

## Explanatory Note on individual CWE TSO's increase/decrease process for Intraday Capacity Calculation

<b>Version</b>	2.0
<b>Date</b>	14-12-2021

## Contents

<b>1 Management summary .....</b>	<b>3</b>
1.1 Purpose of the document.....	3
<b>2 Overview Table.....</b>	<b>4</b>
<b>3 Maximum Increase request on borders .....</b>	<b>6</b>
<b>4 Individual Increase/Decrease Process for ID ATC Extraction .....</b>	<b>6</b>
4.1 Amprion .....	6
4.1.1 Increase Process .....	6
4.1.2 Decrease Process .....	6
4.2 APG .....	8
4.2.1 Increase Process .....	8
4.2.2 Decrease Process .....	8
4.3 ELIA.....	9
4.3.1 Increase Process .....	9
4.3.2 Decrease Process .....	9
4.4 RTE .....	10
4.4.1 Increase Process .....	10
4.4.2 Decrease Process .....	10
4.5 Tennet DE .....	11
4.5.1 Increase Process .....	11
4.5.2 Decrease Process .....	11
4.6 Tennet NL.....	12
4.6.1 Increase Process .....	12
4.6.2 Decrease Process .....	12
4.7 TransnetBW .....	13
4.7.1 Increase Process .....	13
4.7.2 Decrease Process .....	13

# **1 Management summary**

## **1.1 Purpose of the document**

The purpose of this explanatory note is to explain the individual increase/decrease process of the ID ATC after flow-based market coupling process as described in the *CWE Methodology for capacity calculation for the Intraday timeframe*.

## 2 Overview Table

TSO	INCREASE PROCESS	DECREASE PROCESS	How many assessment for Increase/Decrease Process
Amprion	<p>No local process to ask for increase requests in operation. Increase requests for Amprion borders are performed by other CWE TSOs/RSCs.</p> <p>Feasibility of increase requests is checked by local tool considering the latest DA and ID CGMs available. Two validations are performed per Business Day using linear sensitivities similar to a Flow Based approach.</p>	<p>Local process to send decrease notifications before increase/decrease deadline is in operation. Decreases of capacities for Amprion borders during the increase/decrease process on request by other TSOs is also possible.</p>	2 (Based on DACF/IDCF)
APG	<p>An automatic import/export increase request is generated internally, if the FB day ahead leftover in combination with the NP is below a certain threshold.</p> <p>APG then assesses this internal increase requests with a load flow tool that uses day ahead models (DACF) and the D-1 market clearing point. The security assessments considers the DA CGM and models the impact of capacity increases via linear sensitivities. The assessment of increase requests for all MTPs takes place when the DACF files are available.</p>	<p>APG does not have a local tool to assess decreases based on schedules or ATCs/day ahead leftovers.</p> <p>After the DACF load flow calculation process to ensure possible increase requests, a unilateral decrease by APG is possible.</p>	1 (Based on DACF)
ELIA	<p>An increase of 300 MW is requested for one or both directions of the Belgian borders. Market directions may be prioritised.</p> <p>2 assessments are performed per business day. Increase requests are evaluated by performing a detailed security analysis for a set of representative timestamp/corner combinations.</p>	<p>No local process to assess decreases before increase/decrease deadline is foreseen at the moment.</p>	2 (Based on DACF/IDCF)

**Explanatory Note on individual CWE TSO's increase/decrease process for Intraday Capacity Calculation**

RTE	<p>Automatic increase request sent in case of FB day ahead leftover in combination with the NP is below a certain threshold on FR-DE and FR-BE frontiers;</p> <p>Feasibility of the increase requests based on some verification of the absence of overload on the French CNEC on the Final flow Based Domain.</p>	Functionality not foreseen to be used on RTE's side	1 (Based on D2CF)
TenneT DE	<p>No local process to ask for increase requests in operation. Increase requests for TenneT DE borders are performed by other CWE TSOs/RSCs.</p> <p>Likely Corners for Increase Requests are checked for likely corners and TenneT DE CNECs via load-flow calculations. In case of an overload the partial acceptance steps are checked for the concerned corner until no overload is detected anymore or the increase request is zero.</p>	No local process to assess decreases before increase/decrease deadline is foreseen at the moment.	1 (Based on DACF)
TenneT NL	Semi-automatic increase request (max feasible value) is sent for the borders BE-NL and DE-NL in both directions.	<p>Based on 2 possibilities a decrease can be applied:</p> <ul style="list-style-type: none"> <li>• <i>Critical Grid Situation (CGS)</i> confirm ENTSO-E definitions.</li> <li>• Unplanned outage in the 380kV grid</li> </ul>	4 to 6 (Based on DACF/IDCF)
Transnet BW	<p>No local process to ask for increase requests in operation. Increase requests for TransnetBW borders are performed by other CWE TSOs/RSCs.</p> <p>Feasibility of increase requests is checked by local tool considering the latest CGMs available. Currently with likely corners approach but planned to be exchanged in the future to a linear sensitivity analysis similar to a flow based approach.</p>	No local process to assess decreases before increase/decrease deadline is foreseen at the moment.	1 (Based on DACF)

