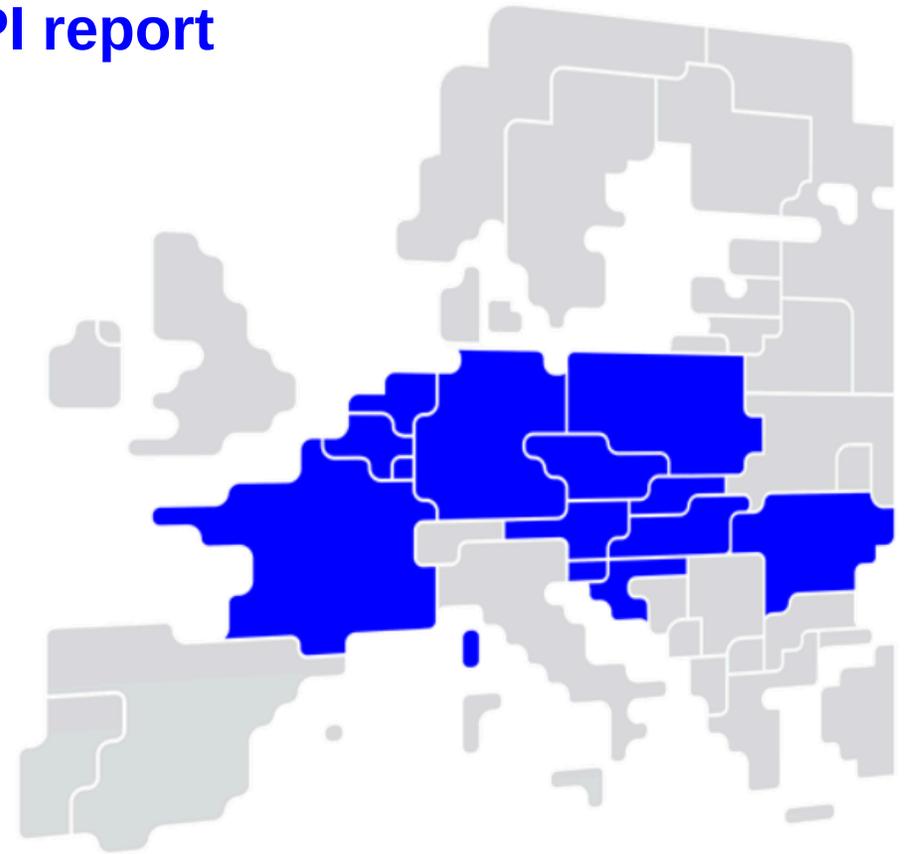




Core FB MC Operational KPI report

February 2026



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

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- KPI 11: Most often presolved CNEs (top 20)
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- KPI 13: Allocation Constraints

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

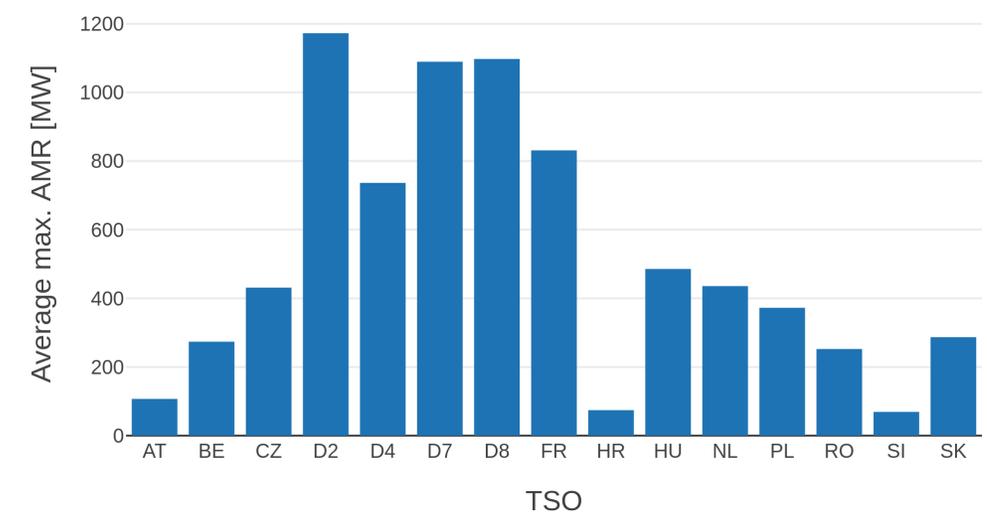
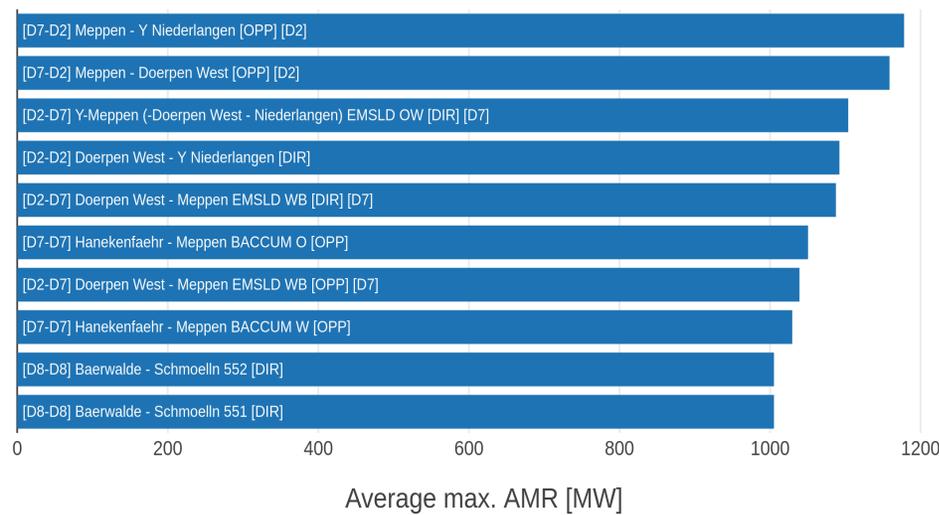
KPI 2: Average maximum AMR per TSO



CNE	Avg. Max. AMR (MW)	AMR/Fmax%	
		(MTUs with AMR > 0 MW)	AMR/Fmax% (all MTUs)
[D7-D2] Meppen - Y Niederlangen [OPP] [D2]	1178.02	57.26%	53.85%
[D7-D2] Meppen - Doerpen West [OPP] [D2]	1158.68	56.32%	53.05%
[D2-D7] Y-Meppen (-Doerpen West - Niederlangen) EMSLD OW [DIR] [D7]	1103.83	44.26%	41.16%
[D2-D2] Doerpen West - Y Niederlangen [DIR]	1092.12	53.07%	49.91%
[D2-D7] Doerpen West - Meppen EMSLD WB [DIR] [D7]	1087.48	43.62%	40.50%
[D7-D7] Hanekenfaehr - Meppen BACCUM O [OPP]	1050.43	42.78%	39.91%
[D2-D7] Doerpen West - Meppen EMSLD WB [OPP] [D7]	1039.04	41.67%	38.70%
[D7-D7] Hanekenfaehr - Meppen BACCUM W [OPP]	1029.42	42.06%	39.25%
[D8-D8] Baerwalde - Schmoelln 551 [DIR]	1005.17	40.30%	40.30%
[D8-D8] Baerwalde - Schmoelln 552 [DIR]	1005.17	40.30%	40.30%

TSO	Average maximum AMR per TSO
AT	107.02
BE	273.66
CZ	431.31
D2	1172.43
D4	736.59
D7	1089.25
D8	1097.52
FR	831.17
HR	74.05
HU	485.67

TSO	Average maximum AMR per TSO
NL	435.64
PL	372.29
RO	252.47
SI	69.10
SK	286.78



KPI 3: Share of MTUs with intervention per TSO



Total BDs

28

Total MTUs

672

MTUs without IVA

42

Share of distinct MTUs without IVA

6.25%

MTUs with IVA

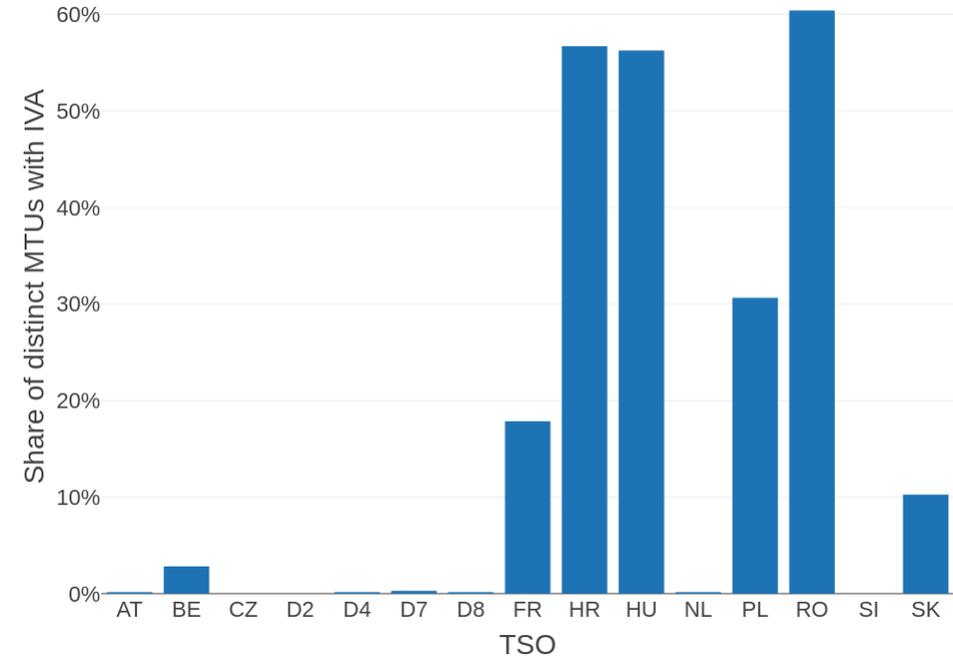
630

Share of distinct MTUs with IVA

93.8%

TSO	Share of distinct MTUs with IVA	Distinct MTUs with IVA
AT	0.15%	1
BE	2.83%	19
CZ	0.00%	0
D2	0.00%	0
D4	0.15%	1
D7	0.30%	2
D8	0.15%	1
FR	17.86%	120
HR	56.70%	381
HU	56.25%	378

