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COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 3.7.2008
SEC(2008) yyy

COMMISSION STAFF WORKING DOCUMENT

Accompanying document to the

**Inter Transmission System Operator Compensation Mechanism and Harmonisation of
Transmission Tariffs for Electricity**

Summary of IMPACT ASSESSMENT

**{COM(2008) xxx final}
{SEC(2008) xxx}**

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1. PROBLEM DEFINITION

1.1. Background

Europe's citizens and companies need a secure supply of energy at affordable prices in order to maintain a high standard of living. That is why EU policy focuses on creating a competitive internal energy market offering quality service at low prices.

Electricity is a powerful and particularly versatile energy source transported to consumers using the transmission and distribution systems. These electricity transmission and distribution networks are natural monopolies. For this reason strict rules, overseen by a regulatory authority, governing access and pricing of network use are necessary.

The total value of the wholesale Electricity market in Europe is over €150 billion per annum. Around 10%, or €15 billion, is accounted for by trade in electricity across national boundaries. The total annual cost of operating the transmission networks for all EU/EEA countries is €10-11bn. Charges to network users to cover this cost are set, in advance, in accordance with the rules set out in the Regulation 1228/2003 and Directive 2003/54/EC .

1.2. Inter TSO Compensation

The nature of electricity networks means that distance or transaction based charges, such as specific import or export charges, result in the inefficient use of the overall network. Nonetheless, non-domestic users who import and export over the transmission system of a country should pay a fair proportion of the costs of grid operation.

The costs associated with cross border use of the network include increased: **Internal congestion** as planned flows resulting from commercial transactions could be greater than the internal network is physically capable of transporting; increased **energy losses** incurred on the TSOs system because, as the amount of electricity being transported on a line increases more

electrical energy is lost as heat; and finally cross border flows influence the **design and development of the transmission system**.

For some time there has been agreement that the appropriate way to ensure that costs are fairly attributed is for transmission system operators to be responsible for the costs imposed on other transmission system operators as a result of cross border flows resulting from actions of users connected to their system. Compensation payments made or received should then be reflected in their regulatory approved tariffs.

In the absence of a European Regulator there is no body equivalent to the national regulator to set the rules governing the costs of cross border network use. Instead Regulation 1228/2003 set out high level principles, and provided for the adoption of detailed guidelines. The full rationale for the ITC model provided for is set out in the explanatory memorandum accompanying the commission's proposal¹ - but the core elements are that it be based on ensuring that TSOs are compensated for the "clearly specific costs incurred by transits".

An effective ITC mechanism must therefore both assess the extent to which a particular transmission system is used for cross border power flows and assess the costs incurred by hosting those cross border flows.

These detailed elements of ITC were not specified in the Regulation, and since its adoption have been left for the voluntary agreement of stakeholders. The number of participating countries in the voluntary mechanisms increased from 8 in 2002, to 35 in the current voluntary mechanism.

Under the voluntary system for 2008/2009, Switzerland the highest net recipient in absolute and relative terms received €69 million. This is equivalent to one tenth of a cent per kilowatt hour of consumption. By way of comparison average household prices were 15.3 cents per kilowatt hour across Europe in 2007.

Although total sums are small in the context of the overall electricity market, the compromise between TSOs from 35 countries reached for 2008-2009² was reached only after very difficult negotiations. Voluntary agreements such as this, with multiple veto points, are not sustainable in the longer term. It is the clear preference of the TSOs that the basis for ITC be formalised through binding guidelines, otherwise ITC payments are likely to cease at some point. This would have a number of potential impacts including:

- Network users in countries which host transits would have costs imposed upon them which result from cross border use of the transmission system.
- National regulators would not be in a position to approve development of the (national) network for internal market benefits .
- TSOs and regulators might attempt to introduce charges to cover the costs associated with hosting cross-border flows. Such charges would be likely to effectively act as import, export or transit charges.

