EFET Insight into Accessing Cross-Border Transmission Capacity in Electricity

What is cross-border transmission capacity?

The transport (or "transmission") of electricity over long distances is managed by Transmission System Operators ("TSOs") via high-voltage transmission lines for electricity and gas pipelines.

Electric lines and cables span national borders, making electricity networks densely interconnected in Europe. TSOs make available cross-border transmission capacity to buyers and sellers of electricity to cover their cross-border transactions.

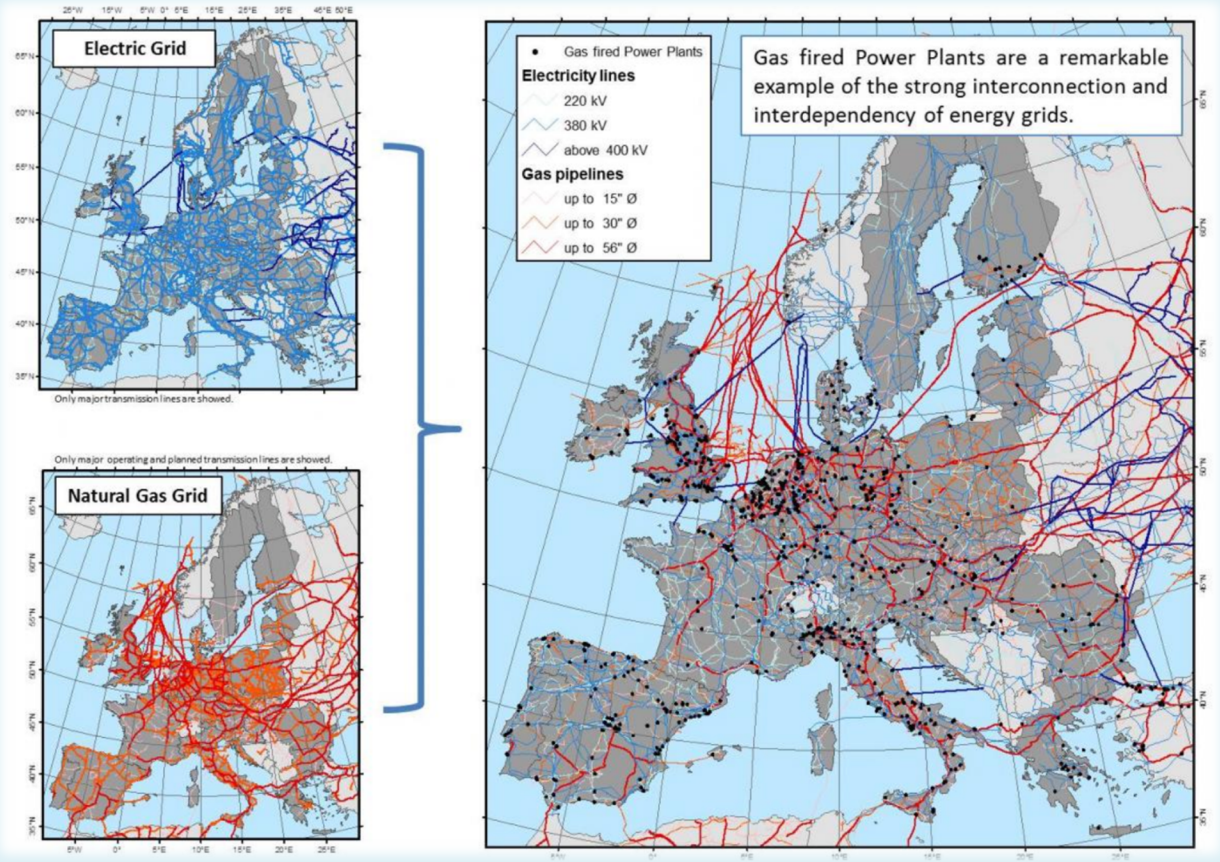


Figure 1: Interconnected electricity and gas transmission network in Europe (Source: EU JRC)

Why is accessing cross-border transmission capacity important?