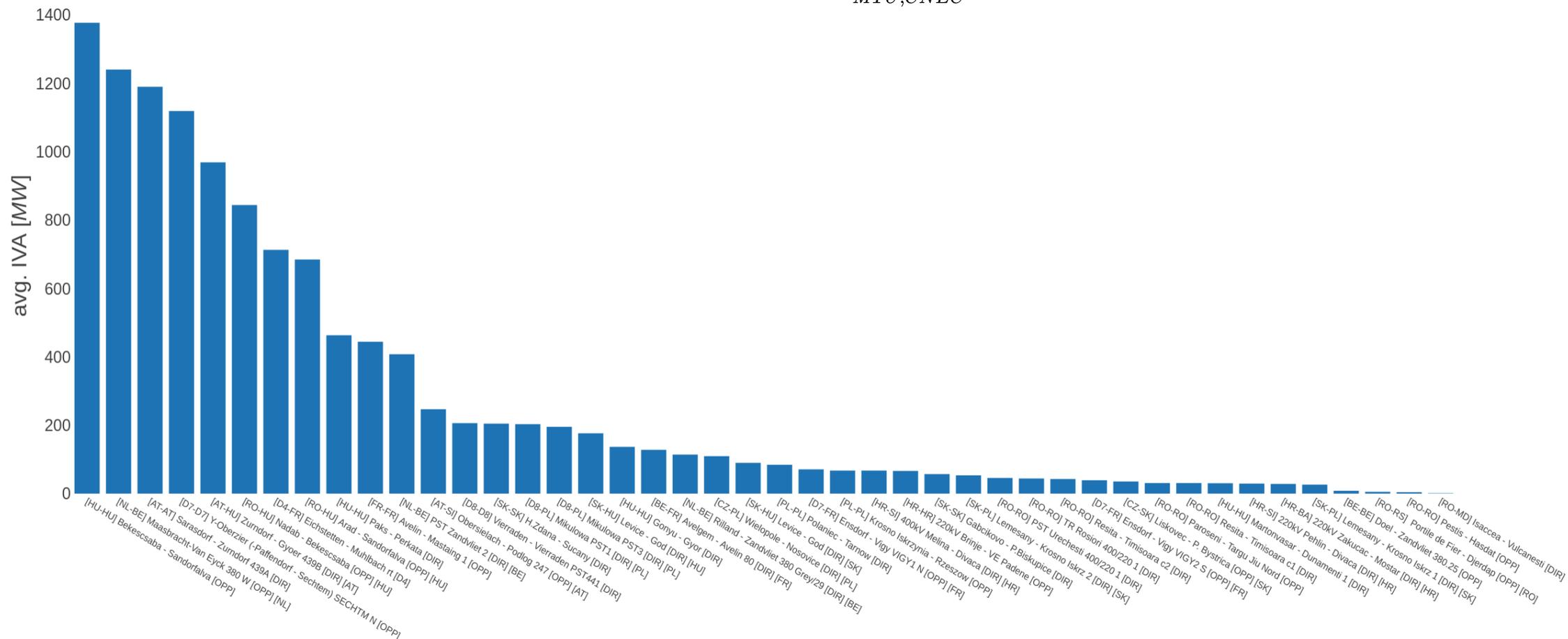
TSO	Share of distinct MTUs with IVA	Distinct MTUs with IVA
NL	0.15%	1
PL	30.65%	206
RO	60.42%	406
SI	0.00%	0
SK	10.27%	69



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



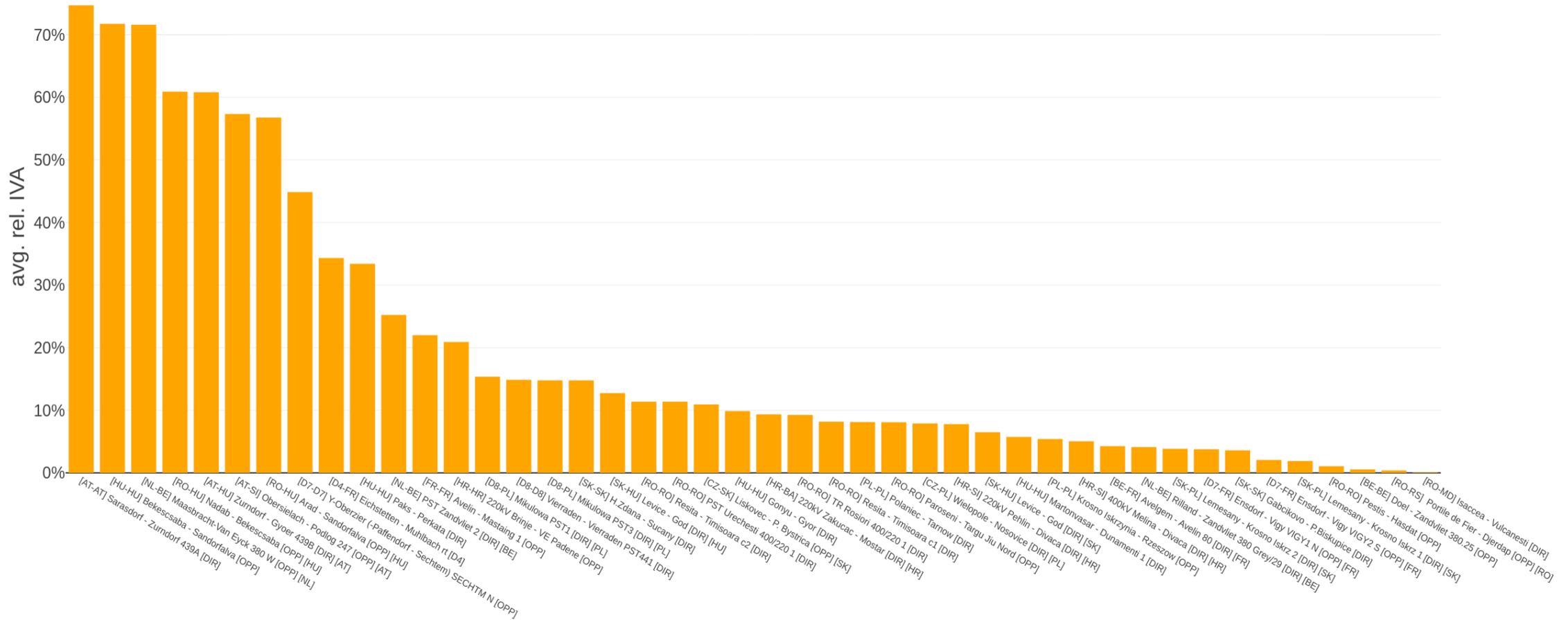
$$\text{avg. IVA}_{CNE} = \frac{1}{\#(CNEC, MTU)[IVA_{CNEC,MTU} > 0]} \sum_{MTU, CNEC} IVA_{CNEC,MTU} [IVA_{CNEC,MTU} > 0]$$



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



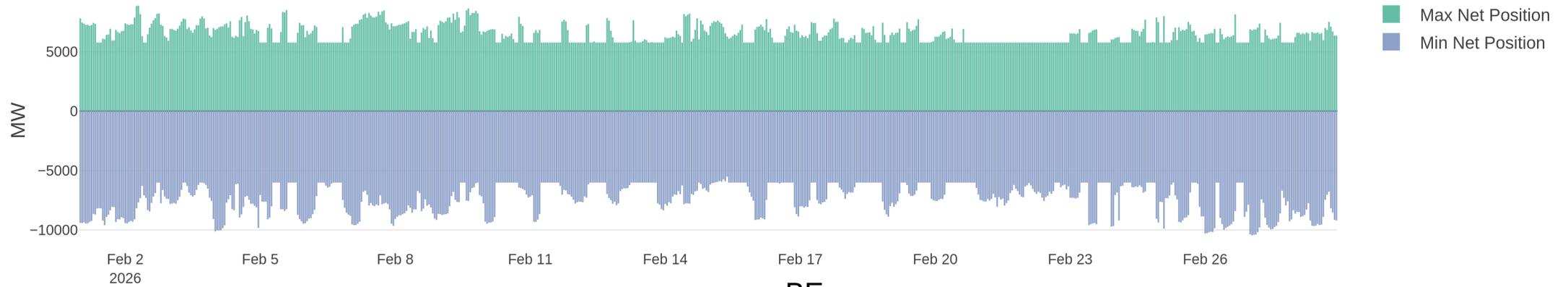
$$\text{avg. rel. IVA}_{CNE} = \frac{1}{\#(CNEC, MTU)[IVA_{CNEC, MTU} > 0]} \sum_{MTU, CNEC} \frac{IVA_{CNEC, MTU}[IVA_{CNEC, MTU} > 0]}{F_{maxCNEC, MTU}[IVA_{CNEC, MTU} > 0]}$$



