

CEER Position Paper

Regulatory control and financial reward for electricity cross-border transmission infrastructure

Executive Summary

The objective of this document is to consider regulatory control and financial reward for electricity cross-border transmission infrastructure with a view to encourage the provision of appropriate new infrastructure and so facilitate the development of an effectively competitive single electricity market. A key output of this consideration is a set of Guidelines which provide regulatory authorities with an immediate and pragmatic toolkit with which to promote such infrastructures. This document builds on the CEER's July 2003 paper on infrastructure¹.

The aspiration to introduce an effectively competitive market structure comprising many upstream and downstream agents independent of TSOs highlights the challenge of how to encourage the provision of new cross border transmission infrastructure in ways that meet all market agents requirements. Different approaches to the problem of co-ordinating investment and generation planning are possible, ranging from ones that reflect existing integrated cost benefit analyses, through to those emphasizing market agent signals. Private, non-TSO provision of 'merchant lines' are also possible subject to a specific regulatory framework.

After examining these potential approaches to promote transmission investment, this document recommends some Guidelines to achieve this goal under the present regulatory conditions and level of implementation of the Internal Electricity Market. Other possibilities remain open for the future and the CEER also recommends actively pursuing them. Therefore, the approach that is proposed in this document should be adopted as an initial and interim measure to promote investment in transmission infrastructure, pending a more detailed analysis aimed at the introduction of a more comprehensive investment framework with a key focus on the ability of signals emerging from trade to highlight the need for new investment.

In the proposed Guidelines, the initiative to pursue new cross-border investments will mostly correspond to TSOs, after they have considered the available market signals and the inputs and requests from the market agents, since the TSOs have the technical knowledge, as well as the expertise, to evaluate cross-border transmission investments. The authorization for construction and operation of new transmission investments, when required by the relevant national regulation, will continue to take place as usual.

This document mainly addresses the issue of elimination of one of the major obstacles to the development of new cross-border transmission investments: the uncertainty about obtaining an adequate remuneration. It chooses to eliminate this uncertainty by requiring the involved regulators (i.e. those that correspond to the TSOs that are involved in the new investment) to reach a common position on an adequate remuneration for the new cross-border transmission facilities and by setting the appropriate remuneration schemes (e.g. use of system tariffs, access tariffs). The use of public competitive tenders is recommended as an adequate means to allocate competitively the construction of new regulated lines and to help in the determination of a reasonable remuneration, although this should be taken as a suggestion and not as a mandatory Guideline.

Merchant cross-border lines are also possible subject to the Electricity Regulation and guidelines for the coexistence of the two regulatory approaches are also provided.

¹ CEER's Position Paper on *Principles on regulatory control and financial reward for infrastructure*, July 2003.

The CEER also recommends that the EU Commission in due course establishes some guidelines on maximum delays in the internal procedures of the different Member States, so that these new cross-border investments will not be unreasonably delayed in their construction.

The CEER commits to a further work programme to attempt the development of a more comprehensive framework for regulatory control and financial reward for infrastructure, encompassing market based mechanisms. This approach would emphasize the contribution of market players' willingness to pay and price signals in determining appropriate transmission investment.

1. Objective

The objective of this document is to consider regulatory control and financial reward for electricity cross-border transmission infrastructure with a view to encourage the provision of appropriate new infrastructure and so facilitate the development of an effectively competitive single electricity market. This consideration will take into account the CEER principles that were presented at the 10th Florence Forum in July 2003. A key output of this consideration are Guidelines which provide regulatory authorities with an immediate and pragmatic toolkit with which to promote such infrastructures.

The CEER stresses that important barriers to the efficient development of transmission infrastructure still exist. One of them, whose treatment is the main purpose of this document, is the uncertainty in obtaining an adequate remuneration for investments in cross-border transmission network facilities. Another important barrier comprises the delays and diverse difficulties to obtain construction and operation authorizations for transmission infrastructure development. However this issue is outside the scope of the CEER's competences and hence this paper.

2. Organization of the document

Section 3 sets out the context within which this paper makes recommendations. It offers some insights on the importance and problems of provision of transmission investment in the new regulatory context and discusses in the context of the Internal Electricity Market some approaches to these problems.

Section 4 sets out suggested guidelines for Regulators to follow in allowing for the appropriate remuneration of cross border transmission infrastructures. The Guidelines are the key part of the document, as they express in a concise format the regulatory recommendations for regulated and merchant investment that correspond to the approach that is initially proposed by the CEER. Technical procedures, whose detailed development is needed to implement the proposal, are also listed as well as some additional issues that still have not been fully addressed.

The Annexes provide further background. Annex A sets out the basic regulatory approaches available. It therefore draws on and to some extent expands on the CEER's July 2003 paper. It also presents some reflections on the nature of merchant lines and the different regulatory schemes that can be employed accordingly.

Annex B describes the kind of regulatory test that might be applied by TSOs when preparing transmission expansion plans and regulators when they have to examine those plans.

Annex C describes in more detail the approach behind the proposed Guidelines.

Annex D sets out the applicable EU legislation and CEER principles.

Annex E describes and develops in more detail the basic features of the kind of model that CEER has committed to study further in order to incorporate more market based mechanisms.

Annex F presents some mechanisms to ensure transparency and availability of the information that will be needed to implement the proposed guidelines.

3. The context

3.1 *The importance of transmission investment in the new regulatory context*

European electricity market liberalization has as its goal the introduction of an effectively competitive single market, where competitive processes are introduced to the largest extent possible and direct regulation is reserved for areas where necessary. This goal is desirable because effectively competitive markets identify and provide the goods and services that customers want more efficiently than those delivered under a regulated or centralised decision making regime.

A competitive single market will be characterized by, among other things, a reasonably large number of generation and supply market players. There will also be effective separation of electricity network activities from the generation and supply markets they serve in order to promote non-discriminatory third party access to electricity networks. It will be necessary to regulate in some form these network activities.