### 3 Maximum Increase request on borders

The maximum increase request for borders involving Belgium is 300 MW (e.g. BE <-> FR, BE <-> DE, BE <-> NL), for other border it's 200 MW (e.g. DE <-> FR, AT <-> DE, DE <-> NL).

## 4 Individual Increase/Decrease Process for ID ATC Extraction

### 4.1 Amprion

#### 4.1.1 Increase Process

There is no local process to ask for increase requests in operation. Increase requests for Amprion borders are performed by other CWE TSOs/RSCs.

#### Assessing the feasibility of the consolidating increase requests:

To assess the feasibility of increase requests, two local validations are performed per Business Day using linear sensitivities similar to a Flow Based approach. The assessment is performed by a local tool considering the latest DA and ID CGMs available before starting the assessment which contains all integrated RAs at this moment in time.

1. h01-h09: DACF CGM (D-1)
2. h10-h24: IDCF CGM (D)

The local validation tool computes the sensitivities (zone2zone PTDFs for the CWE ATC borders) and initial loadflows for each critical network element of Amprion in a basecase or n-1 situation.

Possible loadflow changes from zone A to zone B due to increase request and leftover ATCs can be described as

$$\Delta flow_{A \rightarrow B} = PTDF_{A \rightarrow B} \cdot (increase\_request_{A \rightarrow B} + ATC_{A \rightarrow B})$$

Only positive PTDF factors are considered for the dedicated critical network element. Both directions of a critical network element are evaluated seperately.

The additional flow for one critical network element can be determined by the sum of the delta flows of each ATC border

$$additional\ flow = \sum_{j=1}^{number\ of\ ATC\ borders} \Delta flow_j$$

In case the additional flow leads to an overload of a critical network element for a basecase or n-1 situation after respecting a security margin (FRM), the initial increase requests will be reduced until no overloads occur anymore. If no overloads occur, the request is fully accepted.

The reduction of increase requests is performed successively for all borders applying the same partial acceptance steps (200 MW, 100 MW, 50 MW) followed by a full rejection (0 MW). If different increase requests for several borders are made, the increase requests are curtailed to a common level before all borders are reduced. This ensures non- discriminatory among increase requests for all borders.

#### 4.1.2 Decrease Process

Local process to send decrease notification before the increase/decrease deadline is in operation and can be triggered in case of security concerns e.g. unplanned outages. Decreases of capacities for Amprion borders during the increase/decrease process on request by other CWE TSOs is possible.

### **Explanatory Note on individual CWE TSO's increase/decrease process for Intraday Capacity Calculation**

---

However, when network security in Amprion's, RTE's or TransnetBW's network is endangered, the operator at Amprion's control centre may decide at any time to reduce capacities. When another TSO informs Amprion's control centre via telephone about capacity decreases, Amprion's operator will decide whether or not to apply a capacity reduction.

## **4.2 APG**

### **4.2.1 Increase Process**

Capacity increases are only requested by APG for the Austrian-German border.

An import/export increase of 200 MW is generated internally until 6 pm D-1, if the FB day ahead leftover in combination with the NP is below a certain defined threshold for import/export. These thresholds are based on historical data and can vary due to seasonal effects or based on new knowledge gained in the course of using the increase / decrease process.

APG then assesses this internal increase request with a load flow tool that uses day ahead models (DACF) and the D-1 market clearing point. The security assessments considers the DA CGM and models the impact of capacity increases via linear sensitivities. Remedial actions are taken from DACF, acceptance criteria is n-1 security.