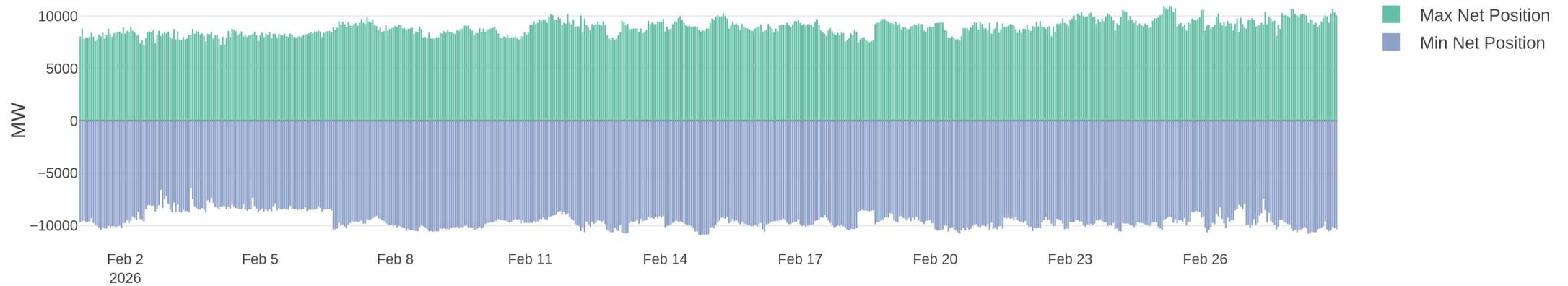
KPI 5: Min & max net positions per BZ hub



AT



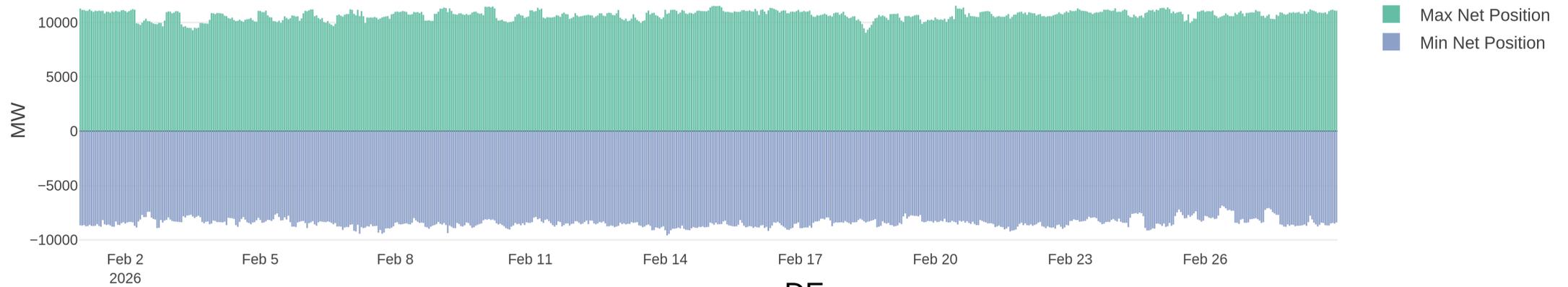
BE



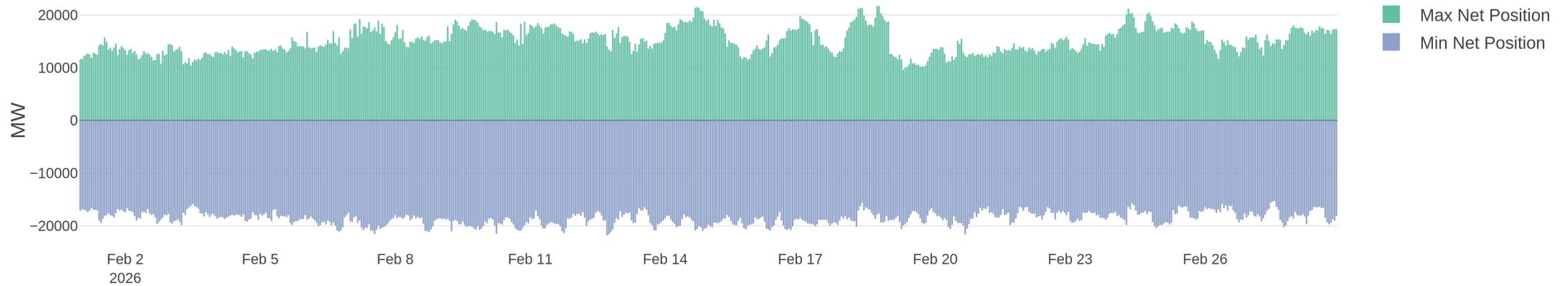
KPI 5: Min & max net positions per BZ hub



CZ



DE



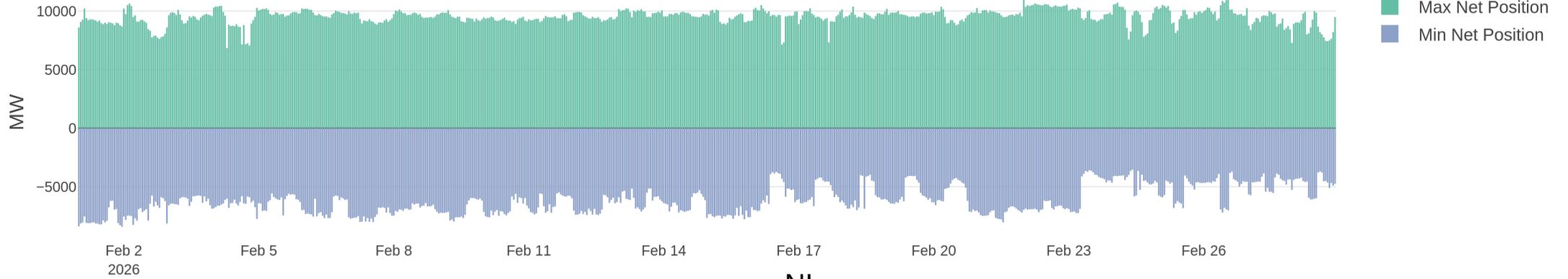
KPI 5: Min & max net positions per BZ hub



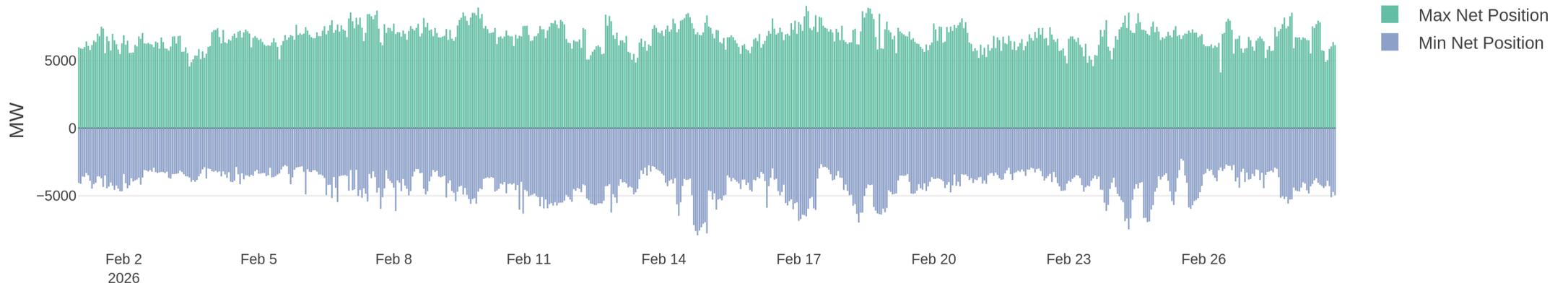
KPI 5: Min & max net positions per BZ hub



HU



NL



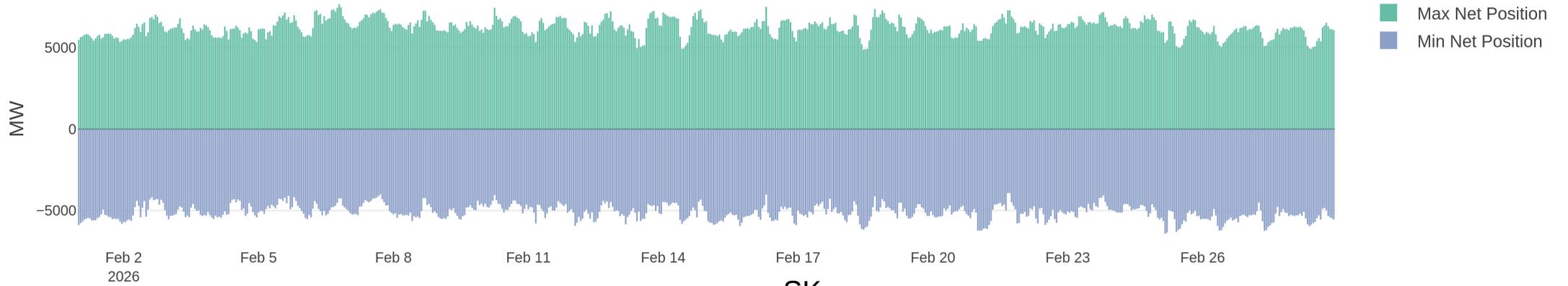
KPI 5: Min & max net positions per BZ hub



