Publication Handbook for Flow-based Outage Impact Calculations on the NUCS platform

Version 0.3

16/09/2026

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Abbreviations:

API	Application Programming Interface
BZ	Bidding Zone
CCC	Coordinated Capacity Calculation
CCR	Capacity Calculation Region
CNE	Critical Network Element
CNEC	Critical Network Element with Contingency
EIC	Energy Identification Codes
FB	Flow-Based
FBMC	Flow-Based Market Coupling
GUI	Graphical User Interface
HVDC	High Voltage Direct Current
LT	Long-term
LTCC	Long-term Capacity Calculation
M-1	Month-ahead
NORMA	Nordic Market Availability
NP	Net Position
NTC	Net Transfer Capacity
NUCS	Nordic Unavailability Collection System
OPC	Outage Planning Coordination
PE OPC	Pan-European Outage Planning Coordination
PTDF	Power Transfer Distribution Factor
RAM	Remaining Available Margin
TSO	Transmission System Operator
UMM	Urgent Market Message
VBZ	Virtual Bidding Zone
Y-1	Year-Ahead

Version Control			
0.1	30.10.2025	LTCC Project	First Version
0.2	17.04.2026	LTCC Project	Second Version
0.3	16.09.2026	LTCC Project	Third Version

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PURPOSE & SCOPE OF THIS HANDBOOK

This handbook defines the target-state framework for the publication of flow-based outage impact calculations under the Nordic Market Availability (NORMA) business process and the NUCS platform. It describes the setup for publishing flow-based outage impact calculations and provides transparency on the methodology, data structures, and access mechanisms supporting enhanced outage-related information in the Nordic Capacity Calculation Region.

The functionalities described represent the full target scope for the current development ambitions and will be implemented progressively. The initial release, planned for the second half of 2026, prioritises core capabilities required to ensure alignment with the flow-based capacity calculation framework and to support market transparency and operational readiness. For providing full transparency towards the market participants, several disclaimers are listed in this handbook outlining the limitations of the first release.

Subsequent release(s) will introduce additional enhancements to further improve data quality, data usability, granularity, and operational efficiency. This phased implementation approach ensures timely availability of essential functionality, while allowing for continuous refinement based on operational experience and stakeholder feedback.

1. Introduction

In October 2024, the Nordic Capacity Calculation Region (CCR) went live with Day-ahead Flow-Based Market Coupling (FBMC), marking a shift in how available transfer capacity is calculated and allocated. Previously, capacity was calculated using the Net Transfer Capacity (NTC) method. This transition enhances transparency and efficiency, enabling more effective utilization of the Nordic transmission grid. However, Urgent Market Messages (UMMs) are still being published under the NTC framework which no longer accurately represent actual capacity reductions in the flow-based world.

To address this gap, the Nordic Market Availability (NORMA) Business Process has been introduced, providing the calculation of capacity impacts of outages in a flow-based context. The results of this process are published on the NUCS platform, together with other outage-related UMMs. Previously, both the business process and the platform were referred to NUCS, and for the reason of clear distinction, the name of the business process has been changed. The NORMA Business Process aims to improve the quality and relevance of UMMs by publishing estimations of impact on capacity from unavailability of transmission infrastructure using flow-based parameters, providing insights to the market in addition to established NTC values.

This handbook introduces the technical foundations for calculating the flow-based impact of outages while outlining limitations of the initial release (chapter 3), provides a detailed walkthrough on the new FB publication format on the web GUI (sections 4.1-4.4), and includes a description of new endpoints for querying the FB publications via the NUCS API (section 4.5). A sample outage calculation of the NORMA process is presented in section 4.6. Finally, the Appendix provides a detailed breakdown of the XML formats of the new FB publications as received from the NUCS API.

Please note that the FB publications summarised in this handbook are expected to begin in 2nd half of 2026. While the initial release is planned for September 2026, it is expected that there will be gradual improvements to the process and the full features explained in this handbook will be rolled out gradually.

2. Legal basis

The publication of capacity-related information, including outage impacts, is primarily governed by two European regulations that safeguard transparency and integrity in the electricity market:

- **Transparency Regulation (EU Regulation 543/2013)** – requires TSOs to publish information on planned and unplanned outages of transmission infrastructure when these affect cross-zonal capacity by 100 MW or more. Articles 10(1), 10(2), and 10(4) specify that details such as the cause, location, and expected impact of outages must be published, ensuring that market participants have timely and accurate data to support trading and system operations.
- **REMIT 2.0 (EU Regulation 2024/1106)** – reinforces the obligation to disclose inside information that could affect wholesale energy prices. Under Article 4, market participants must publish both planned and unplanned transmission unavailability promptly, accurately, and through recognized platforms (e.g., ENTSO-E, NUCS). REMIT 2.0 also strengthens requirements for timeliness, correctness, and accessibility of information.

The **Nordic Unavailability Collection System** (NUCS) platform is a free service for collection of data on unavailable production, transmission and consumption capacity in the Nordic power system for publication on the ENTSO-E transparency platform. The NUCS platform website also publishes the collected data in addition to data retrieved from ENTSO-E to give a complete overview of unavailable capacity in the Nordic power system. In addition, NUCS platform offers services for compliance with REMIT art. 4, disclosure of inside information.

3. Technical description

This chapter introduces the technical foundations for calculating the flow-based impact of outages. First, the calculation process is elaborated in section 3.1, which is followed by the time horizons and frequency of the NORMA FB publications in section 3.3. The chapter further explains which outages will be covered in section 3.3 and the difference between NTC values and net positions published for the FB impacts in section 3.4. The chapter concludes with the detailing of existing limitations that the market participants need to be aware of in section 3.5.

3.1 NORMA process overview

Figure 1 presents the high-level overview of the NORMA Business Process carried out by Nordic RCC in collaboration with the TSOs, delivering the flow-based impacts of Transmission Unavailability. As illustrated in the figure, the NORMA process calculates the impacts of an outage on the long-term grid models (CGMs) and flow-based domains delivered in the Y-1 and M-1 LTCC processes. This is achieved by (re-)executing the FB capacity calculation process after a contingency (outage) was applied to the grid model. This is referred to as *the Grid availability calculation process*. This step is followed by the *Grid unavailability calculation process* where the resulting contingency-adjusted FB domain is compared to the 'intact' LTCC M-1 or Y-1 FB domains via their associated minimum and maximum available net positions (per bidding zones). The reduction (or, in some cases, increase) of the bidding zone-level minimum and maximum net positions compared to the reference LTCC case quantifies the grid unavailability. After the TSOs validated the results, the FB outage impacts are published on the NUCS Platform. This process is run on different timeframes, following the W-1/M-1 outage planning coordination (OPC) process.

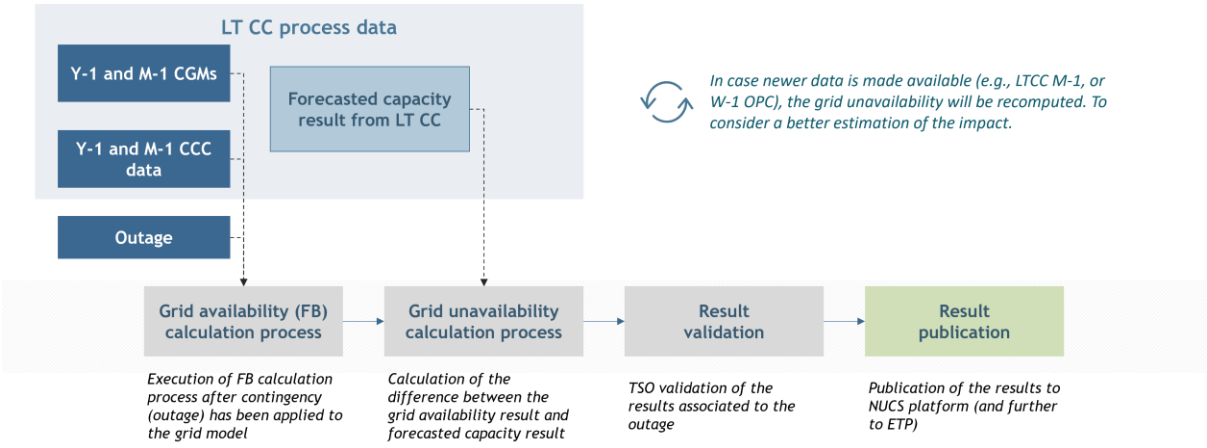

Figure 1 – NORMA high-level business process.

Note that always the latest available long-term grid model (as well as the latest available LTCC FB domain as reference case) is used to calculate the impact of an outage over a time period. To illustrate this point, the reader is referred to the following exemplary case illustrated in Figure 2: Let us consider an outage is published on January 2, lasting from January 15 until March 15. At the time of publication, the M-1 LTCC grid model is already available for the month of January and thus used for calculating the outage impact in this month. For the remainder of the outage period, the Y-1 LTCC results are used to quantify the impact. Specifically, the monthly minimum FB domain is based on the Winter scenario for February, and the monthly minimum FB domain of the Spring scenario is taken as a reference for the remaining period in March.

It is worth mentioning that outages lasting for the whole LTCC timeframe are already considered in the *intact* LTCC reference. For outages extending beyond the available LTCC reference domain, such as into the next calendar year with no available LTCC Y-1 calculations, their impact is only assessed for the current calendar year covered by the existing reference domain.

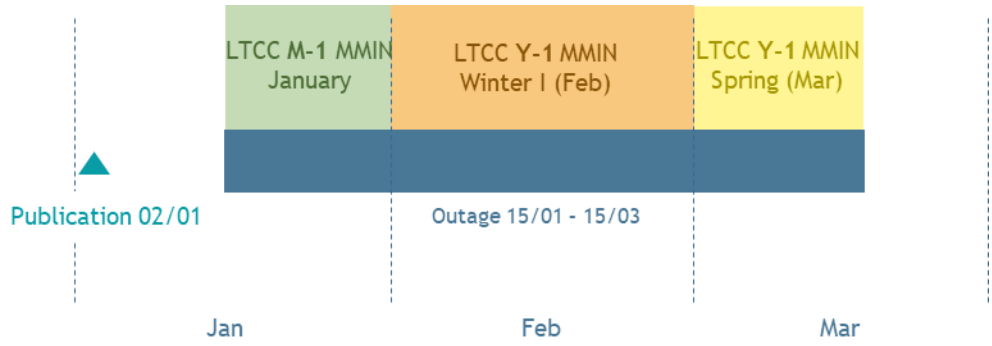

Figure 2 – Illustration of the different reference LTCC domains used for an outage lasting through multiple months.

The monthly minimum FB domain is calculated as the intersection of the resulting constraints of the peak and valley scenarios, which are detailed in the already published LTFB handbook. The peak and valley scenarios represent high load and low load scenarios, and thus the monthly minimum FB domain is based on the combined set of constraints, depicting the most limiting constraints for the month. The monthly minimum FB calculations are derived from the original peak and valley scenario FB results which are published on the Nordic RCC website. The monthly minimum FB calculations will be published as part of the LTFBA go-live planned for October 2026.

The NORMA Business Process entails the calculation of the impact of individual outages as well as the impact of the combination of simultaneously occurring outages. The next chapter 4 details how the results for these two publications are displayed on the NUCS platform. The FB impact of individual outages will be provided

in the form of a FB unavailable capacity page, while the combination of outages will be provided as FB domain forecasts for different time horizons.