¹ This can be found at:

http://intradev:8088/energy/electricity/legislation/doc/regulation_proposal_2001/reglement_en_acte.pdf

² The ETSO note is available at :

http://ec.europa.eu/energy/gas_electricity/consultations/doc/2009_02_28_tso_explanatory_note.pdf

Under the Regulation, guidelines for ITC would apply to the EU/EEA and, eventually, the Energy Community. To be effective ITC would have to make provision for other countries such as Switzerland to join on a bilateral basis. Practically, it would only be applicable where transmission networks were interconnected, for example, Iceland or Cyprus would not be affected by the ITC mechanism.

1.3. Tariff harmonisation

Tariffs are the charges for local system users for use of the transmission system. The main elements of tariffs represent the costs of investment and operation and maintenance of infrastructure. These are fixed in the short-term. In addition the costs of managing congestion on the system are also met by TSO.

Exporters and/or importers pay the national network charges applicable to generation in the exporting country and/or to consumption in the importing country. Network pricing affects the internal market in electricity for because generators incorporate the costs arising from the network charges in their power pricing. For this reason production will take place where charges are lower potentially leading to an inefficient use of the interconnected transmission system. Moreover charges on generators will affect investment decisions; as such decisions are made on the basis on expected lifetime costs.

These concerns do not apply to the same extent to charges on load as demand is generally inelastic, and at any rate less mobile.³

Distortions to trade could arise where significant differences exist as a result of the recovery of some (differing) proportion of the costs of transmission from generators. This can justify either setting out rules to ensure that generators charges are assessed on the same basis across the internal market (in terms of proportion of network costs borne by generators and how network costs are calculated) or directly setting a range of allowable charges for generators.

In 2005 ERGEG prepared draft guidelines on Transmission Tarification after extensive consultation. They represented the consensus view as to the appropriate level of harmonisation.⁴ The draft guidelines provide a range of the range of 0 – 0.5 per €/MWh for generation charges for Continental Europe, but permit average generation charges in the Nordel system, Ireland, Great Britain and Northern Ireland. Formally adopting Guidelines could help ensure that this European level view was maintained, and not subject to change for domestic reasons.

³ The producers of energy intensive tradable goods can have a competitive advantages a result of low transmission charges. However, most consumption is not in this category, and the direct effect of generator transmission charges on competition is greater.

⁴ The full details of this consultation process can be found at: http://www.energy-regulators.eu/portal/page/portal/EER_HOME/EER_CONSULT/CLOSED%20PUBLIC%20CONSULTATIONS/ELECTRICITY/Transmission%20Tarification%20Guidelines/CD

2. ANALYSIS OF SUBSIDIARITY: IS EU ACTION JUSTIFIED ON GROUNDS OF SUBSIDIARITY (NECESSITY AND EU VALUED ADDED)?

2.1. Inter TSO Compensation

ITC is designed to consider transmission from a European level, rather than only looking at national transmission systems. Any ITC mechanism must by definition operate on a cross-border basis. In the absence of a pan-European regulator to set supra-national rules, the detail of how such principles should be applied must either be a matter for voluntary agreement of the development of binding rules at a European level. As noted, reaching voluntary agreement between 35 countries (with an even higher number of participating TSOs) is particularly difficult.

Article 3 of the Regulation (adopted in accordance with Article 95 of the Treaty) requires that arrangements be put in place to provide compensation for Transmission System Operators (TSOs) in relation to the costs⁵ they incur as a result of hosting cross-border flows of electricity on their network. The Regulation specifically provides for the Commission to adopt or amend binding guidelines on the ITC mechanism where appropriate and these must also address transmission tariffication.

2.2. Tariff harmonisation

In relation to tariff harmonisation, it is clear EU level action *can* have a role to play in ensuring an appropriate degree of harmonisation. A European overview focussed on preserving the integrity of the internal market helps ensure that potential benefits of harmonisation are considered which take into account the impact beyond national borders. This is relevant for because investment decisions – taken as a result of the structure of transmission tariffs - in one member state affect the entire internal market., and locational signals for generation which consider only the national transmission network will fail to account for how that generation affects the wider interconnected European transmission system.

