Commission for Electricity Regulation

An Coimisiún um Rialáil Leictreachais

THE TREATMENT OF AUTOPRODUCERS IN THE TRANSMISSION CHARGING REGIME

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This consultation paper addresses the issue of how autoproducers should be treated in the transmission charging regime. The Commission invites comments and submissions on this paper, preferably in electronic format, to be received no later than Friday, 15 December, 2000.

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1. INTRODUCTION

This consultation paper addresses the issue of how autoproducers should be treated in the transmission charging regime.

1.1. Definition

Directive 96/92/EC of the European Union (the so-called Internal Market in Electricity Directive) defines an autoproducer as 'a natural or legal person generating electricity essentially for his own use'. Under this definition, an autoproducer might be characterised as a facility where both generation and load are present on a single site and where the generating plant is typically operating on a continuous basis.

However, it is difficult to distinguish between autoproducers and generators in this context. The definition of an autoproducer does not imply that it invariably generates more than enough to satisfy its on-site load needs and exports the surplus on to the transmission grid for sale to ESB or other customers. It could equally be a net importer of energy on a consistent basis. And even if it were a net exporter, there would be occasions when it needs to import energy to satisfy its on-site demand, for example when its own generating sets are on an outage. The same is true of a 'pure' generator, which periodically requires access from the transmission network for import to serve its on-site needs. This suggests that autoproducers and generators should be treated equally in respect of transmission charges.

1.2. The problem

ESB National Grid's transmission charging regime differentiates between generators, who pay a locational *entry charge* (which is capacity-related and hence fixed) to gain access to the transmission network, and demand, which pays both an *exit charge* (which is also capacity-related and fixed, but is not locationally differentiated) to take energy off the network and a *network usage charge*, which depends on the amount of energy actually taken off the network.

The question at issue is whether autoproducers that both export to and import from the grid at different times should pay both entry and exit charges and the network usage charge; and how the charges they pay should be calculated.

2. THE TRANSMISSION CHARGING REGIME

2.1. Transmission Use of System Charges

The existing transmission use of system (TUoS) charging regime is designed to recover from all users of the network the shared costs of owning, operating and maintaining the transmission network. The TUoS charges include all network costs – i.e. wires costs, ESBNG's own costs, ancillary services and constraints costs. These latter two costs - ancillary services and constraints – are currently charged to demand and are excluded from

the analysis which follows. The wires and ESBNG's own costs relate essentially to the costs of providing transmission network capacity, which suggests that these costs of the network should be recovered on a largely fixed basis.

Transmission use of system charges are currently set to recover 25% of network costs from generation and 75% from demand.[1] Generators are charged on the basis of their installed generating capacity and where they are sited. Demand is charged on the basis of both maximum import capacity and energy transfer, with charges set to recover 60% of the amount to be recovered from demand from capacity charges and 40% through energy charges. The table below sets out these various proportions

Table 1: Shares of Transmission Costs

Allocation and shares	**Generation**	**Demand**
Allocation of Network Infrastructure Costs	25%	75%
Fixed Allocation	100%	60%
Variable Allocation	0%	40%
Fixed share	**25%**	**45%**
Variable share	**0%**	**30%**

It has been argued that, if autoproducers have to pay separate generation and load charges, depending on whether they are exporting to or importing from the transmission network, they will be overcharged relative to other users. This is a particular issue if the autoproducer exports almost all the time and imports only on exceptional occasions. In this case the autoproducer might feel that the capacity element of the demand charge is unfair, on the grounds that it would effectively be paying twice (or more) for the network capacity being provided to serve its site.

On the other hand, it can be argued that, if autoproducers are required to pay only one set of charges, then they are better off than other generation (demand) users in being able to export to (import from) the grid at no (transmission) cost. This argument would have force if it were the case that more (or a different configuration of) network capacity was required to supply energy to a demand than to take energy from a generator at the same point on the network.