3.2 Time horizons and publication frequency

The NORMA Business Process will follow in the target-state all timelines of the Pan-European Outage Planning Coordination Process (PE OPC), which includes Y-1, M-1 and W-1 time horizons. The FB calculated outage impact for individual outages will be presented in an *Unavailable FB Transmission Capacity* table on the NUCS platform according to the PE OPC information. Combined outage impacts are calculated after each OPC process is finalized and visualized as a static view as *Forecasted FB Domains* (see section 4.2). This means the yearly combined outage calculation is performed after the Y-1 OPC process concludes. Once the monthly (M-1) calculation is executed, it provides a more refined and up-to-date forecast, outranking the yearly estimate with improved accuracy. The same applies for the weekly (W-1) calculation that provides an updated view compared to the monthly view. It is important to note that the W-1 process continues to use the LTCC M-1 domains, potential updates in this process can hence only occur from revising the outage plans. An overview of the NORMA publication timings for each horizon is presented in Figure 3.

While the initial release of this process in 2026 focuses on W-1/M-1 processes, it is expected that the results of the Y-1 process will be published for the first time in December 2027 for the calendar year 2028.

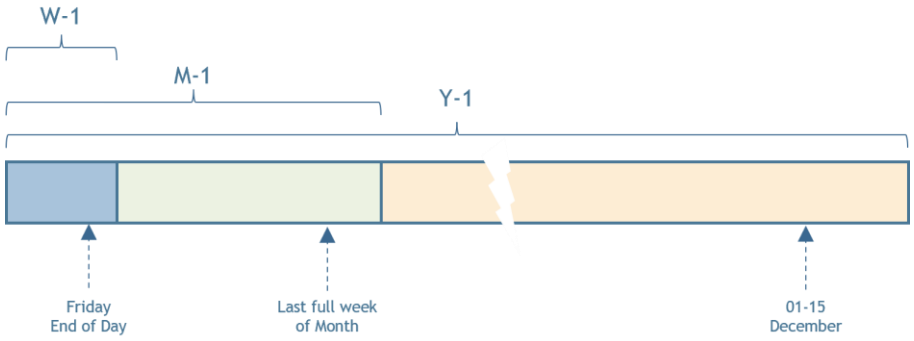

Figure 3 – Overview of NORMA business process publication timings on the NUCS platform.

3.3 Outages involved in NORMA FB publications

The initial scope of the NORMA FB publications covers Transmission Unavailability in the Nordic CCR, focusing on planned outages and unplanned outages that persist for a longer period. Any relevant Transmission Unavailability will be published with their NTC impacts. The initial release focuses AC lines or line segments, HVDC lines, transformers and compensation devices. UMMs for unplanned outages as well as for

outages of other asset types will as a baseline be published only with their NTC impacts.

The W-1 process will consider outages that either start, end or go through the next considered week (Sat-Fri). The M-1 process will calculate the FB impact for outages that either start, end or go through the period from the next month onwards until the end of the calendar year. W-1 forecasted FB domain publications cover Saturday to Friday, while M-1 forecasts cover the next calendar month. If an outage is lasting the entire scenario time frame (per season for Y-1 base case and per month for M-1 base case), it will already be included in the LTCC M-1 'intact' grid publications and thus the individual outage impact can only be provided initially based on the Y-1 LTCC reference domains. As such, the impact of long-lasting outages may be represented differently for individual and overlapping outage publications: For individual outages the impact can only be captured based on the Y-1 reference domain, while for overlapping outages, the updated M-1 reference domains may be used.

3.4 Net positions

Net Positions (NPs) represent the maximum import/export capability of each bidding zone within the FB domain constraints. They differ significantly from traditional NTCs:

Table 1 - Difference between NPs and NTCs.

Concept	Definition	Key Difference
Maximum Available NP	Assumes all other bidding zones have zero NP; shows max import/export for one bidding zone	FB-based, dynamic, scenario-dependent
Reference Case	NPs derived from LTCC domain ('intact' grid)	Used as baseline for comparison
Outage Case	NPs derived from outage-adjusted FB domain	Shows reduction due to outage

The difference between the reference case and the outage case defines the *grid unavailability* for each bidding zone. A visualisation of the intact grid capacity, grid availability and grid unavailability is shown in Figure 4.

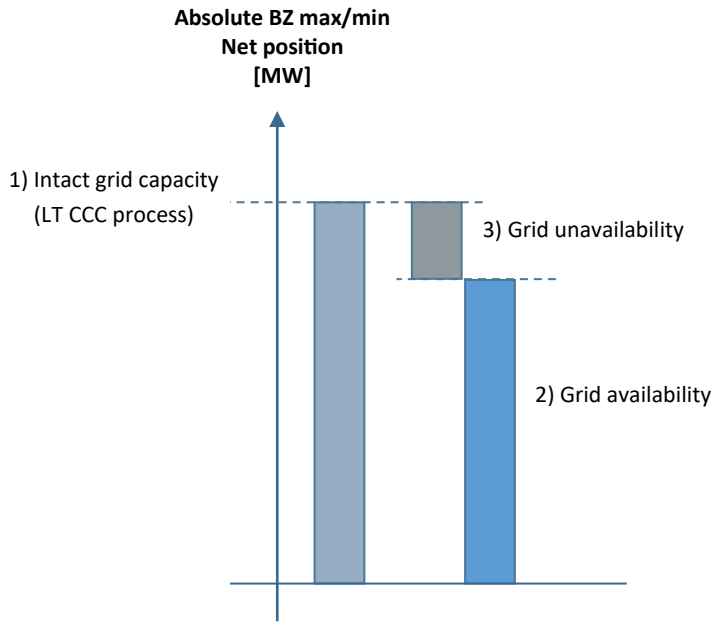

Figure 4 – Visual representation of the relationship between intact grid capacity, grid availability and grid unavailability. A grid unavailability may be positive/negative thus decreasing/increasing the grid availability.

The export capability of a bidding zone is represented by the **maximum NP,** which is a **positive value**, while the import capability is represented by the **minimum NP**, which is a **negative value**.

3.5 Disclaimers regarding the NORMA process

The current scope of the process for the go-live in 2026 has certain limitations that the market participants need to be aware of, both on the technical and procedural side. Market participants should be aware of these limitations when making market effective decisions. Further improvements can be expected over time with associated communication towards the market.

Provision of additional outage-related constraints

In the first go-live version of this process, not all Transmission System Operators (TSOs) are currently being able to provide outage-specific CNECs for the outage definitions. Without outage-specific CNECs, the FB network constraints cannot be accurately represented for some outage calculations. Consequently, the outage-adjusted FB domain may differ from the Day-ahead FB domain, as potentially binding outage-related constraints may not be captured.

The TSOs and Nordic RCC are working on improving this situation in subsequent releases of the process as soon as possible after go-live. This includes further improvements in outage-related modelling and provision of relevant constraints. Any

relevant communication will be done via the typical channels when improvement can be expected.

Supported element types

At this stage in the process, calculations of outage impact are limited to a few supported types of elements, particularly transmission lines (including HVDC associated tielines), transformers, and compensation devices. Due to technical limitations, the impact of, e.g., busbar outages will not be part of the calculations for the time being. Elements for which no impact can be calculated (e.g. busbars) will not have an associated FB outage impact publication, and will also not be part of the forecasted FB domain for the different time horizons. The TSOs will continue to publish NTC UMMs for all applicable outages. If a FB message exists for a specific outage definition, a link between the NTC UMM and FB message is expected to be established, see Section 4.3. For the calculations of the forecasted FB domains, the list of affected assets is detailed on the NUCS platform.

Scenario representation

The reference scenarios cannot fully capture the natural variation in network loading, generation dispatch and renewable production forecasts, as well as consumption patterns. This means that the published results should be understood as indication of expected conditions under the respective reference scenario.

In the Day-Ahead Flow-based (DAFB) capacity calculation process, available capacity is computed on a reference scenario that is aligned with the expected outage state of the grid. The NORMA business process methodology is currently limited in providing an equivalent alignment across all outage impact calculations. Fundamentally, without such outage-specific alignment, it is possible that the capacity calculation cannot establish a reference state with sufficient remaining available margins to accommodate cross-zonal exchanges for the grid outage situation. Thus, the capacities can deviate from what the market participants would typically observe in the DAFB process.

Reconnection of assets

While NTC UMMs continue to reflect the reconnection of assets, e.g. during nighttime or on weekends, this information will not be reflected in the FB messages on the NUCS platform. The FB messages will solely rely on the start and end date of the outage definitions provided by the TSOs and will not show the change of impact during potential reconnection of the assets. The reference for the calculations in this process will be the LTCC M-1 or Y-1 FB domain. In case of reconnection, the most

up-to-date information available to the market participants is the associated intact LTCC reference.

Validation of outage results

Prior to publication of NORMA business process results on the NUCS platform, TSOs perform a validation step to assess whether the calculated flow-based impacts are aligned with their operational expectations and approve the corresponding results.

At the time of go-live, there will be limited insights to the outage domains for the TSO operators, with ongoing enhancements aimed at further strengthening visibility into outage-adjusted FB domains, including constraints and key FB parameters. While the initial release may not yet provide full transparency across all elements, continuous improvements are already underway to expand validation capabilities and to support operators in their validation effort. In the initial release, the validation functionalities for the TSOs are limited and do not provide full insight into the specifics of the FB domain. Hence, the results may include unexpected situations that are not uncovered in the validation process, particularly in cases where outage-specific constraints or outage-related modelling information are not part of the input data.

The published results should therefore be understood as indicative forecasts of flow-based domains and bidding zone net positions under outage conditions, supporting market preparedness and analysis. As validation capabilities continue to mature, the robustness and usability of these outputs will further improve.

Impact of failed flow-based outage calculations and connection to NTC UMMs

In the initial release of the publications, there may be exceptions where an NTC UMM does not have a corresponding FB message, and vice versa. A one-to-one relationship between NTC and FB messages is therefore not guaranteed. For example, if a flow-based calculation fails, e.g. due to input data quality issues or computational errors, only the NTC message may be available on the NUCS platform. Conversely, if an outage does not require an NTC message under REMIT rules, such as an internal outage, an FB message may exist without a corresponding NTC message.

The TSOs will continue to publish NTC UMMs for all applicable outages subject to REMIT requirements. If a FB message exists for a specific outage definition, a link between the NTC UMM and the FB message is created.

4. Publication data

This chapter introduces the updated data publication format associated with the new NUCS platform FB publication stream for unavailability of transmission grid infrastructure. Sections 4.1 and 4.2 provide a walkthrough of the updated format on the web GUI, with section 4.1 touching upon the newly introduced Unavailable FB Transmission Capacity page and 4.2 further elaborating on the concept of Forecasted FB domains. Sections 4.3 and 4.4 explain the coexistence of both NTC and FB publications and the corresponding version control that exists between them. Section 4.5 introduces additional endpoints for retrieving the new NUCS FB publications via the NUCS API. Finally, section 4.6 provides a supplementary illustration of a sample outage calculation.

4.1 Individual outage publications

Figure 5 showcases the new *Unavailable FB Transmission Capacity* page to accommodate the FB publications for individual outages, with the numbered changes explained below. Please note that the current *Unavailable Capacity* page remains largely the same for NTC publications, except for two additional columns introducing a consistency check with the FB messages and a direct link to the corresponding FB message (see further details in section 4.4).

