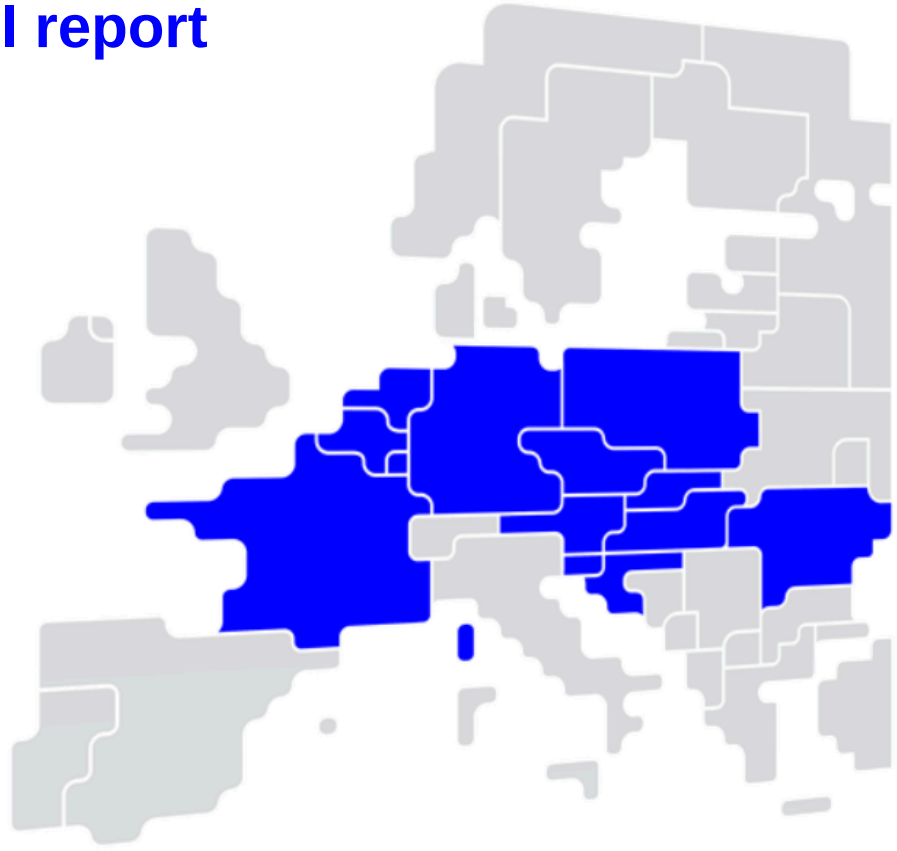
Core FB MC Operational KPI report

October 2025



Overview of Operational KPIs

Adjustment for minimum RAM Inclusion

- KPI 1: Average maximum AMR per CNE
- KPI 2: Average maximum AMR per TSO

TSOs' adjustment after validation

- KPI 3: Share of MTUs with intervention per TSO
- KPI 4: Average IVA applied for each CNE affected by TSO intervention

Power System Impact Analysis

- KPI 5: Min & max net positions per BZ hub
- KPI 6: Virtual margins at market balance for CORE TSOs
- KPI 7: Non-Core exchanges delta flow

Non-costly Remedial Action Optimization Analysis

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- KPI 9: Most limiting CNEC per TSO (NRAO)
- KPI 10: Average variation of relative RAM before and after NRAO

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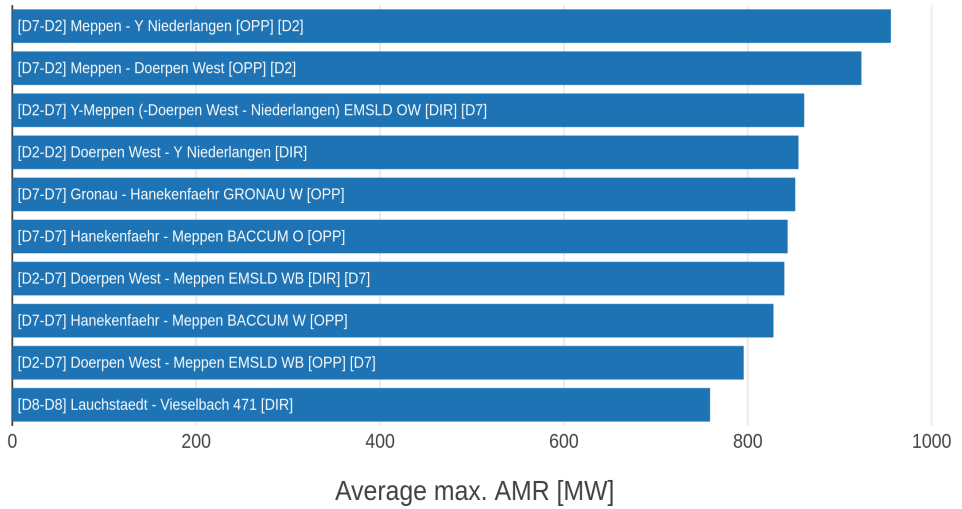
- KPI 12: Most limiting CNEs (top 20)
- KPI 13: Allocation Constraints

KPI 1: Average maximum AMR per CNE (Top 10)

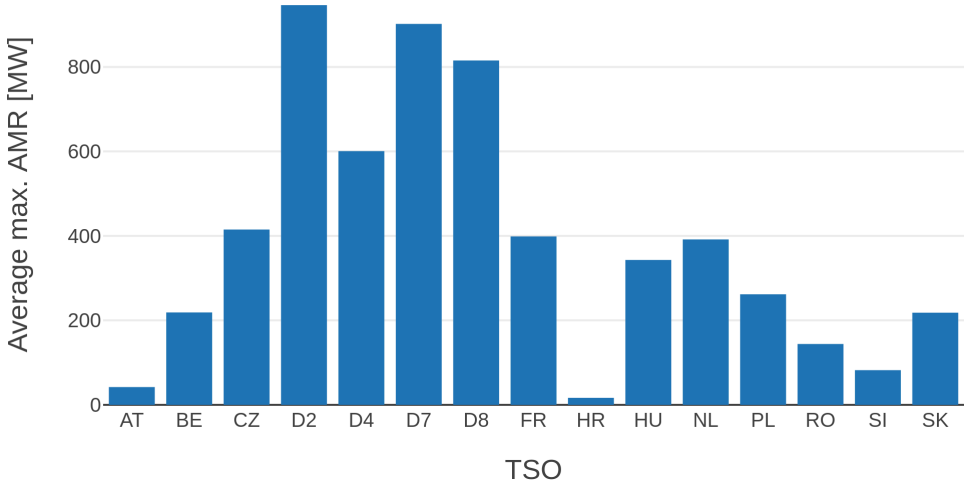
CNE	Avg. Max. AMR (MW)	AMR/Fmax% (MTUs with AMR > 0 MW)	AMR/Fmax% (all MTUs)
[D7-D2] Meppen - Y Niederlangen [OPP] [D2]	955.60	48.83%	40.38%
[D7-D2] Meppen - Doerpen West [OPP] [D2]	923.57	47.23%	41.14%
[D2-D7] Y-Meppen (-Doerpen West - Niederlangen) EMSLD OW [DIR] [D7]	861.35	34.54%	26.56%
[D2-D2] Doerpen West - Y Niederlangen [DIR]	855.13	43.71%	35.67%
[D7-D7] Gronau - Hanekenfaehr GRONAU W [OPP]	851.62	37.23%	30.08%
[D7-D7] Hanekenfaehr - Meppen BACCUM O [OPP]	843.29	36.28%	28.35%
[D2-D7] Doerpen West - Meppen EMSLD WB [DIR] [D7]	839.75	34.07%	27.62%
[D7-D7] Hanekenfaehr - Meppen BACCUM W [OPP]	827.88	36.09%	29.07%
[D2-D7] Doerpen West - Meppen EMSLD WB [OPP] [D7]	795.52	32.24%	25.61%
[D8-D8] Lauchstaedt - Vieselbach 471 [DIR]	758.96	30.43%	5.76%



KPI 2: Average maximum AMR per TSO

TSO	Average maximum AMR per TSO
AT	41.99
BE	218.94
CZ	415.12
D2	946.44
D4	600.83
D7	901.98
D8	815.36
FR	398.77
HR	16.67
HU	343.19

TSO	Average maximum AMR per TSO
NL	391.69
PL	261.92
RO	144.15
SI	82.08
SK	218.30

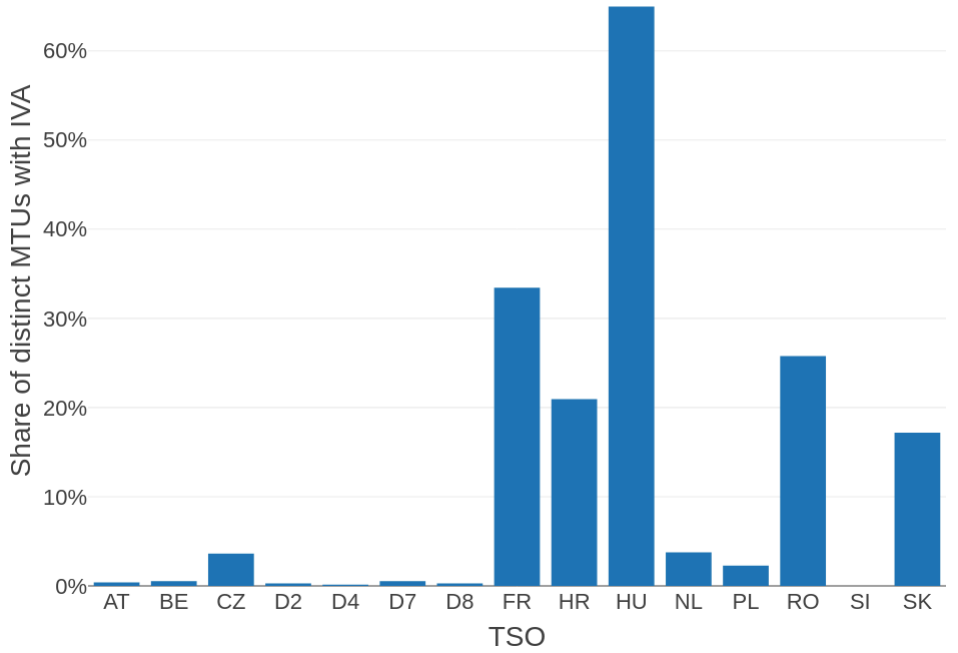


KPI 3: Share of MTUs with intervention per TSO

Total BDs	Total MTUs	MTUs without IVA	Share of distinct MTUs without IVA	MTUs with IVA	Share of distinct MTUs with IVA
31	745	95	12.75%	650	87.3%

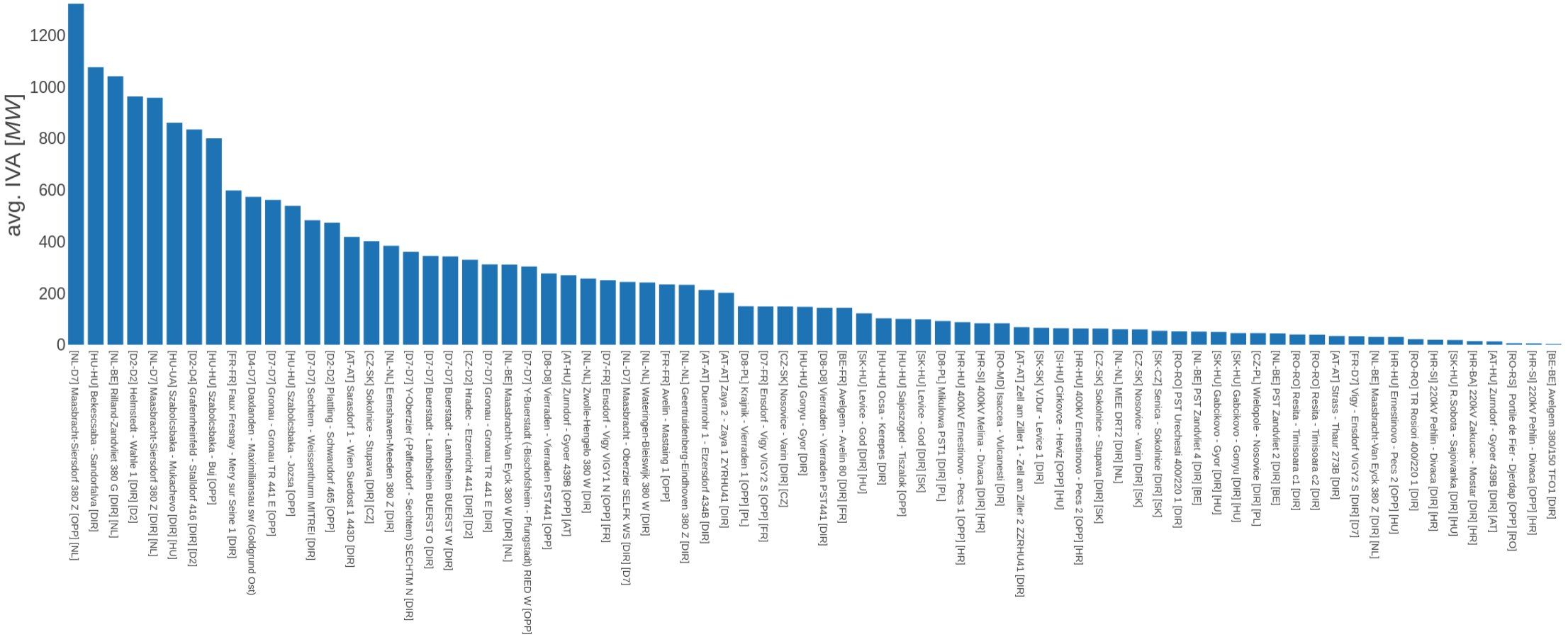
TSO	Share of distinct MTUs with IVA	Distinct MTUs with IVA
AT	0.40%	3
BE	0.54%	4
CZ	3.62%	27
D2	0.27%	2
D4	0.13%	1
D7	0.54%	4
D8	0.27%	2
FR	33.42%	249
HR	20.94%	156
HU	64.97%	484

TSO	Share of distinct MTUs with IVA	Distinct MTUs with IVA
NL	3.76%	28
PL	2.28%	17
RO	25.77%	192
SI	0.00%	0
SK	17.18%	128



