

## Transcost review: Opinion

### 1. Terms of reference and approach adopted

I have been asked to provide advice to the Authority on the two policy options set out in the May 2005 consultation document *Gas Transmission – New NTS entry points, reserve prices in auctions and unit cost allowances (UCAs)*; and to assess whether the new and revised UCAs presented in that document are sufficiently robust for the Authority to issue a Section 23 notice in order to include these UCA figures in Transco's NTS GT license.

More specifically, I have been asked to prepare a report for the Authority which includes, *inter alia*, an initial qualitative and quantitative assessment of:

- the Transcost model,
- the Ofgem assumptions used by Transco to model the UCAs, and
- the two options put forward in Ofgem's May 2005 UCA consultation paper, which are to (i) re-set all UCAGs, new and existing, on a revised basis, and (ii) set UCAGs for new entry points by reference to current UCAGs at existing entry points.

I have also been asked to indicate a recommended way forward.

Evaluation of a complex model such as Transcost necessarily introduces a number of technical issues of engineering and economics. I have been asked to concentrate on the economic aspects of the modelling and, in doing so, have also sought to focus on what I believe to be the key economic issues. The more technical discussions of relevant material are contained in section 4 below.

It is very easy to get absorbed by, and lost in, the detail of network modelling, however. That detail, whilst being relevant and potentially informative for the Authority's decision, is only one of a number of sets of factors to be taken into account in reaching the *policy* decision. I have, therefore, sought to 'frame' the technical material by first examining the purposes and contexts of UCAG/UCA determinations, and by discussing precedents (which are explicitly identified at paragraph 5.25 of the consultation document).

Since there is some heavy going in this report – at least for those who can not look back to a youth spent messing around with optimisation models – it may also be helpful for the Authority to see, at the outset, the principal conclusion that I reached at the end of my deliberations. It is that, while neither of the options identified in the consultation document is free of potential problems and risks, those problems and risks could be expected to be much more severe if Option 1 (as in paragraph 10 of the draft impact assessment at Appendix 3, and summarised above) were implemented.

There is also what I believe to be a decisive policy defect in Option 1, which is based upon revised UCAGs/UCAs obtained from re-runs of the Transcost model. Those very

same re-runs of the model will also produce new estimates of exit charges. Given that the revised UCAG/UCA figures presented in the consultation document imply substantial changes to existing UCAGs/UCAs, it is to be expected that the revised, but undisclosed, estimates of exit charges will also imply significant changes on that other side of the charging arrangements. Since transportation charges are sums of entry and exit charges, it would be inappropriate to use Transcost to make large adjustments to one (entry) without taking account of the implications for the other (exit). The expected result of such a course of action would likely be comprehensive distortion of the charging structure.

For these reasons, the preferred way forward is, in my opinion, as follows:

- Pending the outcome of the price control review, determine that part of the UCAGs/UCAs at new entry points which derives from *network reinforcement* by interpolation from UCAGs/UCAs at existing entry points, possibly guided by knowledge of the underlying structure of the network modelling that led to those earlier determination.
- Determine the remaining part of UCAGs/UCAs, associated with any site-specific investments by Transco (e.g. a pipeline connecting a new storage site to the NTS) by reference to the actual investment costs expected to be incurred.
- Leave existing UCAGs/UCAs unchanged.
- Review all UCAGs/UCAs, their roles and purposes and the methods by which they are determined, in the wider context of the price control review, which could also, simultaneously, take account of the implications for exit arrangements. This exercise should be given some priority.
- Signal these intentions (to review UCAGs/UCAs on a comprehensive basis) to network users when the upcoming decision is made, so as to assist potential purchasers of network capacity rights in forming their own expectations (about necessarily uncertain, future developments) ahead of tendering in long-term auctions.

## **2. Background and context**

### **2.1 LRICs (Long-Run Incremental Costs)**

Transcost is a piece of software that, in conventional terminology, provides ‘estimates’ of long-run incremental costs (LRICs). It would, however, be more accurate to say that Transcost generates a set of numbers that it defines as LRICs.

The underlying point is that LRIC is not an ‘objective’ concept: there is no single ‘right’ number, and there is no single ‘right way’ of estimating LRICs. There is, therefore, significant discretion in choosing how to approach the relevant costing exercises. For example, comparison with telecoms regulation shows that BT

and Ofcom adopt a quite different approach from that used in the energy sector: the label (LRIC) on the tin is the same, but the contents are different.

Another way of putting the same point is to say that LRICs, as traditionally interpreted, are *economic* costs. They are therefore forward looking, and hence *subjective*. Two analysts looking at the same data can arrive at quite different estimates of LRICs, as a result of taking different views, or relying on different forecasts, of the future (and, typically, the longer the time horizon the greater tends to be the scope for ‘reasonable’ differences of view).

## 2.2 *Network issues: deep vs shallow cost attribution*

In networks such as gas and electricity transmission, the subjectivity problem is compounded by the existence of assets whose use is shared by a number of parties. This raises questions of cost attribution among users, *including among users over time*. An incremental load may, for example, trigger particular reinforcement projects, but the increased capacity can provide benefits to a larger group of users, including users in later time periods. For example, if future, similar (in terms of their geographic pattern) flows turn out to be lower than forecast, the extra capacity may be available in later periods to accommodate new incremental demand without any further requirement for reinforcement at that later stage. In this and other similar circumstances, approaches that attribute all costs to the flows that trigger the investment project (the “deep” connections approach) can lead to charges that vary considerably from one flow to the next (similar) flow, depending upon the sequence or ‘pecking order’ in which the flows are declared or evaluated (see further below).

Partly because this offends the principle of non-discrimination, and partly because the approach tends to be based upon an implementation of LRIC charging that ignores both uncertainty in projected flows and the complexities of network cost attribution issues (i.e. is based on overly-simplified modelling), Ofgem has historically favoured “shallow” approaches to network charging, which attribute incremental investment costs (incurred ‘within’ the network) to a wider spectrum of similar flows.

Although these may seem like abstract matters, I think that they are highly relevant to the Authority’s decision. A glance at Table 5.2 in the May 2005 consultation document will confirm that there have been some quite dramatic revisions to estimated UCAGs/UCAs, over quite a short period of time. I will discuss these changes in more detail later, but let me here simply say that the magnitude of the changes appears partly to be an effect of an overly-deep cost attribution procedure. That is, too much cost is attributed to today’s incremental changes in demand for gas transportation capacity, because the future benefits of capacity installed today – e.g. in potentially meeting *unanticipated* demand increments tomorrow – are undervalued. Since this is a different dimension of deepness to the one usually discussed in regulatory documents, let me refer to it as *temporal deepness*.<sup>1</sup>

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<sup>1</sup> The issues here are closely related to the ownership of network assets. If incremental property rights in system reinforcement could feasibly be defined, and if users could acquire those rights, then the difficulties surrounding ‘deep’ charging would subside in significance. The user would then have a mechanism for extracting any future value arising from the use of the assets by others. In practice, of course, Transco retains ownership of the physical assets, and what the user purchases are ‘shallower’

### 2.3 *Criteria for assessing alternative LRIC approaches*

From the Authority's perspective, preferences among the alternative approaches to LRIC estimation will be governed by statutory duties and general principles of good regulation. From Transco's perspective, the relevant assessment criteria will derive from licence obligations and duties to shareholders. The two viewpoints are clearly not identical, although I think that the differences to which they may give rise are not the major source of problems in the current context.

Interest in incremental costs normally arises out of an interest (shared by Transco and Ofgem) in efficient resource allocation: these costs can be used provide signals and incentives to the demand side of a market that will guide network users toward making efficient trade-offs in their own decisions. LRICs (as compared with shorter-term incremental costs) tend to be used where it is judged important to provide signals/incentives for long-run, *irreversible* decisions by buyers. Decisions to build new LNG import terminals, or new offshore-pipelines, or new gas storage facilities are cases in point.

