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DISCUSSION DOCUMENT

Inter TSO Compensations

Background

The Regulation envisages the drafting of binding guidelines relating to the exchange of electricity across national borders. One of the subjects where guidelines are required concerns the determination of compensations to be paid between transmission system operators (TSOs) in different Member States.

Compensation is required since access to the EU network is based on a system of charges at the relevant entry and exit points only. This is confirmed in the Regulation, Article 4(1). Thus, for a cross border transaction, a entry charge will be made in the Member State where the electricity is injected, and likewise an exit charge will be made where the electricity is withdrawn. However, in many cases, the overall pattern of production and consumption between two Member States will caused physical flows in countries' networks: so called "transit flows". These will get no revenue from transmission charges to recognise these flows. Even where the effects of a transactions is confined within the two countries concerned, the network cost implications of these "other cross border flows" may be different from one to the other.

Current Mechanisms

There are currently two functioning mechanisms which already allow for compensation to be paid between TSOs. One mechanism covers the majority of the Members of ETSO in continental Europe "the ETSO mechanism". There is also a model covering the Nordic countries "the Nordel mechanism". Both these are based on an assessment of the impact of "transit" flows on host countries. For both systems the level of transit flows is defined at the minimum of the net physical inflows and net physical outflows for the network concerned.

There are two main differences between the two mechanisms. Firstly, the Nordel model explicitly estimates the impact of transit flows on actual physical flows in the network by performing a "with and without" analysis of the network. This recognises the fact that certain transit flows may have a minimal or even negative impact on the total amount of flows in the host network. Although the ETSO mechanism also shares this overall philosophy, it makes the simplifying assumption that the costs assigned to transit flows on the "horizontal network" of the host TSO will be in proportion to their relationship with total network costs for total national consumption in the period concerned.

Secondly, the existing mechanism for Nordel includes compensation for the increased losses caused by transits whereas the ETSO model covers only fixed network costs. However, both

ETSO and Nordel members agree that compensation should be for both types of costs in future models.

Principles for establishing inter TSO compensation

Article 8 of the Regulation sets out the areas which the guidelines must cover, referring back to Article 3 as appropriate. Article 3 contains the basic principles as to how such a compensation mechanism should work. These principles need to be interpreted into precise rules and procedures.

Transits .v. all cross border flows

Article 8(2) (c) [The guidelines shall specify] details of methodologies for determining the cross-border flows hosted for which compensation is to be paid under Article 3, in terms of both quantity and type of flows, and the designation of the magnitudes of such flows as originating and/or ending in transmission systems of individual Member States, in accordance with Article 3(5);

Article 3(5) The amounts of cross-border flows hosted and the amounts of cross-border flows designated as originating and/or ending in national transmission systems shall be determined on the basis of the physical flows of electricity actually measured in a given period of time.

This Article states that compensation should be based on physical, rather than contractual or declared flows. The Regulation itself includes a very broad definition of the term “cross border flows” which encompasses any “physical flows of electricity on a transmission network of a Member State that results from the impact of the activity of producers and/or consumers outside of that Member State on its transmission network.” In principle, this allows for compensation to be paid to countries affected by “transit” flows and also those countries disproportionately affected by other cross border flows, not necessarily classed as transits.

However, at present, both the ETSO and the Nordic approach only includes transit flows in the compensation mechanism. This could be justified by the assumption that, for flows other than transits, the mutual effects on different networks would be similar. Compensation payments would therefore, by and large, be offsetting and can thus be ignored. This need not be the case of course and scenarios can be given where compensation might be appropriate between two countries even in the case of simple cross border flows. In such an event, it may be appropriate for the guidelines to include specific arrangements concerning the payment of compensation between the affected Member States which would cover all cross border flows.

With and Without .v. Average Participations

Article 8 (2) (a) [The guidelines shall specify] details of the procedure for determining which transmission system operators are liable to pay compensation for cross-border flows including as regards the split between the operators of national transmission systems from which cross-border flows originate and the systems where those flows end, in accordance with Article 3(2)

Article 3(2) “The compensation referred to in paragraph 1 shall be paid by the operators of national transmission systems from which cross-border flows originate and the systems where those flows end.”