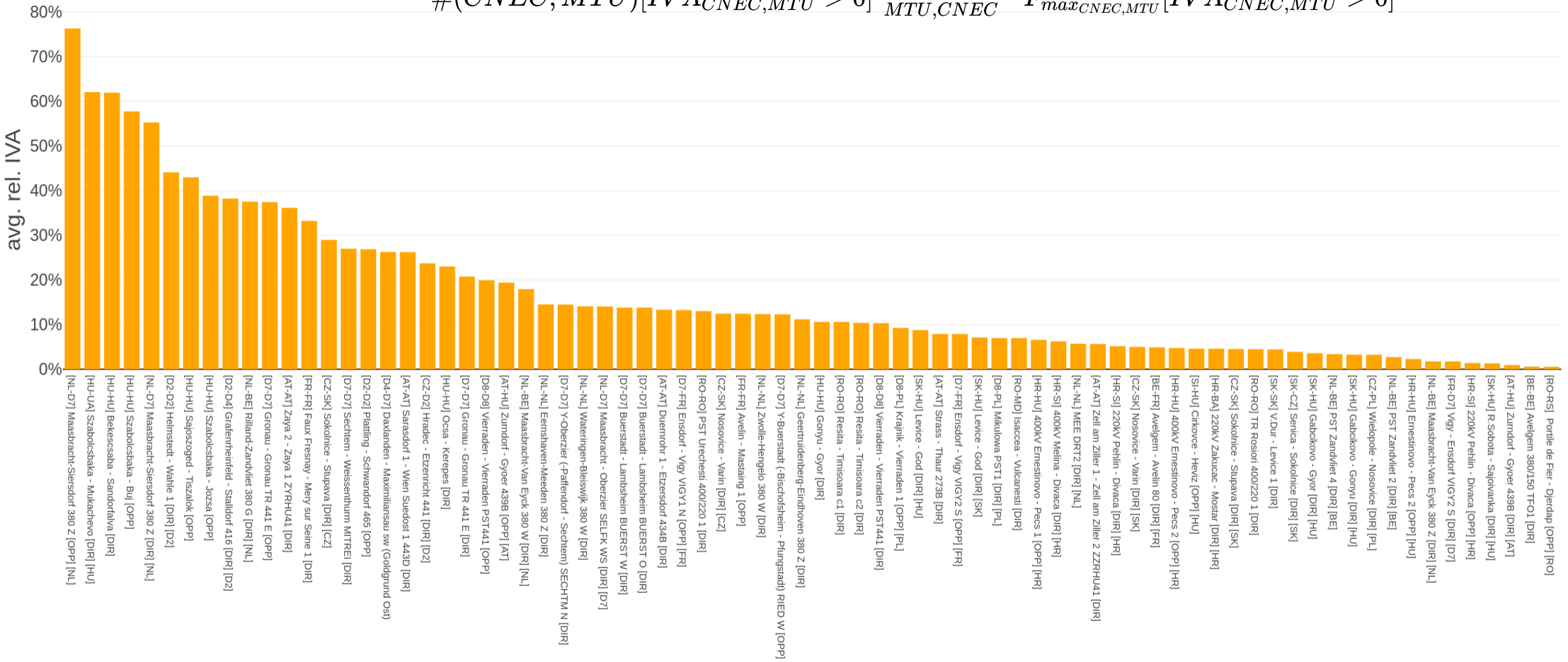
KPI 4a: Average IVA applied for each CNE affected by TSO intervention

$$\text{avg. IVA}_{CNE} = \frac{1}{\#(CNEC, MTU)[IVA_{CNEC,MTU} > 0]} \sum_{MTU,CNEC} IVA_{CNEC,MTU}[IVA_{CNEC,MTU} > 0]$$

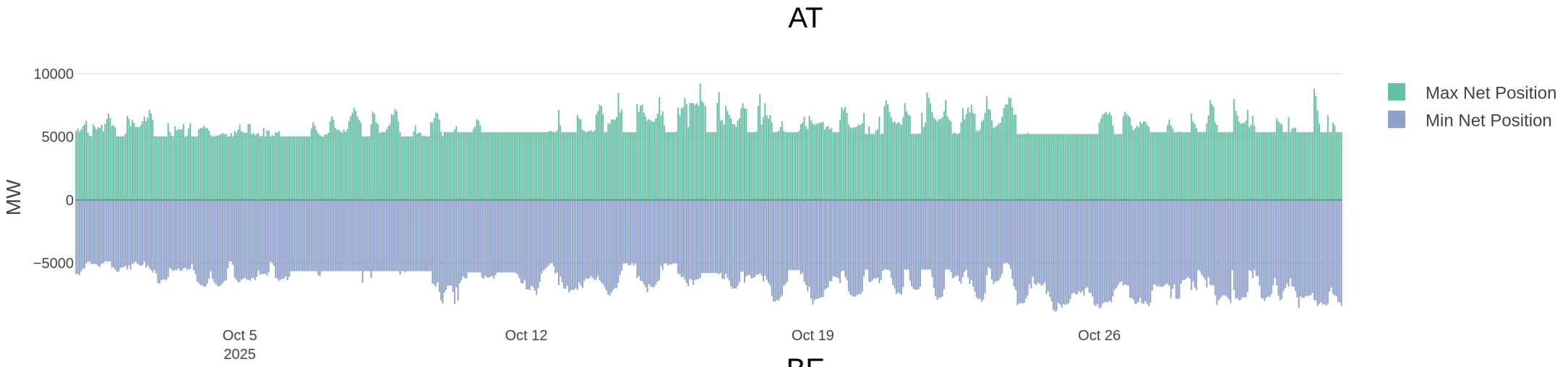


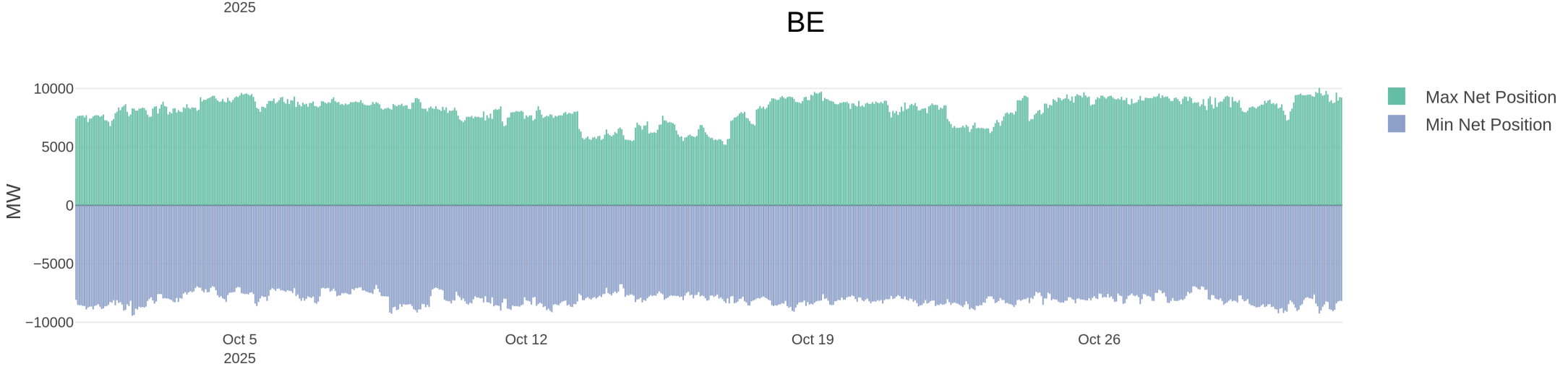
KPI 4b: Average relative IVA applied for each CNE affected by TSO intervention

$$\text{avg. rel. IVA}_{CNE} = \frac{1}{\#(CNEC, MTU)[IVA_{CNEC,MTU} > 0]} \sum_{MTU,CNEC} \frac{IVA_{CNEC,MTU}[IVA_{CNEC,MTU} > 0]}{F_{max_{CNEC,MTU}}[IVA_{CNEC,MTU} > 0]}$$



KPI 5: Min & max net positions per BZ hub





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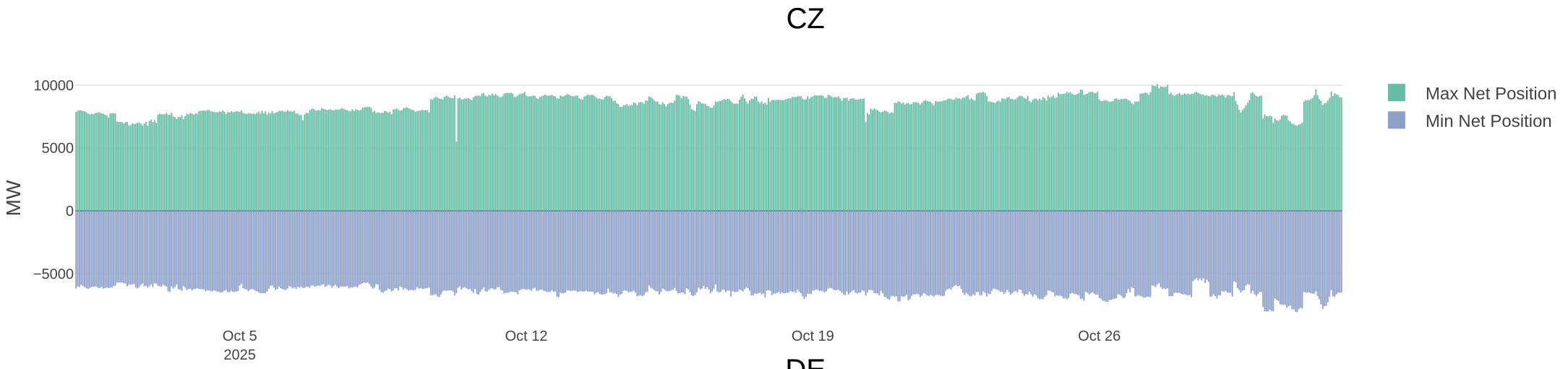

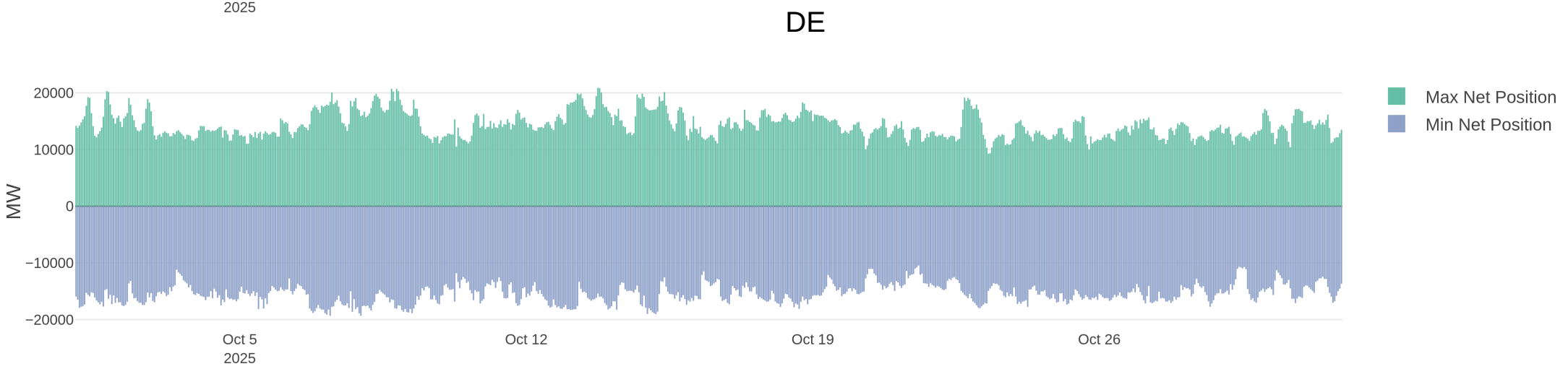

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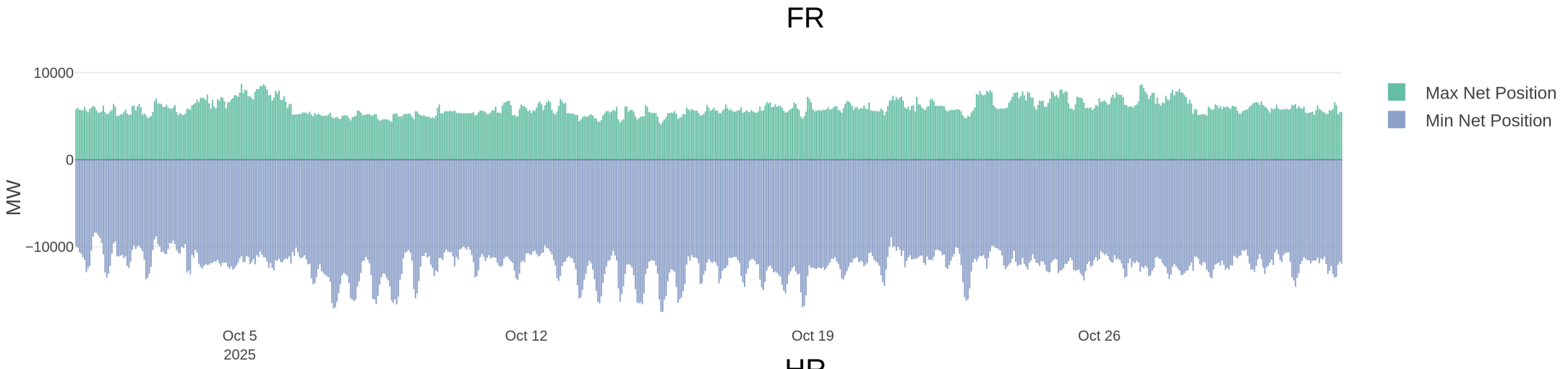

