is possible to use the model to calculate the incremental cost: by running it with and without the increment in question.

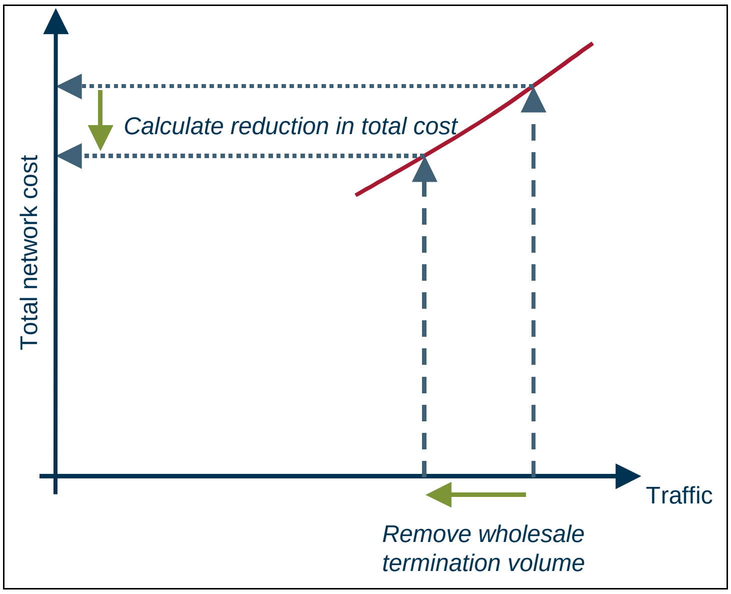


Figure 7.3: Calculating the incremental cost of termination traffic [Source: Analysys Mason]

12 I.e. termination of calls from third parties, but not of on-net calls.

The pure LRIC is calculated in the model by selecting a subset of network element unit costs from the LRAIC+. This subset of network elements should be only those which vary with the removal of the wholesale voice termination increment. According to the model, and because Malta is a small country with a large (mainly fixed) capacity NGN network, there are no costs within the core network that are sensitive to the existence of the wholesale voice termination increment. Only the IMS platform hardware plus software processing costs are considered to be part of the small increment that is wholesale voice termination. All other voice costs are considered as subscriber driven (i.e. independent of traffic) or fixed costs associated with the minimum configuration network in Malta that are traffic insensitive. The cost elements that are included in the LRAIC+ and the pure LRIC increment for the *FTTC NGA and all-IP NGN* scenario are shown in Figure 7.4.

The identification of these network items that are sensitive to the existence of the wholesale termination increment was done by comparing the results of the model with and without the wholesale termination service.

Figure 7.4: Network elements contributing to the LRAIC+ and pure LRIC of voice termination in the FTTC NGA and all-IP NGN scenario

Network element	Model module	In LRAIC +	In pure LRIC
Aggregator for remote line cards	Core	✓	
Access nodes: MSAN processor/rack	Core	✓	
Access nodes: MSAN core facing ports – 1GE ports	Core	✓	
Access nodes: Aggr. Switch res lines 1GE ports	Core	✓	
Access nodes: Aggr. Switch res lines 1GE port cards	Core	✓	
Access nodes: Aggr. Switch res lines 10GE ports	Core	✓	
Access nodes: Aggr. Switch res lines 10GE port cards	Core	✓	
Access nodes: Aggr. Switch res lines chassis	Core	✓	
IP: MPLS at core site: MPLS P router	Core	✓	
IP: MPLS at core site: 10x1GE cards	Core	✓	
IP: MPLS at core site: 1x10GE cards	Core	✓	
Core: 1GE transponders	Core	✓	
Core: 10GE transponders	Core	✓	
Residential aggregation: 1GE transponder	Core	✓	
Residential aggregation: 10GE transponder	Core	✓	
Core nodes: LAN switch – chassis	Core	✓	
Core nodes: LAN switch – 48x1GE port card	Core	✓	
Core nodes: LAN switch – 12x10GE port card	Core	✓	
Clock and synchronisation equipment	Core	✓	

Network management system	Core	✓	
Network billing system	Core	✓	
IMS network management	Core	✓	
Common control layer (DIAMETER, HSS, Legal Intercept)	Core	✓	
Local node: common site space	Core	✓	
Core node: common site space	Core	✓	
Transmission – Aggregation – IP	Core	✓	
Transmission – Core – IP	Core	✓	
Civilworks – Core – IP	Core	✓	
Gozo – Malta submarine cable	Core	✓	
Transmission shared with access	Core	✓	
Civilworks shared with access	Core	✓	
Call servers, including all call functions, ENUM, MRF	Voice	✓	✓
Voice application layer: software and IP interface	Voice	✓	
MSAN PSTN sw license per Mini-MSAN remote aggregator / MSAN	Voice	✓	
SBC – chassis	Voice	✓	
SBC 1GE port cards	Voice	✓	
Peering router – chassis	Voice	✓	
Peering router – port cards	Voice	✓	
IP TDM interconnect-GW – chassis	Voice	✓	
IP TDM interconnect-GW – 1GE port card	Voice	✓	