Such a competitive market structure will bring many new challenges. The one that is the subject of this document is how to encourage network operators to provide new cross-border transmission infrastructure in ways that serve the development of a competitive single market. Pre-liberalization markets were typically characterized by large vertically integrated monopoly players who co-ordinated both production and transmission of electricity. They planned and operated the electricity systems by, among other things, taking into account some sort of trade off between their generation and transmission activities, and often with a centralised planning system for long run generation and transmission infrastructures. Judgements on the extent to which such infrastructure would be justified would be based on assessments of future costs and benefits.

Aspirations for new competitive market structures mean that it is no longer possible to leave the monopolies and the vertically integrated structures to deliver this kind of co-ordination. Instead it will be necessary to consider how a market comprising many competing generators and suppliers can indicate their needs for efficient electricity transmission services in the short and long term, and how TSOs can best respond to such requirements within some form of regulatory regime. Each market agent has a role to play helping to provide at any time the best offer to consumers, to improve the efficiency of production and resource allocation, to make the best investment decisions and at any time minimising costs and taking into account environmental concerns. For these reasons, the CEER in its paper Principles on regulatory control and financial reward for infrastructure given to the July 2003 Florence Forum set out the following overarching principle in relation to infrastructure development:

“The full liberalisation of the market is the dominant prerequisite for the efficient use of existing infrastructure and the development of new infrastructure. In these circumstances, a key focus should be on the ability of signals emerging from trade to highlight the need for new investment.”

Such new investment in interconnection will also help the development of effective competition by for example reducing market power. It will also help security of supply and market liquidity.

Focusing on transmission investment, the co-ordination problem can be characterized in two interrelated steps. First there is a problem of identifying which transmission investments should occur, i.e. how market participants communicate their need for transmission investments to TSOs and how the TSOs assess this need. There is a second step of remunerating these investments and the problem of preventing abuse of any transmission monopoly position.

3.2 The different approaches to the problem of regulatory control and financial reward for electricity transmission infrastructure

There are a number of different approaches to the problem of regulatory control and financial reward for electricity transmission infrastructure.

One approach (called here Approach 1) may be a “predict and provide” CBA (cost-benefit analysis) type approach, where the TSO forecasts demand for transmission capacity, or responds to requests made by the network users or regulators and builds to meet demand, subject in some cases to regulatory authorization and, in any case, under some kind of regulated remuneration. This approach derives to some extent from methods used previously by vertically integrated incumbents in the simultaneous optimization of transmission and generation. It will utilize some form of ‘Regulatory test’ in the CBA. Annex B provides further description of the concept of the ‘Regulatory test’.

Approach 1 solves the co-ordination problem by using the TSO either to forecast the need for new investment or to respond to exogenous requests for new investment. Adequate remuneration for this investment is sanctioned by regulators and recovered from all transmission customers, under some form of price control. Section A.1 of Annex A sets out examples of the different kinds of regulatory price controls that might be used.

Another approach (called here Approach 2) is a further developed market based approach where the competitive interaction of market actors produce price signals that highlight the need for transmission infrastructure, and where TSOs are incentivized to respond to these signals. This approach also calls for full definition of transmission access rights (e.g. in terms of duration, secondary tradability, and financial or physical firmness) in order that market agents can properly form their own view of the value of such rights. An example of how such an approach might be implemented in practice, called the ‘Deep System Operator Incentives Model’, is given in Annex E of this document. This model has not yet been implemented in practice in the electricity sector and it necessitates further work.

Approach 2 solves the co-ordination problem by allowing market agents to signal their willingness to pay for necessary new transmission infrastructure, and by allowing TSOs to respond to this. TSO remuneration may derive in part from the market agents involved. Approaches 1 and 2 relate to a certain extent to TSO investment planning and come under regulated TPA regime.

A further approach is the use of ‘merchant lines’. Under this approach private parties are allowed to identify the need for, construct and/or operate new transmission infrastructure. They receive remuneration from congestion rents. TSOs are only involved to the extent that the merchant lines must connect to and properly interface with the wider transmission network. Hence the merchant lines approach should not be confused with Approach 2. However, regulators and public authorities are still involved, according to national regulations, in the licensing of such merchant investments.

Merchant lines can play a valuable role in joining separate systems, such as the France – England interconnector. They may exist and are consistent with approaches 1 and 2. Their role is likely to be limited however within a highly meshed AC system. Merchant investments may be an interesting alternative to investments under regulated remuneration since private initiative may be able to find solutions where regulated investment does not. Section A.2 of Annex A sets out a further discussion of the nature and role of merchant lines.

The three approaches are not necessarily extremes or mutually exclusive. On the contrary, it is possible for example to introduce elements of Approach 2 into Approach 1 and vice versa in order to create a more mixed approach.

3.3 Approaches and implications for Guidelines

Given the simultaneous realities of the aspiration to create an effectively competitive single market, and the present day existence of partially liberalized markets and incomplete linkages between national markets, each approach can be assessed as follows.

Approach 1 has some immediate advantages:

- It represents a short step from some pre-liberalized market systems and so may be relatively easy to introduce in the short term.
- Monopoly rents may be regulated.
- It provides a secure and controlled environment in which infrastructures can be built.
- It is feasible and will enhance security of supply and competition.
- Construction costs may be efficient since construction contracts can be tendered.
- Pure merchant lines may be accommodated in this framework.

However, it has some disadvantages:

- In a world of competitive markets and unbundled players, neither the TSO nor regulator has information to forecast accurately. This reduces the utility of any kind of 'Regulatory Test' that seeks to forecast welfare benefits of particular infrastructure proposals.
- If the TSO under-forecasts demand for infrastructure there will be significant risks to security of supply.
- Conversely, if the TSO over-forecasts demand for infrastructure – by mistake or because the allowed rate of return is too high – then European customers will be at risk of paying for unnecessary "stranded costs".
- These risks are amplified by the possibility of lobbying of Government, TSOs or regulators by special interest groups.
- Customers bear the risks of inappropriate or inefficient investment.

Approach 2, if viable, will offer:

- The introduction of pricing mechanisms and property rights that together enable market players to express their requirements for further infrastructure development and their willingness to pay for this.
- The introduction of opportunities for profit or incentive mechanism driven investment that encourage TSOs and / or others that are best placed to make use of the available market data and seek out appropriate, efficient and welfare enhancing investments. This will also enhance security of supply and competition.
- The elimination or reduction in risks faced and paid for by all transmission customers.
- The market driven development of transmission infrastructure.

