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Malta Communications Authority

# Implementation of Cost Based Accounting Systems for the Telecommunications Sector

## Consultative Paper

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# Table of Contents

# 1 Introduction

Maltese legislation recognises that, in the interests of developing and sustaining competition in the telecommunications industry, new entrants to the market must have the facility to interconnect to the network of existing operators. Accordingly a telecommunications industry operator providing public telephone networks and designated as having Dominant Market Power ("DMP"), is required to publish a Reference Interconnection Offer ("RIO") where charges are derived from actual costs.

The subject is addressed by the Telecommunications (Regulation) Act and subsidiary legislation enacted under this Act. Relevant EU Directives which the Malta Communications Authority ("MCA") intends to adopt (irrespective of EU membership or not) include the following:

- Directive 97/33/EC of the European Parliament and Council establishing the legal and regulatory framework for the interconnection of telecommunications networks.
- EU Commission Recommendation of 8 April 1998 providing detailed guidelines to National Regulatory Authorities ("NRA") on Accounting Separation and Cost Accounting.

The purpose of this paper is to review the options, outline a strategy and establish a timetable for the implementation of appropriate cost accounting systems by the four existing network operators in the Maltese telecommunications sector.

The consultative paper is structured in the following manner:

- Section 2 provides a brief review of the existing relevant legislation in Malta and the EU;
- Section 3 describes and outlines the relative merits of alternative methodologies for implementing cost accounting systems;
- Section 4 outlines the key principles underlying cost allocation;
- Section 5 considers the available options, the capability of operators to implement the different cost accounting methodologies, the costs of doing so and, taking account also of the theoretical advantages and disadvantages of each methodology, recommends the preferred implementation option;

- Section 6 sets out an implementation timetable for each operator, identifying the main tasks and MCA review points;

The MCA will, in conjunction to this document, address the level of accounting separation and publication of financial information in another consultative paper. The paper will examine the format and presentation of the separately identifiable elements of cost and revenue related to the various activities of the organisation.

To assist in this work, the MCA invites submissions from interested parties on the matters referred to in this document concerning the development of cost based accounting systems in the telecommunications sector in Malta.

*This document is without prejudice to the legal position or the rights and duties of the MCA to regulate the market generally. This is not a legal document; the MCA is not bound by this document and may amend it from time to time.*

# 2 Legislative Background

## 2.1 Developments in Malta

The Government of Malta has launched a wide-ranging process of reform of the telecommunications sector, including market liberalisation, the establishment of the MCA, and the introduction of measures to promote the development of the "information society". A primary objective is to reduce the cost of telecommunications services in Malta, thereby benefiting consumers and increasing both the competitiveness of Maltese industry and the attractiveness of Malta as a location for companies that are intensive users of telecommunications.

In 2000, the Government set deadlines for liberalising the sector. All telecommunications services, except fixed telephony, mobile telephony, the international gateway and cable television, were liberalised. Vodafone's monopoly in mobile telephony was ended and the second mobile licence was issued to a subsidiary of Maltacom, the incumbent fixed operator. Moreover, it was decided that the cable television market would be liberalised on 1 June 2001 and the international gateway and fixed telephony services market on 1 January 2003.

The new measures open up the possibility for existing players to enter markets that had been reserved as monopolies. As set out in the National Plan for the Reform of the Telecommunications Sector, Maltacom can now provide mobile telephony and cable television services. At the same time, the cable TV operator, Melita Cable plc, can provide data services and leased line data services and may apply for a licence to provide fixed telecommunications services over its network after 1 January 2003.

The MCA also intends to develop and implement an EU compliant tariff and interconnection regime (irrespective of EU membership or not). This entails, among other conditions, the definition of transparent, non-discriminatory and cost-oriented interconnection charges, and the implementation of accounting separation and appropriate costing methodologies (see section 2.4).

## 2.2 Telecommunications Services (General) Regulations, 2000 [1]

Regulation 10 of the Telecommunications Services (General) Regulations imposes the obligation on all operators to negotiate interconnection agreements with other operators of public telecommunications services. An operator with a DMP is also obliged to ensure that interconnection is accomplished at charges which are based on principles of transparency and cost orientation. Furthermore, an operator with a DMP must publish a RIO and have cost-oriented and sufficiently unbundled charges supported by transparent cost accounting systems. Regulation 12 further imposes that the RIO must include the service tariffs relating to interconnection services.

Regulation 13 requires that operators with a DMP develop an accounting system to calculate charges for interconnection based on Long Run Incremental Costs ("LRIC") for network elements used to provide the interconnection, excluding overheads such as marketing, personnel or headquarters maintenance. Pending an operator's calculation of such charges based on LRIC and their approval by the MCA, interconnection charges are to be based on one of two alternative methods as decided by the MCA. The MCA may decide that interconnection charges are to be based on "best current practice" in European Union countries. If these are not available the MCA may decide on the basis of other benchmarks, as it deems appropriate.

Regulation 30[2] also requires that an operator providing telephony services having a DMP, other than an operator of public mobile telecommunications systems and services, must use cost oriented tariffs and shall not, without the MCA's approval, bundle a number of services into a single tariff without also offering each of the constituent services under separate tariffs. Regulation 31 further establishes that when such an operator submits a proposal for changes in tariffs, that operator must provide support based on costs and other factors for its proposed tariffs.

Regulation 32 additionally states that the MCA may require an operator of public mobile telecommunications services to provide support based on costs and other factors for its proposed tariffs, and the MCA may also offer an opportunity for comment upon the proposed tariffs by other operators and by customers.

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[1] L.N. 151 of 2000 as amended by L.N. 70 of 2001, hereafter "the Telecommunications Services (General) Regulations".

[2] Regulations 30, 31 and 32 will come into force on a date yet to be determined.

## 2.3 Cable Systems (General) Regulations, 2001 [3]

Regulation 11 of the Cable Systems (General) Regulations establishes that an operator providing cable television and radio services having a DMP shall use cost oriented tariffs and shall not, without the MCA's approval, bundle a number of services into a single tariff without also offering each of the constituent services under separate tariffs. Regulation 12 further states that when such an operator submits a proposal for changes in tariffs, that operator must provide support based on costs and other factors for its proposed tariffs.

Regulation 25 also states that an operator is required to furnish the MCA with accounts which show separately the annual turnover per service category, and with accounts which show annual costs using cost accounting methods to be defined by the MCA, for system services provided to other operators and for services provided under the universal service obligations.

## 2.4 Relevant EU Legislation

The relevant EU directives, which are in the process of being replaced by a new set of directives, set general principles for interconnection charges and cost accounting systems. Council Directive 97/33/EC (on interconnection in telecommunications with regard to ensuring universal service and interoperability through the application of the principles of open network provision) requires that operators notified as having significant market power publish a detailed reference interconnection offer where charges are derived from actual costs. In conjunction with this, it also imposes the obligation of keeping separate accounts for activities related to interconnection and to make these publicly available and have them independently audited.

More specific guidelines were issued in the Commission Recommendation of 8 April 1998 (on interconnection in a liberalised telecommunications market – Part 2 Accounting separation and Cost accounting). The Recommendation specifies that revenues and costs should be disaggregated into: core network, local access network, retail and other activities. Furthermore, it requires the allocation of costs to be done in accordance with the principle of causality (so that at least 90% of the costs can be allocated through direct or indirect causality) and for the cost allocation system to be sufficiently detailed to allow costing of unbundled interconnection services. Although no specific costing system is identified by the Commission, in the above-mentioned Recommendation it invites National Regulatory Authorities to set deadlines

[3] Legal Notice 167 of 2001, hereafter "the Cable Systems (General) Regulations".

for "implementation by incumbent operators of new cost accounting systems based on current costs and activity-based accounts".

The Commission's view, as reflected in the preamble to the Interconnection Directive 97/33/EC, is that "charges based on a price level closely linked to the long-run incremental cost for providing access to interconnection are appropriate for encouraging the rapid development of an open and competitive market". Moreover, the Commission, in the above-mentioned Recommendation stated again the objective of moving to prices based on LRIC. It was also specified that interconnection charges "may include justified 'mark-ups' to cover a portion of the forward-looking joint and common costs of an efficient operator, as would arise under competitive conditions".

The Recommendation also provided reference values based on 'best current practice' to guide the National Regulatory Authorities when assessing charges for call termination "until calculated costs for interconnection based on forward-looking long run average incremental costs are available". The reference values have been updated twice so far and the last figures published by the Commission were the price ranges for the year 2000.

Concerning the actual introduction of current cost accounting by the EU Member States, a growing list of countries (including the UK, Germany, Austria, the Netherlands, Italy, Spain and Ireland) had already introduced it by November 2001, when the latest Implementation Report released by the Commission was published. Other countries, such as Belgium, Denmark, Finland and Luxembourg, were at the time in the process of implementing accounting systems based on current costs. The production of LRIC accounts was confined to the UK, Germany and Ireland, with the Netherlands producing accounts based on embedded direct costs (a kind of proxy for LRIC). Table 1 overleaf illustrates the current and planned cost methodologies for calculating interconnection charges in each of the current European Union member states.

