Explanatory note to the South West Europe TSOs proposal for a common long-term capacity calculation in accordance with Article 10 of Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation

March 2019

<u>**Disclaimer**</u>: This explanatory document is submitted by the TSOs of the South West Europe region for information and clarification purposes only accompanying the TSOs' proposal for a common LT capacity calculation methodology in accordance with Article 10 of the Regulation 2016/1719 of 26 September 2016 establishing a Guideline on Forward Capacity Allocation.

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1 Introduction

This technical document sets out the main principles for the coordinated capacity calculation methodology for the long-term market time frames applied in South West Europe region. It contains a description of both the methodology and the calculation processes in compliance with the Forward Capacity Allocation guideline (hereafter FCA).

The participating TSOs for this calculation are REE (SP), REN (PT) and RTE (FR). The following borders are considered Spain – France and Spain – Portugal.

This methodology is necessarily compatible with the South West Europe TSOs proposal of common capacity calculation methodology for the day-ahead and intraday market time frame in accordance with Article 21 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management. For this reason, the aforementioned document is referenced in this document as SWE day-ahead and intraday capacity calculation methodology.

2 Definitions and acronyms

a. 'CACM regulation' means Capacity Allocation and Congestion Management Guideline according to Commission Regulation (EU) 2015/1222.

b. 'Calculation scenario' means the product of combining the CGMs with the planned outages, the seasonal operational security limits and the remedial actions sent by the TSOs.

c. 'CGM' means Common Grid Model.

d. 'CGMM' means, in this context, All TSOs' proposal for a common grid model methodology in accordance with Article 18 of FCA.

e. 'CNE' means critical network element.

f. 'CNEC' means CNE and contingency.

g. 'Coordinated capacity calculator' means the entity or entities with the task of calculating transmission capacity, at regional level or above.

h. 'CRAC file' means the file containing contingencies, remedial actions and CNEs.

i. 'ENTSO-E' means European Network of Transmission System Operators for Electricity.

j. 'FACTS' means flexible alternating current transmission system.

k. 'FCA' means Commission Regulation (EU) 2016/1719 of 26 September 2016 establishing a guideline on forward capacity allocation.

l. 'GSLK' means generation and load shift keys.

m. 'IGM' means Individual Grid Model.

n. 'NTC' means net transfer capacity.

o. 'PST' means phase shifter transformer.

p. 'RA' means remedial action.

q. ‘RAO’ means remedial action optimization.

r. ‘REE’ means Red Eléctrica de España, the Spanish system operator.

s. ‘REN’ means Redes Energéticas Nacionais, the Portuguese system operator.

t. ‘RES’ means renewable energy sources.

u. ‘RTE’ means Réseau de Transport d’Electricité, the French system operator.

v. ‘SP-FR border’ means bidding zone border between Spain and France.

w. ‘SP-PT border’ means bidding zone border between Spain and Portugal.

x. ‘SWE capacity calculation for day-ahead’ means the capacity calculation done in SWE Region for day ahead according with SWE DA&ID CC methodology.

y. ‘SWE DA&ID CC methodology’ means South West Europe TSOs proposal of common capacity calculation methodology for the day-ahead and intraday market time frame in accordance with Article 21 of Commission Regulation (EU) 2015/1222 of 24 July 2015 establishing a guideline on capacity allocation and congestion management.

z. ‘TRM’ means transmission reliability margin.

aa. ‘TTC’ means total transfer capacity.

bb. ‘UD’ means unintended deviation.

cc. ‘UN’ means uncertainties.

3 Capacity Calculation Approach

Article 10.2 of FCA sets that the approach used in the common capacity calculation methodology shall be either a coordinated net transmission capacity approach or a flow-based approach. SWE TSOs will use **coordinated NTC approach** to determine the long-term cross-border capacities for each border of the SWE CCR.

Article 10.4 of FCA sets that the uncertainty associated with long-term capacity calculation time frames shall be taken into account by applying a security analysis based on multiple scenarios and using the capacity calculation inputs, or a statistical approach based on historical cross-zonal capacity for day-ahead or intraday time frames, if it can be demonstrated that this approach may increase the efficiency of the capacity calculation methodology; better take into account the uncertainties in long-term cross-zonal capacity calculation than the security analysis; increase economic efficiency with the same level of system security. For SWE region, a **security analysis based on multiple scenarios** will be applied.