As already noted, the Nordel model is a “with and without” approach with the ETSO model being a further simplified version of this philosophy. In both these models the impact of transits on the host network is measured without directly assigning the physical flows experienced in transit countries back to specific network users in the other TSOs. A simplifying assumption is therefore required such that every net inflow or outflow from other Member States is assumed to make an equal contribution to the transit flows in other TSO regions.

The alternative to these is the “average participations” (AP) approach. This can be applied to either transits-only or to all cross border flows. This model is able to assign responsibility for flows back to particular network users. It does this by using a stylised model of the relationship between the pattern of flows in the network and the various injections and withdrawals. Although this model is also an approximation, it has the benefit of automatically assigning responsibility for flows back to network users.

Discussion of available models

Since both average participations and the “with and without” approach can conceivably be applied to either transits alone or all network flows, there are four feasible models on which compensations could be based as set out in the table below

with and without transits “WWT”	without and without cross border flows ¹ “WWC”
average participation transits “APT”	average participation cross border flows “APC”

The main advantages of using all cross border flows to determine compensations is in terms of accuracy since the assumption that compensations for other types of flows would be offsetting may not be fulfilled in practice. At the same time, however, both ETSO and Nordel are already using a system based on transits that are working satisfactorily and it may be that the added gains are not that significant. It is also of note that national tariff structures are often determined by much less sophisticated approaches. Furthermore, the retention of the “with and without” approach does allow a more streamlined procedure in which TSOs are able to make their own calculations on an individual basis. This gives some confidence in the results which may be eroded by having a centralised “black-box” approach.

Overall, however, it is not expected that the net results of these different approaches should differ significantly. Where differences do exist, these should be possible to explain with reference to the characteristics of the model used. As a full set of data is being collected during 2003 it will then be possible to examine in detail the application of the different models and interpret the results.

Payment Procedure

¹ This would function in a similar way to the current Nordel model, but all inflows and outflows would be removed with, if necessary, an assumed reduction in local generation or load to give a balance within the TSO concerned.

Article 8(2)(b) The guidelines shall specify details of the payment procedure to be followed, including the determination of the first period of time for which compensation is to be paid, in accordance with the second subparagraph of Article 3(3)

Article 3(3) “Compensation payments shall be made on a regular basis with regard to a given period of time in the past. Ex-post adjustments of compensation paid shall be made where necessary to reflect actual costs incurred and recognised. The first period of time with regard to which compensation payments shall be made shall be determined in the guidelines referred to in Article 8.”

Since ETSO and Nordel are already operating compensation systems it is proposed that the guidelines would reflect the continuation of these systems.

Costing methodology

Article 8(2) (d) The guidelines shall specify details of the methodology for determining the costs and benefits incurred as a result of hosting cross-border flows, in accordance with Article 3(6)

Article 3(6) The costs incurred as a result of hosting cross-border flows shall be established on the basis of the forward looking long-run average incremental costs, taking into account losses, investment in new infrastructure and an appropriate proportion of the cost of existing infrastructure, as far as existing infrastructure is used to transmit cross-border flows. When establishing the costs incurred, standard-costing methodologies shall be used. Benefits that a network incurs as a result of hosting cross-border flows shall be taken into account.

This Article discusses how much should be paid to the host TSO for a given physical flow that it hosts. The first issue is the extent of the host countries' network that "is used" to host cross border flows. Discussion of this issue has led to the concept of the "horizontal network" as used in the ETSO model. However, a move towards more detailed modelling of the effects of transit and/or cross border flows would make this question somewhat redundant. This is because both the with and without model used in the Nordel approach and average participations assess the impact of transit and/or cross border flows on the entire network in terms of actual physical flows. Normally, however it will be expected that flows on the 220KV and 400KV voltage levels will be the most significant.