**Table 1:**
**Current and planned cost methodologies for calculating interconnection charges**

| | Cost accounting system in place for interconnection by SMP Operators | | Deadline for implementation of a system based on current costs |
|---|---|---|---|
| | Cost base | Cost standard | |
| Belgium | Historic | FDC | Implemented for network assets |
| Denmark | Historic and best practice | FDC | 31.12.2002 (LRAIC) |
| Germany | Forward-looking | LRAIC | Implemented |
| Greece | Tariffs based on best current practice | Tariffs based on best current practice FDC | LRIC planned for 2002 |
| Spain | Multi-standard | Multi-standard | Implemented (on 31.7.2001) |
| France | Historic | FDC | LRIC planned for RIO 2002 |
| Ireland | LRIC | LRIC | Implemented |
| Italy | Current | FDC | Implemented (on 1.1.2001) |
| Luxembourg | Historic | FDC | In principle LRIC for RIO 2001 |
| Netherlands | Current | EDC for originating i/c Bottom-up LRIC for terminating i/c | Implemented |
| Austria | Current | FDC | Implemented |
| Portugal | Historic | FDC | No deadline set |
| Finland | Historic/Current | Company specific | Ongoing implementation |
| Sweden | Historic | AIC | No deadline set |
| UK | Forward looking/current | LRIC+FDC | Implemented |

*Source: Seventh Implementation Report, EC, November 2001*

As part of the ongoing overhaul of the EU regulatory framework, two amended proposed draft directives were submitted by the Commission to the

European Parliament and Council of Ministers in July 2001. One covers a common regulatory framework for electronic communications networks and services and the other covers access and interconnection to electronic communications networks and associated facilities. They potentially give rise to a number of important changes:

- coverage has been extended to all electronic communications networks and services not just telecommunications;
- sector-specific regulatory obligations such as cost-orientation and non-discrimination are now triggered by dominance rather than by SMP as represented by a 25% market share. Dominance will be considered to exist if a firm individually or jointly "enjoys a position of economic strength affording it to behave to an appreciable extent independently of competitors, customers and ultimately consumers";
- relevant markets will now be defined using the same principles as in competition policy cases rather than the broad national market concepts specified in the Interconnection Directive (e.g. the national market for interconnection).[4]

The precise impact of all this is unclear, not least because the new proposed directives are still under discussion. The move to the concept of dominance is likely in effect to raise the market share threshold and reduce the number of firms liable to sector-specific regulation. However, the change in the process for defining relevant markets may well have the opposite effect, so too the application of joint dominance which looks likely to increase the number of mobile telecommunications companies that will be caught by the new proposed directives. Also the potential coverage of regulation is widened by the move from telecommunications to electronic communications.

## 2.5 Conclusion

A number of conclusions emerge from this brief review of the legislative background:

- in all the EU countries, DMP operators have implemented fully allocated cost accounting based on historic costs;

[4] The Commission will publish a list of relevant communications markets using a standard approach to market definition. NRAs will then carry out analyses of the state of competition in these markets. A finding of dominance will then trigger requirements for non-discrimination, cost-orientation, accounting separation etc.

- however, it is also evident that EU countries have been slow to implement fully allocated costs based on current costs and that, to date, relatively few have implemented LRIC;
- if, therefore, Malta were not to have implemented either FAC based on current costs or LRIC by January 2003, it would not be out of line with EU practice.

In accordance with the Telecommunications Services (General) Regulations and the Cable Systems (General) Regulations, all DMP operators (mobile, fixed and cable) will be obliged to implement a cost based accounting system and prepare separated accounts based on one of the methodologies presented in Section 3.

# 3 Different Costing Methodologies

If competition were fully effective, one would expect prices for telecommunications services to be cost-based and non-discriminatory. Where competition is not fully effective then regulation needs to try to replicate, to the extent possible, what would happen in a fully competitive market.

Experience from the US and Europe suggests that an information gap exists between operators and regulators concerning the costs of different activities and services. This is particularly important in the case of interconnection services because:

- the market for such services is not normally competitive and hence regulation of prices is required; and
- the adverse impact of incorrectly set interconnection charges is likely to be large in that either competition will be stifled (if charges are above costs) or there will be inefficient entry and the overall cost of telecommunications services will be increased (if charges are below costs).

The existence of asymmetric information means that regulators cannot rely solely on cost data produced by regulated companies. They need to choose the costing methodology to be employed and also establish an audit of interconnection tariffs and their setting, *on an ongoing basis*, to ensure that these accurately reflect the correct application of the chosen cost methodology. Where LRIC is the chosen methodology, regulators may wish to have their own bottom-up model, which can be used as a cross-check on the costs produced by the regulated company or, when populated with input data provided by an independent source or industry working group, can form the basis for setting charges.

This section discusses the different cost methodologies that could be used to set interconnection (or other) charges and identifies some of their strengths and weaknesses.

## 3.1 Different Costing Methodologies

Broadly speaking, two main types of costing methodology can be used as the basis for setting charges for specific services:

- **Fully Distributed (Allocated) Cost**: all costs, including costs caused by specific services and costs driven by groups of services, are attributed to different services according to a set of allocation rules. The process is described at greater length below and in Section 4;
- **Long-Run Incremental Cost (LRIC):** incremental cost is a generic cost concept, defined as the increase in a firm's total costs as a result of an increase in output, or the costs avoided if output falls. If the increment of output under consideration is the whole of a particular service, then the term 'total service incremental cost' is applied. The addition of 'long-run' indicates that the time horizon is sufficiently long for all types of cost to be avoidable. LRIC includes all variable (i.e. volume-sensitive) costs and also the fixed costs specifically relevant to the increment of output under consideration. Fixed costs that are shared between, and common to, a number of services are not included (as they will not be avoided if an increment of output of a particular service is no longer provided). It is normal to estimate LRIC and shared and common costs assuming efficient operating practices.

Once long-run incremental costs have been identified, there is a question as to whether other costs should be added in the form of some kind of mark-up on LRIC. These additional costs might include:

- efficiently incurred shared and common fixed costs;
- costs of conditioning the network and establishing access to outsiders;
- legacy costs (e.g. costs associated with past investments and decisions that are not avoidable if output ceases)
- inefficiency costs.

Typically the first two of the above categories of costs are recovered via a mark-up on LRIC. It is less common for the last two categories of cost to be recovered in this way, although, in some circumstances, there may be an argument for doing so, at least for a limited period of time.

## 3.2 Fully Allocated Costs

The starting point for most telecommunications operators is fully allocated historic costs.

### 3.2.1 Fully Allocated Historic Costs

This is the basis on which management accounts and financial results by service have typically been developed. An outline of the fully allocated costing process is set out below, followed by a brief discussion of its strengths and weaknesses.

It is first necessary to group costs into a number of different categories. These are:

- *direct costs* caused by a specific service;
- *apportioned costs* driven by a group of services.

Apportioned costs can themselves be split into the following categories:

- costs directly attributable to a service;
- costs indirectly attributable to a service;
- costs not attributable to any particular service.

These definitions of cost reflect the ease with which it is possible to attribute costs to particular services. For example, direct costs are so called because they are service-specific, that is, they can be attributed directly to a specific service. Apportioned costs, on the other hand, are not attributable to just one service. In this case, the linkage between the services concerned and the costs that they cause is either identifiable (i.e. *directly* and *indirectly attributable*) or not identifiable (*non attributable*).

The cost categories described are relevant to all types of telecommunication network, both fixed and mobile. Figure 1 and Figure 2 show a highly simplified view of the inputs required for the supply of mobile and fixed telecommunications network services respectively. The arrows show the direction of causation of costs.[5] Thus, for example, plant capital costs are caused by the need to provide network services. In some cases the

[5] In order to prevent the diagram from becoming unmanageable, not all the relevant arrows are shown. For example, there is no arrow shown from General Management to Accommodation even though the former would require the latter as an input.

relationship between cost categories operates in both directions (indicated by the arrows pointing in both directions). This is because one cost category both drives and is driven by another cost category.

The process of deriving fully allocated costs essentially involves reversing the direction of the arrows in the diagram and attributing the different types of cost to the services that directly or indirectly give rise to them. Thus, for example, plant capital costs are attributed to services according to the extent to which each service uses the equipment concerned.

There are also more complex linkages. For example, accommodation would be allocated to the activities that give rise to it (e.g. maintenance, computing etc.) on the basis of say floor space used or pay costs. Maintenance would then be attributed to plant capital costs (typically by using cost codes for different types of maintenance work) and plant capital costs (including the allocated maintenance and accommodation etc.) would in turn be allocated to services.

**Figure 1**
**Simplified Model of Cost Causation in Mobile Network Services:**

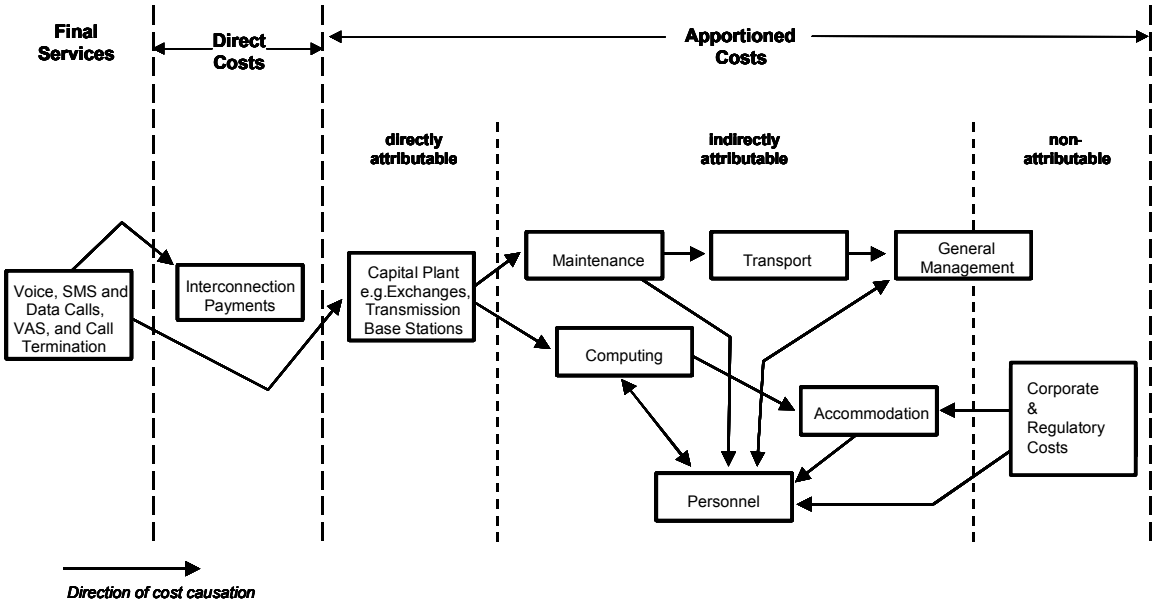
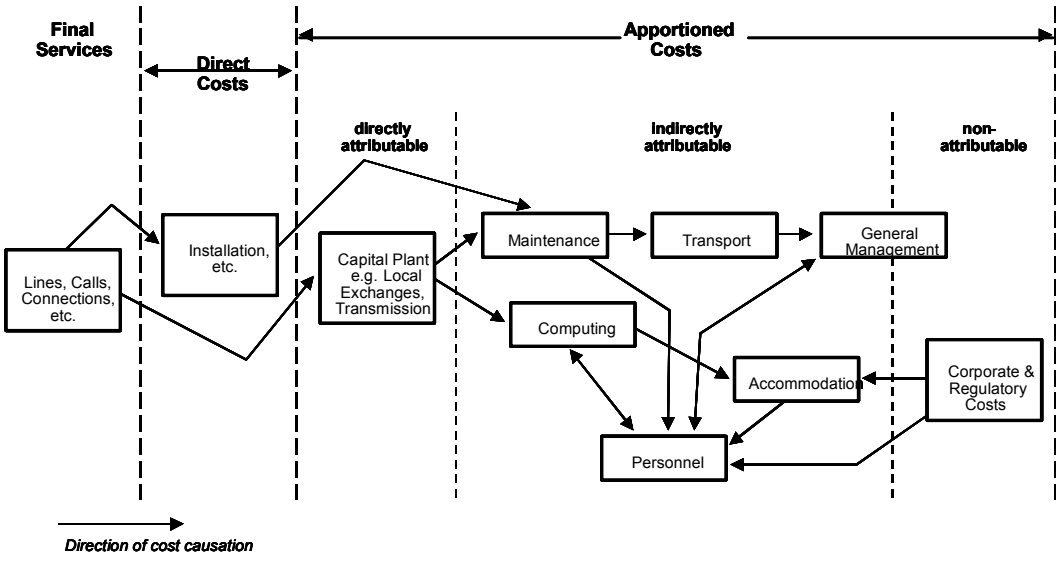