8 Proposed prices

The MCA will utilise the BUCM 2 to calculate the cost-oriented rates for a series of products subject to ex-ante price regulation. This section contains proposed prices for:

- Fixed termination rates (Section 8.1);
- Fixed origination rates (Section 8.2).

8.1 Fixed termination rates

8.1.1 Current rates

The MCA last set fixed termination rates in 2010. These rates were set through the BUCM1 developed in 2005 and subsequently updated. The rates were based on a model of a voice network similar to the one operated by GO at the time and calculated with a LRAIC+ increment (see Section 7.2.1). The model calculated an average cost from which peak, off-peak and night rates were calculated through the application of time-of-day gradients.[13] These gradients were calculated from GO's retail tariffs. These termination rates are shown in Figure 8.1.

Type	Rate (EURcent / min)
Average	0.7163
Peak	0.802
Off-peak	0.638
Night	0.573

Figure 8.1: Current termination rates

8.1.2 Efficient modelled costs

The European Commission has, in its 2009 Recommendation on fixed and mobile termination rates[14] prescribed that fixed termination rates should be:

- calculated with a bottom-up LRIC model of an efficient modern network with a converged next-generation core network;
- calculated with the pure LRIC increment.

13 Peak is defined as from 08:00 to 18:00 from Monday to Friday including public holidays. Off-peak is defined as from 06:00 to 08:00 from Monday to Friday including public holidays and from 06:00 to 18:00 on Saturdays and Sundays. Night is defined as from 18:00 to 06:00 all week including public holidays

14 Commission Of The European Communities, COMMISSION RECOMMENDATION of 7.5.2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU, 7 May 2009.

The technological choices described above are compliant with the *FTTC NGA and all-IP NGN* scenario in BUCM 2 and the model has been prepared to calculate a pure LRIC cost as described in Section 7.2.2. The pure LRIC cost using these choices has been calculated based on 2011 market data and equipment prices.

This results in an average calculated cost for the wholesale fixed termination service of 0.0460 Euro cent per minute (based on the current WACC rate of 12.56%). The expected wholesale fixed termination rate[15] using the proposed new WACC rate of 9.65% is calculated at 0.0443 Euro cent per minute.

8.1.3 Time-of-day gradients

The previously set wholesale termination prices were differentiated between peak and off-peak calls through the application of a time-of-day gradient on the calculated cost output from the model. This gradient was calculated by reference to the retail prices set by GO. The retail pricing in the Maltese market has however developed in a way that makes such time of day gradients less applicable. Operators are still applying differentiated peak and off-peak prices to some subscribers but have for a number of years been including large bundles of minutes into a fixed monthly fee. The MCA considers that these changes to the market context render the use of time-of-day gradients unnecessary as:

- they are difficult to calculate accurately;
- they have no significant meaning to consumers;
- the relevant costs were modelled at peak usage and hence cost recovery of network usage is safeguarded.

The MCA therefore proposes not to apply time-of-day gradients on wholesale fixed termination rates and apply instead a uniform average charge. The MCA believes that this change will afford more leeway to operators to decide whether and how to differentiate their retail pricing.

8.1.4 Glidepath

The proposed new termination rates represent a significant drop vis-à-vis the current levels in the market. Coupled with the change in the charging mechanism explained in the preceding section, the MCA is of the opinion that introducing considerable reductions abruptly is likely to result in significant disruptions in the market. The MCA therefore is considering to apply a glidepath between the current rates and the proposed rate calculated with the pure LRIC methodology. The duration of the glidepath being considered and its associated rates are displayed in Figure 8.2 and Figure 8.3 below:

[15] This computed rate is subject to change following the outcome of the MCA's decision on the WACC rate review

Figure 8.2: Possible glidepath for fixed termination rates calculated using WACC rate of 12.56%

	Step 1	Step 2
From	1 January 2013	1 July 2013
To	30 June 2013	31 December 2013
Price (EURcent / min)	0.3812	0.0460

Figure 8.3: Glidepath considered for fixed termination rates calculated using WACC rate of 9.65%

	Step 1	Step 2
From	1 January 2013	1 July 2013
To	30 June 2013	31 December 2013
Price (EURcent / min)	0.3803	0.0443

8.2 Fixed origination rates

8.2.1 Current rates

The current fixed origination rates were set in the 2010 decision together with the current fixed termination rates (see Section 8.1.1) and were set at the same level as the fixed termination rates. This symmetry between termination and origination rates was a result of assuming the same increment for calculating the cost of two services that use the same network elements. The current fixed origination rates are shown in Figure 8.4.

