

Principles of implementation and best practice regarding FL-LRIC cost modelling

as decided by the Independent Regulators Group

24 November 2000

National Regulatory Authorities (NRAs) implement the regulatory framework laid down in EU and national law. These principles of implementation and best practice (PIBs) have been devised by the IRG to assist in the process of harmonising implementation in IRG member states. The NRAs are committed to implement these principles wherever possible.

The Independent Regulators Group (hereafter: IRG) acknowledges the importance of co-operation between national regulatory authorities (hereafter: NRAs) in order to secure consistency in the application of European Commission Recommendations. The importance of co-operation between NRAs is confirmed by the European Commission in its recent proposals for Directives to come to a new regulatory framework for the communications sector.

In its Recommendation 98/195/EC of 8 January 1998 on interconnection in a liberalised telecommunications market (Part 1 – interconnection pricing), the European Commission has recommended the use of long run average incremental costs for the assessment of cost oriented interconnection tariffs for terminating access. This recommendation of the Commission has been confirmed in the recent study undertaken on behalf of the Commission on the adaptable bottom-up FL-LRIC¹ costing model, ~~as well as in the Review (Consideration 14 of the proposal for a Directive of the European Parliament and of the Council on access to, and interconnection of, electronic communications networks and associated facilities, COM(2000)384)².~~

[Comment 1 by Telecom Italia: this assumption is no longer applicable, therefore the above part of the sentence should be deleted.]

¹ 'FL-LRIC' stands for Forward Looking Long Run Incremental Costs and is as a costing methodology generally applicable to cost allocation issues, and could therefore in principle also be applied in order to assess cost oriented tariffs for e.g. unbundled local loops or the cost of the universal service. ~~This is without prejudice to the European Commission view with regard to the pricing of various types of interconnection services that different pricing rules may be applied (The 1999 Communications Review, COM(1999)539, p. 38 and 45).~~

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In fact, the final version of directive 2002/19 doesn't mention any LRIC methodology. The whereas nr. 14 has become the nr 20. The new framework and in particular the Directive 2002/19 gives NRAs a great methodological flexibility in the way they intend to implement the cost orientation principle mandated under article 13.

The directive, actually, specifies that: " when a NRA calculates the costs incurred in establishing a service mandated under this directive, it's appropriate to allow a reasonable return on the capital employed including appropriate labor and building costs, with the value of capital adjusted where necessary to reflect the current valuation of assets and efficiency of operations. The method of cost recovery should be appropriate to the circumstances taking account of the need to promote efficiency and sustainable competition and maximize consumer benefits" (dir 2002/19- whereas 20)

Moreover the article 13 of the same directive states that" NRA shall ensure that any cost recovery mechanism or pricing methodology that is mandated serves to promote efficiency and sustainable competition..." and that the burden of proof of the cost orientation lies with the undertaking concerned and that the NRA may use a cost accounting method independent of those used by the undertaking.

In the light of this methodological flexibility, in principle the obligation of cost orientation could be complied with by applying different methodological approaches: e.g. price-caps on cost figures, current costs accounting, incremental methodologies and by other means, on the basis of the results of the market analyses

Therefore it' Telecom Italia's opinion that the PIBs on FL-LRIC shouldn't assume that LRIC is the only methodology to be applied when prices must be "cost oriented".

According to that, Telecom Italia proposes also to modify statements a) and b) to clarify the current PIBs:

a) in the case the NRA, according to circumstances and to the results of the market analysis , decides- that a SMP undertaking -should implement an incremental methodology to ensure cost orientation and cost recovery, IRG has considered the following regarding FL-LRIC cost modeling:

Therefore -IRG has considered the following regarding FL-LRIC cost modelling for the assessment of cost-oriented interconnection tariffs:

- a) IRG endorses the view of the European Commission that the FL-LRIC approach to cost allocation is the one that will lead to results that best reflect interconnection tariffs that would occur in a competitive environment;
- b) IRG recognises that most IRG-members are in the process of introducing FL-LRIC, or have already done so. It is the opinion of IRG that this factual there is a need of harmonisation in the system of cost-allocation-LRIC methods and that should imply that there is also a certain common understanding on the way FL-LRIC is defined;
- c) With these principles of implementation and best practice IRG would like to provide a follow up on the work already initiated by the European Commission in developing the adaptable bottom up FL-LRIC costing model;
- d) IRG recognises that IRG-members may or may not decide to migrate to a FL-LRIC-based approach to cost allocation, and that under certain circumstances and due to country specific aspects the choice for another cost allocation approach could be justified;

