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ETSO Position Paper on Roles and Responsibilities of TSOs and other actors in Cross-Border Network Investment

Executive Summary

The use of the transmission grid has evolved significantly. Where it was once a means of achieving economies of scale and security of supply (by allowing regions of low generating capacity to be supported by regions of high generating capacity) it is now much more the facilitator of the energy market by offering open Third Party Access to all market players. TSOs are generally prepared to undertake the necessary investments in cross-border interconnection capacity provided this is done within a stable, regulatory investment climate. However, it has to be noted that the regulatory rules are neither consistent in all countries nor complete and that due to lengthy approval procedures of the planned grid, its development is hindered.

To have a short-term impact on investments in cross-border interconnection capacity ETSO suggests that regulatory authorities facilitate that the costs of these investments are recovered over time and that permitting and licensing procedures should be made more efficient (i.e. quicker) by the responsible governmental bodies.

In the long run ETSO suggests implementing arrangements towards developing an efficient European electricity supply. Hence we should look to both improve the utilisation of existing interconnectors between different markets and to encourage the construction of new cross-border interconnection capacity which offer options to enhance overall efficiency of supply in the EU. Both of these ETSO sees as compatible with the broad aims of the Green Paper on a "European Strategy for Sustainable, Competitive and Secure Energy" and the ERGEG Regional Initiatives.

1. Background

1.1. Driving forces for cross-border investment

The importance of access to and greater development of interconnection capacity for the development of an EU electricity market has been emphasised over recent years in a number of Directives and other statements from the European institutions, such as recently in the Directive on Security of Supply and Infrastructure Development[1] and previously in the outcome of the Barcelona summit[2].

In the Green Paper on a "European Strategy for Sustainable, Competitive and Secure Energy", presented by the EU Commission to the EU Parliament and to the European Council the development of a "priority interconnection plan", in order to increase interconnection capacity, has been suggested as a priority issue for EU energy policy for the coming years. The European Council of March 23rd recognised that increasing interconnection capacity and infrastructure is an urgent challenge to be faced at an EU level, together with "reviewing of the legal framework to speed up the administrative authorisation process" to build new transmission lines.

[1] Directive 2005/89/EC
[2] Barcelona European Council 15 and 16 March 2002

The development of a European interconnected grid has several key drivers:

- Limited interconnecting infrastructure as an important factor contributing to non-optimal integration of the EU electricity market and competitiveness. Therefore the interconnection capacity should be increased.
- Significant increase of renewable energy (especially non-permanent wind generation) which could significantly impact the capacity available for cross-border trade within the context of maintaining security standards across Member States' systems. As the location of the renewable energy sources often cannot be changed, the grid has to be able to accommodate for the additional load flows.
- The potential expansion of the current UCTE synchronous area eastwards and southwards, in response to requests coming from other systems. This could lead to a further increase of electricity trade need transmission capacity as well.

Those goals all require an extension of the transmission system and therefore have all to be taken into consideration. An increase of the renewable energy sources and the possible enlargement of the UCTE system will lead to a need for further transmission capacity and consequently to higher amounts of energy traded with often changing loading patterns.

1.2. Historical development of European transmission systems

European transmission systems were originally designed by individual vertically integrated utilities (responsible for providing adequate generation, transmission and distribution) to move energy from generation centres to serve load centres. Transmission adequacy within a country or control area was defined by the utility in terms of setting and meeting its transmission security standards, which themselves were related to the operating standards applied in operational timescales. They could assess the trade-off between the costs of restricting output from some generating plants with the alternative of alleviating these constraints through the provision of increased transmission capacity. Both sets of costs were born by the utility and, theoretically in this context, a cost effective decision could be made. Within this vertically integrated world the basic design concept was considered: transport of primary energy – with the exception of lignite and hydro power - is cheaper than transporting electricity.