Once the significance of the amount of cross border flows on the network is established the next issue is the definition of costs for which host networks should be compensated. For this, the draft Regulation states that standard methodologies to be used must be based on forward looking long-run average incremental costs (LRAIC). In estimating this value, the approach used in telecoms and other industries implies that the replacement or duplication costs of the existing assets on the basis of today's price levels and technology would be a suitable approximation to forward looking LRAIC. This estimate would be made on an individual Member State basis for each asset type. The attached Annex discusses this subject in more detail

Such an approach contrasts with the current ETSO and Nordel mechanisms in which network investment costs are included on the basis of the regulated revenue of the TSO concerned. This does not appear suitable as a longer term solution since this value may be highly dependent on the date of investment or transfer of assets (e.g. at privatisation), the frequency of any revaluation and the account taken of inflation.

A standardised methodology might include the following steps:

- country specific asset valuation based on replacement cost estimates provided by TSOs, approved en bloc by the Comitology procedure and incorporated into the guidelines,
- common financial and operating cost assumptions: e.g.;
 - cost of capital 6% nominal pre tax,
 - depreciation 40 years,
 - operating costs 2.5% p.a. of capital costs.

Given the fact that money is being transferred between Member States it is important for the values concerned to be consistent, even if the parameters used for determining regulatory revenues in individual Member States is different. The above figures are based on a broad average of current regulatory practice in the different Member States.

Finally it is worth noting that the methodology requires losses to be taken into account. This would also require modelling of the effect of transit or cross border flows on losses in the host network and would probably be a by-product of the calculations relating to network use. Losses could be valued according to the spot price, or some assessment of the OTC contract price, in the countries concerned.

External countries

Article 8(2) (e) [The guidelines shall specify] details of the treatment in the context of the inter-TSO compensation mechanism of electricity flows originating or ending in countries outside the European Economic Area;

Once the Regulation is in force, there will be ten new Member States. This, together with the current Members and Norway, will mean that 26 countries will be covered by the inter TSO mechanism. This should not mean that other countries should be excluded from participating. Switzerland should also be fully involved in the exercise as soon as possible so that export and import charges are removed. In addition, the countries of south east Europe, the Euromed ring and Russia should be progressively included. This will create a wider market structure. Such an arrangement may be included in a legal arrangement between these countries and the EU.

However, it should be the case that all participants from outside the EEA should be required to comply with all three sets of guidelines (i.e. including those relating to congestion management and G\L harmonisation. This, among other things, will require the same treatment of any congestion rents.

For those countries which do not choose to participate in wider European market in this way, declared physical inflows and outflows may be subject to a transaction based charge reflecting

the use of the participating countries' networks as in the current ETSO model. Such a contribution should be at least as great as the payment to be made if these countries were to participate in the system.

DC interconnectors

Article 8(2) (f) [The guidelines shall specify] the participation of national systems which are interconnected through direct current lines, in accordance with Article 3.

In general, participation in the inter TSO compensation mechanism, and the removal of charges relating to cross border transactions will not be affected by whether Member States are connected by AC or DC lines. Such lines shall be deemed to be part of the network in the Member State concerned and the flows on these lines shall be eligible for receipt of compensation where they host transit (cross border) flows. It is expected that for DC lines forming part of the overall TSO network, such compensation would entirely replace fixed charges on interconnector use and any reserve prices in, for example, auction mechanisms.

Likewise, net inflows and outflows from the Member States connected by such lines may engender flows in others' networks and the TSOs which are connected by such lines may be required to pay compensation. As for any other Member State, these compensations may be collected by TSOs as they wish, provided there are no charges based on individual transactions on the basis of the contract path.

A possible exception may be made for direct current interconnectors that are regulated on the basis that they are a legally separate company from the TSO, including those which might eventually have certain exemptions from the provisions of the Directive and Regulation. In such cases TSOs may choose to collect the contributions to the TSO compensation funds from the owners of the interconnector concerned. This will mean that the DC line in question is treated as a TSO in its own right for the purposes of the compensation mechanism.

However, unless the interconnection in question is exempt from third party access (Article 20 Directive), or from regulated access (Article 23 Directive), it would still not be permitted for the owners of the interconnector in question to collect contributions directly from its users (e.g. through fixed charges for use or reserve prices), since this would amount to a barrier to competition in the same way as an export charge. Instead, it would be expected that these charges would have to be found from the proceeds of congestion management revenues or, if these were insufficient, the owners of the infrastructure concerned would have to find the funds from their own resources.