**Figure 2**
**Simplified Model of Cost Causation in Fixed Network Services:**




It can be seen therefore that any fully allocated costing system requires a substantial amount of information about cost drivers and the linkages

between different cost categories. More examples are provided in the following sections.

*3.2.1.1 Direct costs*

There are relatively few direct costs in telecommunications industries. Examples in the case of mobile network services include the cost of interconnection payments made to other operators. The provision of lines into homes for both telephones and Internet access may be considered as direct costs in the fixed network.

*3.2.1.2 Directly attributable costs*

Directly attributable costs are essentially plant and equipment costs, which include both depreciation and a return on assets. Such costs are driven by the number of subscribers, the number of call attempts and the volume and duration of calls. These costs can be allocated to different services using volume and routing factor data. Thus, for example, switch port costs can be allocated to outgoing and incoming calls using the volume of incoming and outgoing calls and information about the number of switching stages per call.

Directly attributable costs are driven by a number of activities:

- the cost of exchange lines (links between distribution points and exchanges) is driven by the number of lines. Clearly costs will depend on the length of line and the terrain, and it may thus be useful to have this information for some regulatory purposes;
- some elements of local exchanges are driven by the number of lines (e.g. a major cost associated with digital exchange concentrators is the cost of line cards). The cost of other elements, however, is driven by the number of calls (e.g. call minutes and call attempts are the primary drivers of port costs and processor costs respectively). In calculating the directly-attributable cost, the first step is to split costs into those which are line-related and those which are call-related. The next step would be to split call costs into those corresponding to different call services. This apportionment should be based on the number of exchange stages used per call, the number of calls and the average duration of calls;
- transmission costs are driven by calls and by private circuit volumes. To calculate fully-distributed costs, information is required on the transmission capacity for both. Call costs can be apportioned using routing stages, the number of calls and call length.

*3.2.1.3 Indirectly attributable costs*

Indirectly attributable costs are driven by directly attributable costs, a process that is illustrated in Figure 1 and Figure 2 above. As can be seen, maintenance and computing are driven ***directly*** by attributable costs whereas transport, personnel and accommodation are driven ***indirectly*** by attributable costs. Allocation of these costs is described below, with reference to a number of examples:

- via records of how engineers spend their time, or through the use of surveys, it is often possible for maintenance costs to be attributed to different types of plant capital costs. Alternatively they can be apportioned in proportion to the value of the underlying assets, although this process is not very precise. For example, some parts of an exchange may be more liable to faults than others;
- transport costs will be partly driven by maintenance and other plant related activities and can thus be apportioned in a similar way to these activities. In addition, transport costs may be driven by marketing costs (since marketing managers may have company cars) or by high level staff costs;
- computing costs will be driven by particular projects, which can then be related to certain activities. These costs may also be driven by the number of staff;
- accommodation costs are partly driven by plant requirements and partly by the number of people in different activities, which is in turn partly driven by plant requirements.

*3.2.1.4 Non-attributable costs*

Non-attributable costs are those costs that are not driven by traffic volumes, even indirectly, or for which no linkage can be established with final costs because the costs are so far removed from final services. In practice two types of non-attributable costs can normally be observed in the supply of telecommunications services:

- costs which are so far removed as to make relationship to specific drivers impossible to identify - perhaps corporate management such as the CEO's office;

- costs which are not really volume related (e.g. marketing or regulatory costs).

However, methods can be developed in a way that allows many seemingly non-attributable costs to be attributed. For example, it is possible to analyse marketing expenditure to see how much is spent on specific projects. While not all marketing costs will be attributable, the chances are that a significant proportion will be.

### 3.2.2 Problems Related to Fully Allocated Historic Costs

The main problems with fully allocated historic costs are as follows:

- general price inflation means that the historic gross book values (and hence net book values) of long lived assets bear little relationship to the true values of the assets concerned;
- this problem is further exacerbated by technological progress, which means that the prices of different assets have evolved very differently over time. For example, switch costs, where there has been a lot of technical progress, have fallen sharply relative to prices in general while site costs, where there has been little technical progress, have generally risen in relation to the general rate of inflation.

As can be seen from the above analysis, a large part of the cost base in (mobile and fixed) telecommunications is not directly related to final services. This means that the estimation of fully allocated costs requires a thorough understanding of a complex set of inter-linkages between the costs to be apportioned. Previous examples have already given some indication of the issues involved in this process. While this is a complex process it is one familiar to telephone companies and one that can be handled by a good activity based costing system. Consequently it is a practicable solution to estimating interconnection costs.

### 3.2.3 Fully Allocated Current Costs

The problems posed by general price inflation and by technological progress can be reduced or eliminated altogether by valuing capital equipment on a current cost basis.

To arrive at current cost asset valuations it is necessary to revalue capital equipment so that the gross book value of equipment is replaced by the gross replacement cost, i.e. what it would cost to purchase and install the

equipment today. This involves identifying the modern equivalent asset and then attaching a price to it.[6] Typically this can be done using recent purchase contracts. The written down value of the equipment (net replacement cost) can then be derived using normal depreciation rules. Thus, for example, if a piece of equipment is five years old and has an accounting life of 10 years, then, under straight-line depreciation, its net replacement cost will be half its gross replacement cost.

It also necessary to take asset price changes into account when moving to current cost accounting. Under the generally accepted approach of financial capital maintenance [7], the impact of asset price changes is included in the allowance for depreciation. If the price of an asset falls by 10%, this reduces its written down value by 10% and this loss of value (the "holding loss") is treated as additional depreciation. Conversely, if the price of an asset increases the resulting increase in its written down value (the "holding gain") is treated as negative depreciation.

### 3.2.4 Points Relating to Fully Allocated Current Costs

While current cost accounting deals with the problems posed by general inflation and technological progress, it is worth bearing the following points in mind:

- the development and implementation of current cost accounting is not a trivial exercise. It is necessary to revalue all capital equipment and to adjust the calculation of depreciation not only to take new asset values into account but also to allow for holding gains and losses that result from changes is asset prices. This will take time and may require training of the relevant accounting staff;
- the problems posed by general inflation and technological progress are, as yet, not generally as great in the mobile telecommunications networks which have mainly been constructed within the past 10 years as with fixed telecommunications networks. This means that historic cost accounting is not likely to be as inaccurate in the case of mobile telecommunications;
- the use of fully allocated current costs does not address the need to estimate forward-looking costs in order to make correct investment and pricing decisions.

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[6] A more detailed discussion of the methodology for revaluing assets can be found in Appendix I.

[7] The different capital maintenance concepts are discussed in Appendix II.

### 3.2.5 Assessment of Fully Allocated Costs

Fully allocated costing systems are widely used by accountants but have been criticised by economists for a number of reasons:

- economically efficient prices should be based on forward-looking marginal cost in order to match the cost to the consumer and the cost to the supplier of an additional unit of output (this is explored in more detail below);
- in some cases fully allocated costing systems do not pay sufficient attention to the cost causation process in the business and as a result can provide a highly misleading attribution of costs;
- even where such systems do attempt to understand the cost causation process, there are certain costs which are not caused by any individual service and can therefore only be apportioned in an arbitrary way.

While fully allocated costs reflect past and present decisions, the appropriate measure of costs for tariff setting is forward looking.

## 3.3 Forward Looking Incremental Costs

The forward-looking costs of an activity are the future costs that a firm would avoid if it were to cease that activity. They include variable costs (i.e. costs that vary with the level of output of the activity) and avoidable fixed costs. They exclude sunk costs (i.e. the costs of irreversible investments). For example, if a company took out a fixed price 25 year lease on a building but market rents subsequently fell, it would be left with a cost that it could not avoid even if it sublet the building (i.e. it would remain responsible for the difference between the agreed rent and the (market) rent received).

A fundamental tenet of economics is that correct resource allocation occurs when price is based on (forward-looking) marginal cost. The marginal cost of a service is literally the forward-looking cost of producing an infinitesimally small additional amount (increment) of output of that service. In practice it is both impossible and meaningless to measure the cost of such a small increment of output. The normal procedure is therefore to measure the cost of say a 5% increase in output and to divide this by the volume of additional output.

Marginal cost includes those forward-looking costs that vary with the volume of output of the service concerned (variable costs). However, it excludes all costs that do not vary as the volume of output of a service changes (fixed

costs). Mobile base station towers and duct in the transmission network of a mobile operator are examples of substantial fixed costs that would not be recovered if prices were set on the basis of marginal cost.

For this reason, incremental rather than marginal costs are normally used for setting prices in industries, like telecommunications, which have substantial fixed costs. In this context, the term incremental cost refers to the per-unit (i.e. average) forward-looking additional cost of providing a large increment of output, such as an entire service. In the latter case, the term total service incremental cost is often used. Total service incremental cost differs from marginal cost in two important respects:

- the per-unit total service incremental cost measures average incremental cost over the entire range of output of the service. If marginal cost varies with the scale of output (possibly due to economies of scale), then average incremental cost over the entire range of output will necessarily differ from marginal cost measured at the current level of output;
- total service incremental cost also includes service-specific fixed costs, i.e. costs that do not vary with the level of output but would be saved if the firm discontinued production of the service.