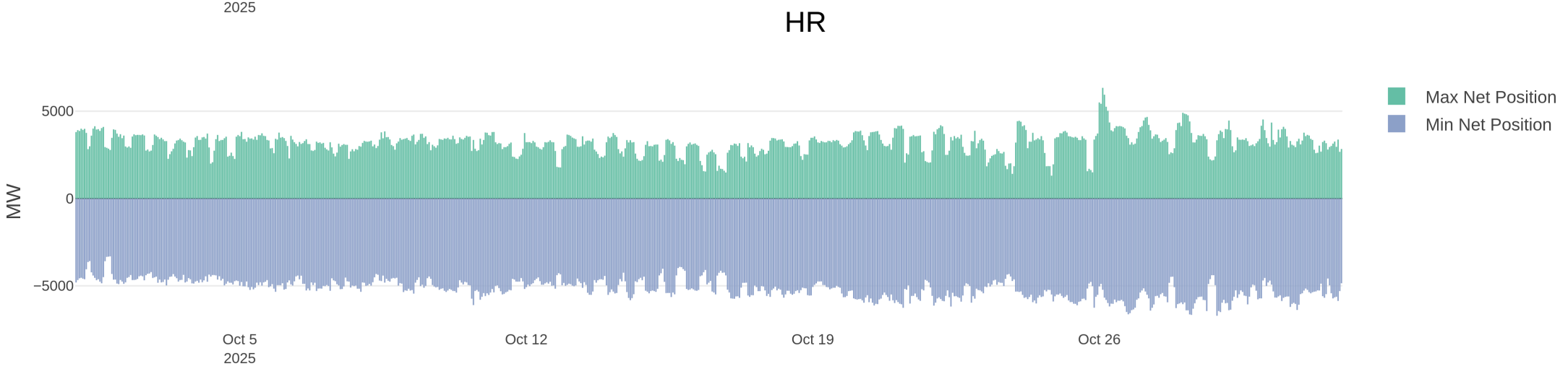

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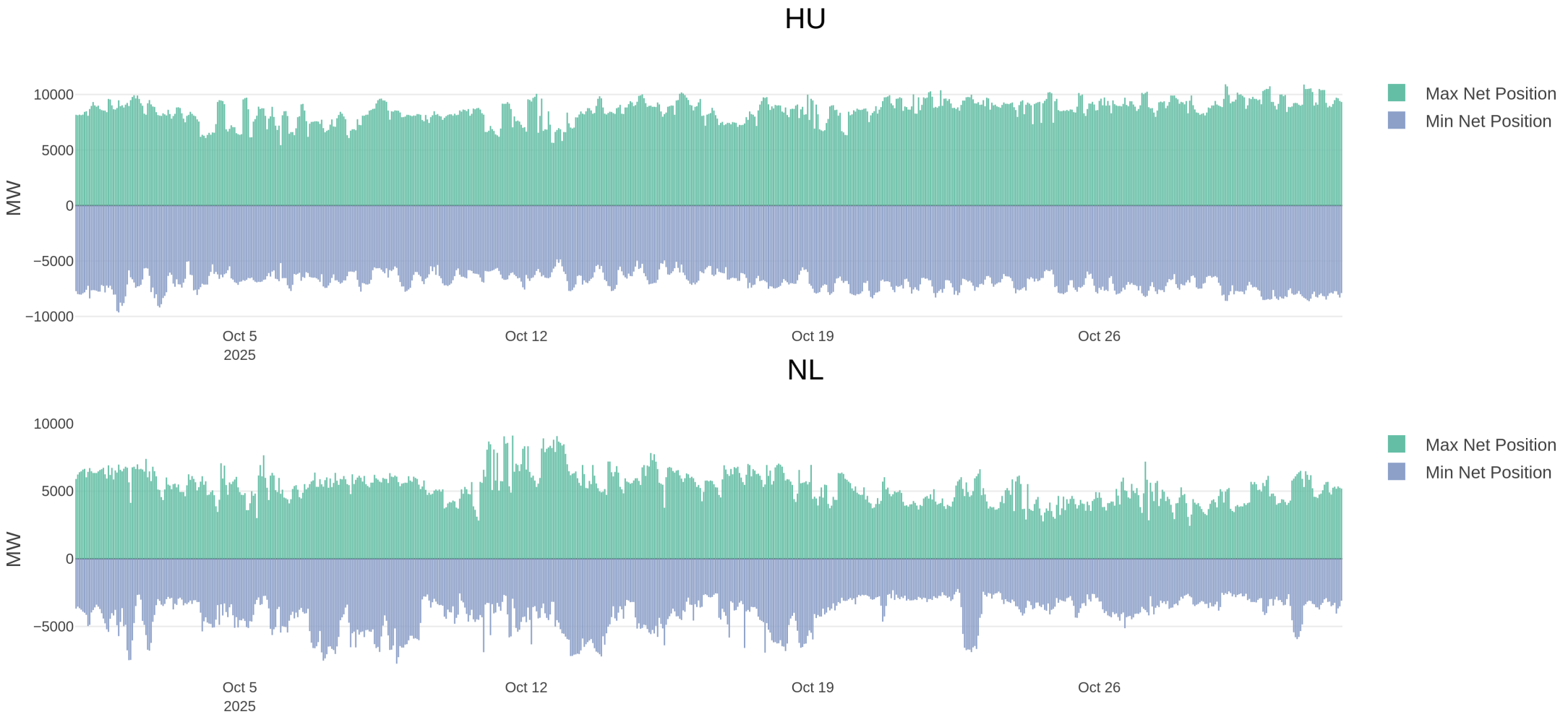

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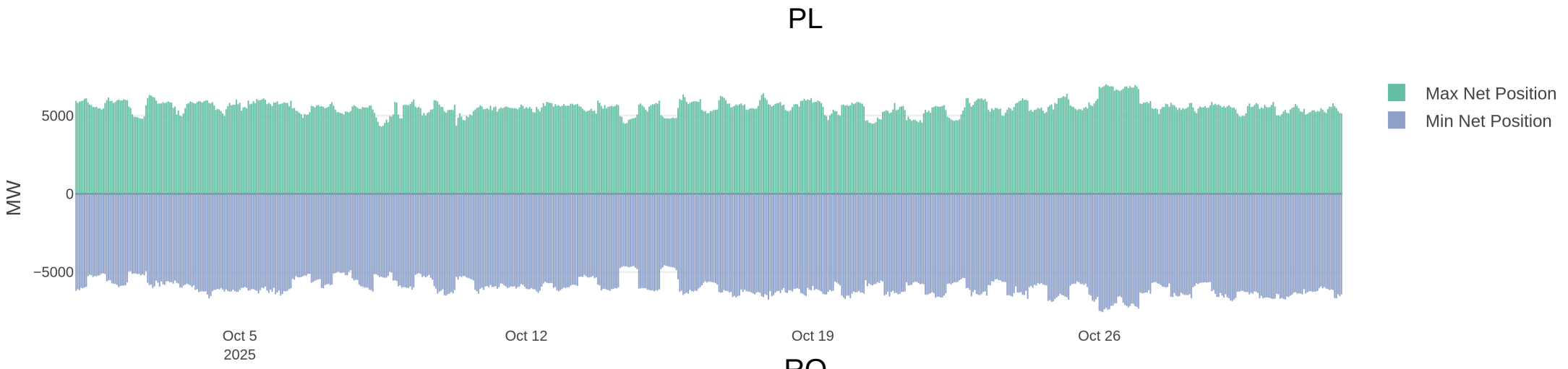
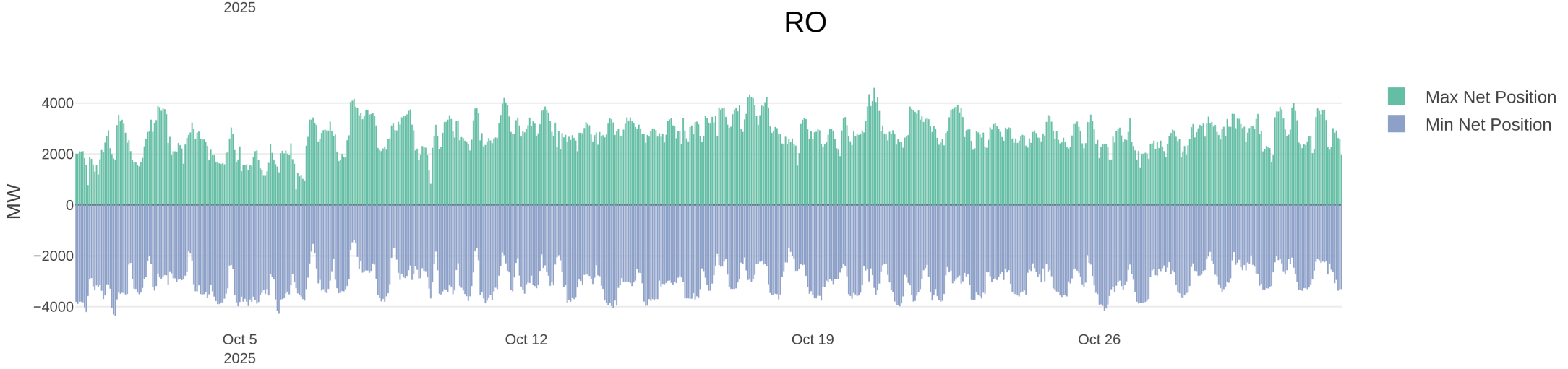
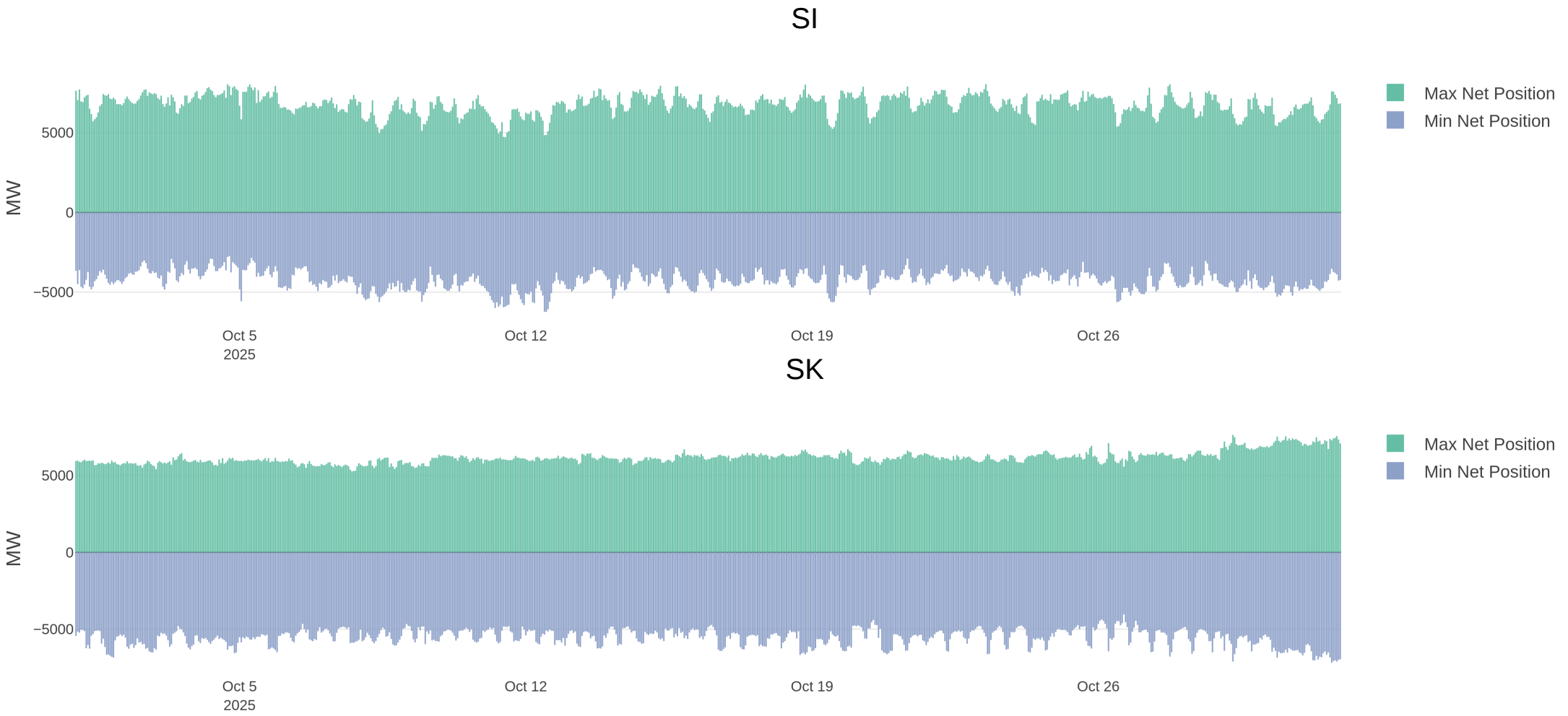
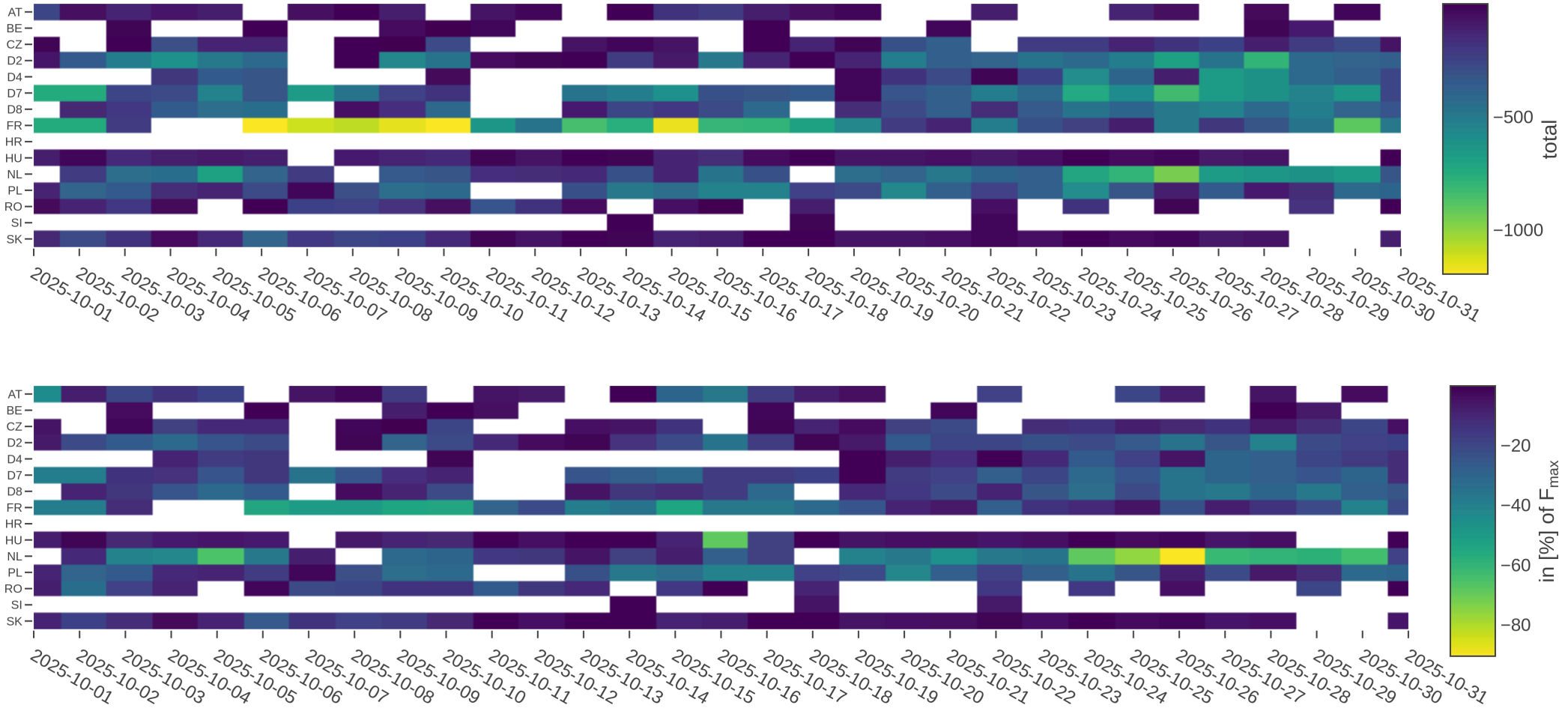




