

## ***P4 - Policy 4: Coordinated Operational Planning***

### ***Chapters***

- A. Outage Coordination Process**
- B. Capacity Calculation**
- C. Congestion Forecast**
- D. Generation Adequacy Assessment**

### ***Introduction***

Policy 4 describes several stages of the operational planning phase. It starts approximately one year before actual operation with an outage coordination process and continues through capacity calculation, day ahead congestion forecast until real-time operational security management.

Today's network operation is based on technical as well as market rules. The changes introduced by the electricity market developments have increased both the volumes and volatility from one hour to the other of cross-border trade in the meshed continental European high voltage network. As a consequence this has resulted to some extent into more operational complexity and increase of congestion risks. As a result, there is a need for increased information exchange and still closer coordination among TSOs during the operational planning phase.

Please refer to appendix 4 for basics and explanation of operational planning processes.

If a LFC Block comprises several TSOs, one of these TSOs may be elected to act on behalf of the other for any of the mentioned processes.

This 2014 version of the policy was inspired by the will to keep a procedure in line with recent evolutions during the period before Network Codes application and to encourage early implementation of Network Codes.

### ***History of changes***

- V 2.8 final version approved by RG CE Plenary on 15.06.2016
- V 2.7. 02.12.2014 Draft reviewed after CSO comments
- V 2.6. 07.10.2014 Draft reviewed after WG NM&FT comments
- V 2.5. 15.09.2014 Drafting Team
- v 2.4. draft reviewed policy, to ..., 4.10.2010, comments from external consultation
- v 2.3. draft reviewed policy, to WG O&S, 8.02.2010, comments from internal consultation
- v.2.2 draft reviewed policy, to WG O&S, 26.08.2008, comments from WG O&S
- v.2.1 draft reviewed policy, to WG O&S, 1.09.2008
- v.2.0 final policy, approved by the UCTE Steering Committee on 03.05.2006

### **Current status**

This version of the document has “draft reviewed policy” status and in due time will replace the current v.2.4 version.

There is a strong link with Policy 3: "Operational Security".

Definitions, standards and guidelines are part of the rules.

*This document and other chapters of the ENTSO-E RG CE Operation Handbook as well as excerpts from it may not be published, redistributed or modified in any technical means or used for any other purpose outside of ENTSO-E without written permission in advance.*

## A. Outage Coordination Process

---

### *Introduction*

The process of outage coordination of the elements of the European interconnected electricity network plays an important role in the operational management of that network.

In order to keep the network in secure operating condition to guarantee a suitable level of security and market access, it is necessary to regularly carry out maintenance work which requires outages of assets. Furthermore, outages are also indispensable to carrying out reinforcement work in substations or to install new network elements.

The outages of TIE-LINES or network elements in the vicinity of TIE-LINES directly impact NTC values and possibly reduce the import and export potential between connected areas as well as the potential of mutual support, and consequently have to be prepared carefully in order to prevent lowering the network security in those areas. The outages of TIE-LINES may affect the security of areas that are in close “electrical” vicinity of the outage.

Together, TSOs determine the most suitable dates of outages and tests for the maintenance or the reinforcement of the following network assets: TIE-LINES, substations, other internal transmission system elements influencing the operation of neighbouring systems. TSOs also take into account and exchange information about generation unit outages and tests; if necessary, TSOs can use national rules to request for modification of generator units outage planning.

### *Definitions*

**D1. ENTSO-E Continental network planning deadlines.** Outage coordination process is an iterative process aimed at an operational and economic optimum for each TSO while respecting the SECURITY LIMITS and the N-1 CRITERION. This iterative process starts in the second half of the preceding year and finishes on the day preceding actual operation (day-ahead).

**D2. Region.** A group of responsibility areas defined by TSOs whose composition depends on the operational tasks foreseen. Reference is made to Policy 3 regarding the issues of the responsibility area and observability area related to the regional approach.

**D3. Week.** For the process of outage coordination the week is defined from Saturday till Friday.

**D4. Test.** Any activity (eg: energization of a new transmission line; generator reactive power control capability tests;...), with potential impact on the electrical system security, aimed at evaluating the capabilities of an asset connected to the transmission system.

### *Standards*

**S1. Operational security.** The TSOs have to jointly ensure that despite the planned outages and tests of POWER SYSTEM assets, the interconnected network always meets the N-1 SECURITY PRINCIPLE in the concerned networks (►P3-A).

