

Fact sheet

EU 70% criterion

Date January 2022

1 Initial situation

The EU's goal is to establish a single electricity market. It is therefore working flat out to implement the third internal market package and the «Clean Energy Package» (CEP) to maximise electricity trade. The CEP is a revised version of the third internal market package with additional provisions.

The lack of sufficient cross-zonal trading capacity¹ between member states was identified in the CEP as one of the main obstacles to the integration of European electricity markets. According to the Agency for the Cooperation of Energy Regulators (ACER)², market integration is the key to achieving European energy goals. This is because the more transfer capacity transmission system operators (TSOs) make available for cross-zonal trade, the more energy exchange can take place. A rise in cross-zonal trading capacities leads to an increase in cross-border competition and helps integrate renewable energy resources.

2 Legal basis

The CEP consists of eight legal acts on the energy performance of buildings, renewable energy resources, energy efficiency, governance and the design of the electricity market.

The relevant legal act with regard to the 70% criterion is the EU Regulation on the internal market for electricity (2019/943). In accordance with Article 16 Para. 8, EU TSOs must reserve at least 70% of the transfer capacity of their grid elements for cross-border trade between EU Member States as of 1 January 2020 or after a transition period lasting until 31 December 2025. TSOs shall not limit the volume of interconnection capacity to be made available to market participants as a means of solving congestion inside their own bidding zone or as a means of managing flows resulting from transactions internal to bidding zones.

The implementation of the 70% rule means a jump in the capacity made available for trading for many EU TSOs. Due to the challenges posed by the implementation of the 70% criterion for the transmission networks, the regulation on the internal market for electricity grants EU Member States a transition period for the expansion of capacities for electricity exchange. This is subject to the condition that member states present an action plan. The plan must contain specific measures for reducing grid congestion. By the end of 2025, EU states must gradually (linear progression curve) achieve the minimum capacity for cross-zonal trade thanks to their action plan. Germany and Austria are among the countries that have already presented an action plan.

¹ Europe is divided into numerous bidding zones (price zones). Each bidding zone is a separate part of the European power market. The bidding zones mostly correspond to national borders, with some exceptions (e.g. Italy).

² ACER releases its second 70% target report on the minimum margin available for cross-zonal electricity trade in the EU (europa.eu)

3 The 70% rule in detail

The 70% rule (Minimum Remaining Available Margin [minRAM]) stipulates that the sum of all commercial electricity flows resulting from cross-border trade must correspond to at least 70% of the maximum thermal capacity of the respective limiting network element. The limiting network element is the element where the safety limits are exceeded in the event of a further increase in power flows. It thus determines the maximum permissible current flow from a system safety point of view.

Cross-border transfer capacity is the maximum capacity in megawatts (MW) that TSOs can make available for commercial cross-border trade. The physical limits of the grid elements, such as lines and transformers, determine how much transfer capacity is available for international electricity trading at the borders. The TSOs are not always able to provide the capacity demanded by the trading activities. Until now, European TSOs were able to limit trading capacity to address grid congestion within price zones or to manage electricity flows resulting from transactions within their national borders. This is no longer allowed under the full implementation of the 70% rule.

Congestion occurs in the electricity grid when a line can transport less electricity than is required. This type of congestion plays an important and obstructive role in the implementation of the 70% rule.

To understand the 70% rule, it is crucial to recognise the different types of power flow in the transmission grid. A distinction must be made between planned trade flows and unplanned electricity flows.

Planned trade flows

In continental Europe, the transmission grids are linked via interconnectors, through which electricity constantly flows across borders. Some of these flows are planned or scheduled trade flows: a trader sells electricity from country A to country B, which then flows across the border from A to B.

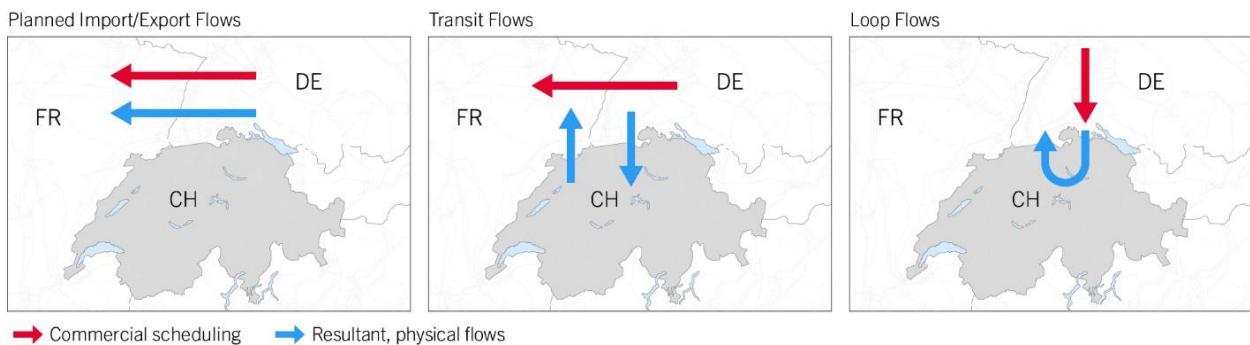
Unplanned electricity flows

In the case of a trade flow from country A to country B, physically often only part of the electricity flows directly across the border from A to B. The rest finds its way through the meshed electricity system via third countries according to Kirchhoff's law. The difference between the trade flow and physical flow is an unplanned or unscheduled flow. The extent of the flow depends on local conditions. Since electricity takes the path of least resistance, unplanned flows cannot be prevented. The highest unplanned flows identified in Europe occur from France through southwest Germany towards Switzerland. The electricity flow here is characterised by the large French nuclear power stations near the border with Germany and their exports to importing countries in the south of Europe.

