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Factsheet
Regional Operational Security Coordination

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1 Initial situation

A secure supply of electricity in Switzerland requires secure grid operations. In accordance with its legal mandate[1], Swissgrid, as the national grid company, is responsible for the non-discriminatory, reliable, and efficient operation of the transmission system as an essential basis for the secure supply of electricity to Switzerland. Swissgrid adheres to internationally recognised standards to ensure the **operational security** of the transmission system.

This includes the **N-1 rule**, for example. This states that in the event of the failure of any grid element (e.g. lines or transformers), no other grid elements may be used to more than 100% of their capacity. This rule protects against a cascading failure of further grid elements due to overloads. To ensure that the rule is adhered to at all times, specialists at Swissgrid regularly calculate the available transfer capacity and compare it in advance with the planned electricity flows.

If there is any danger of **congestion** in power transmission, the specialists in Swissgrid's grid control rooms arrange preventive measures. For example, they can modify the grid topology through **switching operations**. This means that lines are connected to or separated from each other. Switching can be used to redirect the electricity flows in the transmission system and prevent an imminent violation of the N-1 rule or an overload of individual grid elements.

If topological measures are not sufficient, the specialists can initiate a geographical redistribution of utility power generation at an early stage by ordering **redispatching**. If there is a risk of congestion between a power plant and an area with particularly high consumption, then this power plant must reduce its production, while another power plant near the high consumption area increases its production accordingly. Overall, the same amount of energy continues to be fed into the electricity system, but at a different location. This changes the load on the grid elements.

If, despite this advance planning in **real-time operation**, unplanned power flows or faults occur that endanger the operational security of the grid, the Swissgrid system management must take action. Topological measures or redispatching are again possible as immediate measures against a violation of the N-1 rule or an overload of individual grid elements. In extreme cases, the Swissgrid system management can also **intervene directly in Switzerland's power plant park** and increase or reduce the production of individual power plants as required, although this is an obligatory notification event. Direct intervention in the power plant park by Swissgrid is therefore not a standard measure, but an emergency solution.

However, the operational security of the transmission system must not only be guaranteed in Switzerland. This is because Switzerland's transmission system comprises 41 cross-border lines, which makes it an integral part of the continental European interconnected grid. If the operational security of the interconnected

[1] Art. 20 StromVG

grid is at risk, the supply of electricity in Switzerland is also at risk. For this reason, Swissgrid's legal mandate includes coordination with the transmission system operators of neighbouring countries[2].

2 Guideline on electricity transmission system operation

The rules for the operation of the European interconnected grid are laid down by the EU in Network Codes (NC). The EU's aim is to define a clear legal framework and thereby facilitate energy exchange within the EU and ensure a high level of operational security. The Network Code «System Operation Guideline[3]», which entered into force on 14 September 2017, is a step towards the gradual harmonisation of EU transmission system operation. It governs the regular operation of the interconnected grid and essentially contains sections on operational security, operational planning and frequency control.

The guideline on electricity transmission system operation calls for a higher degree of coordination between transmission system operators at regional level. In the area of operational security, congestion management in particular is to be coordinated more closely. This refers to the measures already described to ensure operational security in the event of an imminent violation of the N-1 rule or an overload of individual grid elements. This coordination is becoming more and more important due to increasing volatility in the grid. The sharp rise in cross-border energy exchange also requires greater coordination in congestion management. This rise is due in particular to corresponding EU requirements (cf. 70% rule[4]) and the expansion of renewable energies.

As Switzerland is not a member of the EU, the European guideline on electricity transmission system operation is not automatically legally binding for Swissgrid. However, the guideline specifies that transmission system operators from EU member states must endeavour to conclude an agreement with third countries in the synchronous area. An agreement of this kind forms the basis for their cooperation to ensure secure grid operations. It also ensures that third-country transmission system operators comply with the obligations of the guideline. Switzerland is part of the continental European synchronous area. The transmission system operators in continental Europe, including Swissgrid, therefore contractually committed themselves to jointly implementing the guideline on electricity transmission system operation in the «Synchronous Area Framework Agreement» (SAFA) in 2019[5].

3 Regional Operational Security Coordination

The guideline on electricity transmission system operation requires all transmission system operators in each capacity calculation region (CCR) to develop a proposal for common provisions on regional operational security coordination[6]. The focus is on planning congestion management for grid operations on the previous and current day.