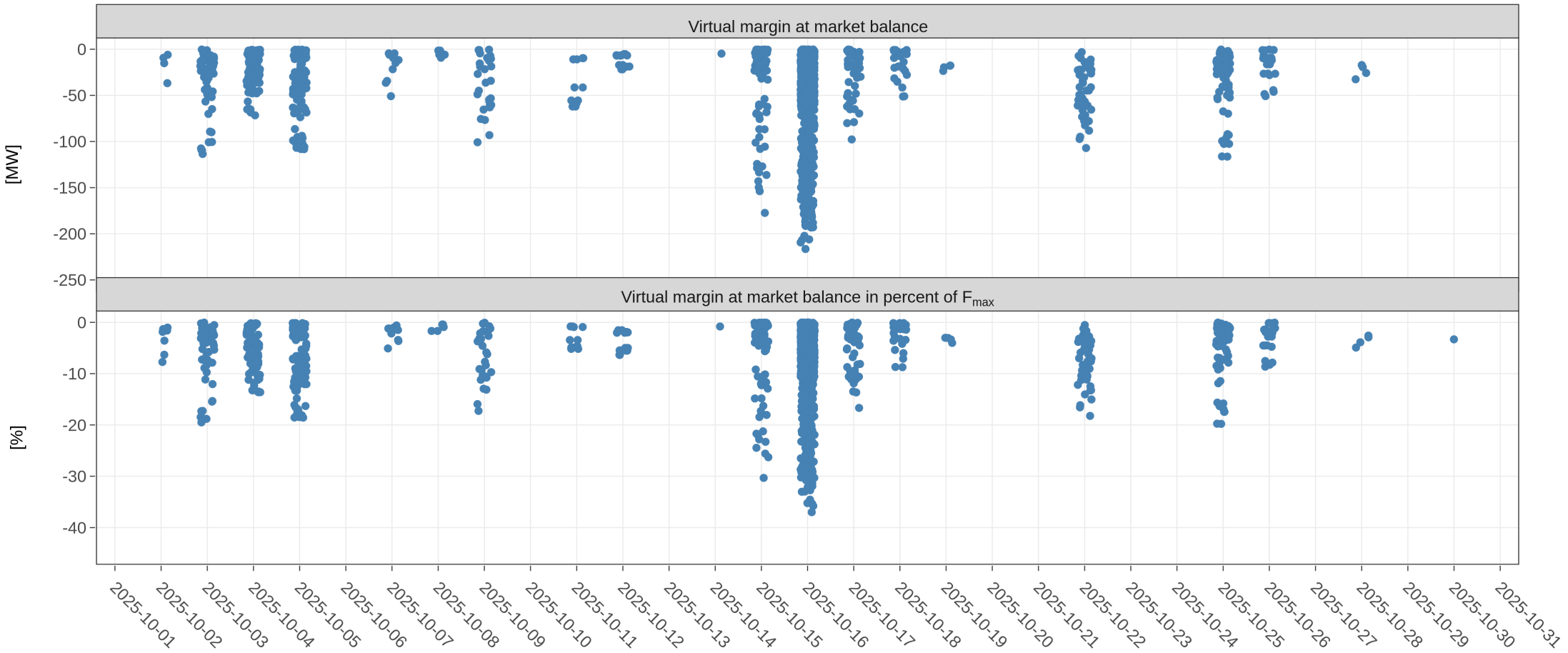
KPI 5: Min & max net positions per BZ hub



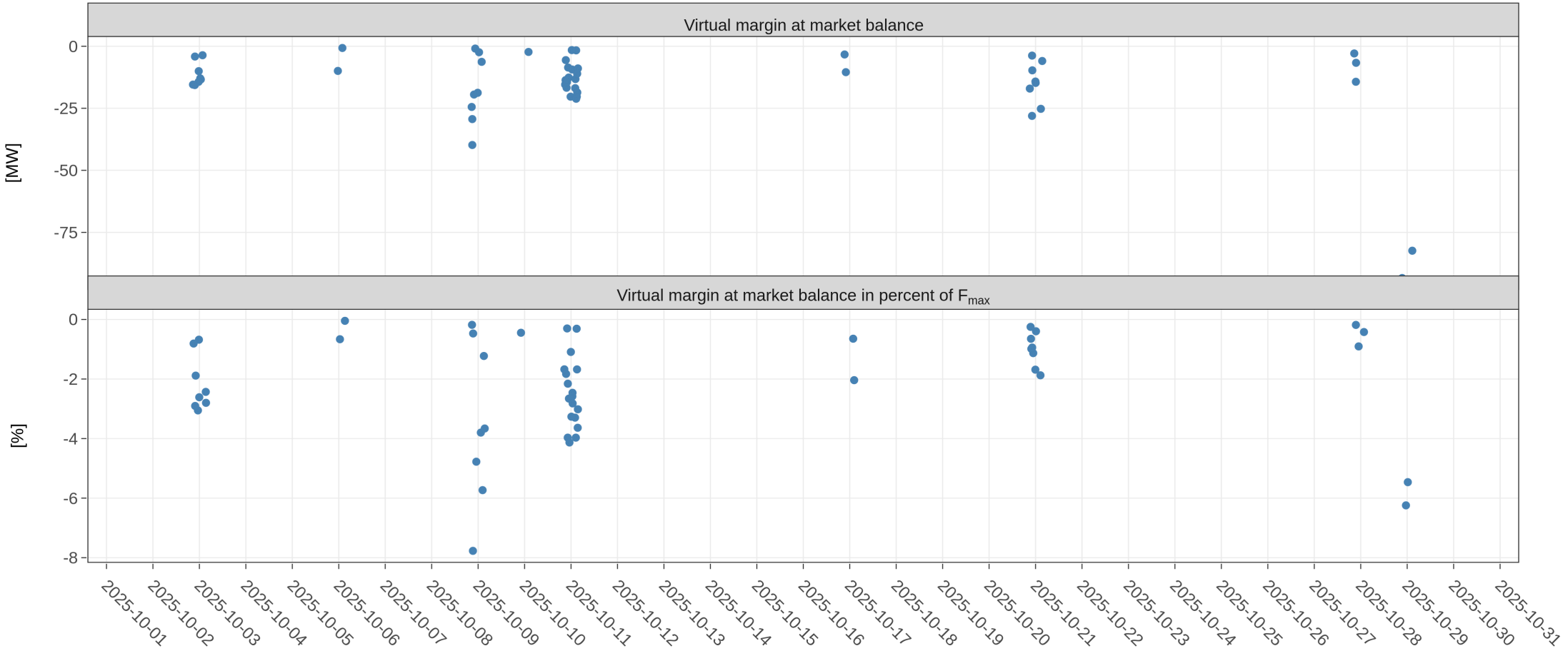
KPI 6a: Highest virtual margins at market balance for CORE TSOs



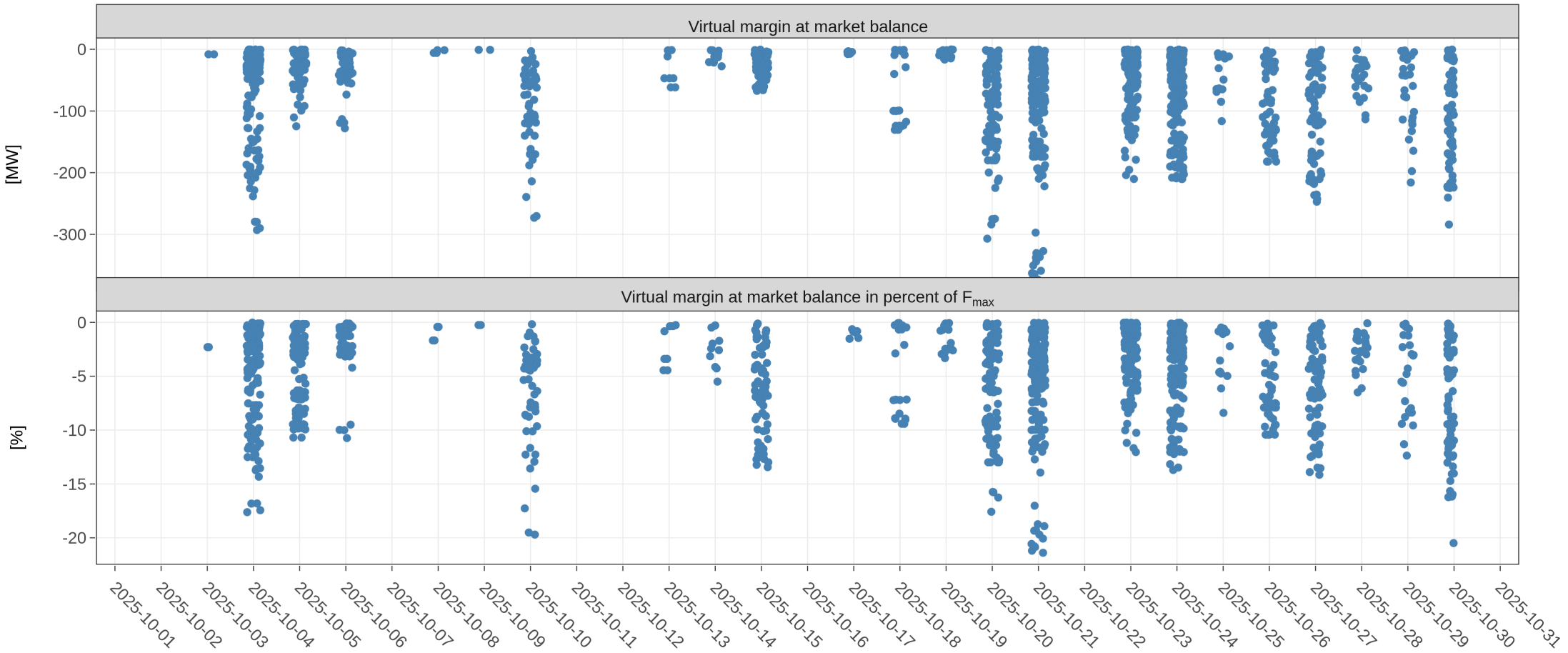
KPI 6b: Virtual margins at market balance AT



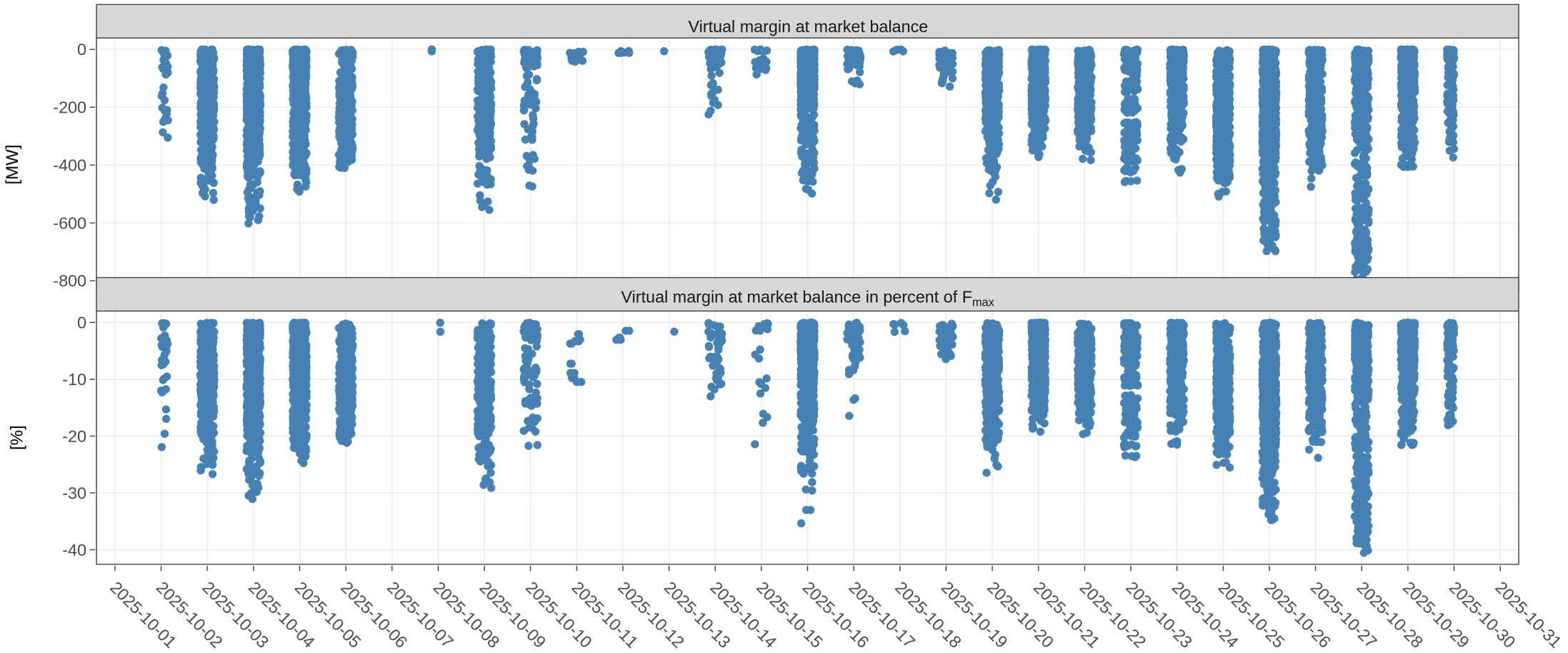
KPI 6b: Virtual margins at market balance BE