Efficiency considerations alone are, however, insufficient for judging different approaches to LRICs, and hence for assessing Transcost in particular. Other relevant effects for the Authority to consider will include:

- effects on consumers,
- effects on competition,
- possible discriminatory effects.

Similarly, it is also relevant to bear in mind principles of better regulation:

- accountability
- transparency
- proportionality
- consistency
- targeting.

Different approaches will, in general, tend to score differently on some or all of the above criteria.

### 2.4 *The regime change in 2002*

Up until 2002, Ofgem's (previously Ofgas's) approach to network charging could be said to rely upon a traditional, utility-regulation framework. This distinguishes between determinations of:

- the *average* level of charges, and
- the *structure* of charges.

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entry rights. Thus, a capacity right to enter gas at E1 might be underpinned by assets that also serve gas entering at E2, but the purchase of the entry right at E1 gives no rights at E2.

UK policy has been innovative in relation to the former (RPI-X, and incentive regulation more generally), but, prior to 2002, much more conservative on the latter.

Privatisation legislation, as a matter of design, initially left regulated companies with considerable discretion in the choice of charging structures ('light handed' regulation); and regulators, particularly those with experience of the failure of marginal cost pricing in the nationalised utilities, were generally not very keen to get involved in trying to exert tight control of tariff structures. Particularly in energy regulation, the dependence of LRIC estimates on subjective, long-run forecasts and the dismal performance of long-run forecasting in the sector in the past were considered to be well-established lessons from experience.

Speaking broadly, this was the world for which Transcost (and models like it) was (were) developed. The models provided acceptable (to regulators) methodologies for resolving pricing structure issues in contexts where broad patterns of flows were relatively stable (north to south in electricity, north and east to south and west in gas). Regulatory policy stressed the desirability of 'cost reflectivity' in charging structures but, for reasons given earlier, it was recognised – as it is also recognised in competition law – that, whilst this principle could be used to *disallow* certain pricing methodologies and outcomes, it still left quite a wide spectrum of legitimate alternatives for tariff structures (again, the position is the same in competition law). That is, 'cost reflectivity' *proscribes* certain types of price-cost relationship, but does not *prescribe* (in an authoritative sense) a particular relationship. Moreover, following the traditional approach to utility regulation developed in the US, charging structures were developed from costing exercises in ways that were not greatly influenced by the demand-side of markets.

In the late 1990s a set of new problems began to emerge in gas – though not in electricity – which raised the profile of price/*investment-structure* issues in regulatory policy. Constraints at the St Fergus entry terminal created a number of short term capacity-allocation and pricing issues, whilst changes in the production profile of UKCS gas fields began to raise major *investment* issues. For example, Transco faced the prospect of much higher geographic substitutability in demand for entry capacity in the future: major new gas flows could potentially evolve in any one of a number of different patterns.

With this prospect in view, the relative neglect of the demand side of the market was unsustainable. Network investment in particular needed to become much more sensitive to demand-side influences. Otherwise there would have been a significant risk of a major disjunction in the investment decisions of Transco on the one hand and of gas producers on the other, leading to inefficiencies in investment expenditures (e.g. stranded assets as a result of Transco reinforcing inappropriate parts of the network on the basis of its own guesses as to the development of the geographic pattern of demand for gas transportation). The LTSEC auctions of entry capacity were developed primarily to address this investment problem.

In the first proposals for reform (which were part of the wider RGTA – Reform of Gas Trading Arrangements – programme) there were no such things as UCAGs/UCAs, and something akin to the earlier storage auction process was envisaged as the way forward

for the allocation of entry capacity. In the storage auctions, reserve prices were adopted chiefly to provide some protection against possible monopsony power and to ensure that prices did not fall below *avoidable costs* (LRICs were hardly mentioned or considered in the storage context – the new arrangements were seen as a movement away from the traditional charging approach).

I am unsure as to the exact origin of UCAGs/UCAs, but some of the difficulties in the current decision before the Authority are associated with the fact that these concepts have, explicitly or implicitly, come to be used for a number of different purposes:

- They serve as reserve prices in entry auctions for baseline capacity. In this context, subject to caveats already made about estimation problems it is perfectly reasonable to base reserve prices on estimated LRICs *for those entry points where there is little or no competition for capacity* (e.g. Barrow, LNG storage sites, etc.). In effect, at these terminals the traditional regime is maintained. The case for linking reserve prices to LRICs at ‘competitive’ terminals is much weaker, however, since it can lead to significant market distortions.<sup>2</sup> Specifically, where there is unutilised, available capacity, reserve prices based on LRICs will tend to prevent or inhibit efficient market clearing.
- They are used in determining the release of incremental obligated capacity. The underlying driver here is the investment cost (if any) of providing extra capacity, and the UCAGs and UCAs are annuitised values of a *deemed* cost. I stress *deemed* cost because UCAGs/UCAs are not LRICs, and neither are they used to estimate LRICs. In general, LRICs will be functions of the size of the capacity increment, and they can vary substantially with the size of the increment (as the analysis of transportation costs for the Milford Haven terminal illustrates). The UCAG/UCA is a single number, specified *ex ante* and derived *from* LRIC estimates (which are, or should be, shown in the Transco’s price schedule for incremental capacity release). I note in passing that the gap between the UCAG/UCA and the estimated LRIC could be eliminated if the UCAG/UCA were determined *ex post*, after the tendering process has been completed. *Prima facie*, this would appear to be more logical, and it is a matter that should at least be considered during the price control review.
- The UCAG/UCA plays a role in determining Transco incentive payments for the release of incremental obligated capacity. In effect, it is used as a *parameter* in the incentive arrangements for the company.

There are tensions among these roles. To give just one illustration, on normal regulatory principles there is a strong case for *not* changing a parameter in an incentive scheme (role 3) other than during a price review or at some alternative, *pre-specified* time. On the other hand, if UCAGs are intended to reflect actual investment costs, since these costs can change at any time (e.g. because steel prices rise) the preferred policy might be to review them more frequently.

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<sup>2</sup> By ‘competitive’ is here meant a situation in which there are several, potential end-users of entry capacity.

As indicated, in relation to the role of UCAGs/UCAs in setting reserve prices, part of the current problem lies in a failure to distinguish sufficiently between different types of entry point. Depending upon their sizes and locations on the network, different types of entry points may merit different arrangements (one size may not fit all). That is, *because there are systematic differences in the economics* (e.g. the notion of an auction is a fiction at a single-buyer entry point, and it is best not to pretend otherwise), it is arguably appropriate to have different approaches to reserve-price determination or to the (implicit) cost attribution assumptions (the deep/shallow issue again) at different entry points. Indeed, in some contexts, failure to reflect such underlying differences in economic circumstances could potentially be held to constitute undue discrimination, and I would suggest that this is another matter that should be addressed with some priority during the next price review.

### 3. Precedents

Ofgem has already faced the issue of determining UCAGs/UCAs for new entry terminals at Milford Haven, Barton Stacey and Garton. In respect of Milford Haven and Barton Stacey, the key document is *New entry terminals to Transco's National Transmission System: Ofgem's views on Transco's proposals and explanatory notes to accompany the section 23 notice of proposed modifications to Transco's gas transporter licence*, dated June 2003. A similar document in relation to Garton was published on 24 November 2003. The Authority's approval of the Milford Haven UCAG was given on 7 February 2005.

The importance of these documents, and of the Garton document in particular, is that they were published at times when there was much clearer sight of the likely evolution of flows on Transco's network than had been the case during the earlier price review. For example, I believe that by end November 2003 the Milford Haven, Ormen Lange (Easington), Isle of Grain and BBL (Bacton) projects, which collectively could be expected to have major implications for the future development of flows on the NTS, were all in the public domain.

