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**ERGEG Paper on Tariff
Principles: A Comment**
Prepared for Gas Transport Services

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Executive Summary

The European Regulators' Group for Electricity and Gas (ERGEG) has issued a consultation paper on "Principles for Calculating Tariffs for Access to Gas Transmission Networks". Gas Transport Services has asked me to provide an independent expert report in which I offer my comments on this consultation paper.

ERGEG's "consultation paper" has in fact been drafted in the form as a proposal, rather than as a discussion of issues for consultation. The key problem with the ERGEG paper is that it lacks any credible and long-lasting statement of regulatory principles. Instead, it describes (imperfectly) a number of specific regulatory methods. These methods may have been used to regulate gas transmission networks at particular times, and may be suitable in particular conditions, but the methods the ERGEG paper describes are not so stable or robust that their use should become a binding commitment on national energy regulators. It would therefore be a mistake to set down these methods in a paper on principles.

In this report I have indicated general regulatory principles which are applicable at all times and which can therefore guide the choice of regulatory methods in the future.

Overall Regulatory Objectives

At a high level, I have defined three objectives that should govern the approach that regulators' take when setting tariffs for gas transmission networks:

- § **Regulators should set tariffs that allow the regulated business to attract capital for efficient investment.**
- § **The method of fixing tariffs should encourage efficient development and operation of the network by the regulated company.**
- § **Tariff structures should encourage efficient use of the network (including their use by efficient new entrants into gas markets).**

Regulatory Principles for Setting Total Revenues

For regulators to set tariffs that allow the regulated business to attract capital for efficient investment, regulators must set allowed revenue at a level sufficient to allow investors to cover their costs. More specifically:

1. *Regulators should offer investors an opportunity to earn a fair rate of return on their investments;*
2. *This fair rate of return should be comparable with the rate of return offered by other sectors of the economy, after adjusting for differences in risk, location, etc;*
3. *Investors should receive this fair rate of return after recovering operating expenditures and investment costs (i.e. depreciation).*

These detailed principles can be summed up by the following phrase:

§ Regulators must set total revenues that offer regulated firms a ‘reasonable prospect of cost recovery’ (where costs include operating expenditures, depreciation of investment costs and the cost of capital).

Regulatory Principles for Designing Tariff Structures

The principal objective when translating total costs or allowed revenue into a set of “cost-based” tariffs for access to a gas transmission network should be to encourage efficient development and operation of the network by the regulated company:

§ *National Regulatory Authorities should strive to implement common network tariff structures, where they would*

- (a) promote efficient use of the European gas pipeline network, and*
- (b) protect the interests of European gas consumers,*

§ *where possible by:*

- (a) facilitating entry into any market by traders from other parts of Europe; and*
- (b) facilitating the efficient movement of energy around Europe.*

These detailed principles can be summed up by the following phrase:

§ The method for setting “cost-based” tariffs should allocate total costs (or total allowed revenues) between users in manner which is fair (i.e. non-discriminatory) and reasonable (i.e. objective or transparent) and which encourages efficient use of the network.

A suitably amended principle would require the fair and reasonable identification of efficient “market-based” tariffs (as discussed in the ERREG paper).

Principles Governing the Definition of Costs

A key step in setting allowed revenues is the definition of costs. Much of the ERREG paper is concerned with this step. The application of the high-level principles outlined above to the definition of costs leads to some further conclusions which I summarise below.

§ The costs of a regulated business include all costs incurred in order to carry out the range of business activities subject to regulation, or to fulfil legal obligations associated with the performance of those activities.

§ In defining the costs of depreciation and allowed return, regulators should adopt rules that meet the accounting principle of “Financial Capital Maintenance” (FCM), i.e. rules which allow investors to maintain the real value of their capital. This principle is a necessary condition for total cost recovery – meaning for efficient investment and for the prevention of monopoly profits. In practice, for the sake of transparency and predictability, it means that regulators should use either

- (a) historic cost asset values in conjunction with a nominal rate of return or
- (b) RPI indexation of assets along with a real rate of return net of RPI inflation (where CPI is a suitable alternative to RPI, if used in both cases).

§ Regulatory processes should apply a depreciation schedule which spreads the whole cost of investment in a network assets over the life of the asset in a manner that is consistent with efficiency (indicating the costs of usage in different years), and fairness/non-discrimination (a fair allocation between consumers in different years).

§ Changes in depreciation schedules will affect the allocation of investment costs to future years, but should not be backdated and should not therefore change the current or past value of the RAB.

Together, these principles will ensure the definition of costs does not contain any biases that harm investors' prospects of cost recovery.

Principles Governing the Choice of Revenue Formula

The total revenue allowance must be sufficient to provide a reasonable prospect of cost recovery, but the method of setting this allowance can vary between different categories of cost. Many regulators use price caps or revenue formulae to preserve incentives for cost minimisation. However, experience has shown it is optimal to combine such price caps or revenue formulae with (total or partial) pass-through of actual changes in costs in some cases:

- (1) where the level of total costs is too unpredictable to be replicated by an index, because the volume of activity cannot be measured and/or unit costs cannot be predicted in advance, e.g. as in the case of the additional costs arising from new legal obligations;
- (2) where the NRA can determine that costs have already been minimised in another regulatory process (e.g. upstream network charges) or in a competitive procurement process (e.g. for fuel gas or flexibility services);
- (3) other cases where the pass-through of actual costs does not harm the efficient development of operation of the network.

Applying these rules will avoid the imposition of unnecessary risk on regulated companies and help to minimise the cost of capital.

Administrative Principles

The above points describe the principles that should govern the way regulators set tariffs. However, any statement of principles ought also to include a commitment to objectivity in regulatory decision-making, i.e. the use of transparent regulatory methods, as defined by the ability of others to replicate results and the avoidance of subjective or arbitrary decisions.

This principle may be covered by regulatory or administrative law in the member states concerned, but some harmonisation of administrative standards (on international best practice) would be desirable as a means to enhance the standing and independence of regulatory authorities.

Conclusions on the ERGED Document

Many of the statements given in the ERGED document are not statements of principle, but rather statements of intent to apply a particular method. Some of these methods are only applicable in particular conditions. Some regimes practise different methods and some regimes may in future want to move away from the methods listed in the ERGED paper, as conditions change.

The ERGED document stresses that tariffs for access to transmission networks may contribute to restricting market liquidity or distort trade across borders of different transmission systems. However, market liquidity and efficient cross-border trade in gas may be desirable outcomes or goals, but they are subordinate to the general objectives of promoting consumers' interests or the efficient development and operation of the network.

Several regulators are constrained by legal obligations that are more akin to the regulatory principles listed in this report, such as duties (1) to promote consumers' interests; (2) to promote efficiency in the development and operation of networks; or (3) to offer investors in networks a reasonable rate of return.

Additionally, any statement of regulatory principles should recommend that legislators constrain regulatory decisions by the need to provide reasons or to show good cause, so that there is an obligation to produce reasoned decisions based on available evidence. Such constraints prevent arbitrary, politically motivated or subjective decisions from undermining the stability of the regulatory framework and harming long-term incentives for investment.

Finally, the ERGED paper asks if any alternatives to entry-exit pricing should be considered. I believe the paper should consider a model of long-term contracts as a method of encouraging efficient new infrastructure investments. This model matches the underlying structure of costs and risks associated with long-lived investments. It therefore provides efficient cost signals to users. If contracts cover actual point-to-point capacity created by real pipeline investments, they provide more accurate and more efficient cost signals than any system of annual entry-exit capacity booking can achieve. Thus, it also provides a good model for efficient use and allocation of existing pipeline capacity.

Long-term contracts need not be harmful – and may actually help – the promotion of competitive gas markets. If pipeline capacity is allocated to a number of users, long-term contracts for capacity will not entrench monopoly providers or “foreclose” access to upstream supplies or to retail markets. If the “point-to-point” contract allows users to deliver gas to intermediate points along the way, long-term contracts will not impose inflexible patterns of network usage or supply. If the capacity in these contracts is tradeable, ownership of long-term rights does not prevent entry by new players, since they can buy capacity in secondary markets; indeed, the need to trade may contribute to highly liquid markets in gas and network capacity. Such contracts can operate under either cost-based or market-based regulation.

Finally, the ERGED paper needs to be redrafted to take more account of the market-based system. At present, discussion of market-based arrangements is confined to one chapter, whilst the rest of the paper either ignores this model or contradicts it. This shows that the ERGED paper needs to be redrafted to apply at a higher or more general level, in order to be applicable in a wider variety of regimes.

1. Background

On 22 November 2007, the European Regulators' Group for Electricity and Gas (ERREG) issued a public consultation paper on "Principles for Calculating Tariffs for Access to Gas Transmission Networks".¹ Gas Transport Services B.V. (GTS) has asked me to comment on this consultation paper ("the ERREG paper").² GTS is the national network operator for gas transmission pipelines in the Netherlands.

My experience of network regulation dates back to the privatisation of electricity networks in Britain in 1990/91 and the Monopolies and Mergers Commission review of British Gas in 1992/03. I have observed the evolution of price cap regulation in Britain since then and have also worked in a number of European countries, as well as in Australia, on matters concerned with network regulation in general and with gas transmission pipelines in particular. My comments have also been informed by extensive discussion with my colleagues at NERA Economic Consulting, including those in Europe, Australia and the United States. I have drawn extensively on this experience in drafting these comments.

ERREG's "consultation paper" has in fact been drafted in the form as a proposal, rather than as a discussion of issues for consultation. I have identified a number of drafting problems with the proposal, i.e. places where the proposal is either incorrectly drafted, or ambiguously drafted, or phrased in such a way that I find it incomprehensible. Where appropriate, my comments point out these drafting errors and suggest alternatives.

However, more seriously, the ERREG paper is lacking any credible and long-lasting statement of regulatory principles. Instead, it describes (imperfectly) a number of specific regulatory methods. These methods may have been used to regulate gas transmission networks at particular times, and may be suitable in particular conditions, but they are not so stable or robust that the use of such methods should become a binding commitment on national energy regulators. In practice, some of the methods operate differently from the way they are described in the consultation paper; some of the methods already face problems that are leading to their abandonment or evolution; and some of the suggestions unnecessarily rule out alternative methods that are likely to be useful in the future. It would therefore be a mistake to set down these methods in a paper on principles.

In this response, therefore, I have not only commented on the proposed methods. I have also indicated where it would be preferable to set out general regulatory principles which will be applicable at any time and which can therefore help to guide the choice of appropriate regulatory methods in the future.

¹ ERREG (2007), Principles on Calculating Tariffs for Access to Gas Transmission Networks – An ERREG Public Consultation Paper, ref: E07-CBT-01-03, 22 November 2007.

² The views in this report are those of the author and do not necessarily reflect those of Gas Transport Services BV or of NERA Economic Consulting.

2. Scope and Objective of the ERGED Paper

2.1. Regulatory Objectives

The opening section does not provide a useful or logical introduction to the document. It mentions a number of terms used in the Gas Regulation, but it does not define them or explain how they should be applied in the regulation of gas transmission tariffs. The following concepts raise important questions of interpretation, to which the ERGED paper does not provide answers:

4. “Cross-subsidy”: Does this refer to cross-subsidies (i.e. transfers of costs or of revenues) between businesses within an integrated company or to cross-subsidies between different customer groups (i.e. to the allocation of costs to different tariffs)? Application of this principle requires some standard against which to measure cross-subsidies. Since all accounting and tariff-making systems involve some allocation of fixed and common costs, the “causality” of costs (or “cost reflectiveness”) provides no guidance. What then is the standard to be used for judging cross-subsidies? The only practical principle is likely to be (1) that tariffs should never be lower than variable costs of output and (2) that fixed and common costs should be allocated in a fair and transparent manner (which may also be the best way to define “non-discrimination”).
5. Distortion of trade: a “distortion” of trade cannot be identified or appraised (e.g. when judging which tariffs “distort trade” the least) unless there is an ideal standard for comparison. In practice, if regulators knew what “undistorted” trade should look like, they would be able to order gas to flow in such a way.
6. Market Liquidity: Liquidity is notoriously difficult to measure (especially when it is applied to trade at a “virtual trading point”, which does not represent trade in any real gas, but rather trade in a virtual or imaginary product). In any case, the gas transmission network does not exist as a tool to promote liquid markets, but rather as a means of transporting gas. The overriding aim of regulation should be to promote efficient development of the network, and also its efficient use by gas traders and shippers. The creation of markets may contribute to achieving those aims, but should not be given a priority above those aims, so that attempts to create markets result in inefficient development and use of the network.