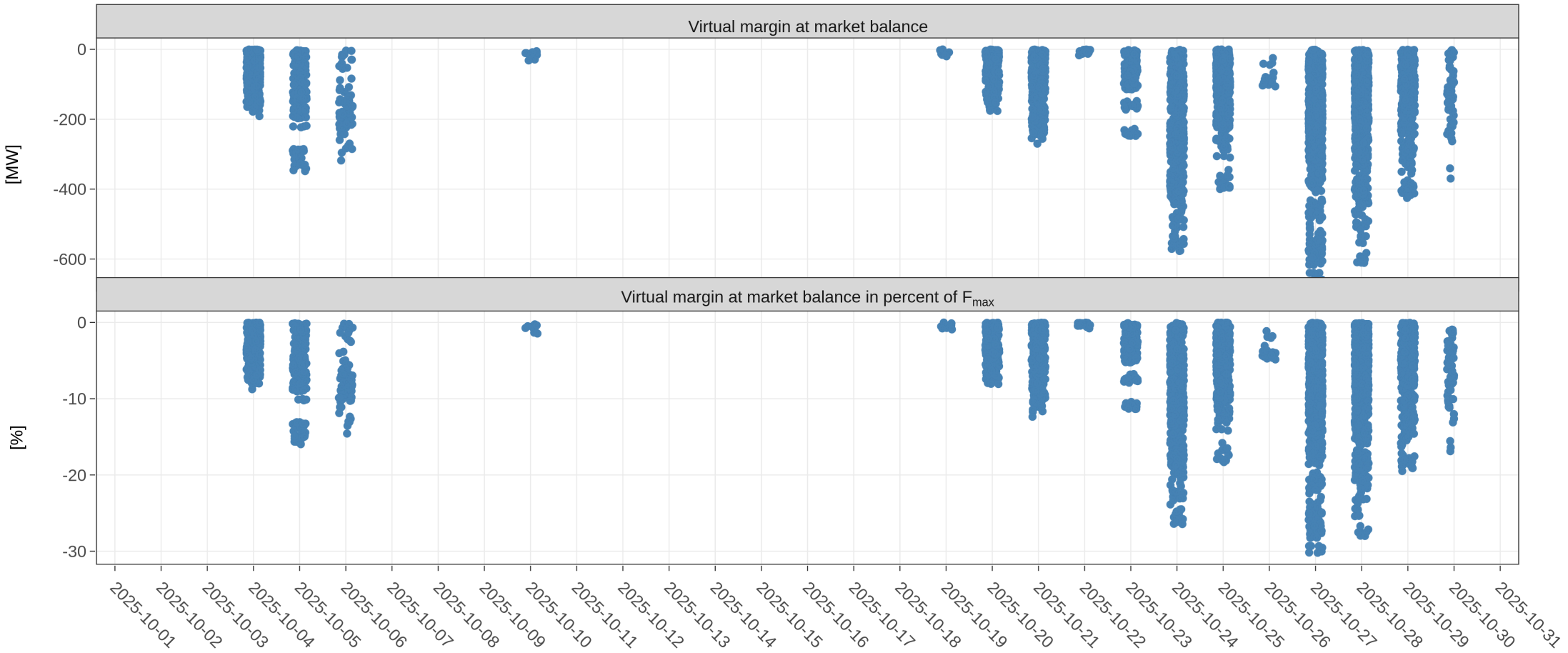
KPI 6b: Virtual margins at market balance CZ



KPI 6b: Virtual margins at market balance D2

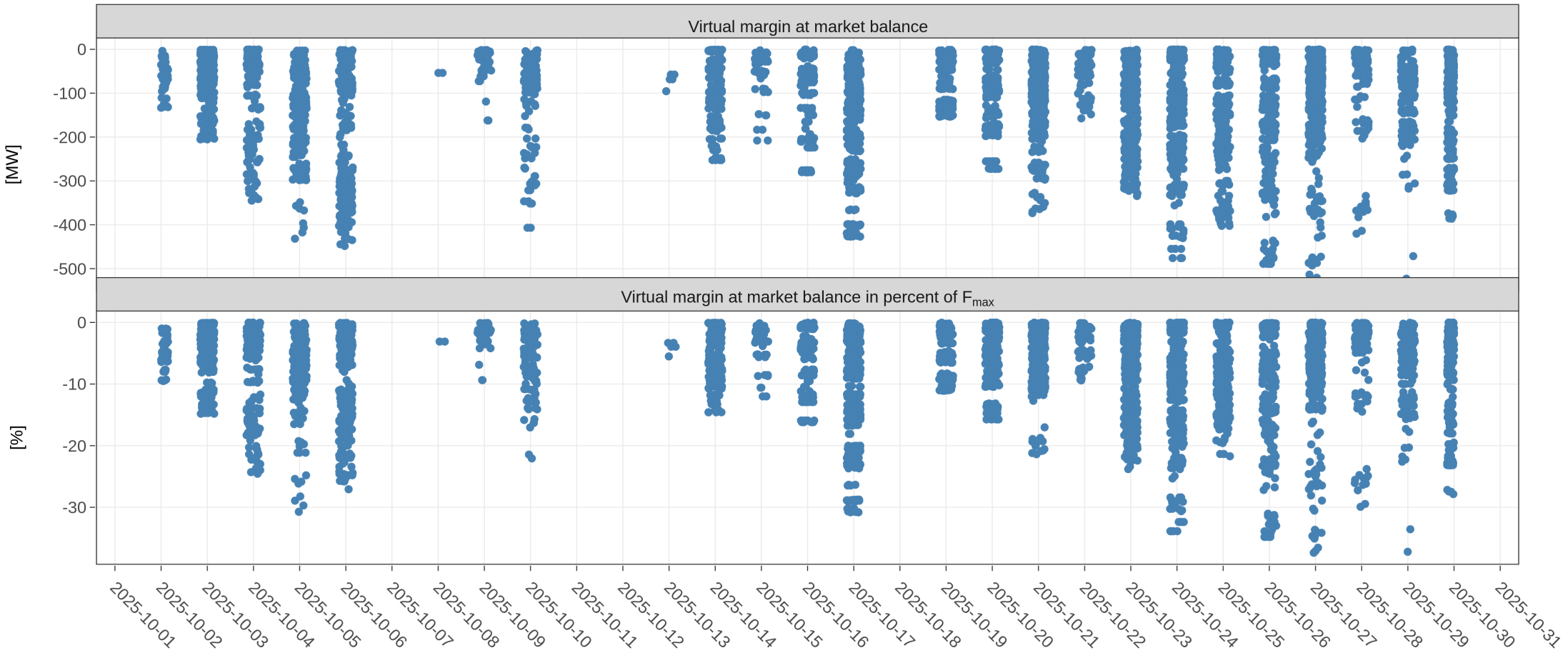


KPI 6b: Virtual margins at market balance D4

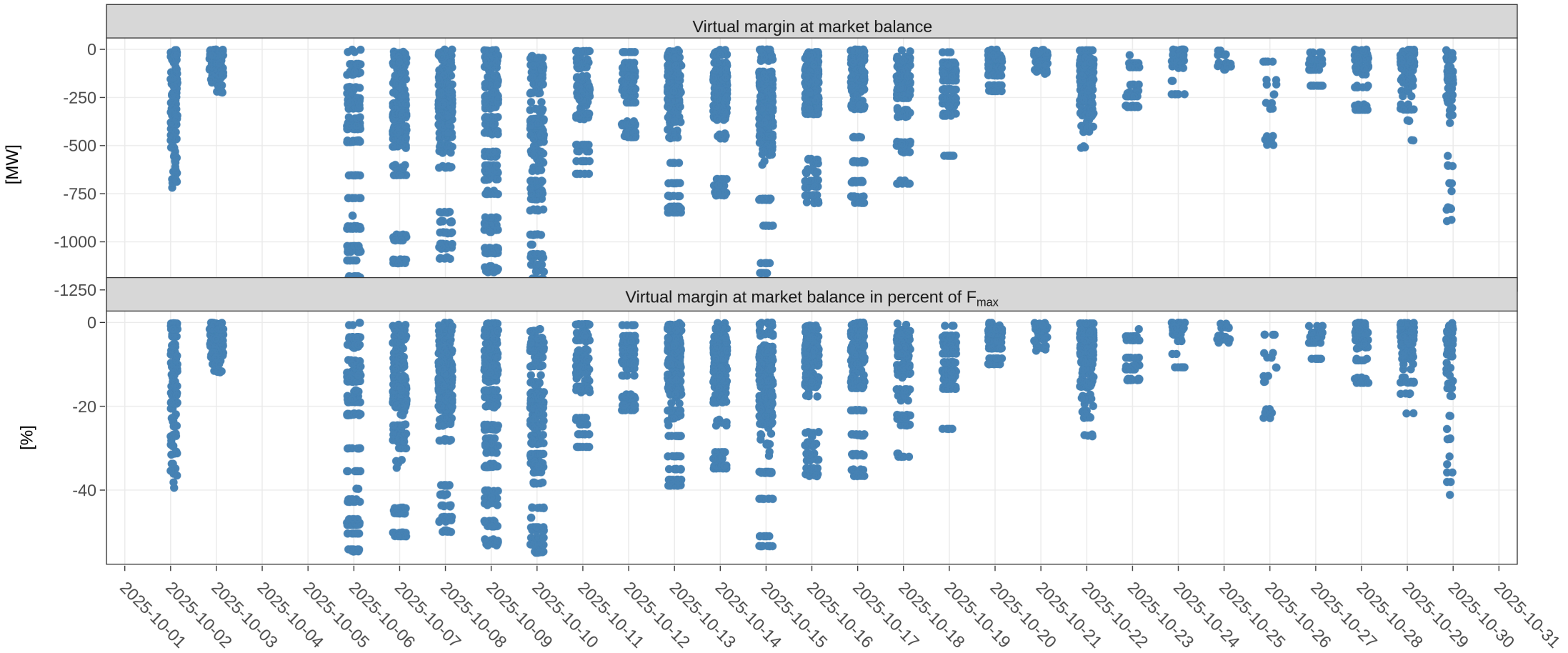


KPI 6b: Virtual margins at market balance D7

KPI 6b: Virtual margins at market balance D8



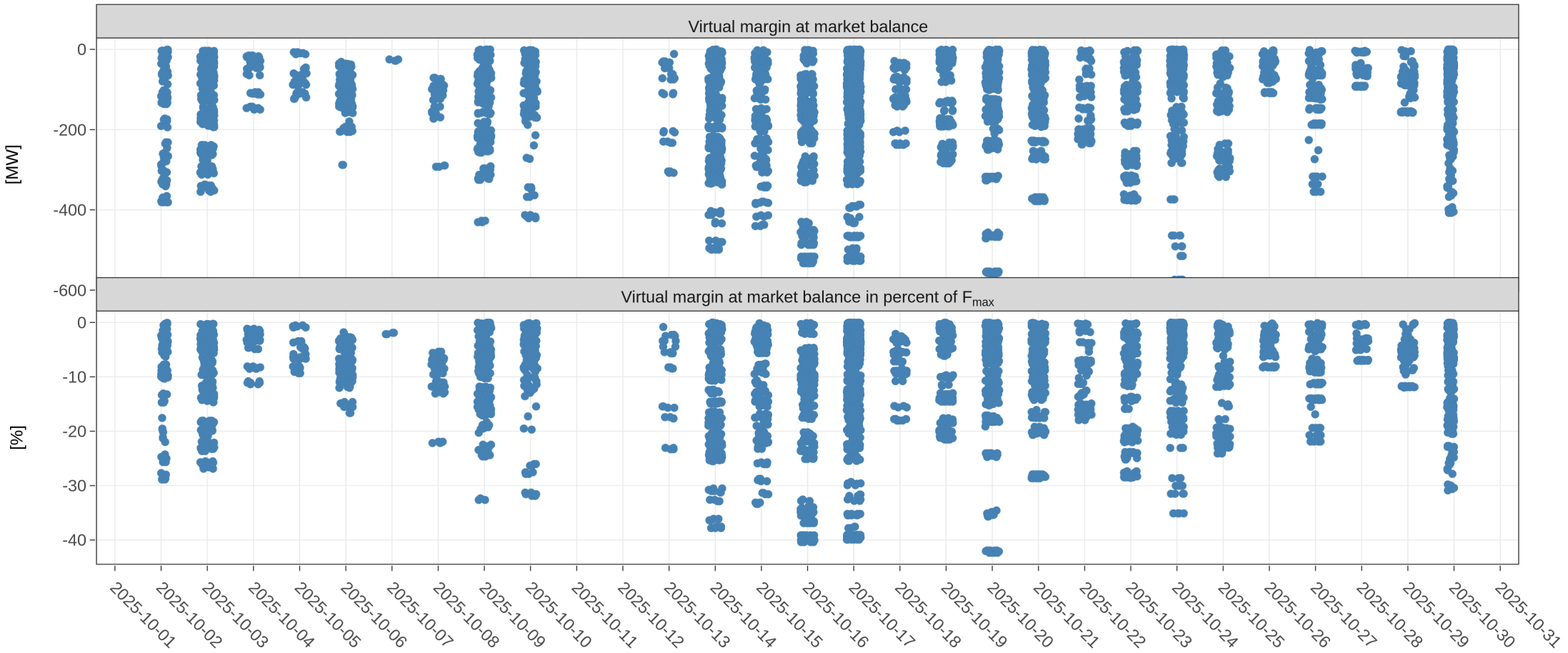
KPI 6b: Virtual margins at market balance FR



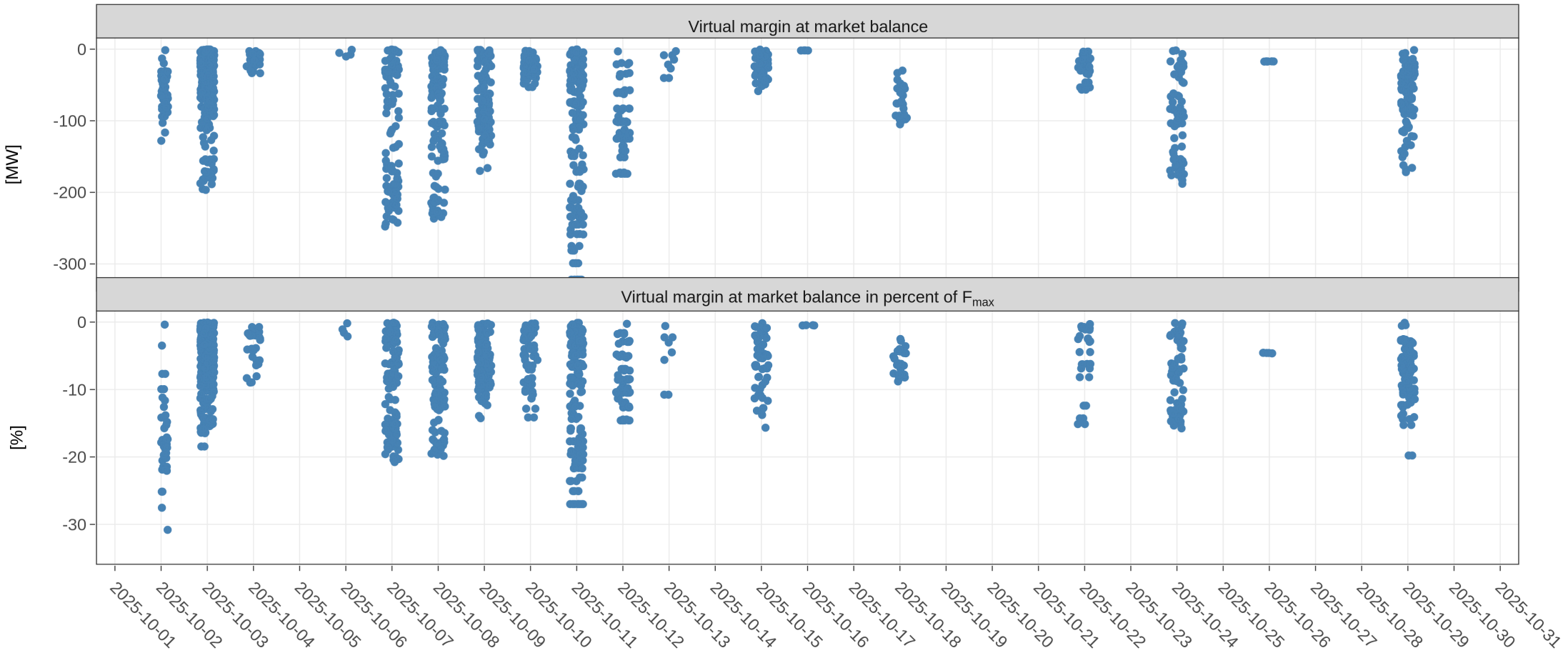
KPI 6b: Virtual margins at market balance HU

