

**An Independent  
Transmission System Operator  
for Northern Ireland**

**A Consultation Paper issued by  
the Director General for Electricity Supply  
(Northern Ireland)**

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## **Contents**

Introduction .....	2
The TSO and Privatisation.....	2
The TSO and the Competitive Market.....	2
The need for a stable and predictable market environment.....	3
The roles of the TSO .....	3
System Security.....	4
The independence of the TSO .....	5
The present position.....	5
The future of the TSO.....	6
The value of the TSO.....	7
TSO - the options.....	7
The TSO and Transmission Planning .....	9
The cost of the TSO.....	10
Incentivising the TSO .....	10
Consultation.....	12

## **Introduction**

One of the most central roles in the management of an electricity supply industry is that of the Transmission System Operator (TSO). No electricity system can operate without the activities of all those participating in the production, transportation, buying and selling of electricity having their actions co-ordinated to ensure that the system remains in balance and that system constraints are managed efficiently.

In a traditional electricity industry with a vertically integrated structure the TSO has a control room function within the electricity utility. Its role is primarily to decide which power stations to dispatch to meet any given level of demand and any given set of system constraints. Normally the TSO would dispatch the lowest cost plants first and bring in more expensive plants to meet peak demand. However, system constraints might require a variation on least cost (merit order) dispatch. The TSO would also have to ensure that it had sufficient plant standing by to deal with the failure of plant that was operating, or other emergencies. Over the course of each year the TSO would have to agree a planned maintenance programme with the power stations so that their maintenance programme was co-ordinated and took place during periods of low demand.

## **The TSO and Privatisation**

With the break up of NIE at privatisation in 1992, through the sales of generating plant to separate companies and the privatisation of the industry's monopoly activities - including the TSO - into NIE plc, the role of the TSO changed. The way in which the TSO function was carried out could have an impact on the revenue streams of the independent generators. Moreover, the transmission business in NIE, by its investment and connection charging policy, could have an impact on the location, operating and profitability of power stations and particularly new power stations. As no new power stations have been built in the period since privatisation these issues have remained largely theoretical, but the planned development of a Combined Cycle Gas Turbine (CCGT) station at Coolkeeragh in 2004 would be the first new investment in an independent plant since privatisation.

The location of the TSO in NIE's Power Procurement Business (PPB) which also had responsibilities for NIE's long term contracts brought the TSO into an environment where engineering issues would begin to be over-laid with commercial considerations. But until 1999 NIE's PPB remained the monopoly buyer and seller of all electricity bought and sold in Northern Ireland.

## **The TSO and the Competitive Market**

The major change came with the introduction of the competitive market. Under the Internal Market for Electricity (IME) Directive, 35 percent of the market had to be opened to competition by 2003. This level of market opening was achieved in Northern Ireland by April 2001. There is a widespread expectation that there will be further market opening, with impetus from the European Commission. The Directive also ensured the right of independent power producers (IPPs) to construct power plants (subject to certain regulatory safeguards). A further initiative is the move towards the creation of an all-island electricity market. There will also be the need to ensure that the NI/RoI markets are developed such that trading

opportunities with the neighbouring GB markets are facilitated. The role of the TSO in this process will be important.

The liberalisation of the electricity market does not change the physical processes for the production, transportation, selling and buying of electricity. It does, however, change the commercial and financial relationships between all the agents in each part of the process. Each transaction between agents now combines physical flows of electricity with financial flows.

### **The need for a stable and predictable market environment**

Trade - in this case of money for electricity - can only take place in a market environment in which market participants have confidence. This means that there must be a framework of rules for behaviour so that participants can be confident that rules will be obeyed and if appropriate, enforced, that all market participants will be treated identically in identical circumstances, that contracts will be honoured and that no participant will be subject to arbitrary power or discriminating practices. The TSO is central to creating a market which functions because market players have confidence that it will function.