The continental interconnected extra high-voltage grid (UCTE area) was mainly designed to link the participating countries to increase the level of security of supply by providing backup in case of local shortages and to lower the necessary reserve margins for each country. The success of the strategy in today's UCTE system is obvious - it is one of the most secure systems in the world. The same observations could be made for large national systems such as those in the British Isles and other regional systems such as the Nordel area.

1.3. Effects of unbundling and liberalisation

Opening the European electricity markets has had a positive effect with highly interconnected markets demonstrating price convergence through greater cross-border trade. However, a practical consequence is that national transmission networks and cross-border interconnections are now increasingly operated in a way for which they were not originally designed. This has led to less than optimal loading patters, network constraints and cross-border congestion with the result that the system is operated closer to its technical limits.

Another result of unbundling and liberalisation is the establishment of independent TSOs. These companies have taken on a number of obligations that were previously the responsibility of the vertically integrated utilities in respect of the provision of transmission capacity. The TSO's obligation to maintain and develop their transmission networks to meet their security standards now has to be achieved not through co-ordinated planning of generation and transmission developments, but through assessments and forecasts made by the TSO as to requirements for secure system operation and also the future needs of the market for transmission capacity. As a consequence the development of generation sources and the optimal design of transmission infrastructure can now be divergent and new mechanisms and incentives have had to be implemented.

1.4. Current status of TSOs

Whilst various mechanisms have been established for investment by TSOs in their own control areas, there is no coherent legislative or regulatory framework to support investment by TSOs or merchant developers for cross border infrastructure. The lack of a stable and coherent legal and regulatory framework for cross-border infrastructure acts as a significant barrier to investment.

The incomes of the TSOs are regulated through different national regulatory schemes. Investments (and the recovery over the long term of the cost of these investments) has to be ensured through clear regulatory arrangements endorsed by the appropriate authorities in the Member States which are interconnected. This holds for both TSO and merchant developments.

Another problem is the efficient use of existing cross-border interconnection capacity and the way it is allocated. The available capacity is used by transits and parallel flows in the first place (with an ex-post inter TSO compensation mechanism devoted to cost recovery of network affected by cross-border flows - which is not an allocation mechanism) and only the remainder can be allocated efficiently for energy transactions between the directly interconnected markets. The more efficient use of the existing cross-border capacity would also lead to better assessment of proper transmission investment needs.

2. Adequate Levels of Interconnectivity

2.1. Indicators of transmission reinforcement need

Historically two approaches have been used as a means of identifying whether or not a transmission system is adequate i.e. a **deterministic approach** to comply with security criteria and a **cost-benefit approach** to compare costs of incremental transmission investment with benefits provided by the investment (also taking account of costs avoided e.g. constraint costs).

In most countries in Europe the two approaches are used together: initially an assessment is made using the deterministic approach and then it is backed-up by using a cost-benefit approach. For the deterministic approach models and procedures exist, however the approach to evaluate the cost benefit may differ widely, and is subject to regulatory approval.

In cases where interconnections already exist and are congested, the value of congestion revenues may suggest the potential need for transmission reinforcement. In cases where there is an interconnection and no congestion, there is no short-term economic case for reinforcement. However, a disparity may exist between the short-term nature of congestion as opposed to a long-term decision to invest in upgrading an interconnection (involving the construction of assets with economic lives of over 40 years).

With this issue in mind, setting priorities for interconnection development to facilitate a "congestion-free" transmission network or requiring arbitrary targets for levels of interconnection capacity for all European borders cannot be seen as relevant indicators of the interconnection (in)adequacy, since in many cases they have no socio-economic or technical justification.

2.2. Transmission adequacy definition

In our opinion the adequacy of cross-border transmission should be determined as a basis of two dimensions: the technical system reliability according to the security standards and the socio-economic benefit of new transmission reinforcements. So the generic definition should be:

"Adequate transmission capacity, including interconnection capacity, is that which enables operational security standards to be met in the reasonably foreseeable circumstances and meet "economically" the requirements of the market. The latter is achieved when you do not expect any additional net socio-economic benefits from additional investments in transmission capacity[3]."