To use energy more efficiently across Europe

Demand for and supply of energy varies not only according to time, but also from one country to the other. This equilibrium between demand and supply is reflected in the price of each electricity price zone (or “bidding zone”) – generally delimited by the political borders of a country.

Interconnected networks allow flowing electrons to where the electricity is most needed, as identified by the price of the bidding zone. The cross-border transmission capacity made available by TSOs to buyers and sellers of electricity enables them to make use of these networks, from one zone to the other.

To reduce the costs of sourcing electricity

Buyers of electricity anywhere in Europe can contract electricity from the cheapest sources of production anywhere else. To make sure they are covered against the physical and financial risk of buying and selling in the different bidding zones, they need cross-border transmission capacity.

As long as cross-border transmission capacity is made available to electricity buyers and sellers, they can transact internationally. This creates a truly European pool of production resources and consumers, with greater competition and liquidity. Cheap electricity will be exported to areas where it is locally more expensive at that moment, potentially thousands of kilometres away.

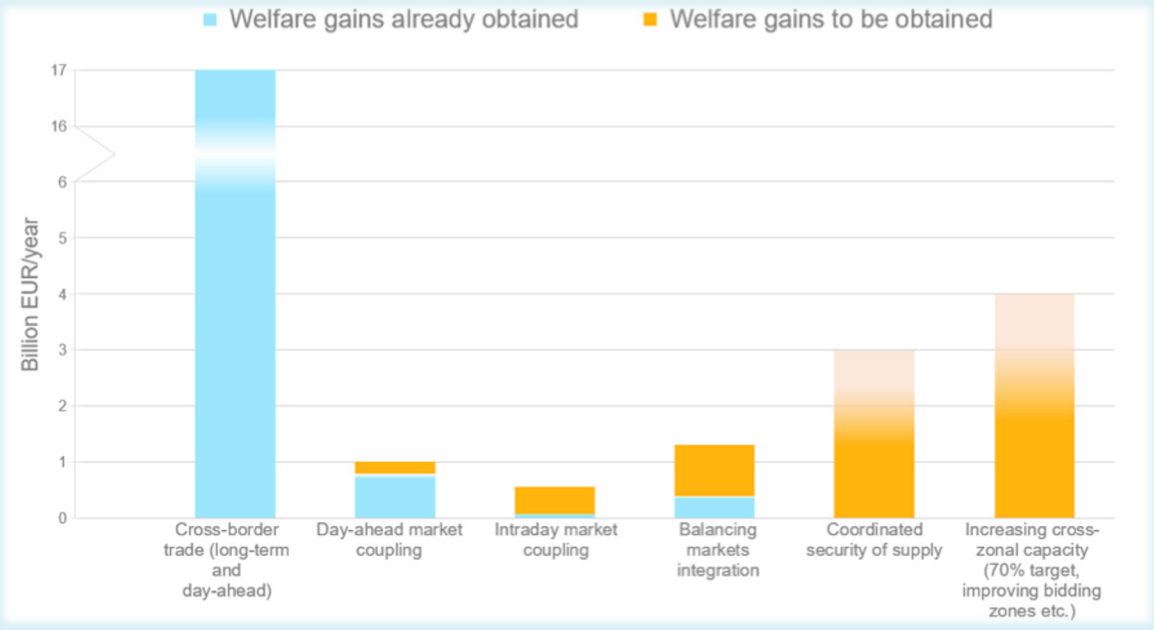


Figure 2: Welfare gains obtained or to be obtained through different elements relying on cross-border transmission capacity (Source: ACER)

How does it work?

TSOs are the owners and/or operators of cross-border transmission lines and cables. They make cross-border transmission capacity available (or not) to the market and price it in different ways.