### **The roles of the TSO**

The journey from vertically integrated monopoly to competitive market has added substantially to the roles of the TSO. The roles are now of two types - physical and financial - and occur in two time dimensions - present and over a longer term planning horizon. Each of these is commented on below.

#### **(a) Real time: physical flows**

The major new real time issue is the financial flows which take place between all the parties. Electricity is not like other products. It cannot be stored but must be consumed as it is produced; consumers may intentionally or unintentionally consume more or less than they contracted for and producers may similarly under or over-produce. About 9% of the electricity produced is lost between power stations and customers though this is not the same for all levels of grid connection. A financial settlement system has therefore to contend with a degree of volatility and instantaneous physical transactions which are unlike those of most markets. If market participants are to be properly remunerated in accordance with what they actually supplied, it follows that the financial settlement system must be driven by the reconciliation of physical settlements. The TSO's tasks therefore include the management of the settlements system. At present we have in operation an Interim Settlement System which - while being refined in the light of experience - copes adequately with the existing degree of market opening. A settlements system to cope with full market opening could, based on experience in GB, be so expensive as to offset some or possibly all of the competitive gains that might be expected from full market opening.

#### **(b) Future time: Network investment**

The role of the TSO in planning investment in the Transmission network will require clarification. One view is that the TSO should have a major role in determining

transmission network investment. Decisions about transmission network investment can have an effect on generation investment. Network constraints might create opportunities for IPPs and their removal by new investment might damage those opportunities. Similarly, network pricing might send location signals to IPPs. As power stations have long lead in times - three to six years - and a life of 20 years and upwards, then the potential role of the TSO and any other body able to influence network investment and pricing to reward or damage generators is substantial. An area where the risk of unreasonable or unpredictable behaviour is perceived to be high will either not attract investment or will only attract investors seeking a higher rate of return on their investment which could only be recovered in higher prices. The TSO is therefore central to the creation of a framework in which generation and transmission investment decisions can be optimised to the benefit of customers.

The present ownership structure of NIE's Transmission and Distribution Business is such that the TSO does not have direct control of the Transmission system planning function, but rather co-operates with NIE's Transmission and Distribution Business in this area. In the near term this relationship will require clarification, and when the TSO business is separated, an appropriate framework agreement will be necessary to properly allocate duties and responsibilities between the TSO and the network owner.

## **System Security**

While we take it for granted that the electricity industry year on year delivers a secure supply of electricity of a consistent quality almost all the time, to almost all customers, this is not easily achieved. The demand for electricity varies according to the time of day and time of the year. The amount of plant needed to provide electricity on a peak winters evening is approximately four times the amount needed on a summer's night. As well as this, there must be sufficient reserve to cope with a plant failure on the peak winters night.

With an integrated monopoly the maintenance of security is simple, though it may be expensive. Within a privatised system it is more complex. There is one school of thought which would argue that the market will provide system security - ie., that the very high price to which electricity will rise when there is high demand will make it worthwhile for somebody to maintain plant which may only be needed for 200 hours a year.

This may be the case in a large market which is not seriously embarrassed by a single plant failure, especially in the case following privatisation when there is a lot of plant with its capital cost effectively written down. It is less convincing in a small market which is not likely to have more than three significant power stations. The TSO's functions in Northern Ireland do therefore require it to put such arrangements in place as to ensure that system security is maintained.

System operational security, as currently enshrined in the Transmission System Operator section of the NIE licence is accompanied in many electricity systems by a requirement to maintain a generation security standard.

This function was previously part of the remit of the Power Procurement Business, when that business was combined with the System Operations business and effectively bought and sold all wholesale power in Northern Ireland. With the advent of the IME Directive, the generation security standard could no longer sit with the PPB business – its market share was

being reduced, hence the totality of customers would benefit from the franchise sector paying for overall generation security. It was decided that the standard should lapse, and that in the event that there was a shortage of generation the market would provide appropriate price signals to encourage investment. This now seems to have been a mistake particularly in a market, which is at best semi-competitive.