Type	Rate (EURcent / min)
Average	0.7163
Peak	0.802
Off-peak	0.638
Night	0.573

Figure 8.4: Current origination rates

8.2.2 Efficient modelled costs

The Recommendation does not provide direct guidance on the cost standard to be used for the setting of fixed origination rates, however it explicitly states that the origination service should not be part of the same increment as the termination service:

"From the traffic-related costs only those costs which would be avoided in the absence of a wholesale call termination service being provided should be allocated to the relevant termination increment. These avoidable costs may be calculated by allocating traffic-

related costs first to services other than wholesale call termination (e.g. *call origination* [emphasis added]*, data services, IPTV, etc.) with only the residual traffic-related costs being allocated to the wholesale voice call termination service."*[16].

In accordance with the above, the MCA has therefore chosen to calculate the efficient cost of the wholesale origination service with a LRAIC+ increment (see Section 7.2.1). The model has been run in the *FTTC NGA and all-IP NGN* scenario without wholesale termination traffic and with 2011 market data. Once the residual costs allocated to wholesale termination have been identified, other traffic related costs are allocated to voice and IP traffic according to LRAIC+ principles.

The applied methodology leads to a different cost for wholesale origination compared to wholesale termination which represents a change from historic regulation across Europe in which the prices for the two services were often equal (as a result of utilising the same network resources in opposite call directions). This new situation is however a direct consequence of the new increment and methodology used only for the termination service. Other European regulators have noted and discussed the need for a differentiation between termination and origination rates.

This results in an average calculated cost for wholesale fixed origination of 0.2753 Eurocent per minute (based on current WACC rate of 12.56%). The expected wholesale fixed origination rate[17] using the proposed new WACC rate of 9.65% is calculated at 0.2643 Euro cent per minute.

8.2.3 Time-of-day gradients

Similar to the discussion applied for wholesale termination rates, the MCA proposes that the time-of-day gradients should be removed also for origination and that a single uniform average tariff should apply at all times of day.

8.2.4 Glidepath

The MCA is considering that a glidepath be applied also for the wholesale origination costs as the new calculated rates again represent a significant reduction vis-à-vis the previous rates. In the case of origination, the effect of a significant reduction is more complex to predict since in practice, call origination is currently being imposed unilaterally on GO (in accordance with the decision on market 2). For this reason the prices for origination need to take into account not only efficient cost recovery but also

16 Commission Of The European Communities, COMMISSION RECOMMENDATION of 7.5.2009 on the Regulatory Treatment of Fixed and Mobile Termination Rates in the EU, 7 May 2009, Annex

17 This computed rate is subject to change following the outcome of the MCA's decision on the WACC rate review

the correct incentives for all players on the market (particularly those making use of call origination services from GO). As it is not possible to predict the most likely outcome in terms of the utilisation and development of wholesale origination by alternative network operators the MCA is therefore considering the glidepath displayed in Figure 8.5 below. The MCA would keep this glide path under review and reserves the right to make the necessary amendments if any abnormal activity is detected during its course. These potential amendments will be adopted following consultation with stakeholders.

Figure 8.5: Glidepath considered for fixed origination rates calculated using WACC rate of 12.56%

	Step 1	Step 2
From	1 January 2013	1 July 2013
To	30 June 2013	31 December 2013
Price (EURcent / min)	0.4958	0.2753

Figure 8.6: Proposed glidepath for fixed origination rates calculated using WACC rate of 9.65%

	Step 1	Step 2
From	1 January 2013	1 July 2013
To	30 June 2013	31 December 2013
Price (EURcent / min)	0.4903	0.2643

9 Consultation framework

The MCA invites comments from interested parties on this consultation document. Comments which are not specifically dealt with in this Consultation but are directly related to the subject matter under this review are also welcome.

The consultation period will run until close of business of 5th November 2012. Late submissions will not be considered. Any requests for extension must be comprehensively justified in writing and must be sent to the MCA by not later than 5 working days before the elapse of the consultation period. It is in the MCA's discretion to concede or otherwise to such requests. Comments should be sent to:

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