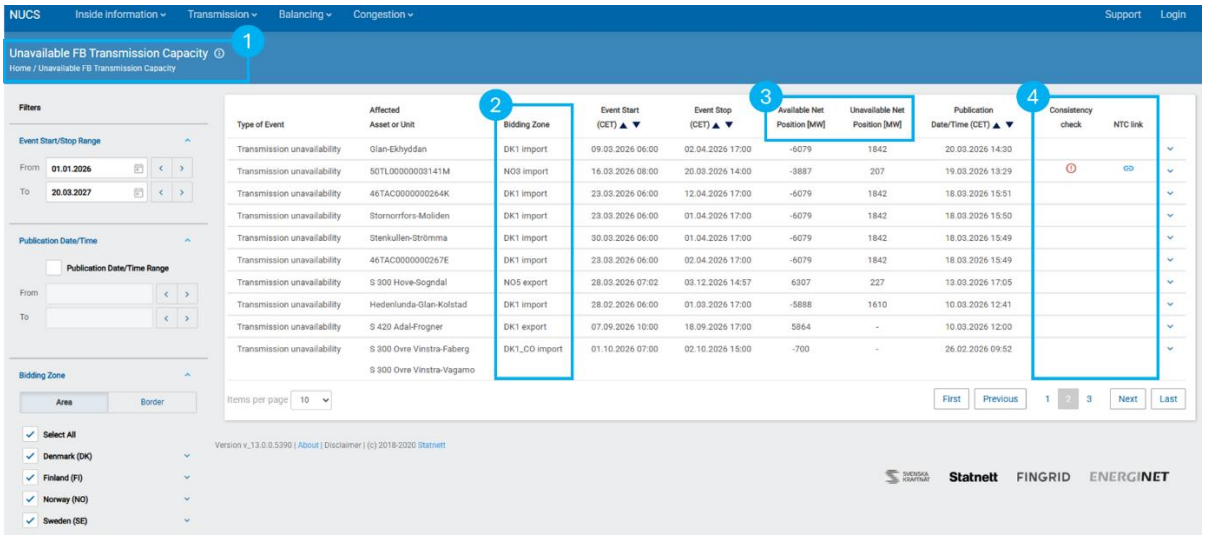

Figure 5 – New Unavailable FB Transmission Capacity (UMM) page.

1. The page header is updated to reflect a new UMM page dedicated to FB publications only. This page is listed in the dropdown menu of *Inside Information* in the header tab.
2. Instead of listing the impacted (directed) bidding zone borders, the impacted **bidding zone(s)** are mentioned with their 'import/export' directions,

representing the minimum and maximum available net positions of the BZ (maximum NP is the export side, minimum NP is the import side). **Note:** In the GUI only unavailability above 100 MW is listed for easier readability. In the corresponding IG-182 file, all unavailability is reported.

3. In the **titles of these columns**, the word 'capacity' is changed to reflect net positions. Specifically, the GUI on the UMM page will feature a direct glance on Available Net Position [MW] and Unavailable Net Position [MW].
4. Two additional columns are added to display a consistency check with already existing NTC messages. Any discrepancies are marked with an exclamation mark to highlight differences. A link to the associated NTC messages is directly available.

When selecting the dropdown of a FB publication for a detailed view, this view is also adapted for the FB format accordingly, which is showcased in Figure 6. The numbered highlights of the changes in the detailed view are explained below. Note that the detailed view for NTC publications remains largely unchanged, with the exception of an additional link to the FB message.

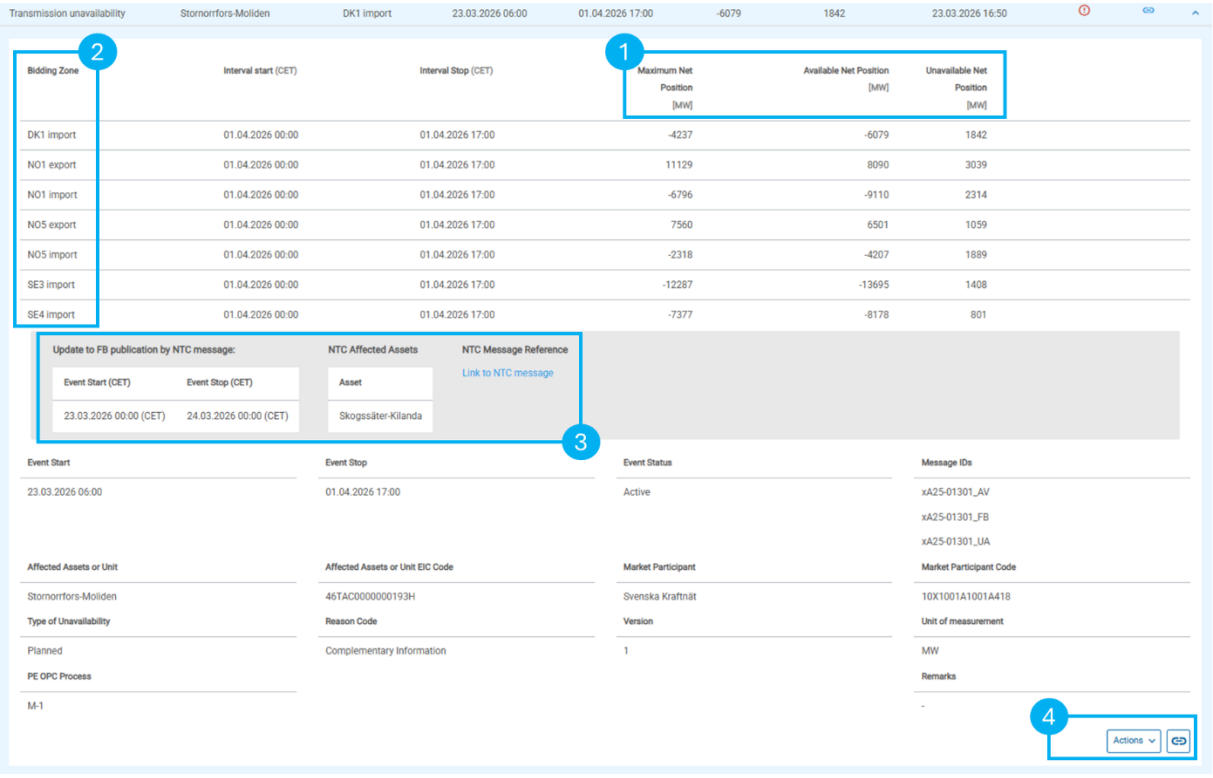

Figure 6 – Detailed FB impact view for a Transmission Unavailability.

1. The **column titles** here are updated to 'Maximum Net Position [MW]' (instead of 'Installed Capacity'), 'Available Net Position [MW]' (instead of 'Available

Capacity') and 'Unavailable Net Position [MW]' (instead of 'Unavailable Capacity').

2. Instead of displaying a specific Bidding Zone Border direction, (e.g., DK1 > DK2), the total available **Bidding Zone** import and export will be mentioned**.** Each row represents an import or export availability in a specific BZ. **Note that there will be as many rows for a BZ import/export as there are months impacted by the outage (a different reference FB domain is available for each month based on the LTCC process and hence one 'set' of min/max net positions impacts will be delivered per month).** This is also illustrated in Figure 7.
3. In case of any discrepancies with the existing NTC message, e.g. due to updates to the event start/stop date or the list of affected assets, these are clearly highlighted in the expanded view and a direct link to the reference NTC message is available.
4. The *Action* button provides the opportunity to see the publication history and **download** both the **unavailable** and **available bidding zone NP impacts** (IG-182 and IG-184) as well as the **FB domain** (IG-183 CriticalNetworkElement_MarketDocument) file for the outage publication.

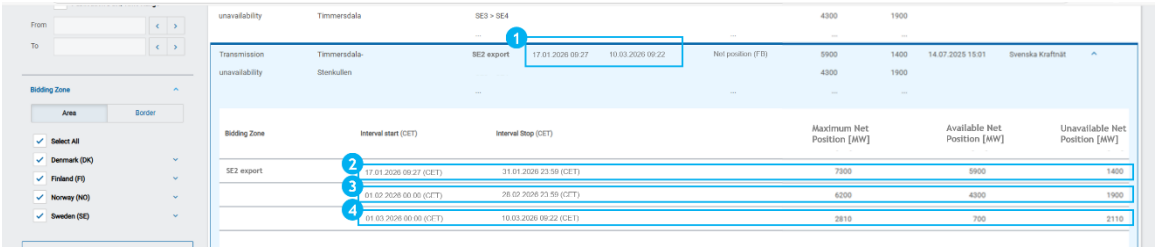

Figure 7 – Example of outage impact over multiple months.

Figure 7 illustrates the fact that for outages spanning through multiple months, a specific bidding zone impact (SE2 export in this example) is delivered for each month. In the example, the event start date is in January 2026 and the event end date is in March 2026 (see marker *1*). This means three different months are affected by the outage and hence three different FB domains were calculated, resulting in three different sets of net positions: see markers *2, 3* and *4*. As the underlying data for scenarios are identical (representations for winter, spring, etc. in the LTCC publications), it might not always be the case that each month has a different unavailability listed.

4.2 Forecasted FB domains

The following section details the new Forecasted FB Domains dashboards that will exist in addition to the Forecasted Transfer Capacities dashboards. The Forecasted FB Domains dashboards which will be available in the dropdown menu *Transmission*

in the header tab consist of separate pages for the week-ahead (W-1), month-ahead (M-1) and year-ahead (Y-1) time horizons. On these dashboards, forecasted minimum/maximum available net positions of the respective bidding zones are displayed (instead of NTC values per bidding zone borders) along with the downloadable FB domains for each time horizon.

Figure 8 illustrates the Forecasted FB Domains dashboard for M-1:

- The 'Event Start/Stop' selection allows for browsing through all the historical forecasts for the previous month periods up until the latest M-1 period.
- The 'Bidding Zone' section allows selecting specific bidding zones for which the Net Position Chart is plotted on the right.
- The Net Position Chart displays the maximum/minimum available net positions for a given bidding zone during the forecast interval. The changing levels are due to different outages being active during the time intervals.
- The Table View presents the different disjoint time intervals during the forecast period for which the flow-based domains are calculated. These disjoint intervals can be characterised by 3 different cases:
    - (1) A single outage is observed during this interval. In such case, the FB domain and net positions correspond to the matching individual outage publication shared on the Unavailable FB Transmission Capacity page
    - (2) Multiple outages occur during this interval. In this case, a combined impact of the overlapping outages is calculated. The resulting FB domain and net positions of this additional outage calculation will be associated with this interval.
    - (3) No outages occur during this interval. In such case, the latest available intact LTCC FB domain and net positions are associated with this interval (monthly minimum results either from the M-1 or Y-1 LTCC processes).
- A separate button is provided for downloading the Forecasted FB Domains for the selected forecast horizon. The download will consist of a zipped file containing the corresponding IG-182 and IG-184 files as well as a single IG-183 file contain the FB domains for each disjoint time interval (for details on the format, please refer to section 5).

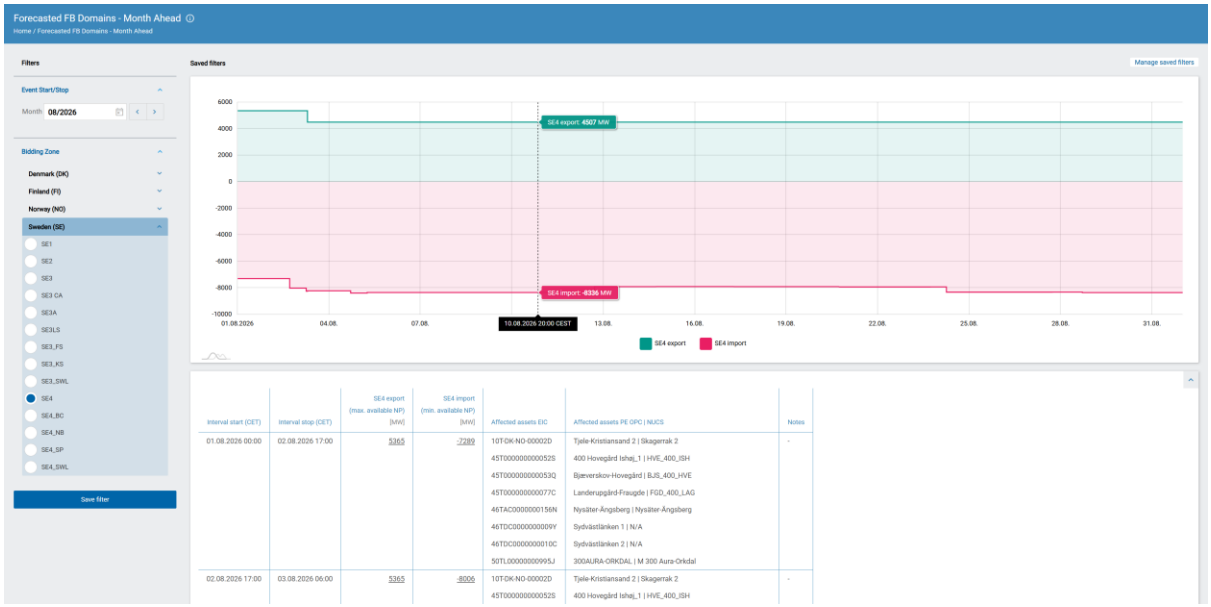

Figure 8 – Example page for Forecasted FB Domains (M-1). Please note that maximum and minimum available net positions may change over the month's horizon for different bidding zones.