In the light of experience from elsewhere, and in the knowledge that investment projects are medium term outcomes, and recognising the possibility of price spikes and generation shortfalls it is apparent that even in a liberalised market there needs to be a body charged with maintaining generation security. It is appropriate that this function should fall on the TSO business, with the cost (if any) of maintaining the standard to be recovered across all customers via the System Support Services charge.

### **The independence of the TSO**

The description of the roles which the TSO is required to undertake in a liberalised market point to the need for a TSO which is totally independent of all the other commercial interests in the industry. The TSO must be independent and believed to be independent by every generator and every supplier. But the TSO must also be immune from any suspicion that it is commercially tied to the financial interests of the transmission business, especially when the latter has interconnector interests. These considerations point to the need for the TSO to be separated from NIE - a view which is generally accepted by all industry players and not least by NIE.

### **Regulating the TSO**

The complete commercial independence of the TSO can be ensured by the ownership structure. However there remains a clear need for the TSO to be accountable for its actions and to ensure that it does not behave in an arbitrary way. In particular the TSO must not be able to refuse to facilitate investment by third parties whether generators, customers or owners of private lines or interconnectors without being able to demonstrate to the regulator that to do so would be contrary to the interests of customers as a whole by virtue of the cost, safety or security of supply implications. If in order to establish regulatory confidence by all network users the regulatory framework of the TSO should give the regulator power to direct the TSO to sign agreements with providers of services to the network provided such agreements are compatible with an economic purchasing obligation.

### **The present position**

As mentioned earlier the TSO was at privatisation placed in NIE's Power Procurement Business. The PPB was subject to a price control at privatisation and the price control was reviewed in 1996 and a new price control was proposed by Ofreg, accepted by NIE and came into effect in 1997.

Following market opening PPB has been divided into its two constituent parts and the price control was divided with effect from 1 April 2000. On 1 May the TSO was formed into a separate company, System Operator for Northern Ireland - (SONI) which is a separate NIE subsidiary. The current position is therefore that the TSO is a separate company with its own price control. Its management structure separates it from the rest of Viridian's regulated and

unregulated energy businesses. The TSO business name is System Operator northern Ireland (SONI). Management accountability to Viridian's Board - who remain the sole owners of the company - is through the NIE Managing Director to whom the Chief Executive of SONI reports.

NIE are to be commended for the speed with which they have acted to maximise the independence of the TSO within the existing industry structure. However, the existing arrangements are not satisfactory in the longer term as the TSO does not enjoy the objective degree of total independence and commercial indifference to all market participants which it must have if all market participants are to have confidence in it. The perception of potential conflicts of interest will become more acute as NIE's own generation aspirations are realised with the commissioning of its Huntstown station in the Irish Republic and as the PPB seeks to act as an energy trader in order to fulfil its economic purchasing obligation.

### **The future of the TSO**

There are four inter-related questions about the TSO which need to be addressed:

- (a) What is the most appropriate legal status for the TSO?
- (b) What should the duties of the TSO be?
- (c) How should the TSO's interface with the Transmission Asset Owner (TAO) be managed after TSO separation from NIE?
- (d) What sort of incentive structure should the TSO have to minimise total electricity costs?

Another issue which merits consideration is the relationship between the TSO in NI and in the ROI as well as to the TSO in GB. The latter is moving from having three TSOs to having one in 2003/4, with the proposed British Electricity Transmission and Trading Arrangements (BETTA). If the two markets on the island of Ireland converge into a single regional market of the European market there may be a case for a single TSO, just as there may be a case for a smaller number of TSOs on the European continent.

It would be premature to come to a definitive view on this point at this stage. Instead, the opportunity should be exploited to view whatever is put in place in Northern Ireland as an experiment the results of which could feed into a longer term structure, including the all-island structure mentioned above. This degree of uncertainty should therefore not be regarded as an inhibiting factor - quite the contrary.