It is also necessary to specify the time horizon for determining the avoidability of costs if output were to cease or be reduced. When reference is made to long-run incremental (or avoidable) cost, this normally means that a very long time horizon is assumed and all types of cost are avoidable, including trench and duct.

Total service long-run incremental cost (TSLRIC) is increasingly used as the basis for setting fixed network interconnection charges. The latter does not include all fixed costs because there are some costs that are common to more than one service (e.g. trench that is shared by mobile and fixed network transmission links, exchange buildings that are shared by the access and call conveyance networks, and some corporate overheads). A decision has to be made about how to recover these and a standard approach is to apply a percentage mark-up to TSLRIC.

### 3.3.1 Derivation of LRIC

*3.3.1.1 Top-down methodology*

The “top-down” methodology for deriving LRIC uses a highly disaggregated version of the management accounts for the business as a whole. The model reflects actual business performance, and includes costs associated with past

investment decisions and inefficient operating practices. The process typically involves a number of stages. These include:

- specification of cost categories which involves disaggregating the management accounts for the business as a whole into a number of reasonably homogenous categories. Homogeneous in this context means that all costs within each category have the same cost driver(s);
- identification of cost driver or drivers for each cost category, e.g. number of calls, number of lines or, in some cases, the number of people involved. In many cases, a cost category will have more than a single driver. For example, the cost of local exchanges is driven both by the volume of calls (and call attempts) and by the number of exchange lines;
- establishment of the relationship between the level of costs and volume of driver. This process involves identifying how costs vary with the volume of the driver(s). It results in the separation of TSLRIC and common fixed costs. In order to establish relationships it may be necessary to draw upon engineering analyses or undertake analyses of staff activities and the extent to which these are dependent on, or independent of, output;
- establishment of the relationship between cost categories and final services. As noted, the relationship between a cost category and final services can be direct or can be indirect (in some cases being driven by a number of intermediate drivers). Thus, a clear understanding of the various inter-linkages within a firm is necessary. The computer modelling will need to take account of the inter-linkages if incremental costs are to be accurately estimated;
- calculation of TSLRIC by following the steps outlined above.

When setting interconnection or other charges, the resulting estimate of TSLRIC may then need to be adjusted to remove the impact of inefficient operating practices. This can be done, for example, via efficiency benchmarking.

*3.3.1.2 Bottom-up methodology*

It is also possible to derive estimates of LRIC and common fixed costs by the application of "bottom-up" modelling. Taking fixed network costs as an example, this involves the following steps:

- specifying the network architecture and identifying the number and type of network "nodes" (e.g. the number of remote concentrators, local and

tandem switches, international gateways etc.) and the number of links between them;

- estimating the required amount of equipment at each of these nodes, based on the (busy hour) traffic levels in the network (e.g. switch processing capacity and numbers of 2 mbit/sec switch ports) and allowing for network resilience, maximum utilisation rates and a margin for growth ;
- estimating the required amount of equipment between nodes, based on the busy hour traffic levels in the network and the length of the links between nodes (e.g. the number and capacity of transmission systems, the number, length and capacity of cables, the length of trench and duct, the number of cross connects/repeaters etc.) and allowing for network resilience, maximum utilisation rates and a margin for growth ;
- calculating the investment costs for each of these network components using modern equipment prices and the calculated equipment capacity;
- turning the investment costs into annual capital charges based on assumptions about asset lives, the chosen depreciation method and the required rate of return (cost of capital);
- estimating the direct and indirect operating costs of each network component;
- adding together the operating costs and annual equipment charges for each network component and then dividing by the actual volume of traffic passed over each component to yield a unit cost for each component;
- calculating the unit cost of each service using the average number of each type of network component that it uses (the "routing factors")[8] and multiplying these routing factors by the corresponding calculated unit costs.

### 3.3.2 Assessment of LRIC

LRIC, plus an appropriate mark-up to recover common fixed costs, provides an estimate of forward-looking costs and excludes the effects of over-manning, outdated technology and so on. It should therefore provide a more economically efficient basis for setting prices than fully allocated costs. Experience from other countries suggests that LRIC plus common fixed costs is substantially lower than fully allocated historic cost, at least in the case of

[8] Routing factors specify the average number of units of each network component used by a particular service.

interconnection services that involve call conveyance. The gap is less pronounced if fully allocated current costs are used.

The downside of LRIC is that it generally requires a substantial amount of time and resources to implement. Evidence from the UK, Ireland and elsewhere indicates that the construction of a top-down LRIC model and related accounting system takes more than a year to develop even when a company already has an effective fully allocated costing system capable of providing costs for different services. It also typically involves expenditure in the range of GBP1.5 million to GBP3 million, even in the case of a relatively small company.

## 3.4 Choice of Methodology

When choosing which cost methodology to employ it is important to note that the different methodologies do not involve separate and mutually exclusive development paths. On the contrary they represent different points on the same path. In order to implement fully allocated costs (FAC) on a current cost basis, it is first necessary to have FAC on a historic cost basis and, in order to implement LRIC, it is necessary first to have FAC on a current cost basis.

This means that the least expensive and quickest methodology to implement is FAC on a historic basis and the most expensive and slowest to implement is LRIC. It also means that it is possible to try to assess the incremental benefit and incremental cost of each step in the chain. If the incremental cost exceeds the incremental benefit, progress down the chain should in principle cease. Thus, for example, although LRIC is the ideal basis for measuring costs and setting prices, the gains from moving from FAC on a current cost basis to LRIC may not necessarily exceed the costs. For example, in 1997, had UK interconnection charges been set using fully allocated current costs they would not have been very different from those based on LRIC, which were actually implemented. At the same time, in a small country such as Malta the incremental costs of introducing LRIC may be substantial relative to existing revenues and costs.

Thus, although the analysis in the preceding parts of section 3 indicates that, other things being equal, LRIC is the best costing methodology and that FAC with current costs is preferable to FAC with historic costs, other things, particularly implementation costs, are not in practice equal. Consequently an assessment needs to be made that takes account of the respective costs and benefits in Malta. The MCA had engaged NERA specifically to carry out such an assessment and this is provided in section 5.

# 4 Principles of Cost Allocation

## 4.1 General Principles

There are a number of fundamental principles that should govern any set of regulatory accounts involving cost allocation to different activities and services. These are:

**Cost causality:** revenues, costs, assets and liabilities should be attributed to network components, services or businesses in accordance with the activities that give rise to the revenues, costs, assets or liabilities concerned.[9] Thus, for example, switch maintenance costs are caused by switches and hence should be attributed to switches. The need for switches themselves is caused by the provision of services and the costs of switches (including maintenance) should therefore be attributed to different services according to the extent to which each service uses the switches.

**Objectivity:** the attribution of revenues, costs, assets and liabilities should be objective and not designed to benefit one operator or user over others. Where sampling is used to derive the basis for attributing costs, revenues, assets or liabilities, it should be carried out using generally accepted statistical techniques or other methods that result in accurate attributions.

**Consistency:** there should be consistency of treatment from one year to the next. Where material changes in accounting principles or attribution methods are necessary, the previous year's results should be restated so as to allow comparison with those for the current year.

**Transparency:** the attribution methods used should be transparent. Also it should be made clear where revenues, costs, assets or liabilities have to be apportioned (i.e. when they are unattributable to any individual service or services) rather than attributed.

Bearing in mind these principles the general approach is to:

- identify the appropriate cost drivers for each type of revenue, cost, capital employed and liability;

[9] In this context transfer charges are treated as revenues or costs depending on the circumstances.

- use objective operational or financial data related to each driver to produce the appropriate apportionment base (e.g. busy hour traffic in the case of traffic sensitive switching equipment);
- review methodologies and update apportionment bases annually;
- introduce enhancements as necessary (e.g. to reflect the impact of changes in technology).

## 4.2 Specific Principles

This section presents the principles of cost allocation for operating costs and capital employed. It is possible to find a variety of examples, with BT and Eircom, for example, both publishing details of their attribution methods. The following pages present the principles set out in the EC Recommendation of April 8, 1998 (on Interconnection in a Liberalized Market: Part 2 - Accounting Separation and Cost Accounting). These provide useful guidance as they effectively have the EU seal of approval. Table 4.1 shows the principles for operating costs, while Table 4.2 shows the principles for capital employed. Both relate to fixed telephony but they can readily be transferred to mobile telephony with the necessary adjustments to include different assets etc.

It can be seen from Tables 4.1 and 4.2 that a substantial amount of information of both a financial and non-financial nature is required in order to implement a reliable cost allocation system. In order to generate this information, it is necessary, amongst other things, to:

- have a system of time recording;
- introduce activity surveys in cases where employees spread their time over a number of different activities or services;
- carry out surveys of the use of buildings to identify the respective responsibilities of different types of equipment for network building costs and the responsibility of different departments for non-network building costs;
- have surveys that identify where a duct is used by the core network, where it is used by the access network and where it is shared by both networks;
- carry out sample surveys of busy hour traffic to identify the volumes and routings of different types of calls.

All such surveys need to be updated regularly (ideally annually). The tables below give some indication of the task implied.