In cases where individual disjoint intervals of the forecasted FB domain publication must be rejected, for example due to input data quality issues, the corresponding LTCC reference domain will be published instead as the most up-to-date available information. In such cases, the corresponding table view will be identical to case (3) described above.

The objective is to maximize the amount of information made available to market participants. Therefore, when only specific disjoint intervals need to be rejected, the combined outage impact will still be published for all remaining valid intervals.

4.3 Coexistence of NTC and FB publications

For the time being, both NTC and FB publications will continue to co-exist for Transmission Grid Unavailability. NTC publications remain the primary publication mechanism for all capacity-relevant outages and continue to fulfil the applicable transparency and REMIT obligations. FB publications provide supplementary outage-related information in a flow-based context and are intended to complement, rather than replace, the corresponding NTC publication. For unplanned outages and for outages occurring in between the NORMA FB publication timings, TSOs will continue to publish NTC impacts to comply with REMIT governing the publication frequency of insider information. If unplanned outages persist, the FB impacts will be published in the next NORMA FB calculation round, providing additional information to the initial NTC estimates (see in section 4.4).

4.4 Version control

Link between NTC and FB publications

TSOs will continue to upload outages manually via the NUCS platform directly in an NTC format. Once the outage is considered in one of the subsequent NORMA business processes, a link will be established between already existing NTC messages and the new FB messages. The unique identifier for NTC and FB messages is the tsoOutageID which will be used to establish the link between these two publications. Once a FB message is received by the NUCS platform, it will be linked to an existing NTC message, and the link is clearly visible as shown in Figure 5. In case no existing NTC message could be found, the column *NTC link* remains empty. This is intended to provide the market participants with an easy reference between the two messages if available. This link will be visible in the tabular page overview for both the **Unavailable Capacity page** for NTC messages (marked as "FB link") and in the **Unavailable FB Transmission Capacity page** for FB messages (marked as "NTC link"). In this way, market participants have a direct way to check if an FB update has been provided in one of the subsequent NORMA processes.

Updating FB publication

During subsequent publication periods, it is possible that the same outage publications are updated. For example, an outage that is published on the NUCS platform and spanning through a given monthly period may be updated during the subsequent weekly publications. Please note that this only applies to individual outage publications to be presented on the Unavailable FB Transmission Capacity page. If changes occur, this can be highlighted in the detailed view in green, as it is done today for NTC UMMs.

If any updates are being made to NTC messages, e.g. change of event start/stop date or the list of affected assets, an exclamation mark on the GUI will highlight discrepancies between the NTC and FB messages (see Figure 5). In the dropdown menu for a specific outage, these discrepancies are further detailed and a link to the NTC message is provided (see Figure 6). Once these changes are also reflected in a subsequent FB message and any previous discrepancies are resolved, then the exclamation mark will disappear.

4.5 Querying FB publications via NUCS API

Enabling users to directly query the result files (IG-182, IG-183, IG-184) of flow-based outage publications, updates are also made to the NUCS API. Section 4.5.1 describes the Request Components for the relevant endpoints, while the detailed format descriptions of the result files are presented in the Appendix.

4.5.1 Request Components

The presentation of the Request Components for each document type here complements the up-to-date NUCS API Reference, which will soon be available in the NUCS portal accessible via a Keycloak login[1]. The already existing request type for the Unavailability_MarketDocument, now accommodates both NTC and FB publications. New request types are established to be able to query the three document types (IG-182, IG-183 and IG-184). While IG-184 is an Unavailability_MarketDocument with the same structure as already the existing NTC document type, the content in the FB publications carries bidding zone NPs instead of cross-zonal capacities.

4.5.1.1 Grid availability due to an outage in bidding zone net positions (IG-184)

Table 2 – Request components for grid availability due to an outage in BZ NPs.

AttributeInstanceComponent	Description
DocumentType [1..1]	A78 = Grid availability due to an outage in bidding zone net positions (IG-184)
DocStatus [0..1]	A36 = Planned A05 = Active A09 = Cancelled Note that for FB outage publications, *A36* can also be used.
BusinessType [0..1]	A53 = Planned maintenance A54 = Forced unavailability
In_Domain [0..1]	Unique identification of the bidding zone the availability relates to. In the case of FB publications, the In_Domain corresponds to the availability of import capability of the bidding zone (minimum available net position).
Out_Domain [0..1]	Unique identification of the bidding zone the availability relates to. In the case of FB publications, the Out_Domain corresponds to the availability of export capability of the bidding zone (maximum available net position).
TimeInterval [0..1]	Time interval in UTC time zone. *Mandatory if combination of PeriodStart and PeriodEnd is not used.*
PeriodStart [0..1]	*Mandatory if TimeInterval is not used.*
PeriodEnd [0..1]	*Mandatory if TimeInterval is not used.*
TimeIntervalUpdate [0..1]	Time interval in UTC time zone. Filters outages based on timestamp of last update.
PeriodStartUpdate [0..1]	Mandatory if PeriodEndUpdate is used. Not used if TimeIntervalUpdate is used.

[1] For non-logged users, the API documentation will be available directly from the NUCS platform. For logged users, the API documentation can be accessed by clicking on their user name and navigating to *Web API Documentation*.

PeriodEndUpdate [0..1]	Mandatory if PeriodStartUpdate is not used. Not used if TimeIntervalUpdate is used.
Mrid [0..1]	Unique identification of Unavailability Message in the system. In case that Mrid parameter is used, then all **parameters for time-based filtering** are ignored even if used. In the XML document it can be found in the mRID element on document level. In the GUI it can be found in the URL of the Permanent link as first part of attribute ummId (followed by "|" character and EIC code of the original sender).
DocumentVersion [0..1]	Version Number of the Unavailability in the system. In the GUI it can be found in attribute Version on Unavailability Detail Screen. *If DocumentVersion is used then parameter Mrid is mandatory.*
fbOnly[0..1]	The parameter is used to return FB publications only (the same DocumentType is also being used by NTC publications). 0 = both NTC and FB publications included in API response 1 = only FB publications included in API response
fbForecast[0..1]	The parameter is used to return Forecasted FB Domain publications (in available net positions). A31 = Week-ahead A32 = Month-ahead A33 = Year-ahead *If the fbForecast parameter is used, only parameters for time-based filtering apply, the rest of the parameters are ignored.*

4.5.1.2 Grid unavailability due to an outage in bidding zone net positions (IG-182)

Table 3 – Request components for grid unavailability due to an outage in BZ NPs.

AttributeInstanceComponent	Description
DocumentType [1..1]	B31 = Grid unavailability due to an outage in bidding zone net positions (IG-182)
DocStatus [0..1]	A36 = Planned A05 = Active A09 = Cancelled Note that for FB outage publications, *A36* can also be used.
In_Domain [0..1]	Unique identification of the bidding zone the availability relates to. In the case of FB publications, the In_Domain corresponds to the availability of import capability of the bidding zone (minimum available net position).
Out_Domain [0..1]	Unique identification of the bidding zone the availability relates to. In the case of FB publications, the Out_Domain corresponds to the availability of export capability of the bidding zone (maximum available net position).
TimeInterval [0..1]	Time interval in UTC time zone.

	Mandatory if combination of PeriodStart and PeriodEnd is not used.
PeriodStart [0..1]	*Mandatory if TimeInterval is not used.*
PeriodEnd [0..1]	*Mandatory if TimeInterval is not used.*
TimeIntervalUpdate [0..1]	Time interval in UTC time zone. Filters outages based on timestamp of last update.
PeriodStartUpdate [0..1]	Mandatory if PeriodEndUpdate is used. Not used if TimeIntervalUpdate is used.
PeriodEndUpdate [0..1]	Mandatory if PeriodStartUpdate is not used. Not used if TimeIntervalUpdate is used.
Mrid [0..1]	Unique identification of Unavailability Message in the system. In case that Mrid parameter is used, then all **parameters for time-based filtering** are ignored even if used. In the XML document it can be found in the mRID element on document level. In the GUI it can be found in the URL of the Permanent link as first part of attribute ummId (followed by "|" character and EIC code of the original sender).
DocumentVersion [0..1]	Version Number of the Unavailability in the system. In the GUI it can be found in attribute Version on Unavailability Detail Screen. *If DocumentVersion is used then parameter Mrid is mandatory.*
fbForecast[0..1]	The parameter is used to return Forecasted FB Domain publications (in available net positions). A31 = Week-ahead A32 = Month-ahead A33 = Year-ahead *If the fbForecast parameter is used, only parameters for time-based filtering apply, the rest of the parameters are ignored.*

4.5.1.3 Grid availability due to an outage in FB parameters (IG-183)

Table 4 – Request components for grid availability due to an outage in FB parameters.

AttributeInstanceComponent	Description
DocumentType [1..1]	B11 = Grid availability due to an outage in FB parameters (IG-183)
TimeInterval [0..1]	Time interval in UTC time zone. *Mandatory if combination of PeriodStart and PeriodEnd is not used.*
PeriodStart [0..1]	*Mandatory if TimeInterval is not used.*
PeriodEnd [0..1]	*Mandatory if TimeInterval is not used.*
TimeIntervalUpdate [0..1]	Time interval in UTC time zone. Filters outages based on timestamp of last update.
PeriodStartUpdate [0..1]	Mandatory if PeriodEndUpdate is used. Not used if TimeIntervalUpdate is used.
PeriodEndUpdate [0..1]	Mandatory if PeriodStartUpdate is not used. Not used if TimeIntervalUpdate is used.
Mrid [0..1]	Unique identification of Unavailability Message in the system. In case that Mrid parameter is used, then all **parameters for time-based filtering** are ignored even if used.

	In the XML document it can be found in the mRID element on document level. In the GUI it can be found in the URL of the Permanent link as first part of attribute ummId (followed by "|" character and EIC code of the original sender).
DocumentVersion [0..1]	Version Number of the Unavailability in the system. In the GUI it can be found in attribute Version on Unavailability Detail Screen. *If DocumentVersion is used then parameter Mrid is mandatory.*
fbForecast[0..1]	The parameter is used to return Forecasted FB Domain publications (FB parameters). A31 = Week-ahead A32 = Month-ahead A33 = Year-ahead *If the fbForecast parameter is used, only parameters for time-based filtering apply, the rest of the parameters are ignored.*

4.6 Sample outage calculation of the NORMA process

This section focuses on providing an exemplary calculation of the NORMA proof-of-concept process. This section outlines the expected depth of information on how outages impact the import and export capabilities of affected bidding zones.