KPI 6b: Virtual margins at market balance NL

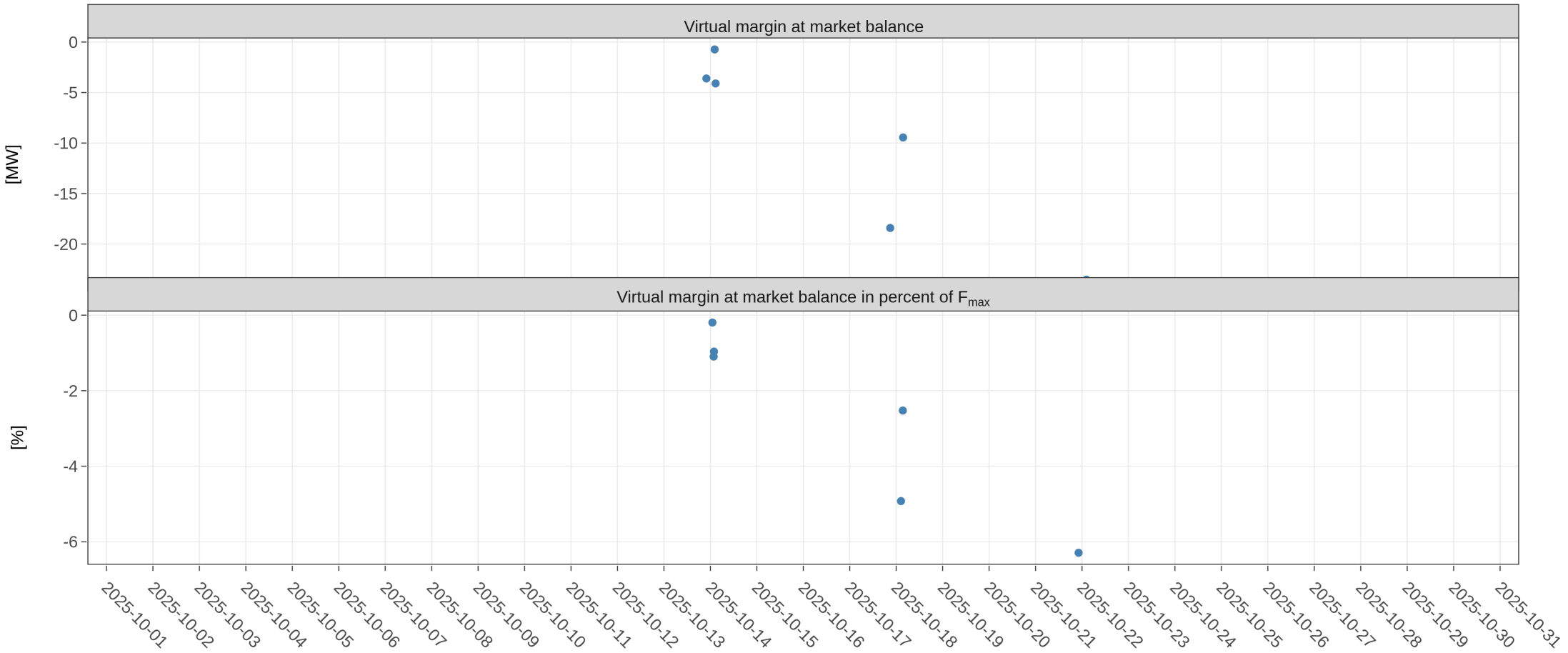
KPI 6b: Virtual margins at market balance PL



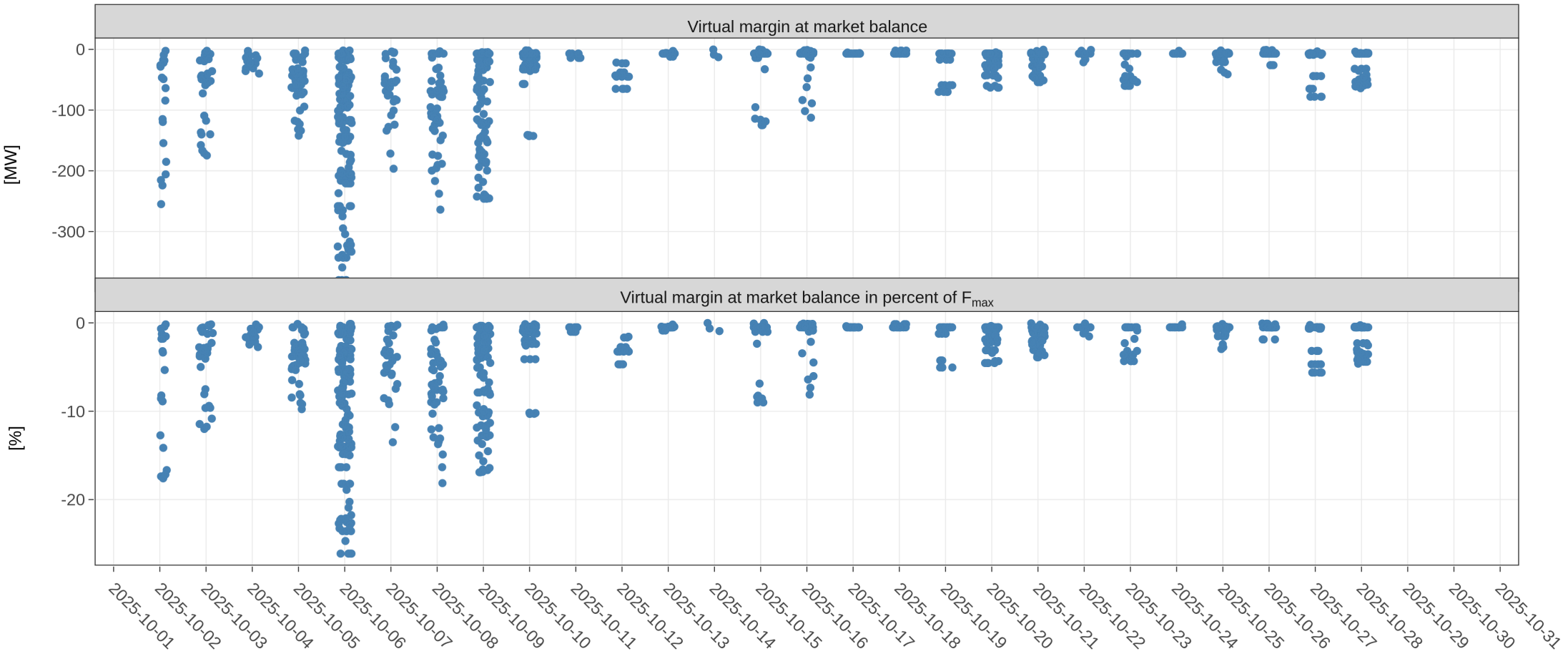
KPI 6b: Virtual margins at market balance RO



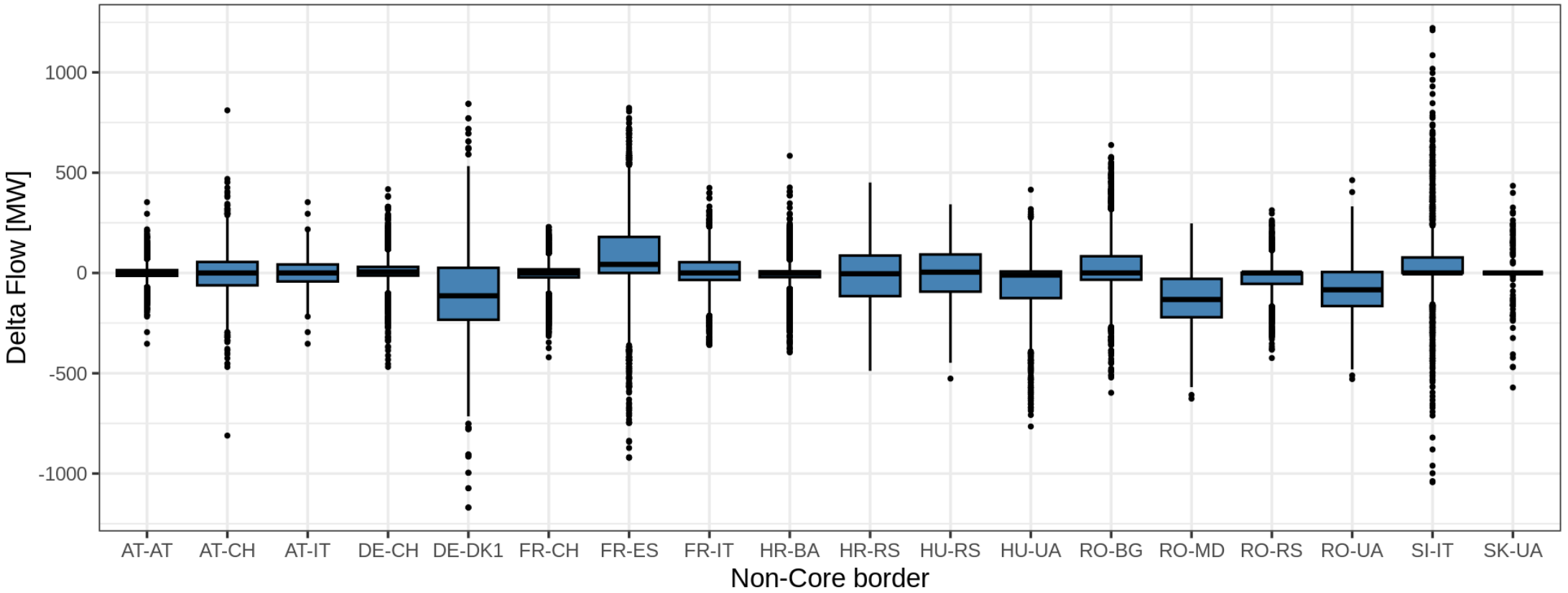
KPI 6b: Virtual margins at market balance SI



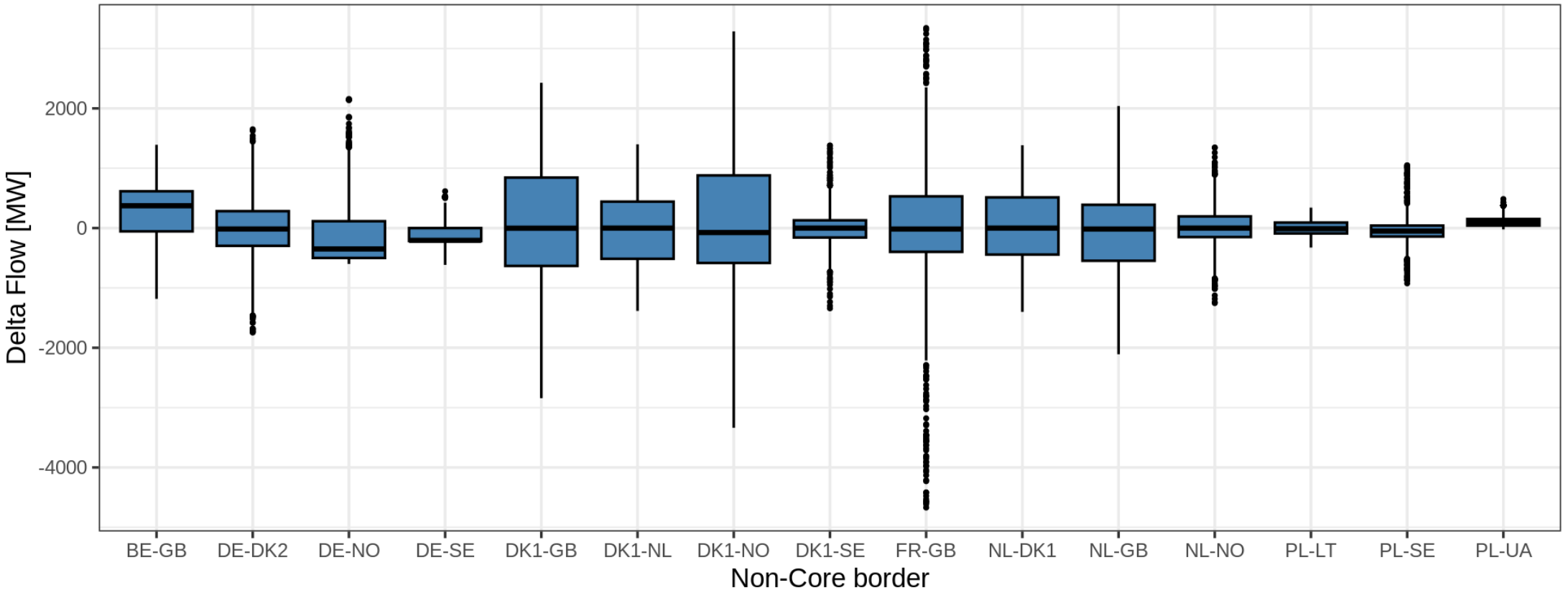
KPI 6b: Virtual margins at market balance SK



