

has been very little participation from the demand side in Neta so far. Why? One of the reasons given is that it is too complex to bid in effectively. Also the acquisition of Yorkshire Electricity's 'special markets' group by Innogy seems to have ruled out one route for customers to get their demand into the market.

And the winners are... large portfolio generators/vertically integrated companies and flexible generators. They are the best positioned to handle the new risks that Neta impose. Although generators are picking up some new uplift costs they are undoubtedly being rewarded through the beer fund for having the flexibility.

Neta rewards flexible generation. Edison Mission has done particularly well with its two pumped storage plants under the BM. Others have brought back kit. Innogy has also brought back some of its mothballed oil-fired kit to exploit the balancing mechanism.

Larger vertical players also have more information about what is happening in the market than other players. For instance, their supply businesses would know first when one of their gensets has fallen off. They also have more ways to manage risk as well as having better information about future planned outages which will affect the forward curve. In addition, they also know more about the 'true' prices of electricity in the market which now remains, elusive to smaller players and new entrants.

Just whether Neta will lower prices remains debatable - the prices on offer to end customers will be the best test of Neta. Until firm evidence is produced, all Neta seems to have done is reallocated some costs and introduced some new ones.

*\* 'Electricity: Regulatory Developments Around the World' by Professor Stephen Littlechild presented on 9 October 2001 at the The Beesley Lectures on Regulation Series XI*

## Transmission

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### Transmission access - a case study in public maladministration?

Ofgem's plans to reform electricity transmission access has been going on for a number of years. With numerous project managers handling the matter, the consultation process has veered back and forth seemingly making little progress. The most recent consultation document produced this summer met with stinging responses from the industry. Ofgem has yet to publish a summary of their responses and it unclear how Ofgem can now take the project forward. In the following article, electricity expert Alex Henney recounts the development of the project, picks apart Ofgem's arguments for reform and asks whether the whole process has flagged up a deeper problem nestling at Ofgem's core?

*" 'But the Emperor has nothing on at all' cried a little child".*

*Hans Christian Anderson.*

#### Background to Neta access

**O**ffer's first new thoughts on managing transmission constraints emerged in the "Review of Electricity Trading Arrangements: Interim Proposals" document of June 1998. The main text of the "Proposals", which followed a month later, described the same approach but tucked at the end of an annex were references to establishing "the cost and/or value of transport from one location to another", to "transmission rights", and to auctioning off and trading these rights.

The Programme Development Office, and the Development and Implementation Steering Group set up jointly by the Department of Trade and Industry and Ofgem, thought about transmission access and a capacity

regime, and the former commented in February 1999 that “The Neta programme team believes that transmission pricing should be refined to send more accurate and *cost*<sup>0</sup> reflective signals regarding the use of the network. A market-based solution, perhaps based on tradable access rights, would be consistent with the general thrust of the proposed reforms in electricity trading and would be similar to the approach adopted in gas”.

With the formation of Ofgem and the publication of “The new electricity trading arrangements”, July 1999, Ofgem’s view had moved on to handling transmission constraints by markets and with auctions, and to making the electricity market as similar as possible to the gas market. The report set out an intent as follows:-

- Transmission losses and constraints represent the short run costs of electricity transmission. If these costs were reflected accurately in the charges, the market should send correct economic signals to the transmission owner (TO) and transmission system users over both the short and long term. This, in addition to influencing the location of new generation or of large consumers and highlighting the need for grid reinforcements, should lead to efficient decisions being made regarding the day-to-day operation of the network...
- A market-based solution, based on tradable access rights, would be consistent with the general thrust of the proposed reforms in electricity trading. For example, a solution that encouraged the value of transmission access to be discovered via the trading of rights by interested parties would be preferable to an approach under which transmission access prices are determined by a centrally administered calculation. Having established a general framework for transmission capacity trading, parties would be free to establish amongst themselves the prices at which they were willing to trade...
- In the GB gas industry, the reform process has maintained a distinction between the title to gas and the right to transport gas over the network. It is for consideration whether a suitably modified version of the transportation capacity market model envisaged for the gas industry could have applications in electricity transmission pricing...It will be important to ensure consistency between transmission pricing in gas and electricity, in the light of the new gas trading arrangements. This will remove any perverse incentives for generators to locate new gas plant on the basis of market-related gas transmission charges with little regard for the costs imposed on the electricity transmission network as a result (since these will only be weakly reflected in the Transmission Network Use of System charges they pay).”

### **Incentives consultation paper**

Just before Christmas 1999 Ofgem published a consultation paper “NGC System Operator (SO) Incentives, Transmission Access and Losses under Neta” which set out from (at least) 100,000 feet concepts for transmission access rights. Ofgem started by stressing the importance of locational charges “to capture short term costs”, and claimed that “there are two main ways in which transport issues can be resolved and charges set. First, a centralised mechanism involving a model of load flows, which of necessity is complex, can be used to determine the optimal (least cost) pattern of generation to meet demand. (This approach is adopted in New Zealand and the three US North Eastern markets). Second, the SO can use a separate congestion market to relieve constraints which was the approach adopted in California”.

Both of these approaches were rejected because “The concept of a centralised mechanism for setting locational charges based on a load flow model is not in accord with the general principles underlying the design of the new trading arrangements...it does not provide a regime that is transparent, simple or easy to understand’... A major issue with the congestion market option is where it would fit into the sequence of markets that is envisaged under Neta...”. Then, without undertaking any analysis of the feasibility of the concept, Ofgem opted for:-

- Firm access rights to use the transmission system allocated to participants and subsequently traded in such a way that the market determines the value of transmission access...the access rights are firm in the sense that if the SO wishes to reduce a participant’s access right allocation, the participant is entitled to receive compensation...Constraint management is achieved by the SO buying back previously allocated firm access rights and selling new rights based on the actual pattern of flows on the transmission system in real time”.

Ofgem mentions “entry and exit rights” and “transfer rights” (an unbaked version of the US concept of “flowgates”) and other possible features of a transfer rights regime such as use-it-or-lose-it, imbalance charges, the importance of secondary trading, and the benefits of auctioning as a means of allocating the rights. It also notes that “the volume [of rights] can lie anywhere between the maximum level that could be achievable (normally referred to as the top-down approach) and a minimum level that can always be guaranteed to be available (a bottom-up approach)”, alludes to a more sophisticated profiling of rights by time of day and season, and mentions shorter term and longer term rights. We are now clearly in the realms of a full blown commodity market with screens galore, trader/speculators taking positions, and clever people devising structured deals. The only trouble with the description is that it lacks the reality of how the auctions might be organised and what the auction prices might mean, neglects to mention that the gas auctions are a chaotic mess, and ignores how

transmission networks operate and are planned. But why spoil a good story?