4.6.1 Disclaimer for performed calculations and associated results

The basis for this exemplary calculation of the NORMA process is a 2026 Y-1 LTCC domain serving as a reference for the individual outage impact calculation. Please note that although the reference domain has been calculated with same process steps as the eventual Y-1 LTCC production one—which was published on the Nordic RCC website at the time of the Y-1 CC process go-live on 31st of October 2025—this calculation is not derived from the final Y-1 production data.

To provide stakeholders with an actual calculation of the NORMA process, two outages have been chosen from the year 2025. Please note that both the interval start and end date (as well as the publication date) for these outages have been adjusted to match the 2026 LTCC reference domain. The outages have originally occurred for the same dates in 2025.

A further point of caution is that only bidding zone net position impacts greater than 100 MW are reported; smaller net position impacts (less than 100 MW) are not included in the following tables. The reported maximum (reference) and available net positions do not represent the actual physical limits of the bidding zones but rather indicate the theoretical export and import capabilities of a bidding zone based on FB parameters such as PTDFs and RAM. The maximum net positions are

calculated as mathematical boundaries to ensure flow feasibility under worst-case assumptions and should not be interpreted as forecasts of actual trades. The capabilities reported on the NUCS platform may be positive or negative for both export and import. In this context, a positive unavailability for either export or import indicates a reduction in the effectively available net position, while a negative unavailability indicates an increase in export or import capability compared to the LTCC reference domain (i.e., the maximum net position).

Due to the FB methodology, the change in topology for a considered outage alters how flows are affected. As a result, limitations for certain zones may be reduced or increased, thus net positions changes may be positive or negative. Net positions are determined by a multidimensional domain constrained by network elements and their sensitivities (PTDFs). When an outage occurs, the algorithm recalculates this domain and associated CNECs with that outage need to be updated in that process. In general, the FB methodology aims to maximize social welfare and can thus be seen as a global optimization for the whole Nordic region, and as such, these theoretical net positions of bidding zones may both increase or decrease due to an outage.

For outages on HVDC links, the export and import definitions for virtual bidding zones (VBZs) are different from the ones of normal bidding zones. A maximum net position (export) is defined towards the associated normal bidding zone, and not towards the virtual bidding zone pair. If an outage of a DC link thus has an impact on the available net position of a VBZ1 (import) and the available net position of a VBZ2 (export), then the flow is limited in the direction of VBZ1 > VBZ2.

The information that will be published on the NUCS platform will contain the type of event; the affected asset or unit; the affected bidding zone (either export or import); interval dates; maximum, available and unavailable net positions. Other attributes such as impact type, publication date and publisher are neglected in this sample overview but will be included on the NUCS webpage.

4.6.2 Tie line outage between NO4 and SE1

The first example is the NORMA outage calculation for the tie line between NO4 and SE1 (Ritsem – Ofoten), which was a foreseen maintenance outage reported jointly by Statnett and Svenska kraftnät. The tie line was out of operation from 28.07.2025 06:00 – 03.08.2025 17:00. As stated, for this exemplary calculation, the dates were adjusted to 2026 which does not imply that in 2026 this exact outage will necessarily occur. Table 5 details the maximum (reference), available and unavailable net positions of affected bidding zones.

Table 5 – Impact on bidding zone NPs from the NORMA prototype results for an outage of the tie line between NO4 and SE1.

Type of Event	Affected Asset or Unit	Bidding Zone[1]	Interval Start (CET)[2]	Interval Stop (CET)[2]	Maximum Net Position [MW]	Available Net Position [MW]	Unavailable Net Position [MW]
Transmission unavailability	Ritsem - Ofoten	NO3 (export)	28.07.2026 06:00	01.08.2026 00:00	3110	4063	-953
			01.08.2026 00:00	03.08.2026 17:00	3034	4009	-975
		NO4 (export)	28.07.2026 06:00	01.08.2026 00:00	2039	1660	379
			01.08.2026 00:00	03.08.2026 17:00	1972	1637	335
		SE2 (export)	28.07.2026 06:00	01.08.2026 00:00	12161	11962	199
			01.08.2026 00:00	03.08.2026 17:00	12087	11903	184
		NO3 (import)	28.07.2026 06:00	01.08.2026 00:00	-3930	-3682	248
			01.08.2026 00:00	03.08.2026 17:00	-3850	-3606	244
		NO4 (import)	28.07.2026 06:00	01.08.2026 00:00:00	-1329	-2690	-1361
			01.08.2026 00:00	03.08.2026 17:00	-1327	-2665	-1338
		SE1 (import)	28.07.2026 06:00	01.08.2026 00:00	-5502	-5074	428
			01.08.2026 00:00	03.08.2026 17:00	-5465	-5044	421

[1] Please note that only those BZs are listed that experience an absolute impact of 100 MW for at least one month compared to the reference domain.

[2] For this sample calculation, the interval start and stop time (and publication date) were adjusted to fit the 2026 reference LTCC domain. The outage originally occurred for the same dates in 2025.

For this specific outage, the NORMA FB recalculation of the NPs shows an increase in available export capability of NO3, while those of NO4 and SE2 are decreased. The import capabilities of NO3 and SE1 decreased as well, while NO4 ends up with a larger available import capability. Differences between months may occur in case different flow-based input data have been provided by the TSOs for the calculation process. Please note that these figures are for illustrative purposes only and may not accurately represent the actual net position impacts within a production process.

4.6.3 Grid line outage in SE4

The second example is connected to the refurbishment of the 400 kV overhead line in between Breared and Söderåsen in the west coast corridor of Sweden, which is under a three-month maintenance ranging from 11.08. – 09.11.2025, as reported by Svenska kraftnät. As stated, for this exemplary calculation, the dates were adjusted to 2026 which does not imply that in 2026 this exact outage will necessarily occur. Table 6 lists the impacts of this outage.

Table 6 – Impact on bidding zone NPs from the NORMA prototype results for an outage of the west coast corridor of Sweden.

Type of Event	Affected Asset or Unit	Bidding Zone[1]	Interval start (CET) [2]	Interval stop (CET) [2]	Maximum Net Position [MW]	Available Net Position [MW]	Unavailable Net Position [MW]
Transmission unavailability	Breared - Söderåsen	DK2 (export)	11.08.2026 06:00	01.09.2026 00:00	16910	16149	761
			01.09.2026 00:00	01.10.2026 00:00	16804	16362	442
			01.10.2026 00:00	01.11.2026 00:00	16804	16362	442
			01.11.2026 00:00	09.11.2026 17:00	16804	16362	442
		SE4 (import)	01.09.2026 00:00	01.10.2026 00:00	-7179	-7363	-184
			01.10.2026 00:00	01.11.2026 00:00	-7179	-7363	-184
			01.11.2026 00:00	09.11.2026 17:00	-7179	-7363	-184
		SE3 (export)	11.08.2026 06:00	01.09.2026 00:00	2896	2322	574
			01.09.2026 00:00	01.10.2026 00:00	3021	2421	600
			01.10.2026 00:00	01.11.2026 00:00	3021	2421	600
			01.11.2026 00:00	09.11.2026 17:00	3021	2421	600

[1] Please note that only those BZs are listed that experience an absolute impact of 100 MW for at least one month compared to the reference domain.

[2] For this sample calculation, the interval start and stop time (and publication date) were adjusted to fit the 2026 reference LTCC domain. The outage originally occurred for the same dates in 2025.

The NORMA process for this outage results in net positions changes for the bidding zones SE3 (export), SE4 (import) as well as DK2 (export). Four values are provided as part of the NORMA process as each month is associated with a reference domain from the Y-1 LTCC process. Hence, the impact for August is different from the impact of the other months of the reported period.

5. Appendix

In sections 5.1 – 5.3, the XML structures for the publication results of the NORMA process are presented. While this document focuses on the specific XML implementation of the result files, the reader is directed to the publication handbook for the Y-1 and M-1 long-term flow-based calculations published on the Nordic RCC website for general clarifications and definitions: Publication-Handbook-Y-1-LT-FB.

5.1 IG-182 Grid unavailability due to an outage in bidding zone net positions

This section of the Appendix covers the structure of exchanges of bidding zone net positions calculated based on the FB domain results for an outage and the FB domain results for Y-1 and M-1 processes. These net position values reflect the grid unavailability due to an outage. The content is structured based on the official ENTSOE *Capacity_MarketDocument*.

The XML structure of the *TimeSeries* of the unavailability is exemplified in Table 7, containing the minimum and maximum net positions (minimum and maximum limit a BZ can reach through the grid constraints) as a result of the calculation process. Each minimum or maximum net position is represented by a dedicated *TimeSeries*. In this class, each *TimeSeries* has only one Period that equals to a specific interval in the month the outage was relevant for, and each Period would contain just a single Point, as the calculation for the outage is performed monthly. Each Point shall subsequently list the minimum and maximum net position values per bidding zone. The IG-182 contains in this updated version each Nordic CCR topology associated bidding zone. In case not unavailability was associated with a specific outage definition, the value in the TimeSeries definition would be 0. The attributes are further detailed in Table 8 and Table 9.

The *Period* class provides for a given *TimeSeries* the MTU information for unavailable capacity. The unavailable capacity is defined by bidding zone net position (minimum and maximum) values. Within the *Period*, the *Point* information defines the values associated with the given *TimeSeries*. If an outage covers multiple months and more than one FBDomain is computed, at least one Period per FB Domain will be defined. Using the curveType with variable-sized blocks (set in the TimeSeries), only changes in position and quantity need to be specified. Although FB calculations are monthly, this data exchange uses minute resolution as the smallest denominator for all expected outage periods.

Table 7 – XML example of a TimeSeries of an outage unavailability

```
<!-- Min (import) net positions for a virtual Bidding Zone (NO2_NK) -->
<TimeSeries>
  <mRID>23ad6b0e60f48af46eabccd53e58ca2f</mRID>
<!-- As we want to define both minimum and maximum net position values for a BZ, we need to distinguish which one is which by the businessType -->
<!-- B69 = minimum value of netted area position, B70 = maximum value of netted area position -->
  <businessType>B69</businessType>
  <product>8716867000016</product>
<!-- In a minimum NP case, the value relates to an import case and hence the in_Domain equal to the BZ and the out_Domain to Nordic Market Area -->
  <in_Domain.mRID codingScheme="A01">50YNBFFTWZRAHA3P</in_Domain.mRID>
  <out_Domain.mRID codingScheme="A01">10Y1001A1001A91G</out_Domain.mRID>
  <measurement_Unit.name>MAW</measurement_Unit.name>
  <curveType>A03</curveType>
 <!-- First Period is defined to start from outage effective start and continue until end of March -->
 <Period>
    <timeInterval>
      <start>2024-03-22T15:22Z</start>
      <end>2024-03-22T15:30Z</end>
    </timeInterval>
    <resolution>PT1M</resolution>
    <Point>
      <position>1</position>
      <quantity>700</quantity>
    </Point>
  </Period>
  <Period>
     …
  </Period>
</TimeSeries>
<!-- Max (export) net positions for a virtual Bidding Zone (NO2_NK) -->
<!-- In a maximum NP case, the value relates to an export case and hence the out_Domain equal to the BZ and the in_Domain to Nordic Market Area -->
<TimeSeries>
  <mRID>23aabb0e60f48af46e6d6cd53e58ca2f</mRID>
  <businessType>B70</businessType>
  <product>8716867000016</product>
  <in_Domain.mRID codingScheme="A01">10Y1001A1001A91G</in_Domain.mRID>
  <out_Domain.mRID codingScheme="A01">50YNBFFTWZRAHA3P</out_Domain.mRID>
  <measurement_Unit.name>MAW</measurement_Unit.name>
  <curveType>A03</curveType>
  <Period>
    <timeInterval>
      <start>2024-04-02T11:00Z</start>
      <end>2024-04-02T11:15Z</end>
    </timeInterval>
    <resolution>PT1M</resolution>
    <Point>
      <position>1</position>
      <quantity>1200</quantity>
    </Point>
  </Period>
  <Period>
     …
  </Period>
</TimeSeries>
```

Table 8 – XML elements and datatypes for TimeSeries (min/max net position)

XML Element	ESMP Datatypes / primitive	Values
mRID	ID_String / String	Unique Identification of Time series within document.
businessType	BusinessKind_String / BusinessTypeList	B69 = minimum value of netted area position B70 = maximum value of netted area position
product	EnergyProductKind_String / EnergyProductTypeList	8716867000016 = Active Power
in_Domain.mRID	AreaID_String / String	Normal or Virtual Bidding Zone EICode. One of the Domains shall relate to the Nordic Market Area =10Y1001A1001A91G
in_Domain.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
out_Domain.mRID	AreaID_String / String	Normal or Virtual Bidding Zone EICode. One of the Domains shall relate to the Nordic Market Area =10Y1001A1001A91G
out_Domain.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
measurement_Unit.name	MeasurementUnitKind_String / UnitOfMeasureTypeList	MAW = MW
curveType	CurveType_String / CurveTypeList	The identification of the coded representation of the type of curve being described. A03 = Variable sized block The curve is made of successive Intervals of time (Blocks) of variable duration (size), where the end date and end time of each Block are equal to the start date and start time of the next Interval. For the last Block the end date and end time of the last Interval would be equal to EndDateTime of TimeInterval.