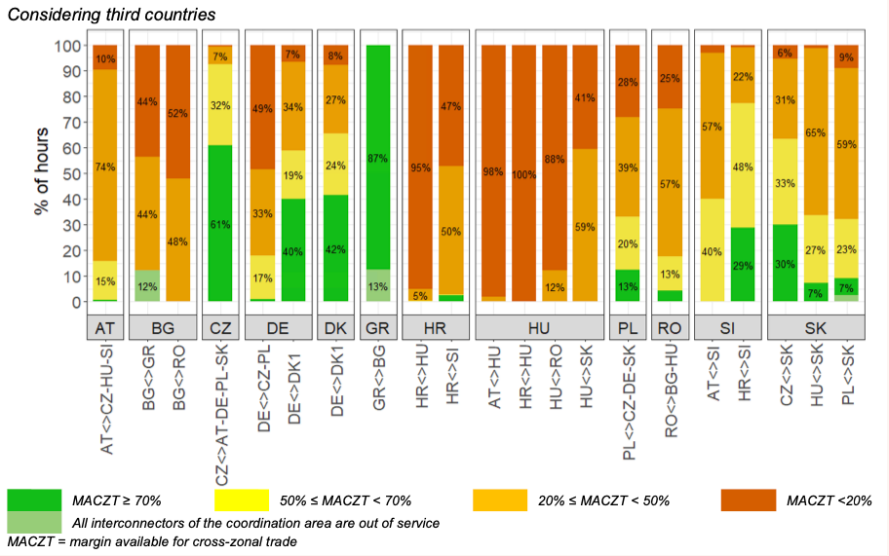
10>1 year(s) ahead	1 year ahead	1 month ahead	1 day ahead	during the day	in real time
TSOs do not make capacity available	TSOs sell physical or financial transmission rights	TSOs sell physical or financial transmission rights	Capacity is implictly included in the price of electricity	TSOs offer leftover capacity for free	Only TSOs have access to capacity

European legislation mandates TSOs to maximise cross-border transmission capacity availability in order to enable buyers and sellers of electricity to make use of exiting interconnected networks to the fullest extent possible while respecting security constraints.

The minimum 70% capacity availability threshold

The Clean Energy Package has set a minimum standard of 70% of existing capacity, respecting security limits, to be made available to the market (art. 16.8 of the Electricity Regulation). ACER further clarified details about the calculation of this threshold in its Decision 01-2019.

In exception to this rule, Member States can adopt *action plans* to reach the minimum 70% capacity standard by 2025 according to a linear trajectory. Austria, Germany, the Netherlands Poland and Romania have enacted such plans. In addition, most TSOs in Europe have adopted temporary *derogations* to the rule, at least for part of the borders they manage. As a consequence, progress towards the minimum 70% capacity standard is slow, as shown below in Central Europe:



How does an efficient use of cross-border transmission capacity contribute to decarbonisation?

Cross-border transmission capacity allows connecting markets in Europe. Making the best possible use of existing transmission infrastructure ensures the integration of cheap and decarbonised electricity production resources and reduces trade and market entry barriers. Therefore, the European Union has set an interconnection target of at least 15% by 2030 to encourage EU Member States to invest in cross-border transmission capacity.

But building transmission lines is not everything: the main added value for the energy transition is to use them efficiently: Market coupling in the day-ahead and intraday timeframes ensures that the cheapest electricity sources – chiefly renewable electricity – are used first throughout Europe to meet the demand of consumers. When more capacity is made available to the market by the TSOs, market coupling enables more renewable electricity production to match the demand of electricity consumers throughout the EU and beyond.

And what about consumers?

Consumers pay for electricity networks maintenance and development via the network charges on their energy bills. This includes cross-border transmission lines and cables. When cross-border transmission capacity is allocated efficiently, this can bring significant benefits to the consumers:

- together, day-ahead and intraday market coupling deliver more than 1 billion Euros of benefits to end-consumers per year
- combined with efficient capacity calculation methods, market coupling allows prices to converge more frequently between Member States
- in cases of high price volatility at local level, efficient use of cross-border transmission capacity contributes to absorbing a price shock at a greater geographic scale

