



Office of the Director of  
**Telecommunications  
Regulation**

## **The Development of Long Run Incremental Costing for Interconnection**

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Decision Notice D6/99

&

Report on Consultation Paper ODTR 99/17

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# 1 INTRODUCTION

As one of a number of steps in consultation on the development of the regulatory environment for the telecommunications sector in Ireland in accordance with National and EU legislation, the Director of Telecommunications Regulation (“the Director”) signalled her intention to consult the industry on the introduction of Long Run Incremental Costs (LRIC) as a basis for calculating interconnection tariffs in ODTR 98/52.<sup>1</sup> She did so in a consultation paper in March 1999 (ODTR 99/17) and invited comments on the key issues addressed in that paper.<sup>2</sup>

The consultation document specifically sought views of interested parties in the following areas:

- Objectives for LRIC based interconnection charges
- Scope of LRIC estimations
- Methodological issues
- Cost issues
- Process Issues

The Director would like to thank the Association of Licensed Telecommunications Operators (ALTO), who represent new entrants in the Irish telecommunications market, for their response to the consultation paper and to thank those who responded in detail to the questions posed:

- ESAT Digifone
- Ocean Communications (Ocean)
- Telecom Éireann (TE).

She was pleased by the broad measure of agreement in principle on moving forward to charges based on LRIC and she appreciated the substantive commentaries which highlighted differences in relation to timing, to priorities and, to some extent, to the precise approach that should be taken in calculating such charges. In taking forward LRIC based interconnection charges, the Director will, of course, also pay careful regard to the best interests of telecoms users in Ireland.

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<sup>1</sup> “Interconnection Rates in the Irish Telecommunications Sector”, ODTR 98/52, November 1998.

<sup>2</sup> “The Development of Long Run Incremental Costing for Interconnection”, ODTR 99/17, March 1998

This paper sets out the report on the consultation process, together with the decisions the Director has made for the effective implementation of LRIC based interconnection charges in Ireland. A number of points of detail will need to be resolved in the work that lies ahead.

The structure of the Paper is as follows:

Section 2 provides background to moving to LRIC based interconnection charges in Ireland;

Section 3 and 4 follow the questions raised in Section 3 and 4 of ODTR 99/17 and outline views of the respondents together with ODTR's reactions to the points raised.

## **2 BACKGROUND**

The provision of interconnection on fair and efficient terms is widely recognised as an essential requirement for the creation of a competitive telecommunications market. This is because operators in a competitive market need to terminate calls on other operators' networks and to receive calls originated on other operators' networks. Furthermore it makes sense economically, especially as competition develops, for competing operators to use each other's core networks for transit purposes and often this will be the only way that a new entrant can provide some switched or leased services. Interconnection charges can account for a substantial proportion of operators' costs. It is therefore important that interconnection charges are soundly derived from appropriate costs and give proper economic signals to operators to guide their investment decisions.

In a parallel exercise, the Director has been consulting upon price control of Telecom Éireann's retail prices (see ODTR 99/19) and on accounting separation (ODTR 99/10 being the consultation document and ODTR 99/35 being the Decision Notice 5/99 and Report, published in May 1999). Improving the transparency and relevance of the accounts can be expected to highlight imbalances in the relationship between various current tariffs – both retail and wholesale. Insofar as such imbalances have a distorting effect on the development of competition, they need to be corrected in achieving a properly competitive market place.

Ireland is in a transitional period between monopoly and effective competition and one respondent raised the question of the relationship between Telecom Éireann's retail prices and interconnect charges. In implementing accounting separation, the Director intends that Telecom Éireann should charge its own retail businesses relevant interconnect charges and then include such charges amongst the relevant costs in accounting for retail prices.

### **3 OBJECTIVES FOR LRIC-BASED INTERCONNECTION CHARGES**

#### **3.1 High Level Objectives**

All respondents broadly agreed with the ODTR's high level objectives as identified in the consultation paper and repeated below. Respondents believed that these objectives should help to determine the detailed development of charges based on LRIC.

One respondent disagreed with some aspects of the detail supporting these objectives, whilst others drew attention to the likely impact of these objectives on their business. Details are provided below, with the ODTR's view of these responses.

The objectives identified in consultation paper ODTR 99/17 were:

##### Encouraging efficient competition

One operator expressed concern that encouraging entry would not help to achieve dynamic efficiency if unduly low charges for interconnection encouraged free-riders and discouraged investment by others in infrastructure.

It is not the objective of the ODTR to achieve either excessively low or high interconnection charges. The objective is to produce cost-oriented charges based on LRIC, which should encourage efficient competition in the wholesale market, leading in turn to competition in the retail market.

##### Sending economic signals that promote efficient forward-looking investment decisions

One respondent believed that a purely marginal cost approach would not lead to efficient investment incentives because the existing network is characterised by of high levels of fixed costs and economies of scale.

The ODTR recognises that interconnection prices based purely on marginal costs might cause concerns as to the ability to recover fixed and sunk costs, which may in some cases deter efficient investments. Interconnection charges based on LRIC should therefore allow recovery of a proportion of such costs, as discussed further below.

### Enabling cost recovery by the incumbent

All those who commented agreed with the principle that interconnection charges should allow the incumbent to recover a proportion of fixed costs, to the extent that they are deemed to be 'efficient' and attributable to the service concerned. One respondent sought a test of whether the inclusion of such costs would constitute a barrier to entry.

ODTR 99/17 recognised that as a result of economies of scale, the marginal costs of interconnection would generally be below average costs. The Director intends to ensure that all the costs that the incumbent operator seeks to recover are reasonable and justified so that only the appropriate proportion of shared and common fixed costs would be recovered. This principle, combined with the requirement on the SMP operator to charge itself the same as it charges competitors (on a non-discriminatory and non-preferential basis – see below) should ensure that the inclusion of such costs does not constitute a barrier to entry.