### 4.2.1 Cost Allocation Principles for Operating Costs

**Table 4.1 Methods of allocating operating costs***

| Category of Operating cost | Description | Method of Allocation | Principal Businesses |
|---|---|---|---|
| **Depreciation** | Depreciation | The allocation of depreciation should follow the allocation of the fixed assets to which it relates. | All |
| **Provision and installation of equipment** | Payroll costs | Direct to network components/other plant where possible; otherwise allocate based on the time spent carrying out installation work. | Core Network, Local Access-Network |
| | Installation, contract and maintenance costs | Direct to network components/other plant on the basis of the plant installed or maintained where possible. | Core Network, Local Access-Network |
| **Maintenance and repair costs** | Payroll costs | Direct to network components/other plant where possible; otherwise allocate based on the time spent carrying out installation work. | Core Network, Local Access-Network |
| | Other costs | Direct to network components/other plant where possible. | Core Network, Local Access-Network |
| **Network planning and developments costs** | Payroll and external costs | Direct to network components/other plant where possible. | Core Network, Local Access-Network |
| **Network management costs** | Payroll costs | Allocate to network components/other plant on the basis of the time spent by staff to manage each type of plant. | Core Network, Local Access-Network |
| | Other costs | Allocate to network components/other plant on the basis of the plant managed, where possible. | Core Network, Local Access-Network |
| **Marketing and sales costs** | Payroll | Direct to products and services where possible; otherwise allocate between products based on labour time. | Retail |
| | Cost of sales of equipment | Allocate to customer equipment services within “Other activities”. | Other Activities |
| | Publicity, Promotions<br>Market research<br>Distributors fees, Other costs | Direct to products and services where possible. Otherwise, for those costs where multiple services are being marketed or promoted, cost should be attributed to the related services on a reasonable basis. | Retail |

* Residual unattributable costs should be specifically identified by operators and their treatment considered separately by NRAs.

## Table 4.1 Methods of allocating operating costs (cont.)*

| Category of Operating cost | Description | Method of Allocation | Principal Businesses |
|---|---|---|---|
| **Billing and collection costs** | Payroll costs | Direct to products and services where possible; otherwise allocate between products based on labour time. | Retail (some costs to Core Network) |
| | Other billing costs (incl. Bad debts) | Direct to products and services where possible; otherwise allocate between products based on usage (e.g. number of bills produced). | Retail (some costs to Core Network) |
| **Operator services costs** | Payroll costs | Direct to services where possible. The costs of staff that carry out tasks for several operator services should be allocated to the related operator services based on time spent on different tasks. | Retail |
| **Directory services costs** | Payroll and other costs | Direct to products and services. | Retail |
| **Payments to other operators** | Out-payments for outgoing international traffic | Direct to products and services. | Retail |
| | Payments for interconnection agreements | Direct to products and services. | Retail |
| **Support costs** | Human resources function costs | HR function costs should be allocated to the staff that are overseen by the HR function and allocated using the same basis as the payroll costs of HR staff. | All |
| | Finance and other head office support functions | If related specifically to a product, service or business allocate accordingly. | All |
| | Building costs and rent | Costs should be allocated in the same way as land and buildings. | All |
| | General computing/IT costs | Allocate to the applications run by the operator on the basis of the use of the computers to support each application. Costs allocated to applications can then be attributed to those products and services that they support. | All |

* Residual unattributable costs should be specifically identified by operators and their treatment considered separately by NRAs.

### 4.2.2 Cost Allocation Principles for Capital Employed

**Table 4.1 Methods of allocating capital employed***

| Category of assets and liabilities | Description | Method of Allocation | Principal Businesses |
|---|---|---|---|
| **Tangible assets**<br>***Primary Plant***- | | | |
| Switching equipment | Local switching equipment | Direct to access or network components where possible. Otherwise allocate to Local Access-Network services and to network components on the basis of the relevant cost of the equipment dedicated to provide customer lines and of the parts dedicated to switch traffic, respectively. Local switch network components can be allocated to products and services based on seconds of use. | Core Network (some costs to Local Access-Network) |
| | Tandem switching equipment | Direct to network components where possible, otherwise allocate based on seconds of use. | Core Network |
| | International switching equipment | Direct to network components where possible, otherwise allocate based on seconds of use. | Core Network |
| | Switching equipment for special services networks | Direct to core network components where appropriate/required by regulation or to the specific services provided by other networks – e.g. data transmission switching equipment should be allocated directly to data transmission services. | Core Network, Other activities |
| | Other switching equipment | Direct to network services where possible, otherwise allocate to other switching network components on the basis of the use of the equipment. | Core Network |

* Residual unattributable costs should be specifically identified by operators and their treatment considered separately by NRAs.

## Table 4.2 Methods of allocating capital employed (cont.)*

| Category of assets and liabilities | Description | Method of Allocation | Principal Businesses |
|---|---|---|---|
| Transmission equipment | Traffic-sensitive transmission equipment | Direct to network components where possible, otherwise allocate based on the usage of circuits. | Core Network |
| | Cable and wire | Direct to access or network components where possible, otherwise allocate to components based on the amount of cable used to provide different services. | Local Access-Network, Core Network |
| | Local loop equipment | Direct to products where possible (e.g. separately identifiable ISDN access equipment), otherwise allocate between access services based on line usage. | Local Access-Network |
| | Radio and satellite equipment | Direct to network components where possible, otherwise allocate based on the usage of channels. | Core Network |
| | Transmission equipment for special services networks | Direct to the specific non-PSTN/non-ISDN services provided by the network – e.g. data transmission equipment directly allocated to data transmission services. | Core Network |
| | International/submarine cable | Direct to network components where possible, otherwise allocate based on usage. | Core Network |
| Other primary network assets | Special network plant | Plant and equipment that is used solely to provide one specific service should be allocated directly to the relevant services. Examples may include:<br>□ Intelligent networks equipment;<br>□ Data transmission equipment;<br>□ Multimedia equipment. | Core Network<br>Other activities |
| | Customer premises equipment | Direct to products and services. | Other activities |
| | Public payphones and related equipment | Direct to service. | Retail |

* Residual unattributable costs should be specifically identified by operators and their treatment considered separately by NRAs.

## Table 4.2 Methods of allocating capital employed (cont.)*

| Category of assets and liabilities | Description | Method of Allocation | Principal Businesses |
|---|---|---|---|
| ***Support Plant*** | Ducting | Ducting can be allocated to the cable and wire that it supports and allocated to products in the same way as cable and wire. | Local Access-Network, Core Network |
| | Power equipment | Allocate to primary plant groups on the basis of the use of power equipment to support each plant– e.g. kilowatts per hour. Assets should then be allocated to products in the same way as the relevant primary plant groups. | Local Access-Network, Core Network |
| | Network management systems | Allocate to primary plant of the different networks provided on the basis of the use of the systems to support each plant – e.g. time spent to control local exchanges, tandem exchanges and international exchanges. Costs should be attributed to products and services in the same way as the related primary plant group. | Core Network |
| Non-network fixed assets | Land and buildings | Allocate to products, services and network components on the basis of the space occupied (i.e. floor space) to support each product, service or network component. | All |
| | General computers | Allocate to the applications run by the operator on the basis of the use of the computers to support each application. Costs allocated to applications can then be attributed to those products and services that they support. | All |
| | Motor vehicles | Allocate to the products and network components based on usage. | All |
| | Furniture and office equipment | Allocate to the products and network components based on usage. | All |

* Residual unattributable costs should be specifically identified by operators and their treatment considered separately by NRAs.

## Table 4.2 Methods of allocating capital employed (cont.)*

| Category of assets and liabilities | Description | Method of Allocation | Principal Businesses |
|---|---|---|---|
| **Intangible fixed assets** | Intangible fixed assets | Direct to products where possible. Any residual or unattributable assets will need to be allocated on an arbitrary basis, to be agreed with the NRA. | All |
| **Working capital** | Fixed asset investments:<br>Pure financial investments<br>Investments in unrelated activities<br>Other investments | Direct to "Other activities".<br>Direct to "Other activities".<br>Direct to the services to which the investments are related, otherwise allocate based on usage. | Other activities<br>Other activities<br>All |
| | Short-term investments (including cash at bank and in hand) | Direct to businesses where possible, otherwise allocate based on the operational requirements of each business. | All |
| | Stocks | Stocks should be allocated directly to products and services. | All |
| | Trade debtors/receivables | Trade debtors may be allocated to products and services based on billing system information where possible. Unattributable balances will need to be allocated on an arbitrary basis, to be agreed with the NRA. | All |
| | Other debtors/receivables | Other debtors/receivables should be apportioned to products and services if possible. Unattributable balances will need to be allocated on an arbitrary basis, to be agreed with the NRA. | All |
| | Trade creditors | Trade creditors should be allocated directly to products and services if possible. Unattributable trade creditors will need to be allocated on an arbitrary basis, to be agreed with the NRA. | All |
| | Long term provisions | Direct to the activities that give rise to the provisions in question. | All |
| | Liabilities for taxation and dividends | No allocation required. Instead average liabilities should be taken into account when considering the operational cash requirements of each business (see "Short-term investments") | All |

* Residual unattributable costs should be specifically identified by operators and their treatment considered separately by NRA

# 5 Options for Future Systems in Malta

## 5.1 Introduction

This section considers the costing methodologies discussed in section 3 and identifies the options that are most appropriate in the Maltese context.

Any recommendation as to which costing methodology is most appropriate for Malta must seek to take account of consumer welfare. It must also reflect what is optimal for the Maltese communications market as a whole, both in the current context and the foreseeable future. Hence any recommendation must be based on an assessment of the trade-off between the potential benefits any methodology can bring, and the undoubted burden, in terms of costs and management of implementation management, that adopting such a methodology would entail.

The main criteria for assessing which costing methodology is optimal in the Maltese context are as follows:

- The main regulatory issues which drive the requirement for such a methodology;
- The capabilities of the operators to implement such a methodology;
- The costs associated with implementing such a methodology;
- The benefits of adopting such a methodology for operators;
- The benefits of adopting such a methodology for the Regulator and for consumers;
- The resources available to the regulator to monitor the implementation as well as assess the outputs of the methodology.

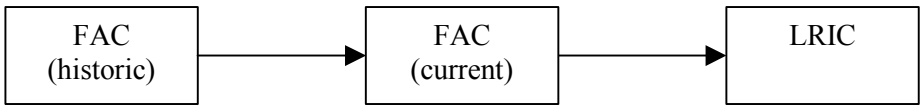
## 5.2 Available Options

As discussed in section 3, there are two main costing methodology options which can be mandated, FAC and LRIC. In addition FAC can be undertaken on an historic cost or current cost basis. Hence the three choices available are as follows:

- FAC (historic cost basis)
- FAC (current cost basis)
- LRIC

These should not be seen as mutually exclusive but rather as part of a linear progression. In order to implement FAC on a current cost basis, it is first necessary to have FAC on a historic cost basis and, in order to implement LRIC, it is necessary first to have FAC on a current cost basis.