**S2. Relevant assets.** The set of Power system assets (e.g. TIE-LINES, internal lines, bus-bars, phase shifters, transformers, major generating units), automatic and protection devices which influence two or more TSOs while being out of operation has to be agreed among involved TSOs on a regional basis.

**S2.1 Critical assets.** A subset of relevant assets which are considered to have a major influence on the operational management of the neighbouring systems has to

be agreed among involved TSOs. The planning of the outages of these elements must be agreed among the TSOs involved on a regional basis. This set must include at least the elements considered in the EXTERNAL CONTINGENCY LIST (►►P3-A) determined by each of the TSOs involved in the region, and, when applicable, critical network elements (►►B-D7) when flow based capacity calculation is applied.

**S2.2 Non-critical assets.** A subset of relevant assets agreed among involved TSOs, for which the outages are considered in the common planning process for information. This set must include at least all the assets of the external observability list (►►P3-A2) which are not part of the critical assets.

**S3. Exchange of information.** TSOs collect and share information about planned outages and tests of the relevant assets within regional groups. The planned outages and tests of critical assets are reviewed at the Weekly Operational Teleconference (►►A- S6).

**S4. Coordination of planned outages and tests.** The outage and test plan takes all relevant assets into account and must be agreed upon by involved TSOs concerning the critical assets. Changes are communicated as soon as possible to the involved TSOs. TSOs plan the outages and tests in three planning horizons:

**S4.1. Long-term planning.**

The TSOs start the sharing of individual planning and coordination of outages in regional groups no later than the first of November and agree until the first of December on a joint plan of outages and tests of all relevant assets impacting two or more TSOs for the next year.

**S4.2. Medium-term planning.** The outage and test planning agreed for the whole year must be revised on a monthly basis, considering the possible changes known at that time, and providing a reviewed version for the rest of the year agreed among involved TSOs.

**S4.3. Short-term planning.** In case of any changes, the agreed plan has to be reviewed in the course of the year and any amendments will be notified to and agreed with each TSO in the group concerned as soon as possible, but at the latest on Thursday before the week concerned.

**S4.4. Solving of Incompatibilities.** When a TSO identifies incompatibilities, it shall start a coordination process involving all affected TSOs, until no incompatibility remains.

**S5. Confirmation of planned outages and tests.** Each TSO reviews and confirms the outages and tests of relevant assets to involved neighbouring TSOs in the course of the week (but latest on Thursday 16:00 CET because of operational security analyses and capacity calculations for coming week-end) before the week concerned during the WOPT(►►A- S6).

**S6. Weekly Operational Teleconference (WOPT).** In order to coordinate possible congestions and other matters, TSOs within regional groups organize on Friday a weekly teleconference call to share operational information regarding:

**S6.1.** planned outages of relevant network elements (►►A- S5)

**S6.2.** special events or circumstances

**S6.3.** week-ahead “trend” of the markets and possible influence on the assumptions to consider

**S6.4.** influence on the published available capacity values

**S6.5.** common investigation to be initiated, e.g impact of (public) holidays, availability of generation reserves.

**S7. Provision and confidentiality of data.** Each TSO shall provide on request to neighbouring TSOs sufficient information to ensure secure and efficient operation of the

interconnected system. The use and communication of all the data exchanged between TSOs and of the associated results have to be treated in compliance with Policy 7.

**S8. Testing phase of relevant Assets.** Each TSO shall as soon as reasonably practicable provide the requesting TSOs with a plan of the tests of the relevant assets within its responsibility area. This detailed plan shall include information needed to allow impact analysis by requesting TSOs on their network, at least changes or constraints on generation, consumption, network topology when applicable. Each TSO shall provide all requesting TSOs with all changes to this testing plan.

**S8.1** If the relevant asset under testing interconnects two responsibility areas, the two concerned TSOs shall coordinate to agree on the detailed information to be exchanged.

**S9. Management of information related to external observability list.** Each TSO shall provide in advance all necessary information about its assets which are included in other TSOs external observability lists, in order that those TSOs achieve correct observability on these assets in real time ((►P3-A2-S6).