These two choices make this proposal fully compatible with SWE DA&ID CC methodology, as requested in Article 10.3 of FCA.

4 Capacity calculation inputs

4.1 Transmission Reliability Margin

Taking into consideration Article 11 of FCA, the common capacity calculation methodology shall include a reliability margin methodology which shall meet the requirements set out in Article 22 of CACM.

The requirements set out in Article 22 of CACM Regulation are defined in the methodology defined for the SWE day-ahead Capacity Calculation that was approved by the SWE regulators in November 15th 2018. The TRM methodology used in the long term capacity calculation will be the same as in D-2 capacity calculation, which is explained below.

The methodology for the day-ahead capacity calculation is based on forecast models of the transmission system. The inputs are created two days before the delivery day with the best available forecast. Therefore the outcomes are subject to inaccuracies and uncertainties. The aim of the reliability margin is to cover these inaccuracies and uncertainties induced by those forecast errors.

4.1.1 The unintended deviation

For control-related reasons, deviations occur between the scheduled flows and the actual flows during the exchange of energy between neighbouring control areas. This implies that at any moment the exchange between two control areas can be significantly higher than the scheduled exchanged, endangering the security of supply.

This part of the reliability margin is linked to the border and not to the market time frame studied.

4.1.2 The uncertainties

The Coordinated NTC calculation methodology is based on different inputs provided by TSOs, they are based on best available forecasts at the time of the capacity calculation, as RES, consumption, production plans or available network elements, which could differ from the real-time situation.

4.1.3 Current target methodology

TRM can be modelled as a probability distribution function resulting from taking into account two variables:

- Unintended deviation on the (France-Spain or Portugal-Spain) interconnection and
- Uncertainties of the forecast between D-2 calculation studies and real time.

Uncertainties will be evaluated from the impact on most relevant CNE elements on the (France-Spain or Portugal-Spain) interconnection. For this approach, the list of most relevant CNE elements will be a reduced number of them whose flows are highly impacted by cross-border exchanges (typically tie-lines and the nearest internal lines). At least, a sensitivity threshold equal or higher than 10% should be considered.

In a first step, each D-2 scenario will be modified to reflect the real commercial exchange on the interconnection in the corresponding real time scenario. These changes fulfil the GSLK methodology established.

Once D-2 forecast can be compared with real time scenario, the difference between flows in D-2 and real time through each CNE element will be collected. The TRM needed to compensate the flow deviation for each CNE will be determined as follow:

$$TRM_{CNE} = \frac{P_{Real\ time} - P_{D-2}}{SI_{CNE}}$$

Where:

- SI_{CNE}: Sensitivity Index for each CNE in base case
- $P_{real\ time}$: monitored branch MW flow in real time scenario (base case)
- P_{D-2}: monitored branch MW flow in D-2 forecast (base case)

Finally, collecting all the above mentioned TRMs for each CNE and scenario during the period of the study, the equivalent Gaussian probability distribution function "UN" will be obtained.

Therefore, the TRM probability distribution function can be obtained by the convolution of the two probability distribution functions UD and UN corresponding to the described variables and the obtained values can be different depending on the border. Finally, the value of RM shall be defined as the 95 percentile of the distribution function.

Transmission Reliability Margin (percentile 95%) = Convolution (UD,UN)

4.1.4 Temporary values to be used until statistical data are available

Until the methodology described above is implemented in SWE day-ahead capacity calculation the current TRM values will be used.

Portugal – Spain border

TRM is calculated as the maximum of the two following values:

- UD is defined with a fix value of 100 MW (covering 95% of the cases of deviation).
- UN is defined at 10% of the TTC.

These thresholds are explained by the specificities of the borders: the huge amount of RES production in Portugal and Spain makes the forecast sensible to changes which gives a high value for the UN threshold, together with high sensitivity to the localization of the production in both countries and thus a high impact of the precision of the GSLK forecast.

France – Spain border

TRM is calculated as the maximum of the two following values:

- UD is defined with a fix value of 200 MW (covering 95% of the cases of deviation).
- UN is defined at 7.5% of the TTC.