### Facilitating effective means of interconnection

Respondents generally supported the proposition that interconnection charging should enable competing operators to interconnect with the network in any reasonable way, particularly in ways that encourage innovation and the development and effective use of new services.

### Being sufficiently transparent

One respondent emphasised the need for transparency whereas another was concerned about asymmetry of disclosure. It was concerned that some operators, such as those deemed to have SMP, will be required to submit information that is commercially sensitive, placing them at a competitive disadvantage with other operators that have no such obligations.

The Director recognises that the incumbent operator may have concerns over confidentiality of commercial information and she will consider how best to balance the incumbent's legitimate interests with her intention that the basis of interconnect charges be transparent. Legislation requires a measure of transparency in and access to the accounts of operators with significant market power, currently Telecom Eireann, and, as indicated in ODTR 99/35, the Director specifically reserves her right in accordance with the law, to publish information which she believes would aid the development of competition.

### Being non-discriminatory and non-preferential.

One respondent reiterated the requirement for the incumbent network operator to charge its own retail operations on the same basis that it charges new entrants, and that interconnection charges in any circumstance should be related to the costs imposed by that interconnection.

The Director believes that this objective will need to be reflected in her decisions on a number of points of detail in the application of charges based on LRIC.

The Director believes that charges related to LRIC should send appropriate economic signals to incumbent and new entrant alike. Such charges should act as an incentive to efficient competition, whether in services or in the provision of competing network facilities, and also act as an incentive to investing in a network where such investment would be economic.

It follows that charges based on LRIC should apply, without discrimination, both to the own service businesses of SMP operators and to their competitors and that such charges should allow SMP operators to recover in full such costs as they would incur as an efficient operator of a modern network.

### **Decision 3.1**

**The Director's objectives in introducing LRIC are to 1) encourage efficient competition, 2) send appropriate signals that promote forward looking investment decisions, 3) enable cost recovery by the incumbent, 4) facilitate effective means of interconnection, 5) be sufficiently transparent and 6) be non-discriminatory and non-preferential.**

### **3.2 Relationship of LRIC to Investment in Alternative Networks, Quality and Capacity**

ODTR 99/17 raised questions about how the introduction of interconnection charges based on LRIC might influence decisions regarding the building of alternative network infrastructure and how the quality and capacity of existing infrastructure might be relevant to decisions on whether to buy, lease or build decisions.

Most respondents agreed that LRIC based interconnection charges are essential to sending appropriate signals to the market as a whole, providing that costs are efficiently incurred.

Each operator entering the competitive marketplace has to decide how far to provide capacity and quality through their own investment, how far to lease capacity from Telecom Éireann or from another operator, and how far to acquire capacity as and when required through interconnection agreements. Adequate capacity and appropriate quality of interconnection are both essential if interconnection is to be effective in enabling operators to provide end-to-end services.

One respondent suggested that charges based on LRIC for call termination should have no impact on build/buy decisions for other operators. However this respondent went on to stress the



significance of the incumbent operator's dominance in the market and the bottleneck that dominance implies in call termination.

The ODTR is of the view that interconnection charges based on LRIC are likely to have an impact on build/buy decisions in the conveyance network. They should inform an operator's evaluation of the economic efficiency of increasing their network, to widen, for instance, the spread of their interconnection points.

The reality, ahead of the development of competitive core networks, is that a significant amount of core network capacity is being purchased from SMP operator against its Reference Interconnection Offer (RIO). In future, as competing carriers believe that they can profitably offer services to each other, a competitive market for such core conveyance should develop.

Some respondents argued that there was a legitimate distinction to be drawn between call origination and call termination as the result of asymmetry of competition between the two types of traffic. They argued that treating the two services in a similar fashion would affect adversely local access competition.

The Director questions the appropriateness of treating call origination differently to call termination, for reasons presented in the latest RIO consultation (ODTR99/16). The ODTR is of the view that interconnection charges based on LRIC should avoid any disincentive to investment in innovation in competing networks.

### **Decision 3.2**

**The Director intends to move to interconnection charges based on LRIC. She considers that there is insufficient competition in the market at present to consider call origination a competitive service.**

### **3.3 Other Important Elements of the LRIC Approach**

ODTR 99/17 invited views on whether there were any elements of the LRIC approach which are particularly important to build/buy decisions.

One respondent indicated that, given that network investment involves long time horizons, stability of interconnect prices would be an important factor in giving efficient build/ buy signals and promoting investment. This respondent suggested that stability could be achieved by introducing a price cap control for interconnect services, but went on to qualify this by stating that the telecommunications market in Ireland is not yet mature enough to move to such a regime.

The Director recognises that, all else equal, predictability beyond the present rates may have some benefits in facilitating efficient investment decisions. She believes that LRIC based charges established and reconciled with the audited accounts of the SMP operator should provide a measure of stability. The requirement on SMP operators to prepare separate accounts will also provide the industry with greater transparency. It should build confidence in the setting of interconnection charges and provide a firm basis for tracking cost allocation.

LRIC based interconnection charges should be estimated for one year. Each year Telecom Eireann will specify the charge for conveyance services in its RIO based on long run incremental costs. This method will require the ODTR to be centrally involved in approving charges and provides little scope for allowing market forces to set charges as competition develops.

The Director believes that as the market becomes more competitive at network levels, detailed regulatory intervention in setting/approving charges may be gradually withdrawn through the use of, for example, long-term price caps on wholesale/network charges. However, mindful that LRIC development is at an embryonic stage, and that network competition is limited in Ireland, she believes that it would be premature for her to consider moving to such a regime in the immediate future.