In detail, for every APG CNEC and MTU, the maximal possible increase (for import/export) is calculated by the formula:

$$Inc_{max\ i} = \frac{F_{max\ i} - F_{DA\ i}}{PTDF\ i}$$

*Inc<sub>max i</sub>* ... maximum possible increase on a certain CNEC i

*F<sub>max i</sub>* ... maximum thermal capacity of a certain CNEC i

*F<sub>DA i</sub>* ... Flow on a certain CNEC i after FB DA MC

*PTDF<sub>i</sub>* ... Power Transfer Distribution Factor for a certain CNEC i for the Border DE/AT based on DACF

After that, the CNEC with the smallest *Inc<sub>max</sub>* of a MTU which had an aggregated increase request  $\neq 0$  MW defines the maximum increase for this MTU by the following formulas:

$200\ MW < Inc_{max} \rightarrow$  accepted increase = 200 MW

$100\ MW < Inc_{max} < 200\ MW \rightarrow$  accepted increase = 100 MW

$50\ MW < Inc_{max} < 100\ MW \rightarrow$  accepted increase = 50 MW

$Inc_{max} < 50\ MW \rightarrow$  accepted increase = 0 MW

At the end of the process, the operators are in charge to finally accept or decline the import/export increase for every MTU, which was provided by the local tool.

### **4.2.2 Decrease Process**

APG does not have a local tool to assess decreases based on schedules or ATCs/day ahead leftovers.

After the DACF loadflow calculation process to ensure possible increase requests, a unilateral decrease by APG is possible.

## **4.3 ELIA**

### **4.3.1 Increase Process**

#### **Increase requests**

Capacity increases are requested by Coreso on behalf of Elia. An increase of 300 MW is requested for one or both directions of the Belgian borders. Market directions may be prioritised.

#### **Assessing the feasibility of the consolidated increase requests**

The local validation of CWE ID ATC increase requests is performed by Coreso on behalf of Elia. 2 assessments are performed per business day:

1. Evening Process:
  - Increase requests for period [00h00-09h00] are evaluated
  - Assessment is based on DACF information.
  - Results are sent to CMT before 21h45 in D-1.
2. Nightly Process:
  - Increase requests for period [09h00-24h00] are evaluated.
  - Assessment is based on IDCF information.
  - Results are sent to CMT before 05h30.

The approach for both processes is the same:

#### Step 1: Selection of representative timestamps/corners

Considering the already allocated capacity, the initial ATC and the ID ATC increase requests per oriented CWE border, a set of representative timestamp/corner combinations is determined. Different sets of likely corners are evaluated. This is done by making use of sensitivity coefficients which reflect the impact of each CWE commercial exchange on the physical flows in the network.

Corner variations consider both initial ATC and ID ATC increase requests. If the initial ATC is very high for a specific border, it will be capped to a more realistic value based on the ID nominations observed in the past. This is done to avoid being too conservative in the assessment of the ID ATC increase requests.

The selection of the representative timestamp/corner combinations is cross- checked with the Elia operator.

#### Step 2: Detailed security analysis

A detailed security analysis is performed for the selected timestamp/corner combinations. The same set of acceptance criteria and remedial actions than the ones used locally at Elia for the DACF/IDCF processes is considered. Both preventive and curative RA are taken into account.

#### Step 3: Validation of results

Coreso calls the Elia operator to present the results. Overloaded CNEC pairs are reported for each timestamp/corner combination which was analysed. The Elia operator can overrule the result in specific situations (i.e. incident has occurred, adequacy issues, voltage issues, ...). Based on the studied timestamps, the ID ATC increase requests for the full period are either accepted or rejected.

#### Step 4: CMT upload

Coreso uploads the Elia feedback for the different ID ATC increase requests to the CMT.

In exceptional situations, Elia can ask Coreso to split the period of the Evening Process or the Nightly Process into 2 sub-periods.

### **4.3.2 Decrease Process**

No local process to assess decreases before increase/decrease deadline is foreseen at the moment.