The Garton document explicitly considered the two approaches that have presented in Ofgem's May 2005 consultation document on new entry terminals. In the 2002-7 price control, Transco had been allowed funding to provide entry capacity at Aldbrough in anticipation of the development of storage facilities in the area. The price control also set a UCA for Aldbrough. Garton is in the vicinity of Aldbrough, and the application for an entry terminal at Garton effectively substituted for the anticipated demand for Aldbrough entry.

In the November 2003 document, Ofgem said the following:

3.13. *In this respect, given Garton's proximity to the existing entry point at Aldbrough, Ofgem considers that one approach is to set a UCA that is based upon the system reinforcement costs which had already been identified and provided for at Aldbrough, under the 2002-2007 price control review, adjusted to account for the 8 km pipeline extension costs.*

3.14. *An alternative approach would be to undertake a new assessment of the reinforcement costs associated with providing capacity at Garton, thereby reopening the previous assessment undertaken at Aldbrough as part of the 2002-2007 price control process.*

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3.16. *Having assessed these approaches, Ofgem considers that it is preferable to avoid re-opening the assessments undertaken on the costs of reinforcement in the Aldbrough area as part of the 2002-2007 price control process.*

3.17. *Instead, we consider that the proposed UCA for Garton should be based upon the current Aldbrough UCA with an adjustment to reflect the costs of the proposed pipeline.*

The significance of these remarks is that, notwithstanding that a great deal was known about the likely future scale and locations of entry flows, Ofgem did not consider the changes in projected flows, or their likely implications for the estimation of LRICs, to be sufficient to warrant a re-opening of the previous assessment, *which had been based on rather different projections of flows.*

The wording of the document suggests a judgment based on ‘proportionality’ considerations: it could reasonably have been expected that, if the assessments had been re-opened, the result would have been a somewhat different UCA, but that the likely effects of the adjustment did not warrant the costs. It is possible, of course, that the judgment made in November 2003 was a poor judgment, but it is nevertheless a material factor in the current context.

Consistency, as well as proportionality, is an important principle of policy: market decisions in general, and investment decisions in particular, will tend to be better made when companies can form clear views of how the Authority, in discharging its statutory duties, is likely to act in a given set of circumstances. The significance of policy consistency is well put in paragraph 9 of the RIA appended to the May 2005 consultation document, and I would add only one further point. Since the current factual position in relation to network developments is not so very different from that in November 2003, the principle of consistency weighs in the balance in favour of the approach adopted in that earlier document.

The relevant weight to be given to the principle of consistency is partly a function of the likely implications of the relevant adjustments in policy: if the effects of adjustments in policy are small, it can be argued that consistency should not be considered to be of major importance. The evidence indicates, however, that the impacts could be substantial. Table 5.2 in the May 2005 consultation documents shows, for example, a revised UCAG for Garton – based on a re-assessment of cost estimates using updated flow projections as the base-case in Transcost – that is 195% higher than the existing UCAG (as proposed in late November 2003).<sup>3</sup>

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<sup>3</sup> There is some confusion in the column headings in the table, which refer to UCAs when it is clear from the table title and from the surrounding text that the numbers are UCAGs.

Nor is Garton an isolated case. Table 5.2 shows changes in UCAGs ranging from +319% at Easington to -100% at a number of entry points, one of which is St Fergus. Thus, St Fergus would go from being the beach entry terminal with much the highest UCAG to an entry point with the (joint) lowest UCAG (zero). In contrast, Dynevor Arms would move in the reverse direction, from (joint) lowest UCAG to much the highest UCAG.

These are dramatic changes by any standards, and, to my mind, the movements are surprisingly large (remembering that one of the arguments for preferring LRICs to shorter-term cost assessments when determining network prices is based upon the claim that it provides more stable signals to the market). I will consider possible reasons for the results shown in Table 5.2 in later discussion, but here simply re-iterate the significance of the principle of consistency. Whilst consistency is not, by and of itself, necessarily a decisive consideration – there are other principles and factors to consider – my view is that, given the magnitudes of the impacts that can be expected to be caused by a policy of ‘re-assessment’ (Option 1), the principle does suggest that there is a significant burden of proof to be discharged when evaluating this particular option. That is, the arguments for Option 1 would need to be clear and compelling to warrant so rapid and so significant a change in policy position.

It is also relevant that the next price control review has already started. The choice is not whether or not to re-assess UCAGs/UCAs. It is whether to reassess them now and implement changes immediately, or to reassess them over the next year or so and implement changes in 2007. The latter not only has advantages in terms of consistency, but, by allowing for consideration of the issues over a longer time period and within a wider policy context, it offers the prospect of better regulatory outcomes.

## **4. Transcost**

### **4.1 Overview**

Strictly speaking, the ‘long-run’ in economics denotes a situation in which all factors of production are variable. The purest form of LRIC pricing therefore takes a set of demands, hypothetically constructs an ideal network devised to meet those demands, and then considers the cost implications of small perturbations in demand by (a) hypothetically constructing a second, fully re-configured network, optimised to meet the perturbed demands, and (b) comparing the costs of the two, hypothetical, optimised networks. This sounds, and is, highly abstract, but the methodology has received some attention in telecoms regulation, and the optimised network approach has very recently been put forward by Ofcom as a possible approach to re-valuing BT’s local copper access network.

One attraction of a ‘pure’ (hypothetical, optimised network) LRIC approach in telecoms arises from Ofcom’s continued reliance on CCA accounting in its regulation of BT (an accounting approach that was abandoned in gas in the 1990s): the capital value of the hypothetical, optimised network translates into the replacement cost of the actual network.

Transcost is not such a ‘pure’ LRIC approach. As I understand matters, it starts with a base forecast of demands for gas transportation, and with a characterisation of the actual network. The network is developed over time in order to be able to meet the given, base forecast demands (although not ‘at least cost’, in the sense that the optimisation procedures are only partial – see below), but in each period the optimisation is contingent on the existence of the network inherited from the previous period. That is, whilst incremental capital is assumed to be variable in the economic sense, and incremental capital costs are therefore avoidable, inherited capital is treated as fixed or sunk, so the network cannot be fully re-configured in every period: if pipes are added in one location in a particular period, they cannot be taken away again in the next. Put simply, *capital is considered variable ex ante and fixed ex post* (sometimes referred to as the putty-clay assumption, in contrast to the putty-putty assumption of ‘pure’ theory).

The assumption here (capital is variable *ex ante*, but fixed *ex post*) is realistic – as the Scottish Play confirms: *what’s done cannot be undone* – and in that sense it is an advance on the ‘pure’ LRIC approach. However, the properties of any model are a function of *all* of its assumptions, not just one, and, perhaps counter-intuitively, increasing the realism of one assumption can degrade the performance of the model overall.

This can be illustrated by considering the costs of backhaul flows. Suppose the predominant flow is from A to B. A demand for gas transport from B to A will reduce that flow and reduce the capacity required to accommodate it. In the putty-putty world, the demand for B-to-A transportation will be credited accordingly. Moreover, the unit credit will be of the same value as the unit charge from A to B. Thus, when two otherwise equivalent demands for transport of gas in opposite directions eventuate simultaneously, the sum of the charges is zero, which is exactly as it should be. In that circumstance no gas need flow, and there is no requirement for extra capacity. The efficient solution is a gas swap between the parties at points A and B, however that swap is arranged in practice (whether automatically or by trading). Thus, even though the assumptions about the variability of capital (or the ‘plasticity’ of the network) may lie at some distance from reality, the analysis provides a sensible answer to the question: what is the LRIC of two equal and opposite flows, considered together? Answer: zero.

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Now consider the position in which capital/capacity is (*ex post*) fixed. Suppose the demand for the A-to-B transportation is addressed first and the incremental capacity cost is £K. When the B-to-A demand turns up, later, the extra capacity is already in place and cannot be removed: *what’s done cannot be undone*. The LRIC attaching to the backhaul flow is therefore zero, and the sum of the charges is £K. Following the arrival of the second demand, there will also be excess capacity in the direction of the predominant flow.

