

TO Market Participants

CLASSIFICATION

DATE

REFERENCE

C1: Public Information

September 12, 2019

SUBJECT Impact assessment of Planned Outage LLS-ENS in 2019Q4

1. Context

In the CWE Consultative Group of 30/03/2016 it was agreed that TSOs would perform a Standard Procedure for Assessing the Impact of Changes (SPAIC) for a commonly agreed list of relevant changes, including the commissioning of new assets. This SPAIC presents an impact assessment of planned outage on Lelystad – Ens 380 Wit (EIC code: 49T000000000022E). During this outage the conductor will be changed to increase the maximum capacity of the line. This reinforcement to 4kA is the first part, afterwards the parallel line will be out of service. For this parallel line a separate impact analysis will be done and will be published in due time.

2. Specific changes in CWE FB CC related to the planned outage

The planned outage of Lelystad-Ens is currently scheduled from mid October till mid December; the latest planning of this and other outages due to planned maintenance in the Extra high voltage network of TenneT TSO B.V. is published at: <https://www.tennet.eu/electricity-market/transparency-pages/urgent-market-messages-planned-maintenance-nl/>.

In the 2 days before the planned outage of Lelystad – Ens 380 Wit (EIC code: 49T000000000023C) the parallel line Lelystad – Ens 380 Zwart will be increased in capacity to 3kA due to a bypass of a substation component, which is only possible for the temporary period during this planned outage situation.

Due to the long duration of the planned outage, TenneT TSO B.V. will include additional CBCOs in the CWE FB CC during the period of the outage to ensure the security of supply during the maintenance period. These additional CBCOs are specified in the file "Dataset 6- SPAIC LLS-ENS VNB 2019Q4 - Additional CBCOs"

3. Methodology behind the SPAIC

This SPAIC analysis consists of a comparison of flow-based domains for eight typical "reference" days commonly defined by CWE TSOs using a clustering algorithm, in order to estimate the impact of a change in grid topology or flow-based parameters. These eight reference days are mapped to the winter and interseason part of the year. This limited number of reference days (8 instead of normally 12) is due to the fact that DE-AT BZB split is only affective since 1/10/2018 and therefore not sufficient data is available to cover a whole year.

For this SPAIC, the eight '2018/2019 reference days' for the period 1/10/2018 to 15/5/2019 have been mapped to the market days in this period on the basis of the season, type of day and how close the historical

domain was to the domain of a reference day. For all these days, Market Coupling Simulations have taken place, to average out impact of specific order books for the "reference days" selected by the CWE TSOs. By averaging the results per cluster over multiple market days, the average impact of the different flow-based domains can be assessed. An overview of the mapping of the typical days to the market days is given in the file "Dataset 5 – SPAIC LLS-ENS VNB 2019Q4 – Typical Day Description".

4. Published datasets

The following results have been simulated and are published:

1. Flow-Based Domains and CBCOs for three different scenarios for all reference days:
 1. The historical Flow-Based Domains and CBCOs ("Historical benchmark")
 2. Updated Flow Based Domains and CBCOs, taking into account significant changes which have taken place or will take place in the methodology between October 2018 till the moment of the planned outage. For all reference days, the following changes were included:
 - i. The DE-AT Split;
 - ii. The commissioning of NEMOlink;
 - iii. The commissioning of COBRACable;
 - iv. The integration of the second circuit of Doetinchem - Niederrhein.
 3. The new pre-solved Flow-Based domains and CBCOs, corresponding with the most probable grid topology (when writing this document) applied to all reference days ("dataset including change").
2. The market coupling results for 222 days for all above three scenarios of Flow Based Domains and CBCOs.
 - From the 227 days in the period, 5 days were in total not simulated because of the following reasons:
 - 2 Days with clock change day (28/10/2018, 31/3/2019)
 - 1 day due to an issue with the mapping script (15/3/2019)
 - 2 days because of unavailability of some historical results in the Euphemia Simulation Facility at the time when the SPAIC was conducted (14/2/2019, 28/2/2019)

Therefore in total, data of 222 days is published.