### **Decision 3.3**

**The Director intends that LRIC based charges will be calculated and approved on an annual basis until network competition is sufficiently developed, at which time she will consider moving to a regime that reduces regulatory intervention.**

## **4 ISSUES IN ESTIMATING LRIC**

ODTR 99/17 discussed a number of issues associated with the estimation of the long-run incremental cost of interconnection. These are considered in turn.

### **4.1 The Scope of LRIC Estimations**

ODTR 99/17 addressed the scope and definition of the services for which LRIC for conveyance services needs to be estimated.

#### **4.1.1 Division between access and core network**

The ODTR's initial view that line cards will normally define the border between the core and access networks received the support of each commentator. Telephone lines from the customer's premises are currently terminated on a line card. Since line cards are customer-specific and not call-related, the number of line cards depends on the number of lines.

However, most respondents suggested that the advent of new access technologies – particularly fibre rings in the access network – would significantly alter the situation.

The Director will monitor the development of access technologies with a view to reconsideration of this boundary, if appropriate, in due course.

#### **Decision 4.1.1**

**For the purposes of calculating LRIC for conveyance services, the Director defines the boundary between the access network and the core network at the line card.**

#### **4.1.2 Minimum range of services to be covered**

There was variety in the views expressed on the range of services that should be encompassed in an initial review of interconnection charges based on LRIC.

Some respondents agreed with the ODTR's initial view that LRIC should (as a minimum) be estimated for the PSTN conveyance services specified in the RIO. These respondents added that (also as a minimum) LRIC should also be estimated for ISDN conveyance.

One respondent argued that the ODTR should adopt the principle that LRIC based charges should be estimated only for services constituting a bottleneck, which that respondent considered to be call termination.

The Director however agrees with those respondents who considered that there is a need to estimate (as a minimum) LRIC for domestic conveyance services specified in the RIO: call termination, call origination and transit. She also agrees with the inclusion of ISDN services as they become a significant component in competitive public switched telephony. She will give such PSTN and ISDN services priority in this process.

#### **Decision 4.1.2**

**Initially, the Director intends to focus on a set of basic inland conveyance services covering call origination, call termination and domestic transit, without prejudice to which other services should be embraced in due course.**

#### **4.1.3 Application of LRIC to other services specified in the RIO, and for Internet services and leased line services**

In ODTR 99/16, the consultation paper on Telecom Éireann's RIO, the Director addressed a variety of issues on interconnect services which interact with this consultation. ODTR 99/17 pointed out that the current RIO includes a number of services which make use of more than the PSTN conveyance network (e.g., directory enquiry services, emergency services) whilst excluding other services (eg Internet services, leased line services).

Some respondents did not support the ODTR's initial view. They stressed that the ODTR should adopt the principle that LRIC based charges should be estimated only for non-competitive services. One respondent expressed the view that requiring LRIC estimates for other services specified in the RIO, and for Internet and leased line services, would delay the introduction of LRIC based charges in Ireland.

Another respondent also felt that it would be necessary to focus on the conveyance services so as to derive maximum value from the process as quickly as possible. This respondent believed that the estimation of LRIC for Internet access services, and for IP network components will be vital to ensure that the SMP operator competes fairly in the market, and to ensure that competitors to the incumbent operator have access to customers and infrastructure on appropriate terms.

The Director is consulting publicly on Internet access services and on further revisions that may be required to the RIO . She intends the coverage of LRIC charges to be consistent with the ODTR’s approach to successive RIOS.

Since the initial focus of the ODTR is on conveyance services within the core network, it follows that early LRIC models would not provide estimates for services that use the access network in a way that carries a significant incremental cost

The Director intends to achieve a set of LRIC related interconnect charges for basic domestic conveyance services in the Reference Interconnect Offer (RIO) in a timely way, recognising that there may be trade-offs between timeliness and the level of detail which can be achieved in a first round of estimates.

### **Decision 4.1.3**

**The immediate focus of LRIC charges will be conveyance services, but LRIC modelling will be developed in a way that makes it straightforward as possible to add or to remove services.**

#### **4.1.4 Classification of network elements**

ODTR 99/17 indicated that the costs imposed on the network by different forms of interconnection service could be determined by aggregating the costs of the components utilised by each of these services. It suggested a network elements-based approach to the calculation of LRIC, on deriving costs for the different components of the network, such as primary and tandem switches.

All respondents supported the network elements listed in ODTR 99/17 as amongst those for which LRIC calculations would be required. Some respondents suggested that it is possible to break down transmission into link- and distance- related elements. The respondents said that such disaggregation will be especially important when analysing the provision of interconnect circuits and private circuits.

The Director welcomes the suggestion of some respondents that it may be helpful to provide a more detailed list. The Director believes that the current classification, as set out in ODTR 99/17, provides the basis for moving forward in developing LRIC estimates. She is mindful that any revisions should not lead to delays in the introduction of LRIC charges. Early sight of the detail of network elements upon which Telecom Eireann is using for its Top-down LRIC model should speed up the process of producing an agreed classification of network elements.

#### **Decision 4.1.4**

**The current classification of network elements list provides the basis for producing LRIC charges. The Director intends to review this list in the context of developing LRIC though she is mindful that this should not cause any delays in it's introduction.**

## **4.2 Methodological Issues**

### **4.2.1 Total service as the increment**

ODTR 99/17 raised the question whether the increment should be defined in terms of total service, and provided an overview of the cost definitions, including marginal cost, total service incremental cost, fully allocated cost and stand alone cost.