These thresholds are explained by the specificities of the borders: A lower proportion of RES in France can explain a lower UN factor, even though there is a high sensitivity to the localization of the Spanish production.

4.2 Operational security limits and contingencies

Taking into consideration Article 12 of FCA, the common capacity calculation methodology shall include methodologies for operational security limits and contingencies which shall meet the requirements set out in Article 23(1) and (2) of CACM.

4.2.1 Critical network elements and contingencies

A CNE is a network element either within a bidding zone or between bidding zones monitored during the capacity calculation process. A CNEC is a CNE limiting the amount of power that can be exchanged, potentially associated to a contingency (see below the definition). Both CNEs and contingencies are determined by each SWE TSO for its own network according to agreed rules, described below.
The CNECs are defined by:

- A CNE: a line or a transformer whose flow is significantly impacted by cross-border exchanges; a node whose voltage is significantly impacted by cross-border exchanges; a line whose voltage phase angle difference is significantly impacted by cross-border exchanges after its trip.
- An “operational situation”: base case (N regime) or contingency cases (N-1, N-2).

A contingency is defined as the trip of one single or several network elements that cannot be predicted in advance. For clarification, a scheduled outage is not a contingency. The normal type of contingency comprises the loss of a single element, which can be:

- a line
- a tie-line
- a DC link
- a generation unit
- distributed generation of a relevant size like a clustered wind farm, cogeneration, etc.
- a transformer (including Phase Shifter Transformers)
- a large voltage compensation installations.

Contingencies situation could result from the combined loss of several elements.

4.2.2 CNEC selection

The selection of contingencies and CNEs needs to be compatible with the selection methodology established in the DA&ID CC methodology. Due to this reason, the lists of contingencies and CNEs that are being used in the day-ahead capacity calculation in the moment of the input collection, are considered.

Long-term capacity implies the possibility of studying future scenarios with new network elements or topologies. Therefore, TSOs can add elements to the lists by applying the selection methodology established in the SWE DA&ID CC methodology to the long-term IGMs, with the same thresholds.

Finally, TSOs have the possibility to consider additional CNEs that can be sensitive to cross border exchanges within a particular combination of outage(s), contingencie(s) and RA(s). These additional CNEs have to comply with the selection criteria after an ex-post analysis.

4.2.3 Definition of operational security limits

4.2.3.1 Maximum permanent and temporary current on a Critical Branch

The maximum permanent admissible current/power means the maximum loading that can be sustained on a transmission line, cable or transformer for an unlimited duration without risk to the equipment.

The temporary current/power limit means the maximum loading that can be sustained for a limited duration without risk to the equipment (e.g. 115% of permanent physical limit can be accepted during 20 minutes). Each individual TSO is responsible for deciding which values (permanent or temporary limit and duration of each overload) should be used, according to the corresponding legislation and security standards.

As thermal limits and protection settings can vary in function of weather conditions, different values are calculated and set for the different seasons within a year. These values can be also adapted by the concerned TSO if a specific weather condition is forecasted to highly deviate from the seasonal values.

4.2.3.2 Maximum/minimum voltage on a node of the network

If the voltage on a node is significantly impacted by cross-border exchanges, the voltage on this element shall be monitored in the capacity calculation. Each TSO shall specify the voltage limits for each element of its transmission system.

4.2.3.3 Voltage Phase Angles Differences

Following the opening or the outage of tie-lines a manual reclosure may be refused by Parallel Switching Devices (PSDs) in case of voltage phase angle difference exceeding the pre-set threshold of the device. The setting of the threshold depends on operational conditions in this respective area of the grid. Typically, the threshold chosen is around 30^0.

4.3 Generation and Load Shift Keys

Taking into consideration Article 13 of FCA, the common capacity calculation methodology shall include a methodology to determine generation shift keys which shall meet the requirements set out in Article 24 of CACM. This proposal includes the same generation shift keys methodology than SWE DA&ID CC methodology.

4.3.1 The proportional shift

This shift methodology will be implemented in RTE control area.

This choice is mainly related to the fact that generation in France is composed at 75% by nuclear power that do not vary following a merit order. Indeed the French electricity market being a portfolio market, the merit order is not geographically relevant. Thus a proportional representation of the generation variation, based on RTE's best estimate of the initial generation profile, ensure the best modelling of the French market.