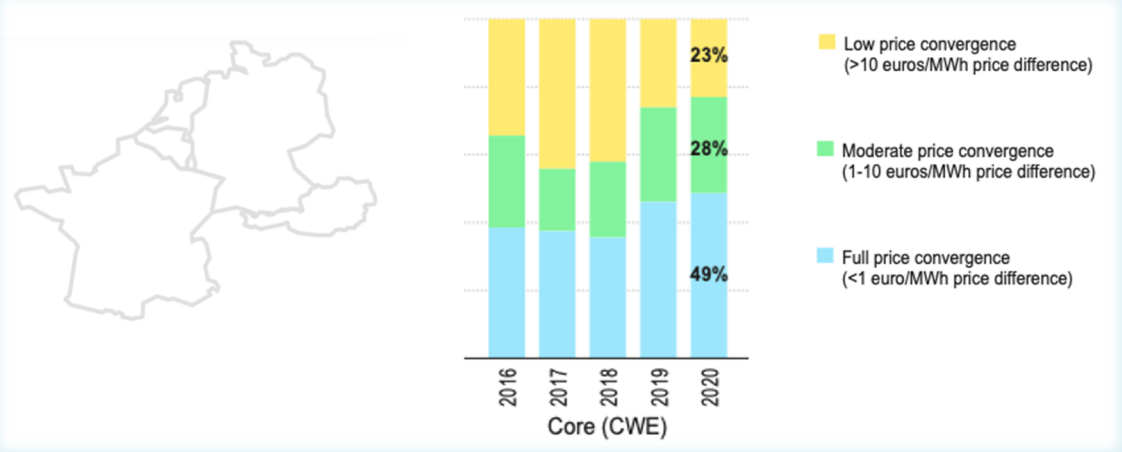


Figure 2: Evolution of price convergence in CWE, the region with the most evolved (flow-based) market coupling (Source: ACER)

How can we improve access to cross-border transmission capacity?

Improving the use and availability of existing capacity

Where cross-border transmission lines and cables exist, it is important we use them to their full potential. Too often still in Europe, cross-border transmission capacity is not made fully available to buyers and sellers of electricity.

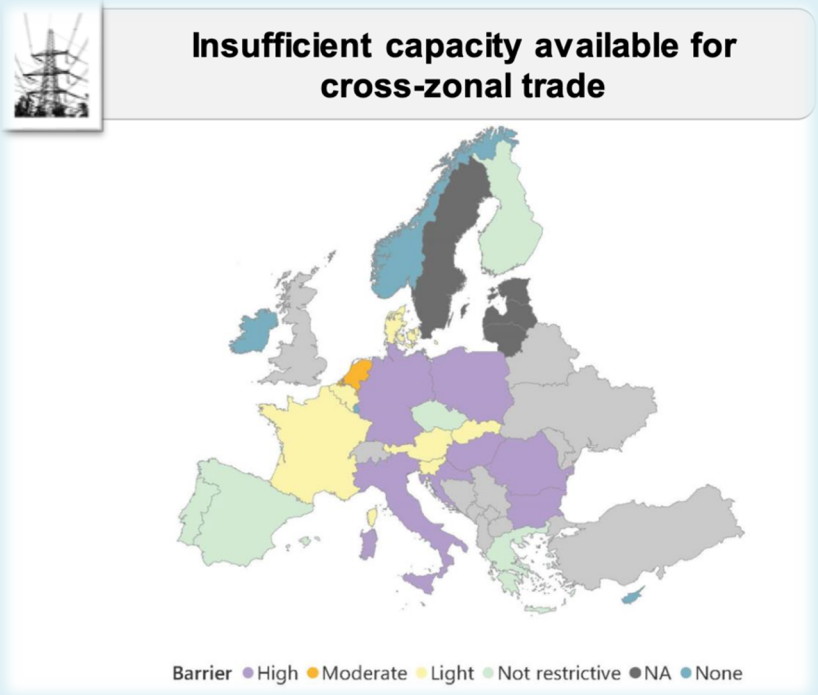


Figure 2: Availability of cross-border electricity transmission capacity in 2020 (Source: ACER)

TSOs need to ensure that the maximum available cross-border transmission capacity is made available to the market, respecting security constraints, from years in advance of delivery to the last minutes of the intraday market. This will ensure that we optimise the efficient pooling of electricity resources and demand at a European level.