Suppose next that the demand for transport from B to A turns up first. The estimated backhaul LRIC will again be zero, but it will create excess capacity in the forward direction. Thus, when the demand for A to B transport turns up later, there will be no requirement for extra capacity. The forward-flow (A to B) LRIC will therefore be estimated at zero. Neither customer pays anything, and the sum of the charges in this case is zero. *The structure of charges is therefore highly sensitive to the pecking order.*

There are also other possibilities. If A-to-B flows are growing, a backhaul demand that is less than the incremental volume growth should be credited with a capacity saving of £K. In this case, the forward flow charge is £K and backhaul charge is - £K, just as in the ‘pure’ LRIC model. To repeat, the key point is simply that, in the putty-clay world, the sequencing of demands matters: it affects both the tariff structure and the revenue collected.

These results are not necessarily wrong. If the network owner is required to meet demands for transportation services, and if investment decisions are irreversible, the LRICs do, rightly, depend upon sequencing. Where things can, and do, go wrong for models such as Transcost is when:

- notwithstanding that demands for transportation arrive simultaneously (in practice in the same cycle of the planning process), the modelling approaches each LRIC estimation separately, based upon one-by-one perturbations of the base case, and/or
- the other assumptions of the model do not adequately reflect the economic implications of irreversibility for investment appraisal (and LRIC estimation) in conditions of uncertainty about future demand.

The latter point here is critical. Irreversibility in investment decisions, coupled with uncertainties about the development of demand for transportation (ever present, although varying in degree in different historical periods) makes *option valuation* central to investment appraisal.

Again this can be illustrated by a slight variation of one of the simple examples given above. Suppose the predominant flow is A to B, and capacity has been provided to carry a maximum flow of Q. Consider a demand for backhaul transportation from B to A, and ask: what is the incremental cost of this flow? If forecasts are exactly right and capacity is adequate to meet A-to-B demand throughout the period, then the answer is the same as before: the LRIC is zero and the backhaul demand simply creates excess capacity.

Base-case forecasts will, however, typically be wrong to a greater or lesser extent. Suppose that A-to-B demand turns out to be higher than expected, and higher than could be accommodated with prevailing capacity in the absence of the backhaul demand. Given the backhaul demand, the gas transporter can now accommodate some of the (unexpected/unforecast) incremental demand at zero cost. However, this spare capacity was ‘caused’ by the backhaul demand – in the sense that it would not exist except for that demand – and there is a strong case for saying that the relevant network user should be rewarded accordingly (and I note that it could be expected that the user *would* be so rewarded if there was competition between gas transporters). Why? Because with uncertain demand and irreversibility in investment, *excess capacity has an option value*, and that option value is, in the hypothetical circumstances, created by the backhaul flow.

This provides another reason why there has been a historical Ofgem preference for a degree of “shallowness” in network charging: the “deep” reinforcements triggered by a specific, incremental load will typically have option values associated with uncertainties

about the future evolution of demand for transportation, and therefore their costs should not all be attributed to the incremental load.

In my view, the principal weakness with Transcost is simply that it is deterministic: there is a given base-case forecast, against which perturbations are evaluated, and there is no real consideration of the implications of uncertainty concerning the evolution of future network flows. For the avoidance of doubt, this is not just a matter of a lack of sensitivity analysis, which deficiency could be cleared up by running the model with different forecasts. Each of those runs would have its own, deterministic base-case forecast, and it is the 'base-case determinism' that is the issue.

In some circumstances this is not a major weakness. In a network that is expanding, and can be strongly expected to keep on expanding, and in which the predominant patterns of flow can be expected to remain stable, the limitations are unlikely to be a major concern. There may be issues of timing of investments to consider, but the general investment plan will be fairly clear. In such a world, deterministic models are capable of producing reasonably robust and useful results.

For this reason, and notwithstanding its simplifications, I would say that the deterministic, Transcost approach was reasonably fit for purpose when it was first developed: the simplifications could be defended in terms of proportionality: more elaborate, more costly evaluation exercises would have been disproportionate in relation to their potential benefits. This position is reinforced in circumstances where the geographic pattern of flows is relatively insensitive to relative prices (e.g. where development of gas fields and offshore infrastructure is not very sensitive to onshore transportation charges).

What has changed over the past few years is that there is much greater uncertainty about the base forecasts, and much greater substitutability among alternative flow patterns (developments that are clearly inter-related). As indicated above, the policy response to (anticipations of) these changing circumstances took the form of the 2002 reforms; and, on the business side, Transco has sought to develop more sophisticated investment appraisal techniques, and has placed greater emphasis on issues such as the emergence of summer constraints and the flexibility of the network (to handle shifting patterns of demands for gas transportation).

UCAG/UCA assessment has, on the other hand, continued to rely heavily on Transcost (although the model was necessarily abandoned for the Milford Haven UCAG/UCA analysis, given the large incremental flows associated with that project –see 4.2.1 below). Although the *directional* movements indicated by the 'revised' estimates of UCAGs shown in Table 5.2 of the May 2005 document seem to be broadly sensible – with capacity values becoming lower at entry points where gas flows are expected to decline and becoming higher at entry points where gas flows are expected to increase – the magnitudes of those movements, in terms of percentage changes, is, in many cases very large.

The problem is therefore as follows. Suppose an existing UCAG is £0.04 per kWh, and that the revised estimate is £0.16 per kWh, a 300% increase. Although such a result from Transcost might reasonably be interpreted as suggesting that the existing UCAG is, in the new circumstances, on the low side, the important question is: by how much is

it too low? As indicated above, the new circumstances also suggest that the reliability of the model will have lessened and that the results might be expected to contain systematic biases (e.g. because of failure to estimate option values). It is entirely possible that a more thoroughly revised cost-assessment methodology, which addresses some of the issues raised above, would suggest a much lower percentage increase in the UCAG, say of the order of 25%, to £0.05 per kWh. In that case, the original estimate (£0.04 per kWh) might be judged more accurate than the (initial) revised estimate (£0.16 per kWh). The difficulty is that we just don't know, although my own view is that the adjustments indicated in Table 5.2 are likely to be too large (see further below).

To these points must be added the further difficulty that the re-run of Transcost on which the revised UCAGs in Table 5.2 are based will have also generated revised exit charges. In order to maintain cost reflectivity, it would therefore be appropriate to make associated adjustments to exit charges. Whilst it can be argued that any changes to exit charging can be made later, in the course of the price control review, there are obvious dangers in splitting the decision process in this way. The revised UCAGs/UCAs imply a particular geographic pattern of exit charging, and if that pattern is not implemented, the charging structure will become distorted. I cannot see, therefore, how the Authority could reasonably approve such major changes in UCAGs/UCAs without first having had sight of the implications for exit charging and without having had time to assess what those implied effects might mean for customers in different parts of GB.

## 4.2 *Points of detail concerning Transcost*

My terms of reference raise a number of specific questions concerning the detailed aspects of Transcost and concerning the use of Transcost for the determination of UCAGs/UCAs. Given the above discussion, these questions can be addressed on a point-by-point basis, as follows.

### 4.2.1 *Determination of the base network*

The base network should, on standard methodology, be Transco's preferred ('planned') network in each year, conditional on today's assessment of the future evolution of demand for use of the NTS. That is, it should be an optimised network, where the optimisation takes account of uncertainty, the irreversibility of investment, 1 in 20 obligations, etc. *The current modelling does not satisfy this condition* (see further below).

The starting year of the base network plan should be the current year, although when considering perturbations of demand for gas transportation the starting year for the perturbation should be the first year in which the incremental flow materialises.