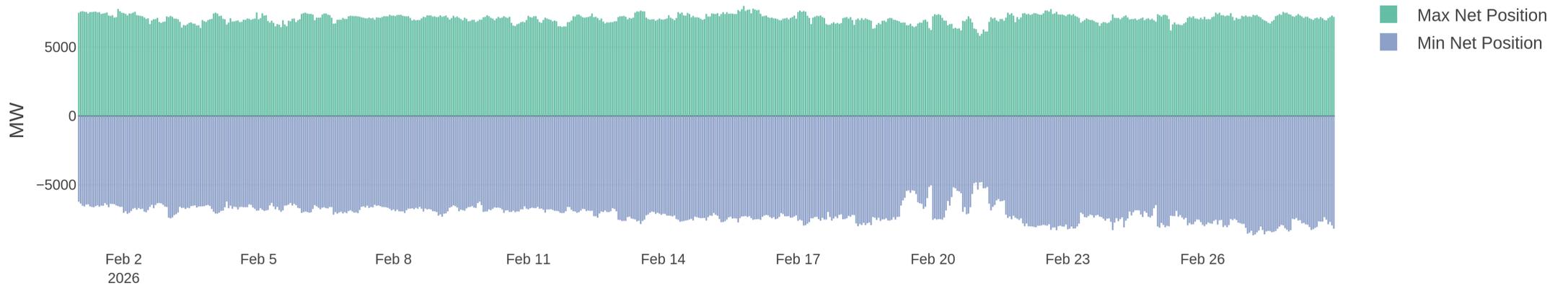
KPI 5: Min & max net positions per BZ hub



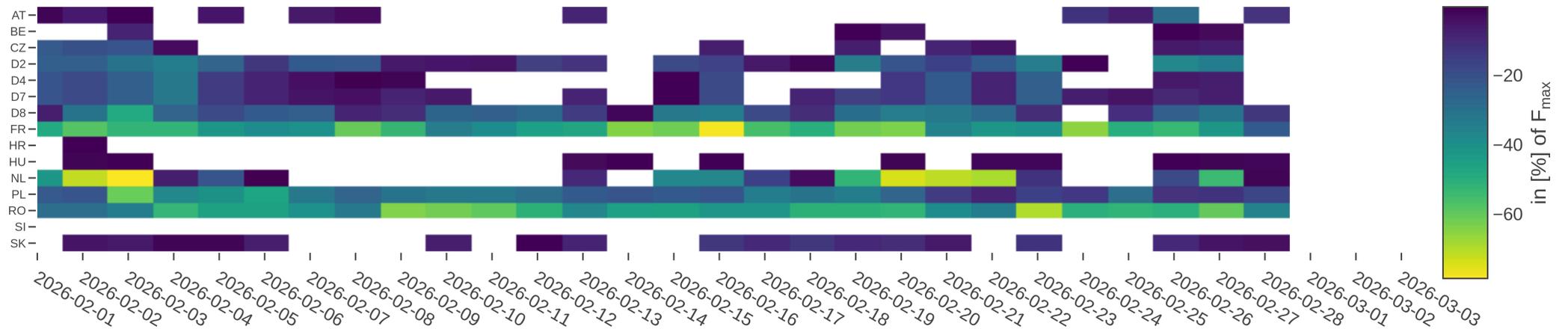
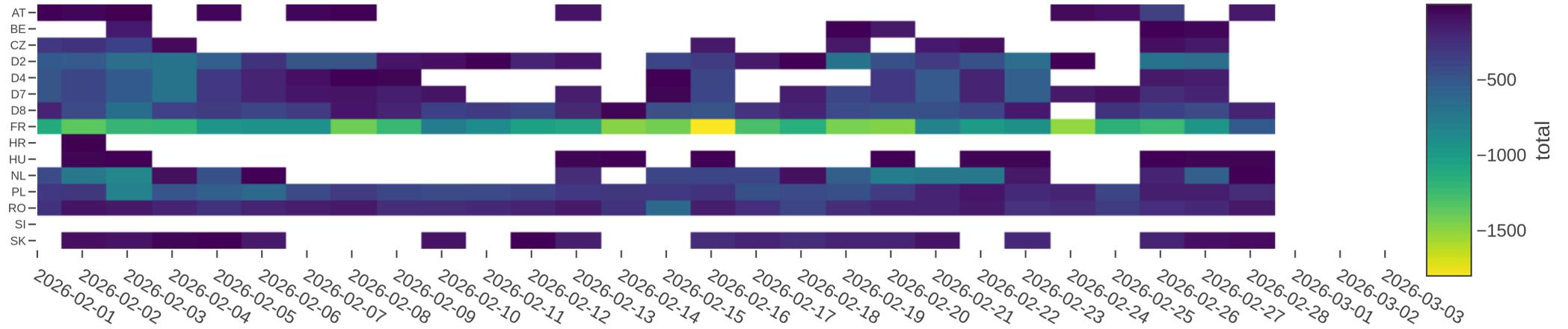
SI



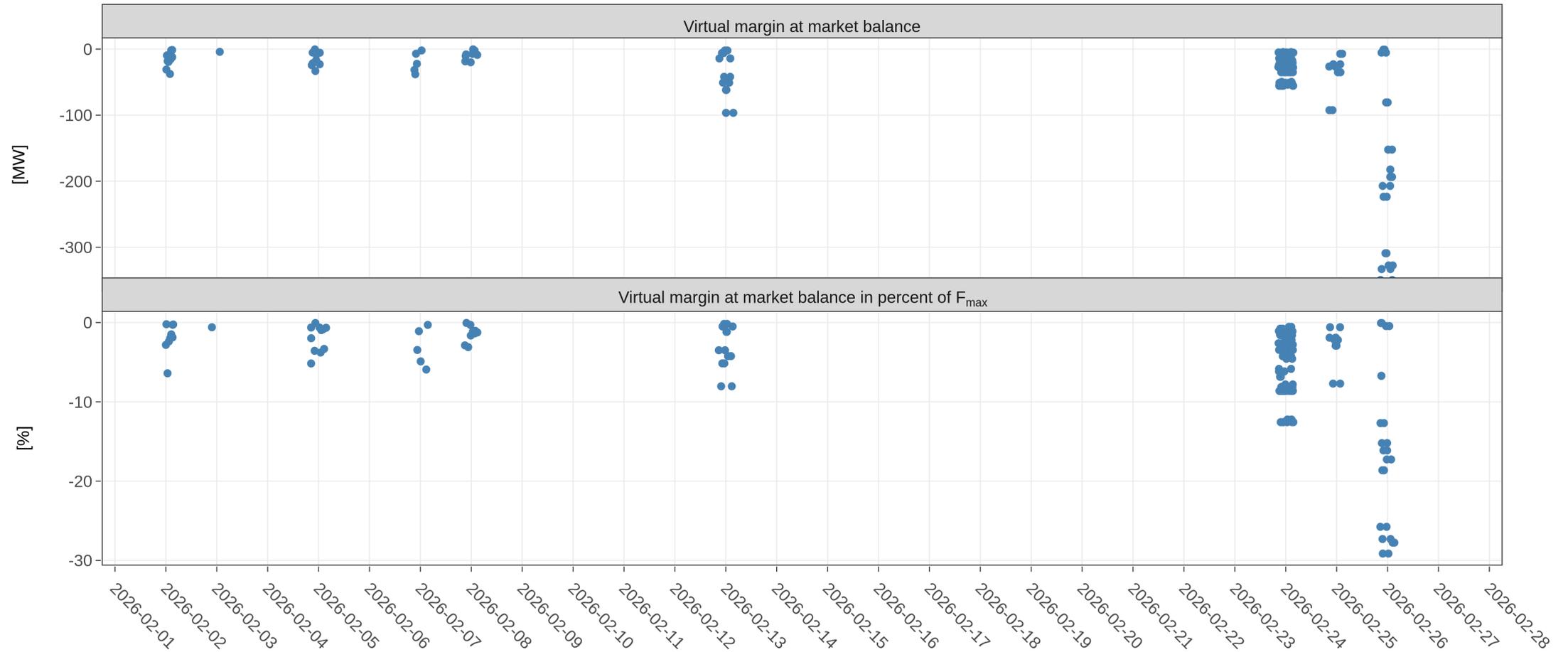
SK



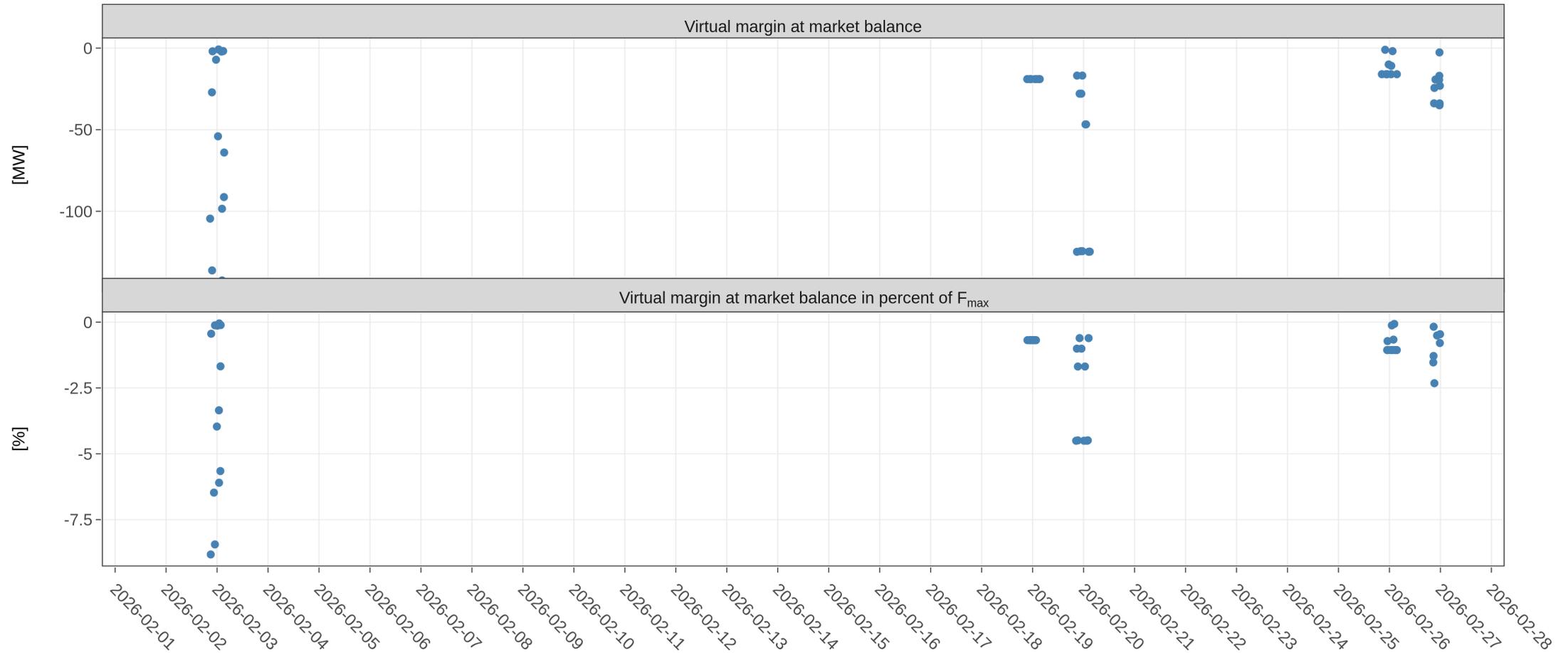
KPI 6a: Highest virtual margins at market balance for CORE TSOs