These questions show that “cross-subsidy”, “distortion of trade” and “market liquidity” are not well defined terms and cannot act as a guide to regulatory policy without a narrower definition (which may not be possible) or without some overall guiding principle (which is missing from the document). In general, these goals should be subsidiary to a general high-level objective, namely the pursuit of **economic efficiency or social welfare**, or, for some national regulators, the pursuit of **consumer welfare or “consumers’ interests”**.

A focus on consumer welfare is often intended to ensure that consumers benefit from any increase in economic efficiency. That principle may affect the allocation of costs between system users. (For example, if an efficient pipeline project benefits gas importers without lowering prices for consumers, regulators might wish to ensure that the gas importers bear the project’s costs, rather than consumers.) However, in regulated systems where total revenues reflect total costs, there is little difference between pursuing economic efficiency and

pursuing consumer welfare, since consumers are unlikely to benefit from decisions that harm the efficiency of the network.

The need to clarify the hierarchy of principles also applies to a fourth goal mentioned in the ERGEG paper, namely the “harmonisation” or “convergence” of tariff structures and charging principles, as required by various European directives and regulations. The introduction of some common systems is likely to facilitate efficiency, by reducing transactions costs and facilitating entry in different parts of the European market. However, it would be a mistake to harmonise or to converge on a system of tariff setting that was demonstrably inefficient.

Moreover, gas transmission pipeline tariffs are not just an instrument for promoting market liquidity or cross-border trade. The level and structure of tariffs also play a role in promoting efficient development, operation and use of gas pipeline networks. Somewhere, this statement of principles should recognise this goal, along with some overarching principle, such as setting fair and reasonable prices or protecting consumer interests or promoting economic efficiency. These principles should be stated at European level (if this is to be a European level document).

The ERGEG paper actually contains very little guidance on common standards for tariff structures or charging principles. Instead, it discusses mainly the process for defining a “revenue requirement” or “allowed revenue” based on total costs. None of the four goals mentioned in the ERGEG paper (cross-subsidy, distortion of trade, market liquidity and harmonisation) provides any guidance on the process of setting total revenues.³ A further set of high level regulatory principles is required, to provide guidance on the matters actually discussed in the ERGEG paper.

2.2. Regulatory Principles

The ERGEG paper needs to include some high level principles of regulation that can serve as a long-lasting guide to the choice of different regulatory methods. The United States went through a process of defining such regulatory principles in the first half of the 20th century. In standard text books⁴ on the fundamental principles of regulation, one can find a number of simple statements that summarise different dimensions of this experience. The European energy sector would benefit by learning from this experience (and adapting it to European institutions).

At the highest level, the purpose of network regulation is to promote greater efficiency in the networks themselves, and in the way they are used:

§ The method of fixing tariffs should encourage efficient development and operation of the network by the regulated company.

³ Except possibly the desire to avoid cross-subsidies, if applied to transfers of costs or revenues between network and non-network businesses within the same company.

⁴ See: (1) Bonbright, J.C., Danielsen, A.L., and Kamerschen, D.R. (1988), *Principles of Public Utility Rates*: Second Edition, Public Utility Reports Inc, pages 382-387; (2) Phillips, C.(1993), *Regulation of Public Utilities: Theory & Practice*: 3rd Edition, Public Utilities Reports Inc, pages 172-173.

In practice, it is best to consider separately the desire for (1) efficient long-term investment by the network company and (2) efficient use of the network.

2.2.1. Efficient investment

In the gas transmission sector, all regulatory procedures need to permit and encourage investors to commit funds to long-term irreversible investments in pipeline capacity. Encouraging efficient investment is the main obstacle to be overcome. Design of regulatory principles should therefore start from a simple objective:

§ **Regulators should set tariffs that allow the regulated business to *attract capital for efficient investment.***

In practice, investment incentives depend largely on the revenues that investors can recover when they invest in new pipeline capacity (rather than on individual tariffs). This objective therefore applies principally to the process of setting total revenue allowances (before their division into tariffs). In the US, this objective is supported by a number of court decisions that provide the legal and economic principles of a revenue-setting process (or the resulting set of tariffs) that will attract capital:⁵

1. *Regulators should offer investors an opportunity to earn a fair rate of return on their investments;*⁶
2. *This fair rate of return should be comparable with the rate of return offered by other sectors of the economy, after adjusting for differences in risk, location, etc.;*⁷
3. *Investors should receive this fair rate of return after recovering operating expenditures and investment costs (i.e. depreciation).*⁸

Note that this list of principles does not amount to a *guarantee* of any particular rate of return. It only commits regulators to offer investors the *opportunity* to earn a rate of return comparable to the rate earned in other sectors. The rate of return actually earned by a regulated firm may vary, if the firm's efficiency is higher or lower than the efficiency of firms in the comparator sectors. These principles therefore permit the implementation of price caps and other forms of incentive regulation.

For simplicity, these detailed principles can be shortened into a summary principle:

§ *Regulators must set total revenues that offer regulated firms a 'reasonable prospect of cost recovery' (where costs include operating expenditures, depreciation of investment costs and the cost of capital).*

⁵ These subsidiary principles have been derived by the US Supreme Court applying the constitutional prohibition on "taking property without due process" to investments in regulated utilities. However, their expression as economic principles makes them universally applicable to regulated industries.

⁶ US Supreme Court case: Smythe vs Ames, 1898.

⁷ US Supreme Court case: Bluefield Water Co, 1923.

⁸ US Supreme Court case: Hope Gas, 1944.

The “reasonable prospect” of cost recovery can be provided by long-term price cap formulae, as well as by cost pass-through arrangements. This summary principle therefore incorporates the desire to encourage regulated companies to incur costs efficiently. In other words, it covers both the objective of efficient *development* of the network (through incentives for investment) and efficient *operation* of the network (through incentives for cost minimisation)

2.2.2. Tariff structures

Some of the “principles” listed in the ERGED paper (non-discrimination, no cross-subsidies) are more applicable to tariff structures than to procedures for setting total revenues. However, they need to be placed in the context of long-lasting guidance on the design of future tariff structures. Whilst incentives for investment and operation of the network depend on the process for setting total revenues, tariff structures affect incentives for use of the network by network users. The objective of any tariff design is therefore relatively simple:

§ Tariff structures should encourage efficient use of the network (including their use by efficient new entrants into gas markets).

In a European context, great emphasis is placed on the need for tariff structures to foster competition in gas markets and to facilitate new entry by competitors. Whilst these aims may have some rationale, they should be subordinate to the objective of efficiency (or consumers’ interests) that guides all good regulatory practices. After all, the promotion of competition in utility sectors is not an aim in itself, but a tool that has been adopted by Western societies to increase efficiency and to benefit consumers. The principles governing the choice of tariff structure should therefore be expressed as follows:⁹

§ National Regulatory Authorities should strive to implement common network tariff structures, where they would

- (a) promote efficient use of the European gas pipeline network, and*
- (b) protect the interests of European gas consumers,*

§ where possible by:

- (a) facilitating entry into any market by traders from other parts of Europe; and*
- (b) facilitating the efficient movement of energy around Europe.*

Efficiency requires that users pay a tariff that covers at least the variable costs associated with their use of the system and makes some contribution to the common fixed costs of the network. The allocation of common fixed costs can be determined by considerations of efficiency (as in “Ramsey pricing”, two-part tariffs and so on), but the analysis required to apply such a principle may lack transparency. Instead, it is common to adopt a simple but transparent rule to allocate costs, taking into account the general consequences of different rules for efficiency and the desire to avoid discrimination. Any list of regulatory principles should therefore include criteria for judging a simple cost allocation rule.

⁹ The terms in this proposed principle reflect some of the statutory obligations placed on energy regulatory authorities in Britain. See section 9 of the Utilities Act 2000, amending section 4AA(1) of the Gas Act 1986, and section 13 of the Utilities Act 2000, amending section 3A(1) of the Electricity Act 1989.

The summary principle of tariff setting in a “cost-based” tariff regime should therefore be phrased as follows:

§ The method for setting “cost-based” tariffs should allocate total costs (or total allowed revenues) between users in manner which is fair (i.e. non-discriminatory) and reasonable (i.e. objective or transparent) and which encourages efficient use of the network.

For a “market-based” tariff regime (as discussed in section 6 of the ERGEG paper), this principle is harder to apply, since there is no measure of total costs or revenues to be allocated. However, market-based tariffs should also meet the criteria of being fair, reasonable and efficient, as defined here.

Together, the components of this summary principle will provide a long-lasting basis for the selection of appropriate tariff structures.

2.3. Drafting Comments on Section 1

Section 1 of the ERGEG paper contains some statements that remain ambiguous and which would benefit from clarification.

In paragraph 4 (“One way to achieve progress...”), the ERGEG paper states that “One way to achieve progress in the harmonisation of the tariff methodologies is for National Regulatory Authorities (NRA) to agree on a common set of principles for calculating transmission tariffs. In addition, it is possible that more detailed legal requirements would be needed to ease this approach.” The meaning of the second sentence in this extract is not clear. Perhaps it means “In addition, legislation at European level may be required to ensure that the duties of national regulators incorporate common standards.”

Paragraph 8 (“In order to ensure transparent...”) says that TSOs or relevant NRAs should publish “sufficiently detailed information on tariff derivation and tariff structure”. However, it does not say how to judge whether the information is “sufficiently detailed”. Assuming that tariffs will be “cost-based”, ERGEG should state that “The methods of calculating tariffs should be objective, so that anyone can understand how tariffs will be calculated in the future.”

Incidentally, section 1 does not seem to anticipate the “market-based” tariff setting procedures discussed in section 6. Any revised version would need to provide a wider introduction to tariff-setting, recognising both cost-based and market-based systems.

2.4. Summary

2.4.1. Problems with the ERGEG paper

The ERGEG paper describes some methods of setting total revenues and tariffs, but it does not set out long-lasting principles that could guide choices between different regulatory methods in the future. Instead, it lists rather vague or undefined terms (cross-subsidy, discrimination, liquidity, etc). These undefined terms will not guide the choice of future regulatory method, but will cause misunderstandings or disputes over their interpretation.

Moreover, it is wrong to regard gas transmission networks as primarily a tool for promoting competition or liquidity in gas markets. Instead, competition should be seen as a tool to promote the higher objective of economic efficiency or social welfare. This objective may be expressed in alternative terms, as the pursuit of consumers' interests, but regulatory decisions that harm efficiency rarely benefit consumers in the long run.

2.4.2. Proposed regulatory principles

Rather than focusing on vaguely defined principles, it would be better to choose methods of regulating European gas networks (and transmission pipelines in particular) that meet the objective of efficient development, operation and use of the networks themselves.