All respondents agreed that the increment could be defined as the total service.

Telecom Eireann provided reasons as to why defining the increment using stand-alone costs is consistent with the ODTR's definition of the total service. It believes that it is first necessary to define a stand-alone network (SAN) as the inland PSTN and ISDN services and inland leased line services which are provided over the combined conveyance (core) and access network. Such a network would exclude all other services. The costs of SAN would, in turn be sub-divided into core and access. The SMP operator stated that the costs associated with interconnection services (conveyance) would fall within the core increment plus a proportion of costs that are shared between the core increment and the access increment. This respondent believes that this is consistent with the concept of the total service as defined in ODTR 99/17.

Whilst Telecom Eireann's views on the core increment are consistent with defining the increment as the total service, its view on modelling a stand alone network has implications on the recovery of shared and common fixed cost.

In economic terminology, the stand alone cost of a service is the total cost of providing a service when no other services are provided. Stand alone cost is thus equal to total service incremental costs plus all shared and common fixed costs, and the Director believes this could this lead to over recovery of shared and common costs if applied to more than one service.

Modelling a SAN has typically involved both conveyance and access networks, as well as private circuits. Some regulators in EU Member States have modelled such a network providing PSTN services and private circuits. They have therefore assumed that all fixed costs associated with the core network would be recovered through PSTN services and private circuits. The ODTR believes that the recovery of “full costs” of the whole network on a stand alone basis appears to imply a cross-subsidy for those services not included in the stand alone approach.

As the focus of ODTR 99/17 was PSTN conveyance services (and therefore not access), the Director considers that only the portion of shared and common costs that were properly attributable to relevant conveyance services would then be included in estimating LRIC. This should be consistent with the LRIC charges that TE will produce.

The Director intends to define the increment as the total service. She will give due consideration to the recovery of a justified level of shared and common fixed costs.

#### **Decision 4.2.1**

**The increment will be defined as the total service that could allow for a justified level of shared and common fixed costs to be recovered by the SMP operator.**

#### **4.2.2 Interconnecting traffic only as size of increment**

ODTR 99/17 sought views on whether a valid case existed for defining the size of the increment as interconnecting traffic only.

All respondents supported the views of the ODTR that using interconnection traffic to measure the size of the increment will lead to under-recovery of the incumbent’s costs.

The Director stresses that it is not appropriate to confine the increment to interconnecting traffic alone.

#### **Decision 4.2.2**

**The increment will be defined as the total service.**

### 4.2.3 Modelling approach

Of possible approaches to estimating forward-looking LRIC, ODTR 99/17 sought views on whether LRIC should be calculated using a “Top-down” and or a “Bottom-up” approach:

- *Top Down*: which uses data from the management accounts, adjusted for current rather than historic costs, and allocated costs to different services based on the relationships between costs and volumes. This approach required assumptions to be made about the scope for efficiency improvements.
- *Bottom-Up*: which involves the development of engineering-economic models so as to calculate the costs of particular network elements and in turn particular services. This approach also required estimates to be made of the costs of efficient, forward-looking technology and efficient operating costs which, one respondent emphasised, may account for up to half of total network costs.

Most respondents agreed that ODTR should develop a Bottom-Up model to complement a Top Down approach, highlighting the effort that would be required in understanding and in reconciling differences in the results.

One respondent argued for a Top Down approach in which these assumptions would be informed by efficiency studies on the operations of the SMP operator. It also argued that bottom-Up approaches underestimate efficient costs.

The Director recognises that there are potential advantages and shortcomings in each approach and she intends that both approaches should proceed in parallel with careful attention to precise assumptions on capital costs, utilisation levels and other inputs as well as to identifying inefficiencies in operational practices. She is still minded to give greater weight to the results of a realistic Bottom-Up approach, as this would probably be more likely to reveal the full scope for efficiency improvements. She appreciates that a Top Down model would use relevant data and could reflect the SMP operator’s accounting system.

She notes that Telecom Éireann's LRIC modelling will not be complete until October 2000. As she believes interconnection rates based on LRIC to be fundamental to furthering developing competition, she intends Bottom up LRIC rates to be available from 1/12/1999.

For future years, the ODTR will use the bottom up model alongside TE's top down model, with a comparative reviews of both approaches before setting the appropriate LRIC rates.



### Decision 4.2.3

**LRIC charges will be calculated using both Top-down and Bottom-up models. The results of the models will be reviewed before determining a final set of interconnection charges. For 2000, the bottom up approach will be used in setting LRIC interconnection rates. The issue of retrospection is being dealt with in the Reference Interconnect Offer consultation exercise.**

### 4.2.4 Approach to developing a Bottom-up model

ODTR 99/17 explained that Bottom-Up models estimate costs of rebuilding the incumbent's network using optimal technology on either a "scorched node" basis or a "scorched earth" basis.<sup>3</sup>

All respondents agreed with the ODTR's initial view that designing and agreeing an optimal network for the purposes of a Bottom-up model is not straightforward nor an uncontentious task.

Respondents' views diverged on the extent to which, in a scorched node approach, the nature of the equipment at any node should be altered to take modern practice into account (the "modified scorched node approach.") Modification takes the existing node location as given (and thus recognises the historical evolution of the network), but optimises the equipment at the nodes, as well as optimising the transmission equipment connecting these nodes. Most respondents support the idea of adopting a modified scorched node approach as this would capture the efficiencies and produce charges that reflect closely those of a forward-looking efficient operator.

One respondent disagreed, stressing the time taken to modernise any incumbent's network and its desire to establish what it calls "true costs".