- e) IRG recognises that the FL-LRIC approach to cost modelling is possibly open to interpretation. Developing a common understanding of principles of implementation and best practice underlying FL-LRIC cost modelling will benefit the effective introduction of this costing methodology and will create the preconditions for market parties to be able to base their European investment decisions on interconnection tariffs based on comparable cost allocation principles;
- f) IRG also recognises that the actual implementation of the FL-LRIC approach to cost modelling is not uniform across Member States. A way in which NRAs are introducing or have already introduced FL-LRIC based pricing is that the 'top down' FL-LRIC costing model of their SMP-operator (in which the costing figures of the SMP are the starting point of costing activities) is evaluated using a 'bottom up' FL-LRIC model developed by the NRA. Another way is for NRAs to base the interconnection tariffs on a bottom up FL-LRIC model (in which the costs of a hypothetical efficient operator are modelled using an economic/technical costing model), developed by the NRA together with market parties. IRG is of the opinion that the fact that the actual implementation of FL-LRIC is not uniform does not rule out the possibility nor the desirability of a common understanding of principles of implementation and best practice underlying FL-LRIC cost modelling;
- g) IRG recognises that generally speaking principles underlying FL-LRIC can only to a certain extent be considered to have the same modelling implications in a top down and a bottom up environment. Nevertheless, IRG assumes that the present principles of implementation and best practice are to a large degree equally applicable in both environments;
- h) IRG presumes the principles of implementation and best practice on FL-LRIC principles to be valid for electronic communications networks in general (mobile as well as fixed networks, access networks as well as conveyance networks);
- i) IRG considers the present principles of implementation and best practice as the results of a first effort and intends to continue the co-operation between NRAs on this subject;
- j) IRG intends to review the present principles of implementation and best practice after a period of one year from now.

Bearing in mind these considerations, IRG has adopted the following principles of implementation and best practice regarding FL-LRIC cost modelling. Besides this, it should be noted that IRG has also defined principles of implementation and best practice in the field of the unbundling of the local loop.

1. Network topology

Considerations

[Comment 2 by Telecom Italia: Actually the present version of the PIBs is completely devoted to the core network aspects; we ask to modify the present section in order to include more explicitly some considerations regarding the Access Network. The additional statements and PIB proposed hereafter are consistent with Recommendation 98/195/EC of 8 April 1998 on interconnection in a liberalised telecommunications market (Part 2) where Access and Transport were explicitly referred to. The statements and the PIB are aimed to point out some relevant aspects

that we think the NRAs should examine when defining a specific LRIC implementation for the Access Network, in order to make an assessment of the pros/cons of the bottom up and top down approaches].

Core network

One of the key decisions to be made in FL-LRIC cost modelling is related to the question whether to adopt a 'scorched node' or a 'scorched earth' approach. In a top down modelling environment this is a decision between whether or not to allow the incumbent to base its costs on the existing network topology (scorched node) or on an ideal network topology that would meet the demands of a fully efficient operator (scorched earth). In a bottom up modelling environment this is a decision between whether or not the bottom up model should take into account the existing network topology (scorched node), or that the costs in the model should be based on an ideal topology (scorched earth). IRG acknowledges that designing and agreeing an optimal network topology is not a straightforward and uncontentious task. Also because of reasons of feasibility, IRG considers it appropriate and reasonable to adhere to a bounded rationality approach, and thus to take the existing network topology as the starting point for the cost allocation process. Such a scorched node approach would imply that the technology at and in between existing switching nodes is optimised to meet the demands of a forward-looking efficient operator (e.g. this could mean the replacement of an analogue tandem switch by a digital tandem switch and possibly also the replacement of a host switch by a remote concentrator).

IRG also considers that it is appropriate and reasonable to modify the scorched node approach in order to replicate a more efficient network topology than is currently in place. Such a modified scorched node approach could imply taking the existing topology as starting point, followed by an elimination of inefficiencies (e.g. this may involve attempting to simplify the switching hierarchy).

PIB

I. IRG considers, for the core network, the implementation of a modified scorched node approach to be a principle of implementation and best practice.

Access network

The access network costs (specifically Local Loops costs) are influenced by many exogenous variables .

For instance elements such as the localization of the users (rural or metropolitan areas), the geo-morphological characteristics of the country³, the distribution and reciprocal distance of the users etc., are variables to be taken in to account in defining the costs of the Local loops (LL).