Drawing upon international experience, I have proposed some long-lasting regulatory principles that can guide the choice of regulatory methods and tariff structures. I have broken down these regulatory principles into detailed requirements, but they can be summarised as follows:

- § *Regulators must set total revenues that offer regulated firms a 'reasonable prospect of cost recovery' (where costs include operating expenditures, depreciation of investment costs and the cost of capital).*
- § *The method of setting tariffs should allocate total costs (or total allowed revenues) between users in manner which is fair (i.e. non-discriminatory) and reasonable (i.e. objective or transparent) and which encourages efficient use of the network.*

2.4.3. Framework for discussion of regulation

Despite its title, the ERGEG paper devotes much more discussion to the task of setting total revenue than to the design of tariffs. This choice of focus may be deliberate. However, even a discussion of revenue-setting should distinguish between the following tasks:

1. define costs (correct definitions, need for common and tightly defined accounting principles, which allow flexibility within common principles)
2. define allowed revenues at regulatory reviews, by reference to some standard of prudence or reasonable behaviour (and why it would be wrong to set the standard equal to "an efficient and structurally comparable network operator" as proposed by section 2 of ERGEG paper)
3. update allowed revenues¹⁰ between regulatory reviews (RPI-X, or pass-through for unpredictable items)

In some places, the ERGEG paper confuses these tasks (e.g. by limiting the definition of costs to those that can be recovered as revenue). Below, I maintain the distinction between these tasks, to provide a framework for my comments.

¹⁰ Some regulatory systems, particularly in the US, convert the allowed revenue identified at stage 2 into tariffs and then update the individual tariffs between regulatory reviews, using RPI-X and other formulae, without reviewing total revenues. Given the lack of emphasis on tariff-setting in the ERGEG paper, the framework described here is more appropriate.

3. Defining Costs

3.1. Cost Base

Section 2 of the ERGED paper opens with the following statement:

“The cost base of tariffs shall include actual costs incurred insofar as such costs correspond to those of an efficient and structurally comparable network operator.”

The same section makes similar statements on the next page in relation to tariff setting:

“The Regulation requires tariffs to reflect actual costs incurred, insofar as such costs correspond to those of an efficient and structurally comparable network operator. Only those costs that an efficient and structurally comparable network operator would incur must be taken into account. Costs incurred by inefficient operations or those not related to network operations would not qualify for inclusion in the establishment of tariffs.”

One half of this paragraph says simply that the costs included in network tariffs should relate only to the operation of the network business (including the costs of any related legal obligations). This statement is intended to prevent regulated tariffs from including costs of other businesses. Such a standard should be incorporated into regulatory accounting guidelines. However, the ERGED paper should also allow network charges to include (either as an element of network tariffs or as a surcharge on network users) the recovery of stranded costs (possibly costs incurred in other businesses). Although stranded costs are not a major feature of regulatory settlements in Europe, they do exist and they facilitate agreement on an efficient market design (by protecting investors against adverse effects of new market arrangements and facilitating their cooperation with the process). The recovery of stranded costs should not be ruled out as a matter of principle.

The other half of the paragraph says that companies should only be allowed to recover the costs that an “efficient and structurally comparable network operator” would incur. This standard concerns the calculation of allowed revenues from cost data and should be considered separately. However, as stated, this principle is not capable of implementation in any literal sense for a number of reasons and should be rephrased.

The reasons why it is not in practice possible to limit cost recovery to the costs of an “efficient and structurally comparable network operator” are:

1. Allowing only the recovery of efficient costs is not consistent with the requirement to attract capital. Firms in other sectors achieve only a “normal” or “reasonable” degree of efficiency, and “efficient” companies earn higher rates of return than average. Regulated companies will not be able to attract capital if they can only recover “efficient costs” and a rate of return consistent with the average returns in other sectors. To attract capital, regulated firms must earn *comparable* returns,¹¹ meaning either (a) efficient costs plus the superlative rate of return of efficient companies or else (b) “reasonably efficient” or

¹¹ See section 2.2.1, principle A.2.

“prudently incurred” costs and a rate of return comparable with that achieved on average in other sectors. In practice, only the latter of these options is feasible in regulatory procedures, since there is no way to estimate the superlative returns earned by efficient companies.

2. It is not possible for any regulator to identify the costs of an “efficient” network operator. Several consultants and regulators have claimed to do so, but their analyses are not complete or statistically robust. Many of the costs deemed to be “inefficient” are without doubt attributable to cost drivers that have been omitted from the analysis. No analysis can ever hope to capture all these cost drivers. The methods used by different regulators when estimating “efficient costs” have therefore become highly subjective and arbitrary, which is not a good basis for any regulatory incentive.
3. Attempts to assess “total costs” or even “opex” in any one year are distorted by the effect of past investment decisions. The only objective basis for assessing the efficiency of investment is to consider whether a reasonable person would have made the same decision *given the information available at the time of the decision*. That principle forms the basis for assessing whether costs have been prudently incurred.

The first of these points is actually implicit in a statement at the start of section 3 of the ERGED paper:

“The return on capital employed must be reasonable in international terms, and must adequately reflect the risk borne by the system operator.”

This statement confirms the principle mentioned in section 2.2.1 and indicates the need to adjust rates of return for risk. If the regulatory method only allows recovery of “efficient” costs, it imposes a risk that some costs will not be recovered (because every company must expect to be only “averagely” efficient). According to this statement in the ERGED paper, the rate of return would have to be adjusted (upwards) to allow for this risk, as explained above. In practice, however, it is always more transparent and objective to allow the regulated firm to recover costs that have been reasonably or prudently incurred (“averagely efficient costs”) and a normal rate of return.

The promotion of consumers’ interests sometimes requires regulators to offer incentives for efficient operation of the networks. However, such incentives derive from the *form* of the revenue control (e.g. price cap or pass-through), not from the *level* of allowed revenues. For instance, incentives for cost minimisation require that the regulated firm can increase its profits by cutting its costs (e.g. because its revenues fall by less than its costs). Simply cutting the firm’s revenues (to the level of “efficient costs”) will not increase the incentives for efficient cost minimisation. The ability to attract capital depends on the regulator offering a reasonable prospect that the company can recover its actual costs.¹² Attempts to cut revenues below this level will make investors less willing to invest and raise total costs.¹³

¹² See section 2.2.1.

¹³ The US definition of regulatory principles was driven by a respect for private property and the recognition that investment in regulated assets is a form of property. Successive court decisions (see above) established that preventing cost recovery would harm property rights, which would not be good for incentives. Attempts to depart from these principles in Europe would not only imply less respect for property rights, but would also harm incentives for efficiency.

The current draft of the ERGEG paper therefore confuses (1) the need to define costs (task 1) with (2) deciding which costs the regulated firm should be allowed to recover through its revenues (task 2). The ERGEG paper should consider these two tasks separately. It also contains contradictory principles. On one hand, the paper advocates the recovery of only “efficient costs” whilst on the other hand it acknowledges that rates of return must be comparable with those offered by other sectors. On the latter principle has any strong basis in the economics of regulation.

3.1.1. Scope of the Business

The costs of a regulated business are all those costs incurred in order to carry out a defined range of activities, i.e. not only the business activities of the network (selling capacity and other services) whose revenues or prices are regulated, but also any special tasks given to the firm as legal or regulatory obligations. The Dutch Electricity and Gas Acts contain a list of tasks assigned to network operators which is used as the basis for identifying the costs of the regulatory business, but the definition of tasks will differ between Member States (and may be augmented by obligations placed on companies by a number of laws). The ERGEG paper therefore needs a statement of a general principle such as the following:

§ The costs of a regulated business include all costs incurred in order to carry out the range of business activities subject to regulation, or to fulfil legal obligations associated with the performance of those activities.

To define these costs, it is necessary to establish a set of regulatory accounting rules, since normal accounting rules are never sufficient to meet regulatory needs. Much of the text in the ERGEG paper should be viewed as guidance to regulatory authorities in how to define the regulatory accounting rules. However, for the sake of transparent and objective regulation, the ERGEG paper should also establish the principle that regulators must define (i.e. explain) the regulatory accounting rules they will use for defining costs and setting revenues. Without such a defined cost base, even cost-based regulation will be unpredictable and arbitrary.

3.2. Cost-Based Tariffs

Section 2 of the ERGEG paper contains the following assertion:

“Cost-based tariffs can be considered non-discriminatory in that they are applied equally to comparable network users and do not provide for cross-subsidisation between them.”

This statement is not correct, since even cost-based tariffs may be considered discriminatory in some instances. To avoid accusations of discrimination, it is not sufficient to “apply” cost-based tariffs equally. It is also necessary to use a non-discriminatory method of constructing the tariffs. However, cross-subsidy is not a well-defined term in this context. It usually means setting prices below variable costs (and making up the difference with revenue from another source). However, the variable cost of serving a particular user on a network is relatively low and is not likely to exceed any tariff. Allegations of discrimination usually concern the allocation of common fixed costs. As a result, the avoidance of cross-subsidy is not a useful guide to or constraint on the design of network tariffs.

A more useful standard would focus on the fair allocation of costs – both (1) variable costs associated directly with a particular user and (2) fixed and common costs that must be allocated among all users. This standard was covered by the principle for tariff-setting set out in section 2.2.2.

3.2.1. Detailed drafting comments

Section 2 defines “Costs” as equal to “CAPEX + OPEX”. It then defines “CAPEX” as “Depr + RAB x WACC”. It is a common drafting error in European documents to call this item “Capex” or “Capital Expenditure”. However, that is an incorrect use of the term and the ERGEG paper should refer instead to it “Capital Costs” (“CapCosts”), or similar. “Capital expenditure” refers to the cash cost of an investment at the time of its purchase, not the accounting costs of depreciation and return spread over its useful life.¹⁴ Thus, if a new transmission pipeline costs €1000 million, is depreciated over 50 years at €20 million per year, and earns a WACC of 6%, then CAPEX is the €1000 million spent in the year when the investment takes place. However, in the next year Capital Costs (CapCosts) are €80 million (= €20 million + (€1000 million x 6%)).

The description of some cost items needs amendment for clarity and for generality. The term “Depr” should be defined as depreciation of the Regulatory Asset Base, which is not necessarily the same as depreciation shown in company accounts (although it may be). The ERGEG paper should recognise that some regimes (e.g. Germany, Italy) divide assets among several different Regulatory Asset Bases and apply different rates of return to them. Also, calculating a rate of return as a Weighted Average Cost of Capital is one of two common methods; some regulators treat the cost of debt as an item of operating expenditure (OPEX) and only calculate the Return on Equity.

Finally, it would be advisable to clean out from this section on the definition of costs any statements about the translation of costs into revenues, such as the reference to tariffs reflecting the costs of “an efficient and structurally comparable network operator”. That process requires a separate set of decisions, particularly decisions about which costs should be “disallowed” i.e. not translated into revenues. Moreover, as a regulatory principle, it is highly dubious, for reasons I explain below. In general, the decisions about translating costs into revenues and tariffs require special consideration, separate from the definition of costs.

In section 3, the first paragraph contains a partial list of costs “all costs, including the costs incurred for the system operation, such as: combustion (fuel) gas, linepack management, maintenance, upgrading and expansion, administration and capacity marketing”. It is not clear what the purpose of this list is, since this is not an exhaustive list of the costs to be covered by network tariffs and neither does the ERGEG paper say that all network tariffs must cover these costs. Hence, nothing is gained by including this list. It might be desirable to establish a set of common concepts and terms for use in designing regulatory accounting guidelines – or even a statement of intent to prepare common regulatory accounting guidelines – but the current list is superfluous.

¹⁴ The definition of capex and capital expenditures can be found in many places. Wikipedia contains the following definition: “**Capital expenditures** (CAPEX or capex) are expenditures creating future benefits. A capital expenditure is incurred when a business spends money either to buy fixed assets or to add to the value of an existing fixed asset with a useful life that extends beyond the taxable year.”

The second paragraph in section 3 refers to “[t]he return on capital employed”. However, there is nowhere any definition of “capital employed” or any explanation as to how it relates to the term “Regulatory Asset Base” that is used elsewhere in the report. It would be better to use the same terms throughout.

3.3. Asset Valuation and the Rate of Return

The opening statement of section 3.1 of the ERGED paper says:

“In principle there are numerous methods to define the Regulatory Asset Base (RAB). For regulatory purposes the cost orientated approach is preferred...”