Any optimised network will necessarily be balanced. *There is therefore no need, if the base case is established correctly, for either 'load absorption' or 'substitution of supply' adjustments.* These adjustments appear to arise as a result of the use of figures from the Transco Ten Year Statement, which show imbalances between aggregate supply and aggregate demand for gas in years going forward. Difficult though this may be, Transco simply has to form a view or, better, a set of probabilistic views, as to how these notional imbalances will be resolved in practice, as they necessarily will be when the time comes. *The existing calculations do not satisfy this condition.*

I have some concerns on this point since, as I understand the procedures that have been used, Ofgem has asked Transco to scale projected demand *upwards* to achieve an overall supply/demand balance (see paragraph 3.44 of the May 2005 document). This is a very supply-driven approach, and the various steps along the way – choose LTSEC volume if above baseline, and the minimum of baseline and 1 in 20 otherwise – look arbitrary relative to standard methodology (which suggests use of best-forecast flows in an optimised network, and which would give total throughput at around the estimated 1 in 20 level of demand). If projected demand has been adjusted upward, the effect will be to give a larger base network and, more likely than not, to raise the LRIC estimates (because of less spare capacity around in the earlier years). More generally, the LTSEC volume and baseline adjustments, where they kick in, will mean that Transco will be making LRIC calculations on the basis of an assumed network that may look somewhat different from the network that the business is, in reality, planning to have available at the relevant time.<sup>4</sup> To the extent that the UCAGs/UCAs are intended to reflect *actual* investment costs, this could potentially be a source of significant error.

Once the base network is established, perturbations are considered by hypothesising a sustained increment of outflow at a specific exit point that is supplied by a sustained increment of inflow at a specific entry point. That is demand and supply perturbations are considered together, thus maintaining overall balance. Ideally, this should be done for all combinations of entry and exit points, although I understand that Transco currently uses only a subset of all combinations (to economise on computing resources) and relies on interpolation to fill in the gaps.

Typically, the estimated LRIC will be a function of the size of the increment. This is revealed most clearly by the Milford Haven calculations, where estimated unit costs fell sharply with volume (e.g. because of scale economies associated with larger pipes). At least when fulfilling its ‘incremental capacity release role’, the UCAG/UCA therefore should therefore depend on the size of the incremental flow, and should not be estimated on the basis of some pre-designated size of increment.<sup>5</sup> The size of the increment and the UCA should ideally be determined simultaneously, *ex post*, although this is not how the new arrangements appear to have been implemented. The weakness was ‘patched’ for the Milford Haven determination, but this is one of the batch of UCAG/UCA issues that it would be advisable to address at the next price review, not least because the Transcost model simply cannot handle the assessments required for large incremental flows.<sup>6</sup>

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<sup>4</sup> There is reference in the consultation document to the ‘signals’ provided to Transco by sales of LTSEC, and it was certainly one of the intentions of the 2002 reforms that the outcomes of the auctions should be used to inform investment planning. That does not, however, mean that there is, or should be, any simple read-across from the volume of LTSEC sales to the base-case forecasts. Transco will need to assess the relevant information alongside all other relevant information, and then formulate its views.

<sup>5</sup> This is another area where the answer to the question in the terms of reference may be dependent on the purposes of the calculations. Before the 2002 reforms, when the aim was to determine a ‘cost reflective’ charging structure (and see above on the meaning of ‘cost reflective’), it was reasonable for Transco to work with a common, small increment for each of the entry/exit calculations. Arguably, this latter approach might also be considered reasonable if the aim is simply to determine reserve prices in auctions at the major beach terminals.

<sup>6</sup> For example, some potential incremental flows at entry points are simply too large to be absorbed by a single exit point, and cannot therefore be realistically assessed on a paired entry-exit basis.

In relation to whether the modelling should take account of variations in capacity attributable to CV variations, temperature, etc., this is a matter of judgment that depends on the empirics and on proportionality. I do not have sufficient familiarity with the network engineering to form an independent view on the matter – it is a question better addressed to the engineering experts – but, looking at matters in the round, I would be fairly confident that there are far more serious problems that need to be addressed first, and that CV and temperature effects on costs are not the immediate, priority issues.

#### 4.2.2 *Economic assumptions*

Absent modelling costs, the evolution of the network should be analysed on all days; but that approach is likely to prove infeasible or excessively costly in the real world. The issues here need to be resolved pragmatically. The aim should to encompass all those factors likely to have a material influence on investment decisions. Since my understanding is that investment can be driven by factors other than peak flows (e.g. summer constraints, the value of flexibility in reconfiguring flows, etc.), some broadening of approach from the current concentration on 1 in 20 peak days may well be warranted. It might be feasible to address these issues by looking at a small number of ‘extreme’ flow configurations that might be expected to eventuate at certain times during a given year.

The current use of a ten year-period for evaluating LRICs illustrates some of the arbitrariness (subjectivity) in the methodology (see earlier). Why not 12 years, or 15 years, or 20 years? Each would give a different answer. Ten years is a relatively short period given the durability of network assets and, by spreading the lifetime costs of investment over tens years, the effect is to tend to raise the unit rates. On the other hand, some of the potential adverse effects of this decision on the time horizon are countered by the rules concerning the release of obligated incremental capacity: users only have to make bids amounting to 50% of the ‘deemed’ costs in order to secure capacity release. The position is complicated by option value determination (what is the capacity likely to be worth to Transco if it is only bought for five years?) and of the very great uncertainties that would surround longer term forecasts (even ten years is a stretch).

The issue is one that merits further consideration as part of a wider review, and one possible line of policy development is for the use of different time horizons for different types of entry terminal. For example, it might be argued that the costs of incremental entry capacity required for new, onshore terminal facilities should be spread over longer time periods because of the likely *durability of peak flows* from such facilities. That is, whereas beach terminals might see declining peak rates of flow as a result of field depletion in the relevant sectors of the UKCS (e.g. Teesside, Theddlethorpe), long-established storage sites such as Rough and Hornsea, operating now for many more years than ten, exhibit no such decline.

A particularly significant point in relation to the technicalities of the modelling is that *it is inappropriate to constrain costs to be non-negative*; and this is one of the weaknesses of the current implementation of Transcost. The limitation arises not from Transcost itself, but from the transformation of the Transcost output data that occurs when the Solver programme is used (Solver is a standard, Excel add-in).

There are some underlying modelling problems here, the most important of which is that *Transcost is only a partial optimisation model*. What it does is to find a least cost, *notional* route between entry-exit pairs. What it does not do is recognise that some of these notional routes will be inefficient in an optimised network, and that they should therefore be eliminated in the estimation of LRICs. For example, consider a St Fergus/SW England entry-exit pair. The relevant cost might not play a role in LRIC determination because, although Transcost may have calculated the least cost route between the two locations, *it might be the case that there will be lower cost configurations of routings capable of accommodating the relevant perturbation (extra supply at St Fergus, extra demand in the SW)*. Roughly, what could happen is that the extra flow from St Fergus is used to substitute for a flow from another entry point (say to the West Midlands), and that the released flow from that other entry point is diverted to meet the incremental demand in the SW. Full optimisation would perform these calculations automatically, eliminating higher cost notional route flows and producing entry and exit values without need for further data manipulation.

The impact of lack of ‘second-stage’ optimisation (elimination of inefficient routes) on estimated costs will depend upon the base-case pattern of flows. When flows are unidirectional (e.g. North and East to South and West), the impact might be expected to be relatively limited. When the flow pattern becomes more complex, however, it is to be expected that the limitations of the model will become more severe. Although this can be no more than an informed guess at this stage, my view is that recent alterations in network flows in the base-case projections throw considerably greater doubt than previously on the reliability of the Transcost estimates of LRICs. Specifically, *I suspect that the upward bias in cost estimates that is inherent in the partial optimisation approach might have increased significantly over the past few years*.

Solver is used to derive entry and exit unit values from the route-costs calculated using Transcost. Two explanations have been offered by Transco as to why recourse is made to the Solver programme:

- It is used to achieve a 50/50 division of revenues from the implied entry and exit charges.
- It is used to constrain entry and exit capacity values to be non-negative.