2.2. System Service Charges

System service charges cover the non-wires costs of transmission (except transmission losses, which are recovered through the market). Under the current regime, generators are charged for system services only if they cause a disturbance (a unit trip). Demand users pay a variable (per MWh) charge for system services, designed to recover the costs to the transmission system operator (TSO) of market operation, of administering the settlement system and of procuring ancillary services.

[1] The non-wire elements of TUoS charges (covering ancillary services and constraints costs) are currently all charged to demand.

The question of whether autoproducers should pay generator system service charges is simpler than the question of use of system charging because there is not the same danger of double charging: the autoproducer's generating plant should be charged on the same basis as any other generator would if it causes a disturbance.

However, the question of whether the autoproducer should pay the demand charge for system services is less straightforward. It has been argued, for example, that all demand connected to the system, whether or not there is on-site generation present, receive voltage, frequency, connectivity and reliability services consistent with network planning and operating criteria. If this is true, the autoproducer should pay a system service charge on the whole of its on-site demand since, if it was not connected to the network, it would incur significant additional costs to provide the same levels of security and stability.

3. ECONOMIC PRINCIPLES

3.1. Economic Principles of Transmission Charging

To the extent possible, the transmission charging regime should conform to the following economic principles:

- **Cost recovery and non-discrimination**: autoproducers should pay for the costs they impose on the system. This will provide proper signals for efficient use and investment. The cost recovery principle also implies non-discrimination: other system users should not be burdened with meeting the costs that autoproducers impose on the system.

- **No artificial incentives**: the charging regime should not artificially encourage system users to build on-site generating plant or to create on-site demand.

  - large electricity consumers should not have an incentive to build on-site generating plant, rather than buying from an independent generator, to avoid transmission charges, or vice versa.

  - generators should not have an incentive to become autoproducers through vertical integration, e.g., by buying a customer's business, to avoid transmission charges, or vice versa.

  Decisions should be based on efficiency considerations, i.e., on the underlying costs of the alternatives.

- **Efficient location**: generators should not have an artificial incentive to locate at the site of a consumer if an alternative location would be better from a system point of view.

To the extent that transmission charges properly reflect costs, they are likely to be consistent with the other principles outlined above. The difficulty in this area is identifying and allocating the costs of the transmission system between users.

3.2. Putting the Principles into Practice

ESB National Grid put forward the ratios between generation and demand (25:75) and between fixed and variable (70:30) on the basis that they represent a reasonable allocation of the costs of the transmission system to users.[2] ESB National Grid felt that the transmission network, being essentially a fixed cost, should be recovered on a largely fixed basis. The Commission accepted this approach as reasonable.

ESB National Grid examined a number of ways in which to levy the fixed share. Given that the network is designed to meet the maximum export capacity (MEC) and maximum import capacity (MIC) values of both generation and demand users, under a variety of operating conditions, it was felt that users should pay on that basis.

In designing the network, the TSO must generally design and operate the network in the immediate vicinity to meet the sum of MEC and MIC requirements of users. Farther from the periphery in the deeper system, diversity effects are taken into consideration so as not to over construct the network. It is this usage of the deeper system that is recovered through the variable network transfer charge paid by demand users.

The following paragraphs look at each element of the transmission charging regime in turn in the light of the economic principles set out above and consider whether the costs attributable to autoproducers are properly reflected in the charges they would pay under the current regime.

3.2.1. Demand and Generation Network Capacity Charges

As was stated above, it has been argued that, if autoproducers have to pay separate generation and demand network capacity charges, depending on whether they are exporting to or importing from the transmission network, they will be overcharged relative to other users, i.e., they will be charged more than their fair share of costs. This is a particular issue if the autoproducer exports almost all the time and imports only on exceptional occasions, in which case the generation network capacity charge would be expected to be significantly positive. In this case the autoproducer might feel that the capacity element of the demand charge is unfair, on the grounds that it would effectively be paying twice (or more) for the network capacity being provided to serve its site.