Use of the passive verb (“is preferred”) hides the source of and the reasoning behind this statement. In practice, a number of regulators have “preferred” (i.e. actually used) an approach to defining the RAB which is not cost-based. For example, the definitions used in the British electricity, gas and water networks began from a stock market valuation over a certain period. Governments have sometimes established new values for the RAB at the start of a new regulatory regime, based on a number of policy objectives.¹⁵ The ERGED paper should therefore recognise that national governments and regulatory authorities may adopt other approaches in some conditions.

In general, for the sake of transparency, the ERGED paper should not express “preferences” without providing a source and a reasoned justification for them.

3.3.1. Accounting standards for regulation

Much of section 3.1 of the ERGED paper discusses the choice between historic cost values¹⁶ and current cost values¹⁷ for setting the RAB and its implications for the allowed rate of return. The discussion is broadly correct, although it does contain some errors. For instance, it states that “...the historical cost approach requires a nominal risk-free rate, whereas the replacement cost approach requires a real risk-free rate...”, whereas in fact this difference applies to the cost of capital as a whole (and some methods of estimating the cost of capital do not require the use of a risk-free rate). However, the most serious omission is the lack of any general regulatory principles to guide the choice of valuation method or the associated rate of return.

Any statement of principles that discusses this topic should state the need to use the same definition of inflation for the two adjustments – inflating the value of assets and calculating a real cost of capital. This principle is a necessary condition for total cost recovery – meaning for efficient investment and for the prevention of monopoly profits.¹⁸ The choice of different

¹⁵ For instance, governments that are corporatising or privatising state-owned companies must balance consumers’ interest in low prices against the owners’ interest in raising the sales value of the company and its future cash flows and the efficiency benefits of setting tariffs equal to long-run marginal costs.

¹⁶ i.e. the original cost of purchasing or building the asset, less depreciation.

¹⁷ i.e. indexed values, or values updated to replacement costs, less depreciation.

¹⁸ Section 6 of the ERGED paper says “Tariffs have to be cost-based and shall not allow for inappropriate revenues (so-called monopoly profits).” This statement seems to imply that only tariffs based on costs will prevent monopoly profits; it does not fit well with the discussion of market-based tariffs, but is an adequate description of the outcome

accounting rules was covered in detail in the Byatt Report¹⁹ of 1986 and the ERGEG paper would benefit by learning from that discussion now.

3.3.2. Financial Capital Maintenance as regulatory standard

The Byatt report discussed the appropriate choice of accounting rules and established that any rules should meet the standard of “Financial Capital Maintenance” (FCM). Byatt et al described FCM as a common standard that allows investors to compare accounting returns among alternative investment opportunities. Since it makes rates of return comparable, it also defines the “comparable” rate of return that regulators should allow to investors in regulated companies.

Applying FCM to the valuation of regulatory assets ensures that investors can recover their costs (once and once only) if the allowed rate of return is equal to the cost of capital. Other schemes require an adjustment to set the allowed rate of return above or below the cost of capital, to compensate for implicit errors in the calculation of capital costs (CAPCosts).

As Byatt et al. explain:

“Investors will want to calculate the real rate of return after the maintenance of the real value of their capital for comparison with returns available elsewhere.”²⁰

FCM therefore provides the standard by which investors effectively measure whether the regulatory regime is allowing them to recover their costs including a rate of return comparable with that offered by other companies and sectors. (See section 2.2.1 above.) Similarly, regulators must ensure that the rate of return they allow regulated companies to earn is consistent with the FCM standard. The 1986 Byatt Report recognised that investors would only expect to recover their costs if the allowed rate of return is sufficient to cover the cost of capital and after maintaining the real financial value of their investments:

“No commercial competitors would come into an industry if they did not expect to be able to recover the decline in real values of their assets, as well as earn a normal profit (the opportunity cost of capital). They would measure their return on investment after recovery of funds sufficient to maintain the real value of the financial capital they had invested.”²¹

This extract sets out certain conditions for entry into competitive markets. Those conditions apply equally to regulated businesses, which must offer a rate of return comparable to that in

under cost-based regulation. Section 3.1 of the ERGEG paper mentions that “Users of the infrastructure paying for an investment more than once over its lifetime should be avoided”, which is the practical outcome of allowing cost recovery as defined by a reasonable rate of return after recovery of opex and investment costs (depreciation) Equally, investors will expect to recover their costs *at least* once, or they won’t be willing to invest.

¹⁹ Byatt et al., “Accounting for Economic Costs and Changing Prices”, Volume 1, HMSO, 1986.

²⁰ Byatt et al., “Accounting for Economic Costs and Changing Prices”, Volume 1, HMSO, 1986, paragraph 87. Emphasis in original.

²¹ Byatt et al., “Accounting for Economic Costs and Changing Prices”, Volume 1, HMSO, 1986, paragraph 19. Emphasis in original.

other sectors, in order to attract capital into the sector. The compensation for investment must cover all declines in the real value of the assets, whether caused by depreciation of the asset or by revaluations at less than the rate of inflation.²² FCM is the appropriate way to measure depreciation and profits, so as to achieve this aim.

Manuals on Current Cost Accounting (CCA) distinguish between real Financial Capital Maintenance (FCM) and Operating Capability Maintenance (OCM). Various accounting standards already allow the application of OCM, under which asset prices and depreciation charges are reset each year in line with the cost of replacing the asset concerned. FCM differs from OCM in the following way:

“the depreciation charge to the profit and loss account includes holding gains and losses due to changes in the asset prices, in addition to the OCM depreciation charge.”²³

In other words, FCM treats all changes in the value of assets in the RAB as a profit (if positive) or a cost (if negative), whether the change in the value is due to depreciation or revaluations.

3.3.3. Regulatory accounting for inflation

When accounting (and regulatory) practices use Historic Cost Accounting, application of the FCM principle is relatively straightforward, since assets are not revalued. Depreciation is defined by reference to historic costs only, but the “nominal” rate of return includes compensation for inflation.

However, when regulators offer some of the return to capital in the form of asset price indexation (i.e. asset revaluations), the calculation of an appropriate return is more complex. When regulators calculate a real cost of capital by subtracting an inflation rate from a nominal (market) rate of return. To meet the FCM standard, regulators should use the same inflation index to calculate the increase in asset values. If there is a mismatch between the two indices, there must be some offsetting correction.

For example, suppose that the general rate of inflation (CPI) is 2 percent per year (% pa), but that the prices of gas pipeline assets only rise 0.5% pa, because technical progress causes their prices to decline in real terms. If the regulator inflates asset values one year by 0.5%, using an asset-specific price index, investors will have lost 1.5% of the real value of their asset (i.e. 2%-0.5%). If the regulator then calculates the real cost of capital by deducting 2% pa inflation (based on the CPI), the rate of return offers no offsetting compensation. Instead, the regulator would have to offer 1.5% pa additional return by other means (e.g. by overstating the cost of capital or by offering some other allowance.)

²² By recovering “decline in real values of their assets”, investors are effectively maintaining the real value of their capital, since they receive cash from revenues in exchange for depreciation of asset values. This principle is effectively a definition of a property right akin to the rights underlying US regulatory practice and law.

²³ OfTel, “Pricing of Telecommunications Services from 1997”, Annexes to the Consultative Document, December 1995, Annex F, p. 38.

Regulators using a CCA approach can solve this problem by using the same retail price index (RPI) or consumer price index (CPI) *both* to inflate asset values *and* to calculate the real cost of capital. The real cost of capital offers no compensation for inflation, but the revaluation of assets by RPI or CPI maintains their real value.²⁴

However, some systems do not meet the standard of FCM e.g.:

- § Germany's method of regulating energy sector assets still applies OCM standards, in which asset values are inflated by a different (asset-specific) price index without any offsetting compensation for rising/declining real values.
- § A recent "draft method decision" from the Dutch energy regulator proposed a combination of real WACC and non-revalued RAB for gas distribution networks. That combination is also a mistake, since it deprives investors of any compensation for inflation, and so exposes them to a steady decline in the real value of their assets.
- § The situation in Finland is hard for me to determine with precision (a description of the latest decisions is available only in Finnish), but I understand that some regulatory decisions apply an estimate of the nominal rate of return to a revalued asset base. The combination would offer compensation for inflation twice over – were it not for the fact that the estimated nominal rate of return seems to be extremely low.

Each of these methods may offer temporary advantages to investors or consumers, but they inject unnecessary regulatory risk in the long-run. For the sake of transparency and predictability, regulators should use either (a) historic cost asset values in conjunction with a nominal rate of return or (b) CPI indexation of assets along with a real rate of return net of CPI inflation.²⁵

In the latter case, i.e. Current Cost Accounting, the Retail Price Index (RPI) or some other stable index of general inflation is a suitable substitute for the Consumer Price Index (CPI). It is also possible in principle to meet the FCM condition by replacing CPI in both parts of the calculation with a Producer Price Index (PPI) or an asset-specific price index. However, the resulting estimate of costs tends to be less stable and so to have undesirable consequences for the path of tariffs over time. In practice, transparent and predictable application of the FCM standard requires either historic cost accounting or asset revaluations using CPI or RPI.

3.4. Depreciation

Section 3.2 of the ERGED paper says:

“A depreciation schedule shall be used which best reflects economic reality and is designed to keep tariffs constant in real terms over the life of the system.”

²⁴ Britain uses RPI in this way and the Netherlands uses CPI. There may be some confusion over the time period from which the index is taken. For instance, asset values should be revalued using the latest index, whereas estimates of the real cost of capital based on data in past years should use forecasts of inflation made in those years.

²⁵ The Retail Price Index (RPI) or some other stable index of general inflation is a suitable substitute for the Consumer Price Index (CPI).

In support of this statement, it refers to two documents, CEER Tariff guidelines from 2003²⁶ and a report by the Brattle Group.²⁷ The latter is not in the public domain, so the reference does not contribute to open and transparent regulation. Moreover, the sentence does not provide a useful principle and is internally inconsistent.

A “depreciation schedule” is nothing more than the rate at which a capital expenditure is allocated to future years over the life of an asset, e.g. straight-line (equal share in each year), sum-of-the-digits (a more complex formula), etc. The ERGED paper says that this rule should both “reflect economic reality” and “keep tariffs constant in real terms”. No depreciation schedule will always meet these two conflicting aims simultaneously. In fact, there is no reason why a depreciation schedule should be set or adjusted to keep tariffs “constant in real terms”, if the level of costs (“economic reality”) is changing over time.

Moreover, the phrase “life of the system”, as distinct from the lives of individual assets, has no meaning and so cannot be applied to real accounting systems.

Depreciation in an orderly regulatory regime is just a way to return investment to its owners. However it is done, if the value of investors’ property is returned to them, they’ll be happy to provide more when it is needed. The choice of depreciation schedule therefore just has to be consistent with the general principles of regulation set out in section 2.2.1. If there is any need to be more specific about the economic principles guiding the definition of depreciation, it may be worth stating the following:

“Regulatory processes should apply a depreciation schedule which spreads the whole cost of investment in a network assets over the life of the asset in a manner that is consistent with efficiency (indicating the costs of usage in different years), and fairness/non-discrimination (a fair allocation between consumers in different years).

Changes in depreciation schedules will affect the allocation of investment costs to future years, but should not be backdated and should not therefore change the current or past value of the RAB.”

The former principle requires support from engineering analysis to define appropriate asset lives. The latter principle has already become a common custom in the UK, even though regulators have occasionally changed asset lives and depreciation schedules.

3.5. Operating Costs (sic)

3.5.1. Definition of costs

This section refers to operating expenditure (opex), not operating costs (which include depreciation). Moreover, this section refers incorrectly (and unnecessarily) to opex being “efficiently incurred”, whereas in fact opex includes all the “day-to-day costs of running and maintaining an infrastructure.” In general, this section confuses the definition of costs with the conversion of costs into a revenue allowance (which should be discussed separately).