-Therefore, when implementing a model to calculate the costs for the Local Loop, it is advisable, in order to get a "representative" cost of LL, to use a methodological approach such that the access network topology in the model can really reflect the main characteristics of the current and real deployment of the access network, in correlation to the characteristics of the country.

Thus IRG recommends that when defining or implementing an LRIC model for the calculation of the LL costs, the NRA should pay great attention to pros/cons of Top Down and Bottom Up models and in particular to the effective feasibility of Bottom Up

³ These aspects differ between countries (presence of high/low mountains, density of population, level of urbanisation. Therefore IRG recommends to be careful in applying international benchmarking since the model developed in a given country depends strictly on geo-morphological conditions of that country.

(BU) models. It is assumed that a bottom up model should be based (both for transparency reasons and for auditing purposes) on a set of reasonably agreed assumptions and on publicly available input data. However several relevant Factors/Drivers which are necessary for the implementation of Access Network BU models (e.g. actual location of the users , characteristics of all the buildings, maps of the constraints due to electricity/ gas infrastructures, etc) are often not publicly available with the detail and granularity which is required in order to implement a sound model. It could be argued that the territorial branches of the dominant Operator do have a lot of information about their customers, but –apart any consideration about the legal possibility to have a disclosure of such information- it is unlikely –for historical reasons- that those data are recorded with a structure consistent in all the country and in such a format to be easily considered as an input for a BU model. Consequently NRAs should carefully assess the risk that the lack of adequate publicly available information could lead to a “too theoretical” BU model ; this model could greatly either underestimate or overestimate the cost of the network elements in the local loop.

PIB

IRG, in calculating the charges for the ULL, recommends that NRA should evaluate the effective feasibility of a Bottom UP model for the access network, on the basis of the public available relevant information.

2. Relevant increment

Considerations

LRIC cost modelling includes only those costs that are caused by the provision of a defined increment of output (or, alternatively, those costs that are saved when the defined increment of output is no longer provided). This implies that in LRIC cost modelling a decision has to be taken concerning this relevant increment. In principle, there are an infinite number of different sized increments that could be measured, which can be grouped into an individual or collection of products, services, components or elements.

IRG considers it important that increments are defined in such a way that the resulting incremental cost data is fit for purpose, i.e. that the outputs can be used to demonstrate that charges are cost orientated.

An example, in the case of regulated incumbent telecommunications companies, is that one may want to treat ‘ access’ and ‘ conveyance’ as two separate increments since for access the costs are driven by the number of physical lines and for conveyance the costs are largely driven by traffic.

However, defining only two increments – ‘ access’ and ‘ conveyance’ – could result in a high aggregation level of cost data that may not provide the information necessary to demonstrate cost orientation.

Therefore it may be necessary to derive subsets of the main increments to enable LRIC data to be calculated at a lower level (such as the core components of the network). However, there are practical and methodological limitations to defining

increments at a too narrow or too detailed a level. Generally, the smaller the increments being considered, the more detailed and resource intensive the cost modelling has to be.

[Comment 3 by Telecom Italia : in order to have the maximum coherence with the new Framework and specifically with directive 2002/19/EC art. 13 and whereas 20, it is necessary to give further guidelines on the services to be considered for the purpose of the "demand" assessment in a LRIC model. This is an area which involves both relevant regulatory aspects and technical aspects. Therefore T.I. proposes to amend the following section, adding some points of clarification, and to modify the PIBs in the box:]

The new framework, (framework directive - art. 16) establishes that the NRA must carry out an analysis on the markets contained in the list published in the recommendation C(2003)497. The remedies identified in the directive 2002/22 art. 16, 17 and 18 and directive 2002/19, articles 7 and 8, must be applied only to those markets where the undertaking has SMP (either on one or more markets altogether).

The remedy of setting "cost oriented prices" can therefore be applied only with reference to those services belonging to those markets where the undertaking has been notified as having SMP.

The compliance to the cost orientation obligation (directive 2002/19 art 13), can be obtained in different ways, and the directive allows the NRA to take the final decision to be adopted on this regard.