These concerns have some validity and reflect the lack of locational capacity charges to demand users. The current generation charging methodology rewards generators for siting their plant on a part of the transmission system that minimises the need for network infrastructure, i.e., in areas deficient in generation. Under an equivalent locational demand-charging regime, demand would be rewarded for locating in areas deficient in demand, or in generation surplus. Thus, under a full locational charging regime an autoproducer located in a demand deficit area may have a negative demand network capacity charge.

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[2] See Table 1 above.

ESB National Grid remains convinced of the need to charge for use of the network on the basis under which it was designed (MIC & MEC). It argues that the system needs to be designed adequately to meet the needs of a facility with on-site generation under conditions of unplanned loss of generation or demand. This means that the facility must contract for a reasonable MEC and MIC respectively or verify to ESB National Grid's satisfaction that sufficient protection is in place to ensure that neither the MEC nor MIC are exceeded under unplanned loss scenarios.[3]

However, the Commission recognises that anomalies are caused by non-locational demand charges. A number of options exist for reducing the demand capacity charge paid by autoproducers:

- introducing ***locational variations*** in the demand network capacity charge on a limited basis for facilities with on-site generation. Studies by ESB National Grid have shown that, under the current network cost allocation ratios, locational demand charges would range from half of the current level to approximately double depending upon the location of the on-site demand on the system.[4] While this might appear a feasible solution, it is likely to be administratively complex. Moreover, the potential for abuse of such provisions is significant and would require management through a rule-set to ensure generation is not being installed on artificial grounds.[5] Another potential problem is that it might be considered discriminatory toward other demand users (i.e., those without on-site generation).

- changing ***the fixed/variable split*** of the demand network cost allocation. For example, reducing the fixed demand capacity charge and increasing the variable demand network transfer charge would benefit facilities with on-site generation facilities *if the network transfer charge were applied on a net rather than gross basis*. Using a net basis would be valid if it could be argued that on-site demand is being met instantaneously by on-site generation, and that it was not therefore making use of the deeper network, the costs of which are recovered in the network transfer charge. However, to change the fixed/variable split would increase the variable recovery of what is essentially a fixed cost.

3.2.1.1. Infrequent consumption

It has been argued that it is inequitable that on-site demand should be required to pay the demand network capacity charge for very short and infrequent import of energy from the network under generation outages. This concern stems from the minimum charge under the demand network capacity charge that is levied regardless of use. [6]

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[3] For example, matching a demand reduction with a generation loss using instantaneous tripping to optimise MIC requirements

[4] Under Tariff Schedule DTS-T (transmission connected demand) the Network Capacity Charge Rate is €782.77/MW/month or £616.48/MW/month.

[5] For example, a rule such as the facility MEC must be more than twice the MIC for locational demand charging to apply could be used.

[6] The current structure of the DTS-T and DTS-D1 tariffs allow for a bandwidth in assessing the demand network capacity charge between the maximum of MIC and a minimum of 80% of the MIC, or the MIC less 4 MW. While this provides some variability in the charge, the charge is largely fixed. The intention

ESB National Grid has suggested a specific provision for infrequent use if surplus capacity is available. While properly selected MIC and MEC values should ensure that both unplanned and planned consumption requirements will be met at a facility with on-site generation, options may exist to provide a short-term demand service on a *planned* basis if system conditions permit it. This form of service requires wires capacity (distribution and/or transmission) to be present at the time of the requirement to facilitate it. If surplus capacity is available then the short-term consumption requirement may be serviced without significant costs being imposed on the system.