**Figure 5.1**
**The process of refinement of cost methodologies**




### 5.2.1 FAC (historic)

As discussed in section 3, adopting an FAC historic cost methodology means that all the costs of the operator are allocated and apportioned to the various products or services provided. The main advantages of this approach are:

- **Computation**: it is relatively easy to compute the costs once the correct cost drivers and accounting principles have been adopted;
- **Reconciliation**: it is possible to reconcile the figures back to statutory accounts which are prepared on the same HCA basis;
- **Completeness**: FAC accounts ensure that all costs have been allocated so that consistency can be maintained when regulatory intervention is focused on one part of the business as opposed to another.

An operator adopting an FAC methodology will have to adopt the procedures outlined in section 3. In summary, the operator will have a number of tasks to undertake in setting up an FAC accounting system. Some of the main tasks are to:

- Ensure that it can accurately measure and record inputs to the accounts such as labour time spent on a particular task or within a particular cost centre;
- Be able to disaggregate its network into components or segments which can then be used as a basis to understand which services or products utilise which parts of the network;
- Be able to measure volumes of minutes or capacity of the network as the driver for allocating and apportioning network component costs to particular services;
- Have detailed records of non-network fixed assets with sufficient disaggregation to allow for either direct allocation to a particular products or service or, where necessary, apportionment to several assets;
- Identify and measure the cost drivers that allow directly and indirectly attributable costs to be allocated to different products and services;
- Develop robust accounting policies regarding the allocation of unattributable (common) costs to be allocated across different products and services.

The main drawback with FAC historic cost accounts is that the true current value of a company's assets may bear little relationship to their historic purchase prices because of technological change and general inflation. The cost of fixed assets, as reflected in annual depreciation charges and the required rate of return on capital, is usually a significant percentage of the total costs of a telecommunications network. This means that Operator A paying an interconnect charge to Operator B might be paying for the historic purchase costs of Operator B rather than the true current costs of the service. Where asset prices are falling, which is the typical situation for many assets in a telecommunications network (e.g. switching and transmission equipment), this would raise interconnection costs relative to the costs of installing new equipment, thereby placing Operator A at a disadvantage or distorting its invest versus interconnect decision.

For this reason FAC (current cost) is often the preferred costing methodology. The process of shifting from an HCA to CCA basis of accounts preparation is not particularly onerous. More specifically, it involves:

- **Revaluation of Assets**: it is necessary to make detailed estimates of the current value of all fixed assets on a replacement cost or modern equivalent asset (MEA) basis. The difficulty of this task is directly related to the age and complexity of the network. The older and more complex the network the harder the task. Generally the newer the network the better and more up to date are the records of that equipment;
- **Depreciation Adjustments**: existing asset lives are applied to the current cost asset values. The accounting entries that are generated are adjustments in depreciation (supplementary depreciation and backlog depreciation) as well as any holding gains and losses generated by asset price changes that occur during the accounting period.
- **Staff Training**: Staff may have to be trained or consultants hired to set up the current cost workings.

### 5.2.2 LRIC

As discussed in section 3, LRIC is often considered the ideal methodology to adopt. From an economic perspective it delivers the best approximation of what an efficient operator's costs should be. This is because it is incremental rather than fully allocated costs which is the correct starting point for setting prices. This in effect means that interconnect charges derived using LRIC provide the correct economic signals to the market.

However, in deciding whether to implement LRIC it is important to assess the following issues:

- Implementation of LRIC has typically been preceded by the adoption of first FAC historic cost and then FAC current cost methodology. This is because the derivation of cost volume relationships is dependent on the underlying cost base of an operator being allocated and apportioned across the products and services using that cost base. Therefore, the process of moving to LRIC should be viewed as incremental to the establishment of robust FAC reporting;
- The additional cost of implementing the LRIC process is considerable due to the complex nature of the task and the requirement for skilled staff able to both perform and understand that process;

- The incremental benefit in terms of lowering interconnection charges that comes from moving from FAC (current costs) to LRIC might be relatively small relative to the additional costs of running the LRIC process. For example, in the UK, the move from fully allocated historic costs to LRIC (plus a mark-up to recover a share of common fixed costs) led to a reduction of interconnection charges of between 10% and 20%, most of which was accounted for by the change from historic to current costs rather than the change from FAC to LRIC.

## 5.3 Accounting Separation

Sitting alongside the choice of costing methodology is the type of accounting separation that the MCA will require the operators to adopt (MCA's Consultative Paper on Accounting Separation refers). This choice will help determine how an operator sets up its accounting systems to produce regulated accounts.

Separated accounts have traditionally been prepared so as to facilitate transparency of the costs of an incumbent operator's products and services, particularly interconnection. Reflecting this, accounting separation typically involves the production of separate accounts for the core (i.e. call conveyance) network, the access network and for retail services.

Retail services can be further disaggregated, the level of detail depending on regulatory requirements. Retail services are often split between residential and business lines, local calls, national calls (if they exist), international calls, leased lines, payphones, calls to mobile, directory enquiries and other. However, the choice very much depends on local circumstances. NERA's suggestions as to possible separate accounting formats that might apply in Malta are contained in separate power point files, that have been e-mailed by the MCA to operators.

The chosen degree of retail disaggregation is likely to reflect the regulatory priorities of the MCA. For example, if there were no immediate concern as to the tariffs charged by a telephony operator for particular retail services but there was concern over the level of interconnection rates, the MCA would need a network/retail split (with detailed information on the costs of different network components) but not necessarily any disaggregation of retail services. Conversely, given the likely scenario that some form of tariff rebalancing is required between international, local calls and line charges, then the costs and revenues of each of these retail services will need to be separately identified.

The nature of accounting separation will also depend on a particular operator's business. For example, mobile operation would appear to warrant a network/retail split with retail services further broken down into voice/SMS/data traffic. A cable TV network provides an access type network, which can be used in an Open Access environment by third party service providers wishing to gain access to the cable company's subscriber base. However, a cable TV company with a digital network could also provide carrier services for another operator, which would then imply the need to separate out core and access network costs.

It should be recognised that any system of accounting separation will require operators to reorganise their accounts in such as way that the cost of network operations can be fully distinguished from that of retail operations. The proper application of the FAC methodology will ensure that the cost base is correctly allocated and apportioned to the correct part of the business. However, there will be an additional need for the operator to set up a system of transfer charging, based on network costs, between its own network and retail activities.[10] This will ensure that the operator's own retail operations are not receiving network services on an artificially favourable basis.

Reflecting the above discussion, it is clear that, in defining the structure of any accounting separation, there is a need to ensure that there is sufficient transparency to allow effective regulation of the operator concerned. Hence, at the very minimum, it is important that:

- network activities are separately identifiable from retail activities;
- the regulator and operators understand that the system of regulatory accounts adopted cannot be permanently fixed and must reflect dynamic changes in the market place.

## 5.4 Conclusion

In assessing which costing methodology is most suitable in the Maltese context, it is necessary to compare the theoretical and practical advantages of each methodology as outlined in section 3 with the realities of our communications market. It is clear that the current capabilities of the four operators to implement any rigorous cost allocation system varies in terms of level of preparedenes of each. What is clearly evident however is that

[10] Such transfer charging can be either explicit or implicit, i.e. it is not necessary for money actually to change hands, only for the cost of purchased network services to be recorded so that any predatory pricing or cross-subsidisation can be identified.

considerable investment will have to be made by the operators to upgrade their systems and introduce processes to support the adoption of a new methodology. One must emphasise however that this is as much in their interest as it is a regulatory imperative. The move by all operators to an FAC (historic cost) basis of accounts preparation over a reasonable time frame, while challenging, is both essential as well as eminently achievable.

Whilst LRIC, as discussed in section 3, is often considered the ideal methodology to ensure an operator with market power is operating efficiently, to proceed to LRIC in a controllable manner will require operators first to adopt the FAC methodology and then to move from historic to current cost accounting. It is also not clear that at this stage a move to LRIC will necessarily create incremental benefits, which will outweigh the additional costs created. This assessment can only realistically be made when an FAC methodology has already been applied to the operators.

Therefore the MCA's plans are to mandate operators with a dominant market position to adopt the FAC (historic cost) methodology as the basis of preparing regulatory accounts. The MCA believes that this should be the first priority, with a subsequent move to FAC (current cost). An assessment with regard to eventually moving to LRIC will made at the appropriate time but not before June 2003.[11]

[11] If companies remain obliged under Maltese legislation to introduce LRIC, this should not happen until reliable fully allocated costing systems and separate accounts based on historic costs have been implemented.

# 6 Time Frames

## 6.1 Considerations

The full liberalisation of the telecommunications market in Malta will take effect in January 2003. This is a key milestone. Ideally robust FAC accounts should be produced before that date so that any market entrants have cost-based interconnection charges and are able to establish that such charges are non-discriminatory. Also, it will be important for the MCA to have such information in order to be in a position to regulate retail prices with a full knowledge of the relevant costs.

Section 5 highlighted some key considerations that should be taken into account when deciding on setting a timetable for adoption of FAC accounting with associated separate accounts. In setting such a timetable it is important to allow for the abilities of the operators to undertake the tasks required.

The most important considerations in setting a timetable are:

- The need to obtain internal management agreement on the best means of implementing FAC in terms of potential capital investment on new systems and/or the most appropriate organisational changes
- The likely requirement to engage consultancy services at the start of the process;
- The opportunity to upgrade management information systems by operators, as well as the need to define and record key inputs;
- The time taken for each operator to set up a system of FAC reporting;
- The need to recruit and resource the process with suitable staff;
- The resources available to the Regulator to monitor the process;
- The fact that full liberalisation will occur in January 2003.

Maltacom by virtue of its history, size and complexity faces the most challenging task and as a result the timetable for delivery must take into account such factors. The mobile operators should not find establishing an FAC methodology too difficult for the reasons already discussed. Melita has a more challenging task in establishing a robust methodology but it is likely that its present capacity can be refined on an ongoing basis, especially after the launch of digital services.