4.3.2 The merit order shift

This kind of shift methodology will be implemented in REE and REN control areas.
The main reason for this choice is that power flows in these control areas are very sensitive to different generation profiles and locations especially due to high RES penetration. Therefore, for different generation profiles, different power flows in the grid elements are obtained. Consequently, different stress areas in the systems with potential impact in the NTC calculations can arise.

Some examples:
- If the wind production is high the marginal production could be reduced;
- If the winter is wet the marginal price of hydro power-plants could be lower than the marginal price of thermal power-plants, and vice-versa for dry seasons.
- Depending on the primary sources' prices, the market behaviour will be different and affect the location of the production.

4.4 Remedial Actions

During coordinated NTC calculation, SWE TSOs will take into account remedial actions. According to Article 14 of FCA, each TSO shall ensure that these remedial actions are technically available in real time operation and meet the requirements set out in Article 25 of CACM.

The general purpose of the application of RAs is to maintain the transmission system within the operational security limits during the capacity calculation process, where maximum power exchanges are reached, with the subsequent benefit of the market.

A RA can be:

- Changing the tap position of a PST.
- Topological measure: opening or closing of one or more line(s), cable(s), transformer(s), bus bar coupler(s)or switching of one or more network element(s) from one bus bar to another;
- Change of generator in-feed or load.
- Change the flow in the HVDC links France-Spain: use of the modulation modules
- Change the flow in a line using a FACTS.
- Change the voltage on a node by activating/deactivating reactance(s) or capacitor(s)

TSOs will take into account RAs expected to remain technically available in real time operation according to Article 14 of FCA.

All explicit RAs applied for NTC calculation must be coordinated in line with article 25 of CACM.
Prior to each calculation process, the TSOs of a bidding zone border shall agree on the list of remedial actions that can be shared between both in the capacity calculation. These shared remedial actions can only be activated with prior consent of the neighbouring TSO since their activation have a significant impact on its control area.

4.5 Planned Outages

Each TSO will provide the coordinated capacity calculator with the latest version of the list of coordinated planned outages on each of its borders before every long-term calculation.

The coordinated planned outages list will contain all outages planned for the different calculation time frames. The list will be initialised before the year ahead calculation and will be updated before each monthly calculation.

4.6 Common Grid Model

The methodology used to create the IGMs and to merge them into CGMs in this process is in line with the CGMM. In case the CGMM do not cover any capacity allocation time frame, SWE TSOs will define the scenarios to be considered.

The coordinated capacity calculator will establish, from the defined scenarios, a set of calculation scenarios by combining the common grid models with the outage planning.

4.6.1 Year-ahead scenarios

The scenarios that will be used in SWE region for year-ahead calculation are agreed according to the relevant Article of the CGMM.

4.6.2 Month-ahead scenarios

The scenarios that will be used in SWE region for month-ahead are agreed according to the relevant Article of the CGMM.

4.6.3 Quarter-ahead scenarios

At the time of submitting this proposal, the CGMM does not cover quarterly scenarios. Given that for this time frame TSOs have normally updated the outage planning, year-ahead scenarios corresponding to the relevant quarter will be used. The coordinated capacity calculator will establish, from the scenarios mentioned above, different calculation scenarios taking into consideration the updated outage planning.

4.6.4 Individual Grid Model

Each TSO of SWE region shall determine an IGM for each of the scenarios mentioned above, using its best estimates of the following variables:

a) Network model;
b) electricity demand;
c) the conditions related to the contribution of renewable energy sources;
d) determined import/export positions, including agreed reference values allowing the merging task;
e) the generation pattern, with a fully available production park;
f) the year-ahead grid development;
g) outages covering whole calculation period.

4.6.5 Common Grid models

The individual TSOs' IGMs are merged to obtain a CGM according to the CGMM. The process of CGM creation is performed by the European Merging Function and comprises the following services:

a) Check the consistency of the IGMs (quality monitoring);
b) Merge IGMs and create a CGM;
c) Make the resulting CGM available to all TSOs.

The merging process is standardized across Europe as described in European Merging Function requirements.