Unplanned flows can take two forms. Firstly, electricity can be transported from country A to country B via country C, which is not involved in the trade. This is referred to as a *transit flow*.

If, on the other hand, electricity flows from country A to country B (which is not involved in the trade) and then from another point there back to the country of origin A, this is called a *loop flow*. The electricity produced within a country is therefore consumed in the same country, but transits via foreign lines in the process and reduces the transfer capacities available for energy exchange in the direction of flow.

Unplanned electricity flows can be reduced by grid reinforcement and expansion but can never be completely prevented. Furthermore, the installation of phase-shifting transformers also allows better control of electricity flows and helps relieve neighbouring grids.



The following example illustrates how an unplanned flow is determined: Germany imported 0.1 TWh from the Netherlands in 2018 (trade) and exported 14.6 TWh. This resulted in an export surplus (trade) of 14.5 TWh. At the same time, 0.7 TWh flowed physically from the Netherlands to Germany. By contrast, 20.9 TWh flowed from Germany to the Netherlands. This resulted in an export surplus (physical) of 20.2 TWh. On balance (trade minus physical), 5.7 TWh of electricity flowed from Germany to the Netherlands that was not traded between the two countries. This is referred to as an unplanned flow.³

Planned flows and transit flows are decisive for the 70% rule. These flows must correspond to at least 70% on the limiting grid element. This 70% threshold can in part only be realised by means of considerable, risky and cost-intensive system interventions – such as redispatch.

4 Impacts on Switzerland

There are different interpretations of how to deal with the 70% rule with non-EU states like Switzerland. At the moment, however, it can be assumed that without corresponding agreements, cross-border trade flows with non-EU states do not count towards the specified 70%.

Swissgrid is anticipating an increase in trading within the EU following the implementation of the 70% rule. Without adequate inclusion of Switzerland in the necessary capacity calculation processes, Swissgrid expects even more unplanned flows in the Swiss transmission grid. This means that there is a risk that situations will arise more frequently in which Swissgrid grid elements are overloaded.

Swissgrid must then intervene in grid operations to keep the transmission grid stable. This will involve additional work and higher costs. Increasingly, questions are being raised about the availability of these remedial actions, as they rely essentially on hydropower in Switzerland. However, hydropower is also needed for supply and for balancing power, and in the future could also be required for the energy reserve proposed by the Federal Council as part of the revision of the Electricity Supply Act. But water can only be turbinated once, so these resources are limited, especially in winter.

According to the monitoring report issued by the European regulatory authority ACER, there is still considerable room for improvement in AC lines in Europe in order to reach the 70% target for most regions and borders.⁴ If our neighbouring countries have problems meeting the 70%, there is therefore a danger that they will unilaterally limit cross-border capacities in order to comply with the rule for trading within the EU. They will have to relieve their internal grid congestion temporarily at the expense of export capacities for Switzerland in order to avoid having to pay for an increased use of redispatch. This will potentially massively curtail Switzerland's import and export capacities without us being able to do anything about it. This could have a negative impact on Switzerland's security of supply in the winter months in particular, since Switzerland is dependent on electricity imports in winter.

³ Cf: Monitoring Report 2019, p. 240, Federal Network Agency/Federal Cartel Office (Link: https://www.bundeskartellamt.de/SharedDocs/Publikation/DE/Berichte/Energie-Monitoring-2019.pdf?__blob=publication-File&v=5)

⁴ ACER releases its second 70% target report on the minimum margin available for cross-zonal electricity trade in the EU (europa.eu)

5 What is Swissgrid doing?

Swissgrid successfully concluded a corresponding agreement with the «Italy North» capacity region in December 2021. At the end of October 2021, the TSOs of the Italy North region introduced the 70% rule. Swissgrid also applies the rule as a «Technical Counterparty». The new rule can be expected to apply until the introduction of flow-based market coupling in the Italy North capacity region, subject to annual approval by the EU regulator concerned. Subsequently, it will most likely have to be renegotiated.

Swissgrid is striving to reach technical agreements with EU TSOs to improve Switzerland's situation with regard to the 70% rule. It is trying to implement the 70% rule on its limiting grid elements (lines and transformers) at the Italian border, even though Switzerland is not legally obliged to do so. However, as a typical transit country, Switzerland already meets the EU requirements to a high degree. Maintaining this level of conformity is an argument for Switzerland's inclusion in EU processes relevant to it, such as coordinated capacity calculation or the coordination of remedial action in system operation.