To assess the time scales needed by the operators, the MCA has identified the key work streams and outputs required for the successful implementation of FAC accounting. These work streams are illustrated in the three figures below. As can be seen there is a considerable range of work to be undertaken. Different operators will face different issues and it is not possible to predict the precise time needed by each operator to undertake each task. However, the following tasks are essential:

- Separate steering groups for the fixed telephony, mobile telephony and cable services sectors will be set-up. The steering groups will start meeting in April on a regular basis, at least once a month. The purpose of the steering groups will be to support and monitor the implementation process;
- The MCA is requesting the respective operators to prepare a project plan setting out the implementation of cost based accounting systems in their respective organisation. The project plans should be compiled by April 2002 when the steering groups start meeting.
- The operators must set out their allocation methodology and accounting principles in the early part of the implementation process and these must be reviewed by the MCA (review points are shown by dotted lines in Figures 6.1 to 6.3);
- The exact format of the separated accounts must be agreed between the MCA and the Operators;
- Whilst MCA staff will be closely involved in all aspects of the process, key outputs such as the treatment of fixed assets should be reviewed by the MCA (illustrated by dotted line in the charts below).

The timetables allow for refinement of the various outputs in response to comments and sign-offs from the MCA (see dotted extensions to the bars in the following charts).

**Figure 6.1 – Maltacom:**

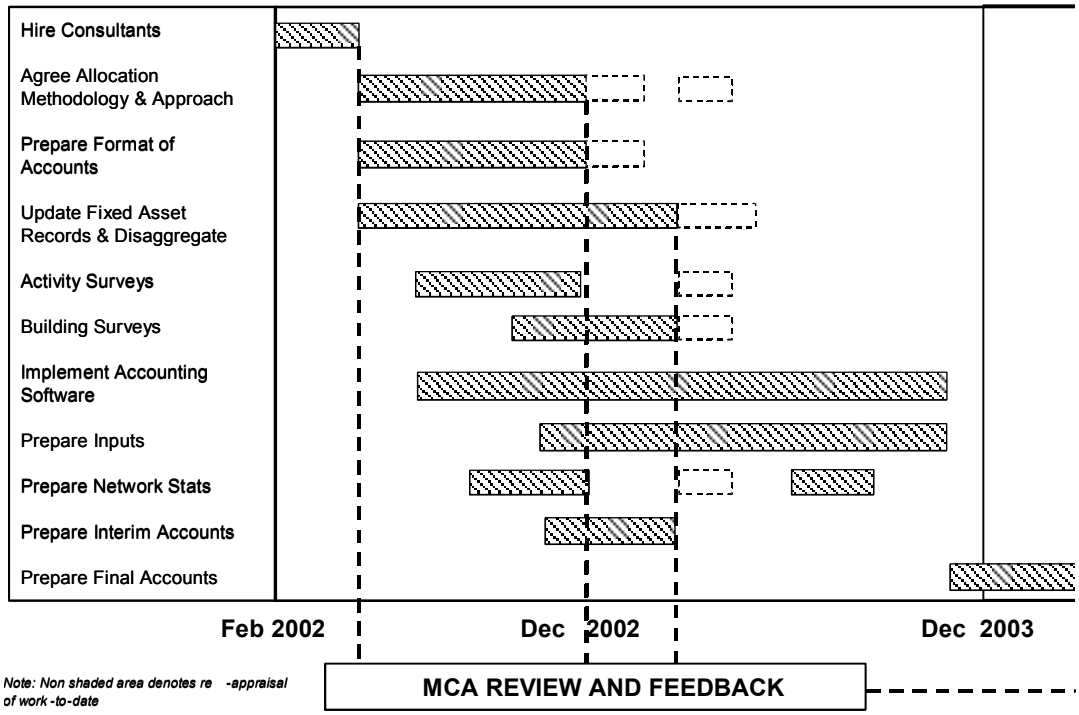



**Figure 6.2 – Mobile Operator:**

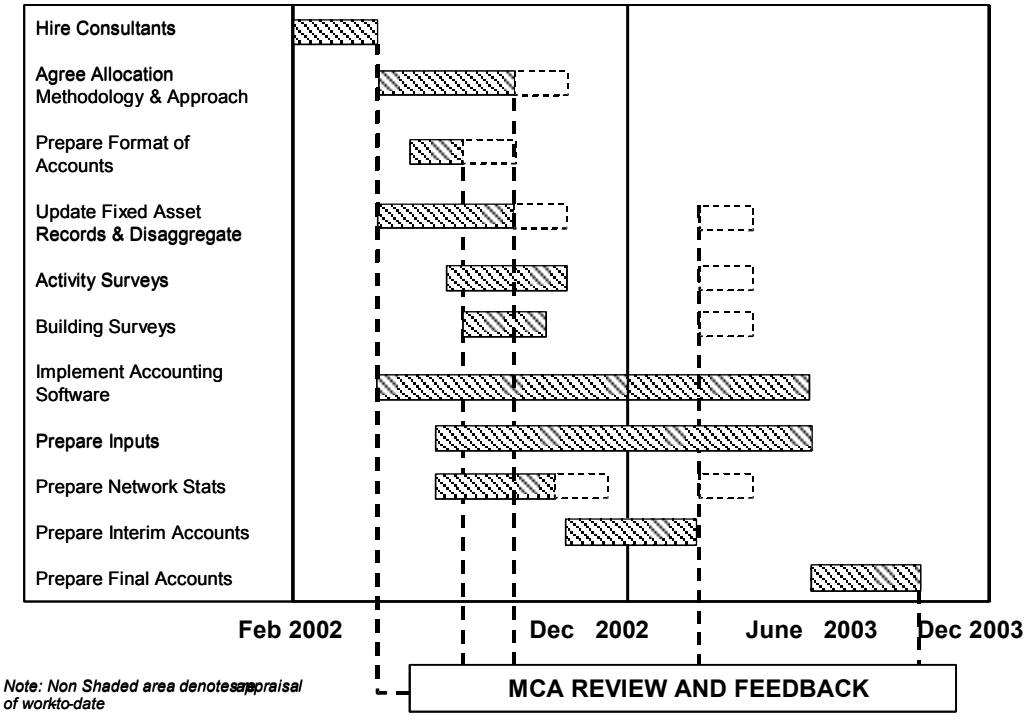
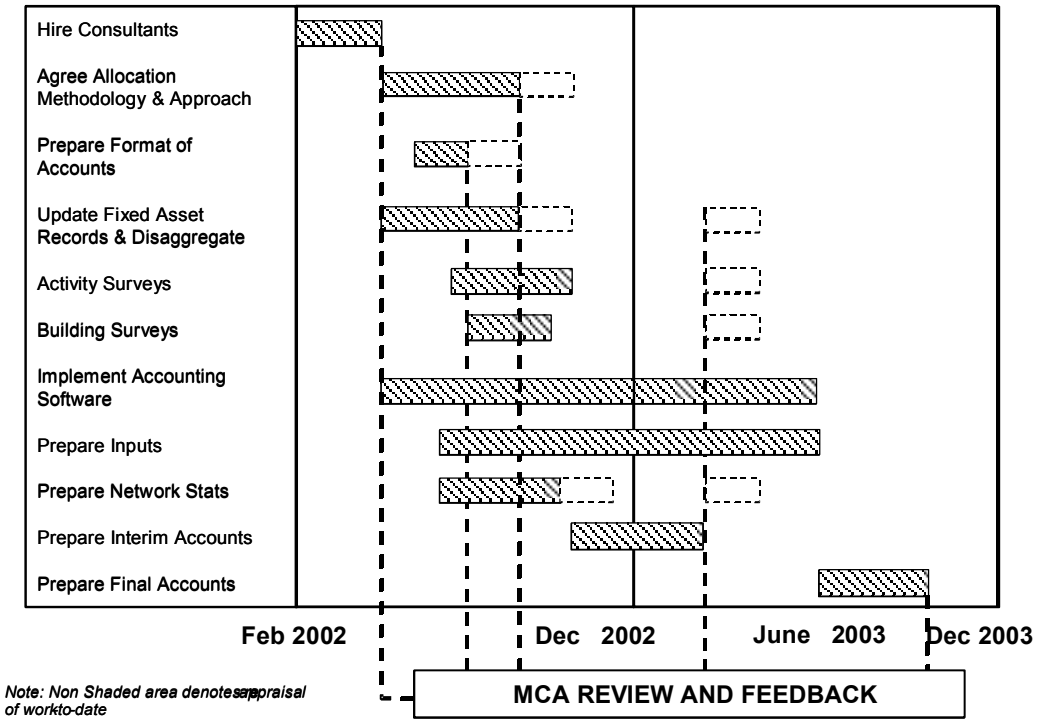


**Figure 6.3 – Melita Cable**




## 6.2 Conclusion

The MCA is mindful that the imposition of regulatory obligations in relation to the implementation of cost based accounting systems, accounting separation and publication of financial information must allow reasonable timeframes for operators. The timeframes must be long enough to allow the operators to put all the necessary groundwork in place and then produce the separated accounts and short enough to focus minds on the tasks ahead.

Reflecting the points made above, MCA believes it should allow the following time scales for operators to produce FAC separate accounts using historic costs .