²⁶ cf. CEER Tariff guidelines, Report to the Madrid Forum, 28 August 2003. See footnote 6.

²⁷ The Brattle Group, “The Impact Of Entry-Exit System On Cross-Border Flows”, July 2003.

The list of costs given in this section (which would be unnecessary, if there were a separate section on the definition of regulatory accounting guidelines) contains two inconsistent categories of cost:

- § costs defined by *network task*: “costs used for operation and maintenance of a pipeline system”; and
- § costs by *type of expenditure*: “labour costs, overhead/administrative costs, costs for marketing capacity, and fuel gas.”

Any definitions should either define the scope of activities for which operating expenditures must be recorded (see section 3.1.1) or else refer to detailed regulatory accounting guidelines (see section 3.2.1).

3.5.2. Escalation clauses

Section 3.3 of the ERGEG paper contains a paragraph on “escalation” of OPEX, but it is incomprehensible and needs redrafting. I think that the sentence beginning “In case the tariff methodology” is an attempt to state the following:

“In cases where Operating Expenditure (OPEX) is rising, the tariff methodology shall not pass through the rise in costs as an increase in tariffs.”

However, even this statement would be too prescriptive, since in some cases an increase in opex should lead to an automatic increase in tariffs by the same amount. The following revised text provides a more general and coherent statement of the principles discussed in the second paragraph of section 3.3 of the ERGEG paper:

“In cases where Operating Expenditure (OPEX) is rising, the tariff methodology shall not automatically pass through the rise in costs as an increase in tariffs. Otherwise increasing costs will lead automatically to increased revenues, which is not always the best way to encourage efficient operation of networks. The pass-through of OPEX does not encourage TSOs to behave in an efficient manner. It is therefore recommended when allowing for OPEX to use a formula that includes an automatic adjustment to keep revenues in line with expected costs, whilst maintaining incentives to minimise costs (such as Retail Price Index minus an efficiency factor, X, or RPI-X).”

Note that this statement refers to the process for translating costs into revenues, not the definition of costs themselves. However, even this formulation would not apply in the many legitimate cases where it is appropriate to allow the pass-through of changes (up and down) in OPEX. In many cases, changes in OPEX can be handled by indexing revenues (e.g. by including a spot price index to represent fuel costs). However, experience has shown that sometimes it is necessary to allow the pass-through of actual costs, because the changes in costs are too unpredictable to be replicable via an index. This condition is particularly important for the costs arising from new legal obligations imposed since the start of a price cap period. Hence, the paragraph would be better if it read as follows:

“In cases where OPEX may rise or fall, allowed revenues should be automatically adjusted, whenever possible, to keep revenues in line with costs. In most cases, the

adjustment should be achieved by including appropriate price indices in a revenue formula – e.g. “RPI-X” for costs that rise in line with general inflation (RPI) and decline at a predictable rate of efficiency growth (X), or alternatively a commodity price index for the costs of materials purchased as inputs (such as fuel gas). The use of such revenue formulae will preserve incentives for cost minimisation. The (total or partial) pass-through of actual changes in OPEX may however be applicable in the following cases:

- (1) where the level of total costs is too unpredictable to be replicated by an index, because the volume of activity cannot be measured and/or unit costs cannot be predicted in advance, e.g. as in the case of the additional costs arising from new legal obligations;
- (2) where the NRA can determine that costs have already been minimised in another regulatory process (e.g. upstream network charges) or in a competitive procurement process (e.g. for fuel gas or flexibility services);
- (3) other cases where the pass-through of actual costs does not harm the efficient development of operation of the network.”

3.6. Fuel Gas

It is unclear why this cost item merits a separate section, given that it has already been listed (albeit superfluously) as an item of OPEX, since the points in this section (the need for efficient procurement) apply equally to all cost items.

3.7. Cost of Capital

This is a major section of the ERGED paper. However, it contains so many errors that it merits detailed discussion in a separate chapter.

3.8. Conclusion

Sections 2 and 3 of the ERGED paper discuss the definition of costs for regulatory purposes, but do not set out a useful set of principles for defining costs, contain errors in the discussion of costs and confuse the definition of costs with the process of converting costs into revenues (or, alternatively, with the definition of revenues). These sections require reconsideration, in order to identify the applicable principles.

4. The Cost of Capital

This section is crucial to the definition of regulatory principles, since the cost of capital is the one cost which cannot be defined by accounting and which must instead be estimated. This process of estimation is always liable to provoke disputes (whereas the definition of costs in accounts can be agreed once and for all). It therefore requires careful consideration.

4.1. Understanding of Regulatory Principles

Unfortunately, the first paragraph of section 3.5 contains a gross error which suggests that the author of this draft did not understand regulatory procedures. The ERGED paper says that the cost of capital is “the maximum return on capital that an investor (regulated company) must expect to earn on its investment”. In fact, if the cost of capital is estimated properly, it represents the *minimum* return on capital that an investor (regulated company) must expect to earn on its investment”.

After all, it should be obvious (as reflected in the principles in section 2.2.1) that investors who *expect* to earn *the same as or less than* their cost of capital will simply not have any incentive to invest in the network. A regulatory regime will only attract capital if investors expect to earn *the same as or more than* their cost of capital. Of course, if the company invests imprudently or lets OPEX rise uncontrollably, investors may actually earn less than their cost of capital, but no workable regulatory regime can set such a standard as a target.

The first paragraph also “recommends” that regulators calculate a Weighted Average Cost of Capital (WACC) comprising the cost of equity and the cost of debt. This statement is unnecessarily prescriptive, since in some regimes regulators set only the Return on Equity (ROE) and treat the cost of debt as a component of OPEX. The ERGED paper provides no justification for its recommendation to adopt WACC instead of ROE.

These errors and omissions suggest that the authors of this section had limited experience and understanding of regulatory procedures for setting the cost of capital (WACC or ROE). In practice, the whole section needs to be redrafted.

4.2. Survey Results

The ERGED paper reports the results of a survey of national regulators, claiming to show the parameters used in the calculation of WACC. The survey reports figures incorrectly in several cases – mainly where it describes a *real* risk-free rate as a *nominal* one.

The low risk-free rates (2-4%) for the UK, Finland, Hungary and the Slovak Republic all apply to asset values which are revalued each regulatory period (or were revalued at the last regulatory review). A nominal rate would be about 2% higher in the UK and a similar adjustment probably applies to the other cases.²⁸ Eliminating these cases (or adding 2% for inflation) and the Romanian figure of 12.62% (which presumably includes a special allowance for country inflation or currency risk) narrows the range of the nominal risk-free

²⁸ For Finland, Hungary and Slovakia, I found statements that network assets had been revalued recently, but have been unable to find a regulatory commitment to revalue the assets in line with inflation at subsequent regulatory reviews.

rate considerably. The remaining cases lie between 4.13% (CREG) and 5.02% (ERU/Poland). That range seems reasonable, although a comparison of real risk-free rates would be more informative, since the comparison of nominal rates may still be affected by different estimates of inflation.

4.3. Choice of Method

Section 3.5 of the ERGEG paper takes this CAPM framework and comments on it extensively. However, CAPM is not the only method of calculating the cost of capital and is not always the most suitable. The table below takes the range of parameters listed in the ERGEG paper and makes the following assumptions:

- § The “nominal risk-free rates” are converted to real risk-free rates by deducting 2% inflation (where the rate is not already quoted in real terms);
- § Gearing is set at 60% (debt/(debt+quity)); and
- § The tax rate is set at 30%.

The resulting range of possible values for the real pre-tax WACC on this basis would be 3.9% to 10.9%. (See Table 4.1.) Even though the ERGEG paper acknowledges that the parameters apply to different time periods, this example is sufficient to show the problem with the CAPM formula: plausible inputs provide a very wide range of outputs. As a result, the CAPM formula does not in practice constrain the regulator’s choice of WACC.

**Table 4.1
Range of CAPM Parameters and Outputs**

CAPM Parameter	Min	Max
RFR	2.13	3.02
DP	0.41	2.5
D/(D+E)	0.6	0.6
ERP	3.15	6.19
Asset B	0.25	0.66
E/(D+E)	0.4	0.4
Equity beta	0.625	1.65
Tax Rate	30%	30%
Cost of Debt	2.54	5.52
Cost of Equity	4.1	13.2
Pre-Tax WACC	3.9	10.9

Within each regulatory review, the range permitted by CAPM parameters will be narrower than shown here, but still too wide to resolve all disputes. As a result, the final choice of a WACC within the wide range defined by CAPM would be driven by other, less transparent or even arbitrary considerations. In these conditions, to provide transparent and predictable decisions, NRAs should adopt other methods (e.g. the Dividend Growth Model or DGM), either as the primary method of setting the cost of capital, or as an additional (minimum or maximum) constraint on a WACC calculation. In general, a statement of principles should

not constrain the choice of method, especially by adopting a method that offers no transparency.

However, the ERGED paper discusses the cost of capital in terms of the CAPM framework and my comments follow the same approach. By and large my comments indicate that it would be wise not to try to set out regulatory principles in relation to a complex and detailed regulatory method like the CAPM.

4.4. Risk-Free Rate

4.4.1. Source of data

The ERGED paper states “Since financial markets consider conventional government bonds of a particular MS at the prevailing risk-free rate, conventional long-term government bonds (e.g. from 5 to 10 years) shall be taken as the risk free base rate.”

However, it is regulators who consider conventional government bonds as an indicator of the risk-free rate. Financial markets do not form (or state) such views. Furthermore, the rate on government bonds may be distorted by institutional constraints, such as legal obligations on key investors to hold a certain proportion of their assets in government bonds, regardless of the rate they offer. Such obligations used to apply to banks in many countries and now apply to pension funds in the UK. As a result, the yield on UK and other government bonds may understate the risk-free rate required by investors.

4.4.2. Cyclical factors

In discussing the choice of data source, the ERGED paper does not recognise the complexity of the decision. Regulators set the cost of capital for a single regulatory period at a time, so it makes sense to consider the cost of capital for that period. However, the current yield on government bonds with a remaining time to maturity equal to the regulatory period may not be the appropriate risk-free rate. The allowed cost of capital for the coming period may have to be adjusted for:

1. cyclical fluctuations within the coming regulatory period;
2. fluctuations in recent history that have left the regulated company holding long-term debt at past rates of interest; and
3. institutional constraints on the demand for government bonds that distort their yields.

Both factors affect estimates of the allowed cost of capital over the coming regulatory period.

4.4.3. Time period of data

The ERGED paper says that “the appointed date based approach” is “more precise” than “the historical average approach”. In fact, either method can be “precise”, so the comment is neither correct nor useful. The real question is whether the allowed cost of capital should be adjusted to allow for cyclical fluctuations, as described above, by recognising historical yields as well as current yields. A short-term estimate of the risk-free rate (based on today’s yields) is often distorted by cyclical factors and is therefore inconsistent with the long-term

estimation of the Equity Risk Premium based on historic yields. (All estimates of the ERP are long-term; there is no such thing as a short-term estimate of the ERP.)

Hence, there are strong arguments for using the historical average approach and this document should certainly avoid suggesting that the “appointed date” method is superior, “more precise”, more accurate, etc. Rather than define the relative merits of different approaches, this document should note simply that there are different methods of estimating the risk-free rate and that “any method should provide a reasoned estimate consistent with the other parameters of the CAPM formula.”

4.4.4. Historic debt

The ERGED paper says “This approach will take into account the possibilities for gradually refinancing the financing portfolio of TSOs.” This principle is broadly correct, but is not stated in a way that makes its meaning clear. The inclusion of the term “gradually” implies a recognition that the TSOs cannot immediately refinance their debts at today’s rates. As a result, the actual cost of debt incurred in the past may be higher or lower than today’s yields. (See point 2 in section 4.4.2 above.) It would not be efficient or reasonable to expect TSOs to refinance their debt using short-term loans all the time. The principle should be restated for clarity as follows:

“The allowance for the cost of debt will take into account a reasonable refinancing policy and the implications for debt portfolios.”