5 Capacity Calculation Methodology

5.1 Time frames and calculation scenarios

Taking into consideration Article 9 of FCA, all TSOs in each capacity calculation region shall calculate the long-term cross-zonal capacity for each forward capacity allocation, and at least for yearly and monthly time frames. At the time of writing of this proposal, the following long-term allocations exist in SWE region:

1. Yearly allocation.
2. Monthly allocation.
3. Quarterly allocation, only for SP-PT border.

For a given time frame, the process described in section 5.2 is applied for each of the calculation scenarios. Calculation scenarios are defined by the product of combining the CGMs with the planned outages, the seasonal operational security limits and the remedial actions sent by the TSOs.

5.2 General process

The capacity calculation process designed by the SWE CCR is represented by the schema below.

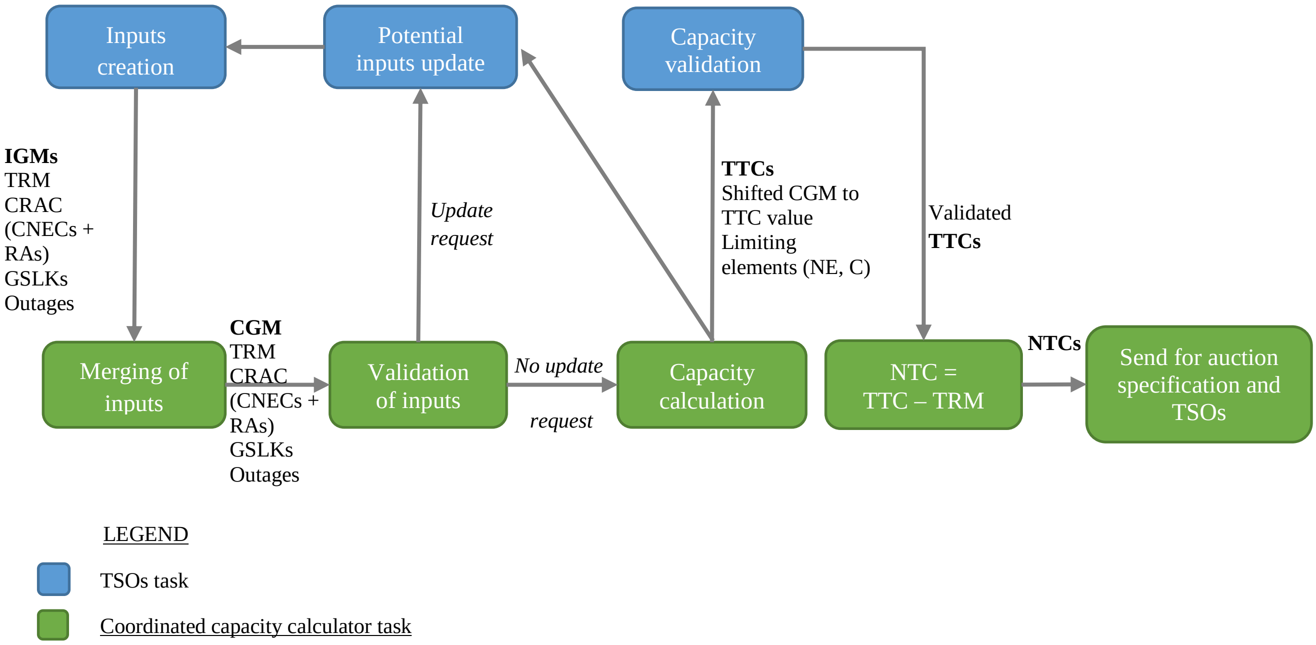

Figure 1 Capacity Calculation process

This process is divided into the following main phases:

1. TSOs prepare their inputs and send them to the coordinated capacity calculator.
2. The coordinated capacity calculator merge all the inputs.
3. The coordinated capacity calculator validate the merged inputs. If errors are detected, a request for updating the corresponding input is launched.
4. The capacity calculation is done for each calculation scenario.
5. The coordinated capacity calculator provides TSOs with the TTC values for each calculation scenario and the corresponding CNECs.
6. TSOs can update the inputs and ask for launching a second calculation if they detect the opportunity to improve the calculation with new conditions that were not considered in the first version of the inputs.[1]
7. Each TSO validates the outputs given for each calculation scenario, updating them if necessary.
8. NTC values are calculated by subtracting TRM to TTC values.
9. NTC values are delivered for the corresponding auction specification and for TSOs transparency purposes.