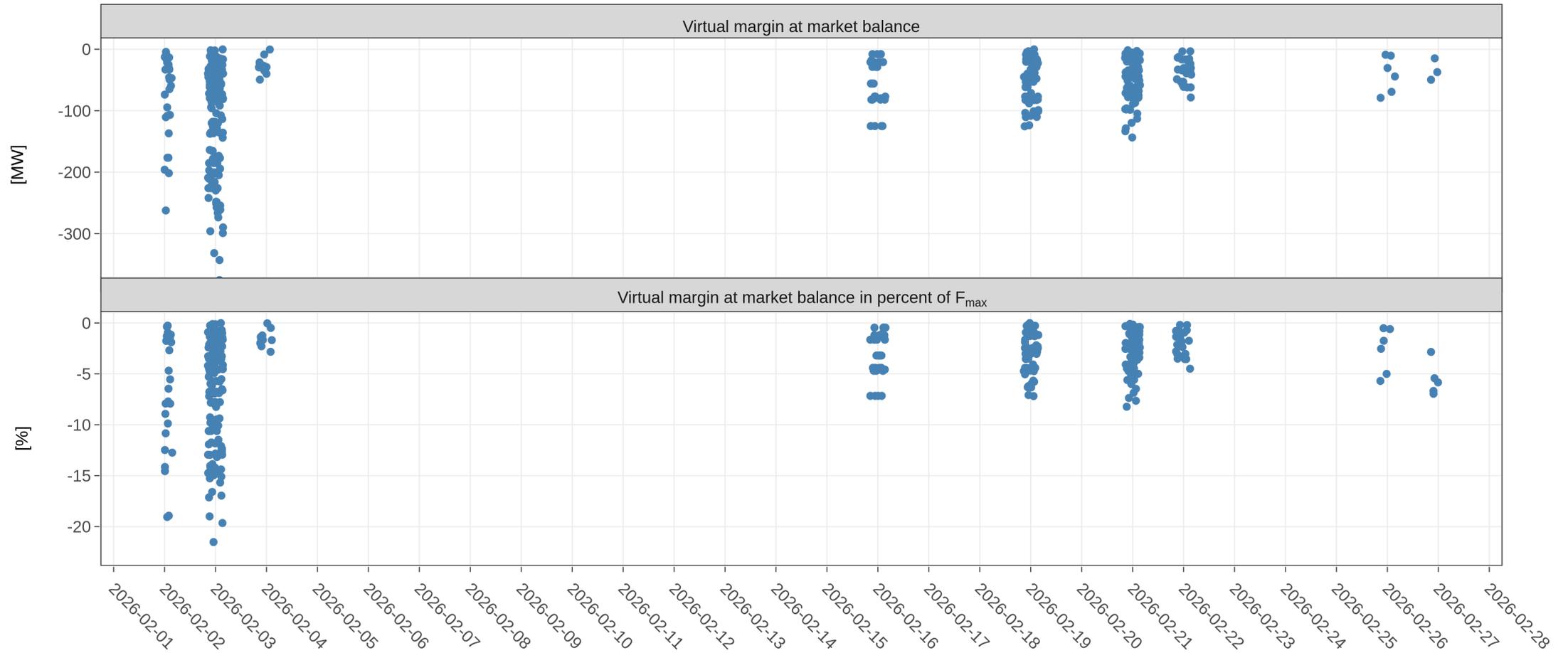
KPI 6b: Virtual margins at market balance AT



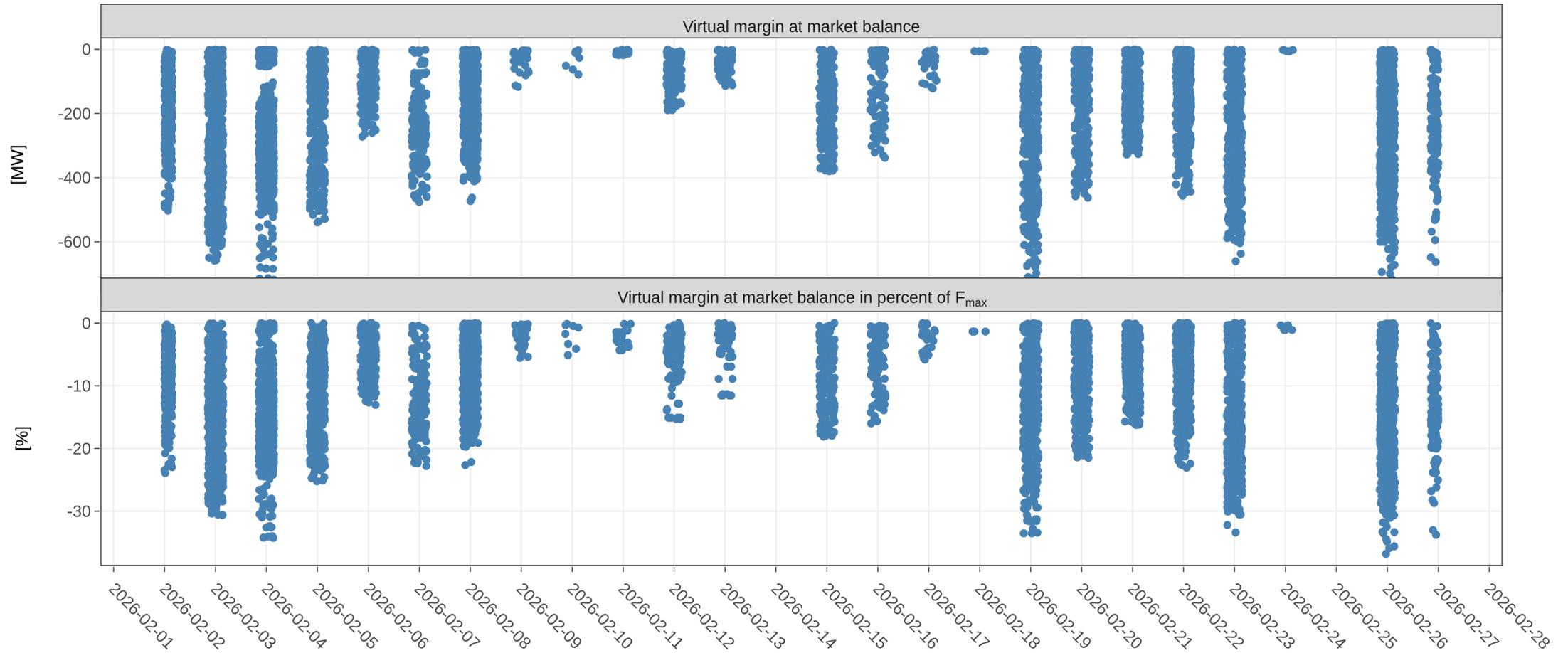
KPI 6b: Virtual margins at market balance BE