### Why the need for change?

Ofgem organised a conference on 3 February 2000. Several questioners asked why, given the modest level of constraints (£20m p.a.), a radically new - and obviously complex and expensive - approach to managing constraints was required. The answers given were:-

- “Neta would change the pattern of generation and demand”. Why? The economics of running plant economically under the Pool and Neta is basically the same<sup>2</sup>
- if the flow in the French interconnector reversed the cost of congestion could increase to “several hundred millions”

These responses were unsubstantiated generalities; the interconnector figure was not one that NGC recognised, and in due course the absurd proposition was dropped. The pragmatic approach to dealing with transmission access and congestion management would have been to implement Neta and see how significant the constraints were. But since auctions are Ofgem’s millennium economic fashion and it had introduced entry auctions into gas then, given its superficial views on the convergence of the two markets, perforce electricity should also have entry auctions.

In early 2000 Ofgem asked NGC to develop some thinking, which it subsequently shared with the Transmission Users’ Group. Also in March 2000 Ofgem referred to “the introduction of an new capacity regime in April 2001”, chalking up one more Neta time target that was missed. The next public step in the process was a workshop in August 2000. NGC had prepared a “strawman” which showed that if the concept of access was limited to entry rights and the system was divided into 6 zones and if the rights were optimally distributed they would resolve only about half of the congestion.

If there were 12 zones the rights would resolve about two thirds of the congestion, but the Herfindel-Hirshman Index would be above 3000 in eight of the zones, indicating significant market power. Indeed in two zones there would be only one generator; in one zone just two; and in three four generators. The pursuit of unreality should have stopped at this point because there was an obvious conflict between on the one hand achieving any modest hope of liquidity and not having excessive market power, and on the other hand resolving sufficient of the constraints to provide NGC with a useful congestion management tool. But since common sense has no place in Neta the show rolled on with the added concept of US style flowgates tossed in the ring.

Ofgem promised another consultation paper. There were rumours of a 300 page draft. Months passed, increasingly Ofgem spun the story that the access arrangements were essential for Neta; in turn CUSC was essential for the access arrangements; QED we must have CUSC. In what may yet prove to have been a misuse of Section 68 of the Utilities Act, Ofgem and the DTI pushed through a licence change to enforce it.

### Transmission access and losses

*“Keep your thinking as simple as possible and only as complex as necessary”.*

*Albert Einstein.*

Eventually in May 2001 Ofgem published another Consultation document titled “Transmission access and losses under Neta”..

The consultation document can be analysed in five parts:-

- the alleged “need for reform” and the rationale for auctions of transmission access rights
- the characteristics of auctions in general, and notably auctions for gas entry and electricity access
- two mutually inconsistent objectives underlying the proposals
- other difficulties with the proposals
- the responses to the consultation paper and NGC’s way forward

Ofgem dismissed the general criticism that “the costs of implementing new transmission access and pricing arrangements might not be justified given the low level of constraint costs in the last few years of the Electricity Pool...[because in ways that Ofgem did not explain] the issues involved are much broader than simply the resolution of the current level of transmission constraints”. Its attempt to demonstrate the need for reform commenced with a section titled “Weakness of the initial Neta arrangements for transmission access pricing and losses” which claimed that:-

- “The impact of transmission arrangements on the functioning of traded electricity markets is extremely difficult to quantify, but general considerations indicate it could be very substantial. Neta has already exerted significant downward pressure on prices and is expected to lead to major economic benefits by, among other things, reducing the distortions caused by inappropriate trading arrangements, including in particular those aspects of the Electricity Pool arrangements that had the effect of increasing the incentives to exploit market

power. Deficient transmission arrangements have the potential to undermine significantly these benefits.

- In the absence of a comprehensive reform of transmission, there exists the potential for conduct that would distort traded electricity prices and given the likely scale of electricity trading post-Neta, this could increase the payoffs from the exercise of local market power. A particular concern is that there is no cap on total generation access rights under Neta other than the total installed capacity on the system. Resulting distortions in wholesale electricity markets could, in turn, limit the development of liquidity in those markets and increase prices, with damaging consequences for competition and for consumers.
- A further concern is that rights made available to participants to use the transmission system (access rights) are not well-defined, particularly on the demand-side”.

The first paragraph is a sequence of unsubstantiated generalities and, other than Ofgem’s public relations claims, there is no evidence that Neta per se has reduced prices; the second is without foundation<sup>3</sup> ; while the third is incorrect - the rights of both supply and demand-side users were “well defined” under the combination of the Pooling & Settlement Agreement and the Master Connection Use of System Agreement.

## Inefficiencies

Ofgem then proceeds to discuss “Short and long term inefficiencies”, stating that “While the BM is likely to be effective in resolving constraints, it will be a mechanism that allocates transmission capacity inefficiently *in the sense that the BM is intended to reflect the value that participants place on energy rather than transmission access*”. The italicised statement will come as a surprise to many people who thought that the Balancing Mechanism was definitely not intended to reflect the value of energy.

According to Ofgem “Historic constraint costs only reveal the cost of constraining on and off plant in order to resolve transmission constraints. They do not reflect the economic costs arising from inefficient generation and demand decisions given a constrained network, either in the short term (operating decisions) or in the long term (location and disconnection decisions).” Here Ofgem appears to be developing a new theory of transmission pricing which contradicts the work of the last two decades on spot pricing and nodal pricing markets.

Ofgem moves on to observe that “Over the longer term changing patterns of generation and demand in England & Wales and changes in the pattern of imports and exports across Europe could also influence the costs of resolving transmission constraints”, and claims that without appropriate signals of the short and long term *costs* there may be inefficient investment decisions. Although it is correct to say that the pattern of generation will change - the question is how rapidly? There is no basis for claiming either that the regional pattern of demand will change significantly in the next two decades, or that changes in power flows in Europe could have a significant impact on constraints in England & Wales. Likewise, although it is easy to criticise the investment cost related methodology that has been the basis of NGC’s charging for use of system, Ofgem has not quantified the financial significance of errors due to using the methodology.

## NGC rebuts claims

In its response to Ofgem’s views on inefficiencies NGC politely observes<sup>4</sup> :-

“The exposure to transmission loss factors compared to the potentially more intermittent incidence of constraint costs suggests that improved signals concerning the cost of losses should be the priority. In quantitative terms...the effect of including transmission losses in this optimisation could reduce total losses (of around £100m per year) by at most 3%...Whether there is a justification for improving the short term signals for constraint costs is more debatable. In recent years, total constraint costs have been at a low level (circa £20m per year) and this tends to arise from a number of short-lived pinch points. Even if an access regime permits participants to resolve a significant proportion of these, the potential for reducing the costs arising from congestion would tend to be a small proportion of this total. Hence, if constraint costs remain at this level, there is unlikely to be a significant benefit from improving the efficiency of arrangements for resolving transmission constraints at this time.”

Hopefully Ofgem will now grasp the obvious.

Under the heading of “NGC investment signals and incentives” Ofgem claims that “Ultimately, the weaknesses of the initial Neta arrangements, with regard to unified NGC signals and incentives, could manifest themselves in three types of effect”, viz 1) “a failure to maximise the capacity available to participants”; 2) “administered and regulated investment drivers will tend to result in inefficient levels of transmission investment”; and 3) in unspecified ways “NGC could face conflicting signals as to the impact of incremental investment across its TO and SO activities”.