Drawbacks of such an approach may include:

- The specifics of the approach are still in the phase of design. It may not be feasible, at least in its full fledged form. It requires significant effort to implement.
- A full implementation will require effective separation of TSO functions, efficient locational pricing, and firm and tradable transmission access rights.
- Returns to some infrastructure developers or TSOs may be higher than under a purely regulated approach.

In sum, Approach 1 derives from and can be built on existing methods used by TSOs for identifying, building, and receiving remuneration for infrastructures. However it is not likely to result in the most efficient identification of infrastructure and nor is it compatible with the longer term aim summarised in the CEER's overarching principle for infrastructure development.

Conversely, Approach 2 is by design consistent with this principle. It side steps many of the problems associated with Approach 1. It requires however significant further work to implement and faces the intrinsic regulatory difficulty of trying to introduce competition in an activity with characteristics of natural monopoly.

Given these constraints, and the CEER's desire both to promote proper cross border infrastructure in the immediate term and the development of liberalized and effectively competitive single market in the longer term, the CEER suggests that:

- Guidelines are proposed for the remuneration of cross border infrastructure that provide regulatory authorities with an immediate and pragmatic toolkit with which to promote such infrastructures.
- The CEER continues with the development of Approach 2 in order to evaluate the feasibility of the type of approach in the electricity sector as well as that ability of Approach 2 to develop efficiently new cross-border transmission infrastructures.

Detailed guidelines are therefore presented in section 4. They are given as two sets. The first set is to apply to regulated TSO activities. The second set is to apply to merchant lines.

The development of Approach 2 is left as a further programme of work. It is worth noting however that is possible and desirable to supplement Approach 1 with mechanisms that reflect Approach 2.

4. Guidelines

Guidelines for cross-border network expansion with regulated transmission lines (i.e., lines whose construction is proposed by TSOs, subject in most cases to authorization of national regulators and whose remuneration is subject to regulation) are presented first in section 1. Section 2 presents a parallel scheme with the specific rules that allow the possibility of merchant investments (i.e. investments whose level of remuneration is not set by regulation). In some countries a cross-border transmission investment requires the explicit authorization of the national regulatory authorities of the Member States where the facility will be installed. In this way, regulators may evaluate each individual investment proposal and decide on the proposed approach. It is intended that regulatory authorities use these Guidelines on a voluntary basis as an immediate and pragmatic toolkit with which to promote new cross-border electricity transmission infrastructure.

Annex C sets out further background and discussion of the approach behind these Guidelines.

4.1. Transmission network expansion with regulated investment

- STEP 1: Proposal by a TSO or a group of TSOs²

These guidelines only concern cross-border transmission investments. Therefore, the considered network reinforcement is either an interconnection between two TSOs or it is internal to one TSO, but, following consideration of the perceived market signals and of the impacts of this reinforcement on the flows on its own grid, at least one more TSO is interested in promoting or opposing this new investment. It cannot be ruled out the possibility of discrepancy or opposition of one or more TSOs, with respect to the proposal made by another TSO or TSOs, regarding a new investment of cross-border category. Any proposals for new investments that may be sent by interested parties –including suggestions being made by regulatory authorities–, will have to be examined in the process. The proposal has to be sent to each one of the respective national regulators for authorization, if this is required by the national regulation. Some harmonization of dates of presentation to national regulators of these proposals is commended.

It is not the intention of these Guidelines to create further obstacles to the development of the transmission network. For this purpose, some kind of simple rule or threshold will be established to aid the TSOs to determine when a network reinforcement must be considered as a cross-border transmission investment, so that TSOs other than the ones in whose territory the line is built can be represented in the procedures of proposal or authorization. If the facility is considered a domestic one these Guidelines will not be applicable.

- STEP 2: Authorization by the regulatory authorities

As indicated before, in some countries an explicit authorization of the national regulatory authorities of the Member States is needed. In addition, in the case of a confirmed cross-border facility, it is required that the regulators corresponding to the involved TSOs are informed about the proposed new cross-border investment and that they establish a procedure to arrive at a common position regarding the utility of the facility and the determination of its regulated cost, which will be paid to the owner, according to the cost allocation among TSOs that the regulators will determine. The procedure of approval should take into account economic and system security considerations from a multinational perspective. It is recommended that a public tender mechanism be used to assign the construction of the line and to have the cost of the winning bid accepted as the regulated cost of the investment by the corresponding national regulators³.

In cases where the regulator has to give its authorization, the CEER should be informed about the new cross border regulated investments by the corresponding national regulatory authority and may have a consultative role regarding these new investments. In case of disagreement among the involved regulators with respect to the approval of a proposed new facility, the CEER offers to mediate in the resolution of this kind of conflicts.

Authorisation of DC lines is subject to the same criteria and procedures as for AC lines.

² For the sake of simplicity in the presentation, the proposal of the TSOs will be assumed to consist of a single facility. In a general case the proponent TSO or TSOs may propose a network reinforcement plan comprising several transmission facilities.

³ Note that the inter-TSO payment mechanism allocates the *standard* cost of any new investment among TSOs, as it is established in the Regulation and its Guidelines of development.

Apart from these principles the CEER recommends that at the EU level, some guidelines on maximum delays in the internal procedures of the different Member States be established, so that these new cross-border investments will not be unreasonably delayed in their construction and functioning.

- STEP 3: Construction of the new investment

In principle this should be left to the subsidiarity of Member States in whose territory the facility is built, as it is currently done. These Guidelines recommend the use of public tendering for the construction of these cross-border investments.

- STEP 4: Remuneration of the new investment

In case of an interconnection, each Member State will apply the corresponding national rules to the fraction of the agreed infrastructure within its territory, also in accordance with the agreed procedure in STEP 2.

The proposed approach recommends the use of a public tendering procedure for the construction of cross-border facilities. If this is the case, the tendering procedure may determine the regulated cost to be used by the involved national regulators. The major advantage of the proposed approach is to provide the means of minimizing the risk for the investors in these cross-border facilities.