There is a relationship between the legal status of the TSO, the predictability of its revenues and the obligations which it can assume. For example, if it is to have contractual relationships with generators by which it pays them for certain services it must be either owned by a financially robust organisation or be empowered (whether by licence or direct legislation) to collect revenues from customers. There are several international models which may serve as comparators. These range from a system operator role, which in NI would effectively be the operation of the licence conditions which currently fall on the TSO, to a more complex market operator role which could for example include more duties relating to active system balancing (such as buying or re-dispatching capacity), to a fully integrated TSO/TAO where the transmission network is owned by the TSO, and incentives for operating the transmission system are tied in with transmission investment and physical system

operation.

It is important to note that the structure of the TSO and the shape of the trading system on which the market is based on will be closely linked.

### **The value of the TSO**

The TSO was part of the business which shareholders bought when NIE was floated in 1993. If Viridian's shareholders are to relinquish their stake in it, then they must be bought out. Moreover, any new owner must pay a fair price for acquiring the business.

There are two distinct sets of values. The value of the TSO business to its future owners will be a function of the revenues it is allowed to earn, the costs and obligations it must assume and the opportunities it has for increasing its income or appreciating or depreciating in value. None of these things have yet been decided so it is not possible to say what a new owner for the TSO business should pay.

The value which Viridian should receive for its sale is another matter. That should be capable of being decided by reference to the TSO revenue stream both now and into the future and the value of its assets. The cost of buying the TSO from its present owners may be more or less than the price any future owners may be expected to pay. But it is unlikely to be the same. Viridian's shareholders will not be responsible for the changing circumstances which will make the TSO worth more or less in the competitive market than it was in the monopoly market. They should neither receive a windfall gain or suffer an unanticipated loss. It would certainly be unacceptable for Viridian to have an interest in setting up future market structures which could enhance the value of the TSO business they were about to sell.

This means that the sale value should be set now by a process of market testing or negotiation. Once the TSO is sold, any shortfall should be made up to Viridian by customers through revenue collected by the TSO; any excess should be used to reduce costs faced by customers.

It should be made clear that the interim price control proposals for the NIE-owned TSO business (to apply from 1 April 2002 – 31 March 2004) will not continue to be in force when the business is separated. In that event, Ofreg will develop and implement a new range of price and performance incentives to apply to the structure which emerges from this consultation process.

The problem is that the value of the TSO business will not be known until its forward regulatory framework is in place. In this case it might be difficult to secure for customers through the new owner the extra value which the regulatory framework creates. Conversely can a new owner be expected to purchase the TSO without having a reasonably clear idea of its value?

### **TSO - the options**

There are a number of obvious options for the ownership and legal status of the TSO.

#### **(a) Public ownership**

The TSO will be an entity regulating the transactions between all the other industry participants. In the Irish Republic it will remain in the state sector. Public ownership would, at least in theory, ensure that it acted and was seen to act in the public interest. However, in public ownership there is the risk or perceived risk of political interference undermining its independence and a confusion of its role with that of Ofreg. Conversely public ownership might be the most direct way of ensuring that public policy was given effect. Temporary public ownership however while the regulatory framework and value are being established has considerable attractions. Perhaps the ultimate argument against public ownership is simply current political fashion.

**(b) Industry ownership**

As the TSO has to operate on behalf of all the industry's players, there is an argument for their collectively owning it. They could be paid in a debenture, giving them a low fixed rate of return and no incentive to maximise profits. Their share ownership could be proportionate to their licence fee and each new licence holder could buy into the ownership by buying down and thereby diluting the shares of existing licence holders. Shareholders could be required to put up the money for additional investment on a pro-rata basis. Ownership would have, however, to be separated from policy making and management if the objectivity, independence and disinterestedness of the TSO was to be maintained. It is not clear how a satisfactory link could be maintained between management accountability and ownership. One solution might be a government structure which included customers and suppliers interested in minimising system costs.

**(c) Private ownership**

The TSO could be sold as a business to a suitable company without any other energy interests in the UK or Irish Republic. There are precedents for this - ESB for example, provided a TSO service in Alberta. The ownership could be outright of the TSO company, SONI or it could be a licence auctioned for a specified number of years.