Table 9 – XML elements and values for Period class.

XML Element	ESMP Datatypes / primitive	Values
Period:timeInterval:start	YMDHM_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
Period:timeInterval:end	YMDHM_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
Period:resolution	Duration / Duration	PT60M = Values per 60 minute PT30M = Values per 30 minute PT15M = Values per 15 minute PT1M = Values per 1 minute (default)
Period:Point:position	Position_Integer / Integer	A sequential value representing the relative position within a given time interval.
Period:Point:quantity	Decimal / Decimal	Principal quantity identified for a point.

		This information defines the unavailability associated with the specific bidding zone within the interval period. In this data exchange can be either a positive or a negative value.

The *Capacity_MarketDocument* is the main class that packs each individual *TimeSeries*. The example message is illustrated in Table 10 and the associated attributes are described in Table 11.

Table 10 – XML example to pack all TimeSeries into the Capacity_MarketDocument.

```
<?xml version="1.0" encoding="utf-8"?>
<!-- OPDE PUBLIC -->
<Capacity_MarketDocument xmlns="urn:iec62325.351:tc57wg16:451-3:capacitydocument:8:2">
  <mRID>tsoOutageID_UA</mRID>
  <revisionNumber>1</revisionNumber>
  <type>B31</type>
  <process.processType>A31</process.processType>
  <sender_MarketParticipant.mRID codingScheme="A01">10X1001C--00008J</sender_MarketParticipant.mRID>
  <sender_MarketParticipant.marketRole.type>A36</sender_MarketParticipant.marketRole.type>
  <receiver_MarketParticipant.mRID codingScheme="A01">10V1001C--000187</receiver_MarketParticipant.mRID>
  <receiver_MarketParticipant.marketRole.type>A33</receiver_MarketParticipant.marketRole.type>
  <createdDateTime>2024-10-01T12:54:49Z</createdDateTime>
  <docStatus>
      <value>A36</value>
  </docStatus>
  <period.timeInterval>
    <start>2024-12-31T23:00Z</start>
    <end>2025-12-31T23:00Z</end>
  </period.timeInterval>
  <domain.mRID codingScheme="A01">10Y1001A1001A91G</domain.mRID>
  <TimeSeries>
    <!-- Include Table 7 for a min or max NP value -->
  </TimeSeries>
  <TimeSeries>
    <!-- Include Table 7 for another min or max NP value -->
  </TimeSeries>
</Capacity_MarketDocument>
```

Table 11 – XML elements and datatypes for Capacity_MarketDocument.

XML Element	ESMP Datatypes / primitive	Values
mRID	ID_String / String	Unique identification to be kept the same for an Outage throughout its lifetime.
revisionNumber	ESMPVersion_String / String	Version will start with 1 and will increment with each publication.
type	MessageKind_String / MessageTypeList	B31 = Additional Constraint document
process.processType	ProcessKind_String / ProcessTypeList	Identification of the corresponding PE OPC process used for this calculation. A31 = Week-ahead A32 = Month-ahead A33 = Year-ahead
sender_MarketParticipant.mRID	PartyID_String / String	10X1001C--00008J = NRCC
sender_MarketParticipant.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
sender_MarketParticipant.marketRole.type	MarketRoleKind_String / RoleTypeLit	A36 = Capacity Coordinator

receiver_MarketParticipant.mRID	PartyID_String / String	10V1001C--000187 = NUCS platform
receiver_MarketParticipant.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
receiver_MarketParticipant.marketRole.type	MarketRoleKind_String / RoleTypeLit	A33 = Information receiver
createdDateTime	ESMP_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mm:ssZ"
docStatus.value	Status_String / StatusTypeList	Identification of the condition or position of the document with regard to its standing. It is used to identify an unavailability document that has been withdrawn or cancelled. A36 = Planned A05 = Active A09 = Cancelled
period.timeInterval:start	YMDHM_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
period.timeInterval:end	YMDHM_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
domain.mRID	AreaID_String / String	10Y1001A1001A91G = Nordic Market area
domain.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC

5.2 IG-183 Grid availability due to an outage in FB parameters

This section of the Appendix covers the XML structure for the exchange of FB constraints and their RAM and PTDF values extracted from the FB domain result for an outage. The content is based on the official ENTSOE *CriticalNetworkElement_MarketDocument*. This publication covers the exchange of RAMs, PTDF values and additional quantities associated to a CNEC.

These two attributes are included as a *Monitored_Series* element within the *Constraint_Series*, as exemplified by Table 12. This class defines the container for all FB parameters for a single CNEC and a single MTU. The optional element *constraintStatus_MarketObjectStatus.status* with A54 value is used if the constraint is denoted as presolved (non-redundant), while the optional element *Optimization_MarketObjectStatus.status* is used with A64 value if the constraint is denoted as relevant (significant). Relevant information contained in the *Monitored_Series* as *Measurements* cover Individual value adjustments (IVAs), maximum allowed flow (Fmax), Reference flow (Fref), linear flow approximation (F0), adjustment for minimum RAM (AMR), already allocated capacity (AACs), flow reliability margin (FRM), average voltage (Uavg), and maximum admissible current (Imax). In addition, the Constraint_Series caters the *Contingency_Series* element detailing information on N-k FB constraints considered in the calculation.

With regards to the publication of the merged IG-183 for the forecasted FB domain, the *TimeSeries* elements detail the FB domain for each disjoint interval. The list of affected assets impacting any specific disjoint interval are listed through *Reason* elements per *TimeSeries*.

Table 12 – XML example to pack FB values into Constraint_Series.

```
<Constraint_Series>
  <mRID>mRID of the CNEC</mRID>
  <businessType>B40</businessType>
  <name>name of the CNEC</name>
  <quantity_Measurement_Unit.name>MAW</quantitiy_Measurement_Unit.name>
  <Party_MarketParticipant>
     <mRID codingScheme="A01">TSO_EIC</mRID>
  </Party_MarketParticipant>
<!-- constraintStatus is only recorded if the element is significant (A50) or non-redundant (A54) -->
  <Optimization_MarketObjectStatus.status>A64</Optimization_MarketObjectStatus.status>
  <constraintStatus_MarketObjectStatus.status>A54</constraintStatus_MarketObjectStatus.status>
<!-- Contingency_Series is displayed for N-k FB constraint -->
  <Contingency_Series>
    <mRID>mRID</mRID>
    <RegisteredResource>
      <mRID codingScheme="A02">mRID</mRID>
      <name>name of the contingency element</name>
      <in_Domain.mRID codingScheme="A01">EIC if available</in_Domain.mRID>
      <out_Domain.mRID codingScheme="A01">EIC if available</out_Domain.mRID>
    </RegisteredResource>
  </Contingency_Series>
<!-- Monitored_Series is displayed for monitored elements -->
  <Monitored_Series>
    <mRID>0a1ee6401-9325-1afb-611e-6645ee4ec93e</mRID>
    <RegisteredResource>
      <mRID codingScheme="A02">mRID of the Monitored element</mRID>
        <name>name of the Monitored element</name>
        <in_Domain.mRID codingScheme="A01">EIC of the in_Domain</in_Domain.mRID>
        <out_Domain.mRID codingScheme="A01">EIC of the out_Domain</out_Domain.mRID>
        <in_AggregateNode.mRID codingScheme="A02">mRID if available</in_AggregateNode.mRID>
        <out_AggregateNode.mRID codingScheme="A02">mRID if available</out_AggregateNode.mRID>
<!-- Remaining Available Margin (RAM) -->
        <flowBasedStudy_Domain.flowBasedMargin_Quantity.quantity>1000</flowBasedStudy_Domain.flowBasedMargin_Quantity.quantity>
<!-- Array(PTDF values) – List of PTDFs per BZs for the current CNEC. As many PTDF_Domain as number of BZs (2 as example) in the Nordic FB topology -->
```

```
        <PTDF_Domain>
          <mRID codingScheme="A01">10Y1001A1001A44P</mRID>
          <pTDF_Quantity.quantity>0.23</pTDF_Quantity.quantity>
        </PTDF_Domain>
        <PTDF_Domain>
          <mRID codingScheme="A01">10Y1001A1001A45N</mRID>
          <pTDF_Quantity.quantity>0.51</pTDF_Quantity.quantity>
        </PTDF_Domain>
    ...
<!-- Measurement of the specified types -->
<!-- Individual value adjustment (IVA) -->
        <Measurements>
          <measurementType>A25</measurementType>
          <unitSymbol>MAW</unitSymbol>
          <positiveFlowIn>A01</positiveFlowIn>
          <analogValues.value>0</analogValues.value>
        </Measurements>
<!-- Maximum allowed flow (Fmax) -->
        <Measurements>
        ….
        </Measurements>
<!-- Reference flow (Fref) -->
        <Measurements>
        ….
        </Measurements>
      ...
    </RegisteredResource>
  </Monitored_Series>
</Constraint_Series>
```

The *Constraint_Series* elements are then packed into a *TimeSeries* class that contains all the CNECS of the FB domain for the given period the grid availability was calculated for. In case there was more than a single FB domain computed for an outage (i.e., if the outage extends to two different months), one *TimeSeries* per FB domain will be defined. See the exemplary XML structure in Table 13. Note that for forecasted FB domain publications, the list of affected assets is provided through individual Reason.text fields.

Table 13 – XML example to pack Constraint_Series into TimeSeries.

```
<TimeSeries>
  <mRID>23ad6b0e-60f4-8af4-6e6d-6cd53e58ca2f</mRID>
  <businessType>B38</businessType>
  <curveType>A03</curveType>
  <Period>
<!-- TimeInterval defines the period for which the given FBDomain is applicable for -->
    <timeInterval>
      <start>2023-03-01T23:00Z</start>
      <end>2023-03-05T23:00Z</end>
    </timeInterval>
    <resolution>PT60M</resolution>
    <Point>
      <position>1</position>
<!-- As many Constraint_Series as the CNECs to exchange -->
      <Constraint_Series>
        <!-- Include Table 12 for a constraint -->
      </Constraint_Series>
      <Constraint_Series>
        <!-- Include Table 12 for another constraint -->
      </Constraint_Series>
      ...
    </Point>
  </Period>
<!—ONLY for forecasted FB domain publications (combined outages): -->
  <Reason>
    <code>A95</code>
    <text>EIC of element 1</text>
  </Reason>
  ...
  <Reason>
    <code>A95</code>
    <text>EIC of element x</text>
```

```
  </Reason>
</TimeSeries>
```

The *CriticalNetworkElement_MarketDocument* is the main class that packs each individual *TimeSeries*, see an example message in Table 14.