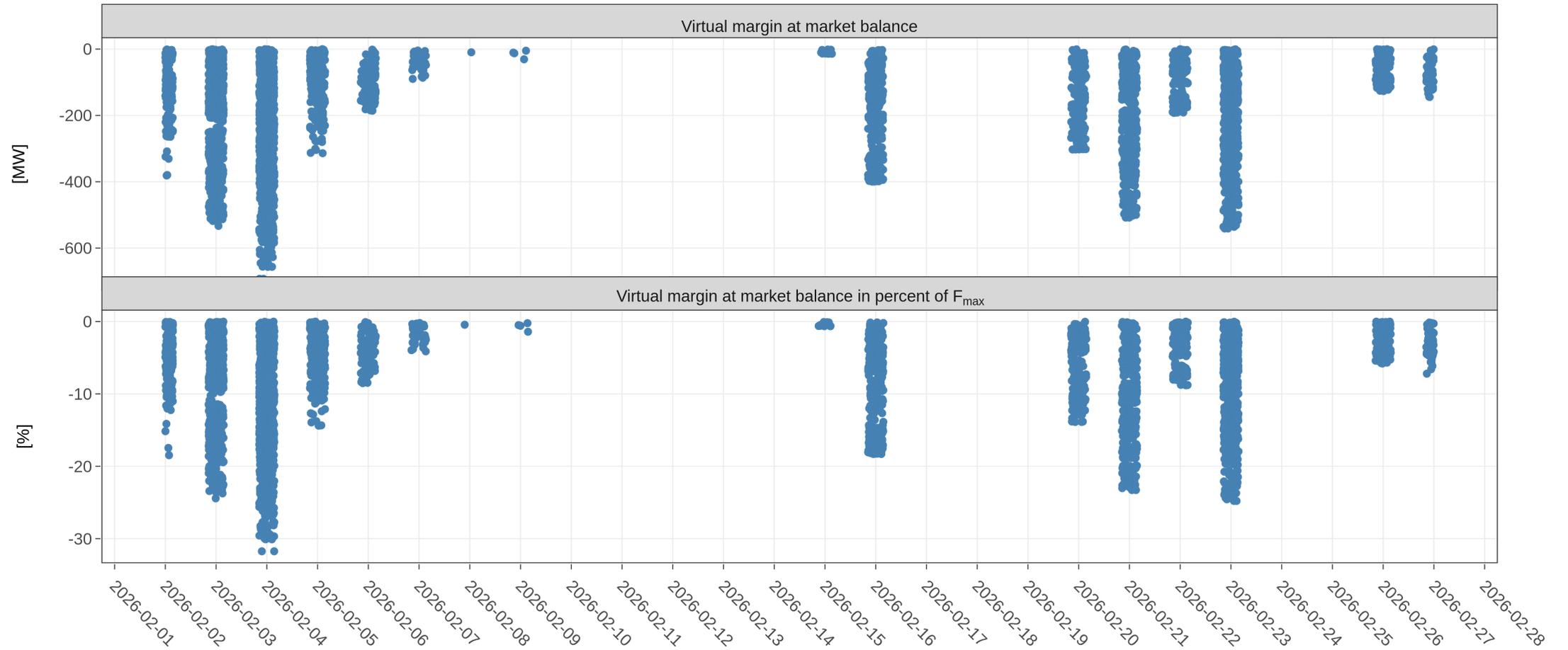
KPI 6b: Virtual margins at market balance CZ



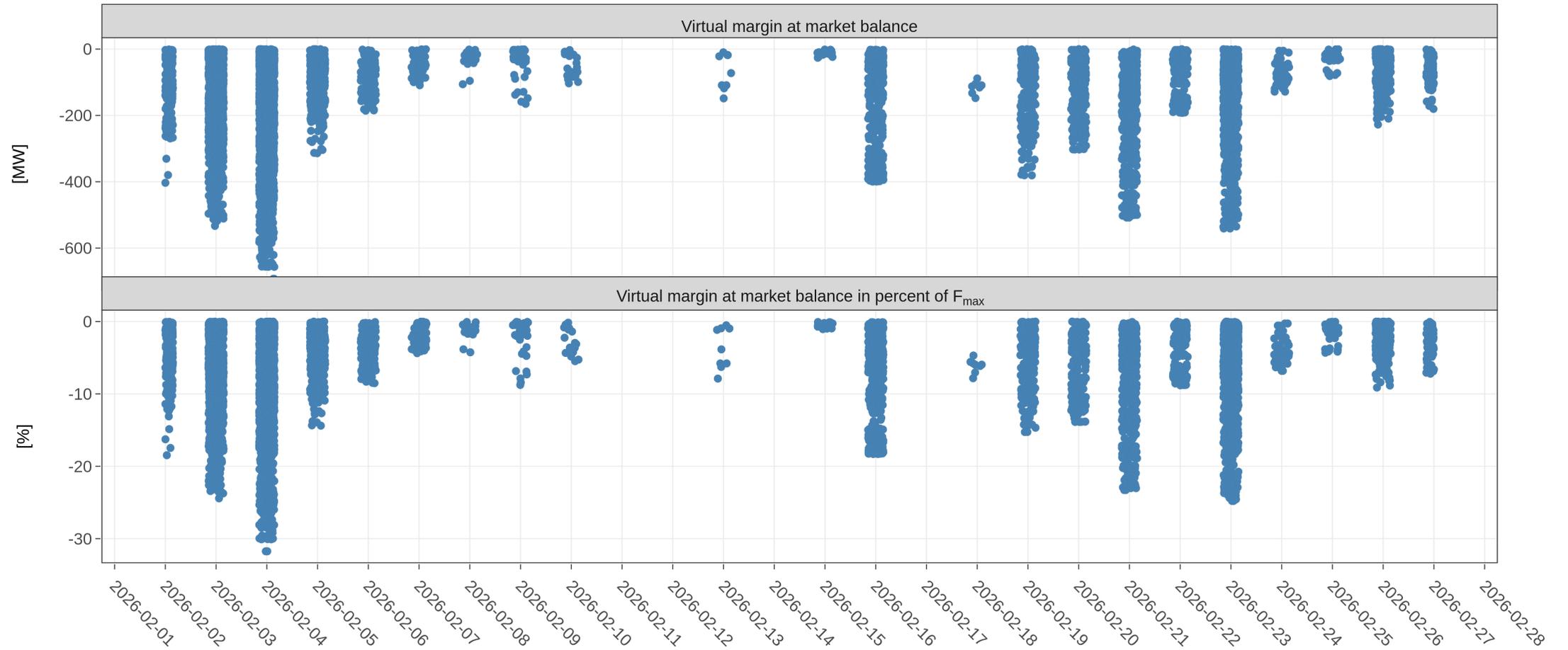
KPI 6b: Virtual margins at market balance D2



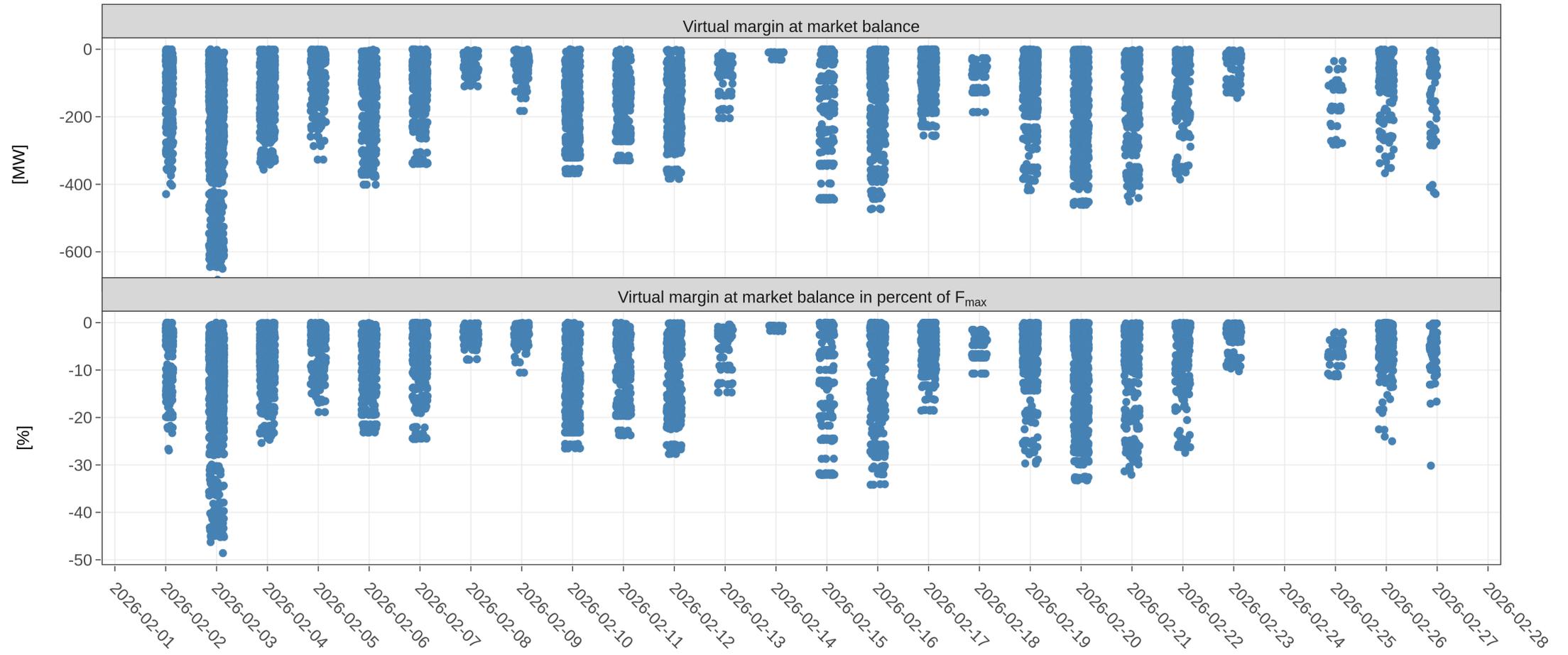
KPI 6b: Virtual margins at market balance D4