While this might work, the attractiveness of this type of business opportunity to the sort of significant energy company which would be required is not obvious. While the public interest might be protected by the TSO licence conditions there would still remain an underlying issue of control. There would at the very least be a possibility that with an external energy company owning and running the TSO business control issues would emerge which might be difficult to handle if decisions were ultimately made in boardrooms thousands of miles away with little sensitivity to local concerns.

**(d) The Transmission Business**

In Great Britain the TSO is part of the transmission business - the National Grid Company (NGC). The NGC has reduced its costs and improved the quality of its services over the years and its role as TSO has not been controversial. The relationship between transmission ownership, transmission planning and the TSO is variable. There is no single pattern which can be universally applied. To date no one in Northern Ireland has argued for the TSO to be part of the Transmission Business. The Transmission Business is and always has been a single business with Distribution and the general view has been that splitting Transmission and Distribution into separate

companies would increase the overhead costs of both. If this is the case it is hard to see the benefit in the TSO being owned by the Transmission business. Apart from this it would potentially damage the perception of TSO indifference as between generators and network investment, especially in a system where the use of interconnectors could be subject to TSO influence.

(e) **Ownership by external TSO**

It is possible that for example NGC or other similar company could own the TSO if such were interested in acquiring a relatively small business. Depending on the degree of local autonomy, if such a structure would allow, this option is certainly worth exploring. Possible disadvantages are that a company operating in GB where the market is so much stronger and older would find it difficult to operate in Northern Ireland and their agenda might produce fresh complications to the longer term evolution of the market in Ireland. Conversely, a five year licence might be an effective way of ensuring that NGC's expertise was harnessed in the short run without locking the TSO in perpetuity into a long term ownership which might appear less advantageous to either party with the passing of time. These arguments could also be applied to ownership by Eirgrid.

(f) **Management/employee buyout**

This type of structure was employed with success at Coolkeeragh Power Station, following privatisation in 1992. The advantage is undoubtedly local ownership and responsiveness to local circumstances. The possible disadvantage is the creation of a set of TSO commercial interests which might not be properly aligned with the wider interest of customers either in the short term or the long term. More than with any other ownership structure, appropriate incentives would be required to ensure that total system costs were optimised.

(g) **Customers' co-operative**

As the customers - large and small - have the keenest interest in having a TSO which runs the system at least cost, there is a case for the customers owning the TSO through the price which they pay for electricity. In future instead of paying a return on NIE's assets and contributing to profits from cost savings, they would, after buying the business, simply pay its actual costs. Company structure could be in the form of a mutual or a company limited by guarantee.

## **The TSO and Transmission Planning**

One issue which will need to be considered is the role of the TSO in transmission investment planning. Hitherto in Northern Ireland the TSO role and the Transmission Planning role have been kept separate. Informally the mechanisms have always existed by which the TSO could be consulted and inform the planning process. Achieving the right balance in the future will not be easy and there is an interaction between the TSO's incentives and the appropriate structure.

The TSO has two interests in network planning. The first is to minimise total system costs.

If there are network constraints which put up prices by - for example - requiring inefficient and expensive power stations to be dispatched ahead of merit, the TSO would favour investment in the network if that produced a lower cost overall solution. But in general keeping costs down means lower investment.

On the other hand the TSO has an interest in the security of the network. This means that prudence might cause it to seek to encourage network investment. Cost minimisation and system security will tend to pull in different directions.

The prospect of the Transmission business being merged with the TSO was discussed earlier in this paper. If the Transmission business is not to be linked to the TSO the question remains of the role of the TSO in transmission investment planning.