2.3. Preconditions for developing cross-border criteria

Most TSOs have developed detailed criteria for assessing the adequacy of their transmission systems and therefore for determining the need for investment in their systems. However, for cross-border investments no systematic approach has been derived yet, and in most cases cross-border investments are not managed under an agreed set of criteria and objectives. The extension of the intra-country approaches to cross-border investment would seem the obvious solution, but in order to do so the following changes would be necessary:

- agreements, among the regulators, on the allocation principles for the costs incurred by the TSOs for interconnection investment[4];
- regulatory mechanisms, such as TSOs incentive payments or increased regulated return on investments in case of the development of new interconnection infrastructures[5];
- remuneration methodologies for intra-country transmission investment that increase interconnection capacity;
- solutions which encompass required investment by a third country to upgrade interconnection capacity between two other countries;
- arrangements which permit merchant developments and allows those developers to retain congestion rents as the reward for taking the investment risk in the first instance.

The need for further interconnection capacity can therefore be identified in relation to some European standards on deterministic and cost benefit approaches, yet to be adapted and agreed, or by the commercial assessments in case of merchant interconnection developers.

3. Assessing Future Transmission Needs

3.1. Electricity market rules harmonisation

[3] This presumes socio-economic efficient use of cross-border transmission capacity which is not the case where transit and parallel flows are prioritized.

[4] These would include investments in other than interconnector capacity with the purpose to increase interconnection capacities

[5] Including new infrastructures other than interconnectors that increase interconnection capacities

In general, each country within the EU has developed and put in place its own market rules which therefore differ among the countries. Differences exist e.g. as to whether firm rights are provided to users or not; price setting mechanisms differ as in some markets all participants receive or pay the market clearing marginal energy price and in others not; market structures differ from a day ahead to just before real time; some markets include separate capacity payment mechanisms while others rely entirely on the energy price and fundamental differences exist between how ancillary services are provided and paid for.

Since the assessment of transmission adequacy, as indicated above, depends on many uncertainties an exact optimum for the transmission adequacy is difficult to determine. To deal with all these uncertainties, the planning of the transmission grid, performed by the TSO, is based on planning scenarios in order to find out whether the transmission system is robust in many market situations. It is clear that a higher compatibility of market rules and procedures would be a step forward both in assessing the benefits of cross-border trade in order to appraise the economics of interconnection investment and in ensuring that the level of trade over existing interconnections is efficient. However, it is equally clear that the process leading to such harmonisation will be time consuming and expensive.

3.2. Determination of generation mix and location

Since the location of new generation cannot be directly influenced by the TSOs, this represents a very high uncertainty for TSO planning activities. As the existing power plants are becoming older and have to be replaced by new units in many areas the locational signals for the connection of new power plants become very important. Locational signals are provided in some markets however in many cases these may not be sufficient or may be overridden by other considerations. Compared to the costs of acquiring a site, constructing a power plant and sourcing its fuel, the grid connection and the use of system charges are relatively low so that the existing locational signals based on the allowed prices are in most cases not strong enough. Therefore in some areas this results in a very high loading of the grid close to its limits as well as a sub-optimal transmission development. Those costs are carried by all users so that in effect they are socialised and the players responsible do not have to carry the cost they incur.

An increasing capacity of wind generation (stochastic by nature), also increases the difficulties towards the optimization of future transmission infrastructure. Regions with a high density of wind generation and low electricity consumption can cause parallel flows in neighbouring grids. This situation may be worsened through mechanisms for priority dispatch for renewable generation causing flows in already congested areas of the network forcing TSOs to reduce the tradable capacity. The problem is in itself not the priority dispatch for renewable generation but the fact that any surplus generation in an area causes parallel or transit flows in adjacent areas for which proper allocation mechanisms have not yet been defined.