KPI 7: Non-Core exchanges AC delta flow



KPI 7: Non-Core exchanges DC delta flow

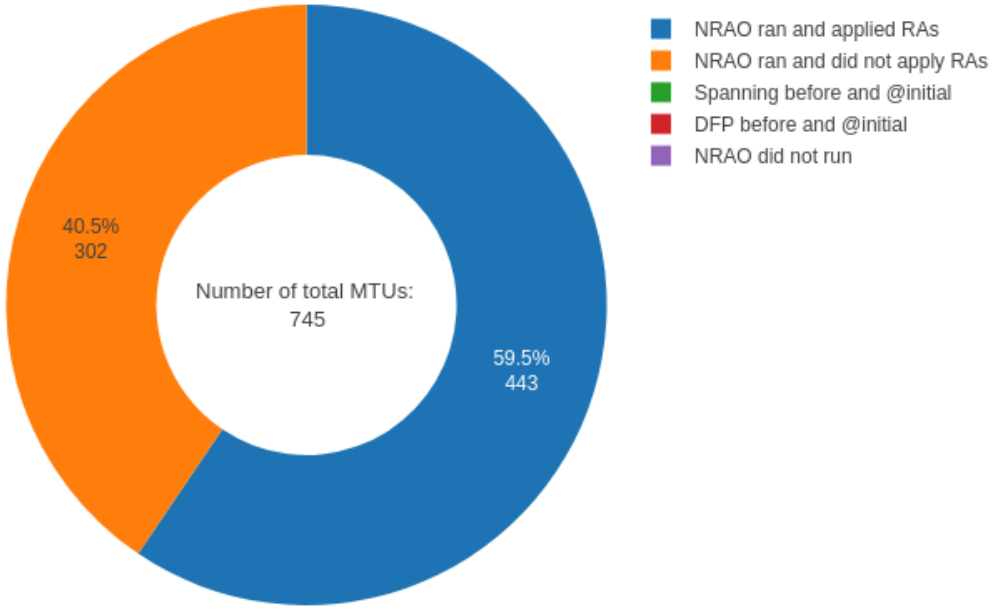


KPI 8: NRAO – Applied Remedial Action

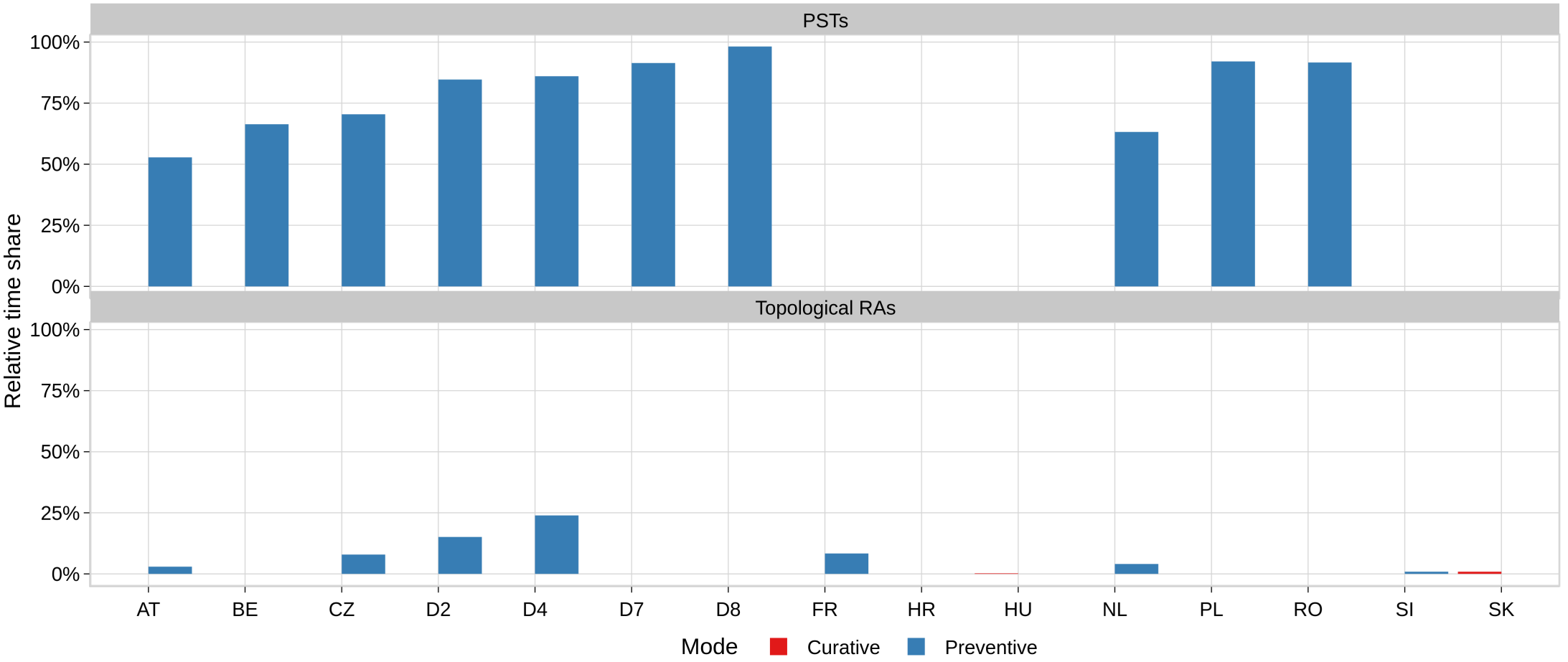
In the following plots, the relative time share relates to the hours labeled ‘NRAO Ran and Applied RAs’.

Total MTUs: 745 hours

Category	Hours (%)
NRAO ran and applied RAs	443 hours (59.5%)
NRAO ran and did not apply RAs	302 hours (40.5%)
Spanning before and @initial	0 hours (0%)
DFP before and @initial	0 hours (0%)
NRAO did not run	0 hours (0%)

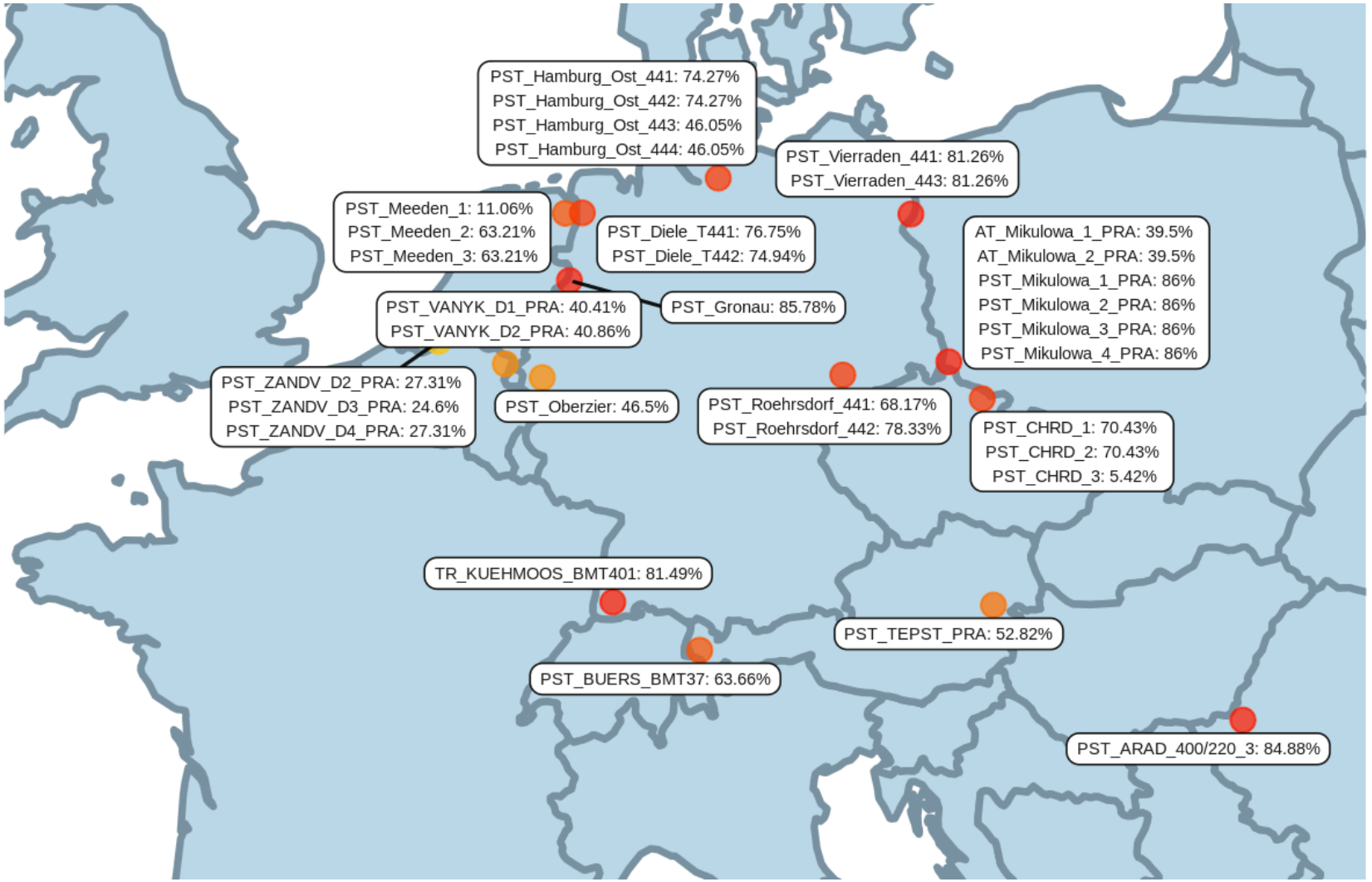


KPI 8: Relative Time Share of Applied RAs, by TSO, Type and Mode



KPI 8: Relative Time Share of Applied RAs, by TSO, Type and Mode

Relative Time Share of Applied PSTs in Preventive Mode



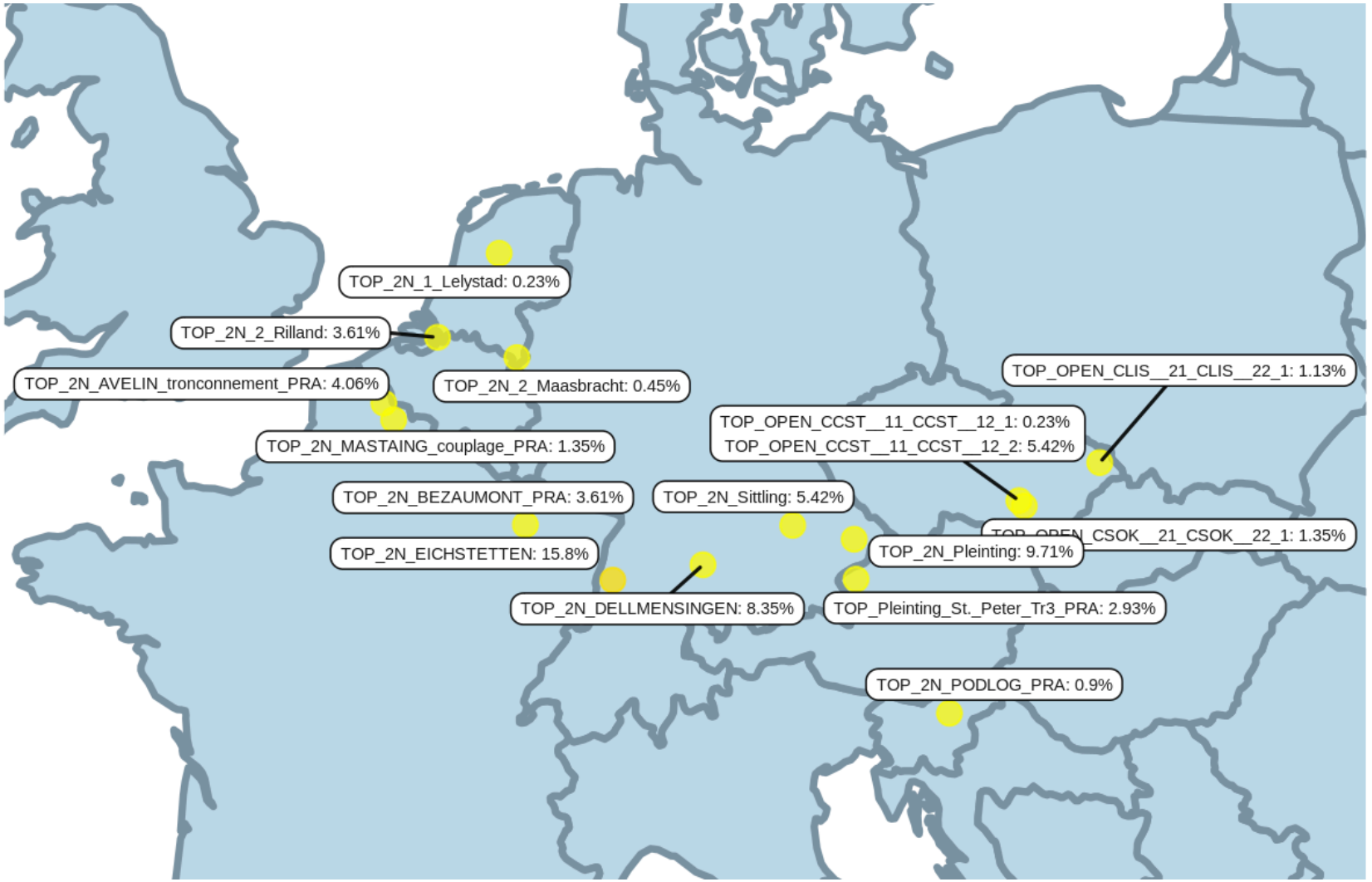
KPI 8: Relative Time Share of Applied RAs, by TSO, Type and Mode

Relative Time Share of Applied PSTs in Curative Mode

- 0%-10%
- 10%-20%
- 20%-30%
- 30%-40%
- 40%-50%
- 50%-60%
- 60%-70%
- 70%-80%
- 80%-90%
- 90%-100%