## **Guidelines**

**G1. Organisation of work.** All TSOs meet in regional groups or have teleconference calls to monitor and coordinate the outage planning on a regional basis. These meetings shall take place at least for the Year-Ahead time horizon and during the WOPT for the Week-Ahead horizon. The regional groups and their composition can be changed by the TSOs involved according to the impacts of each TSO's responsibility area. In case of outage incompatibilities, TSOs perform joint studies on the impact of planned outages to relief these outage incompatibilities.

**G2. Common data-base.** TSOs in the same regional group continuously update a common set of data with information on the relevant assets considered, the critical assets agreed and the joint plan of outages for the rest of the year. All adaptations shall be shared with the affected TSOs.

**G3. Information on Infrastructure projects.** All TSOs shall provide all relevant information at its disposal on infrastructure projects related to the transmission system, generation, demand facility and distribution network to all TSOs likely to be affected.

### **G4 Information about assets included in external observability area**

**G4.1 Annual all-grid update.** Once a year TSOs within regional groups should exchange the latest maps of their power grids (220 kV and higher) and share information (e.g. project status, commissioning dates) about expected changes in the next year in their grids.

**G4.2 Database structural information sharing.** Each TSO should provide in advance to other TSOs having some of its assets in their observability list, all necessary information, including at least:

- at least 5 weeks in advance, electrical diagram and characteristics for all new or modified asset, and date of entry in service,
- as soon as possible before entry into service, associated tele-information addresses (TASE.2 protocol) and date of entry in service

**G5. Support from Regional Security Coordination Initiatives (RSCIs).** Each TSO should, in coordination with other TSOs of its regional group, consider whether part or all of the services required by the fulfilment of Chapter A standards could be procured by an RSCI, in view of progressive application of the Policy Paper approved by ENTSO-E Assembly on September, 30<sup>th</sup>, 2014.

## B. Capacity Calculation

---

### *Introduction*

The process of capacity calculation deals with the determination by TSOs of cross-border capacity available to the market. Especially in the parts of the continental European network where congestions are experienced on a regular basis, this capacity calculation process is crucial. However, due to the changing pattern of trade, congestions are likely to appear suddenly in any part, thus capacity calculation should cover every interconnection and hence the maximum set of plausible situations to come. Due to the complexity of transit flows and interactions between areas, the TSOs' capacity calculation process must be coordinated. The accuracy of the capacity calculation depends on the availability of reliable information about each TSO's network system, including expected load and generation patterns.

This chapter deals with two methods of the capacity calculation. The first one is based on NTC and the second one on Flow-Based.

Capacity calculation should be designed as a continuous risk assessment process, including all necessary updating loops.

### *Definitions*

- D1. Best forecast.** Forecast for the capacity calculation process, using the best information available within the region.
- D2. Base-Case Exchange (BCE).** The exchanges forecasted for a specific time horizon (e.g. one year, one month or one week) before the time stamp of a base-case that could be modified upon agreement of all TSOs involved.
- D3. Seasonal Reference Case.** A joint reference case created each half year by TSOs within ENTSO-E RGCE. The reference case includes exchanges.
- D4. Total Transfer Capacity (TTC).** The maximum exchange program between two areas satisfying the N-1 SECURITY PRINCIPLE (►P3-A).
- D5. Net transfer Capacity (NTC).** The maximum exchange program, which can be realized taking into account the N-1 SECURITY PRINCIPLE (►P3-A) and uncertainties.
- D6. NTC Method.** NTC approach means a capacity calculation method optimizing the calculation of available capacity by computing TTC and NTC.
- D7. Flow-Based Method (FB).** Flow-based approach means a capacity calculation method optimizing the calculation of available capacity taking into account that electricity can flow via different paths in highly interdependent grids. In the flow based method, impacts of commercial trades are evaluated as energy flows on specified critical branches.
- D8. Available Transfer Capacity (ATC).** The capacity which can be allocated on the market.
- D9. Reliability Margin (RM)** Reability Margin means the necessary margin in the calculation related to critical network elements or cross-zonal capacity which is required to cover uncertainties of power flows in the period between the capacity calculation and real time.

- D10. Composite NTC value.** The composite NTC value calculated for the borders between three or more TSOs. The composite NTC value is not necessarily the sum of bilateral NTC values.
- D11. Individual Grid Model (IGM).** Individual Grid Model means a data set describing power system characteristics (generation, load and grid topology) and related rules to change these characteristics during capacity calculation prepared by the responsible TSOs, to be merged with other individual grid model components in order to create the common grid model.