 - All market coupling results of the SPAIC days are performed with the Market Coupling Algorithm Euphemia 10.3 (the version currently in operation for Market Coupling).
3. Overview of the typical days and the mapping of the typical days to the individual days of the period
4. Overview of temporary additional CBCOs added to the CWE FB MC for the duration of the outage of LLS-ENS 380 Wit.

The data of the simulation results are attached in separate datasets. The contents of the datasets 1-4 are explained below.

The table below summarizes the standard outputs of a SPAIC analysis that were agreed upon, including a reference to the joined datasets indicating where the corresponding information can be found.

#	Output	Description	Dataset
1	Description change and features of the typical days	<ul style="list-style-type: none"> A qualitative description of the foreseen change, period and expected high-level impact resulting from this A description of the main quantitative features of the 8 typical days A list of CBCOs which are added to the CWE 	<ul style="list-style-type: none"> Qualitative description of foreseen change: Cover note Description of the typical days: Dataset 5 Overview of temporary additional CBCOs added to CWE FB MC for the duration of the change: Dataset 6.
2a	Capacity calculation indicators Dataset historical benchmark <ul style="list-style-type: none"> 24 PTDF matrixes + RAM for each typical day and for all fixed labels Min/max Net positions volume 	This is the dataset that is used as a reference for the change that is subject of the change	<ul style="list-style-type: none"> PTDF matrixes + RAM: Dataset 1 – Sheet “Historical Benchmark 2A” Min/Max NP: Dataset 2 – Sheet “Historical Benchmark 2A” Volume: Dataset 3
2b	Capacity calculation indicators Dataset updated historical benchmark <ul style="list-style-type: none"> 24 PTDF matrixes + RAM for each typical day and for all fixed labels Min/max Net positions volume 	This is the dataset that is updated, including all methodological changes that are known at the time of the study	<ul style="list-style-type: none"> PTDF matrixes + RAM: Dataset 1 – Sheet “Updated Historical Benchmark 2B” Min/Max NP: Dataset 2 – Sheet “Updated Historical Benchmark 2B” FB Domain Volume: Dataset 3
2c	Capacity calculation indicators Dataset including change <ul style="list-style-type: none"> 24 PTDF matrixes + RAM for each typical day and for all fixed labels Min/max Net positions volume 	This is the dataset that includes the change that is subject of the impact assessment	<ul style="list-style-type: none"> PTDF matrixes + RAM: Dataset 1 – Sheet “SPAIC 2C” Min/Max NP: Dataset 2 – Sheet “SPAIC 2C” FB Domain Volume: Dataset 3

#	Output	Description	Dataset
3a	Market simulation indicators for the dataset historical data	After the capacity calculation is performed, also Market Coupling simulations have been performed to get insight in impact on the following market indicators for the CWE Bidding Zones:	All information can be found in Dataset 4. Column A indicates whether the data refers to scenario #3a, 3b or 3c:
3b	Market simulation indicators for the dataset for the updated historical benchmark	<ul style="list-style-type: none"> • Net positions (MRC Net Position and balanced CWE Net Position) • Market prices • Market Spreads and Price Convergence • Market clearing volumes (executed Supply and Demand) • Social Welfare indicators (consumer surplus, producer surplus, congestion income, total social welfare) • PRBs indicators • Number of Euphemia solutions found 	<ul style="list-style-type: none"> • MRC Net Position, CWE Net Position and Market price – Sheet “MRC NP, CWE NP, P” • Price spreads and Price Convergence – Sheet “MarketSpread, convergence” • Market clearing volumes (max executed Supply and Demand) – Sheet “Market Volumes” • Total CWE Social Welfare, MRC Social Welfare, PRB indicators (number of PRBs, maximum of DeltaP¹, sum of DeltaP, PRB Utility Loss), Euphemia Solutions found – Sheet “CWE SW, MRC SW, PRBs, EuphemiaS” • Consumer Surplus, Producer Surplus, CWE Congestion Income – Sheet “Social Welfare”
3c	Market simulation indicators for the dataset including changes		

¹ Value in EUR indicating the ‘in-the-moneyness’ of an (individual) block order