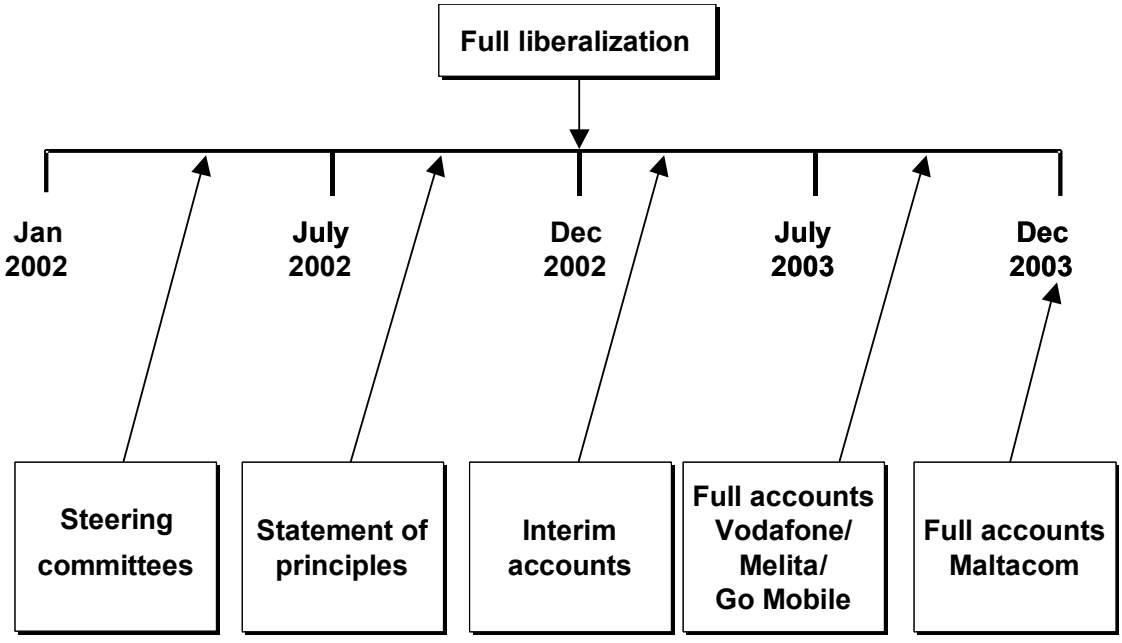
| Operator | **Suggested time scale** |
|---|---|
| Maltacom | 2 years |
| Vodafone | 21 months |
| Go Mobile | 21 months |
| Melita | 21 months |

However it would be wrong to establish a timetable for two years without setting interim milestones to ensure that operators are proceeding with implementation. The MCA intends to adopt the following timeframe:

- By April 2002 establish the steering groups for each of the fixed telephony, mobile telephony, and cable services.
- By September 2002 a statement of allocation principles and methodology to be returned to the MCA by each operator;
- By February 2003 an interim statement of accounts with a first cut of the adopted structure and estimates of the balances involved;
- By September 2003 (December 2003 in the case of Maltacom) a full set of FAC (Historic) accounts to be produced.

This timetable is shown in Figure 6.4 below

**Figure 6.4**
**Proposed timetable for introduction of FAC accounting**



# 7 Consultation framework

## 7.1 Consultation Period

The consultation period will run until Monday 15th April 2002. Comments should be sent before noon on Monday 15th April 2002 to:

Joseph Cuschieri
Malta Communications Authority
"Il-Piazzetta" Suite 43/44
Tower Road
Sliema SLM 16
MALTA

Tel: +356 21 336 840
Fax: +356 21 336 846
e-mail: jcuschieri@mca.org.mt

## 7.2 Finalisation of the MCA's Position

The MCA will consider comments received in response to this consultative document before reaching a decision on the implementation of cost based accounting systems for the telecommunications sector in Malta.

## 7.3 Project Plans

As part of the consultation process and in accordance with the tasks identified in Section 6 the MCA is requesting the operators to:

- Submit a project plan setting out the implementation of cost based accounting systems in their respective organisations.
- Nominate their representatives to the steering groups. Representatives are expected to be members of the high level decision-makers in their organisation.

## 7.4 Conclusion

In conclusion, this methodology is proposed by the MCA for comment by interested parties. The MCA recognises the subject to be a very important one for the regulation of the telecommunications market, both now and in the future.

# Appendix I - Revaluation of Assets Under CCA

This section briefly looks at different valuation methodologies that can be used when assets are revalued for the purposes of current cost accounting. Any chosen set of valuation methods will need to be reviewed from time to time as a result of changes in technology.

The principal valuation methods that can be used are described below.

### A.1.1. Existing Technology

If the assets in question have not been subject to substantial technological change, for example local distribution copper cable, two approaches are possible:

- **Indexation:** where there has been very little technological change and the service potential of new assets is similar to that of existing ones, it is possible to apply price indices to historic cost acquisition values in order to derive current cost valuations;
- **Absolute Valuation:** this involves taking non-financial measures such as physical volumes of lines and multiplying these by current prices. This may be necessary where, for example, satisfactory index data does not exist. In some cases it may be difficult to calculate unit prices and decide on the baseline to be used.

It is not always obvious which method will give more reliable and accurate results and this will need to be assessed carefully for each category of assets.

### A.1.2. New Technology

The determination of current cost must take account of technological change. As a result of changes in technology an asset may have altered substantially in any or all of the following respects:

- the initial capital cost;
- the level of operating costs, e.g. lower maintenance costs;
- the service provided (capacity and/or functionality).

Where existing assets cannot be replaced in the same form, the replacement cost is based on "the modern equivalent asset". In the case of BT, for example, a forecast is made of the likely mix of technologies that will be in

place in 3 years time so as to reflect practical constraints such as manufacturing capacity and lead times.

*A.1.2.1. Cost adjustments*

Where the modern equivalent asset differs from the existing asset in terms of operating costs, asset life or service provided, this needs to be allowed for when revaluing the asset concerned. For example, if the operating costs of the new equipment are lower than that of the existing equipment, the cost of the modern equivalent asset should be reduced by the present value of the extra operating costs associated with the existing equipment over the remainder of its life.

Similarly, the new equipment may have increased capacity and/or functionality. If so, the cost of the modern equivalent asset should be reduced by the estimated cost of upgrading the existing asset to the capacity and/or functionality of the modern equivalent asset.

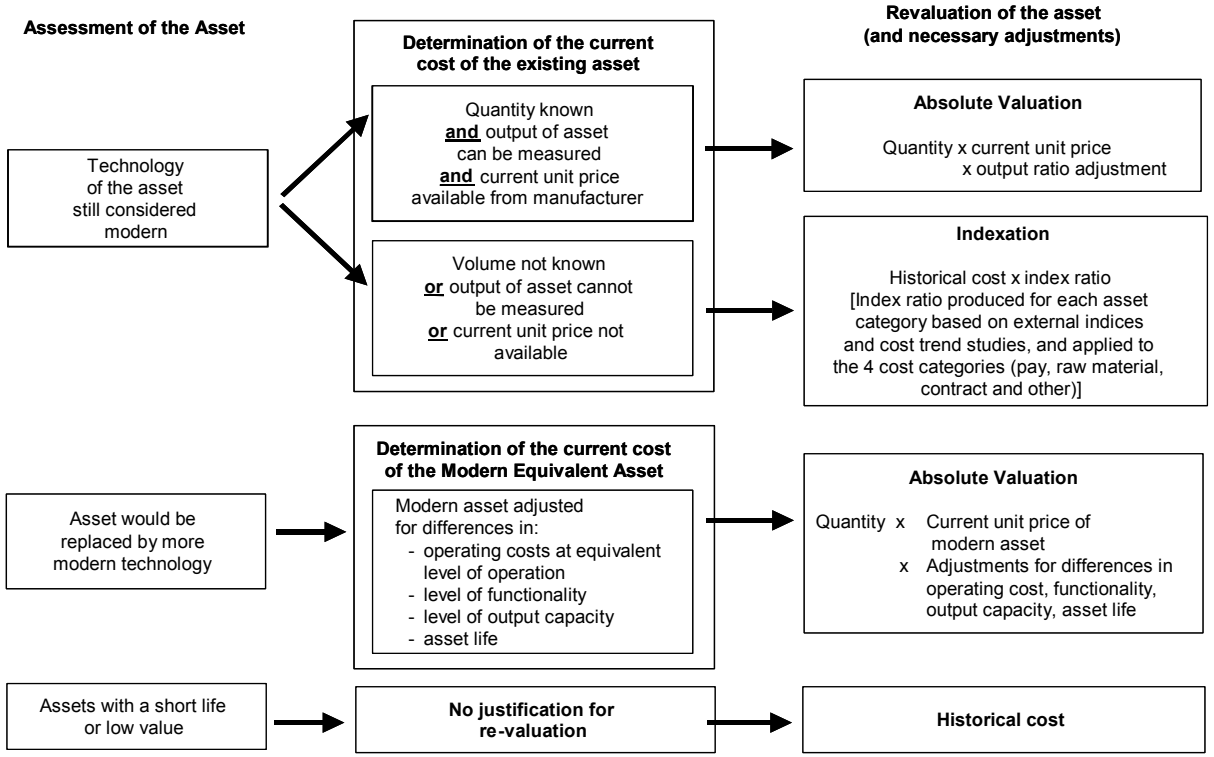
Where there is surplus capacity, i.e. capacity that is not currently required and is not expected to be required within the network planning horizon, valuations should be adjusted downwards. For example, BT found that the only asset for which they had surplus capacity under the above definition was specialised accommodation such as exchange buildings. This reflects the fact that the space requirement of modern switching equipment is much lower than that of analogue equipment. A way to deal with this is to use modern building and site costs but assume a space requirement consistent with what is necessary for modern equipment.

**A.1.3. Equipment with Low Value or Short Life**

Historical costs are sometimes used for low value items or equipment with a very short service life and in this case no revaluation method is applied.

The graph below summarizes the main principles underpinning the choice of a valuation methodology (in order to calculate the net replacement cost) as well as the adjustments that should be considered.

## Choice of valuation methodology



# Appendix II - Capital Maintenance Concepts

This Appendix briefly discusses the merits of adopting the financial capital maintenance (FCM) concept over the operating capital maintenance (OCM) concept, bearing in mind that the telecommunications industry is becoming increasingly competitive, that interconnection prices have to be set rather than being determined by the market and that telecommunications assets (particularly switching and transmission equipment) are subject to substantial technical progress and hence rapidly falling prices.

While the OCM approach focuses on the ability of a company to maintain its operating capability (assets are revalued to current costs), it does not take account of the impact of price changes on financial capital (i.e. the value of shareholders' equity). In contrast, the FCM approach measures profits only after the value of financial capital has been maintained. Financial capital is assumed to have been maintained if shareholders' funds at the end of the accounting period are the same in real terms as they were at the beginning of the accounting period.

While both approaches require a revaluation of assets to current costs, costs under FCM differ in two respects from those under OCM, reflecting the need to maintain financial capital:

- allowance is made for the holding gains and losses that are caused by changes in the prices of assets; and
- the impact of general price inflation on the value of shareholders' equity is taken into account.

Generally, when preparing accounts in current cost terms, the use of FCM is recommended. This is in line with the European Commission's recommendation on interconnection in a liberalised telecommunications market, the approach taken by OFTEL in the UK, the ODTR in Ireland, ACCC in Australia, the FCC in the USA and OFTA in Hong Kong.

The chart below summarizes the main differences between the Operating Capital Maintenance approach and the Financial Capital Maintenance.

**Main Differences between Operating Capital Maintenance and Financial Capital Maintenance**