- STEP 5: Allocation of the cost of the new investment

The regulated costs of new cross-border network investments will be recovered via appropriate regulated remuneration.⁴ The inter-TSO compensation mechanism will allocate these costs to the different TSOs whenever the new transmission investment belongs to the so called “horizontal network”⁵ (this will be certainly the case of all transmission facilities that deserve the attention of this document). In case a tendering procedure is used for the construction of the new cross border facilities, the determination of the network cost to be taken into account in the calculation of the inter-TSO compensation would be facilitated, as the cost resulting from the tendering could be used.

4.2. *Transmission network expansion with merchant investment*

- STEP 1: Proposal of a merchant investment

Any entrepreneur that meets some general prerequisites may propose the construction of a new transmission facility subject to the conditions that are stated in this section:

- The proponent entity must, when appropriate according to the national rules, notify the involved TSOs (which are according to the same criteria as in STEP 1 for regulated investments) and the respective regulatory authorities of the corresponding Member States, and follow the general procedure that is established in article 7 of the Regulation.
- DC merchant lines, subject, if required, to the approval of the corresponding regulators (as in the preceding bullet point), have the option to be considered as just a pair of a generator and a load that inject and retrieve the same amount of power to/from the network. In this case they need to satisfy technical and commercial

⁴ Taking into account any revenues resulting from the allocation of interconnection capacity according to article 6.6 of the Regulation and the rules on principle 5 for Congestion Management.

⁵ This is a term that is used in the context of the mechanism of inter-TSO payments.

conditions on the same basis as any generation or load connected to the same systems. In addition, they will have to be subject to specific conditions in order to take into account their impact on the grids to which they are connected, especially the externalities they induce on them.

Alternatively, DC merchant lines have the option to be subject to the same conditions as AC lines.

- There will be access to both regulated and merchant network facilities on non-discriminatory conditions. Any network charges or collection of congestion rents must be set – or determined by market mechanisms- in a non-discriminatory and transparent manner. The regulatory authorities must have the responsibility for ensuring this. Initial long-term contracts for transmission capacity may be authorized, if they respect the established principles on congestion management, notably the use-it-or-lose-it rule.

- STEP 2: Authorization by the regulatory authorities

The criteria for the grant of an exemption from rTPA requirements, in other words the allowance of a merchant line, is set out in Article 7 of the electricity Regulation and must be followed. In this process, the competent authorities will notably verify that any externalities induced on the TSOs' grids are properly taken into account in the proposed investment and operation scheme (these externalities may notably include the impact on network losses, flow repartition, congestions, reliability, or security of supply, among others). The CEER should be informed about the new cross border merchant investments by the corresponding national regulatory authority and may have a consultative role regarding these new investments.

- STEP 3: Construction of the new investment

The construction of the new merchant facility is entirely the responsibility of the entrepreneur.

- STEP 4: Remuneration of the new investment

The remuneration of the owner of a merchant network facility will not be regulated but, in principle, it will have to follow the same rules on access, transparency and non discrimination that apply to regulated facilities. However, while the remuneration of a regulated network facility is determined a priori on the basis of incurred costs or the results of an open tender for construction, the remuneration of a merchant network facility will be based on the congestion rents earned by the facility and there will be no regulated limit to its value. Congestion rents will be the result of an allocation mechanism compliant with the regulation.

The existence of a merchant line cannot prevent the construction of an additional regulated or merchant line, even if it induces a decrease of the congestion rent levied by the merchant line. Equally, the conditions under which any such additional regulated line may be built need to be set out in advance in order to minimize regulatory risk for the Merchant investor.

Since the merchant facility is subject to a totally different economic regime compared to regulated facilities, merchant facilities will not receive an inter-TSO compensation mechanism payment. However, the flows in these lines will be considered when

calculating the contribution of each country to the inter TSO payment fund and its compensation.

- STEP 5: Allocation of the cost of the new investment

Since there is no regulated remuneration there is no regulated cost to be allocated. The remuneration of the merchant investment is obtained from congestion rents and the sale of any long-term contracts.

4.3. List of required procedures

A number of procedures, to be developed in detail in due course, have been identified during the definition of the proposed regulatory scheme:

- Criteria and the procedure to be developed by TSOs to determine if a new internal reinforcement has to be considered as a domestic or a cross-border investment and who are the involved TSOs.
- A description of the regulatory tests that are used in EU countries, with the objective of establishing some future recommendations on how to perform this test and the specification of the information that has to be made available for this purpose.
- Indicative guidelines to implement a tendering procedure for cross-border investments, which will be developed taking into consideration the existing experience in diverse Member States in this regard.
- Definition of the information that has to be made available to network users and potential network investors.

4.4. Associated issues

A comprehensive regulatory framework for transmission network expansion must comprise other aspects that have not been paid due attention in this document, mainly:

- Mechanisms for ensuring transparency and availability of relevant information for all the stakeholders during the entire process. An initial draft proposal can be found in Annex F.
- A more expeditious administrative authorization procedure.

The first of these aspects appears to be relatively uncontentious and therefore can be elaborated further as and when the Guidelines are used.

The second issue arises because an important barrier to cross border electricity transmission infrastructure development comprises the delays and diverse difficulties in obtaining construction and operation authorizations for such development. However this issue is outside the scope of the CEER's competences and hence this paper.

Annex A

Regulatory Models

A.1 Some regulatory models

The core elements of electricity transmission correspond to an activity with the economic characteristics of a natural monopoly. If left unregulated, a monopoly transmission owner could extract large monopoly rents, as its market power could be large. Answers to the recent survey conducted by the CEER Infrastructure Task Force shows that Member States have adopted different approaches to transmission regulation and to transmission investment. Some examples are:

- **Case A, Cost of service:** In some countries the TSO prepares the transmission expansion plan, which is approved by the regulator, who actually is ultimately responsible for the final expansion plan. Under this regulation the transmission owners and operators are paid their costs of service (fixed costs and operation and maintenance costs) and the financial risk for the investors is very small. The TSOs may have the incentive to over-invest in the network (fewer security problems, plus the firm becomes larger and also more profitable if the regulated rate of return is favourable) and therefore the regulator must apply some control to verify that the proposed investments are necessary and justified.
- **Case B, Output standards and RPI-X:** In other countries the TSO plays a more “active” role. The TSO prepares the expansion plans and carries them out. Remuneration for the transmission owner and system operator is usually based on some form of performance measure, but it is not a cost of service remuneration. It may for example be an RPI-X type remuneration, where each transmission facility is not remunerated individually. Instead, some global measure of performance and/or demand requirements are the basis for the activity remuneration as well as compliance with some minimum mandatory requirements (e.g. grid code). In this case, absent appropriate output standards and associated incentive mechanisms, the TSO may tend towards under investment.
- **Case C, Unregulated revenues for merchant lines:** In the two previous cases the remuneration of the transmission activity is subject to regulation. In another basic approach to transmission expansion: merchant investment, the remuneration of the transmission facility is unregulated and it is determined by the market value that the transmission owner can obtain from arbitrage or from selling capacity on the line.