4.4.5. FCM

The final comment on real and nominal rates should be reviewed in the light of the discussion of the FCM principle set out above.

4.5. Debt Risk Premium

At the end of the first paragraph, the following statement should be added, to reflect real regulatory practices and constraints:

“In addition, the debt risk premium should be compatible with the financial ratios (interest cover, etc) that the company can achieve with the revenues allowed by the regulator. The range of relevant financial ratios and minimum/maximum values are defined by the ratings agencies.”

The second paragraph is not fully comprehensible as drafted, but I believe it is intended to say the following:

“If the debt rating of a regulated business is not directly observable, the calculation of debt costs will assume a comparable debt rating to that which can be observed for other businesses.”

4.6. Equity Risk Premium

This section of the ERGED paper confuses two concepts: (1) the Equity Risk Premium (or “Market Risk Premium”) derived from analysis of the stock market and (2) the company-

specific risk premium calculated in the CAPM model as the product of the Equity Risk Premium and the Asset Beta. The Equity Risk Premium describes a general characteristic of stock markets whereas, according to the CAPM model, all company-specific risks are captured in the asset beta. The Equity Risk Premium is not related in any way to the specific risk characteristics of a TSO, or even necessarily to “a particular MS”. The ERP is a characteristic of the financial market in which the TSO must raise capital, which may be defined at the level of a currency (\$, £, €) or economy (MS, Euroland or EU, Australia, US, etc).

Note that one cannot use the CAPM model to derive the Equity Risk Premium, as stated in the ERGED paper. Rather, an independent estimate of the Equity Risk Premium, derived from long-term analysis of capital markets, is an *input* into the CAPM model.

4.7. Asset Beta

The ERGED paper reports the characteristic of the CAPM whereby only the market risk should be incorporated into the WACC and company-specific risk is seen as diversifiable. This is a *deficiency* of the CAPM, not a conclusion that can be applied to the regulation of specific companies. In practice, company-specific risks – and regulatory risk in particular – does affect the cost of capital.

One problem is that the CAPM *assumes* risks are normally distributed, i.e. symmetrically, whereas regulatory risk – which is company-specific – tends to be asymmetric. The CAPM is therefore incapable of taking regulatory risk into account, even when it affects the cost of capital.

Moreover, there are several other theories that explain how regulatory risk affects the cost of capital – for instance the “real options theory”, which stresses the irreversible nature of investment (another factor with the CAPM simply does not recognise).

These deficiencies in the CAPM do not prevent it from being used in a regulatory context, but equally the CAPM does not provide any reason why company-specific or regulatory risks should be ignored by regulators. The importance of these risks provides another reason why it is important to consider other methods when calculating the cost of capital, at least as a constraint on a CAPM formula. Other methods of calculating the cost of capital (e.g. the Dividend Growth Model) can allow for the effects of regulatory risk and may provide a better measure of the cost of capital.

4.8. Gearing

When calculating a Weighted Average Cost of Capital, some regulators allow for the actual gearing of the regulated company, some impose upper and/or lower limits on the proportion of debt, whilst some impose a notional gearing ratio at each review. The ERGED paper is silent as to the criteria for choosing one of these methods, or the constraints on applying them.

The use of a notional gearing ratio raises a particular question about sustainability. A regulator might assume notional gearing of, say, 60% at a regulatory review, but might recognise that it will rise to, say, 65% by the end of the next regulatory period. (Such a rise in debt might not affect the cost of capital allowed by the regulator.) If the regulator

repeatedly restates the opening gearing at 60%, this method effectively assumes that the additional 5% of debt is cancelled or refinanced as equity – without cost – at the start of each regulatory period. This assumption is clearly impossible to achieve in reality, so this approach is not consistent with offering a reasonable prospect of cost recovery.

To overcome this problem, regulators might be required to allow for the effect of changes in gearing over a regulatory period at the next regulatory review, but it is difficult to keep track of such changes in a notional balance sheet. A better method is to assume that the company maintains constant gearing over each regulatory period and to allow the company to recover the costs of maintaining constant gearing, by issuing debt and equity in the required proportions.

The cost of capital should, in any case, include an allowance for the costs of issuing new debt and new equity, a principle which the ERGED paper should state.

4.9. Tax

The ERGED paper recommends that the cost of equity finance should be adjusted upwards by a tax wedge to take account of corporation tax payments. However, this restriction on methods may not be applicable in all regimes.

In Britain, Ofgem now uses a post-tax WACC, because the tax wedge had become an inaccurate estimate of tax liabilities. In practice, some regulated companies pay more tax than implied by the tax wedge, because depreciation in their tax accounts is lower (and accounting profits are higher) than in Ofgem's regulatory calculations. These companies therefore need compensation for a higher tax rate. However, some companies pay less tax than implied by the tax wedge, so Ofgem did not want to raise the tax wedge in the pre-tax WACC for all companies. Shifting to a post-tax WACC solved this dilemma.

Other regimes also use a post-tax WACC. Hence, it is overly prescriptive to state that the use of a pre-tax WACC with a tax wedge is a requirement or a principle. Instead, this document should say:

“The calculation of allowed revenues should make adequate provision for taxes paid by each regulated business. The provision for taxes on profit may reflect actual tax payments as an item of OPEX or an allowance (“tax wedge”) within the calculation of a pre-tax WACC. In either case, it would be desirable to give regulated companies an incentive to reduce their tax liabilities.”

4.10. Conclusion

The section on the cost of capital needs to be extensively re-written, to correct gross errors but also to avoid overly constraining the choice of method. The draft has apparently been written from the point of view of a narrow range of experience and does not accommodate either alternative methods that have developed in other regimes or the need for flexibility.

5. Principles for Setting and Updating Revenues

As noted above, the ERREG paper frequently confuses the definition of costs with the process of defining revenues (at a regulatory review) and updating revenues (between regulatory reviews). There are many different methods of setting and updating revenues in regulated sectors, but a statement of regulatory principles should include some guidance on the choice of methods.

5.1. Setting Revenues

In particular, any statement of principles ought to advocate:

1. objectivity (transparency of method, as defined by the ability of others to replicate results and the avoidance of subjective or arbitrary decisions); and
2. revenue sufficiency (allowing a reasonable rate of return, or reasonable prospect of cost recovery, sufficient to attract capital).

Some of these principles may be covered by regulatory or administrative law in the member states concerned, but some harmonisation of administrative standards (on international best practice) would be desirable as a means to enhance the standing and independence of regulatory authorities. The principles of revenue sufficiency are discussed in section 2.2 above.

5.2. Updating Revenues

With regard to the formulae used to update allowed revenues between regulatory reviews, see my comments on:

1. Pass-through of OPEX (section 3.5.2), which apply equally to variation in other costs; and
2. Incentives for New Infrastructure (ERREG paper, section “4.8”), set out below.

5.3. Conclusion

The ERREG paper contains comments on the procedures for setting and updating revenues, but they are mixed up with comments on the definition of costs. It would be helpful to separate them out, so that they can be properly scrutinised.

6. Tariff Principles

The ERGED paper contains few if any principles on the process of setting tariffs, such as those discussed above in section 2.2.2. Instead, section 4 of the ERGED paper launches into a discussion of entry-exit tariffs, on which I comment below.

6.1. Entry-Exit Tariffs

6.1.1. The “Principle” of Entry-Exit Tariffs

ERGED begins section 4.1 with a statement that “[t]he entry-exit tariff system is considered to be the most beneficial to the development of competition in the gas market of the commonly applied tariff systems.” There are two problems with this statement that make it unsuitable as a regulatory principle.

First, this statement is another case of unattributed passive verbs (“is considered”) which hide the basis for the apparent preference. In practice, this so-called “tariff principle” depends on the views of certain unnamed individuals, whose views may not be universally accepted and which may change in the light of new conditions.

Second, it suggests that the main purpose of setting gas network tariffs is to promote competition in gas markets, which overlooks the need to promote efficiency in the development and operation of the gas network and to encourage efficient use of networks. As indicated by the many requests to exempt new infrastructure from third party access (and, by implication, from entry-exit tariffs), other tariff systems may be more supportive of efficient investment in gas transmission pipelines.

It is not certain or self-evident that entry-exit tariffs are beneficial to the development of competition in the gas market. US gas markets do not use an entry-exit system, but rather a framework of long-term, tradable point-to-point contracts for pipeline capacity. Yet US gas markets show many times the trading volume and liquidity of European gas markets. That comparison suggests that the problem with EU gas markets is not a lack of entry-exit tariffs, or even that entry-exit tariffs are harmful to gas market liquidity.

There are certainly ways in which entry-exit tariffs are harmful to competition and liquidity in gas markets. First, the provision of access to a whole network, regardless of actual pipeline routes within the network, avoids the need for competing shippers to trade gas (and pipeline capacity) in order to achieve different patterns of delivery; instead the monopoly network operator arranges for gas to be re-routed within the network. The role of the network operator reduces the volume of trade. Second, when entry-exit tariffs cover large market areas, they give the impression that gas in many different locations is equivalent and can be traded in one market; the resulting trades are not really “competition”, since they concern a “virtual” or “notional” (i.e. imaginary) product, and not efficient trades in real gas. Hence, any trading or “competition” that emerges is an imaginary concept, not a real one.

Entry-exit tariffs emerged because of the dominance of incumbent gas companies. These tariffs allow new entrants to arrange the transport of gas from A to B without having to know anything about the network (which is seen as an advantage available to incumbents) and

without having to trade with the incumbent (which is likely to be necessary if the market is fragmented).

The first problem could be solved by publishing detailed information about gas transportation networks, in which case networks would not need to adopt a tariff structure that distorts competition. The second problem can be solved as a matter of competition policy, for instance by encouraging incumbents to release gas to a number of users at upstream points on their network.

It would be a mistake to base any statement of principle on a temporary view of current priorities. In the near future, “it may be considered” more important to promote efficient investment in gas transport pipelines than to generate the kind of gas markets that emerge under entry-exit tariffs. This statement should therefore be marked as temporary (“Currently, the entry-exit tariff system.....”), or dropped altogether.

6.1.2. Scarcity Charges

Section 4.1 also states that entry-exit tariffs allow network operators to apply a scarcity charge, in case of physical congestion, and an additional charge to ensure full recovery of fixed costs. However, this is not a characteristic of entry-exit tariffs alone and should not be linked to any particular tariff structure. Moreover, there are better ways to indicate scarcity in other tariff systems, such as in the secondary trading of long-term capacity rights.

ERGEG also states that “the scarcity charge can be set based on a market-clearing mechanism such as an auction, or on marginal cost calculations.” This statement is incorrect. It is not possible to indicate scarcity through marginal cost calculations, since marginal costs only indicate an efficient price when supply can expand to meet demand. Scarcity, on the other hand, is defined by the condition in which demand exceeds supply, and the efficient price of capacity lies above the marginal cost of adding capacity.

6.2. Capacity Utilisation

Section 4.2 of the ERGEG Paper states that

“The capacity utilisation shall be determined in terms of contractually committed capacity based on valid transportation contracts as well as projections for future capacity requirements assessed by the NRA or one which has already been committed, for example, under a public and transparent procedure to evaluate market demand, e.g. open season procedure.”

It is not clear what this section is intended to communicate. Capacity utilisation can be measured relatively simply, but its purpose in a document on tariff setting principles is unclear:

- (a) Is this section intended to indicate the structure of tariffs, i.e. to suggest that tariffs should have a fixed capacity charge for booked capacity and a volumetric charge for volumes shipped over the network; or

(b) Is this section intended to discuss the conversion of total revenue requirements into tariffs, based on forecast or actual figures for booked capacity and transported volumes?