If the criterion to be adopted, according circumstances, is an incremental one. e.g. FL-LRIC, then NRAs shall take due account of the following principles, relevant for the LRIC models:

1. The undertaking notified as dominant on one or more markets, usually offers also services in markets where it's not dominant;- for the latter, the framework provides for full deregulation since they are offered in a competitive context;
2. When the Operator is notified in one or more markets, the incremental methodology (to be used for "cost orientation purposes") should consider only the services belonging to that (those) market(s). Therefore the incremental model shall consider as relevant increment only the increments caused by the services related to the notified markets.
3. In this framework the total increment of the SMP services to be used in the LRIC model is equal to the demand of the "notified services"; in other words such a demand is that to be considered to choose the target network to be modelled and to calculate the "target" network' dimension.
4. In defining the demand of a notified service the NRA should take into account the aggregate demand arising from all the users of that relevant market (e.g. in the case of the market nr 11 of the recommendation - wholesale unbundled access to metallic loops and sub loops- the demand shall be the sum of the loops required by the OLOs and by the Commercial Division of the notified operator

In LRIC-modelling, cost drivers can be used to identify cost volume relationships (CVRs). A cost driver is the factor or event that causes a cost to be incurred, while a

CVR describes how costs change as the volume of the cost driver changes. The aim of identifying a CVR is to be able to demonstrate how costs change as the volume of the cost driver is altered.

PIB

- II. Incremental costs are the costs caused by the provision of the defined increment of output given that some level of output (i.e. for different increments) is already being produced. Increments can be defined in a number of ways but would typically be an individual or collection of products, services, components or elements over which all outputs are measured;
- III. A possible concept in calculating incremental costs is the cost volume relationship (CVR). A CVR describes how costs change in relation to the volume of the cost driver. A cost driver is a factor or event that causes a cost to be incurred;
- IV. When defining the increments relevant for regulatory purposes IRG considers it advisable to take, inter alia, the following factors into account:
1. *What purpose will the LRIC information be used for?* For example: it is important that LRIC data can be appropriately disaggregated to a product or service level if the purpose is to demonstrate that prices are cost orientated;
 2. *What are the key external or independent cost drivers?* Identifying these main cost drivers will assist the process of defining increments. In the context of telecommunication networks these could be the costs driven by, say, the number of lines or volume of calls or geographic network coverage;
 3. *What are the modelling constraints?* LRIC models can be large and complex requiring significant expertise and computing resources to operate effectively. Generally as the number of increments increases the modelling and calculation of LRIC data will become more complex as well as create a more complicated set of common costs.
- V. In the case the NRA intends to use the FL-LRIC standard to verify the compliance of the prices of notified SMP services to the cost orientation principle, the "increment" to be considered in the LRIC model is the total demand of those notified SMP services;
- VI. The target network architecture given by the model must be able to provide all the services of the "increment" at the appropriate level of quality, i.e. a level of quality which is deemed as appropriate for an SMP efficient undertaking, and should also be dimensioned in such a way to carry the correspondent total demand (service driven approach)
- VII. IRG intends to continue the further development and elaboration of a common understanding on the definition and instrumentation of the relevant increment.

3. Common costs

Considerations

The term 'common costs' is used to describe the costs that are incurred in the supply of all or a group of products or services provided by the company and that are not incremental to any one product or service.

[comment 4 by Telecom Italia: The new framework explicitly recognizes that cost recovery mechanism or pricing methodology that is mandated serves to promote efficiency and sustainable competition; therefore all costs should be taken into account and the following statement should be modified]

~~Depending on the approach used, LRIC cost modelling as such may not include common costs.~~

Nevertheless, it is fairly standard practice to mark-up LRIC by an amount considered appropriate to cover a reasonable proportion of common costs. There are various methods of recovering common costs across a range of services. From an economic point of view distortion is minimised by recovery of common costs according to Ramsey Pricing. This recovers common costs from the products based on the products' relative marginal cost of production and price elasticities. However, this method of recovering common costs requires robust and detailed information on elasticities, which is often hard to find. The alternative is to recover common costs according to an accounting rule. For example, if the common input were used to produce two separate, regulated services, one simple rule would be to split the common cost equally between the two services. Another example would be to recover common costs in proportion to the incremental cost of the two services. This method of allocating costs is known as equal proportionate mark-up (EPMU).

An initial prima facie test that a FL-LRIC based price is cost orientated, is that it lies between the incremental (LRIC) *floor* and *stand-alone ceiling* (SAC) costs⁴. A price below the LRIC floor would mean that not even all incremental costs would be recovered (with no contribution to common costs, thus possibly generating predatory prices); a price above SAC would mean that an amount in excess of the LRIC plus all of the relevant common costs would be recovered (excessive pricing practice).