3.2.2. System demand charges

The current demand system services charge is levied on a variable (per MWh) basis to recover the costs associated with the purchase by the TSO of ancillary services and with settlement system administration and set-up. The service covered can be itemised as follows:

1. **Operating Reserve**: Constraint and utilisation payments arising from the provision of operating reserve services to the TSO
2. **Reactive Power**: Constraint, availability and utilisation payments arising from the provision of reactive power services to the TSO
3. **Black Start**: Availability payments arising from the provision of black start services to the TSO
4. **System Support Services**: Constraint and contract payments arising from the provision of system support services to the TSO
5. **Transmission Congestion**: Constraint payments arising from transmission congestion
6. **Dispatch Constraints**: Constraint payments arising from less than optimal system dispatch
7. **Settlement System Administration** and set up

ESB National Grid have reviewed the costs associated the demand system services charge and find that a number of the constituents should not be levied on on-site demand.

3.2.2.1. Operating Reserve, Reactive Power and Black Start

ESB National Grid feels it is appropriate that the costs associated with the provision of operating reserve, reactive power and black start should accrue to all demand connected to the system (regardless of whether it is served from on-site generation). This is because all demand connected to the system, whether or not there is on-site generation present, receive voltage, frequency, connectivity and reliability services consistent with network planning and operating criteria. If the autoproducer was not connected to the network, it would incur significant additional costs to provide the same levels of security and stability.

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of the bandwidth was to offer some flexibility in the manner in which the charge was levied while still recovering a largely fixed contribution for network infrastructure.

Nonetheless, while these benefits accrue to all demand on-site, ESB National Grid has proposed that if the on-site generation can provide these ancillary services, they will be treated in the same manner as all other generators capable of providing such services.[7]

3.2.2.2. System Support Services and Transmission Congestion

The costs associated with system support services and transmission congestion are largely costs incurred in lieu of building network infrastructure. Generation would be compensated if constrained on or down to avoid significant network capital where economic, or where network infrastructure is delayed. Such avoidance of network infrastructure costs is largely to the benefit of users transferring electricity across the deeper network. ESB National Grid feels that on-site demand being met by on-site generation should not be subject to these cost components.

3.2.2.3. Dispatch Constraints

Constraint payments arising from less than optimal system dispatch occur because of variations in demand forecasts and changes in generation availability. ESB National Grid believe that these costs should not be charged to on-site demand.

3.2.2.4. Settlement System administration and set-up

The allowable transmission revenue for 2000 approved by the Commission in February included a budget for settlement system administration set-up and operations. The amounts were included in the demand system services charge.

In other countries the costs associated with market and settlement system set-up and operation are typically recovered as a distinct "trading charge" levied by the Market Operator and is visibly separate from transmission charges. These costs typically include capitalised set-up costs and continuing operating costs and are recovered through combinations of standing, per transaction and per MWh traded charges. Where charges are levied per MWh traded the amount charged is usually based on the net amount entering the network from a generation or facility with on-site generation. Justification for this approach is based on the premise that demands serviced on-site are outside the market boundaries and do not represent actual traded quantities.

The following table summarises the extent to which ESB National Grid feels that the demand system services charge components should apply to the gross or net demand at a facility with on-site generation. It should, however, be borne in mind that in many cases the metering does not currently exist to support this charging approach.

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[7] ESB National Grid submission to CER for consultation on *Ancillary Service Payment Derivation* - May 12 (see http://www.cer.ie/Grid_Code/ceresb0020.pdf)

Table 2: System Service Charges

Demand system services charge component	On-site demand		Percent of charge
	Benefits	Treatment	
1. Operating reserve		"gross"	33%
2. Reactive power		"gross"	25%
3. Black start		"gross"	3%
4. System support services	×	"net"	10%
5. Transmission congestion	×	"net"	1%
6. Dispatch constraints	×	"net"	6%
7. Settlement system operation and set-up	×	"net"	21%

The demand system services charge on on-site demand could be reduced to about 60% of its current level if this approach were adopted.

4. PRACTICE IN OTHER COUNTRIES

4.1. Northern Ireland[8]

In Northern Ireland, only customers pay UoS charges (i.e. there are only exit charges) so generators are only charged if they import electricity. Premises with own generation, who are sometimes importing and sometimes exporting, have to pay UoS charges with respect to the system capacity provided to meet their maximum demand.