Regional Operational Security Coordination (ROSC) therefore takes place in the capacity calculation regions. These are regions where grid meshing requires increased coordination in operational planning processes. Due to the lack of an electricity agreement with the EU, Switzerland is not part of the «Core» and

[2] Art. 20 StromVG

[3] Official title: System Operation Guideline (SO GL); Commission Regulation (EU) 2017/1485

[4] Factsheet «EU 70% criterion»

[5] Factsheet «Synchronous Area Framework Agreement (SAFA)»

[6] Art. 76 SO GL

«Italy North» capacity calculation regions relevant to it and is therefore excluded from market processes in these regions.

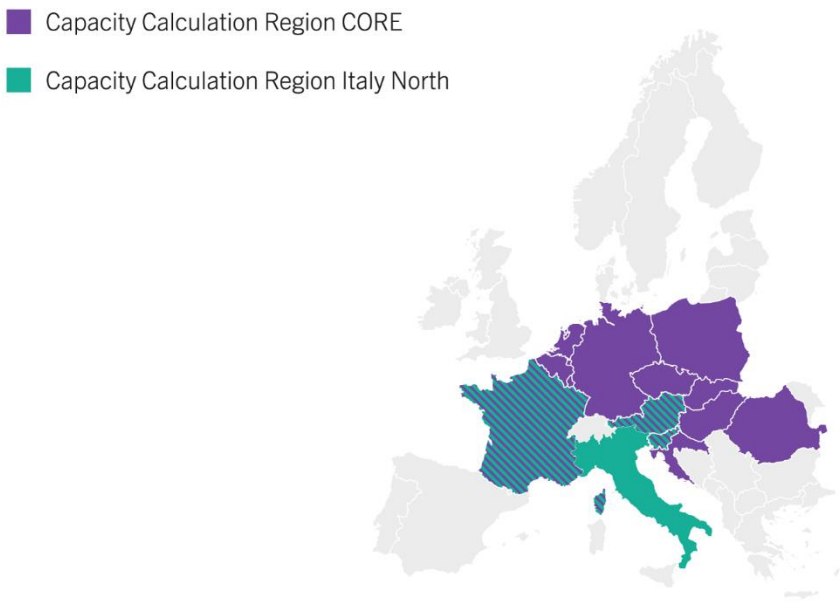

Figure 1: Capacity calculation regions relevant to Switzerland

However, as the regional coordination of operational security is crucial for the secure supply of electricity in continental Europe, Swissgrid is at least involved in the corresponding grid security processes. The legal basis for this cooperation is established by means of contracts under private law drawn up between transmission system operators. Since 2021, Swissgrid has been actively involved in the development of the common provisions for regional operational security coordination. Swissgrid will start implementing these provisions in 2023.

4 Implementation

The introduction of regional operational security coordination results in a paradigm shift in grid operations. Whereas in the past, the transmission system operators themselves identified measures to ensure operational security as part of their congestion management, such measures will now be optimised centrally. This means that in the future, measures will be proposed for the entire capacity calculation region via regional coordination processes. The specialists in the grid control rooms will then check whether the suggested measures are feasible before activating them if possible. It remains up to the transmission system operators to decide whether to implement the measures. The aim is to prevent contradictory measures being taken in different countries and optimise costs.

In order for the desired paradigm shift to succeed, firstly, a central platform for analysing operational security and coordinating measures must be created. Secondly, the transmission system operators must adapt their national grid security processes and coordinate them with the various stakeholders. For example, the processes for requesting redispatching must be defined in association with the power plant operators.

The Regional Coordination Centres (RCC) will be responsible for operating the central platform and therefore for calculating and coordinating centrally optimised measures. There are six Regional Coordination Centres in the continental European interconnected grid. For the capacity calculation regions «Italy North» and «Core», these are TSCNET Services GmbH based in Munich and Coreso SA based in Brussels.

Participation in the most important European grid security process will give Switzerland three key advantages, in addition to increased operational security. Firstly, the central optimisation of congestion management may have a positive impact on Swiss import and export capacities. Secondly, Swiss power plants have great potential for flexible redispatching and can offer this internationally in the future. Thirdly, Swissgrid will have access to a large international portfolio of remedial action for its own grid.