Participants are invited to respond to this discussion document, in particular by responding to the following questions:

- i. How rapidly, if at all, should the compensation methodology be amended to cover all cross border flows rather than transits only?*
- ii. Does the “with and without” approach currently being used provide sufficient accuracy in terms of the net payments to be made or would a more overarching model such as average participations be preferable?*
- iii. In the standardised costing methodology, what common parameters should be used?*
- iv. What is an appropriate “entry” payment to be made for electricity being imported into the participating countries’ networks from external sources? How should this be calculated?*
- v. Under what circumstances should DC lines be treated as a separate participant in the TSO mechanism?*

Background

The draft Regulation introduces the concept of forward looking Long Run Average Incremental Cost (LRAIC) when discussing the amount of inter TSO compensation between Member States. The concept of LRAIC is not new, and is recommended for use in a number of situations to set prices for the use of network assets with a high degree of fixed costs. For example the Commission Recommendation on interconnection in a liberalised telecommunications market (latest version 2000/263/EC: 20 March 2000).

Long Run versus Short Run Incremental Costs

The evaluation of the incremental costs per unit of additional traffic implies the consideration of the extra costs to the network if traffic increases by a certain amount implied by certain amount “**the increment**”. Alternatively one can measure the avoided costs if traffic were to reduce by a certain amount “the decrement”. The evaluation of incremental cost over the long run, as opposed to the short term, relates to the size of the increment or decrement being considered.

An evaluation of short run incremental cost would consider the increase in cost needed to accommodate a very small increase in traffic. Usually this value would be very unstable since increases in capacity can only be added in large blocks. Thus, in most cases a small increase could be accommodated with minimal cost. In the event that capacity is already fully used, however, the cost would temporarily increase to a very high level.

By contrast, the use of a long run period implies a large increment and implicitly the consideration of the fixed investment costs. The Commission has already taken this line in telecoms where all users are obliged to contribute to the fixed costs of the network and LRAIC is defined such that in the long run:

“... the **entire investment cost** entailed at any point of interconnection, and any investment in ...capacity required to handle interconnected traffic would be avoidable and thus captured in the long run incremental cost measure.”

Such an approach considers the costs that would be avoided if traffic on the network fell from the current level to zero in the portion of the network being considered. In this case the avoided costs are the future costs of renewing the network at the end of its economic life.

An alternative framework, which would yield similar results, would be to assess a large enough increment (say a doubling of traffic) that would require the duplication of the existing line. In either case the estimate of LRAIC would, to a large extent, reflect the fixed costs of the existing network based on an estimate of construction costs based on current cost conditions.

Provided that geographical and other local conditions are the same, there is unlikely to be a significant deviation between the LRAIC estimates generated by different Member States. However there may, for example, be a lower cost level in candidate countries to reflect the lower unit labour costs. Some adjustment may also be required if there is a higher proportion of more expensive underground transmission cables, or for transmission in mountainous or densely populated regions.

Difference between regulated costs and LRAIC

Because the LRAIC concept is also forward looking it will, in effect, generate a standard unit cost to be used for the networks concerned based on today's price levels, efficiency levels and technology. This contrasts with approaches used by regulators to assess the overall level of transmission charges which are usually based on accounting values which differ considerably by Member State. For example an historical cost valuation will depend on the price level at the date the assets were constructed, revalued or transferred between owners.

Worked Example

Suppose the current capacity of a given line is 1250MW, LRAIC might imply an assessment of the cost/MW of increasing capacity to 2500MW. This might imply the construction of an identical line parallel to the existing line. If the line in question is 50km and construction costs are estimated at €1m/km, the cost would be €50m.

This gives a value for LRAIC of $\text{€}50\text{m}/1250 = \text{€}40.000/\text{MW}$ capital cost
or an annual capital cost (assuming 30 year depreciation and a 5% return) =

- €3,3/KW or
- €0,4/MWh (assuming maximum 8760hours/year).

Conclusion

The use of the concept of LRAIC therefore allows a costing methodology that would:

- i. implicitly includes the existing fixed investment costs in the calculation,
- ii. implies a standardised costing approach based on current technology and cost levels, avoiding arbitrary differences resulting from the differing construction dates in each Member State and different accounting principles.