4.2. England and Wales[9]

Customers who are both generators and demand users can be granted "trading site" status, which means their net import/export of electricity is counted rather than gross amounts.

Trading sites that export under normal circumstances, if the generator is centrally despatched, pay TUoS charges based on the net genset registered capacity.[10] If the net import is zero in all three triad periods[11] then demand charges will be zero. If net imports are positive in any of the triad periods, then demand charges will be made to the generator on the basis of average net import during the triad. There are currently no trading sites that are normally net importers so there are no specified rules for these.

Embedded trading sites that reduce the TUoS charges of the host REC, by reducing net inflows during a triad period, are rewarded for doing so. On the other hand, embedded trading sites are liable for DUoS charges, levied on the basis of the cost of the system

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8 Reference: *Statement of Charges for Use of the Northern Ireland Electricity Plc Electricity Transmission and Distribution System by Authorised Persons 1999/2000*, Northern Ireland Electricity Transmission and Distribution Business

9 Reference: www.ngc.co.uk/information/LC10

10 Non-centrally despatched generators are exempt from TUoS charges.

11 The triad periods are the three half hours of highest system demand between November and February, which are separated by at least 10 days.

capacity provided to meet the maximum power required (as requested by the embedded generator) and the extent to which that supply is taken up.[12]

4.3. Scotland

Hydro-Electric has no auto-producers connected to its system, so it does not have to specify a policy.

ScottishPower charges autoproducers on the basis of whether they are usually net exporters or net importers (as in England and Wales). Net exporters pay only entry charges, whether or not they import from time to time; likewise for net importers.[13]

4.4. Australia[14]

Only customers pay UoS charges in Australia – so, like in Northern Ireland, a generator would only pay UoS when it takes power from the network.

In a situation where the generator was just importing in exceptional circumstances, it would negotiate a contract for "standby supply" with the network, to determine the amount of UoS charges it would pay. The actual negotiation of the amount of standby payments has been controversial (and provisions differ between states): there is little agreement even at the level of principle.

5. POINTS FOR CONSULTATION

Views are requested on the following points:

1. Is there a case for recognising that, if autoproducers have to pay separate generation and demand network capacity charges, depending on whether they are exporting to or importing from the transmission network, they will be overcharged relative to other users, i.e., they will be charged more than their fair share of costs?
2. If so, how should the demand charges they pay be restructured? In particular:
   - should locational demand network capacity charges be introduced, but only for autoproducers?
   - should the fixed demand network capacity charge be reduced at the expense of an increase in the variable network transfer charge?

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[12] It should be noted that under the triad system, some customers can avoid the transmission charge entirely by curtailing their demand at peak hours. That may be reasonable approach where any customer is small compared to the total demand in an area. But in the smaller Irish system, it would mean that some very large customers, for whom substantial transmission assets where specifically required, could avoid the charge by curtailing demand for only a few hours per year, while still taking demand (and therefore still requiring specific infrastructure) for the rest of the year. Other customers would have to pay the costs, which would be inequitable and inefficient.

[13] This only works well if charges are split 50/50 between generation and demand. At any other division, there would be a major discontinuity at the balance point.

[14] Source: National Economic Research Associates, Sydney, Australia

- should infrequent planned use by on-site demand of the network be priced at lower level, in conditions where sufficient local network capacity exists?

- should the demand network transfer charge be levied on a net or gross basis?

- should autoproducers be charged all the demand system support services charge on a net or gross basis, or only on a net basis for system support services, transmission congestion. dispatch constraints and settlement system operation.

3. If demand network transfer and demand system service charges are to be levied on a net basis, how should a site be defined? And will netting-off on-site demand from generation create metering difficulties.

4. Should there be a *de minimis* level (e.g., 10MW) below which embedded autoproducers should not be liable for the generation locational network capacity charge?