Table 14 – XML example to pack all TimeSeries into the CriticalNetworkElement_MarketDocument.

```
<?xml version="1.0" encoding="utf-8"?>
<!-- OPDE PUBLIC -->
<CriticalNetworkElement_MarketDocument xmlns="urn:iec62325.351:tc57wg16:451-n:cnedocument:2:5">
  <mRID>tsoOutageID_FB</mRID>
  <revisionNumber>1</revisionNumber>
  <type>B11</type>
  <process.processType>A31</process.processType>
  <sender_MarketParticipant.mRID codingScheme="A01">10X1001C--00008J</sender_MarketParticipant.mRID>
  <sender_MarketParticipant.marketRole.type>A36</sender_MarketParticipant.marketRole.type>
  <receiver_MarketParticipant.mRID codingScheme="A01">10V1001C--000187</receiver_MarketParticipant.mRID>
  <receiver_MarketParticipant.marketRole.type>A33</receiver_MarketParticipant.marketRole.type>
  <createdDateTime>2023-03-01T12:54:49Z</createdDateTime>
<!-- The Related_MarketDocument class is used to associate this file to the Grid unavailability due to an outage in bidding zone net positions (IG-182) created by NRCC BA -->
  <Related_MarketDocument>
    <mRID>tsoOutageID_UA</mRID>
    <revisionNumber>1</revisionNumber>
  </Related_MarketDocument>
<!-- Another Related_MarketDocument class is used to associate this file to the Grid availability due to an outage in bidding zone net positions file (IG-184) created by NRCC BA -->
  <Related_MarketDocument>
    <mRID>tsoOutageID_AV</mRID>
    <revisionNumber>1</revisionNumber>
  </Related_MarketDocument>
<!-- The timeinterval on the header information shall be made matching with the Outage effective time -->
  <time_Period.timeInterval>
    <start>2024-01-14T22:00Z</start>
    <end>2024-02-03T15:00Z</end>
  </time_Period.timeInterval>
<!-- TimeSeries' originating from FBDomains associated to the outage related calculations -->
  <TimeSeries>
    <!-- Include Table 13 for all CNECs for one FBDomain associated to the calculation -->
  </TimeSeries>
 <TimeSeries>
    <!-- Include Table 13 for all CNECs for another FBDomain associated to the calculation (if
applicable) -->
  </TimeSeries>
  <Reason>
    <code>A95</code>
    <text>MMIN</text>
  </Reason>
</CriticalNetworkElement_MarketDocument>
```

The XML elements are further detailed in Table 15, Table 16,
Table 17, Table 18 and Table 19.

Table 15 – XML elements and datatypes for CriticalNetworkElement_MarketDocument.

XML element	ESMP Datatypes / primitive	Values
mRID	ID_String / String	Unique identification to be kept the same for an Outage throughout its lifetime.
revisionNumber	ESMPVersion_String / String	Version will start with 1 and will increase with each publication.
type	MessageKind_String / MessageTypeList	B11 = Anonymized flow-based parameters publication
process.processType	ProcessKind_String / ProcessTypeList	Identification of the corresponding PE OPC process used for this calculation.

		A31 = Week-ahead A32 = Month-ahead A33 = Year-ahead
sender_MarketParticipant.mRID	PartyID_String / String	10X1001C--00008J = NRCC
sender_MarketParticipant.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
sender_MarketParticipant.marketRole.type	MarketRoleKind_String / RoleTypeLit	A36 = Capacity Coordinator
receiver_MarketParticipant.mRID	PartyID_String / String	10V1001C--000187 = NUCS platform
receiver_MarketParticipant.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
receiver_MarketParticipant.marketRole.type	MarketRoleKind_String / RoleTypeList	A33 = Information Receiver
createdDateTime	ESMP_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mm:ssZ"
Related_MarketDocument.mRID	ID_String / String	Identifies the related MarketDocument mRID that these FB parameters have a relation to. Two Related_MarketDocument elements shall be defined: 1) One that relates to the grid unavailability due to BZ net positions file (IG-182) 2) Another that relates to the grid availability due to BZ net positions file (IG-184) See Appendix for details.
Related_MarketDocument.revisionNumber	ESMPVersion_String / String	Identifies the related MarketDocument revisionNumber that these FB parameters have a relation to. See Appendix for details.
time_Period.timeInterval:start	YMDHM_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
time_Period.timeInterval:end	YMDHM_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
Reason.code	ReasonCodeTypeList / ReasonCode_String	A95 = Complementary information
Reason.text	ReasonText_String / String	Text containing the mentioning of the calculation type associated with the results of the reference domain: MMIN

Table 16 - XML elements and datatypes of Monitored_Series element.

XML element	ESMP Datatypes / primitive	Values
mRID	ID_String / String	A unique identification of the series.
RegisteredResource:mRID	ResourceID_String / String	A unique identification of the series.
RegisteredResource:mRID (codingScheme)	CodingSchemeTypeList	A02 = CGM
RegisteredResource: name	ID_String / String	Name of the monitored element
RegisteredResource: in_Domain.mRID	AreaID_String / String	EIC of Area To
RegisteredResource: in_Domain.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
RegisteredResource: out_Domain.mRID	AreaID_String / String	EIC of Area From
RegisteredResource: out_Domain.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC

RegisteredResource: in_AggregateNode.mRID	ResourceID_String / String	Name of Station To
RegisteredResource: in_AggregateNode.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
RegisteredResource: out_AggregateNode.mRID	ResourceID_String / String	Name of Station From
RegisteredResource: out_AggregateNode.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
RegisteredResource:flowBasedStudy_Domain.flowBasedMargin_Quantity.quantity	Decimal / Decimal	RAM value of the constraint
RegisteredResource:PTDF_Domain:mRID	AreaID_String / String	Identification of the BZ (EICode) the PTDF value relates to.
RegisteredResource:PTDF_Domain:mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
RegisteredResource:PTDF_Domain:pTDF_Quantity.quantity	Decimal / Decimal	Identification of the actual PTDF value
RegisteredResource:**Measurements**:measurementType	AnalogTypeList	Specifies the type of measurement (for example maximum line flow, reference line flow, etc.) A25 = IVA, A02 = Fmax, A22= Fref, A34= RA, A26 = F0, A18 = AMR, A33 = FAAC, A03 = FRM, A14 = U (voltage), A24 = ImaxA
RegisteredResource:Measurements:unitSymbol	UnitSymbolList	The unit of measure of the measured quantity. “KVT” for A14, “AMP” for A24 “MAW” for all the rest
RegisteredResource:Measurements:positiveFlowIn	IndicatorTypeList	A01 = absolute value is positive A02 = absolute value is negative
RegisteredResource:Measurements:analogValues.value	Float / Float	The value of the given measurement.

Table 17 – XML elements and datatypes of Constraint_Series element.

XML Element	ESMP Datatypes / primitive	Values
mRID	ID_String / String	Identification of the Constraint (CNEC) by the mRID defined by the TSO.
businessType	BusinessKind_String / BusinessTypeList	B40 = Network Element Constraint B37 = Allocation Constraint C90 = Combined Dynamic Constraint (PTC)
name	Characters200_String / String	Identification of the Constraint by the name defined by the TSO.
constraintStatus_MarketObjectStatus.status (optional)	Status_String / StatusTypeList	A54 = Used to indicate if the constraint is presolved (non-redundant)
Optimization_MarketObjectStatus.status (optional)	Status_String / StatusTypeList	A64 = Used to indicate if the constraint is relevant (significant)
Contingency_Series	Class	Class associated with the contingency of the constraint (if appliable)
Monitored_Series	Class	Class associated with the monitored element of the constraint

Table 18 – XML elements and datatypes for TimeSeries.

XML Element	ESMP Datatypes / primitive	Values
mRID	ID_String / String	A unique identification of the series.
businessType	BusinessKind_String / BusinessTypeList	B38 = Initial Domain
curveType	CurveType_String / CurveTypeList	The identification of the coded representation of the type of curve being described. A03 = Variable sized block The curve is made of successive Intervals of time (Blocks) of variable duration (size), where the end date and end time of each Block are equal to the start date and start time of the next Interval. For the last Block the end date and end time of the last Interval would be equal to EndDateTime of TimeInterval.
Period:timeInterval:start	YMDHM_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
Period:timeInterval:end	YMDHM_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
Period:resolution	Duration / Duration	PT60M = Values per hour
Period:Point:position	Position_Integer / Integer	Position the data related to. Given that we use variable sized block, it is expected that there is a single position for a TimeSeries.
Reason.code (optional)	ReasonCodeTypeList / ReasonCode_String	A95 = Complementary information
Reason.text (optional)	ReasonText_String / String	Text containing in case of the forecasted FB domain publication the EICs of all affected assets during the respective time interval

Table 19 – XML elements and datatypes of Contingency_Series element.

XML Element	ESMP Datatypes / primitive	Values
mRID	ID_String / String	A unique identification of the series.
RegisteredResource:**mRID**	ResourceID_String / String	EICode of Contingency element. In case EICode is not yet available, can be the mRID of the monitored element defined in the respective FBDomain file.
RegisteredResource:**mRID (codingScheme)**	CodingSchemeTypeList	A01 = EIC
RegisteredResource:**name**	ID_String / String	Name of the Contingency element
RegisteredResource:**in_Domain.mRID**	AreaID_String / String	EIC of Area To
RegisteredResource:**in_Domain.mRID (codingScheme)**	CodingSchemeTypeList	A01 = EIC
RegisteredResource:**out_Domain.mRID**	AreaID_String / String	EIC of Area From
RegisteredResource:**out_Domain.mRID (codingScheme)**	CodingSchemeTypeList	A01 = EIC

5.3 IG-184 Grid availability due to an outage in bidding zone net positions

This section of the Appendix covers the XML structure used to exchange bidding zone net positions, which are calculated based on the Flow-Based (FB) domain results related to an outage. These net position values indicate grid availability when an outage occurs. The content is based on the official ENTSOE *Unavailability_MarketDocument*.

Net position availability for a specific bidding zone direction (import/export) impacted by an outage is represented as a *TimeSeries*, with each *TimeSeries* identifying the effect on minimum and maximum net positions for transmission grid related assets. The number of *TimeSeries* entries in the publication corresponds to the number of bidding zone direction (import/export) for individual outage publications. If a bidding zone direction is not affected, the availability of the underlying reference domain is provided. For the forecasted FB domain publications, the number of *TimeSeries* entries corresponds to the bidding zone directions (import/export) times the number of disjoint intervals that the forecasted horizon contained. In other words, the IG-184 for the forecasted FB domain caters a *TimeSeries* entry for each bidding zone import/export per disjoint interval. The net positions are derived from the FB domain results related to the outages.

The *Available_Period* class provides for a given time series the MTU information for available capacity, defined by (minimum and maximum) bidding zone net position values. Each Period within a *TimeSeries* contains Point elements for relevant intervals. In case there were more than a single FB domain computed for an outage (i.e., if the outage extends to multiple months), at least one Period per FB Domain will be defined. By utilizing the *curveType* with variable sized block (defined within the *TimeSeries*), it is only necessary to define positions and quantities where a change occurred. Typically, each Period has one Point, and a *TimeSeries* may include multiple Periods. Although FB calculations are monthly, data exchange occurs hourly, with intervals split if outages begin or end mid-hour. The *in_Domain.mRID* and *out_Domain.mRID* elements indicate whether values pertain to minimum (import) or maximum (export) net positions, with the other *Domain.mRID* always referring to the Nordic area. An *out_Domain.mRID* with a corresponding Bidding Zone EICode indicates export values, while *in_Domain* denotes import values.