As already stated, a full-optimisation model would produce entry and exit values automatically (these are the values of the *dual* variables, or *shadow prices*, at the optimum solution of the cost-minimisation problem). The difference between any two of these shadow prices is the implied *difference* in the economic value of gas at the different locations, which is equal to the optimised cost of transportation between the two points. In setting actual *levels* of entry and exit charges from a set of estimated *differences*, there is therefore one degree of freedom available.

In systems in which there is trading at a well-defined, major hub, the obvious recourse is to use that hub as the reference (or zero) point. Each entry or exit value is then the implicit, optimised cost of transporting gas to or from the hub. The UK approach, however, has thus far not been based upon a physical hub. Rather it uses the available degree of freedom in setting charges to achieve a target split of Transco revenues from entry and exit charges. This is the ‘virtual hub’ approach (the ‘NBP’); although one can

also think in terms of a shadow physical hub. For example, in a system with a predominant north to south flow, shifting revenue recovery from exit toward entry charges would be equivalent to moving the shadow physical hub further south. In this way, a desired entry/exit split of revenue can be determined without recourse to any major data transformations.

I think that it is probably the case that Transcost needs Solver to attain the desired split precisely because it fails to optimise the routing pattern of flows. In effect, Transcost's output contains cost estimates for large numbers of 'redundant' (not least-cost) notional routings of gas, which then have to be condensed into a smaller number of entry/exit parameters. Solver therefore appears to be a 'patch' for an unfinished optimisation.

Further distortions in the estimates of LRICs arise from the imposition of non-negativity constraints. The non-negativity constraints necessarily imply some systematic deviations from cost reflectivity. Consider a physical hub in a north to south system, and suppose that the hub lies well to the south. The entry charge reflects the cost of transport from the entry terminal to the hub, whereas the exit charge reflects the cost of transport from the hub. Next consider an entry terminal in the north and an exit terminal in the north. Absent non-negativity constraints, there will be a positive entry charge and a negative exit charge such that, when the two are added together, the transport charge/cost reflects the fact that the gas does not have to be carried very far from entry point to exit point. If, however, exit charges are constrained to be non-negative, for given entry charges the transport charges to northern customers will be excessive (because the exit charge is constrained to be higher than it should be). Solver will seek to reduce the size of the distortion by reducing the northern entry charge, and indeed by adjusting all other entry and exit charges throughout the system. The distortions introduced by the constraint are therefore spread throughout the whole charging structure. Put another way, Solver turns a few potentially large distortions into a large number of smaller distortions.

The usual argument against adopting negative charges is that they can give rise to opportunities for gaming by network users. For example, a negative entry charge will reflect the value of particular *flows* that serve to reduce investment costs in the system. On the other hand, what is actually sold is the *right* to use entry capacity, or the *right* to flow. It can be argued, very reasonably, that users should not be rewarded for rights to flow in situations in which the flow – which is the thing that has value – does not actually materialise.

The obvious way forward in these circumstances is contractual: negative charges for entry or exit capacity could be made contingent upon flows. Although it would be non-trivial to develop the relevant contractual matrix, it seems to me to be unwarranted to impose a non-contractual solution, by means of a constraint in a computer programme, in circumstances where it is known that such a fix will, with near certainty, distort cost estimations. Given the implications for cost reflectivity, I believe that it would be necessary to show that the imposition of the constraint is necessary or indispensable for its purposes (the avoidance of gaming that could have damaging consequences for consumers) before it can be concluded that it is justified. At a minimum, this would require careful assessment of the feasibility of contractual alternatives.

Turning to the question (in the terms of reference) of the period for which UCAGs/UCAs should be fixed, the first point to make is that, as indicated earlier, UCAGs/UCAs are currently used for different purposes. One of these purposes (to determine Transco incentives) suggests that they should be fixed for the length of a review period, or for some other predetermined period; another purpose (to determine conditions for the release of incremental obligated capacity) indicates that they should be adjusted to reflect significant changes in market conditions and Transco investment costs, irrespective of when such changes occur.

The first priority, therefore, should be to determine the role and purpose of UCAGs/UCAs. Only then will it be possible to provide clear answers to the above question (which, when they have been formulated, should be clearly and unambiguously communicated to network users). Such a re-assessment of the roles and purposes of UCAGs/UCAs is clearly better left to the price control review, and cannot sensibly be done ahead of the decision now confronting the Authority.

## **5. The two options in the May 2005 consultation document**

The two options identified in the consultation document, as summarised in the RIA that is attached to that document as Appendix 3, are:

### **Option 1**

*Calculate UCAGs for the new applications on the basis of the methodology detailed in Chapter 3 and recalculate existing UCAGs on the same basis. Given that shippers can purchase entry capacity rights for up to 15 years, it is proposed to review all existing UCAGs before the next long-term entry capacity auction (i.e. September 2005).*

### **Option 2**

*Cap the UCAGs at new entry points to the level of UCAGs at nearby, existing entry points. Leave existing UCAGs unchanged. Review all these UCAGs as part of the next price control review.*

Given what has been said above, the first of these options is, in my view, unattractive for a number of reasons, the most important of which, expressed in broad terms, are:

- As recently as 24 November 2003, in relation to a very similar issue (determining the UCAG for a new entry point at Garton) Ofgem decided against undertaking a review of UCAGs, even on a local basis (i.e. revisiting the Aldbrough UCAG), before the next price control review. So far as I can determine, there have, since then, been no very major, unexpected developments in the demand for gas transportation services that would give cause for a change in that judgment. Moreover, other things equal, the case for waiting for the next review is likely to have been strengthened (relative to the case in the Garton document) on account of the fact that we are now closer to the conclusion of that review than was the case in November 2003.

- The roles and purposes of UCAs need to be reassessed and redefined. With hindsight, it is clear that entry capacity arrangements designed to address problems arising from major uncertainties about the future pattern of gas flows in GB, and focused on the major ‘competitive’ beach terminals (St Fergus, Teesside, Easington, Theddlethorpe, Bacton), require some adjustments to better address issues arising from the development of new entry points. To reset UCAGs/UCAs now would, given the very major changes in the numbers indicated in Table 5.2, seem to be putting the cart before the horse. I think it entirely possible that, if UCAGs/UCAs were revised now, a fuller review during the course of the price control would move a number of the revised estimates back towards their current levels.
- There are a number of problems with the existing modelling that give strong grounds for believing that the results – such as those presented in Table 5.2 – are biased and, more generally, are non-robust. I find some of the numbers to be non-credible, and strongly suspect that a few changes of assumptions used in the modelling could move these numbers around quite a lot. Although I am willing to be convinced that these ‘heuristic’ perceptions are wrong, the amount of analysis required for such convincement would likely be substantial. At a minimum, I would like to see LRIC estimates based on elimination of redundant/inefficient notional routings from the Transcost outputs, and some results from a model with a stochastic base-case. Neither of these modelling exercises would be trivial.
- While it is *possible* that the revised UCAGs in Table 5.2 are more cost reflective than the existing UCAGs, it is also quite possible that they are not. As noted earlier, the directional changes make some sense in terms of the changing patterns of demand for entry capacity – with, for example, St Fergus capacity becoming less valuable and Easington capacity becoming more valuable – but this is insufficient to form a strong view about the relative merits of the two sets of numbers presented. Even if the directional movements are right the magnitudes of the changes shown in Table 5.2 may be too large, leading to ‘overshooting’ in the revised numbers.
- The revised UCAGs/UCAs must be associated with revised estimates of exit charges, since the two sets of numbers are estimated simultaneously by Solver, using Transcost output data. Option 1 is completely silent on this point. Does it imply that existing exit charges should remain unchanged, or that exit charges should be adjusted toward the revised, but undisclosed, exit values associated with the revised UCAGs/UCAs? The first approach would lead to obvious distortions; the second would pre-empt assessments and decisions to be made during the course of the price control review; each is unsatisfactory.
- For reasons given, re-assessment of UCAGs raises a series of difficult and complex issues. My view is that these issues are better addressed during the price control review, in a wider context that encompasses other aspects of the entry and exit arrangements, not by means of an eleventh hour exercise that would likely cause delay to planned auctions of entry capacity.