KPI 8: Relative Time Share of Applied RAs, by TSO, Type and Mode

Relative Time Share of Applied Topological RAs in Preventive Mode



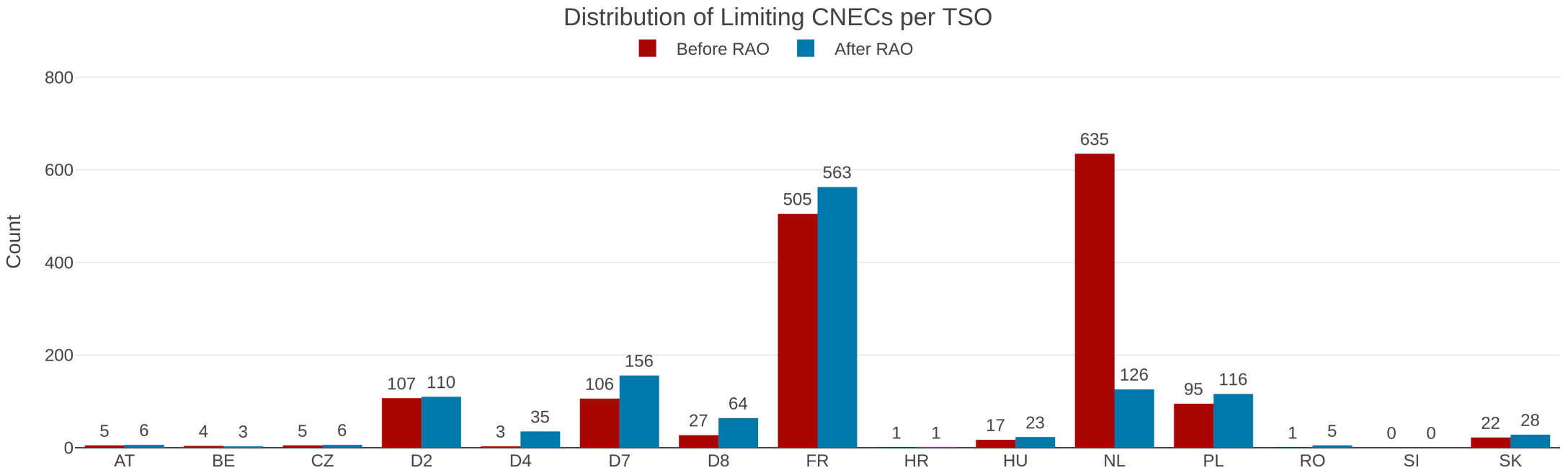
KPI 8: Relative Time Share of Applied RAs, by TSO, Type and Mode

Relative Time Share of Applied Topological RAs in Curative Mode

0%-10%
10%-20%
20%-30%
30%-40%
40%-50%
50%-60%
60%-70%
70%-80%
80%-90%
90%-100%

KPI 9: Most limiting CNEC per TSO (NRAO)

The graph below shows the distribution of CNECs which are the most limiting from NRAO perspective, these are the CNECs with lowest relative RAM per MTU



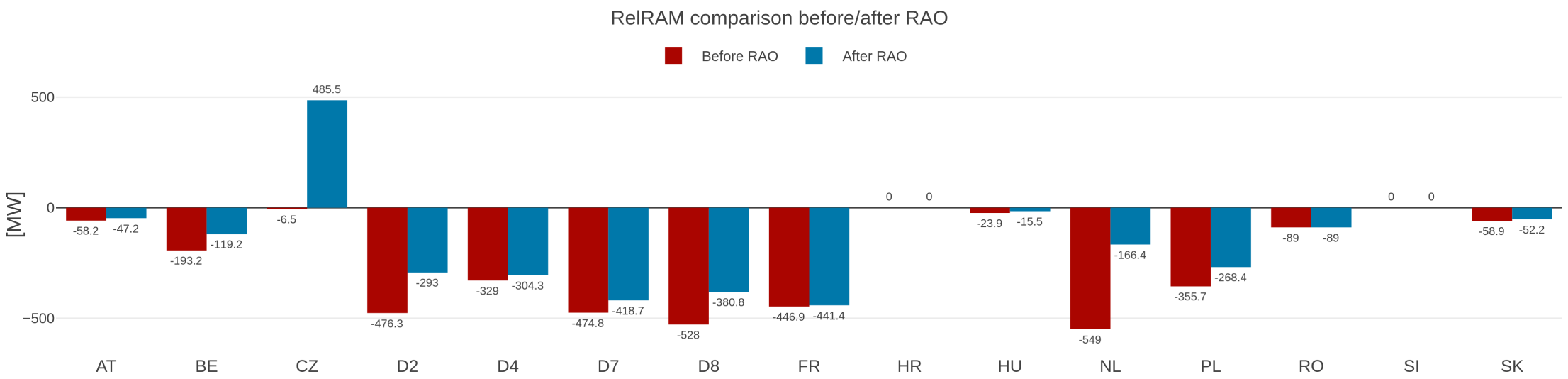
As expected, there is redistributing of the most limiting CNECs. This is because the application of Remedial Actions does not eliminate flows but re-routes, reducing the flows on some limiting CNECs and increasing the load on others, which at the end impacts also the RAM values.

KPI 10: Average variation of relative RAM before and after NRAO

The graph shows average values of relative RAM before and after NRAO, per TSO on the most limiting CNECs from NRAO perspective. Selected CNECs before RAO are the same as after RAO, and average computed for MTUs when was used further in the process.

- Most limiting element from NRAO perspective is the one which has the lowest relative RAM per MTU
- To determine value of relative RAM, the following formula was used

$$RAM_{rel} = \begin{cases} \dfrac{RAM_{nrao}}{\sum_{(A,B) \in neighbouring\ Core\ bidding\ zones\ pairs} |PTDF_{A \to B,nrao}|}, \ if\ RAM_{nrao} \geq 0 \\ RAM_{nrao}, \ if\ RAM_{nrao} < 0 \end{cases}$$



KPI 11: Most often presolved CNEs (top 20)

CNE	Distinct hours CNE was presolved	Count of presolved CNECs	Avg RAM/Fmax	Min RAM/Fmax	Max RAM/Fmax	Max z2zPTDF	Max sum z2zPTDF
[CZ-SK] Nosovice - Varin [OPP] [CZ]	745	1218	98.89%	71.81%	133.05%	0.3366	1.3938
[HR-SI] 220kV Pehlin - Divaca [DIR] [HR]	745	769	35.17%	0.00%	83.16%	0.2306	0.5315
[SK-SK] V.Dur - Levice 1 [DIR]	745	745	44.34%	34.80%	57.26%	0.1944	0.7741
[AT-HU] Zurndorf - Gyoer 439B [DIR] [AT]	745	1891	90.33%	51.15%	132.83%	0.3861	1.6794
[HR-SI] 220kV Pehlin - Divaca [OPP] [HR]	745	1487	132.69%	97.06%	218.45%	0.2306	0.5315
[SI-HU] 400 kV Cirkovce - Hevitz [OPP] [SI]	745	1489	73.52%	51.58%	99.82%	0.2167	1.1154
[HU-HU] Gonyu - Gyor [DIR]	745	1641	70.88%	24.89%	116.23%	0.2995	1.678
[HU-AT] Gyor - Zurndorf [OPP] [HU]	744	1004	92.31%	62.12%	135.71%	0.3364	1.5275
[SI-HU] 400 kV Cirkovce - Hevitz [DIR] [SI]	744	1485	107.64%	80.16%	132.10%	0.2167	1.1154
[SI-HU] Cirkovce - Heviz [OPP] [HU]	744	744	73.66%	53.17%	100.22%	0.2783	1.1783
[HU-HU] Gonyu - Gyor [OPP]	743	1029	112.48%	66.81%	168.76%	0.2995	1.678
[CZ-SK] Nosovice - Varin [DIR] [CZ]	742	1304	74.86%	20.05%	109.48%	0.3287	1.3483
[NL-NL] MEE DRT2 [DIR] [NL]	735	735	47.39%	19.96%	158.27%	0.3114	0.6957
[CZ-PL] Wielopole - Nosovice [DIR] [PL]	723	1731	58.87%	44.95%	81.24%	0.3596	1.2813
[NL-BE] Maasbracht - Van Eyck 380 White/28 [OPP] [BE]	721	2003	75.11%	30.95%	110.82%	0.3697	0.8554
[AT-SI] Obersielach - Podlog 247 [DIR] [AT]	721	1432	76.79%	30.50%	135.66%	0.1616	0.5098
[CZ-PL] Wielopole - Nosovice [OPP] [PL]	720	1504	115.01%	82.61%	156.27%	0.3435	1.217
[SK-SK] H.Zdana - Sucany [DIR]	716	773	76.12%	69.26%	90.19%	0.2761	0.9278
[NL-BE] Maasbracht - Van Eyck 380 White/28 [DIR] [BE]	711	1587	97.55%	66.22%	149.00%	0.3697	0.8554
[BE-BE] Achene - Gramme 380.10 [OPP]	710	2225	89.26%	61.62%	125.26%	0.2721	0.6064

Note 1: *The shown z2zPTDF values do not correspond to the maximum zone-to-zone PTDFs according to equation 5 of the Day-ahead CCM and hence are not the ones used for the CNEC Selection. The z2zPTDFs are calculated only between neighbouring BZs. See KPI reading guide on JAO.*
Note 2: *RAM for Core exchanges can be higher than 100% due to the relieving effect of Fuaf: RAM_Core = CEP_target - Fuaf. So if Fuaf is very negative you can get above 100%.*

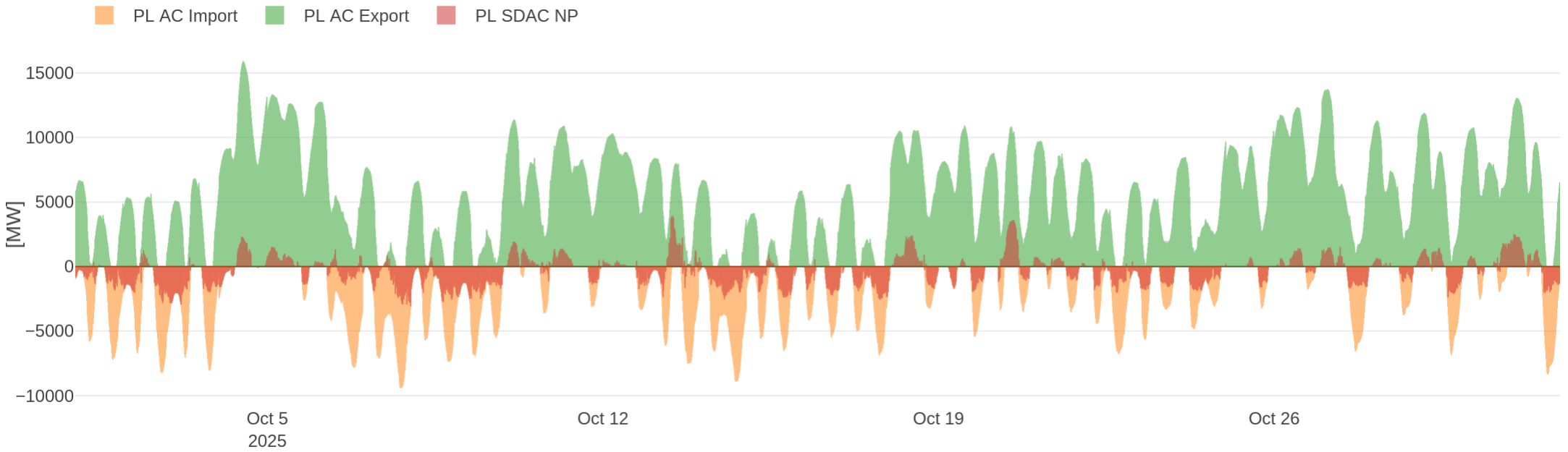
KPI 12: Most limiting CNEs (top 20)

CNE	Distinct hours CNE has shadow price	Count of hours CNECs have shadow price	Max shadow price [€/MW]	Avg RAM/Fmax	Min RAM/Fmax	Max RAM/Fmax	Max z2zPTDF
[FR-FR] Creys - Saint-Vulbas 2 [OPP]	368	368	1070.33	22.87%	19.97%	36.55%	0.1677
[SK-HU] Levice - God [DIR] [HU]	341	341	1431.38	50.21%	39.03%	65.30%	0.3466
[NL-NL] MEE DRT2 [DIR] [NL]	247	247	374.86	29.62%	19.96%	56.65%	0.3114
[AT-D2] St. Peter 2 - Pleinting 258 [OPP] [AT]	138	139	995.16	69.96%	32.30%	109.37%	0.1652
[FR-D7] Vigy - Ensdorf VIGY2 S [DIR] [D7]	135	220	1482.52	22.35%	19.96%	53.77%	0.2392
[D8-PL] Mikulowa PST1 [DIR] [PL]	130	130	860.57	50.76%	34.70%	59.70%	0.2816
[D2-D2] Altheim - Sittling 220 [OPP]	127	127	2028.22	57.50%	25.78%	95.09%	0.0841
[D8-D8] Roehrsdorf - Roehrsdorf PST442 [DIR]	109	109	826.95	51.49%	41.14%	59.00%	0.345
[D2-D2] Altheim - Sittling 219 [OPP]	83	83	1543.8	54.06%	22.41%	90.59%	0.081
[D7-FR] Ensdorf - Vigy VIGY2 S [OPP] [FR]	83	84	593.35	29.73%	19.96%	52.55%	0.2345
[AT-SI] Obersielach - Podlog 247 [DIR] [AT]	70	76	722.95	61.41%	30.50%	98.50%	0.1608
[RO-RO] TR Rosiori 400/220 1 [DIR]	69	69	796.09	43.91%	26.88%	61.25%	0.1355
[CZ-SK] Nosovice - Varin [DIR] [CZ]	64	68	396.44	67.08%	20.05%	91.36%	0.3229
[FR-FR] Creys - Saint-Vulbas 1 [OPP]	62	62	993.49	20.95%	19.97%	32.32%	0.167
[D8-PL] Krajnik - Vierraden 1 [OPP] [PL]	61	61	476.45	49.34%	20.19%	63.32%	0.3832
[BE-BE] Achene - Gramme 380.10 [DIR]	60	65	204.05	78.68%	57.27%	97.21%	0.2716
[CZ-PL] Wielopole - Nosovice [DIR] [PL]	46	46	288.02	55.82%	49.21%	65.08%	0.3429
[NL-BE] Maasbracht - Van Eyck 380 White/28 [DIR] [BE]	40	40	18.35	98.27%	76.79%	111.70%	0.4102
[NL-BE] PST Zandvliet 4 [DIR] [BE]	36	36	74.62	86.66%	68.84%	106.83%	0.4426
[SK-SK] V.Dur - Levice 1 [DIR]	30	30	621.57	41.26%	35.12%	48.73%	0.1783

Note 1: *The RAM values (expressed as % of Fmax) should not be interpreted as "the capacities offered by the Core TSOs to the market coupling". Indeed, since the introduction of Ext LTA inclusion Euphemia performs an optimization where it takes a portion of the FB domain and a portion of the LTA domain to maximize welfare. The RAM value shown in this KPI report correspond to the "portion of the FB domain" resulting from this optimization*
Example:

- RAM = 500MW
- Portion of FB Domain = 40%
- RAM offered by Core TSOs = 500MW/0.4 = 1250MW

KPI 13 : Allocation Constraints - Poland

	# MTUs
AC was limiting MC	977
AC < 0 MW	387
AC = 0 MW	581
AC > 0 MW	9

	PL AC Import [MW]	PL AC Export [MW]
Avg.	-1775.09	5503.06
Min.	-9373.00	0.00
Max.	0.00	15882.00