In either case, the section should be written more clearly. Question (b) seems the more likely interpretation, in which case the principle for tariff setting is as follows.

“The conversion of total allowed revenues into individual tariffs should take into account objective evidence on actual capacity bookings and transported volumes, updated by firm commitments made in public and transparent auctions and open seasons.”

6.3. Backhaul Flows

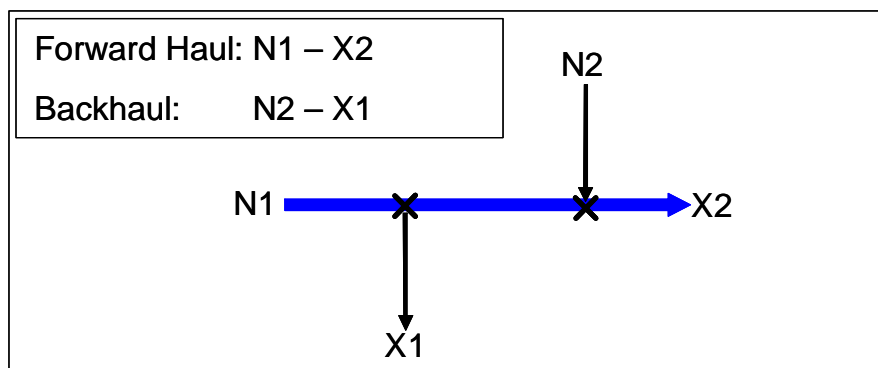
Section 4.3 of the ERGEG paper states that

“backhaul flows shall be defined by reference to the direction of the predominant physical flows in a network. Backhaul flows are subject to interruptions in case the flow in the main direction does not occur. The risk of interruption must be sufficiently reflected in the tariff, in this case.”

The use of an entry-exit system makes the identification of backhaul flows impossible (or else requires a detailed discussion of network characteristics, which the entry-exit system is intended to avoid). The inclusion of this statement, along with section 4.1 of the report, implies at best an unstated recognition that tariff systems other than entry-exit will be permitted (e.g. on interconnectors between entry-exit zones). At worst it indicates muddled thinking. Retention of this section means that section 4.1 of the ERGEG paper should recognise the possibility of using tariff systems other than entry-exit, or at least the possibility of applying entry-exit tariffs within zones, with interconnector capacities between the zones.

Note that in a gas pipeline, backhauls rarely occur in practice. Consider a schematic pipeline network where the main flow of gas (the forward haul) along a pipeline goes from entry point 1 (N1) to exit point 2 (X2), as Figure 6.1 illustrates. Suppose also that a shipper wishes to transport gas against the main flow of gas (a backhaul flow) from entry point 2 (N2) to exit point 1 (X1).

**Figure 6.1
Schematic Pipeline System**



Where there is a point-to-point charging system, shippers' capacity rights and transportation costs reflect physical gas flows. Rather than paying a charge for backhaul, a shipper entering gas at N2 to supply gas at X1 would instead swap gas with shippers entering gas at N1 for supply at X2. Gas would then flow forwards, from N1 to X1 and from N2 to X2. The process of arranging these gas swaps would contribute to the liquidity of the markets for gas (at N1 and N2) and for transmission capacity (on sections of the pipeline N1-X2).

Under an entry-exit system, shippers would pay entry charges for entering gas where they nominate entry flows, and exit charges for taking gas off the network at their customers' sites. A shipper would therefore be able to supply a customer at X1 by injecting gas at N2. However, in practice, the system operator would have to arrange a gas swap internally to the network, sending the gas from N2 to customers at X2, and redirecting some of the gas that enters at the N1 to customers at X1. Assigning the task of making this gas swap to the system operator reduces the need for and level of trade in gas markets.

6.4. Short-Term Capacity

ERGEG states that “[f]or short-term services... cost-reflective tariffs shall be applied. These tariffs may be higher than tariffs for long-term transportation services due to higher risk of short-term contracts, but must not distort short-term trading activities, e.g. at hubs.”

Again, the overriding objective of tariff-setting seems to be the promotion of gas trading, when it should be the efficient development, operation and use of the network.

6.5. Transportation on Interruptible Basis

Section 4.5 of the report states that “[t]he probability of interruption must be sufficiently reflected in the tariff. Shippers must be put in the position to assess the likelihood of interruption. For this purpose, TSOs shall publish actual historical flows for each relevant point for the past 3 years as well as a list of actual interruptions.”

The requirement to “reflect” the probability of interruption in the tariff needs careful interpretation to avoid either inefficiency or non-cost-reflective pricing.

Any user who is willing to be interrupted any time the pipeline or network is congested avoids completely the need for investment in capacity (as explained in Box 1). Thus, *willingness to be interrupted* avoids the same cost, i.e. the cost of building firm capacity, however many times the user is actually interrupted. A cost reflective price would not therefore assign any capacity charge to interruptible users, as long as they were truly interruptible.

If the network operator were to be required to vary tariffs for interruptible service *in proportion to* the probability (or observed number) of interruptions, these tariffs would have to depart explicitly from any cost basis. As long as interruptible users are willing to be interrupted whenever the network is congested, a tariff policy based on the probability of interruption would not charge users on the basis of the costs they impose on the system, but rather on their *willingness to pay*, assuming that users who are interrupted less often are willing to pay more for their use of the system. Tariffs based on willingness to pay conflict with the cost-reflective approach in many cases.

Box 1: The Costs of Interruptible Pipeline Usage

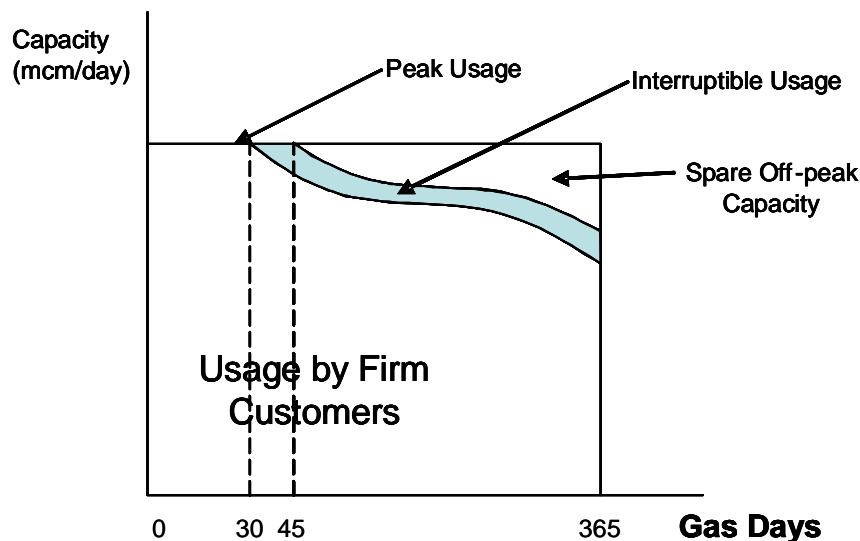
Figure 6.2 shows the pattern of usage over a year for a defined piece of pipeline capacity, with the days of the year arranged from left to right *in descending order of demand*. On the left, firm users are using the full capacity of the pipeline for 30 days (a purely illustrative figure), but on other days of the year they use less than the full capacity. Therefore, on those other days, spare capacity can be used by others, on condition that they interrupt their usage when the firm users need it.

Interruptible users (the shaded area) are interrupted, in this example, between 30 and 45 days a year, to make space available for firm customers. Different users may be interrupted for different numbers of days within a year, but none requires the pipeline company to build any capacity on its behalf.

Up to 30 days a year, the pipeline is fully utilised by customers willing to pay the cost of capacity in order to secure firm (i.e. guaranteed) access. In the 15 days between day 30 and day 45, some capacity is unused by firm customers and available for use by interruptible customers. There is no additional cost associated with making this capacity available (although there might be excess demand for it from interruptible customers, such that it would have a positive value if it could be sold in a secondary market for capacity). In practice, there is limited scope for trading exit capacity under the entry-exit system, as exit capacity is specific to an exit point at which the number of users may be very small. These users cannot therefore trade the part of their exit capacity which uses a congested route that serves many exit points.

Outside the 45 days of peak demand, there is always some spare capacity available at no extra cost (apart from the variable cost of moving gas), so capacity has no value or cost.

Figure 6.2
Interruptible / Firm Customer Usage Patterns



The principle of linking tariffs to the “probability” of interruption may refer to interruptible tariffs which *limit* the number of hours or days on which the user may be interrupted, if this limit lies below the number of hours or days of congestion. Suppose part of the network experiences congestion on 30 days per year, but that the network operator offers interruptible tariffs for a maximum of 15 days per year of interruption. No single interruptible user helps the network operator avoid the costs of building capacity completely, but two equally sized interruptible users in the same place would be able to share capacity built to serve the peak demand of one user. A simple rule might dictate that each user then pays half the capacity tariff. However, this rule applies to the maximum number of days of interruption, rather than the probability of actually being interrupted.

These observations suggest that some revision of the tariff-setting principle is required. Unfortunately the key phrases set out here are taken from the Gas Regulation 1775/2005/EC, so only “clarification” is possible, not a complete revision.

6.6. Imbalance Charges

In relation to flows on interconnectors between transmission systems, section 4.6 of the ERGEG paper states the following:

“TSOs shall, for each of the interconnection points of their system linking it to another TSO system, establish an Operational Balancing Accounts (OBAs) in close cooperation with the respective adjacent TSO. Close cooperation, especially concerning operational flow control, shall ensure that in the case of changes or interruptions of gas flows, or flows below the minimum capacity, or steering differences, the quantities of gas properly nominated by shippers and confirmed by the TSO, can be allocated to the shipper whenever possible without interruptions or reductions. This way, the responsibility of operational balancing of the system is with the TSOs. Shippers should benefit from lower or no imbalance charges in these cases.”

The last sentence needs amendment. Shippers will avoid imbalance charges on their nominations, if TSOs are responsible for arranging the redirection of flows to maintain network security, but shippers will still have to reimburse the TSOs for the costs of maintaining flows over the interconnectors. If it is necessary to include any comment on the effects of this approach it should read “Efficiency gains and the benefits of sharing risks will normally mean that the TSOs’ costs will be lower than the costs that shippers could achieve for the same task.” However, I am not aware of any evidence to support this claim and there may be conditions in which this wish is not fulfilled.

Section 4.6 also state that “NRAs shall pursue convergence of the balancing regimes in order to provide for sufficient liquidity on the balancing market.” This statement suggests that convergence will by itself promote liquidity. However, balancing regimes might converge on a system that destroys liquidity. Also, liquidity is not a suitable aim for any process; instead, NRAs should “pursue convergence of the balancing regimes in order to facilitate entry into the market and to promote efficiency in use of transmission networks”. Liquidity might follow if these aims are met.

6.7. Use of Auction Revenues and Overrun Fees

Section 4.7 states that:

“Revenues deriving from auctions, overrun fees and other revenues not part of the original Third Party Access (TPA) service shall be checked by the NRA at the end of a period that can be determined by the NRA and shall be redistributed, net of any extraordinary maintenance cost, directly to all concerned users, or with a decrease of the relevant transportation tariff.”

To turn this statement of fact into a principle, it would be necessary to add “...in a manner that least distorts the efficiency of decisions by shippers, including their participation in auctions and their use of networks.”

7. Incentives for New Investments

Section 5 of the ERGED Paper describes three approaches that NRAs take to incentivise investment in new infrastructure.

The first involves offering a higher rate of return (i.e. WACC) on new investments for a specified period of time. In fact, the award of a “higher” WACC for new investment (than for existing investments) is an admission that the WACC on existing investment is not sufficient to attract capital. The possibility of awarding two different rates therefore creates the potential for NRAs to discriminate between incumbent investors and new entrants, by awarding new entrants a WACC sufficient to attract capital whilst penalising the owners of existing assets. The award of a higher WACC should always be justified by a difference in long-term risk characteristics between the new infrastructure and existing networks, not by the difference between past and future investors.