[1] For example, one remedial action that was not included in the first version of the CRAC file could be given to improve the calculation.

In the following sections, calculation and validation are explained. Inputs and TRM methodologies are explained in chapter 4. The way to merge IGM and create CGMs is out of the scope of this document, as it is done according to CGMM.

5.3 Dichotomy approach

The capacity calculation step can be described as a calculation by dichotomy.

The tool used by the coordinated capacity calculator will define a starting capacity level and check if this level of exchange allows the transmission system to be operated within its operational security limits by performing a security analysis.

If the level is secure, it will then test a higher value of TTC. Otherwise the coordinated capacity calculator will then test a TTC value in between the secure and unsecure TTC values until it reaches the last secure TTC. The dichotomy is set with a 50 MW step, the same used in the SWE DA&ID CC methodology.

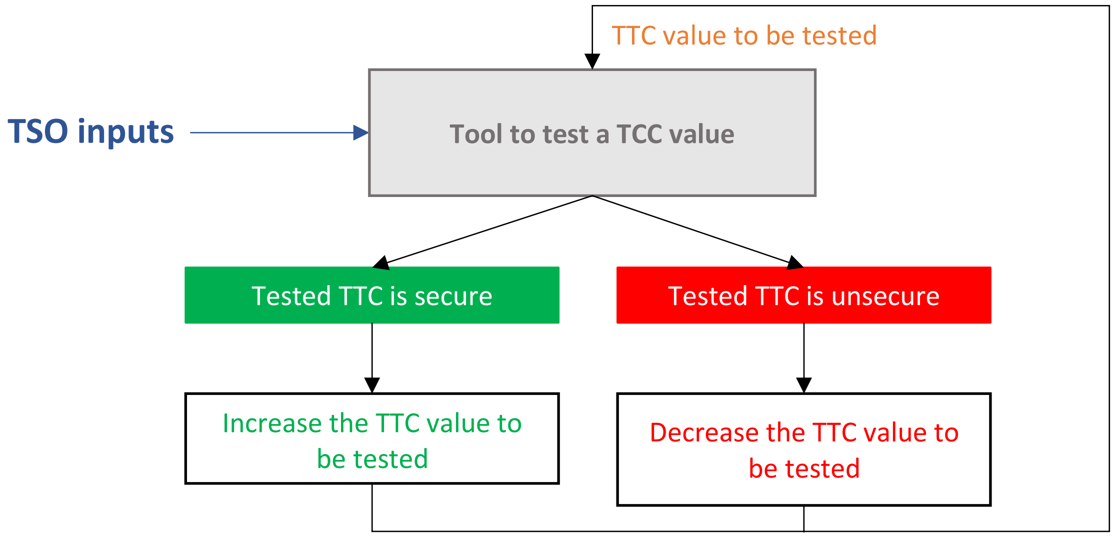

Figure 2 The dichotomy process

5.4 Security analysis

Power flows, voltage levels and voltage phase angle differences will be evaluated within the same sequence of the capacity calculation process. The calculation tool will monitor at each step of the calculation the maximum flows, the adequate voltage levels and the adequate voltage phase angle differences defined by the TSOs on all the CNEs in N situation and after applying each defined contingency. When finding a security violation, the tool uses a RAO to look for RAs able to solve the violation. This is explained in chapter 5.5.

At the time of writing of this explanatory note some features of the SWE capacity calculation tool are under development, as it is the cases of voltage levels and voltage phase angle difference assessments inside the RAO algorithm. While this feature is not implemented, the following temporary solutions will be applied.

5.4.1 Temporary voltage validation

After the flows assessment has been completed, it will be validated that after a set of contingencies the voltage level on some CNEs (nodes) is within a safety range based on the TSOs operational rules:

- If yes, the computation is over.
- If no, a list of specific remedial actions defined by the TSOs such as topological actions, activation of reactance(s), capacitor(s) and FACTS, can be applied.
- If these remedial topological actions relieve the constraint, the RAO is performed again if these remedial actions are preventive.
- If remedial actions other than topological ones relieve the constraint, the computation is over.