In its response NGC observed:-

“Whilst information arising from auctions, particularly if they relate to capacity several years ahead, could

supplement the planning data currently used, a regulatory linkage between auction prices and the financing of new investment has the potential to give rise to a number of significant detrimental effects. An inappropriate linkage could lead to a delay or reduction in network investment, exposure to unduly high access prices for market participants and ourselves, and consequently barriers to entry of new generation capacity. We do not think it would be in the interests of market participants, the security of the system or ourselves to change the existing approach and introduce the risk of inappropriate linkages between investment and access prices...Exposure to a tradable access rights regime would not improve our incentives to invest from those that currently exist under the combination of our main price control and our Balancing Services Incentive Scheme”.

### Interactions

Gas and electricity market interactions is one of Ofgem’s favourite themes and was wheeled out as a way of justifying reform. Ofgem says:-

“...it is important that new entrants and existing players receive consistent pricing and locational investment signals across the gas and electricity markets. A new transportation access entry regime has already been implemented in the gas market and it is important that arrangements in electricity are broadly consistent with the new arrangements in gas” because “a divergence in arrangements could lead to inefficient or perverse decisions being taken by participants... The initial Neta arrangements for transmission access and pricing are not consistent with the proposed exit capacity regime in gas. Over the long term, the inconsistency between the two regimes, if allowed to continue, will lead to distorted decisions by NGC and new entrants on the location of new investments and in the short term to interactions between the gas and electricity markets which do not reflect consistent incentives and price signals”.

What this array of words neglects to mention is that the prices arising from the gas entry auctions are artificial and bear no relationship to investment pricing signals, and furthermore that the auctions are a chaotic mess, a point which is developed below. Essentially Ofgem is arguing that two wrongs (i.e. ill conceived pricing regimes) make a right. As NGC observes:-

“We do not believe it necessary to use identical market arrangements in gas and electricity to achieve compatibility of signals. Rather, the specific characteristics of each market should be addressed and accommodated in whatever arrangements are put in place.”

It is long overdue that Ofgem ceased promoting its superficial claim that gas and electricity are inherently similar commodities and consequently the design features of the markets should be aligned. In practice the pursuit of false “convergence” has increased regulatory interference as first a new complexity is introduced into one market, and then read over into another market. Electricity has half hourly settlement - therefore Ofgem proposes hourly (if not half-hourly) settlement for gas; gas has entry auctions, therefore electricity should. And so it goes on, turning both industries into regulatory playgrounds and increasing regulatory risk.

### Objectives of reform

Having stated what it regards as a case for reform, Ofgem says that “the objectives of reform” are to eliminate the shortcomings, and then without any further analysis (let alone considering the quixotic characteristics of electricity networks) jumps to the conclusion that “the best means of achieving these objectives is the establishment of firm tradable access rights...”. We read that there are four benefits of reform, namely:-

- Neta - related issues. “Neta has been established on the basis of treating electricity as a single system-wide tradable commodity. In order to encourage liquid trading in forward electricity markets, trading is without regard to location. Due to the costs of losses and transmission constraints, the value of electricity can differ according to its location. Market based arrangements for transmission access and losses will capture this locational diversity”. *For reasons that Ofgem does not trouble to explain “the result of this will be to make the pricing of forward electricity contracts more transparent and straightforward, thus reducing volatility, increasing liquidity in forward electricity markets and hence increasing the efficiency gains expected from Neta”. In fact adding further complexity and basis risk would surely reduce the little liquidity that there is in the forward electricity markets*

Ofgem also observed that:-

- “By separating the energy and transmission markets, new arrangements based on tradable transmission capacity access rights will also simultaneously reduce the opportunities for, and the scope of damage from, exploitation of locational market power - for example, by facilitating leverage of locational positions into the wider electricity market - and increasing the effectiveness of regulatory oversight of such adverse conduct”. *This seems to me to be a meaningless set of words.*
- Short and long term efficiency issues. “Ofgem believes that market based transmission access rights [and new losses arrangements] will ensure that the locational variation in the costs of electricity that arises

because of transmission constraints and losses are reflected in prices faced by participants”. Consequently “In the longer run, the access prices emerging from the new arrangements will more accurately reflect the scarcity of transmission access at each location on the system and influence long term investment and retirement decisions for generating plant, and for significant demand sites, accordingly”. In Appendix 7 Ofgem claims that “Under the new regime for...a traded access right regime, participants will be exposed to short run locational cost signals based on the marginal *cost* of...transmission constraints”. The consultation document also referred to “Exposing participants more fully to the economic *costs* of their own actions”.

*But as I argue later, if the auctions functioned, they might allocate to reflect scarcity if capacity could be defined, but they will not indicate costs*

- NGC investment signals and incentives. Ofgem claims that “market based transmission access arrangements will allow NGC’s TO and SO incentives to be unified... As a result, investment in new transmission capacity and decisions made with regard to making the maximum amount of existing transmission capacity available, will reflect both the long term *costs* of constructing and maintaining the transmission network and the short term *costs* of using the transmission network”.

*This is unfounded rhetoric*

- Gas – electricity interactions. “The benefits of consistent market based transmission arrangements in gas and electricity will be to enhance security and quality of supplies as short and long term interactions between the two markets are improved; lead to more efficient location decisions and reduction in both the short and long run costs of operating the gas and electricity transmission system and facilitate arbitrage.”

*This is meaningless verbosity*

Ofgem wrote eleven pages of fluff that could have been written without double repetition in four pages – but it would still have been fluff. One does not need a degree in economics or accounting to understand that Ofgem’s economic rationale (or perhaps more accurately “rationalisation”) for reform consists of no more than unquantified generalities. It is clearly neither capable of the quantitative analysis that should characterise the economics of public policy issues, nor does it display understanding of the techno-economics of transmission systems.

## The characteristics of auctions

*“Es un entre verado loco, lieno de lucidos intervalos”<sup>5</sup>*

*Don Quixote.*

It is important to understand that different types of auctions have different economic characteristics. In particular there are significant differences between:-

- common auctions to buy a house or a second hand car or the internet based auctions which large companies set up for procuring goods
- the types of auctions that have been developed in electricity markets in some parts of the world
- the type of auctions which Ofgem has created for gas entry and is proposing for transmission access.

### Common auctions

Three crucial features of common auctions are that 1) the product is defined in that it is a specified house or car or widget; 2) for most prospective purchasers a particular purchase is to varying degrees discretionary because the purchaser generally has significant choice – he rarely has to buy a particular house or car or widget because there are plenty of other houses and cars on the market; and 3) there are external market prices to which to relate a bid price.