A.2. The nature and the role of merchant lines

Merchant network investments are facilities that are not built under the initiative of regulators or TSOs, and whose remuneration is determined by the market and not by regulation.

Under the existing EU Regulation, regulated investments are assumed to be the general rule, while merchant investments are considered to be exceptional cases. This appears to be reasonable, since the nature of the transmission activity makes it unlikely that satisfactory networks will be developed with just merchant investments. But both regulated and merchant

lines may coexist and they may complement each other in ways that will end up being useful for the global power system.

This is why it is worthwhile to identify several instances where the existence of merchant investments makes sense and is desirable. The inventory of situations that is presented next is not meant to be exhaustive or limited, and it depends to a large extent on the specific regulation of transmission for the particular country or TSO.

A first prototypical situation arises when the TSO and/or the regulator consider that a certain network facility would be clearly beneficial for the system, but it is unclear that it will be economically justified (i.e. that the expected benefits exceed the expected costs). The uncertainty in the technical feasibility, the investment costs or the potential benefits of the investment may be too large for the regulator to make a decision to authorize an investment under the regulated framework. However, the perception of the factors determining the risk may be different to the entrepreneur, who may estimate that the investment will be profitable under a merchant regulatory framework. On occasion special circumstances may exist that impede or delay the construction of a cross-border transmission investment by the official institutions, whereas a merchant investment may be more effective in having the required reinforcement built on time.

A second possible situation, which applies to some European countries, arises when the remuneration of the transmission activity in a Member State is not strictly based on some kind of cost-of-service scheme, but on some other criterion that reflects some measure of global network performance (case B in section A.1 of Annex A). Under these regulatory conditions, the TSO may not find it profitable to make a network investment (although network users would be better off if this reinforcement is built). This may typically be the case of submarine interconnectors joining two countries or TSOs. This leaves room for merchant investments.

A third situation, which is more susceptible to arise in power systems with poorly meshed networks and where distances between convenient sites for power plants and major load centers are very large, is the possibility of associating the development of a new generation plant with the construction of a transmission line that is necessary to transport the resulting power. This situation is more common in gas markets, where merchant transmission development is much more frequent than in electricity. In the Internal Electricity Market this situation may perhaps arise in relation to interconnectors with non EU countries and in a few other cases.

Regulatory characterization of merchant lines

A first reflection on merchant investment regards the characterization of this activity under a regulatory viewpoint. Two possible approaches will be considered here. Both of them have to be complemented by a framework where the conditions for the coexistence of regulated and merchant lines may be possible from an operational and regulatory point of view. This framework notably deals with the externalities, if any, induced by merchant lines on the rest of the interconnected grid. Such externalities include but are not limited to: constraints on grid operation, voltage control, congestion relief, impact of planned and unexpected outage on grid reliability analyses, etc. It may include limitations of the transit capacity and provisions concerning the repartition of the costs incurred by the merchant line on the TSOs' grids.

According to the first approach, a merchant investor could be seen as a purely trading activity, that is, purchasing some electrical energy on one end of the line E1 and selling a similar amount (adjusted for losses) on the other end E2, which happens to need a physical asset (the transmission line) that is not subject to any kind of regulation. Consistency with this viewpoint would require making the electricity withdrawal E1 and the injection E2 to pay the corresponding

access charges to the general transmission network as demand and generation, respectively, and to be subject to all other rules applicable to generation and load, such as deviations, participation in balancing markets and such. The implementation of this approach may be only possible with DC links, since the amounts E1 and E2 can then be precisely controlled. Many practical difficulties would appear when trying to apply this approach to an AC link in a meshed network.

The second approach would be to treat the transmission line as any other line in the system for all purposes (operation, access rules, congestion management) except for remuneration and the possibility of establishing initial long term contracts. Subordination to the general rules of open access and congestion management is absolutely necessary so that the European grid can be operated efficiently and safely. It seems contrary to logic that owners of individual lines within a meshed network, where flows follow the laws of physics and not any commercial agreements, may try to decide which transactions are allowed and which are not. Hence, if merchant lines of this kind are provided, some form of ex post financial settlement would be required.

Coexistence of regulated and merchant lines

Rules for coexistence of regulated and merchant lines have to be developed which, on one side are compatible with the predominance of the former but, on the other side do not unduly obstruct the development of the latter. Here we shall only present the fundamentals on which the rules of coexistence should be built up.

The natural incentive for a merchant investor is the appropriation of congestion rents, whenever they have a stable pattern and a significant volume, so that the expected income that is obtained exceeds the expected cost of the line. This is entirely normal in a business activity. But we should note what the implication is: whenever a new line is economically justified, all other things being equal, it will be less expensive for the network users as a whole to pay the cost of the line than to pay the congestion rent. This is one of the reasons why a regulator might in principle look for the development of regulated network investments. Of course, things are rarely equal, and merchant investors will generally find options and opportunities that are missed in a more regulated setting.

Since the income of the merchant investor is directly derived from the congestion rents, the investment that would maximize the profits of a merchant investor is typically of a lower capacity than the optimal investment that the regulator would have chosen, if he were able to assess the optimal investment. In general, the socially optimal network investment would reduce too much, from the point of view of investors, the remaining congestion rents. In actual transmission networks of developed countries congestion rents globally collect a small fraction of the total costs of the transmission network. This is why merchant investments can only contribute to the development of a transmission network in some specific instances, but they cannot be relied on as the main mechanism to develop the network.