As noted already, ERGEG has prepared draft guidelines on Transmission Tarification. There is a high degree of voluntary compliance with these guidelines. When the Regulators, who are responsible for approving tariffs in the Member States, developed the draft guidelines, they did so in the expectation that they would be adopted as binding guidelines, in accordance with the provisions of Article 8 of the Regulation.

3. OBJECTIVES OF EU INITIATIVE: WHAT ARE THE MAIN POLICY OBJECTIVES?

Liberalisation is designed to secure the competitiveness of Europe by delivering *competitive, secure and sustainable* energy Markets. The Regulation was adopted as one of the measures to speed up liberalisation in the electricity sector, by promoting an intensification of cross border trade in electricity. The regulation aims to achieve this by establishing *transparent and non-discriminatory* charges for network use based on *fair, cost-reflective, transparent and directly applicable* rules.

⁵ Costs arise in relation to losses and use of network infrastructure.

3.1. Inter-TSO Compensation

The best approach towards the development of an ITC mechanism is to focus on cost recovery as network utilisation is addressed by border congestion management mechanisms and locational transmission network access within national systems. The specific objectives for the ITC mechanism are that it should be:

Accurate Should accurately reflect the physical flows of electricity derived from cross-border flows; Should determine accurately those responsible for cross-border flows; Should allow for a correct treatment of perimeter countries.

Compensatory (reflective of costs *and* benefits): Should capture both costs and benefits as a result of cross-border flows (including benefits commercial flows); Should be applicable to losses and use of transmission infrastructure; should take account of congestion rents

Transparent and Stable Should be stable and respond in a reasonably predictable manner to changes in data and parameters; Should be capable of specification in a way which creates confidence in the method; Should be transparent and capable of being understood and verified.

Implementable/ Low administrative burden Should be practical and as easy to implement in terms of data and methodology; Should not result in excessive costs for national regulators and TSOs; Should be capable of specification in guidelines

3.2. Transmission tariffication

The need for fair, cost-reflective, transparent and directly applicable rules also applies to transmission tariffication. In particular transmission tariffs must be non-discriminatory and cost-reflective. The objective of the Regulation is to achieve a *certain degree* of harmonisation to avoid distortions of trade.

Specifically, the aim is to facilitate the efficient utilisation of the interconnected transmission system across Europe and avoid the distortion of investment decisions. However, it is also necessary that member states be able to implement tariffs which encourage efficient network utilisation within their borders.

4. POLICY OPTIONS: WHICH OPTIONS HAVE BEEN CONSIDERED AND WHICH HAVE BEEN ASSESSED IN DETAIL?

4.1. Inter TSO Compensation

Scope of EU action

Option 1 No new action by Commission (continuation of voluntary approach): Under this option, there would be no adoption of the guidelines. This would leave the ITC mechanism to the TSOs to develop and regulators to agree. This represents a "business as usual" option which is not supported by stakeholders.

Option 2 Suppression of ITC mechanism through guidelines: A number of respondents to the Consultation process argued that an ITC mechanism was no longer necessary. Congestion

payments by market participants for scarce interconnection points, in this view, obviate the need for ITC.

Option 3 Adoption of high level principles in guidelines: Under this option the guidelines would set out the principles to be followed in the development of a detailed mechanism. The responsibility for developing the methodology would lie with the TSOs and ENTSO-E. This option is applicable irrespective of the design of ITC.

Option 4 Adoption of guidelines to endorse a detailed mechanism: This would involve developing clear and detailed guidelines to be adopted by the Commission. Discretion left to the bodies responsible for implementation would be minimized. This option is applicable irrespective of the design of ITC.

Option 5 – A regionalised approach: There was no support from any respondents to the consultation to a regionalised approach.

Design of ITC Mechanism

It is not possible to directly identify the impact of cross-border flows on the network. There are many variants of model which can be used for estimating the extent and impact of cross border flow, some of which have already been used in voluntary ITC mechanisms. Models typically fall into one of two broad types – relatively simple export-import models and complex power flow models. For the sake of simplicity the analysis presented here is generally based on this distinction.