### Existing electricity auctions

Over the last few years two types of explicit<sup>6</sup> auction have been introduced into electricity markets relating to transmission:-

- auctions to hedge congestion such as those for “fixed transmission rights” in the PJM market where prospective purchasers bid to buy a financial hedge of specified MW<sup>7</sup> for congestion between specified points or zones, and the auctions run by the Australian National Electricity Market Management Company which offer financial hedges across the intertie price differentials between market zones
  - auctions of physical capacity between markets such as those across the England-France interconnector and the interties between the Netherlands and Germany or Belgium. The capacity from France to England has been auctioned in three year strips of 50MW, one year and quarterly and daily strips of 1MW. The capacity from Germany to the Netherlands is auctioned in one year, monthly, and daily 1MW hour strips
- Again we find the same three features in electricity auctions that characterise conventional auctions. Namely

first, both of these types of auction are auctioning defined products. While the hedges are related to the underlying physical behaviour of transmission networks, the auctions of physical rights are directly related to the physical capacities of transmission facilities. The England/France interconnector generally flows from France to England into a potentially import constrained zone and so it can - and for years until the introduction of first Neta and then capacity auctions, has - run at the full 2000MW. Although the capacity of the interconnectors between the Netherlands and the surrounding countries vary depending upon system circumstances, by the time of the daily auctions the available capacity for the next day can be reasonably accurately forecast.

Second, they are discretionary in the sense that market participants do not have to have them in order to do business. Generally auctions of physical capacity between markets are not central to the business of the majority of market participants but provide a peripheral opportunity to trade, particularly for generators who are likely to be focused on their "home" market<sup>8</sup>. And third, the price which a market participant will be prepared to pay for a hedge or to transmit power from one market area to another is based in principle on the expected differential in "market" prices between the nodes, or zones<sup>9</sup>.

### The current gas entry auctions

The current biannual gas entry auctions<sup>10</sup>, which commenced in September 1999 and offers month by month strips of "firm"<sup>11</sup> entry capacity for each of the six major entry terminals, is fundamentally different to the foregoing types of auction in three critical respects:-

- there are no clearly definable measures of capacity that can be auctioned and so the resulting prices do not value scarcity, let alone any measure of operational costs
- it auctions a product which is essential for those wishing to undertake business - they are auctioning access to an "essential facility"
- they are subject to continuing rule changes, which creates regulatory risk

There is no clearly defined measure of capacity because the capacity of a meshed network that behaves in an interactive manner between inputs and outputs is very difficult to define in general terms. Ofgem attempted to finesse the assessment of physical capacity for the biannual gas entry auctions by avoiding any attempt to assess the "flange capacity" of the six terminals. Instead the total "capacity" of the six terminals was defined as being related to the ability of Transco to move the gas through the terminals, and this depends upon whether or not there is a constraint at or downstream of the terminal:-

- if there is a constraint, then the ability to move gas depends upon the terminal flange capacity if that is the cause of the constraint, or if it is downstream (e.g. at a compressor) then it is local consumption plus the export capacity of the constraint
- if there is no constraint, then the ability to move gas away from a terminal depends on the national consumption and the quantities of gas flowed through the other terminals

Until the latest auctions in September 2001 Ofgem required Transco to define the total entry capacity to be auctioned as related to the system weather normalised demand profile plus a percentage (0% then 10%), and the total was then divided among the six major entry terminals pro-rata to their historic average flows. In the latest auction the basis was switched to the 1 in 20 year system maximum demand concept used for planning the network, which is offered in all periods regardless of the probability of incurring maximum demand and regardless of physical capability. In the case of St. Fergus the capacity offered may get close to the physical flange capacity in peak winter months, but in off-peak months the quantities offered are far in excess of physical capability<sup>12</sup>. This feature is even more pronounced at the terminals that deliver higher swing capability.

Yet unless the capacity is determined by a genuine physical limit the product auctioned is in no respects a measure of the physical capacity of the gas transmission system. This point is most obviously made by considering a grossly oversized network that could supply all demand from input from any one of its terminals. Using the "demand" methodology for assessing auction capacity one can contrive artificial scarcity given that some shippers with a portfolio of supplies will wish to overbook capacity to provide the flexibility to allow them to choose which supplies to use<sup>15</sup>. A consequence of this approach to artificially defining capacity is that the auction prices are neither valuing a scarce resource, nor are the prices reflecting the need for investment. In a similar manner shippers and producers no longer have access to a realistic assessment of onshore capability and consequently are at risk of making investment decisions that they may come to regret. Notwithstanding this obvious point, and without resolving the underlying flaws in the biannual auctions, Ofgem has been promoting the concept of auctions for long term capacity rights which would supposedly provide Transco with signals of the need for new investment<sup>14,15</sup>.

The product is necessary for business: a gas shipper needs access to one or more gas terminals in order to be able to conduct any business at all and so to varying degrees Transco is auctioning an "essential facility". In consequence, because many of the shippers regarded their demands as inelastic with long term commitments at

one terminal and some producers supply at one terminal, they will bid what is necessary to get access to avoid the risk of being left high and dry. Shippers' downstream commitments and limited sources of supply create an environment of inelastic demand whereby they cannot walk away from entry capacity auctions without exposing themselves to possible loss of downstream business and penalty payments on long term supply contracts. This means bidding against an estimate of the supply curve of the other shippers who are all facing similar pressures. The result is that bid prices climb, ultimately forcing some into a "distress" purchase situation. The pressure on shippers to buy capacity in the monthly auctions was exacerbated by:-

- the high over-run charge for flowing gas without "a ticket to ride"
- the reserve price for firm capacity bought in the daily market was set higher than the reserve price in the auction for monthly entry capacity
- neither at the time of the auction, nor subsequently, does Transco inform shippers of how much daily capacity was likely to be available - they are thus bidding blind

The combination of the demand approach to assessing the monthly capacity plus the various auction rules created artificial scarcity and a "shipper fear" factor, and there has been something of a scramble in the auctions. The 2000 March auctions of monthly entry capacity saw prices rise far higher than the previous auction six months earlier. A review by Ofgem of the new gas trading arrangements<sup>16</sup> reported that the weighted average price increased by between 100% and 700% across the six entry points, and prices were also much more volatile and the spread of accepted bids was very large.

The income from the auction was £228m compared with the target of £144m. Ofgem concluded that the "key factor driving the auction prices was...the demand for monthly capacity was very high compared to the volume of capacity available". It suggested there were a number of factors why demand might have been high, including high oil prices increasing the incentive to lift oil, and hence associated gas; increased exports through the Bacton-Zeebrugge interconnector; and the capacity being lower in the summer due to lower consumption (which would be an absurd explanation for a genuine shortage of physical capacity); and Transco's maintenance programme, which is undertaken in the summer months, reducing capacity. Ofgem conceded that features of the auction design, as well as bidder behaviour and perceptions, may also have had an impact.

Despite changes to the auction rules, a similar situation arose in February 2001 when auction prices at St. Fergus averaged over 7p/therm, which is equivalent to more than a third of current spot commodity prices, and the auction raised £426m compared to a target of £61m - an over-recovery of nearly 600%. Again despite a major change to increase capacity for the September 2001 auctions, there was still a significant over-recovery of £60m.