### **Standards**

- S1. Operational security.** During the capacity calculation process the TSOs have to jointly ensure that the interconnected network always meets the N-1 SECURITY PRINCIPLE (►P3-A).
- S2. Capacity calculation.** TSOs perform capacity calculations for different time frames and in advance of corresponding capacity allocation procedures. Those binding values are assessed on the basis of the TSOs' best forecast.
- S3. Harmonisation of capacity values in case of NTC method.** Neighbouring TSOs have to harmonize the calculated capacity values on their common borders and region. In case there is no agreement on a common value, the lower value has to be used, as this ensures secure operation in both systems.
- S4. Procedure for the capacity calculation.** Each TSO uses a coordinated and harmonized methodology with the neighbouring TSOs or in the region. The methodology must guarantee system security in the affected grids. It has to deliver available capacities satisfactory and reliable for the market. They shall be defined using either an NTC method or a FB method.
- S5. Seasonal Reference Cases Preparation.** The time schedule and the data of the Seasonal Reference Cases which can be used for the NTC calculation are determined and controlled by the ENTSO-E RG CE plenary or its appropriate subgroup.
- S6. Calculation of ATC values.** In case there is a joint capacity allocation procedure, TSOs calculate and harmonize the ATC values.
- S7. Confidentiality of data.** The use and communication of all the data exchanged between TSOs have to be treated in compliance with Policy 7. Special attention shall be given to communication and exchange with third parties for which non-disclosure agreements are required.

### **Guidelines**

- G1. Capacity Calculation coordination.** In case of harmonized procedures, TSOs could establish a common service.
- G2. Exchange of information.** For the purpose of performing common studies TSOs exchange the appropriate information, e.g. scenarios for load and generation patterns.
- G3. Composite NTC value**

- G3.1. Calculation of composite NTC values.** In case of strong interdependencies between more than two control areas, TSOs can decide to calculate composite NTC values.
- G3.2. Splitting of the composite NTC values.** A composite NTC value can be split by the TSOs involved into bilateral NTC values.
- G4. Model used for capacity calculation.** Common network models should be prepared by the responsible TSOs in a coordinated way in the region with the following parameters:
  - G4.1.** a detailed model of the region, at least from 220kV voltage level, with the equivalent of the lower voltage network when it is necessary,
  - G4.2.** updated important changes of the network topology,
  - G4.3.** updated load patterns,
  - G4.4.** updated generation pattern, considering especially intermittent generation,
  - G4.5.** updated power exchange forecasted on HVDC links as TSO internal generation/load nodes,
  - G4.6.** updated possible position of the phase shifters and transformers,
  - G4.7.** for the non-participating TSOs, the D-1 or snapshot files for the representative historical timestamps can be used.
- G5. Model used for capacity calculation.** Model used for capacity calculation could be based on different forecasting network models. It depends on the crossborder capacity allocation cycle (yearly, monthly, daily, intraday).
  - G5.1. For D-2 procedure.** Each TSO provides its agreed set of hourly individual grid models on the agreed regional location, where it is accessible to all other participating TSOs, before the agreed regional time schedule.
  - G5.2. For intraday procedure,** each TSO provides its individual grid model for regionally agreed timestamps and locations.
  - G5.3. For other cycles.** TSOs can define common scenarios regionally agreed, on which a common network model is created, or TSOs can regionally agree on alternative coordinated methods.
- G6. Common network models of the TSOs in the region.** These common network models for the capacity calculation and other applications should be updated according to the best knowledge.
- G7. Exchange of common network models among regions.** Different regions could harmonise and exchange common network models.
- G8. Handling of transformer and phase shifters taps.** During the capacity calculation TSO should use non-costly available remedial actions (such as PST coordination, special protection schemes, ...) to improve capacity calculation results.
- G9. Reliability Margin (RM).** Each TSO, according to a methodology, has to determine the RM which is taken into account in the capacity calculation process. This methodology can be coordinated with other TSOs of the same region.
- G10. Support from Regional Security Coordination Initiatives (RSCIs).** Each TSO should, in coordination with concerned TSOs for regional capacity calculation, consider whether part or all of the services required by the fulfilment of Chapter B standards could be procured by an RSCI, in view of progressive application of the Policy Paper approved by ENTSO-E Assembly on September, 30th, 2014.