If it is not possible to ensure that the transmission system is maintained within the operational security limits with this level of exchange, the same process is performed decreasing the TTC value 50 MW. This process will be repeated until the TTC value ensures the operation of the transmission system within the operational security limits.

5.4.2 Temporary voltage phase angle difference validation

After flows and voltage assessments have been completed, the tool validates that after some particular contingencies the potential reclosure of the line would fulfil the requirements of voltage phase angle difference between the extremes of the line, agreed by SWE TSOs.

The tool will calculate the angle difference, compare it with the defined limit and validate it by applying the following rules:

- If lower, the computation is over.
- If higher, it can then apply a list of specific curative remedial actions defined by the TSOs such as redispatching or topological actions.
- If these remedial actions relieve the constraint, then the computation is over and the calculated TTC is confirmed.

If it is not possible to ensure that the transmission system is maintained within the operational security limits with this level of exchange, the tool then performs again the same process while decreasing the TTC value by 50 MW. It then repeats this process until the TTC value ensures the operation of the transmission system within the operational security limits.

5.5 Remedial action optimization

Some of the security constraints found during the security analysis can be relieved by using some remedial actions. The kernel of the calculation tool is the RAO algorithm. In this chapter it is explained how it works[2].

5.5.1 Theoretical description of the remedial action optimization

In the case of an electrical system where discrete changes can be done, a non-convex and non-linear situation is faced, dealing with topology changes on the network, which represent discrete actions by definition. Therefore, the problem treated by the RAO algorithm is a combinatory problem.

Branch and bound algorithms are commonly used for high complexity mathematical problems, containing combinatory and discrete aspects.

5.5.2 The inputs given to the RAO

TSOs, based on their expertise, associate RAs with the relevant CNECs. The RAO process allows the TSOs to do a pre-selection of associations that will both help the optimizer to find the best combinations (especially when a complex set of RAs is necessary to solve some particular constraints) and reduce the computation time. This ensures the efficiency of the calculation process in the allotted time.

5.5.3 The remedial actions handling

The remedial actions selection process of the RAO, taking advantage of the branch and bound algorithm used, let the opportunity to define usage rules for remedial actions. These usage rules can be seen as an availability assessment of the remedial action before branching.

The algorithm will assess which remedial actions are available at this stage based on usage rules, and only after that, it will enter the branching algorithm to test them individually. It can be seen as a mean to filter the remedial actions for the algorithm, or to control the usage of some remedial actions for specific constraints.

The RAO can deal with many different remedial actions such as those listed in chapter 4.4.

5.5.4 The computation

The RAO will monitor at each step of the calculation the maximum flows, the adequate voltage levels and the maximum voltage phase angle differences defined by the TSOs on all the CNEs. The margin for a given CNE is defined as the difference between the maximum flow/voltage/angle difference allowed on the CNE and the measured flow/voltage/angle difference on the element after simulating a load flow. In the case of under-voltage assessment, the margin is defined as the difference between the measured voltage and minimum voltage allowed on the CNE.

[2] Please be informed that the RAO methodology is under a continuous improvement process. The sections depicted in this chapter reflect current and foreseen status at the time of writing of this proposal.

In the SWE region a positive margin methodology is used, meaning that as soon as all the margins computed with a given TTC value are positive, the remedial actions optimization stops and moves directly to the next TTC value.

5.6 Methodology for the validation of cross-zonal capacity

Once the coordinated capacity calculator has calculated the TTC values for all the calculation scenarios, it provides the concerned TSOs with these values. Each TSO then has the opportunity to validate the TTC values calculated, or to modify them in case the centralized calculation could not see a particular constraint.

Some constraints cannot be monitored by the centralized capacity calculation processes. Those constraints could be, but not limited to, dynamic behaviour of the grid, and unplanned outage that occurs after the deadline to update the inputs.

The TSOs requesting a capacity modification is required to provide a reason for this reduction, its location and the amount of MW to be modified.

Where the two TSOs of a bidding zone border request a capacity modification on their common border, the coordinated capacity calculator will select the minimum value provided. The reason associated to this value will be the one taken into account in all report required by relevant legislation.

5.7 Fallback procedure

5.7.1 Backups and replacement process

For all inputs related to the capacity calculation, standard backup communication process have been defined among SWE TSOs and the coordinated capacity calculator. Where inputs are not available for one of the parties at the expected time, back up procedures are applied until a critical deadline is reached, in order to get the associated inputs and carry on with the original process.