## 4.4 RTE

### 4.4.1 Increase Process

*The following process is operated by CORESO on behalf of RTE*

- ✓ If the ATC FR<>BE is below 500 MW, a request for increase of 300MW is sent, nothing otherwise
- ✓ If the ATC FR<>DE is below 1000 MW, a request for increase of 200MW is sent nothing otherwise

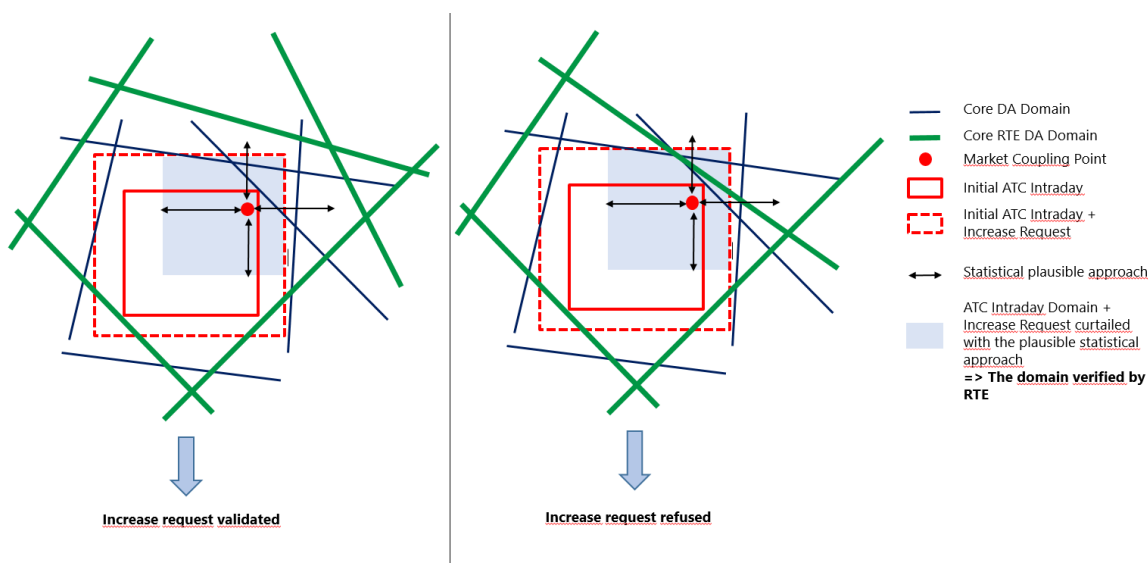
#### Assessing the feasibility of the consolidating increase requests:

The requests are tested on the Core Flow Based Domain containing only the RTE CNECs, the final PTDF and the Remaining Available Margin (RAM\_ID) taken into account for the ID ATC extraction process of Core Day Ahead, therefore this process is based on the D2CF CGM used for the Core Day Ahead process. When Extended LTA inclusion is "on", the LTA margin is recomputed and taken into account in the RAM\_ID, to ensure that RTE provide an assessment with the inclusion of the LTA.

The ATC domain with the increased capacity is combined with a statistical plausible approach. This ATC domain is curtailed to the maximum activity already observed in the ID process by Market Participants.

If, on the corners of this ATC domain combined with statistics approach, no French CNECs are overloaded therefore the increase requests are accepted, otherwise there is a rejection.

The square in light blue represents the ATC domain combined with a statistical plausible



approach. This statistical plausible approach is the maximum activity by market parties observed per frontier over a certain period of time.

The domain delimited by the green CNECs represents the Final FlowBased domain containing only the RTE CNECs.

On the left, the light blue domain is included inside the RTE Green domain so the requests are accepted, on the right, the requests are rejected because some French CNEC will be overloaded on some corners of the light blue domain.

The assessment of consolidated increase/decrease requests is done once per day, in the evening of the D-1.

### 4.4.2 Decrease Process

This functionality is not foreseen to be used on RTE's side

## **4.5 Tennet DE**

### **4.5.1 Increase Process**

There is no local process to ask for increase requests in operation. Increase requests for TenneT DE borders are performed by other CWE TSOs/RSCs according to the agreed rules about maximum increases.

The increase requests are assessed starting from DA CGM and the D-1 clearing point. Maximum utilization of potential ID ATCs (total of initial ATCs, decrease notifications and increase requests) is simulated via CWE GSKs for the most likely combinations of simultaneous exchanges on all five borders (hereafter referred to as likely corners). Security assessment is performed for all defined likely corners using AC load flow security analysis and CNECs of TenneT DE. If the network security assessment fails for at least one likely corner, the PTDF of each border is checked against a threshold (currently 5%) and the security assessment is repeated with reduced increase requests for those borders with PTDF higher than the threshold in order to check for the possibility of partial acceptance. Borders with PTDF lower than the threshold remain unchanged to not prevent increases on non-impacting borders for concerned CNECs.

The assessment of increase requests takes place for all MTPs simultaneously once per day using the merged DA CGMs.