If merchant and regulated network investments coexist, then the merchant investor has the risk of losing his congestion rents because of a new regulated investment. This may create perverse incentives for either the TSO or the owner of a merchant link to create obstacles to the further development of the network, where these parties have conflicting interests. This is particularly worrying when the owner of the merchant investment is somehow related to a TSO, who may have some influence on the existence of congestions. Therefore, the rules of coexistence should establish how the regulatory rules applicable to merchant lines will deal with the case when the construction of a regulated line is expected to significantly impact the revenues collected by an existing merchant line. Such rules shall take into account on the one hand the necessity that the existence of a merchant line not prevent the construction of a regulated line and on the other hand that the regulatory risk for the merchant investor be reduced as much as possible.

Otherwise this risk, if left entirely to the whim of the TSO and the regulator, may be so strong as to completely deter beneficial merchant investments.

Annex B

The Regulatory Test

The “regulatory test” is the rule that should be applied by the TSOs when preparing their transmission expansion plans and by the national regulators (if this is the case, depending on the specific domestic regulation) when deciding which new investments must be authorized. Conceptually, the rule should tell a justified investment from another one that is not justified.

Under traditional regulation the rule is as follows: “One should invest in transmission network assets only while the additional network investment cost is still smaller than the additional saving in system operation costs”. Obviously, and expressed in simplified terms, when alternative investment possibilities exist, the network planner should choose those maximizing the ratio of operational saving to cost.

This definition is consistent with the one that might conceptually be applied in a context of competition: “Invest while the additional network investment cost is smaller than the net aggregated benefits (once network charges are included) of all network users (i.e. all generators and all consumers)”. The net benefit of a generator, because of a new transmission investment, is the increment in its margin of market revenues over operation costs, minus the network charges corresponding to the new investment. The net benefit of a consumer, because of a new transmission investment, is the increment in its margin of its utility function over its cost of purchasing electricity, minus the change of network charges corresponding to the new investment.⁶

Benefits might also extend to, for example, large aggregations of distributed generation that might be connected to distribution networks, since these reinforcements may facilitate, or even make possible, the secure injection into the lower voltage grid of significant amounts of power.

Note that the regulatory test should allow the justification of so called “reliability lines”, i.e. lines whose justification is mostly because of a general improvement of reliability conditions in the power system. Reliability can, conceptually, be quantified in economic terms, even if the beneficiaries whose reliability conditions are improved might be widely dispersed. In other cases “reliability lines” may be dictated because of mandatory requirements in national or international grid codes.

Although conceptually sound, the regulatory test is very difficult to apply in practice in strict terms. Different kinds of approximations and simplifications are used in practice throughout the world by regulators⁷. In competitive markets therefore, a much greater role can be given to market players in this respect. It would be, therefore, advisable to perform an investigation on the regulatory tests that are presently used in the EU Member States, with the objective of establishing some future recommendations on how to perform this test and the specification of the information that has to be made available for this purpose.

⁶ This is how the Australian regulatory authority has expressed the regulatory test: “A new interconnector or transmission system augmentation satisfies this test if it maximizes the net present value of the market benefit, having regard to a number of alternative projects, timings and market development scenarios. Market benefit here means the total net benefits to all those who produce, distribute and consume electricity in the electricity market”.

⁷ For instance, “benefits” are frequently replaced by some measure of “electric usage” and very often the traditional rule is used even in the context of competitive wholesale markets.

Annex C

Approach behind Guidelines

The approach that has been adopted in the Guidelines that have been proposed in the present document could be termed as a hybrid approach, with the following basic features:

- The guidelines only concern new cross-border transmission investments, which may be either an interconnection between two TSOs or an internal transmission facility within a TSO with a significant involvement in cross-border trade.
- The initiative to propose new cross-border investments will mostly correspond to TSOs, after they have considered the available market signals and the inputs and requests from the market agents (who are the ones that directly receive any existing locational signals), since the TSOs have the technical knowledge, as well as the expertise, to evaluate cross-border transmission investments. The authorization for construction and operation of new transmission investments -either domestic or cross-border ones-, when required by the national regulation, will continue taking place as usual.
- Depending whether the national regulation of transmission corresponds to cases A or B, the economic incentive for the TSO to invest in a new network facility will be different, as explained in section A.1 of Annex A. It may not exist at all in some situations: in case A if the rate of return on investment is too low; in case B if the performance index that is used for remuneration does not reflect the cost of the investment. Incentive schemes can be used, in case B in particular, to try to encourage the TSOs to invest efficiently.
- A key factor to facilitate transmission investment is an adequate remuneration. This will be normally achieved by an adequately designed cost-of-service scheme (case A), or in case B when the performance index reflects the cost of the new investment, or when the expected revenues of a merchant investment sufficiently exceed its costs. The main purpose of the proposed Guidelines is to ensure an adequate remuneration for cross-border investments.
- Concerning the construction of domestic or cross-border lines when the involved TSOs find that the existing mechanisms provide enough incentive to do so, the Guidelines introduce a regulated scheme for cross-border lines that is based on public tendering (with automatic recognition of the remuneration requested by the winning bid, therefore achieving a drastic reduction of risk for the potential investors), plus the possibility of construction of merchant lines, subject to specific conditions.
- This proposed scheme is meant to overcome the difficulties of having to deal with the current diversity of regulatory schemes for transmission investment (approaches A and B, or any intermediate mechanisms), some of which may not provide sufficient remuneration in some cases for cross-border investments. The proposed approach leaves to the group of involved TSOs the responsibility to propose the construction of new cross-border investments. It is the job of the involved regulators to examine the case and to adopt a common position regarding an adequate remuneration. In this way the involved TSOs may recur to a procedure that will always guarantee an adequate remuneration for the new transmission investment. It is also recommended the adoption of public tendering as a useful tool for the allocation of the construction and the

determination of the remuneration of new cross-border transmission facilities that have been identified and proposed by the involved TSOs.

- Merchant lines will be an alternative possibility, subject to specific conditions and priority rules. Merchant lines have a higher remuneration risk for the investor and a higher cost for network users than the regulated option. They may however identify and build some infrastructures that under regulated investment may not take place and so merchant lines can be a viable scheme to promote new network investment.
- The authorization for construction and operation of new transmission investments, when required by the national regulation, will continue taking place as usual for all projects.