In the situation in which the price of more than one product, service, component or element is based on FL-LRIC including a mark up for common costs, this first test alone is not sufficient to demonstrate cost-orientation. For example, if all prices were set at SAC, no individual service would be deemed to be priced excessively under the first test, but taken together the services would be priced excessively since revenues are more than sufficient to recover all incremental and common costs. Therefore a further test might be considered necessary. This is the combinatorial test, whereby the aggregate revenue of services straddling the common costs is compared to the LRIC and SAC of these services measured as a single increment. Potentially, a large number of combinatorial tests may need to be carried out.

PIB

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| <p>VI. The term 'common costs' describes those costs that are incurred in the provision of two or more increments and are not incremental to any one product or service;</p> <p>VII. A NRA will need to take account of the appropriate recovery of a reasonable proportion of common costs when using LRIC information for regulatory purposes;</p> <p>VIII. In the situation in which the price of more than one product, service, component or element is based on FL-LRIC including a mark up for common costs the use of combinatorial tests might be considered necessary.</p> |
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⁴ The SAC of an increment is the cost incurred in providing that increment by itself, on the basis that no other increments are provided. The difference between the LRIC - Floor and SAC - Ceiling of an increment is the common costs associated with the production of the increment under consideration and of any other increments.

4. Long Run and Forward Looking

Considerations

Comment 5 by Telecom Italia: it is necessary, also in correlation with directive 2002/19/EC art. 13 and whereas 20: a) to give a specific guideline on the "time horizon" of LRIC models; b) to clarify that MEA is one of the possible methods for CCA, the other one (and largely used) being that of the "current purchase price of an identical asset"; c) to give a specific guideline on the types of costs to be recovered in a context of "current" cost accounting, which is the context of the LRIC models. Therefore we propose the following changes both in the text and in the PIBs/

Use of LRIC requires a long run view of costs, meaning that the costing methodology should take all costs as being variable. In economic theory other words: the 'long run' is defined as the time horizon within which the operator can undertake capital investment or divestment to increase or decrease the capacity of its existing productive assets. ~~Thus a very long time horizon is observed in which all costs, including investment capital and all costs related to network capacity, are potentially variable with no fixed element.~~

For regulatory purposes and for granting the cost recovery mandated under directive 2002/19/EC art. 13, the "long time horizon" to be taken into account shall be properly related to the specific aims of the regulation (e.g. if LRIC is to be used in a context of network charge control method- or network cap-, the time frame should be the same as that of the network cap).

In applying LRIC cost modelling forward-looking costs are the appropriate cost base. Where the regulatory objective is to mimic the workings of a competitive market these forward looking costs should reflect resource costs. ~~In a competitive environment operators may not be able to set the price for every product in order to fully recover its incurred or historic cost, since they have to respond to market prices, which can often lie well below historic costs (e.g. conveyance). They cannot therefore work according to historic cost since reversing investments is, for the main part, either not possible or only possible at a loss. An operator should therefore only be able to recover the costs that it would currently incur in order to build and maintain an access or a transport network in a competitive environment.~~ This implies that the basis for asset valuation is the replacement cost of an asset as derived from the application of current cost accounting (CCA) methodologies.

In practice, the concept of forward-looking costs requires that assets are valued at Current Costs using primarily the current purchase price of an identical asset or the cost of replacement with the modern equivalent asset (MEA). The MEA is the latest available lowest asset in the market cost of an asset, providing at least equivalent functionality and output as the asset being valued and which could imply the lowest overall costs (i.e. considering architectural , managing , controlling and maintenance aspects). The MEA will generally incorporate the latest available and proven technology (a technology which will support services accepted by the users), and will therefore be the asset that a new entrant might be expected to employ.

It will also be necessary, particularly with top down LRIC models, to assess what costs are relevant for and appropriate to deriving LRIC data. Relevant costs are those

related to all the network elements needed to provide a given service (i.e. depreciation, maintenance, and all other costs directly caused by the provision of the service both to the final users and OLOs).

Regarding the access and core networks, the CCA accounting method must be used to evaluate all the underlying network components of the services offered. In order to give to the market and to the alternative investors the right economic signal concerning the make or buy decision , it's necessary to include and evaluate both all the network components and all the related activities (as cables, switches, multiplexers, buildings, other equipments, ducts, trenches, poles and the related capitalized labor costs) as well the Current Purchase Value.

The MEA methodology implies that some ~~There may be~~ operating cost (e.g. maintenance) costs currently incurred on the basis of the historical investments that are investments could be modified inconsistent with a forward looking long run view of the business and which should be excluded or adjusted in the modelled cost base. An example may be restructuring costs that arise from past decisions contradictory to best management practice.