The same criticism applies to the second approach which NRAs use to incentivise new investment, by allowing investors a shorter depreciation schedule on new investments (than on existing assets). Under this approach, there is still a need to justify such differences by reference to a difference in the risk characteristics of the projects, and not as a way of discriminating in favour of future investments and against existing investors.

The final approach that ERGED lists is to make long-term commitments to a certain tariff methodology, in order to:

“allow a TSO to secure the necessary financing of an infrastructure project by providing security to financial institutions that the tariff methodology will remain unchanged over a specified period of time.”

It is not clear why this arrangement should be available to discrete new pieces of infrastructure, as opposed to reinforcements of the existing network or to network capacity in general. If there is a financing advantage implicit in long-term commitments, the EC and NRAs should not be trying to prevent the use of long-term contracts for network capacity. If there are concerns about long-term contracts “foreclosing” markets, NRAs should address those concerns by making long-term capacity holdings tradeable and imposing an obligation on the holders of the capacity to market it if they are not using it (Use-it-or-lose-it being one version of this rule).

8. Criteria to Assess Effective Pipe-to-Pipe Competition

Section 6 of the ERGEG Paper appears to be an afterthought, included perhaps in an attempt to reconcile cost-based tariffs with non-cost-based tariffs (such as tariff benchmarking). In fact, it is not possible to reconcile market-based tariffs with cost-based tariffs, except in a very abstract sense, that both should avoid monopoly profits. The difference lies in the treatment of rents, i.e. profits on scarce resources, which may not be monopoly profits but rather, for example, the benefit of owning cheap (i.e. old and depreciated) assets, or of operating the network more efficiently than competitors. ERGEG's text assumes away such rents and therefore avoids discussing the problem in a meaningful way.

Section 6 begins with the statement that:

“Tariffs have to be cost-based and shall not allow for inappropriate revenues (so-called monopoly profits). Having two infrastructures in place does not mean per se that they are in competition (for instance, operators may agree between themselves, shippers may not have a real and full choice). Benchmarking of tariffs might also be an acceptable approach of tariff setting if and where effective pipeline-to-pipeline competition exists. In this respect, Regulation 1775/2005 recognises that, if effective competition between TSOs exists, tariffs will always reflect incurred costs, making a cost-based tariff setting regime unnecessary.”

There are two problems with this statement. Firstly, the statement that “[t]ariffs have to be cost-based” would preclude market-based pricing.

Secondly, this description of the outcome of competition (and rationale for tariff-benchmarking) is not correct. Even if there is effective competition between existing pipelines, their tariffs need not reflect “incurred costs”. Moreover, this section also describes Gas Regulation 1775/2005/EC incorrectly. There are only three references to “incurred” costs in 1775/2005/EC relating to tariffs for access to gas networks, and none indicate that market-based tariffs will reflect incurred costs:

- § From 1775/2005/EC paragraph (6), “[i]t is necessary to specify the criteria according to which tariffs for access to the network are determined, in order to ensure that they fully comply with the principle of non-discrimination and the needs of a well-functioning internal market and take fully into account the need for system integrity and reflect actual costs incurred, insofar as such costs correspond to those of an efficient and structurally comparable network operator and are transparent, whilst including appropriate return on investments, and where appropriate taking account of the benchmarking of tariffs by the regulatory authorities.”
- § From 1775/2005/EC paragraph (7), “[i]n calculating tariffs for access to networks it is important to take account of actual costs incurred, insofar as such costs correspond to those of an efficient and structurally comparable network operator and are transparent, as well as of the need to provide appropriate return on investments and incentives to construct new infrastructure. In this respect, and in particular if effective pipeline-to-pipeline competition exists, the benchmarking of tariffs by the regulatory authorities will be a relevant consideration.”

§ From 1775/2005/EC Article 3.1, “[t]ariffs, or the methodologies used to calculate them, applied by transmission system operators and approved by the regulatory authorities... shall be transparent, take into account the need for system integrity and its improvement and reflect actual costs incurred, insofar as such costs correspond to those of an efficient and structurally comparable network operator and are transparent, whilst including appropriate return on investments, and where appropriate taking account of the benchmarking of tariffs by the regulatory authorities.”

Indeed, Paragraph 17 of the “Commission Staff Working Document on tariffs for access to the natural gas transmission networks regulated under Article 3 of Regulation 1775/2005” says precisely the opposite:

“In the event that benchmarking of tariffs is applied, the tariffs emerging may deviate from those that would accrue from a pure cost-based approach. Bearing in mind that cost-based tariffs might be the preferred option to promote the underlying objectives of the Regulation and Directive 2003/55/EC (to establish a well functioning internal market for gas) such an approach seems to be justified, if these objectives are thought to be better achieved by tariffs emerging from benchmarking. Therefore, the outcome of a benchmarking of tariffs by regulators may be taken into account where there is effective pipeline-to-pipeline competition and where tariffs based on actual costs incurred would distort this competition. The benchmarking therefore serves as a complementary method to the cost based approach.”

ERGEG’s description of the outcome of competition would make market-based pricing no different from cost-based pricing, which would render it impossible to apply. Prices in a competitive market reflect the marginal costs of the marginal producer, i.e. the costs of the most expensive producer in the market which by definition lie above those of the other producers in the market. In a market with economies of scale and limits on capacity, prices may be constrained by the average costs of a new entrant, which can lie above or below the costs of incumbents. In these cases, the tariffs of each pipeline will not reflect the costs “incurred” by that pipeline (unlike in cost-of-service regulation, i.e. cost-based tariffs).

8.1. Criteria for Applying the Tools of Antitrust Investigations

In applying the assessment tools that European competition authorities use in merger or cartel investigations, ERGEG states that NRAs should consider seven criteria:

1. “If there exists competitive behaviour among (possibly) competing system operators;
2. If there exists real transportation alternatives for the network users between (possibly) competing system operators, assuring a real choice exists;
3. If there exists practical experiences of network users concerning transportation alternatives and competitive behaviour of system operators (assessment to be conducted);
4. If there exist sufficient interdependency between (possibly) competing system operators;
5. If there exists an appropriately low level of concentration of system operators in the relevant market;

6. If there exists sufficient available capacity for network users in order to have a real choice between (possibly) competing system operators. This should be done together with the analysis of an upstream market; and
7. If the (possibly) competing system operators did not enter into formal or informal agreements concerning common (non competitive) network operation.”

The first of these criteria rather begs the question: if it were possible to observe (or even to define) “competitive behaviour”, it would not be necessary to apply the merger appraisal procedure involving the definition of a relevant market. As the third criterion suggests, some kind of assessment of the situation is needed to assess whether behaviour is competitive or not.

Regarding the fourth criterion, I am not sure how ERREG defines “interdependency”, but if networks are dependent upon each other (e.g. for balancing and flexibility services), there is a greater chance that they will co-operate, rather than compete. If “interdependency” means that the networks are linked and can offer users a choice of competing route from A to B, that point is already covered by the previous criteria. This criterion also conflicts with criterion 7, which regards common operating agreements as anti-competitive.

The fifth criterion is unduly restrictive, as it does not recognise the existence of potential competition from new entrants (a standard consideration in competition policy).

The sixth criterion is poorly defined. Competition is possible, even if existing pipelines are fully used, if other investors can threaten to build a competing pipeline. On the other hand, if there is spare capacity, competition would drive the market price for capacity down to (nearly) zero, as shown by secondary capacity markets in the US. Hence, application of this principle would mean that full pipelines would be declared uncompetitive by definition and pipelines with spare capacity would be declared uncompetitive if their tariffs were above zero.

The comments above suggest that explaining each bullet point more precisely would identify a number of conflicts between them.

8.2. Assessing Competition Under Tariff Benchmarking

The end of section 6 states that:

“In the event that a benchmarking of tariffs is applied, the tariffs emerging shall not significantly deviate from those that would accrue from a pure cost-based approach. The benchmarking therefore serves as a plausibility check for the cost based approach.”

This statement implies that tariff benchmarking is not an alternative to detailed consideration of cost-based tariffs, but merely a reason for permitting small deviations from cost-based tariffs. However, there is no indication that the German network regulator is planning to review costs as well as tariffs in any case of tariff benchmarking.

9. Responding to the Document

Below, I set out my responses to the questions for stakeholders issued in section 7 of the ERREG paper.

§ Do you consider the described cost and tariff principles appropriate to achieve convergence of tariff structures and charging principles where tariffs for access to transmission networks may contribute to restricting market liquidity or distort trade across borders of different transmission systems?

No. Many of the statements given in the document are not statements of principle, but rather statements of intent to apply a particular method. Some of these methods are only applicable in particular conditions. Some regimes practise different methods and some regimes may in future move away from the methods listed in the ERREG paper, as conditions change.

Also, market liquidity and efficient cross-border trade in gas may be desirable outcomes or goals, but they are subordinate to the general objectives of promoting consumers' interests or the efficient development and operation of the network. (Promoting competitive gas markets is another legitimate aim, but liquidity is a by-product of a competitive market. It is not a pre-condition of competition that regulators can manufacture.)

For an alternative set of regulatory principles, see section 2 above and other suggestions scattered through this report.

§ Are there different or additional cost and tariff principles currently in place? If yes, please outline which.

Yes. Several regulators are constrained by legal obligations that are more akin to those listed in my report, such as (1) a duty to promote consumers' interests; (2) a duty to promote efficiency in the development and operation of networks; or (3) a duty of offer investors in networks a reasonable rate of return.²⁹ Administrative decisions in general (or regulatory decisions in particular) are often constrained by the need to provide reasons or to show good cause, so that there is an obligation to produce reasoned decisions based on available evidence. Legislators have imposed these obligations on regulatory authorities with good reason – to prevent arbitrary, politically motivated or subjective decisions from undermining the stability of the regulatory framework and harming long-term incentives for investment. Any statement of tariff principles that ignores these principles will present a distorted picture of possible regulatory methods.

²⁹ In Britain, the energy regulator is obliged by law to let regulated firms “finance their licensed activities”, i.e. their regulated businesses. (See Utilities Act 2000, section 9 amending section 4AA of the Gas Act 1986 and section 13 amending section 3A of the Electricity Act 1989.) This obligation might be interpreted as an obligation to put companies in a position where they can attract capital, or as an obligation to provide a reasonable rate of return, but in practice the regulator only checks that future net revenues do not infringe certain minimum financial standards. The precise meaning of this obligation has not been tested and remains uncertain. It would therefore be better to adopt a less ambiguous phrase.

§ Are the described incentives for new infrastructure appropriate? Are there additional possible concepts?

The model of long-term contracts is a well proven method of encouraging investment in new infrastructure projects. It matches the underlying structure of costs and risks associated with long-lived investments and provides efficient cost signals to users. If the contract covers the actual point-to-point capacity created by real pipeline investments, it provides more accurate and more efficient cost signals than any system of annual entry-exit capacity booking can ever achieve. Thus, not only is it well suited to new infrastructure, but it also provides a good model for efficient use and allocation of existing pipeline capacity.

If pipeline capacity is allocated to a number of users, long-term contracts for capacity will not entrench monopoly providers or “foreclose” access to upstream supplies or to retail markets. If the “point-to-point” contract allows users to deliver gas to intermediate points along the way, long-term contracts will not impose inflexible patterns of network usage or supply. If the capacity in these contracts is tradeable, ownership of long-term rights does not prevent entry by new players, since they can buy capacity in secondary markets; indeed, the need to trade may contribute to highly liquid markets in gas and network capacity.

A model of long-term, tradeable capacity rights allocated to multiple, credit-worthy capacity holders is therefore a viable and important alternative to a system of short-term entry-exit tariffs.

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