In cases where the regulator has to give its authorization, the CEER should be informed about the new cross border investments by the corresponding national regulatory authority and may have a consultative role regarding these new investments. In case of disagreement among the involved regulators with respect to the approval of a proposed new facility, the CEER could offer to mediate in the resolution of this kind of conflicts.

Annex D

Applicable Legislation and CEER Recommended Principles

The following summarizes the applicable legislation and the most relevant CEER recommendations on this subject:

Directive 2003/54/EC of 26 June 2003 concerning common rules for the internal market in electricity:

Art. 20: Member States shall ensure the implementation of a system of third party access to the transmission and distribution systems that is based on published tariffs, applicable to all eligible customers and applied objectively and without discrimination between system users. Member States shall ensure that these tariffs, or the methodologies underlying their calculation, are approved prior to their entry into force ... and that these tariffs, and the methodologies –where only methodologies are approved-, are published prior to their entry into force.

The operator of a transmission system may refuse access where it lacks the necessary capacity. Duly substantiated reasons must be given for such refusal ... Member States shall ensure, where appropriate and when refusal of access takes place, that the transmission or distribution system operator provides relevant information on measures that would be necessary to reinforce the network.

Art. 23.2: The regulatory authorities shall be responsible for fixing or approving, prior to their entry into force, at least the methodologies used to calculate or establish the terms and conditions for:

- a. connection and access to national networks, including transmission and distribution tariffs. These tariffs, or methodologies, shall allow the necessary investments in the networks to be carried out in a manner allowing these investments to ensure the viability of the networks;
- b. the provision of balancing services.

Art. 23.3: ... Member States may provide that the regulatory authorities shall submit, for formal decision, to the relevant body in the Member State the tariffs or at least the methodologies... The relevant body shall, in such a case, have the power to either approve or reject a draft decision submitted by the regulatory authority. These tariffs or the methodologies or modifications thereto shall be published together with the decision on formal adoption. Any formal rejection of a draft decision shall also be published, including its justification.

Art. 23.4: Regulatory authorities shall have the authority to require transmission system operators, if necessary, to modify the terms and conditions, tariffs, rules, to ensure that they are proportionate and applied in a non-discriminatory manner.

Other: (Art. 10) unbundling of TSOs, (Art. 9e) TSOs will ensure no discrimination between system users, (Art. 11-1, 2) TSOs will determine the use of interconnectors with other systems, (Art. 11-5) TSOs may be required by Member States to comply with minimum standards for the maintenance and development of the transmission system, including interconnector capacity.

Regulation (EC) No 1228/2003 of 26 June 2003 on conditions for access to the network for cross-border exchanges in electricity

Art. 3: Inter transmission system operator compensation mechanism.

1. TSOs shall receive compensation for costs incurred as a result of hosting cross-border flows of electricity on their networks.
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 infrastructure is used for the transmission of cross-border flows, in particular taking into account the need to guarantee security of supply. When establishing the costs incurred, recognized standard costing methodologies shall be used. Benefits that a network incurs as a result of hosting cross-border flows shall be taken into account to reduce the compensation received.

Art. 5: TSOs will publish estimates of available transfer capability for each day, and also weak-ahead and month-ahead estimates.

Art. 6.6: Any revenues resulting from the allocation of interconnection shall be used for ...

Art. 7(1, 2 and 3): Exemptions of new DC interconnectors from the provisions of art. 6(6) of this Regulation and art. 20 and 23(2), (3) and (4) of Directive 2003/54/EC, upon request and on a case by case basis, under a number of conditions. This also applies to significant increases of capacity in existing interconnectors. This will also apply, in exceptional cases, to alternating current (AC) interconnectors, provided that the costs and risks of the investment in question are particularly high when compared with the costs and risks normally incurred when connecting two neighbouring national transmission systems by an AC interconnector.

CEER "Principles on regulatory control and financial reward for infrastructure", July 2003

PRINCIPLE #1.	Public authorities should endeavour to encourage sufficient investment in gas and electricity network infrastructure in order to implement the internal energy market, facilitate efficient competition and safeguard security of supply. Public authorities need to maintain oversight of infrastructure decisions in order to promote both security of supply and network efficiency.
PRINCIPLE #2.	Transmission System Operators must manage their networks in a way that ensures the efficient use of infrastructure.
PRINCIPLE #3.	Public authorities should establish transparent, non-discriminatory and standardised options for the development of infrastructure and aim as far as possible to minimise regulatory risks.
PRINCIPLE #4.	Public authorities should enforce a minimum procedure for the publication of the Transmission System Operators' infrastructure plans.
PRINCIPLE #5.	Transmission System Operators must be effectively unbundled to ensure that there is no conflict of interest when making investment decisions and to ensure there are sufficient incentives to provide non-discriminatory third party access. Unbundling of network ownership is the preferred route to follow.

PRINCIPLE #6a. -Public authorities should establish, in advance and in a transparent manner, which regulatory regime is to be applied for both national and cross-border investments. That regulatory regime should include a clear description of its applicability, the relevant criteria for the financial reward for new infrastructure investment and should describe the relevant criteria applicable to third party access to the new infrastructure.

PRINCIPLE #6b. -Merchant infrastructures have to be decided on a case-by-case basis and should continue to be subject to an *ex-ante* regulatory control for each individual case. Where the merchant status is granted on a time-limited basis, the ongoing regulatory status should be properly re-appraised at the end of this period.

PRINCIPLE #7. Public authorities should guarantee that procedures applicable to granting required licences for new investments in gas and electricity network infrastructure are non-discriminatory and efficient.

PRINCIPLE #8. Swifter, more expeditious administrative authorisation procedures are required for infrastructure development, particularly those for interconnection infrastructure.

Annex E

'Deep System Operator Incentives' Model of Market Based Transmission, Generation and Supply Market Co-operation

A TSO can be incentivized to identify and provide incremental transmission capacity in response to signals of market participants' changing needs for transmission capacity. This might operate for example where transmission zones are identified, within which there is relatively little congestion, and between which there is more marked or frequent congestion. The TSO would provide a base level of transmission capacity within and between these zones, which it would provide on a financially firm basis for a variety of durations up to several years. The TSO might be rewarded under a traditional RPI-X type price control for providing these base level transmission capacities.