Making sure forward transmission rights are available at all European borders

Forward market enables buyers and sellers of electricity to appropriately cover (or “hedge”) price volatility risks over long periods of time. Long-term transmission rights (physical or financial) issued by TSOs are the most reliable tool to connect national forward markets with each other and enable buyers and sellers of electricity to cover the risk related to the scarcity of cross-border transmission capacity.

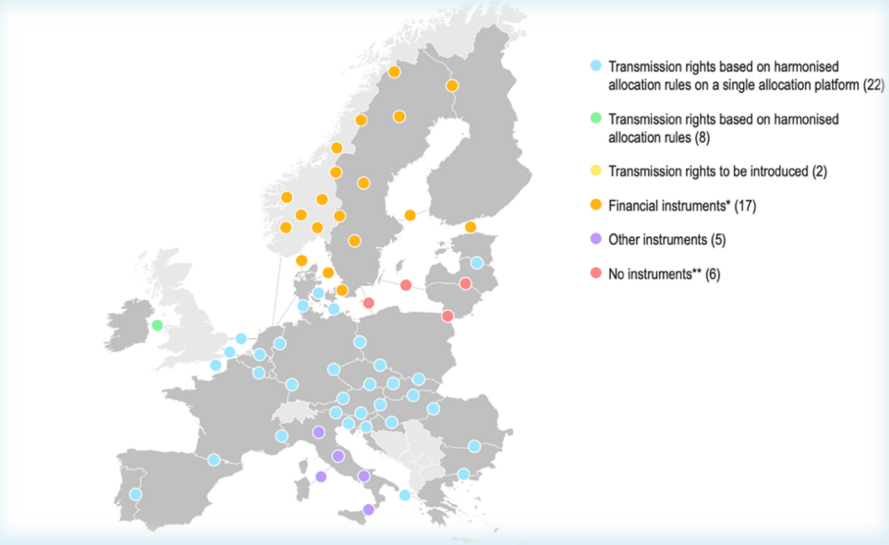


Figure 5: Long-term transmission rights (in blue and green) only exist at certain European borders (Source: ACER)

The **issuance of forward transmission rights by all TSOs at all European borders** should become mandatory, without exception. This will ensure that transmission capacity is made available to the market to underpin cross-border transactions sufficiently in advance of delivery and help hedge short-term price risks across borders for the benefit of end-consumers.

Making forward transmission rights available earlier

The longer the time horizon forward markets cover, the more efficient they will be at smoothing short-term price fluctuation for end-consumers. If long-term transmission rights were available earlier than one year before delivery, they could more efficiently support forward trading and the conclusion of long-term PPAs, especially for renewable electricity.

TSOs should issue forward transmission rights up to 5 years ahead to start matching the forward curve in the most liquid markets (3 to 5 years), and the contract duration of at least the shortest PPAs.

Deliver new infrastructure in time to resolve bottlenecks, where needed

Bottlenecks on the electricity network create network and market inefficiencies. Whether they occur within a bidding zone or at its borders, it has effects on the cross-border transmission capacity made available by the TSOs to buyers and sellers of electricity.

We need strict timelines, incentives and fast-track procedures for resolving electricity network bottlenecks. TSOs should reinvest the revenues from cross-border transmission capacity allocation (“congestion income”) into grid reinforcements where they are needed.

In summary

The electricity networks of European countries are interconnected. The corresponding cross-border transmission capacity made available to buyers and sellers of electricity allows:

- using energy more efficiently across Europe
- reducing the costs of sourcing electricity
- lowering barriers to cross-border trade and market entry
- better integrating renewable electricity production and demand
- improving price convergence between countries

Member States and European institutions have a role to play in reinforcing the availability of cross-border transmission capacity. **We recommend the following actions be taken**:

- Improving the use and availability of existing capacity
- Mandating the issuance of forward transmission rights by TSOs at all European borders
- Developing 5-year-ahead forward transmission rights to start matching the forward curve in the most liquid markets and the contract duration of PPAs
- Where needed, deliver new infrastructure in time to resolve bottlenecks, using TSOs' congestion income from cross-border transmission capacity allocation

For more information, feel free to contact us at secretariat@efet.org