Turning to Option 2, the Consultation Document points to a number of drawbacks that are summarised in the RIA as follows:

- There is a risk that locational signals would be inappropriate.
- Shippers at existing entry points might purchase entry capacity rights for up to 15 years at a price which might not reflect the underlying costs.
- This could lead to higher prices for consumers and undermine confidence in the efficient functioning of wholesale markets.
- Non cost reflectivity could lead to cross-subsidisation among shippers, leading to inefficiency.

All these points are correct, but the difficulty is that nearly all such ‘might’ or ‘could’ statements are almost trivially correct. Given the uncertainties, each statement applies equally to Option 1, and what is therefore required is some assessment of the levels of the risks in each case.

My own view is that the risks that have been identified as arising from Option 2 are of significantly less significance than those associated with Option 1. The main points are as follows:

- Perhaps the most important of the risks is that a storage project might go ahead on the basis of an unduly low UCAG/UCA, when a more efficient outcome would be for the project to be abandoned and for another, similar project to be substituted for it at a different location (i.e. there would be locational inefficiency). I do not have financial information concerning the projects likely to be affected by a decision in favour of Option 2, but, from general knowledge of the market, I cannot see this as a major drawback of the Option. Storage projects at different locations are not easily substituted for one another, being dependent on factors such as geological conditions and planning permission. Even if such a possibility (more efficient location elsewhere) existed, there would be associated costs of delay to weigh in the balance, including the ‘cost’ less competition in storage markets in the interim (which has particular relevance for domestic consumers who are more exposed than average to peak prices). It is therefore difficult to envisage any such locational efficiency losses being of substantial magnitude.
- Shippers might indeed purchase long-term capacity rights in auctions at prices that turn out, on later assessment, to be below best estimates of LRICs. They would only make such purchases, however, if they believed that prices were likely to go up: expectations of downward adjustments (e.g. at St Fergus, Teesside, Barrow, Bacton, if the Table 5.2 numbers are taken as a guide to expected, directional movements) would tend to lead to deferrals in purchases.

At Easington, there is no guarantee that LTSEC could be secured at prices equal to the existing UCA. The UCA is a *reserve price* for baseline capacity, and strong expectations of higher prices in the future could lead to market-

determined prices in excess of UCAs. The relevant shippers would need to make their own assessments of the changing structure of transportation costs and bid accordingly, precisely as the 2002 reforms intended. At Theddlethorpe, the LTSEC baseline is well in excess of likely demand for entry capacity, which is anticipated to decline. In such circumstances, any concern that current reserve prices for LTSEC might be too low would seem to be perverse.

Early purchase of LTSEC in anticipation of future increases in UCAs is, therefore, most likely to be an issue in relation to recently connected, and soon to be connected, storage sites (e.g. Barton Stacey, Garton, Ganstead, etc.) Again, the relevant shippers will need to take views on what the results of a more comprehensive assessment of UCAGs/UCAs might be. If they take the view that UCAGs/UCAs will increase sharply, purchase substantial quantities of long-term entry capacity, and turn out to be right in their assessments, then they will have made a good buy; but that is far from being the only possible outcome. There is, for example, the argument that the ten year horizon used by Transco when estimating costs is an inappropriately short horizon for storage sites (see section 4.2.2 above). If that argument proved to be persuasive during the course of the price control review, lengthening the appraisal horizon would, other things equal, tend to reduce UCAG/UCA estimates.

- In relation to consumers, protection is afforded by the general cap on Transco revenues. Given that the issue at stake is largely one of timing – the UCAGs/UCAs will be re-assessed shortly in the course of the price control in any event – I cannot see any material damage being inflicted on consumers in the event that the Authority chooses to make a later, more considered, and wider ranging re-assessment.
- Cross-subsidy is a slippery concept in nearly all contexts, but is particularly problematic in the face of the deep/shallow (cost attribution) and option value issues raised earlier. So far as I can see, any relevant concerns are already covered by preceding comments.

## **6. Way forward**

My advice to the Authority is that:

- Given statutory duties and the principles of better regulation (of which consistency is perhaps the most important in the current context), Option 2 dominates Option 1.
- The role and purposes of UCAGs/UCAs should be re-assessed during the course of the next price control review, in a wider context that takes into account a number of other, related aspects of the entry and exit arrangements.
- It would help market participants form expectations (and thereby reduce regulatory uncertainty) if recognition of the following were signalled before the next round of auctions:

- UCAGs/UCAs can be expected to change over time as market conditions change, and hence, given the developments since the last price control review, the next assessment can be expected to lead to some adjustments in future years;
- during the course of the review, Ofgem will need to work conscientiously with all parties to arrive at best possible assessments of Transco's incremental investment costs, and, in particular, will want to ensure that issues of cost-attribution for shared network assets (deep/shallow issues) and of investment option values are fully addressed;
- by implication, this will require more than just a 'review of Transcost' (not least because Transco does not itself rely on Transcost for investment planning purposes): a more thoroughgoing review of investment planning, related Transco-User information exchanges, transparency, etc. will be in order;
- there are material economic differences between 'competitive' and 'non-competitive' entry points, and one issue for consideration is whether these may call for more explicit differentiation between the two in future arrangements.

In relation to the practicalities of implementing Option 2, I think that the key notion is interpolation, at least in relation to the determinations required for smaller entry-capacity applications. Existing UCAGs/UCAs show a very definite geographic pattern – higher in the north and in the east – and a regression of existing UCAG/UCA values on grid co-ordinates would produce a relationship that could be used to interpolate between established entry terminals, even when the new site is relatively distant from established terminals.

For major new developments, the relevant precedent has been set by the approach adopted for the Milford Haven terminal, which did not rely on Transcost and which left the final determination of the UCAG/UCA to be made after the auction had occurred.

George Yarrow

6 July 2005

## NOTICE UNDER SECTION 23(3) OF THE GAS ACT 1986

The Gas and Electricity Markets Authority (**the Authority**) hereby gives notice pursuant to section 23 (3) of the Gas Act 1986 (**the Act**) as follows:

1. The Authority proposes to modify the conditions of the gas transporter licence granted to Transco plc (**Transco**) in respect of its National Transmission system, treated as granted under section 7 of the Act which was amended and restated by a licensing scheme made by the Secretary of State for Trade and Industry pursuant to paragraph 19 of schedule 7 to the Utilities Act 2000 on 28 September 2001 (the "Original Transco Licence") by amending Special Condition C8B: *Restriction of revenue in respect of the NTS transportation owner activity and NTS system operation activity Part 2*, by amending:
  - (a) The current definition of UCAG including the accompanying table set out in Part 2 paragraph 14 (5) (a) of Special Condition C8B in the manner set out in Appendix 1 of this notice; and
  - (b) Schedule A: *NTS output measures for the price control Table A1: NTS TO baseline entry capacity (GWh/day)* and Table A2: *Initial NTS SO baseline entry capacity (GWh/day)* as set out in Appendix 2 of this notice.
2. Wherever possible the amendments are shown in bold and italicised below. The amendments would be deemed to take effect from 0.00 hours on 15 September 2005.
3. The reasons why the Authority proposes to make these licence modifications and their effects are set out in the main document published by the Authority in conjunction with this Notice and entitled: "*Section 23 notice to modify Transco's gas transporter licence. Explanatory note to accompany proposals for a new entry terminal to Transco's National Transmission System*", Ofgem, August 2005.
4. In summary the effects of the proposed licence modifications are as follows:

- (a) The addition new National Transmission System (NTS) entry points at: Burton Agnes (Caythorpe), Blyborough (Welton), Winkfield, Tatsfield, Albury and Palmers Wood under Transco's NTS system operation activity revenue restrictions and more specifically, in relation to Transco's NTS system operator entry capacity investment incentive revenue;
- (b) The addition of new unit cost allowances gross ("UCAGs") for each of the planned new NTS entry points at: Burton Agnes (Caythorpe), Blyborough (Welton), Winkfield, Tatsfield, Albury and Palmers Wood; and
- (c) The addition of new NTS entry points at Burton Agnes (Caythorpe), Blyborough (Welton), Winkfield, Tatsfield, Albury and Palmers Wood under Transco's NTS transportation owner (TO) output measures for the price control and under Transco's system operation (SO) output measures.