## C. Congestion Forecast

### Introduction

In order to carry out load flow forecasts during the operational planning phase and to identify possible congestions, it is necessary to exchange relevant data among TSOs. The influence of the neighboring networks on the considered network has to be taken into account, especially for contingency analysis, even if the identified congestions are not located on TIE-LINES. Hence, one of the main tasks for TSOs is to organize this data exchange, to agree upon the preparation of the data sets and to ensure the confidential treatment of the data exchanged (►P6).

The process of congestion forecasting in relation with operational security analysis in operational planning activity deals with the following timeframes:

- Year-Ahead
- Week-Ahead,
- D-1
- Intraday

NB: in this version, *D-1* procedure and datasets replace the previously common naming “*DACF*”, in order to align with future vocabulary used in the EU Network Codes. It also expresses the fact that these datasets can be used to perform all kind of security analyses, not only flow congestion forecasts. Besides *intraday* procedure and datasets are introduced. For TSOs that already run an automatic IDCF process, the final targets apply, and for TSOs starting this process the minimum requirements apply for a limited period of time.

### Regional approach (►P3-A)

The operation of the grid becomes more and more complex with highly volatile cross-border flows. For this reason, TSOs are improving their existing cooperation to guarantee security of supply also at regional level and, consequently, offer best conditions for market integration. The cooperation should aim at providing the involved Parties' security improvements of the power system operation, in order to ensure the security in the region, develop security calculations based on common and shared procedures and anticipate detection of congestions which might occur in real time.

### Standards

- S1. Infrastructure.** For exchanging the IGMs and the results of the network security analysis, TSOs use the Electronic Highway (EH) infrastructure described in Policy 6.
- S2. Data provision.**
  - S2.1. Network model.** Each TSO provides to the EH-ftp server a forecasted load flow data set of its grid, with the whole, detailed network model related to the transmission grid, i.e. a real model (no equivalents) of at least all elements at  $\geq 220\text{kV}$  level like busbar couplers, nodes, lines, transformers, nodes' load and injections. Equivalent or real lines and transformers can be used to represent networks of lower voltages, in case they influence the 750kV, 380 kV or 220 kV level significantly.
  - S2.2. Data format.** TSOs shall use the agreed format published on the ENTSO-E website for the exchange of the IGMs.
  - S2.3. Backup procedure.** In case of EH-ftp server malfunction, TSO shall exchange the data sets by sending an e-mail to an agreed list of addresses.

- S2.4. Access to LFC Block programs.** Besides the participants' networks, the LFC Block programs, provided by the ENTSO-E coordination centers, shall be accessible to all TSOs.
- S3. Data collection.** Each TSO collects IGMs from the EH-ftp server and, where applicable, constructs a network model (i.e. the IGM merging process) that represents the most probable state of the forecast time. That model can include all ENTSO-E networks, but a TSO can also disregard the data sets of TSOs whose influence on its network is deemed negligible. This process can be done in a decentralized way or in a centralized way by a TSO, a regional group or a regional TSO initiative (RSCI).
- S4. Quality of D-1 and intraday process**
- S4.1. Coordination.** The ENTSO-E RG CE relevant group is responsible for the coordination of the D-1 and intraday process, i.e. improvements, quality monitoring, and problem solving.
- S4.2 Quality Service provider.** Each TSO shall appoint a Service provider among those selected by RGCE plenary for coordination of model corrections.
- S4.3. Quality of data set and merging process.** TSOs follow the rules included into the document "Quality of datasets and calculations". Each TSO checks the diagnosis available on the ENTSO-E RGCE Quality Assurance Portal and delivers updated IGMs when necessary.
- S4.4. Monitoring the quality of the process.** On a regular basis, but at least twice a year, ENTSO-E RG CE relevant group checks the frequency and quality of the D-1 and intraday process and presents the results to the RGCE plenary with the proposals of improvements.
- S5. Confidentiality of data.** The use and communication of all the data exchanged between TSOs have to be treated in compliance with Policy 7. Special attention shall be given to communication and exchange with third parties for which non-disclosure agreements are required.
- S6. Participation of TSOs.** All TSOs of the synchronous area participate in the D-1 and intraday process.
- S7. Datasets for D-1 process.** 24 daily data sets shall be supplied corresponding to the reference times from 0:30 to 23:30 (C.E.T.). Each TSO has to provide its complete IGM load flow data set with exchange program on the EH ftp-server before 6 p.m. (C.E.T.), where it is accessible to all other participating TSOs.
- Datasets for intraday process.** 24 daily data sets shall be supplied corresponding to the business times from 0:30 to 23:30 (C.E.T.). Each TSO has to provide its complete IGM load flow data set (according to last agreed exchange programs at the ENTSO-E RG CE Verification Platform) on the EH ftp-server at latest one hour:
- **Minimum Requirement:** before each reference time (0:00, 8:00 and 16:00 CET), and with at least the next 8 coming hours.
  - **Final target:** before each business time with a rolling forecast from DACF to IDCF with an hourly update (without merging DACF and IDCF processes) and with all the remaining hours of the business day.
- S8. Verification platform.** For the purpose of managing the D-1 and intraday process, all LFC Blocks of the synchronous area provide the agreed Verification platform with the D-1 exchange programs before 6 p.m. (C.E.T.), and with the Intraday exchange programs after every Intraday market gate.
- S9. Security check.** All TSO of the ENTSO-E RG CE shall carry out D-1 and intraday N-1 security calculations according to Policy 3 A1-S3.a