3.3. Investment lead time

Time-consuming licensing procedures and legal proceedings are the most significant obstacles to high-voltage transmission infrastructure development. Strong opposition to new extra high voltage transmission lines from environmentalist groups or local organisations is also a significant obstacle to carrying out important projects. Because of this, different time lags for the development of transmission lines exist and prevent a rapid response to adapt the grid to the generation capacity development. The time to build a power line may take more than 10 years, if it is possible at all, but

to build for example a standardised gas-fired power plant takes only up to 2-3 years. Therefore by the time a power line goes into operation it could be argued that the interconnector is a potentially stranded investment. If interconnector investment is to be encouraged this point needs to be addressed.

3.4. Co-ordinated planning

In many cases new projects to increase the transmission capability between two countries affect the flows in other countries and could reduce the effectiveness of the initial scheme. Since the optimum for small parts of the system may differ from the optimum of the entire system, co-ordinated planning is commonly used to optimise the benefit for the total system.

There are differences in the ways in which the regional associations currently deal with the issue of transmission adequacy and development. Initial attempts to do so have established that within Nordel, Great Britain and Ireland co-ordinated plans have been developed for the transmission systems. The Nordel TSOs for example have in place a significant degree of harmonisation but this has been achieved against a background of a high level of political and economic consensus between the countries involved and establishment of common rules. Great Britain and Ireland can undertake co-ordinated studies aided by the fact that there are a relatively small number of TSOs within their AC interconnected systems and that they are only interconnected with other systems via DC links.

Within the continental AC interconnected system (UCTE), individual schemes (under development or being studied) are mainly being undertaken on a bilateral basis due to the size and complexity of the UCTE system, as well as mentioned differences in market designs. If needed, studies are performed on a regional basis. Also the recently launched large studies in UCTE and ETSO i.e. feasibility studies for synchronous interconnection between UCTE and IPS/UPS systems and the European wind integration study (EWIS), show that TSOs implement co-ordinated planning procedures. Furthermore a new working group is going to be set up at UCTE level, in order to improve co-ordinated planning activity.

4. Proposed Ways Forward to ensure Cross-Border Transmission Adequacy

TSOs are both prepared and well positioned in order to undertake the necessary investment to ensure a secure, reliable and efficient European transmission system in the future. Merchant developers may also be prepared to invest in interconnecting tie-lines. However it should be recognised that this requires a stable and complete framework that is conducive to investment.

ETSO proposes a number of recommendations that should be taken forward by the relevant actors in order to create an environment that encourages cross-border investment and also clarifies the situation where intra-country reinforcement is required to support the new investments.

Member States and Governments should be responsible for creating the overarching policy and framework, which would:

- enable permitting procedures to happen in practical and realistic time scales and ensure their compatibility for cross-border lines.
- extend regulatory arrangements (including return on investments) to cross-border investment;
- clarify how investment in one Member State that is for the benefit of the region should be financed; and
- incentivise generators to locate new plant in economically desired areas.

The role of the relevant regulatory authorities would then be to implement a long-term stable framework as above and take further measures, namely:

- giving a long-term guarantee of rate of return on investments;
- provide guidelines on cost allocation principles between national systems, the treatment and recovery of third party costs, revenue-recovery principles;
- implement methods to evaluate the costs and benefits of new interconnection capacities; and
- provide guidelines to potential merchant developers and ensure their compliance.

The TSOs would then take the responsibility to continue to plan the development of their network, perform feasibility and technical studies in a co-ordinated manner to identify required investments and build/upgrade where necessary in a timely and adequate manner.

ETSO is committed to working towards the goal of a single European market, which is likely to be achieved through the successful implementation of ERGEG's Regional Initiatives. Commitment from the TSOs, Member States, Regulatory Authorities and other relevant actors is vital in creating a stable environment conducive to investment in interconnection and supporting reinforcement.