The Transmission business, itself, will clearly have a view on the need for new investment in transmission to upgrade, replace and strengthen the network and will have to persuade Ofreg that such investment is desirable. The Transmission business is however less well placed than the TSO is to overview the total efficiency of the system including generation, the effect of interconnection, embedded and distributed generation and long term industry dynamics. Clearly the TSO will have a view on the value or the desirability of any proposed transmission investment and the need for transmission investment which is not proposed by the Transmission business. Accordingly, the TSO needs its own access to independent transmission planning expertise to model power flows and the impact of transmission, generation and load growth changes over time.

In this light transmission investment decisions must be made by an iterative process involving both the TSO and the Transmission business with both having the right to initiate proposals and both having full access to Ofreg to discuss transmission proposals or the transmission implications of proposals to forego or avoid transmission investments. It may prove necessary for a detailed regulated agreement to be developed to define the roles, responsibilities, incentives, and primacy of the TSO and the transmission asset owner if the two are to remain as separate organisations. The terms of such an agreement must include incentive measures for the TSO to actively manage overall system costs, including the cost benefit of investment spending by the TAO.

### **The cost of the TSO**

It is distinctly possible that the TSO will cost more in future than in the past. The role of the TSO has - as this paper has indicated - become more, rather than less complex with the move to a liberalised market. Not only is there a power system to be operated but it is now shadowed by complex financial flows which the TSO must also manage. Other duties which formerly were achieved by simple administrative rules of thumb can now require monetary signals which may or may not deliver the desired outcome. If the TSO costs more than in the past then this should - in principle - be offset by lower generation and supply costs though it remains to be seen if these can be achieved.

### **Incentivising the TSO**

Incentivising the TSO is going to be a difficult balance of harmonising conflicting objectives.

In part too, it will depend on the ownership status and who is being incentivised. An incentive for a diffuse ownership such as all customers is unnecessary. An incentive for a large external owner might have to be unaffordably large to actually incentivise a cost reducing approach. For incentives to work, the value to the recipient has to be large while the value to the customers has also be appreciable and the incentives must of course reduce rather than increase total system costs.

At present there is the normal revenue cap formula which incentivises the TSO to reduce costs since the greater the gap between the allowed revenue and actual costs, the greater the owners' profits. An element of this is likely to survive into any future price control but as the TSO's total costs are going to be a small percentage of the system's total costs (currently the TSO accounts for about 1.5% of total system costs) it is much more important to incentivise the TSO to bring total system costs down than to minimise its own costs. This sort of approach would - for example - allow the TSO to invest in new software or take on additional staff if the result was to drive down costs through more efficient competition in the generation market.

Incentives might also relate to system performance and the trade off between cost and performance. The other aspect of incentive regulation is monetary penalties when the performance falls below a certain standard. There is no significant provision yet for penalties in the NI electricity industry. Would penalties be appropriate for the TSO or would they so change the risk profile as to be counter-productive? If suitable incentive structures can be devised it is at least worth exploring if they can be optimised by incorporating penalties for non-compliance.

### **Stakeholders Role in Governance**

There are recognisable tensions between the way in which the TSO conducts its affairs and the interests of network users. There are also tensions between the objectives of different network users, for example between customers who will want lower prices and customers who will want an improved network, between new generators who may have different priorities for network investment from existing generators. It is desirable that all the stakeholder interests are adequately articulated and as far as possible either reconciled or an optimised solution is achieved. This may require a TSO stakeholder forum to be established with rules of procedure, clearly defined rights of access and to be consulted.

## **Consultation**

Views are sought on the future role, ownership and incentive mechanism for the TSO. In particular:

- (a) what should the TSO's ownership structure be?**
- (b) what should its role be in relation to Transmission planning and the transmission asset owner?**
- (c) how should it be incentivised to improve both its own and the overall performance of the industry?**
- (d) how should the TSO be regulated?**
- (e) should there be formal structures to allow stakeholder inputs and if so how should they be organised?**
- (f) Does the TSO need to be "parked" after it is separated from NIE before it can be sold on and if so how would this be managed?**

Comments on the issues contained in this Consultation Paper should be sent by Friday 03 May 2002, to

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Please include a one-page summary with submissions.