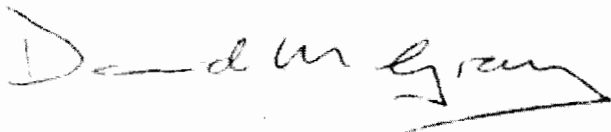
5. More specifically, the effects of the proposed licence modifications are as follows:

The inclusion of a new UCAG for each of the planned new entry points to accommodate storage facilities at Burton Agnes (Caythorpe), Blyborough (Welton), Winkfield , Tatsfield, Albury and Palmers Wood will supplement the existing UCAGs contained in Transco's GT licence in respect of its National Transmission System for existing entry terminals. The UCAGs, which underpin Transco's entry capacity investment incentive, are ex-ante agreed estimates of the unit costs of providing incremental entry capacity at each NTS entry point. The UCAGs determine the range of Transco's revenue allowance for the provision of incremental entry capacity. Transco is allowed to earn a rate of return of between 5.25 per cent and 12.25 per cent on the UCAG on each unit of obligated incremental entry capacity offered for sale in response to signals revealed in long-term entry capacity auctions. The proposed modifications will provide UCAGs to accommodate new entry points to the NTS at Burton Agnes (Caythorpe), Blyborough (Welton), Winkfield , Tatsfield, Albury and Palmers Wood.

The Authority has proposed 12 further modifications in order to update Schedule A of Transco's GT licence in respect of its National Transmission System. Tables A1: *NTS TO baseline entry capacity (GWh / day)* and Table A2: *Initial NTS SO baseline entry capacity (GWh / day)* have been updated to accommodate the zero baseline output measures and zero TO and SO baseline entry capacity volumes for the new entry points at Burton Agnes (Caythorpe), Blyborough (Welton), Winkfield, Tatsfield, Albury and Palmers Wood. The current output measures set out in Schedule A provide for the SO baseline entry capacity levels that Transco will be required to offer for sale for each NTS entry point in each year of its current price control.

7. A copy of the proposed modification and the explanatory note can be obtained (free of charge) from Robert Hull, Ofgem, 9 Millbank, London, SW1P 3GE and are available on the Ofgem website ([www.ofgem.gov.uk](http://www.ofgem.gov.uk)). Any representation or objection to the proposed modification should be made on or before 14 September 2005 to the address above and marked for the attention of Robert Hull.

**David Gray**

A handwritten signature in black ink that reads "David Gray". The signature is written in a cursive style with a long horizontal line extending to the right from the end of the name.

**Managing Director – Networks**

**Authorised on behalf of the Gas and Electricity Markets Authority**

15 August 2005

## Appendix 1

**Special Condition C8B: Restriction of revenue in respect of the NTS transportation owner activity and NTS system operation activity**

**Part 2: The NTS system operation activity revenue restrictions**

**Paragraph 14 (5): Entry capacity investment incentive revenue (ECIIR)**

UCAG<sup>1</sup> means the unit cost allowance in pounds per kilowatt hour in respect of terminal j and has the value set out in the following tables:

Terminal j	UCAG <sup>1</sup> (£/kWh)
Bacton	0.182
Barrow	0.014
Easington	0.034
St. Fergus	0.639
Teesside	0.059
Theddlethorpe	0.031
Glenmavis	0.532
Partington	0.009
Avonmouth	0.064
Isle of Grain	0.186
Dynevor Arms	0.000
Hornsea	0.153
Hatfield Moor (storage)	0.042
Hatfield Moor (onshore)	0.042
Cheshire	0.003
Hole House Farm	0.002
Wytch Farm	0.000
Burton Point	0.002
Barton Stacey	0.000
Garton	0.039
Burton Agnes (Caythorpe)	0.083
Winkfield	0.092
Blyborough (Welton)	0.038
Tatsfield	0.092

Albury	0.396
Palmers Wood	0.145

Terminal j	UCAG <sup>j</sup> (£/kWh)	UCAG <sup>j</sup> (£/kWh)
Milford Haven	0.343 where PRIORCIOEC <sup>i<sub>m</sub></sup> ≤ 500 GWh/d	0.257 where PRIORCIOEC <sup>i<sub>m</sub></sup> > 500 GWh/d

PRIORCIOEC<sup>i<sub>m</sub></sup> shall mean the cumulative obligated incremental entry capacity in respect of each day in month m at terminal j at a date to be determined by the Authority.

## Appendix 2

### Schedule A: NTS output measures for the price control

**Table A1: NTS TO baseline entry capacity (GWh/day)**

Terminal	2002/3	2003/4	2004/5	2005/6	2006 /7
Bacton	1527	1646	1839	1939	1939
Barrow	812	790	790	791	791
Easington	1105	985	1141	1180	1180
St. Fergus	1689	1721	1809	1831	1863
Teesside	910	823	834	845	845
Theddlethorpe	758	628	879	942	942
Glenmavis	110	110	110	110	110
Partington	239	239	239	239	239
Avonmouth	165	165	165	165	165
Isle of Grain	243	243	243	243	243
Dynevor Arms	55	55	55	55	55
Hornsea	195	195	195	195	195
Hatfield Moor (storage)	60	60	60	60	60
Hatfield Moor (onshore)	1.1	1.1	1.1	1.1	1.1
Cheshire	0	0	119	179	238
Hole House Farm	29	29	29	29	29
Wytch Farm	3.6	3.6	3.6	3.6	3.6
Burton Point	61.3	61.3	61.3	61.3	61.3
Milford Haven	0	0	0	0	0
Barton Stacey	0	0	0	0	0
Garton	0	0	0	0	0
Burton Agnes (Caythorpe)	0	0	0	0	0
Winkfield	0	0	0	0	0
Blyborough (Welton)	0	0	0	0	0
Tatsfield	0	0	0	0	0

Albury	0	0	0	0	0
Palmer's Wood	0	0	0	0	0

**Table A2: Initial NTS SO baseline entry capacity (GWh/day)**

	MONTH				
	$1 \leq m \leq 12$	$13 \leq m \leq 24$	$25 \leq m \leq 36$	$37 \leq m \leq 48$	$m \geq 49$
<b>Terminal</b>	<b>2002/3</b>	<b>2003/4</b>	<b>2004/5</b>	<b>2005/6</b>	<b>2006/7</b>
Bacton	1374	1481	1655	1745	1745
Barrow	731	711	711	712	712
Easington	995	887	1027	1062	1062
St. Fergus	1520	1549	1628	1648	1677
Teesside	819	741	751	761	761
Theddlethorpe	682	565	791	848	848
Glenmavis	99	99	99	99	99
Partington	215	215	215	215	215
Avonmouth	149	149	149	149	149
Isle of Grain	218	218	218	218	218
Dynevor Arms	50	50	50	50	50
Hornsea	175	175	175	175	175
Hatfield Moor (storage)	54	54	54	54	54
Hatfield Moor (onshore)	1	1	1	1	1
Cheshire	0	0	107	161	214
Hole House Farm	26	26	26	26	26
Wytch Farm	3.2	3.2	3.2	3.2	3.2
Burton Point	55	55	55	55	55
Milford Haven	0	0	0	0	0
Barton Stacey	0	0	0	0	0
Garton	0	0	0	0	0
Burton Agnes (Caythorpe)	0	0	0	0	0
Winkfield	0	0	0	0	0
Blyborough (Welton)	0	0	0	0	0
Tatsfield	0	0	0	0	0

Albury	0	0	0	0	0
Palmers Wood	0	0	0	0	0