Option 1: Simplified import-export model A simplified import export model looks only at the flows of electricity at border points between different control systems, focusing on transfers between individual transmission systems or control areas to make the model tractable.

Option 2 Complex power flow models: Power flow models attempt to replicate the impact of cross border flows of electricity on the interconnected network in its full complexity.

There are several other examples of complex models including the Marginal Participation model, the Average Participant Model (which is based on water flow models) and the IMICA previously developed by ETSO.

The *With and Without Transit Model* has been used in recent voluntary agreements for the purpose of assessing losses as a result of hosting transits. It uses a counter-factual of national network cross border flows with transits of electricity removed.

Valuation of infrastructure: Once infrastructure use has been identified, its value and costs must be assessed. Either an assessment can be made of those elements of national networks which are used for cross border flows and regulatory approved values for that element of the network, or, alternatively a standardized approach can be taken removing the impact of different regulatory treatment of costs.

Options warranting detailed consideration

The principles, recently reconfirmed in the Third Energy liberalisation package, that compensation reflect the costs of hosting cross border flows, and that it be based on physical flows of electricity remain the most appropriate.

Abolition of ITC could result in countries hosting cross border flows for which they do not receive compensation, as physical flows of electricity differ from the commercial links. Moreover, congestion rents used for the construction of new capacity will reduce overall rents and thereby also reduce the funds available to compensate for cross border flows. Therefore the option of suppressing ITC should not be considered in detail

In view of the minimal support for a regionalized approach, it would not be appropriate to pursue this approach.

Both import –export models and power flow based models warrant detailed consideration – including the valuation of infrastructure, as does the level at which EU action should take place.

4.2. Transmission Tarification

Options available in relation to transmission tarification are:

- (1) No action
- (2) Adopt the 2005 draft ERGEG guidelines
- (3) Amend the 2005 draft guidelines by adjusting the range of allowable generation tariffs for using the transmission system, by broadening or narrowing the range of allowable generation charges
- (4) Several respondents to the consultation called for load tariffs to be based on Ramsey principles. This would transmission tariffs to the elasticity of demand.
- (5) Establish detailed rules setting out both the how national regulators should carry out the assessment of actual costs which can be recovered from system users.

Ramsey pricing, set out in option 4, is arguably economically more efficient as consumption decisions are closest to what they would be were (short run) marginal pricing possible. However, it would not be in line with the Regulation's provisions which specifically give significant flexibility in relation to the setting of transmission tariffs for load in line with subsidiarity. Therefore only options 1, 2, 3 and 5 warrant detailed consideration.

5. ASSESSMENT OF IMPACTS: THE MAIN ECONOMIC, ENVIRONMENTAL AND SOCIAL IMPACTS OF EACH OPTION

5.1. Inter TSO Compensation

Scope of EU action

The level of EU involvement in specifying ITC rules has only a minimal effect on the costs of implementing and complying with the mechanism developed.

Both voluntary mechanisms and binding guidelines can be designed to ensure that exports and imports are treated equivalently with power flows originating within the system. This has been a feature of all voluntary agreements to date. Non member states, including Switzerland, have been involved in the consultation process and at the Florence forum.

Design of ITC Mechanism

Total compensation payments are marginal in terms of the end result on electricity bills – generally less than 0.06% of average retail prices in terms of total costs. Differences in payments to countries implied by different options are also small, meaning that the net impact on consumers is effectively imperceptible.

How well the options contribute to the wider goals for the internal market is a function of the extent they meet the objectives for ITC. In itself a complex model will not have a more positive impact than a simplified model, or vice versa. It depends on how accurate, compensatory, transparent and implementable the approach is in practice.

The design of the ITC mechanism does not have a particular social or environmental impact. The secondary impact of the distribution of total network costs for the interconnected European transmission system does not have any significant social or environmental impacts.