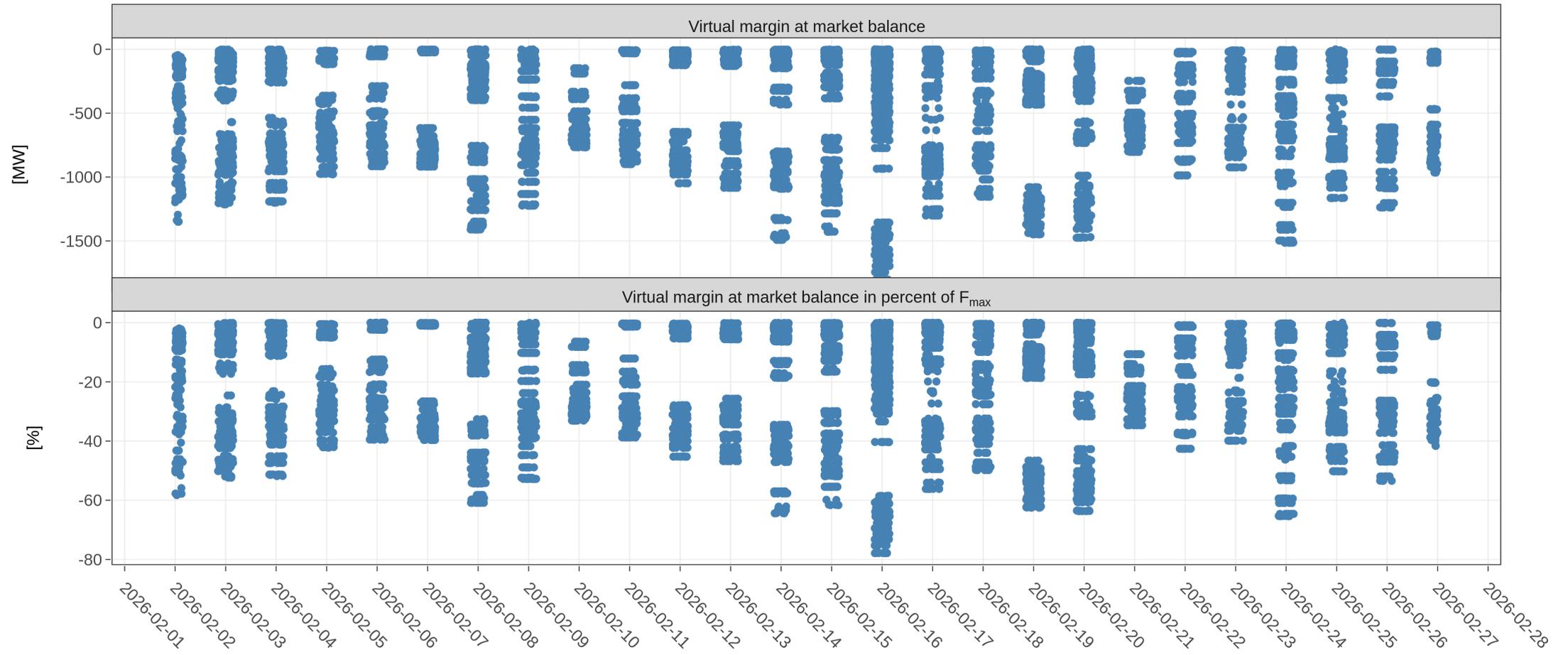
KPI 6b: Virtual margins at market balance D7



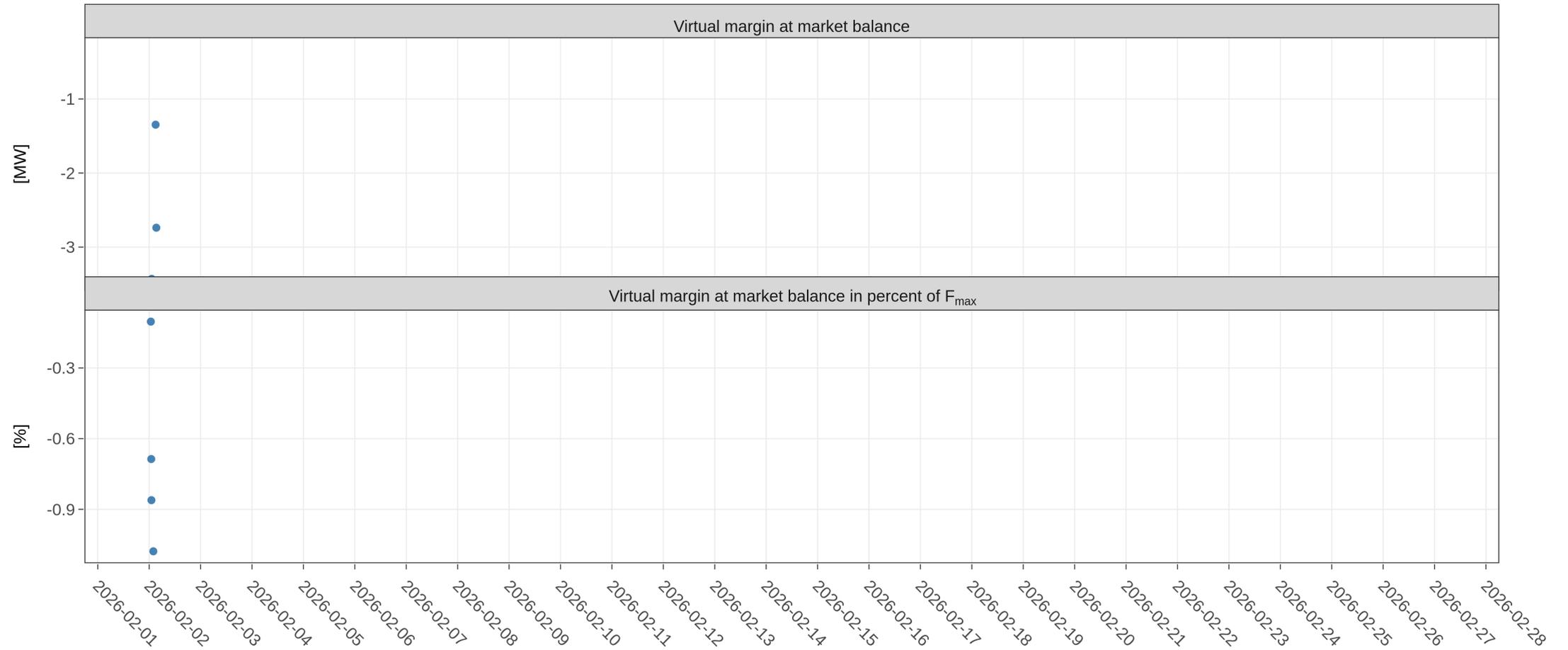
KPI 6b: Virtual margins at market balance D8



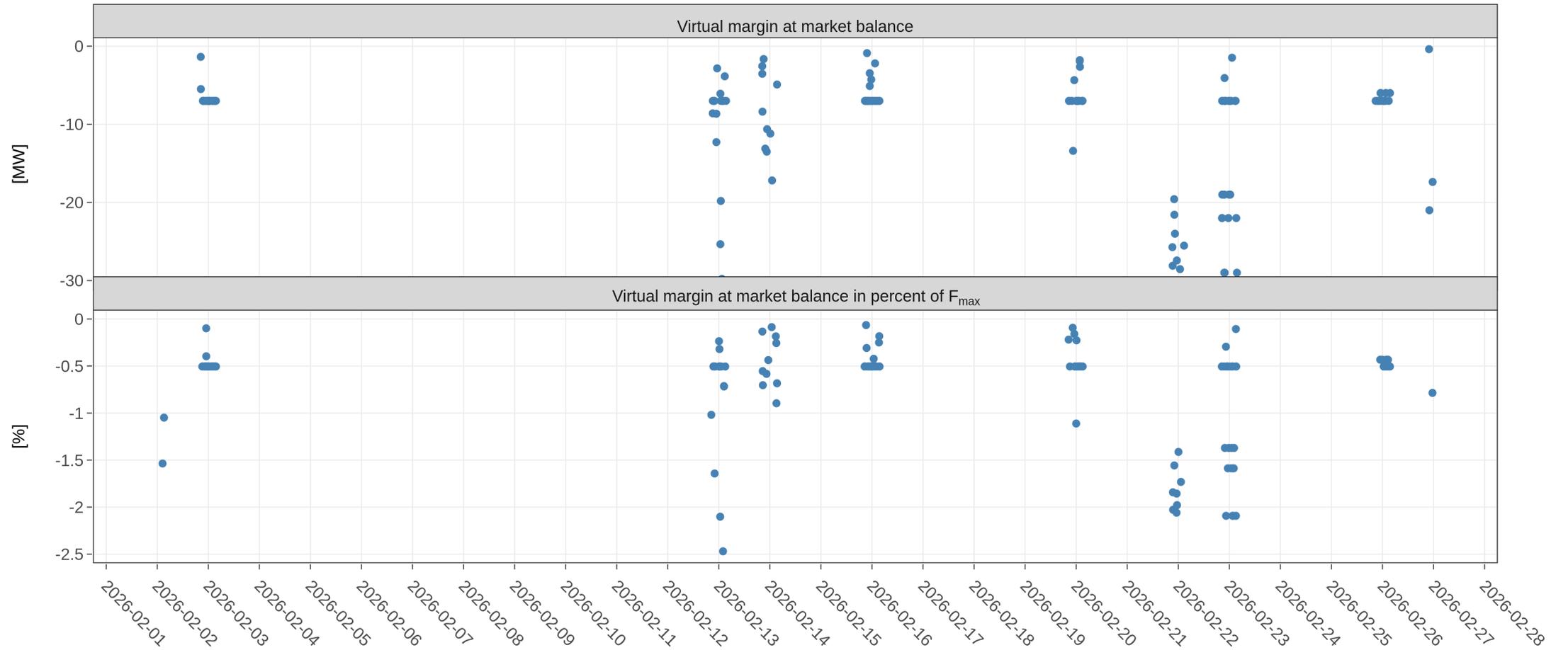
KPI 6b: Virtual margins at market balance FR