An example of the XML implementation of a *TimeSeries* of an outage availability is presented in Table 20. The *Asset_RegisteredResource* class represents an affected asset within the outage publication, containing the asset EIC code, the name of the resource, as well as the asset type. Please note that depending on the number of assets impacted, there can be one or multiple *Asset_RegisteredResource* elements present in the document. The used attributes are further detailed in Table 21, Table 22, and Table 23, for the *Available_Period* class, *Asset_RegisteredResource* class, and *TimeSeries* within the *Unavailability_MarketDocument*, respectively.

Table 20 – XML example of a TimeSeries of an outage availability.

```
<TimeSeries>
  <mRID>6fafff327cb84efa9abc73b4f8040e79</mRID>
  <businessType>A53</businessType>
  <in_Domain.mRID codingScheme="A01">10Y1001A1001A91G</in_Domain.mRID>
  <out_Domain.mRID codingScheme="A01">10YFI-1--------U</out_Domain.mRID>
  <start_DateAndOrTime.date>2024-03-22</start_DateAndOrTime.date>
  <start_DateAndOrTime.time>15:22:00.0000000Z</start_DateAndOrTime.time>
  <end_DateAndOrTime.date>2024-04-02</end_DateAndOrTime.date>
  <end_DateAndOrTime.time>11:22:00.0000000Z</end_DateAndOrTime.time>
  <quantity_Measurement_Unit.name>MAW</Quantity_Measurement_Unit.name>
  <curveType>A03</curveType>
  <Asset_RegisteredResource>
    <mRID codingScheme="A01">EIC code</mRID>
    <name>Name of the resource</name>
    <asset_PSRType.psrType>B22</asset_PSRType.psrType>
  </Asset_RegisteredResource>
  <Available_Period>
<!-- Include for first timeinterval -->
    <timeInterval>
      <start>2024-03-22T16:00Z</start>
      <end>2024-03-31T22:00Z</end>
    </timeInterval>
    <resolution>PT60M</resolution>
    <Point>
      <position>1</position>
      <quantity>1200</quantity>
    </Point>
  </Available_Period>
  <Available_Period>
<!-- Include for second timeinterval -->
  </Available_Period>
  <Reason>
    <code>B19</code>
    <text>Maintenance on line</text>
  </Reason>
</TimeSeries>
```

Table 21 – XML elements and datatypes for the Available_Period class.

XML Element	ESMP Datatypes / primitive	Values
timeInterval.start	YMDHM_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
timeInterval.end	YMDHM_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
resolution	Resolution / Duration	PT60M = Values per 60 minute PT30M = Values per 30 minute PT15M = Values per 15 minute PT1M = Values per 1 minute
Point:position	Position_Integer	A sequential value representing the relative position within a given time interval.
Point:quantity	Decimal	Principal quantity identified for a point. This information defines the availability associated with the specific bidding zone within the interval period. In this data exchange can be either a positive or a negative value.

Table 22 – XML elements and datatypes for the Asset_RegisteredResource class.

XML Element	ESMP Datatypes / primitive	Values
mRID	ResourceID_String / String	CGMES formatted string corresponding to the cim:Object the outage related to.
mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC A02 = CGMES
name	String	Any number of human readable names for an object
pSRType.psrType	PsrType_String / AssetTypeList	**Type** / **Asset** **A01** TIE (tieline) **A02** LINE (internal OHL or cable) **A09** CAP (capacitor) **A10** IND (inductor) **B21** AC Link **B22** DCL (DC-Link) **B23** SUB (Substation) **B24** TRA (Transformer)

Table 23 – XML elements and datatypes for the TimeSeries within the Unavailability_MarketDocument.

XML Element	ESMP Datatypes / primitive	Values
mRID	ID_String / String	Unique identification of the series
businessType	BusinessKind_String / BusinessTypeList	A53 = Planned maintenance A54 = Unplanned outage
in_Domain.mRID	AreaID_String / String	The unique identification of the bidding zone the availability relates to. Defined only in case the value is corresponding to an *import* capability of the bidding zone.
in_Domain.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
out_Domain.mRID	AreaID_String / String	The unique identification of the bidding zone the availability relates to. Defined only in case the value is corresponding to an *export* capability of the bidding zone.
out_Domain.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
start_DateAndOrTime.date	YMDHM_DateTime / DateTime	A start date associated with a TimeSeries in format "YYYY-MM-DD".
start_DateAndOrTime.time	YMDHM_DateTime / DateTime	A start time associated with a TimeSeries in format "hh:mm:ss.0000000Z"
end_DateAndOrTime.date	YMDHM_DateTime / DateTime	An end date associated with a TimeSeries in format "YYYY-MM-DD".
end_DateAndOrTime.time	YMDHM_DateTime / DateTime	An end time associated with a TimeSeries in format "hh:mm:ss.0000000Z".
quantity_Measurement_Unit.name	MeasurementUnitKind_String / UnitOfMeasureTypeList	MAW = MW
curveType	CurveType_String / CurveTypeList	The identification of the coded representation of the type of curve being described.

		A03 = Variable sized Block The curve is made of successive Intervals of time (Blocks) of variable duration (size), where the end date and end time of each Block are equal to the start date and start time of the next Interval. For the last Block the end date and end time of the last Interval would be equal to EndDateTime of TimeInterval.
Asset_RegisteredResource class	Association end	See Table 22
Available_Period class	Association end	See Table 21
Reason.code	ReasonCode_String / ReasonCodeTypeList	B19 = Foreseen maintenance B18 = Failure
Reason.text	ReasonText_String / String	Remarks and Special condition

The *Unavailability_MarketDocument* is the main class that will pack the *Asset_RegisteredResource* and *TimeSeries* into the full XML document. One market document defines the result associated with one outage entity within the NORMA calculation process.

Table 24 provides an exemplary *Unavailability_MarketDocument, with a full example of the associated attributes in* Table 25.

Table 24 – XML example to pack all TimeSeries into the Unavailability_MarketDocument.

```
<?xml version="1.0" encoding="utf-8"?>
<!-- OPDE PUBLIC -->
<Unavailability_MarketDocument xmlns="urn:iec62325.351:tc57wg16:451-6:outagedocument:4:1">
  <mRID>tsoOutageID_AV</mRID>
  <revisionNumber>1</revisionNumber>
  <type>A78</type>
  <process.processType>A31</process.processType>
  <createdDateTime>2024-01-14T12:54:49Z</createdDateTime>
  <sender_MarketParticipant.mRID codingScheme="A01">10X1001C--00008J</sender_MarketParticipant.mRID>
  <sender_MarketParticipant.marketRole.type>A36</sender_MarketParticipant.marketRole.type>
  <receiver_MarketParticipant.mRID codingScheme="A01">10V1001C--000187</receiver_MarketParticipant.mRID>
  <receiver_MarketParticipant.marketRole.type>A33</receiver_MarketParticipant.marketRole.type>
  <unavailability_Time_Period.timeInterval>
    <start>2024-03-22T15:22Z</start>
    <end>2024-04-02T11:22Z</end>
  </unavailability_Time_Period.timeInterval>
  <docStatus>
    <value>docstatus value</value>
  </docStatus>
  <TimeSeries>
    <!-- Include Table 20 for a BZ the outage had an impact on -->
  </TimeSeries>
  <TimeSeries>
    <!-- Include Table 20 for another BZ the outage had an impact on -->
  </TimeSeries>
</Unavailability_MarketDocument>
```

Table 25 – XML elements and datatypes for Unavailability_MarketDocument.

XML Element	ESMP Datatypes / primitive	Values
mRID	ID_String / String	Unique identification to be kept the same for an Outage throughout its lifetime.
type	MessageKind_String / MessageTypeList	A78 = Transmission unavailability
process.processType	ProcessKind_String / ProcessTypeList	Identification of the corresponding PE OPC process used for this calculation. A31 = Week-ahead A32 = Month-ahead A33 = Year-ahead
createdDateTime	ESMP_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mm:ssZ"
sender_MarketParticipant.mRID	PartyID_String / String	10X1001C--00008J = NRCC
sender_MarketParticipant.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
sender_MarketParticipant.marketRole.type	MarketRoleKind_String / RoleTypeList	A36 = Capacity Coordinator
receiver_MarketParticipant.mRID	PartyID_String / String	10V1001C--000187 = NUCS platform
receiver_MarketParticipant.mRID (codingScheme)	CodingSchemeTypeList	A01 = EIC
receiver_MarketParticipant.marketRole.type	MarketRoleKind_String / RoleTypeList	A33 = Information receiver
unavailability_Time_Period.timeInterval.start	ESMP_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
unavailability_Time_Period.timeInterval.end	ESMP_DateTime / DateTime	DateTime in format "YYYY-MM-DDThh:mmZ"
docStatus.value	Status_String / StatusTypeList	Identification of the condition or position of the document with regard to its standing. It is used to identify an unavailability document that has been withdrawn or cancelled. A36 = Planned A05 = Active A09 = Cancelled

5.4 Bidding Zones Codes and EIC Codes

Short Code (name)	Description	EIC code
NO1	Norwegian Area Elspot Area 1	10YNO-1--------2
NO2	Norwegian Area Elspot Area 2	10YNO-2--------T
NO3	Norwegian Area Elspot Area 3	10YNO-3--------J
NO4	Norwegian Area Elspot Area 4	10YNO-4--------9
NO5	Norwegian Area Elspot Area 5	10Y1001A1001A48H
SE1	Swedish Elspot Area 1	10Y1001A1001A44P
SE2	Swedish Elspot Area 2	10Y1001A1001A45N
SE3	Swedish Elspot Area 3	10Y1001A1001A46L
SE4	Swedish Elspot Area 4	10Y1001A1001A47J
FI	Finland	10YFI-1--------U
DK1	Denmark DK1	10YDK-1--------W
DK2	Denmark DK2	10YDK-2--------M
NO2_SK	Skagerrak (NO2-DKW) in NO2	50YCUY85S1HH29EK
DK1_SK	Skagerrak (NO2-DKW) in DK1	45Y000000000001C
DK1_SB	Storebelt (DKW-DKE) in DK1	45Y0000000000038
DK2_SB	Storebelt (DKW-DKE) in DK2	45Y0000000000062
FI_FS	Fenno-Skan (FI-SE3) in FI	44Y-00000000160K
SE3_FS	Fenno-Skan (FI-SE3) in SE3	46Y000000000001Y
DK1_KS	Konti-Skan (SE3-DKW) in DK1	45Y000000000002A
SE3_KS	Konti-Skan (SE3-DKW) in SE3	46Y000000000002W
SE4_SP	SVE-POL in SE4	46Y000000000003U
SE4_NB	Nord-Balt SE4	46Y000000000004S
SE4_BC	Baltic Cable SE4	46Y000000000005Q
FI_EL	Est-Link in FI	44Y-00000000161I
DK1_DE	DK1 to DE	45Y0000000000054

DK2_KO	Kontek in DK2 (DKE-DE)	45Y0000000000070
DK1_CO	COBRA (DK1-NL) in DK1	45Y0000000000046
NO2_NL	NordLink (NO-DE) in NO2	50YNBFFTWZRAHA3P
NO2_ND	NorNed (NO-NL) in NO2	50Y73EMZ34CQL9AJ
SE3_SWL	Sydvästlänken (SE3-SE4) in SE3	46Y000000000017J
SE4_SWL	Sydvästlänken (SE3-SE4) in SE4	46Y000000000018H