The Director is aware that early work on similar issues in the UK assumed some modification of nodes and she notes that subsequent practice assumed greater modification. These regulatory models reflect experience of incumbent operators that are replacing local switches with concentrators (ie are optimising nodes). She intends to use the modified scorched node approach; her views on the degree of modification will be informed by discussions with an industry advisory group.

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<sup>3</sup> Equivalent issues must be faced in using a top-down approach.

#### Decision 4.2.4

**A modified scorched node assumption will be adopted when developing a Bottom-up model of the incumbent's network in Ireland.**

#### 4.2.5 Implications of the approaches

ODTR 99/17 sought views on whether the approach taken to Bottom-up modelling would have an impact on the costs of the network estimated.

Whilst there was mention of the possibility of a bias towards some operators in particular approaches to modelling most respondents doubted that such a bias was inherent in the methodology. It is too early to predict the impact of an approach ahead of consideration of a range of factors, such as choice of technology, asset valuation, and assumptions as to appropriate levels of efficiency.

One respondent is of the view that the scorched earth and the modified scorched node approaches are inferior to the scorched node in that they are relatively subjective. It argued that they are therefore less likely to result in robust and accurate LRIC based interconnection rates that reflect what it called "true costs" associated with providing interconnection services.

The Director has given consideration to these views. By adopting a modified scorched node approach, she does not intend favour one operator over another. She agrees with those respondents who saw no inherent reason to expect the approach adopted to over- or to underestimate the costs of conveyance.

She wishes to ensure that the incumbent has appropriate incentives to design and invest efficiently in its own network in the future and that new entrants receive similarly appropriate economic signals that assist them in deciding between building their own networks, leasing capacity or paying for interconnection with the incumbent's network.

All methods involve the exercise of professional judgement. Any advantage from the scorched node being less subject to interpretation than a modified scorched node approach has to be offset by the disadvantage of a scorched node approach which does not adequately estimate the costs of a forward looking efficient operator but of the existing network instead. Since the incumbent operator is currently modernising its network, a LRIC model using a scorched node assumption would not capture the changes even now taking place.

## Decision 4.2.5

**Interconnection charges will be set to send appropriate signals to incumbent and entrant alike on the basis of a reasoned approach to the underlying costs of a forward looking efficient operator.**

### 4.2.6 Forward-looking technology

In ODTR 99/17, the Director sought views on what technologies should be assumed for switching and transmission in calculating LRIC for an efficient forward looking network operator.

All respondents supported the ODTR's view that an efficient operator would employ digital switching technology.

The Director is inclined to assume conventional digital switching. She understands that although Irish operators are already deploying or planning next generation switches (using ATM), they are doing so for advanced data services and not for the mainstream of switched voice services.

Most respondents agree that SDH rings with add/drop multiplexers to connect the local and tandem/tertiary switches should be used to model the transmission network. They qualified their support, however, by arguing that rather than accept generalisations about forward-looking technology, it would be more sensible to consider each of Telecom Eireann's routes in turn as SDH might not penetrate the remoter parts of Ireland in the near future. That would mean not simply assuming universal application of SDH but considering what is cost efficient for acceptable quality in particular cases.

The Director therefore considers that SDH is the appropriate technology to model for dense traffic routes. The ODTR will consider the use of PDH transmission technology on routes where traffic volumes are lower. In deciding how far certain routes would not effectively be served by SDH technology, the Director expects the ODTR to be informed by the advisory group she intends establishing, although this should not delay the implementation of charges based on LRIC.

## Decision 4.2.6

**The Director, in calculating LRIC for an efficient forward looking network operator, will assume digital switching technology and SDH transmission technology. Her decision on which transmission routes would not effectively be served by SDH technology will be informed by an advisory group.**

### 4.3 Cost Issues

ODTR 99/17 indicated that LRIC calculations would need to make allowance for three broad categories of cost:

- operating expenditure (e.g., labour costs, materials costs, power costs);
- the costs of capital maintenance (i.e., depreciation), and
- a return on capital employed (which may be calculated by applying the cost of capital to the appropriate asset value).

As the cost of capital and the treatment of depreciation were to be the subject of separate ODTR consultation exercises, ODTR 99/17 focused on issues raised by the remaining categories of cost and, in particular on asset valuation, where commentators all supported modern equivalent assets valued at current costs. The Director expects the advisory group to inform her decisions on what equipment should constitute modern equivalent asset and on what current costs are appropriate. Such current cost asset values will be adopted in both the Top-Down and Bottom-Up approaches.

#### 4.3.1 Current cost asset values

In ODTR 99/17, the Director sought views on whether LRIC calculations should be based on current cost values or modern equivalent asset values (MEAV), rather than on historic asset values.

All respondents accepted current cost asset valuation as the appropriate basis for LRIC. This accords with both the recommendation of the Commission for application across the EU and with the view of the Director. Basing interconnection prices on historic costs would tend to give a higher cost than would be incurred in parts of the network where there has been significant technological process, such as local switches and transmission equipment.

A Top Down approach requires judgements to be made on modern equivalent assets whilst a Bottom-Up approach requires a forward-looking assumption to be made about the technologies that would be adopted by an efficient operator making investment decisions now.

Telecom Eireann is to be required, as part of accounting separation and its Top-down LRIC model, to produce a list of modern equivalent assets (MEAs) and then a set of CCA values. The Director intends to take advice from the industry advisory group on MEA's and their CCA values in arriving at her decisions in this area.

#### **Decision 4.3.1**

**LRIC will be calculated on the basis of current cost asset values.**

#### **4.3.2 Efficiency**

A Bottom-Up modelling approach assumes a level of best practice operating and capital cost efficiency. A Top-Down modelling approach requires estimates to be made of the scope for efficiency improvements. ODTR 99/17 invited comments on aspects of efficiency that the modelling should address and what measures of efficiency might be appropriate.