5.2. Transmission tariffication

Since the beginning of the liberalisation process there has been a tendency towards generation transmission charges being set at zero. Regulators generally set transmission tariffs within the bounds of the 2005 draft guidelines developed by ERGEG. These allow scope for variation in generator charges, as border congestion means that prices do not equalise across Europe, reducing the potential impact of variation in tariffs.

Without formal adoption of binding guidelines, a coherent European approach risks being undermined by divergent member state views. Guidelines, give a legal framework which increases market confidence and certainty.

Reducing allowed average generator transmission charges should ensure that all generators in Europe competed on an equivalent basis – though the difference in prices between countries mean that this is generally not relevant in practice. In theory such a change would have no effect on relative prices within a particular system or on the final prices that customers pay for electricity as generators would adjust their prices to reflect the charge.

However, most contracts would still be based on the higher charges creating a windfall gain for generators while customers would have to pay higher network. Conversely, a widening of the permissible charges, if acted on, would impose a windfall loss on generators who had made investment decisions based on expected lower charges. In practice introducing negative pricing to retain locational signals (which might need to be significant) could lead to difficulties in implementation.

Harmonising the methodology underlying the calculation of tariffs should ensure that all generators are treated equivalently with a positive impact on the internal market. However EU level rules could undermine the ability of regulators to take local circumstances – including environmental considerations – into account without any particular advantage compared to a "results based" approach.

6. COMPARISON OF OPTIONS: WHAT IS THE PREFERRED OPTION ON THE BASIS OF WHICH CRITERIA/ JUSTIFICATION?

6.1. Inter TSO Compensation

6.1.1. Scope of EU action

Stakeholders have asked the Commission to develop binding Guideline effectively as an "honest broker" without a direct stake in the final rules. The current voluntary process is becoming unmanageable, and failure is highly likely.

Binding guidelines on the ITC mechanism, and on transmission tariffication, will support completing the internal energy market. This is the clearly expressed view of all major stakeholders. It is reasonable to conclude that that it necessary for the Commission to introduce guidelines at some level.

6.1.2. Design of ITC Mechanism

The objectives that ITC be accurate, transparent and compensatory follow from the overall objective of creating a fair and non-discriminatory market for electricity across Europe. The coherence of each of the options is directly related to its effectiveness at achieving its objectives. In the context of ITC operational costs and appropriately amortized development costs would have a marginal impact on any estimate cost-effectiveness.

The assessment of the effectiveness of the various models was informed by expert advice from consultants and the experiences of ERGEG and ETSO and the consultation with stakeholders at the Florence forum and in the public consultation process.

Accuracy Experience with power flow based model been that the actual results are highly volatile and often counter-intuitive when used for ITC purposes. Based on this experience there can be little confidence that they truly provide the promised increased accuracy when reflecting the actual flows which occurred on the transmission system. This is less of an issue when using a single counter-factual as is done using the *With and Without Transit Model*. Import export models of transits, while not precise give a very good overall view of the amount of transits. They are "approximately right rather than precisely wrong". This offsets such models shortcomings of in how cross border flows originated.

Transparency and Stability A transparent and stable model also allows TSOs and regulators to better plan the development of the system. This is difficult with complex power flow based models. Confidence is required not only in the model but also in large amounts of underlying data. It is difficult to verify this data.

Simplified import-export models are by their nature much easier to understand. They also have much more limited inputs. On this basis stakeholders find it relatively simple to verify the results of the model. There was widespread support in the consultation process for the use of such models on this basis.

Compensatory Insofar as they are accurate, complex power flow based models identify both the costs and benefits of hosting cross border power flows, up to the impact on individual transmission lines. Moreover, it is also possible to identify injections and withdrawals of power which cause cross border flows.

The simplifications of import-export models mean that both payments and receipts are based on the total imports and exports, and not individual injections of power. Moreover, because imports and exports are assessed on a system basis, the impact on individual lines is not isolated. However, this approach is similar to the approach adopted by national regulators when assessing total revenues for TSOs.