Where a critical deadline is reached and the inputs could not be provided to the concerned party on time, then fallback for NTC values described in section 5.7.2 is applied.

5.7.2 Fallback NTC values

If the SWE TSOs and the coordinated capacity calculator could not complete a coordinated capacity calculation within the allotted time for calculation, the following cases apply:

- For yearly time frame, capacity values from the year ahead calculation of the previous year shall be used.
- For any other time frame, capacity values from the corresponding superior long-term time frame shall be used.

The coordinated capacity calculator uses this values as an input of the validation process described in section 5.6. The TSOs have then the opportunity to adjust these values following the rules of this process.

6 Transparency channels

6.1 ENTSO-E transparency platform

SWE TSOs shall fulfil the obligations from the Transparency Regulation 543/2013.

6.2 Individual TSO websites

According to Article 11.2 of Transparency Regulation 543/2013, each SWE TSO shall publish the NTC values on their respective websites no later than:

- For the year-ahead market time frame, one week before the yearly allocation process but no later than 15th December.
- For the quarter- and month-ahead market time frames, two working days before the quarterly and monthly allocation processes.

6.3 Reports toward SWE NRAs

The coordinated capacity calculator shall, every three months, report all reductions made during the validation of cross-zonal capacity to all SWE NRAs. This report shall include the location and amount of any reduction in cross-zonal capacity and shall give reasons for the reductions.

SWE TSOs shall, upon request, provide to SWE NRAs a report detailing how the value of long-term cross-zonal capacity for a specific long-term capacity calculation time frame has been obtained. The limiting element will be provided to SWE NRAs upon request.

The reasons for reductions can be:

1. dynamic behavior of the grid,
2. unplanned outage that occurs after the deadline to update the inputs and
3. incomplete input.

6.4 ENTSO-E reports towards the Agency

SWE TSOs will participate in the elaboration of the ENTSO-E biennial report on capacity calculation and allocation, which will be provided each two years and updated under request of the relevant authorities, according to Article 26 of FCA GL. For SWE region, this report will contain the capacity calculation approach used, statistical indicators on reliability margins, statistical indicators of cross-zonal capacity, quality indicators for the information used for the capacity calculation and, if appropriate, proposed measures to improve capacity calculation.

After consulting the Agency, all SWE TSOs shall jointly agree on the statistical and quality indicators for the report. The Agency may require the amendment of those indicators, prior to the agreement by the TSOs or during their application.

The Agency shall decide whether to publish all or part of this report.

7 Timescale for the CCM Implementation

7.1 Prerequisites

When the new Capacity Calculation (CC) goes live, the calculation will be performed by the coordinated capacity calculator based on input provided by the TSOs, and finally validated by the TSOs. Some crucial elements in this process are:

a. TSOs' input provision;
b. Common Grid Model (CGM);
c. Industrialized Capacity Calculation Tool.

CGM is not developed by the SWE CCM project, but by a coordinated project of all ENTSO-E TSOs. The industrialized capacity calculation tool is being developed by the coordinated capacity calculator.

All these prerequisites shall be implemented before the "go-live" of the CCM.

While the SWE long-term capacity calculation process is not implemented, the current bilateral long-term capacity calculation will keep working, so long-term capacity values are guaranteed in the region.

7.2 Timeline for implementation of the CCM

The following timeline is estimated for the implementation of the process:

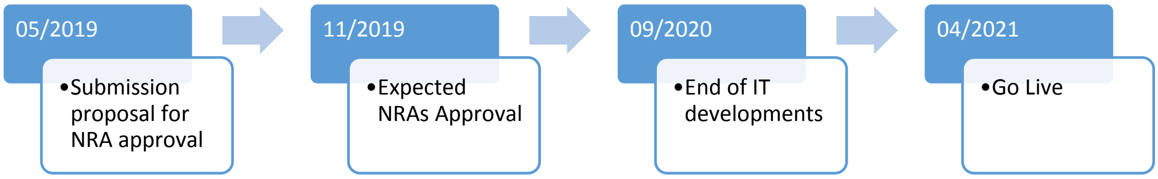

Figure 3 Implementation plan