Respondents provided suggestions on ways of adjusting the SMP operator's costs for efficiency.

One of the respondents objected to simple indicators, benchmarks and to bottom-up modelling in general. It preferred the use of a forward-looking Top Down approach that – in its opinion – would use practical rather than hypothetical efficiency gains. It proposed that best practice efficiency analyses should be conducted in the following forms:

- 1) efficiency adjustments resulting from the CCA valuation; and
- 2) comparative analysis of the SMP operator's overall network costs with costs of other competitive operators.

Other respondents favoured a comprehensive comparative efficiency study that avoided the pitfalls of simple comparisons by taking into account differences in operating environments.

One respondent proposed engineering studies that involve analyses of network activities and processes in detail, in order to assess the scope for improvements. It was suggested that, as interconnection charges in some Member States were already supposed to be cost-based, they should reflect the relative efficiency of network operators in different countries.

Finally, one respondent argued that, rather than focusing on adjustments for inefficiencies per se, the ODTR at this stage should concentrate on the main reasons why the Top-down and Bottom-up approaches were likely to produce different results. It stressed the need to produce an overall "hybrid" result.

The Director supports the preference of some respondents for detailed studies. Efficiency studies and data provided by competing operators should inform both Top-Down and Bottom-Up work since both should reflect the LRIC of an efficient operator.

The ODTR accepts that it is important to understand the differences between the two modelling approaches. Since Bottom-up LRIC methodology models the network of a forward looking efficient and Top-down models should incorporate efficiency adjustments, conclusions about efficiency should be important in carrying out reconciliation.

The Director is of the view that an independent efficiency study would provide an appropriate basis for assessing the operating and capital efficiency of the SMP operator, and that this should draw on both the engineering and econometric analyses . Although it welcomes the plans of the SMP operator to prepare a comparative efficiency study, the Director believes that an independent study would provide market players with greater confidence in the approach and its findings.

#### **Decision 4.3.2**

**The Director will commission an independent study of the comparative efficiency of the SMP operator.**

#### **4.3.3 Recovery of service specific fixed costs**

ODTR 99/17 sought views on whether LRIC based charges should recover fixed costs specific to the interconnection service.

All respondents agreed with the ODTR's initial view that an efficient level of such costs should be fully recovered.

If no such costs are recovered, the SMP operator may face a shortfall between revenues and (an efficient level of) costs. If all such costs are recovered through interconnection charges, the SMP operator may over-recover revenue in total.

The Director recognises that she may need to adjudicate on the scope and efficient level of service-specific fixed costs but that they should legitimately be recovered fully in LRIC charges.

### **Decision 4.3.3**

**LRIC charges will recover all justified service-specific fixed costs.**

### **4.3.4 Recovery of shared and common fixed costs**

ODTR 99/17 sought views on whether LRIC based charges should include shared and common fixed costs.

One respondent invited the Director to consider disallowing recovery of such costs (common and shared), or at least to examine the size and basis of any mark up carefully, arguing that they should be small and that they might constitute a barrier to entry. Another expected LRIC to include shared and common fixed costs associated with the efficient production of the increment.

One other respondent believed that, by defining the increment as the total service, common costs that were not captured within the LRIC charges were likely to be insignificant. This respondent suggested that a purist approach to LRIC modelling would disallow mark-ups, not least because - as is the case with introducing allowances for the incumbent's inefficiencies - any significant move away from economic-based charges would inevitably fail to send the correct economic signals. There was concern that unjustified mark-ups on LRIC could re-introduce cost elements which would have been excluded as part of a Bottom-Up modelling exercise.

The Director acknowledges concern expressed by those commenting on “full recovery” of costs that there is a need both to discern those costs that should be allocated and to determine the methodology by which they should be allocated. A total service approach to LRIC should assist in both regards. Under this approach, an appropriate proportion of common and shared fixed costs with other services should be recoverable through interconnect charges in accordance with the principles of efficiency and of reasonable cost recovery. This accords with EC recommendations.

The Director believes that a proper approach to LRIC based charges in Ireland should look at realistic provision – that is not only provision for the full range of services currently carried over the existing network but also appropriate dimensioning for potential growth and innovation. Such an approach will mean that all those providing services over the network

take some share in the risks associated with investment and contribute to the fixed common and joint costs of the network.

The Director intends that the allocation of costs should accord with a principle of non-discrimination between operators' different service businesses. She will ask the advisory group to advise her on defining the types of cost, on efficient levels of fixed costs, and on the methodology appropriate to their allocation.

#### **Decision 4.3.4**

**LRIC charges will include a proportion of efficiently incurred shared and common fixed costs.**

## **4.4 Process Issues**

### **4.4.1 Timing of accounting developments within Telecom Éireann**

ODTR 99/17 sought views of the industry on the time by which by when it is reasonable to expect Telecom Éireann to have completed LRIC modelling.

Telecom Éireann's financial year-end for 1999/2000 would be 1<sup>st</sup> May 2000. They expected audited figures would not be available before 1 August 2000 and corresponding audited (Top Down) LRIC numbers would not be available before October 2000. They were concerned about additional burdens which might flow from any widening of the scope of LRIC or from an overly burdensome consultation process.

Other respondents pointed to the need for reconciliation between LRIC and Telecom Éireann's *Financial Support System* (FSS) and highlighted the possibility of reflecting this in retrospective LRIC-based charges for the 1999/2000 financial year. They believed that it should be possible for Bottom-Up LRIC modelling to be completed by the year end, if work is commenced speedily, and saw no good reason why the production of LRIC rates should take any longer than 12 months to complete.