- S10. Congestion Management.** In case of a detected congestion during the D-1 or intraday security check, results shall be shared with involved TSOs. The involved TSOs then decide whether and what kind of countermeasures shall be taken to solve the detected congestion (►P3).
- S11. Additional data.** For examining D-1 and intraday data quality or for purposes of examinations of events in the interconnected network TSOs shall provide on request of other TSOs snapshots (SN) of the real operation. In case of disturbances or other unusual operation of interconnected system each TSO can require SN. All TSOs who are requested to do so shall prepare and send SN to other TSOs through the EH-ftp server as soon as possible and no later than two working days after the request was made.
- S12. Intraday process.** In order to allow TSOs to perform security analysis during different timeframes and for an intraday procedure purpose, the intraday IGMs should be provided for every hour/each timestamp of the day. IDCF files created around hour hh should be built with the available data at the Intraday Verification Platform of hh-1:30.
- **Final Target:** For intraday IGM provision an automatic process is needed to exchange hourly updates.
- S12.1. Intraday information updates.** TSOs update their IGM as soon as modifications significantly influence the grid.  
*Note: This includes change of expected load profiles, production schedules (including redispatch and (change of) renewable production), HVDC, expected topology (including (unplanned) outages and phase shifter transformer tap positions), modification of the standard automatic devices operation and remedial actions activated in day-ahead or intra-day process. The models could be based on a current snapshot or updated D-1 data set of the TSOs grid.*
- S12.2. Congestion Management.** In case congestion is detected, the TSOs involved decide whether and what kind of measures shall be taken to solve the detected congestion, if possible based on the measures defined during the D2CF and/or D-1 process.

COSAQ (reply by Y/N. If "No" = TSO is not compliant).

Are you able to deliver intraday files and send updates when the topology, load, generation or cross border exchange programs change and influence the TSO or neighboring TSOs grid?

## Guidelines

- G1. Exchange programs verification.** Besides the D-1 information, each TSO should check the cross-border exchange programs for the next day on the agreed Verification platform to estimate whether extraordinary transit flows or congestion might be expected.
- G2. Yearly procedure.** TSOs should exchange network models for yearly security analysis. The same basic infrastructure and formats as for the D-1 should be used for this procedure.

- G2.1. Data provision.** The models of the TSOs network are adjusted with typical load profiles, production and load forecast and expected topology (including new facilities).
  - G2.2. Exchange programs.** TSOs within a region agree exchange programs or net positions in order to ease the merge of the datasets.
  - G2.3. Coordinated remedial actions.** In case TSOs involved detected measures to solve congestions, the remedial actions should be communicated and shared in order to be agreed.
  
- G3. Weekly procedure.** TSOs should exchange network models for weekly security analysis. The same basic infrastructure and formats as for the D-1 should be used for this procedure.
  - G3.1. Data provision.** The models of the TSOs network are adjusted with updated expected load profiles, production forecast and expected topology (including outages, phase shifter transformer tap positions).
  - G3.2. Exchange programs.** TSOs within a region agree exchange programs or net positions in order to ease the merge of the datasets.
  - G3.3. Coordinated remedial actions.** In case TSOs involved detected measures to solve congestions, the remedial actions should be communicated and shared in order to be agreed.
  