Implementable /Low Administrative burden Data collection costs for either a simplified import export model or a complex power flow model should not be significant as the required data is already collected and has indeed been used in the voluntary schemes developed thus far. The detailed design phase of a complex power flow model would be time-consuming and difficult and subject to significant testing procedures.

Experience with the IMICA model shows that important problems can present themselves during the application of complex models. This would increase the burden on TSOs who would have to carry out the bulk of this work and on national regulators who would oversee it. Simplified import-export models are easy to implement and apply. The additional resources required by TSOs or national regulators required to oversee a simple export system would be minimal.

Summary ITC Mechanism

	<i>Accuracy</i>	<i>Transparency</i>	<i>Compensatory</i>	<i>Implementable /Low Administrative burden</i>
Import Export	Medium	High	Medium	Medium-High
Complex Power-flow	Low – uncertain and sensitive to assumptions	Low	High	Medium
	(Higher when simplified counterfactual used)	(Higher when simplified counterfactual used)		

Valuation of infrastructure

In the Consultation process, there was support for valuing infrastructure both on the basis of standardised costing, which would and on regulatory approved values.

Moving to a standardised costing approach has a number of advantages. For one, it acts as a form of incentive regulation for TSOs and national regulators. It also avoids the need to harmonise the calculation of the costs of the transmission network across member states.

Basing compensation for the use of infrastructure on regulatory approved values should mean that domestic tariffs and ITC compensation payments are consistent. At present there are variations in the definition of transmission between member states. Moreover, transmission lines are used for cross-border flows. National level assessments would have to be reassessed to ensure consistency for the purpose of ITC. Continuing such an approach is feasible, but does involve "unpicking" the regulatory decisions at a national level.

Treatment of lines with dedicated funding

Some individual lines in the interconnected European transmission system are financed directly rather than through general tariffs. Compensating TSOs for the costs of making such infrastructure available to cross border trade could amount to double payment.

Conclusions Inter TSO Compensation

A simple import export model is to be preferred when designing the ITC mechanism in regard to infrastructure usage. The *With and Without Transit* model should be used for assessing losses. Finally a fund should be established to compensate all TSOs for the infrastructure costs associated with cross border flows. This should be based on a technical assessment of long run average incremental cost of making infrastructure available for cross border flows of electricity. The Europe-wide assessment should be made by the newly established Agency for the Co-operation of Energy Regulators.

6.2. Transmission tariffication

There are good grounds for establishing a framework within which regulators exercise their powers of tariff setting. Focusing on the methodology underlying the calculation of tariffs potentially would ensure that generators were treated equivalently. However, regulatory discretion would be reduced, and there would be conflict with the principle of subsidiarity.

Neither as part of the consultation process or in the work undertaken by the consultants engaged by the Commission was significant evidence put forward to indicate a need at this point to adopt a different range of allowable G-charges than those provided for in the 2005 draft guidelines. It is therefore not appropriate at this stage to make significant changes to the regulatory regimes prevailing in Member States. The consultation process indicated widespread support for formally adopting the 2005 draft guidelines. Moreover, when they were developed it was clearly envisaged that they would serve as the basis for binding guidelines under the Regulation.

Conclusion Adopting the 2005 draft guidelines would serve to increase the legal certainty for market participants. It would have a clear and positive impact upon the coherence of the rules governing the internal market in electricity, without undermining either the effectiveness or efficiency of the current regime where there is a wide degree of discretion for national regulators.

7. MONITORING AND EVALUATION: WHAT ARE THE ARRANGEMENTS TO ESTABLISH THE ACTUAL COSTS AND BENEFITS AND THE ACHIEVEMENT OF THE DESIRED EFFECTS?

The effectiveness of the new arrangements in meeting the objectives of the regulation should be subject to review after five years by the Agency for the Co-operation of Energy Regulators to be established under the forthcoming Agency Regulation, or earlier on the initiative of the Agency in line with Article 5 of the Agency Regulation. In relation to transmission tariffication, this review should specifically consider both the appropriateness of considering the variance of average tariffs – between and within countries - as well as their median value. If appropriate the guidelines would then be amended in accordance with the provisions of the Regulation.