Telecom Éireann's view that the publication of separated accounts for their financial year ending in April 2000 is unlikely to be possible until October 2000 means that a subsequent reconciliation will not flow into LRIC related charges until January 2001. The Director whilst recognising the need to be able to reconcile the LRIC model with the FSS and regulatory accounts in a clear and transparent manner, believes that this timetable is not sufficiently ambitious and should be accelerated. She intends Telecom Éireann to provide the ODTR with results from the Top-down LRIC model by 1 June 2000.



The Director understands that, by April 2000, the FSS model should be in place, with visibility down to local exchange components. She also understands that Telecom Éireann's initial LRIC Implementation Plan ran through to completion of data assembly by June 2000 with the LRIC model running in parallel with the FSS, rather than becoming an integral part of it.

The Director does not consider it appropriate to await Telecom Éireann's production of audited figures, and she may put interim interconnect charges in place in the meantime and consider retrospective adjustments. She intends the interim rates to start from 1 December 1999 and be based on the results of Bottom-up model until Telecom Éireann's estimates from the Top-down model have been provided to the ODTR and reviewed thereafter. It is the Director's intention to use interim rates to introduce LRIC based interconnection rates in a timely way. This should accelerate the development of both Telecom Éireann's FSS model and its Top-down model.

The issue of retrospection is covered in the ODTR's consultation paper on the RIO (ODTR 99/16).

#### **Decision 4.4.1**

**Telecom Eireann should provide LRIC estimates from the Top-down model by 1 June 2000. An interim interconnect regime based on the Bottom-up model will be introduced from 1 December 1999.**

#### **4.4.2 Requirement for a Bottom-up model**

The ODTR asked whether a Bottom-up model should also be developed. Most respondents agreed with the ODTR's initial view that Bottom-up models are more likely to reveal the scope for efficiency improvements and that they are one of the best way of testing the reasonableness of outputs from Top-down models. One respondent argued that, given the tight timescales facing the SMP operator, the initial focus of LRIC based charges should be the Top-down model.

The Director, recognising the support received from respondents for a Bottom-up model and the advantages of developing both types of models for interconnection charges in Ireland, believes that a Bottom-up model should be developed.

#### **Decision 4.4.2**

**A model using a Bottom-up methodology will be developed.**

#### **4.4.3 Responsibility for developing a Bottom-up model**

The ODTR asked questions on who should develop the Bottom-up model and whether there is any scope for using a Bottom-up model being developed by the European Commission.

All respondents were of the view that the ODTR, with the help of consultants, should develop the Bottom-up model. They believed that the best way to proceed for the ODTR would be to set-up an industry group to assist the ODTR in introducing LRIC.

One respondent pointed out that the planned EU model might be of use as a basis for the model but that this would depend on timing. Another respondent stressed the importance of ensuring that inputs and modelling assumptions reflected the unique nature of the Irish telecoms market and Telecom Éireann's network. As such, whilst a generic model, such as that being developed by the EU, may provide a useful starting point for the development of an appropriate model, it must be recognised that significant time and resources will be required to ensure that the model structure, assumptions and inputs accurately reflect the Irish situation.

The Director has given consideration to these views. The ODTR will take responsibility for developing a Bottom-up model.

#### **Decision 4.4.3**

**The ODTR shall be responsible for developing a Bottom-up model.**

#### **4.4.4 Need for an industry group**

All respondents were of the view that there is a role for industry participants to assist the ODTR with the development of a Bottom-up model and to review the approach and results of the Top-down model.

The Director is encouraged by the willingness of market participants to participate working and intends to set up such a group. She intends to seek significant input from Telecom Éireann and other operators.

The Director believes that an industry advisory group should provide a basis for building participation from across the industry, and provide advice to her Office and its consultants in developing a Bottom-up model.

#### **Decision 4.4.4**

**The Director will establish an advisory group to advise on key issues outlined in this Notice**

#### **4.4.5 Role of the industry group**

ODTR 99/17 asked market participants as to whether they would be prepared to participate in such a group and, if so, in what capacity.

All respondents agreed to participate in the Group. There were varying responses on the extent and role of their involvement. Respondents were in favour of participating in establishing the principles on which the Bottom-up model would be based, and of working in an advisory capacity. The SMP operator wished to play a significant role in the group and stressed the need for input from itself.

The Director is encouraged by responses of the market participants. In particular, she notes the positive response of the SMP operator. She understands that in countries where such groups were established for LRIC development, the participation of the SMP operator was essential to producing LRIC charges on time and in ensuring that results of the model were acceptable to all parties.

The Director indicates below some of the matters upon which she believes that the Advisory Group could inform the process and her decision making.

The objective of this group will be to provide advice to the ODTR in relation to the development of a Bottom-up model. The Director expects to be informed by the group before making her decisions, though she will take final responsibility for developing a Bottom-up model. She hopes that consensus will be possible, but she must give priority to having a LRIC based rates in place for 1/12/1999.

The Director appreciates operators' concerns about timing. She expects the advisory group to take account of the overall timetable and not introduce unnecessary delays

The Director recognises that operators may have concerns over confidentiality of commercial information and she will consider how best to balance the interests of the industry with her obligation that the basis of interconnect charges be transparent.

The Director intends to collect data on a bi-lateral basis from the participants of the advisory group. She believes that market participants will be well placed to provide various inputs (or expert comment) to the Bottom-up model, for example:

- prices of capital equipment
- cost of capital
- operating costs
- those transmission routes would not effectively be served by SDH technology.

In addition, the Advisory Group will advise the ODTR as to their views on the approach and underlying principles of the Top-down model, including the appropriateness of the MEAs and their CCA values.