- G4. Reactive power ancillary services.**
  - G4.1. Reactive power sources availability.** Each TSO should assess in all operational planning timeframes whether its available Reactive Power sources are sufficient to ensure the Operational Security of the Transmission System.
  - G4.2. Coordination.** Whenever the level of Reactive Power Ancillary Services is not sufficient for maintaining Operational Security, each TSO should inform neighboring TSOs and prepare corresponding remedial actions for activation.
  
- G5. Support from Regional Security Coordination Initiatives (RSCIs).** Each TSO should, in coordination with other relevant TSOs, consider whether part or all of the services required by the fulfilment of Chapter C standards could be procured by an RSCI, in view of progressive application of the Policy Paper approved by ENTSO-E Assembly on September, 30th, 2014.

## D. Generation Adequacy Assessment

### *Introduction*

Generation adequacy deals with the ability of a power system to supply its demand in all the steady states that it may face. Due to the larger fluctuations in generation, demand, and cross border flows, it becomes more and more important to accurately assess and forecast adequacy.

The present policy states the performance of winter and summer coordinated adequacy analyses as well the main principles to be applied in responsibility area adequacy analyses to be performed by each TSO, and the common information to be shared related to these processes.

### *Guidelines*

**G1. Responsibility area adequacy analyses.** Each TSO should assess, from year-ahead up to intraday timescales, within its responsibility area, the possibility for the sum of generation and cross-border import capabilities to meet the total demand under various scenarios, taking into account the required level of active power reserves.

**G1.1. Data for analyses.** Each TSO should use the latest available data for capabilities of power generating modules and their availability statuses and cross border capacities while taking into account demand and forecasted contributions of renewable energy sources.

**G1.2. Result of the analyses** Each TSO should assess the probability and expected duration of an absence of adequacy and the expected energy not served as a result.

**G1.3. Information process.** If an absence of adequacy within its responsibility area or a situation where generation in the responsibility area alone is not enough to meet the demand is detected, each TSO should inform all TSOs.

**G2. Summer and winter adequacy outlooks.**

**G2.1 Data for analyses** The data used for the responsibility area adequacy analyses should be made available by all TSOs as input data for an annual summer and winter coordinated Adequacy outlook. This data should take into account at least the data specified in **G1.1**. The weekly peak demand for each period of study should be forecasted both for normal and severe conditions.

**G2.2. Result of the analyses** All TSOs should perform annual summer and winter generation adequacy assessments before May 21<sup>st</sup> and November 21<sup>st</sup> respectively, applying ENTSO-E methodology.

**G2.3. Analyses updating** Each TSO should monitor changes on the availability status of generators, demand and generation forecasts or cross border capacities of its responsibility area from the values provided for summer and winter adequacy outlooks. When significant changes are detected, the TSO should perform an updated adequacy assessment in accordance to **G1**.

**G2.3. Quality of the summer and winter coordinated adequacy outlooks** All TSOs should monitor the quality of the summer and winter adequacy outlooks and, if necessary, make proposals to improve the following adequacy outlooks.

**G3. Common information.** Relevant data used for adequacy analyses should be made available by all TSOs through the environment decided for this purpose. Available relevant data should include at least:

**G3.1.** winter and summer adequacy data provided.

**G3.2.** winter and summer coordinated adequacy outlooks report.

**G3.3.** Information about a lack of adequacy according to **G1.3**.

**G4. Support from Regional Security Coordination Initiatives (RSCIs).** Each TSO should, in coordination with other relevant TSOs, consider whether part or all of the services required by the fulfilment of Chapter D standards could be procured by an RSCI, in view of progressive application of the Policy Paper approved by ENTSO-E Assembly on September, 30th, 2014.

### ***Bibliography***

- [Definition of X-nodes and nominal thermal limits and file naming conventions]
- [Quality of datasets and calculations, RGCE Network Models and Forecast Tools, version approved by RGCE Plenary 25.01.2013]
- Policy paper on Core Strategy for TSO Coordination approved by ENTSOE Assembly 30.09.2014