Such an auction may be effective in allocating a scarce - or artificially contrived scarce - resource (*see below*) to users by the value they place upon it, and it transfers a scarcity rental to the auctioneer. At least one, and possibly two, and possibly a third, consequences follow:-

- the resulting auction prices do not reflect any operational costs - short run or long run - and consequently they do not provide an accurate cost based investment signal. Rather they reflect the value of an (essential) facility to the purchasers
- since Transco is not allowed to keep any over recovery, and the excess auction income is returned to shippers, a large amount of money sloshes around with redistributive consequences that generally benefit Centrica
- if (as has been the case with the gas auctions) the prices are above the cost of expanding the network then the auction may breach Article 82 of the Treaty of Rome, prohibiting undertakings from abusing their dominant positions to the extent that such conduct affects trade between member states (*viz* UK/Belgium). Essentially Transco is in a dominant position and if it is abusing that position (even with the approval of Ofgem), then if the prices are significantly above the cost of expansion, this might constitute an abuse (*viz* excessive pricing above cost is an acknowledged category of abuse)

Rule changes: throughout the two years since the gas entry auctions were introduced there have been a series of changes to the auction rules altering reserve prices, capacities, and other features of the auctions. Some of the changes are widely believed to be promoted by Ofgem<sup>17</sup>. The last set was introduced in a flurry on 24 August five days before the auction (so late that the normal consultation period had to be reduced), and were followed with further changes to the distribution of the surplus<sup>18</sup>. The Competition Commission report on the market abuse licence condition quotes the Director General as saying "Constant rule changes caused uncertainty, and this could stifle innovation and damage competition". Obviously, this philosophy is not one that Ofgem believes in applying consistently.

Over the process of introducing and developing auctions Ofgem has made little obvious effort to understand the prices emerging from the auctions, and it has made little or no attempt either to simulate how longer-term auctions might operate or to understand the interaction between the different proposed auctions.

## A warning for electricity

The gas auctions should serve as a warning to the electricity industry. “Reforms” have been implemented in a piecemeal fashion. Doctrine has prevailed over pragmatism and the auction process has been the subject of constant tinkering and rule changes. With little evaluation or understanding of the chaotic mess it was creating due to a fundamentally flawed concept, Ofgem proposes to extend the auctions in gas to long term auctions that were (wrongly) supposed to provide investment incentive signals to Transco (yet two years after introducing them with this intent, Ofgem does not know how to do it), and also to extend them to electricity.

Along the way the means - auctions - appear to have become more important than the ends, namely how to charge sensibly for entry access and to allocate the available capacity (sensibly defined). The gas entry auctions are not only flawed in concept, they have become chaotic.

## The proposed electricity access rights<sup>19</sup> auctions

The features described for the gas entry auctions apply equally to the proposed electricity entry rights auctions. Namely the product is necessary for a generator’s business, and thus if access is perceived to be scarce and if an auction is perceived to be competitive (*which is a big “if” for transmission access, see below*) then:-

- the resulting auction prices do not reflect any operational costs - short run or long run - and consequently they do not provide an investment signal. Yet part of Ofgem’s rationale for auctions was to provide short run and long run cost signals, and hence investment signals from the latter
- the auction arrangements may lead to results that breach Article 82 of the Treaty of Rome

Furthermore the difficulty of defining capacity is even more extreme in a meshed AC electrical transmission network than in a gas network because there are far more entry points; an electricity network is much more complexly and dynamically interactive than a gas network with significant - and sometimes seemingly perverse - loop flows; and electrical networks are designed and operated within security constraint limits where an injection in one part of the network may impact on flows and hence constraints a distance away.

Up to the limit where so much power is being injected into and supplied from a network that one or more of its significant facilities reached their thermal limits or there would be voltage drop or dynamic instability in the whole system, the concept is in fact almost meaningless because the maximum “capacity” of a given network depends upon how it is used<sup>20</sup>. Thus if there were no generators in the southern part of England other than synchronous compensators the maximum capacity of NGC’s network (defined as its ability to take in and supply power to grid supply points) would be one figure, while if there were no generators in the north the capacity of the same set of facilities would be a different figure. Then below these limits the “capacity” depends upon the configuration of injections and withdrawals played out against security considerations. As NGC commented:-

- “The potential volume of available access products for a particular power transaction across the network is a complex function of the size and location of other transactions combined with the thermal capabilities of transmission equipment, system voltage characteristics and dynamic stability issues. Simplification of these relationships into a manageable set of products requires an as yet unproven accuracy in their forecasting and assessment”.

Although the consultation document glibly comments that “The volume of access rights allocated in their primary allocation mechanism must relate in some way to the underlying physical capabilities of the transmission system - the system’s ability to transfer power from one location to another” the truth is that for a year and a half Ofgem has flailed around without success trying to define transmission capacity. More to the point it lamely - and not surprisingly - observed that “There is no clear definition of system capability on which the primary allocation of rights can be used...all measures of transmission capability will inevitably involve subjective judgements and assumptions on demand and generation...further consideration needs to be given to exactly how to define transmission capacity”. Quite so - but the definition of capacity is fundamental to any meaningful auction.

## Two mutually inconsistent objectives

There are two mutual inconsistencies at the heart of the access concept:-

- the conflict between possible (but probably imaginary) liquidity and the resolution of constraints
- the conflict between the desire to decentralise through markets and the need for central coordination and facilitation by NGC

### Liquidity versus the resolution of constraints

As mentioned above, NGC’s strawman produced for the conference in August 2000 brought out the potential conflict between possible (see below) liquidity and the potential for resolving constraints. NGC undertook

further analyses and found that with 12 zones only about two thirds of the total volume of transmission constraints could be resolved prior to gate closure; with 24 zones about 75% could be resolved; and with 31 zones about 90% could be resolved. Significantly Ofgem neglected to mention either the Herfindel-Hirshman indices or how many generators there would be to compete in the various zones.

Ofgem's muddled thinking is revealed by the following mutually contradictory statements in the Consultation document:-

- there should be large zones to create liquid markets because "secondary trading in access rights will be critical in ensuring that new transmission access and pricing arrangements result in the allocation of rights between participants"<sup>21</sup>
- Ofgem's aim is "that any transmission access market should aim to resolve at least 75% of total constraints prior to gate closure...[thus] Ofgem considers that it may be necessary for these entry rights to be split between a relatively large number of zones (around 30) in order that the SO can resolve the most constraints via the trading of access rights...further consideration needs to be given as to whether some form of nodal definition of rights along with other mechanisms to facilitate trading should be employed"

It is a no brainer that these are irreconcilable aims, and as NGC observed "Our earlier analysis of the likely market concentration within transmission access markets suggest that there is a high probability that efficient prices would not emerge. Investments based on such signals would also risk being inefficient." Even Ofgem recognised this point when it observed that its:-

"initial view is that a definition of access rights based on a relatively small number of zones would be desirable since it would facilitate liquid secondary trading. However, it seems likely that it will not be possible to create transmission access rights that capture the majority of expected transmission constraints without using a large number of zones. Thus, further consideration needs to be given as to whether some form of nodal definition of rights, along with other mechanisms to facilitate trading should be employed".

This conflict should have consigned the scheme quietly to oblivion if some semblance of rational thinking prevailed in Ofgem.