Existing legislation requires a measure of transparency in and access to Telecom Éireann's accounts. "Accounting Separation and Publication of Financial Information for Telecommunications Operators" has been the subject of separate ODTR papers (ODTR 99/10 and 99/35). The advisory group would not have access to material that was appropriately confidential to Telecom Éireann, bearing in mind its status as an operator designated as having SMP.

Given the technical nature of discussions in the Advisory Group, there was some unease by one respondent about involving customers or their representatives. The ODTR consider that the composition of the Advisory Group, bearing in mind its objectives, should be the incumbent operator and new entrants, together with appropriately qualified representatives from user groups.

#### **Decision 4.4.5**

**The Director intends the Advisory Group to assist the ODTR develop the Bottom-up model. She may, from time to time, seek advice from the Group in reviewing and assessing the principles and approach adopted for the Top-down model.**

#### **4.4.6 Workshop**

ODTR 99/17 asked market participants as to whether they would find it helpful if the ODTR organised a workshop, the aim of which would be to present and, where necessary, clarify the LRIC estimation issues outlined in this consultation document.

In light of the responses, this does not appear to be necessary and the Director will move directly to establishing the advisory group.

The ODTR will shortly be contacting respondents about fixing an appropriate date.

At the first meeting, the ODTR will introduce:

- its plan for LRIC developments
- clarify the principal tasks facing the advisory group and their terms of reference
- identify areas of preliminary examination and salient issues
- seek nominations from each operator of a representative and alternate who would be prepared to commit time and effort to the matters outlined in this Report.

#### **4.4.7 Review**

This decision will be reviewed from time to time in light of the responsibilities of the Director. In any event she intends to review the model towards the end of 2000, in the light of experience gained and the completion of Telecom Éireann's own top down model. She will take account of the need to retain certainty in the model and not to make too frequent changes. She will also consider what, if any adjustments may be required.

## ANNEX 1: GLOSSARY OF TERMS

**Avoidable costs.** The costs that would be avoided were output to reduce, or not to increase, by a defined amount.

**‘Bottom-Up’ LRIC models:** Models that use engineering-economic relationships to calculate the costs of different network elements and, in turn, particular services.

**Common fixed costs:** Fixed costs associated with the supply of all services produced by a firm.

**Current Cost Accounting (CCA):** Financial accounts prepared on the basis of the current value of a company’s assets.

**Economies of scale:** Economies of scale are said to exist if the average cost per unit declines as the volume of output increases.

**Economies of scope:** Economies of scope occur due to the presence of common and shared fixed costs or of joint costs in producing different products or in providing a range of services.

**Fully Allocated Costs:** The costs that would arise for each service provided by an operator if an appropriate share of all of the operator’s costs were allocated to each service.

**Historic Cost Accounting (HCA):** Financial accounts prepared on the basis of the cost of a company’s assets when they were purchased, adjusted for depreciation.

**Increment:** The output over which costs are being measured.

**Incremental costs:** The additional costs that would result from a defined increment to demand.

**Interconnection:** The physical and logical linking of telecommunications networks in order to allow users of one network to communicate with users of another network.

**ISDN:** Integrated Services Digital Network – an integrated, hierarchical approach to access, switching and transmission allowing end-to-end digital connectivity.

**Joint Costs:** Costs that vary with the level of output and which are shared between two or more (possibly all) services (and so are not uniquely attributed to a particular service).

**Long run:** The period over which all factors of production, including capital, are variable.

**Long Run Incremental Costs (LRIC):** The incremental costs that would arise in the long run with a defined increment to demand.

**Long Run Average Incremental Costs (LRAIC):** The term used by the European Commission to describe LRIC with the increment defined as the total service.

**Marginal cost:** The change in the cost of a firm caused by an increase or increase in its output.

**Modern Equivalent Asset Value (MEAV):** The cost of replacing existing assets with modern asset that would perform the same function.

**Modified scorched node assumption:** A modelling assumption that takes the existing node location as given but differs from the scorched node assumption (q.v.) is that it optimises the equipment at those nodes in a way that may alter the functionality. For instance, a small local switch might be replaced by a remote concentrator. The transmission equipment is also optimised.

**PSTN:** Public Switched Telephony Network – A generic term for the collection of networks that provide fixed line basic telephony services.

**Reference Interconnect Offer (RIO):** A document required to be produced by each telecommunication operators providing fixed service public telephone networks and designated as having Significant Market Power (SMP) to set out interconnect offerings and rates.

**Scorched earth assumption:** A modelling assumption that optimally-sized switches are employed at locations optimal to the overall transmission design, as if the network was being optimally redesigned on a ‘greenfield’ site.

**Scorched node assumption:** A modelling assumption that up to date technologies are employed to perform existing functions at each existing node. So that, for instance, a small analogue switch would be replaced by a small digital switch and not by the remote concentrator which might, in due course and in practice, be its replacement. Optimal transmission technologies are used to connect up these nodes.

**Service-specific fixed costs:** Fixed costs specific to the service concerned.

**Shared fixed costs:** Fixed costs associated with the supply of a group of services comprising more than one, but less than all, of a firm’s services.

**Short run:** The period over which at least one factor of production, usually including capital, is fixed.

**SMP:** Significant Market Power.

**Stand Alone Cost:** The cost incurred in providing a service in isolation.

**‘Top Down’ LRIC models:** Models which use aggregate accounting data from the management accounts, adjusted for current rather than historic costs, and allocate costs to different services based on the relationship between volumes and costs.

**Total Service Long Run Incremental Cost:** Synonymous with Long Run Average Incremental Cost (q.v.).