In addition to this mechanism, incentives would be in place to encourage the identification and provision for further increments of transmission capacity. Market participants could signal to the TSO to provide incremental transmission capacity out of zones, perhaps through auctions of transmission access rights. The TSO would undertake to provide greater transmission access rights and be rewarded for so doing. Importantly, the TSO would be free to provide such rights by either increasing physical capacity, or reconfiguring network operation, or both.

The GB Regulator Ofgem has set out such a model for the electricity market in England and Wales, called 'Deep System Operator Incentives'. It has the following features.

Financially firm, tradable long-term rights for transmission users

Transmission system users need to be able to purchase firm transmission access rights covering several years ahead to meet their own requirements and trade them to hedge short-term transmission capacity price risks. Such rights will enable users to have confidence that generation or supply related investments are supported by enduring transmission access, and so will encourage such investments. Hence a clear definition of financially firm access rights is needed, where users are compensated by the TSO if access is not given or is curtailed.

Market based arrangement for signaling value of transmission access

Some mechanism needs to be introduced that signals market participants' value of transmission access. This might be done for example by auctioning transmission access rights. Secondary trading of access rights can also create a market that will produce price signals for where access is valued.

Incremental capacity

A clear set of baseline transmission capacity access rights must be given, against which any incremental capacities can be judged. One way of doing this is for the TSO to identify entry and exit transmission capacities for each transmission zone, where zones are given as regions within which there is relatively little congestion.

Incentives on TSO

The TSO should be rewarded at a rate higher than the regulated rate of return for the release of any transmission access rights associated with any incremental capacity provided. This will enable the TSO to have flexibility in meeting the rights by either physically investing or by reconfiguring its system operation.

The allowed revenue for incremental transmission capacity under the transmission capacity release incentive would comprise allowances for depreciation, financing and operational costs. A higher than regulated rate of return is appropriate to reflect the fact that it is unlikely that all the available access rights will be allocated on a long-term basis and hence the TSO will be exposed to the risk that it will undertake investment whose costs it is not subsequently able to recover fully.

It is possible that the TSO will undertake additional investment to increase transmission capacity only to discover that it has over-estimated demand for additional transmission capacity. As a result, the revenues associated with this incremental transmission capacity may be less than it would have earned had the investment been funded under the TSO price control. In these circumstances it is appropriate that a minimum level of allowed revenue should be set by reference to a rate of return somewhat lower than the TSO cost of capital.

Within the cap set by the upper and lower rates of return, the revenues that the TSO earns will depend solely on what it receives from the sale of incremental transmission capacity.

Further incentivisation on the TSO to invest efficiently may be achieved by basing the allowed revenue for incremental investment on unit cost allowances rather than actual costs. Hence to the extent that the TSO succeeded in delivering incremental transmission capacity at a capital cost lower than that implied by the unit cost allowance, it would keep the difference but would also have to bear the costs if the investment costs were higher than the unit cost allowance.

This incentive might last for a period of years, after which the incremental investment to which it relates would be rolled into the existing regulatory asset base and be remunerated at the usual regulated level. This would be appropriate where the investment was justifiable on the basis of information available at the time the TSO took the decision to invest.

Annex F

Mechanisms for Ensuring Transparency and the Availability of the Information Needed

In order for investors to make rational economic decisions about investments in new cross-border transmission facilities, they should have access to reliable information on the drivers for the market and how these evolve. Improving access to information is particularly important for decisions that involve long-term commitments, such as investments in new cross-border facilities. This chapter presents the information regarding the electricity market that is needed in such decisions and how the availability of the information can be ensured.

Information needs

To assess investment in new cross-border facilities, the following information regarding the electricity market should be monitored and made available in the respective countries:

- Electricity prices, including spot and forward prices.
- The development of demand for electricity.
- Data on the physical topology of the transmission grids, including the cross-border facilities, and the distribution grids.
- Total generation capacity and the capacity of individual plants.
- Data on the usage of the cross-border transmission facilities.

For each of the above information elements historical data should also be made available.

Usefulness

In order to support market participants in their decisions about new cross-border facilities, information should be reliable, understandable and easily accessible. Reliability of information could be improved by publishing information that can easily be traced back to physical data (e.g. generation facilities, number of consumers, network elements). Information would be understandable if clear definitions are provided explaining what the information stands for and possibly how the underlying data was collected and aggregated. Information would be easily accessible if it is, to the largest possible extent, made available in standardised electronic, for example in spreadsheets on web-sites.

Roles

Several parties could make information available, for example the TSO, the Ministry and/or the regulator. Which information which party makes available should depend on the type of information. As a general rule it would be recommendable that each party provides data that is not already available elsewhere. For example, the grid owners would than publish data on the physical topology of their grids.

Furthermore market parties would benefit from a summary document describing the different stages in the establishment process of a new cross-border facility and the role of each party in that stage.

The roles are being discussed further in a separate paragraph on item 6 of the scope of work, dealing with the roles of the different entities in the electricity market.

Legal basis

The entity or entities responsible for providing information should be vested with the necessary powers to obtain the information. This would require a clear legal basis that ensures that the publication is not hampered by lack of information.

It follows a table with the relevant elements of the information to be provided.

Information category	Information elements (unit)
Price and volume	Spot market (day-ahead) clearing price (currency/MWh)
	Spot market clearing volume (MWh)
	Forward contracts prices (currency/MWh)
Demand	Total energy consumption per year (TWh)
	Total system peak load per year (MW)
Generation	Total installed capacity (GW)
	Capacity of individual plants (GW)
	Location of plants in the grid
	Plans for installation or decommissioning of plants
Physical grids	Transmission grids topology including the interconnectors
	Distribution grids topology
	Capacity of each interconnector (MW)
	Net Transfer Capacity of the interconnectors (MW)
	Plans for modifications of the grids and the interconnectors
Interconnector usage	Total import per year (GWh)
	Total export per year (GWh)
	Usage per interconnector (GWh)
	Ex ante and ex post availability and reliability
General	Historical data of the above items

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