The word "possible" was italicised above because it is very unlikely that such a small market (which would not be exchange based, and would be reliant on NGC, see below) would have any prospect of significant liquidity. The more the market is divided, the lower will be liquidity and hence reduce the efficiency of the market because contractual positions can only approximately be matched with demand. NGC was clear that the although the primary auction would have to be of "bundled" relatively simple products, ultimately since the access rights were supposedly physical rights<sup>22</sup> which it could use to manage constraints, the initial products would have to be unbundled into half hourly access rights for each zone. For their part market participants would ultimately aim to own a portfolio that matched their input schedules otherwise they would be penalised with access imbalance charges. Defining access rights at the half hour level that implies about 30 different property rights have to be defined for each half hour which requires 525,000 different contracts annually (and times two if there were matching exit rights). Obviously there will not be sufficient liquidity for continuous trade of so many contracts, particularly since NGC will have to be the counterparty for many, if not most, trades.

## **The conflict with centralism**

There is a fundamental inconsistency in trying to decentralise trading when the nearer one gets to real time the more essential central coordination becomes because of real time changes and the complexity and externalities in electricity networks. The document included a series of words about the prospect of "Unfacilitated" trading versus the need for trading facilitated by NGC.

NGC is the only party in a position to resolve constraints and to take account of the idiosyncratic nature of flows in meshed AC networks, and it stated as much observing that "If access rights were defined on an entry/exit basis, SO facilitation would be necessary for trading between different zones or nodes, especially if rights were defined with a large number of zones or nodes". The reason for NGC's necessary facilitation role is that near real time only it has the information to assess the (often quixotic) trade-offs between making changes to flows in different parts of the network that are necessary to maximise the use of the network while keeping within security constraints. The Annex provides a simplified example. Ofgem's statement that "It might be possible to rely on unfacilitated trading" is nonsense. The following is a more realistic view from the consultation document:-

"If liquid secondary trading within zones or at nodes does not develop, then the only realistic way to increase liquidity may be to allow participants to trade rights between locations (zones or nodes). However, this requires some method of determining how volumes of rights can be exchanged between locations as participants will not themselves be in a position to know ex ante the exchangeability of rights in different locations. Hence the SO would need to facilitate trading by assessing the exchangeability of rights between locations...".

NGC comments that “Our analysis suggests that a complex access imbalance system, which settles the access position of each market participant, would be unavoidable in such an approach”. The conflict of objectives between decentralism and centralism also implicitly emerged in the difficulties Ofgem was encountering with an imbalance arrangement for the access auctions. Namely it observed:-

- “It follows that an access imbalance regime with imbalance charges and payments based on (although not necessarily equal) to the best available estimate of real time access prices (i.e. those emerging from secondary markets) will provide appropriate incentives for participants...Cost reflective pricing of access imbalances implies an imbalance price for each location related to the costs of the SO resolving prices at that location”
- “The general principle underlying access imbalance settlement should be that, to the extent that participants’ ex-ante purchases of access rights do not match their physical generation or consumption, and this imposes costs on the system participants, they should be exposed to these costs. Cost reflective pricing of access imbalances implies an imbalance price for each location related to the costs of the SO resolving imbalances at that location”

Here we miss what Ofgem had earlier rejected, namely real time nodal prices set by a last price auction which can only be derived by using a centrally run security constrained optimiser.

### Other difficulties

Three further points are worth stressing about the access rights proposals; namely 1) they would introduce additional uncertainty; 2) they are complex and expensive; and 3) they would further discriminate against small generators:-

- they would introduce more uncertainty into the market through the imbalance charges - does one sell power before one has procured transmission access, or vice-versa? Unless the secondary market were liquid - which it would not be - this dilemma would increase risk. Furthermore although analysing access rights on a half hourly basis may be relatively straightforward for base load plant which will want to purchase base load transmission access rights, it will be much more difficult (if not impossible) for intermittent or flexible plant (which Neta was supposed to reward)
- at best the arrangements would be complex and expensive for NGC and for the market participants:-
- NGC observed “Our preliminary assessment of the cost of the settlement system for a tradable access regime is based on the need for a system that would have a size and complexity similar to the Neta energy settlement system. Based on experience of Neta implementation, we believe these initial estimates may have understated the project management and legal costs associated with such a project”. Yet early on in the document Ofgem claimed that it wished to “avoid complex centrally administered solutions wherever possible”
- if we take Neta as a guide, the additional set up and five year running costs of the market participants is generally estimated at four or five times that of the central systems
- a company with generating units in (say) 3 zones would have to manage 52560 physical positions annually, attempting to match them via an inefficient secondary market. Firms would either have to incur additional transaction costs adapting their transmission rights portfolio to intended transactions or incur penalty charges for deviations from the permitted flows
- NGC observed “Under a tradable rights regime there will be access imbalance risks that will be more difficult to minimise by aggregation because only the diversity available in each zone or area can be exploited. We believe it is particularly important to assess the likely impact of a tradable rights regime on small generators as quickly as possible in order that the implications for the government’s targets for CHP and renewables can be assessed.” Indeed it requires few brain cells to realise that the risks and transaction costs discriminate against small operations, and renewable energy sources like wind are at a disadvantage because they are weather dependent reducing predictability and combined heat and power production is also at a disadvantage as it is driven in part by the heat demand which is a function of weather. But as we know from Neta, Ofgem does not seem to be concerned about small generators

### Responses to the consultation

There were about 60 responses of which all but a handful were vehemently opposed to the scheme. NGC has already been quoted extensively on detail points. Although it said that a scheme of access rights could be devised using a sophisticated simultaneous clearing auction, it summarised its views as follows:-

“We have examined the ways in which such a regime could be implemented, considered its potential effectiveness against a number of objectives, including those set out in the consultation document, and estimated its likely costs. While we believe such a regime could theoretically be designed to address concerns with the

current regime, such a system would inevitably be both complex and expensive to build and operate. Under the present market conditions, we believe the benefits of reform will be small. While future conditions may be different, there is considerable uncertainty about when, if ever, the potential benefits of reform may be sufficient to justify the significant costs. Indeed, it is possible that modest developments to the present regime could reduce the risk of existing shortcomings ever becoming material.”

NGC proposed a simple method of allocating firm access rights to all participants, for which they would pay a capacity based access charge. To avoid the need for a complicated access imbalance settlement system the initial volumes would not be specific capacity levels but a right to operate within certain “natural” limits (e.g. for a generator between 0 and its registered capacity) which are linked with the nominal capacity of the system designed in accordance with NGC’s Security and Quality of Supply Standard. The form of the access charge should depend upon whether or not additional locational signals are given to participants through transmission losses charges. If there are short term locational signals provided through a transmission loss charge the access charge could be a flat postage stamp charge.