Note: there might be changes needed due to ALEGrO, i.e. 6 borders instead of 5, increasing to corners further. The impact assessment is not finalized yet.

### **4.5.2 Decrease Process**

No local process to assess decreases before increase/decrease deadline is foreseen at the moment.

## **4.6 Tennet NL**

### **4.6.1 Increase Process**

TenneT NL sends every day an increase request for the borders BE-NL and DE-NL in both directions. By default it's always the maximum capacity increase per border and direction. The request only deviates if a decrease situation occurs (see Decrease Process). After D-1 18:00 TenneT NL validates the increase request from each border via a TTC (Total Transfer Capacity) computation. The loadflow application calculates the max feasible transfer capacity per border and direction against the following components:

- Most recent Common Grid Model (CGM), DACF or IDCF
- Newest forecast information from market parties
- Only 380kV Critical network elements from the Dutch are taken in to account (impact only on own grid)
- Left over capacity from Flowbased DA (Intraday ATC)
- Validations steps with rounding (50MW)
- Depending on the grid situation, TenneT NL validates min. 4 times till 6 times per business day. It respects the gate opening and closures timing from the ID CMT.

### **4.6.2 Decrease Process**

Based on 2 possibilities a decrease can be applied:

- *Critical Grid Situation* (CGS) according to ENTSO-E definitions.
- Unplanned outage in the 380kV grid or on Dutch HVDC interconnector(s)

If one of the possibilities occur before D-1 18:00 than the grid operator analyses the unexpected grid situation. Based on the outcome, the operator can decide to reduce the left-over intraday ATC till it's minimum capacity.

The Intraday ATC without virtual capacity is seen as the minimum capacity which can be given to the market based on the information available.

The  $\Delta flow_{A \rightarrow B}$  will be provided to the ID CMT as decrease request.

if  $ATC(\text{without virtual capacity})_{A \rightarrow B} > ATC(\text{left over capacity})_{A \rightarrow B}$  then

$\Delta flow_{A \rightarrow B} = 0$  else

$$\Delta flow_{A \rightarrow B} = -(ATC(\text{left over capacity})_{A \rightarrow B} - ATC(\text{without virtual capacity})_{A \rightarrow B})$$

## **4.7 TransnetBW**

### **4.7.1 Increase Process**

There is no local process to request an increase of capacity in operation. Increase requests for TransnetBW borders are performed by other CWE TSOs/RSCs.

Assessing the feasibility of the consolidating increase requests:

For assessing the feasibility of the increase requests, local validations are performed per Business Day with a load flow tool which uses Day Ahead Common Grid Models which contain all RAs known at this moment in time as basis. Shortly after the CGMs are available the ID assessment process starts with a simultaneous check of the increase requests if they can be granted. In case a full acceptance is not possible, the process is repeated with the partial increase requests according to the common rules.

The current process will be exchanged with a new process based on linear sensitivities similar to the flow based process. The calculation of PTDFs is based on a common grid model. The local tool calculates the zonal PTDF at the CWE borders for the base case and relevant n-1 cases.

The load flow changes from zona A to B with the increase request  $request_{A \rightarrow B}$  and the available transfer capacity on the border  $ATC_{A \rightarrow B}$  can be described as:

$$\Delta flow_{A \rightarrow B} = PTDF_{A \rightarrow B} \cdot (request_{A \rightarrow B} + ATC_{A \rightarrow B})$$

During the calculation positive PTDF Factors are considered to determine the maximum influence on each CNE. At the end of the process the individual influences are added up to gain the total additional flow for each critical network element with a certain contingency (CNEC)

$$\Delta TotalFlow = \sum_{j=1}^{number\ of\ ATC\ border} \Delta flow_j$$

If the total additional flow overloads a given CNEC the initial request will be reduced until no CNEC is overloaded.

The reduction of increase requests is performed successively for all borders applying the same partial acceptance steps (200 MW, 100 MW, 50 MW) followed by a full rejection (0 MW). If different increase request for several borders are requested, the increase requests are curtailed to a common level before all borders are reduced. This prevents discrimination among increase requests of different borders.

### **4.7.2 Decrease Process**

No local process to assess decreases before increase/decrease deadline is foreseen at the moment. However, when network security is endangered on TransnetBW grid or surrounding borders which could be eliminated by a decrease of ID ATC on the border DE/LU-FR, DE/LU-AT the TransnetBW operators may inform Amprion or APG operators that a decrease of capacities is necessary to ensure grid security.