PIB

- IX. IRG assumes the ' long run' to be defined as the time horizon over which all costs (including all capital investment) are variable. ~~This allows all costs, even if only in the very long term, to adjust to the change in output;~~
- X. IRG assumes that the forward looking principle implies the use of current cost accounting (CCA) methodologies to derive the appropriate level of input costs including asset values;
- XI. IRG assumes that, in using CCA, assets are stated at their value to the business, usually equivalent to the net replacement cost. This is generally derived from the asset' s gross replacement cost and is the current purchase price of an identical asset or the cost of a modern equivalent asset (MEA) with the same service potential;
- XII. ~~The MEA valuation of an asset should be adjusted to take account of differences in operating costs, asset lives, output and functionality between the MEA asset and the existing asset;~~ The differences between the functionalities of a MEA and the existing assets could lead to differences in the operating costs.

XIII. IRG acknowledges that, in addition to the potential cost base adjustments under CCA methodologies, it may be necessary to exclude or adjust other operating costs that are not relevant for regulatory purposes.

XIII-a IRG assumes that an undertaking shall recover all the FL- LRIC costs incurred in the provision of the services.

XIII-b IRG recommends that a CCA method shall evaluate all the network components needed to offer the services. Thus to give to the market and to the alternative investors the right economic signal concerning the make or buy decision , it's necessary to include and evaluate both all the network components and all the related activities (as cables, switches, multiplex, buildings, other equipments, ducts, trenches, poles and the related capitalized labor costs) as well the Current Purchase Value.

5. Asset valuation: Capital maintenance

Considerations

Assuming the CCA approach for asset valuation, the issue of capital maintenance becomes important. For example: The experience of decreasing prices of assets necessary to operate a telecommunications network leads to the situation that, assuming CCA, at the end of the economic life of an asset the total sum of depreciation does not cover the historic investment in that asset. This situation can be looked at from the perspective of two basic approaches: the operating capital maintenance method (OCM), and the financial capital maintenance method (FCM). OCM assumes that capital is maintained in such a way that the production of a certain amount of goods and services is ensured. FCM assumes that capital is maintained in such a way that the initial financial investment is preserved. Both approaches have

different objectives and the choice between the two will depend in part on the nature of the regulatory objectives.

PIB

XIV. IRG acknowledges that from different perspectives a different decision can be made regarding the choice between OCM and FCM; a NRA should select the capital maintenance concept most appropriate to the objectives to which the information will be applied.

6. Depreciation

Considerations

In a FL-LRIC modelling exercise it is necessary to calculate an annualised cost for consumption of capital assets. Consideration needs to be taken of the relevant asset life, an appropriate depreciation period (if different) and, depending on the method of calculation, the cost of capital. It is widely accepted that annualised costs should be calculated on the basis of economic depreciation which would include an appropriate allowance for the cost of capital. While conceptually not difficult, economic depreciation is in practice very difficult to calculate. The main problem is that estimating economic depreciation is very information intensive.

Because of the practical difficulties with calculating economic depreciation more simple approaches are often preferred. However, the yardstick by which these simpler approaches should be judged is how close they are likely to come, given the nature of the asset concerned, to the theoretically correct measure of depreciation.

The following are a number of commonly used surrogates for economic depreciation which can be appropriate and may be preferred: (tilted) annuity, (tilted) straight line, and 'sum of the years digits' depreciation.

PIB

XV. IRG acknowledges the theory that ideally economic depreciation should be modelled, but accepts that because of the many difficulties involved in gathering the data required to model economic depreciation directly, appropriate surrogates are acceptable and may be preferred. However, NRAs should judge the appropriateness of these surrogates on the basis of how close they are likely to

come to the theoretically correct measure of depreciation (i.e. economic depreciation).

7. Reasonable rate of return

Considerations

In calculating the reasonable rate of return, which operators notified as having Significant Market Power are allowed to charge in their interconnection tariffs, the use of the Weighted Average Cost of Capital (WACC) formula is widely accepted. For the calculation of the relevant return on equity, IRG recognises that different methods are applied by NRAs. IRG will review the need for a preferred method.

IRG intends to continue the development of a common understanding on the more detailed aspects related to the relevant reasonable rate of return.

PIB

XVI. In calculating the reasonable rate of return IRG considers the application of the WACC formula to be a principle of implementation and best practice.