In order to resolve potential transmission constraints ahead of Gate Closure and the Balancing Mechanism, the SO would buy locationally defined option contracts in a tender process whereby generators and loads would make tenders for providing information on bids/offers to be incremented or decremented from a level Physical Notification ahead of Gate Closure. Exercise payments would be proportional to the magnitude of the Inc or Dec i.e. in £/MWh. The options would be called to deliver a particular volume in advance of Gate Closure hence giving participants time to trade out any energy contracts that otherwise would have been put out of balance. This should ensure that the prices offered relate solely to the costs of transport rather than any energy costs or energy imbalance risks. The short term locational costs of transmission constraints could be charged to market participants via a locational BSUoS-type constraint charge.

Having created confusion and forced CUSC through, it now looks as though Ofgem may be opting out of taking transmission access further. Recently at a Transmission User Group meeting a representative of Ofgem said that the next document it produces on transmission access will merely consist of an analysis of responses, and that the matter will then be left to the industry to progress by offering amendments for consideration through the new CUSC governance arrangements (which provide Ofgem with the final say).

## A case study in public maladministration?

*“There is nothing more amusing than seeing an enemy fall off a high roof”.*

*Chinese saying.*

To state the obvious, the first step in public policy analysis should be a quantified statement of the problems to be resolved (or issues to be addressed). The second step should be to consider the practicality of options for resolving the problems, where possible based on a thorough understanding of both why the problems arise and how they might be resolved. The third step should be an analysis of the cost-effectiveness of feasible methods for resolving the problems. The final step should be to either do nothing or to select one of the options.

Thus in the case of transmission access and the management of constraints the appropriate approach should have been to appoint a consultant who understood the electrical and economic characteristics of transmission systems and also the operation of electricity markets, and another consultant who understood auctions. Ofgem should then have quietly discussed with NGC the quantified problems and/or issues which needed addressing. Then in a structured and knowledgeable manner, it might have tried to push the bounds to see whether a novel idea like decentralised auctioned access rights might be relevant, and if so prepared a case and showed how the arrangements might work.

Ofgem did not follow this process. It began with a solution - auctions - looking for a problem, and subscribed to shallow thoughts about the need for convergence with gas entry auctions and wallowed in superficialities and overblown rhetorical first year economics. At no stage has it given the appearance of possessing the necessary know-how of either the behaviour of transmission systems or of auctions, and the standard of logical rigour it displays in arguments is (as usual) low. Also it appears to have great difficulty in writing either concisely, or clearly, or consistently. And the process has not been helped by Ofgem having appointed five managers in two years to handle the project, none of whom were obviously qualified for such specialist work and at least one of whom had no belief in the concept. A consequence of Ofgem’s approach has been to waste many people’s time.

The experience has been similar to Neta, where a radical and expensive change in the market was introduced without any significant analysis to show that the changes were likely to have any discernible benefits. The difference between the main Neta market (and the gas auctions) is that electricity transmission is manifestly more complex and illusions quickly bump into the reality of network operations. Ofgem may not understand either Ohms or Kirchoff’s laws and how power flows (including so called loop flows), but they are there!

These issues raise questions about Ofgem and how it tackles such matters. It is increasingly looking like an organisation with too much power and too little accountability, that is out of its depth. It is driven by people who have a naïve and “fundamentalist” belief in markets for the sake of markets regardless of practicalities, transaction costs, and (regulatory) risk.

### Footnotes

0 The word “cost” has been italicised here and elsewhere to draw attention to the difference between the alleged objectives of an access rights regime and the reality of what the prices in an access rights auction would in fact reflect, see? (supposing such auctions were feasible).

1 Criticism of a “centralised mechanism that is complex” and advocacy of “a regime that is transparent, simple, and is easy to understand” is rich coming from the organisation that gave us the balancing mechanism!

2 Ofgem claimed in its evidence to the Competition Commission considering the market abuse licence condition (see para 7.293 of the Commission report):-

“Although predicting and managing transmission constraints might be more difficult under Neta, it did not expect overall constraint volumes to change, or significant and persistent changes to emerge, as the physical location and underlying economies of generation would not change”.

As will become apparent, consistency is not a quality that concerns Ofgem.

3 In “You cannot split a pantomime horse in two”, Power UK, June 2001. Tim Russell analysed this contention in detail and concluded “the notion that constraint costs could increase dramatically due to Neta is unfounded”.

4 Response to “Transmission access and losses under Neta” Ofgem consultation document May 2001, National Grid Company.

5 “He’s a muddle-headed fool with some lucid intervals”.

6 In addition to the explicit capacity auctions there are implicit combined energy/access bids in the market splitting approach adopted in the Nordic market.

7 This is an over simplification of the PJM concept of the hedges associated with “network service”.

8 Exceptions include a generator built specifically to export from one market area to another and a trader set up primarily to import and export.

9 In practice a forthcoming study for the European Commission will show that there is negligible correlation between the auction prices for daily capacity from Germany to the Netherlands and the spot price differentials between the Frankfurt and Amsterdam Power Exchanges. Part of the reason is that the capacity auctions take place before the power exchange auctions.

10 In addition there are daily auctions of firm and of interruptible capacity and an intra-daily market. The offers of month by month strips supplemented by daily and intra-daily auctions are intended to allow a shipper to profile its purchase of capacity to meet the pattern of its demand both across months, within months, and within days.

11 They are firm in the sense that if Transco cannot take the gas it either has to buy back the right or pay a penalty.

12 Until the latest gas auction some shippers, thought that the capacity offered at St Fergus was close to physical capability because Transco had increasingly been driven to curtail firm capacity availability. Interestingly a debate developed around whether constraints be regarded as physical or commercial. An argument was that commercial constraints led to high bid prices, which creates problems of winners and losers alongside significant revenue redistribution issues in the context of a priced controlled monopoly being required to return excess rent. This issue was of such significance that the question of physical capability became a second order issue; and the result was a modification designed to reduce commercial scarcity.

13 Consider a situation where there are three shippers using a terminal where Transco is auctioning 75 units of capacity, and they normally flow equal amounts. If each bid for 25 units, then each would be satisfied - but if one shipper has a portfolio with supply from another terminal, then it might want flexibility to switch supplies and so bid for 30 units, leaving the other two short.

14 Long Term Signals and Incentives for Investment in Transmission Capacity on Transco’s NTS, Ofgem. May 2000 and Conclusions on the Framework, Ofgem December 2000.

15 It does not require much with to work out the flaws in the concept, including the incentive on Transco to under-invest, but that is another story.

16 The New Gas Trading Arrangements: A review of the new arrangements and further development of the regime, Ofgem, July 2000.

17 Presentationally Ofgem it seems tries to hide behind the Network Code under which market participants and Transco propose changes, and Ofgem rules on them. But it is widely accepted that often Ofgem is the

puppet master behind some changes.

18 Letters from Steve Smith, Director of Trading Arrangements, Ofgem, dated 24 August 2001 and 28 September 2001.

19 The emphasis in the consultation document is on access rights. Ofgem conceded that the exit regime might be different from the access regime, and seemed to imply that it might reduce to call option contracts to load manage.

20 In Appendix 5 “The transmission price control review of the National Grid Company from 2001: Transmission asset owner - Final proposals”, Ofgem, Sep 2001, NGC points out that the current exit capacity of the grid is 58.6GW; the total maximum circuit capacity at entry points is 179.9GW; the maximum simultaneous demand capability is 56.1GW; and it provides a table of system boundary capabilities. NGC also points out “It is important to note that the calculation of boundary capability depends on the strength of the transmission network (across the boundary and locally to it) and the disposition of generation and demand either side of a boundary. As the disposition of generation and demand changes from year to year, throughout the year and indeed over the course of a day, the boundary capabilities will also change... Given the close proximity of some boundaries, certain reinforcements will increase the capability on more than one boundary, so as problems are resolved in one particular area, this may give an increase above the minimum required capacity on another boundary. At off peak times, system transfers may be larger than those calculated for the time of peak demand. During the summer, boundary capabilities will also fall due to the need to take circuits out of service for essential maintenance and construction work”. As Oscar Wilde observed “The truth is rarely pure and never simple”.

21 Ofgem observed that with SO facilitation “in practice there may be few speculators interested in rights”. As there is very little speculative trading in Neta the idea that speculators would get involved in an illiquid micro and complex auction market illustrates well the delusions of Ofgem’s thinking.

22 More correctly they would have to be obligations.

23 The example is taken with thanks from Optimal congestion treatment for bilateral electrical trading, Karsten Neuhoff, Department of Applied Economics, University of Cambridge, October 4, 2001, karsten.neuhoff@econ.cam.ac.uk.

**Annex<sup>23</sup> The necessity for NGC’s involvement in efficiently resolving constraints**

The four node network in the figure illustrates why the system operator has to obtain several types of transmission rights to efficiently reconfigure the types, which only it has the information to assess. Assume a lossless AC network where all links have identical reactance and two links between node A and B and node A and D are capacity constrained. Nodes B, C and D are injection nodes and energy is withdrawn at node A. It suffices to define entry rights for nodes B, C and D because the amount of energy withdrawn at node A follows from the amount of energy inserted at the other nodes. Due to loop flows the energy transmitted from node B to A does not only use the direct link, but part of the energy is transmitted on alternative routes via node C and D. For example 5/8 of the energy inserted at node B and withdrawn at node A is transmitted via the direct link, 2/8

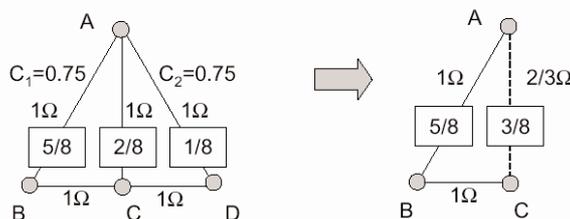
transmitted via the link between C and A, and 1/8 transmitted via the link between D and A. For its internal calculations the system operator defines rights for the constraint links B-A and D-A; an entry right to insert one MW at node B corresponds to the transmission of one MW from node B to A and is associated with 5/8 MW of flow gate rights to link B-A, 2/8 MW of flow gate rights to link C-A, and 1/8 MW of flow gate rights to link D-A.

Assume the system operator initially assigns the entire transmission capacity to create entry rights for nodes B and D. A market participant requests an entry right for node C, but one MW of the right increases flows on both constrained links B-A and D-A by 1/4 MW, thus violating the transmission constraints. Before issuing entry rights to node C the system operator therefore has to buy back some entry rights to nodes B and/or D.

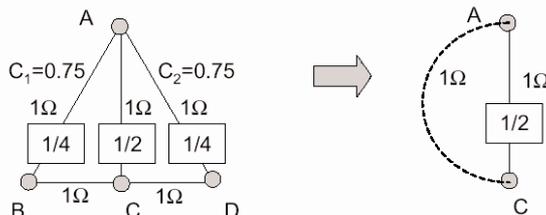
If we assume that the market for entry rights is illiquid, then the system operator might only be able to obtain one type of rights, say one MW of entry rights at node B which corresponds to 5/8 MW of flow on link B - A and 1/8 MW on link D - A. The system operator subsequently sells 1/2

**Entry rights example**

Analysing flow from A to B



Analysing flow from A to C



Source: Karsten Neuhoff

MW of entry rights to node C, increasing the load on both links B-A and D-A by 1/8 MW. The constraint on link D-A is binding again, restraining the system operator from issuing more rights, whilst the constraint on link B - A is slack.

The alternative approach, which the system operator might pursue if there is a liquid market in access rights, is to simultaneously buy entry rights at B and D. In exchange for half a unit of entry right B and half a unit of entry right D the system operator can sell 3/2 units of entry right C.

This approach is more efficient. In order to facilitate exports of one MW from node C, in the first approach combined exports from node B and D are reduced by 2 MW, whereas in the second approach the combined exports are reduced by 2/3 MW.

In either case only the system operator can reconfigure entry rights, because it has to ensure that they correspond to the underlying structure of flow gate rights. If the market is not liquid, the resulting allocation might not be efficient; if the market is liquid, the resulting allocation may be efficient. In reality the number of binding constraints is significantly higher, implying that the system operator would have to simultaneously trade a large number of entry rights to ensure an efficient allocation will result.

## Metering

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### Ofgem updates on metering progress

Ofgem has outlined how it plans to progress various issues relating to metering.

A new document\* reviews the work that it has carried out over the last six months and looks at possible next steps.

Ofgem's work on the strategy over the past six months has focused on two key areas related to gas metering. First, the review of Transco metering price control - for which final proposals were published on 26 September 2001. Second, the development work of industry processes and data flows to support competition, under the auspices of the

Review of Gas Metering Arrangements (RGMA) project.

There have also been wider industry developments since the publication by Ofgem of a document on metering in March. Elexon has convened two expert groups to review the operation of processes that allow suppliers to appoint alternative metering and meter reading agents, and to

review the technical capabilities that new entrant service providers need to demonstrate before they are accredited to provide services to suppliers.

Looking to the future, Ofgem has agreed to establish a Review of Electricity Metering Arrangements (REMA) industry working group - as a means of ensuring that business processes in electricity are sufficiently robust.

The March document also consulted on measures to increase the degree of contractual flexibility available to energy suppliers in providing metering services to customers, and measures to enable customers to provide their own meters. Ofgem is not progressing these measures in the short term.

In Ofgem's view, while contractual flexibility and customer choice are important elements of the strategy in the longer term, the practicalities of such steps would benefit from further consideration before action is taken.

\*'Ofgem's strategy for metering' Report on progress and next steps is available from the Ofgem web-site.

## Takeover

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### Utilicorp bids for MEB

Utilicorp, the US power and gas group, has offered to buy Midlands Electricity's distribution business for £1.4bn (incl. c£1.1bn debt from GPU Power UK).

It has been reported that Powergen and Scottish and Southern Energy were also bidding for the company. The deal

will include GPU's share in Teesside Power.

The offer is subject to regulatory approval and to approval from US group First Energy, which is in the process of taking over GPU, the current owner of the Midland network.

Analysts believe that the price offered for MEB is very high. Utilicorp seems to be paying a 36% premium to the regulatory asset base value.