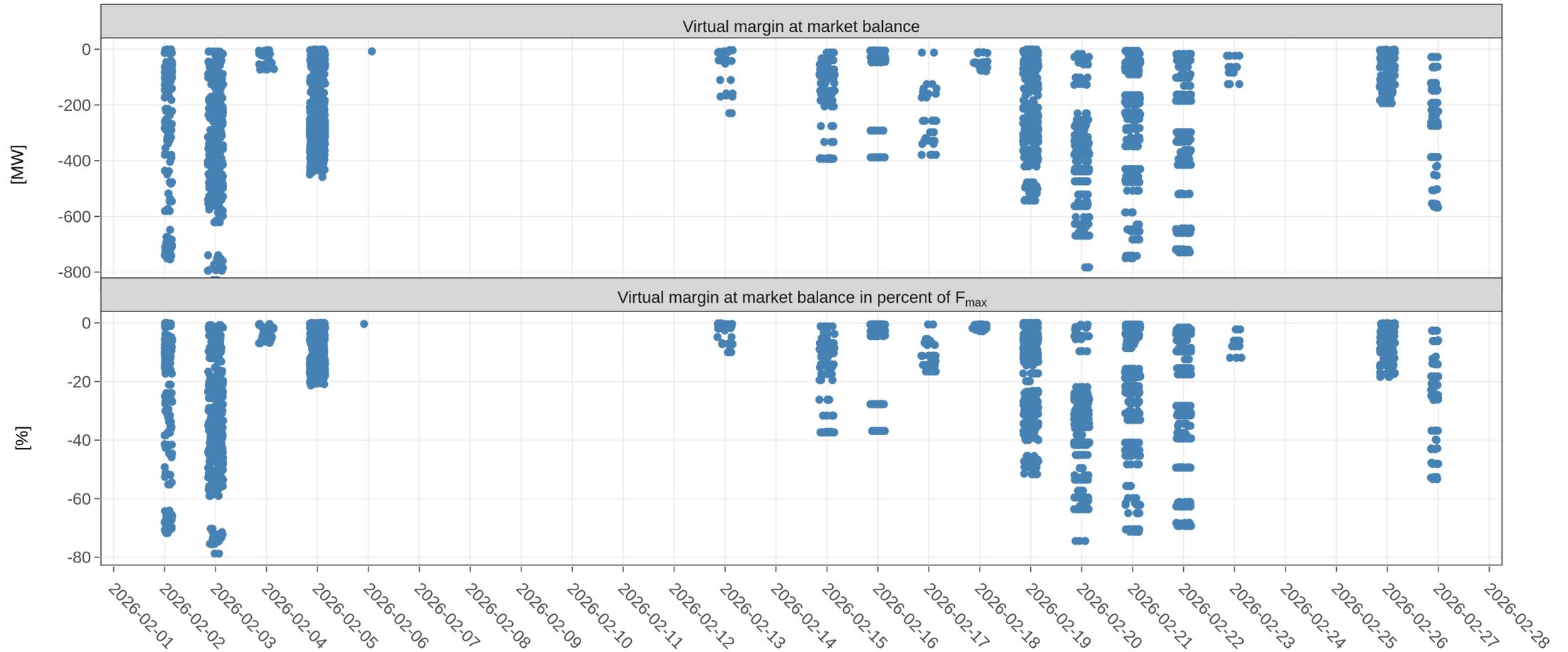
KPI 6b: Virtual margins at market balance HR



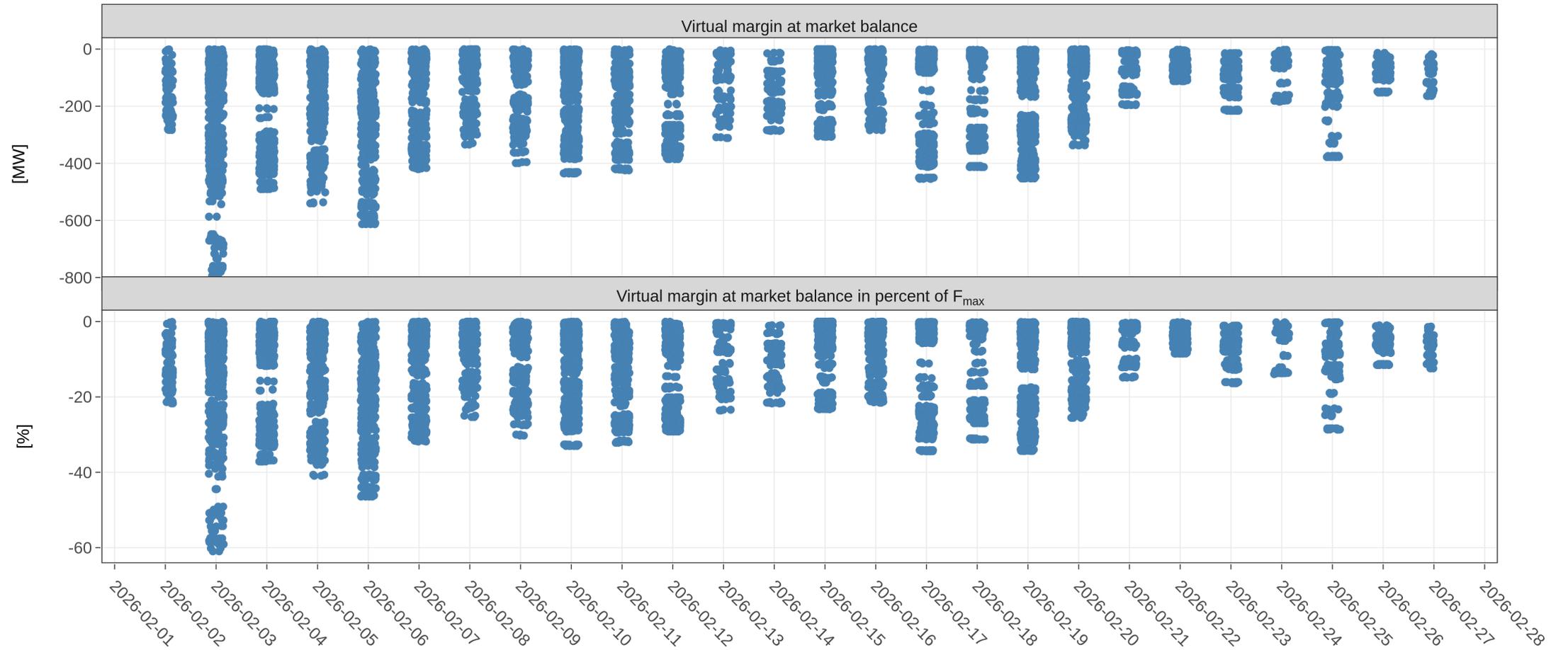
KPI 6b: Virtual margins at market balance HU



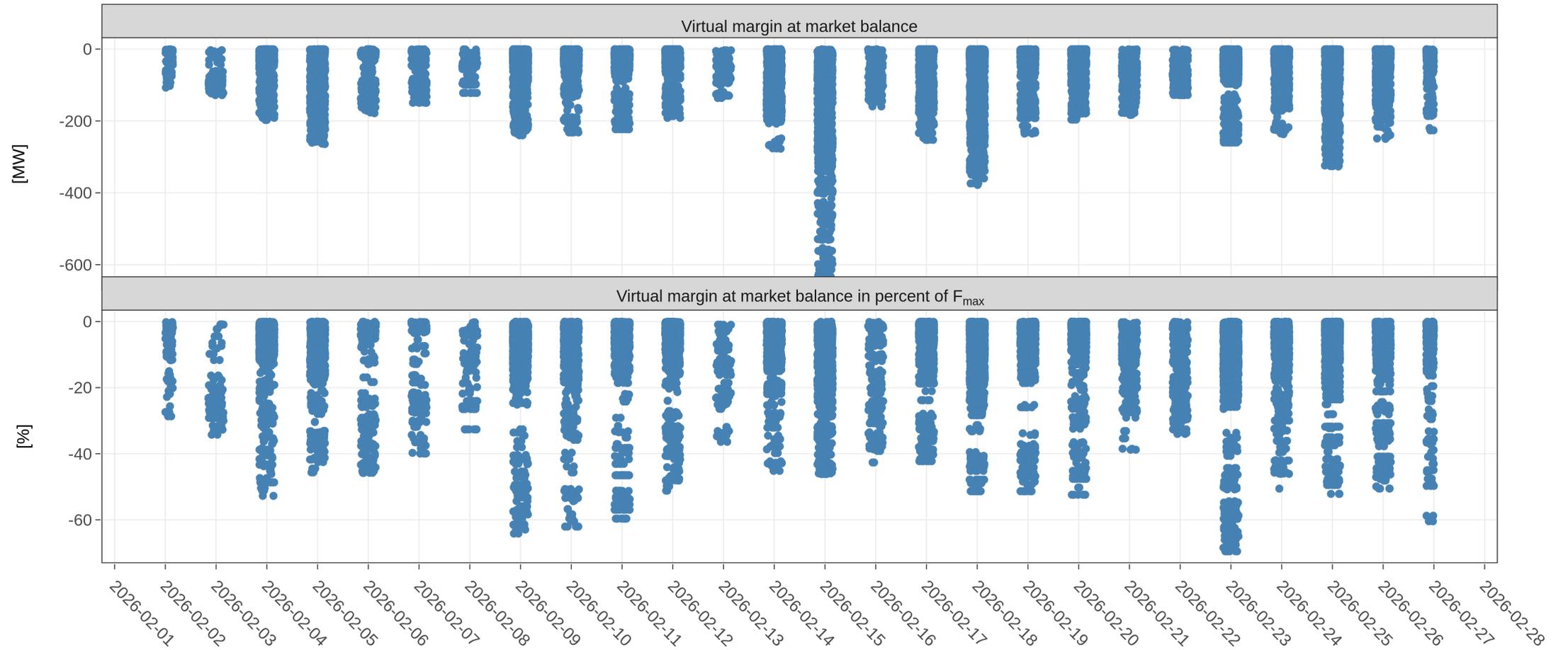
KPI 6b: Virtual margins at market balance NL



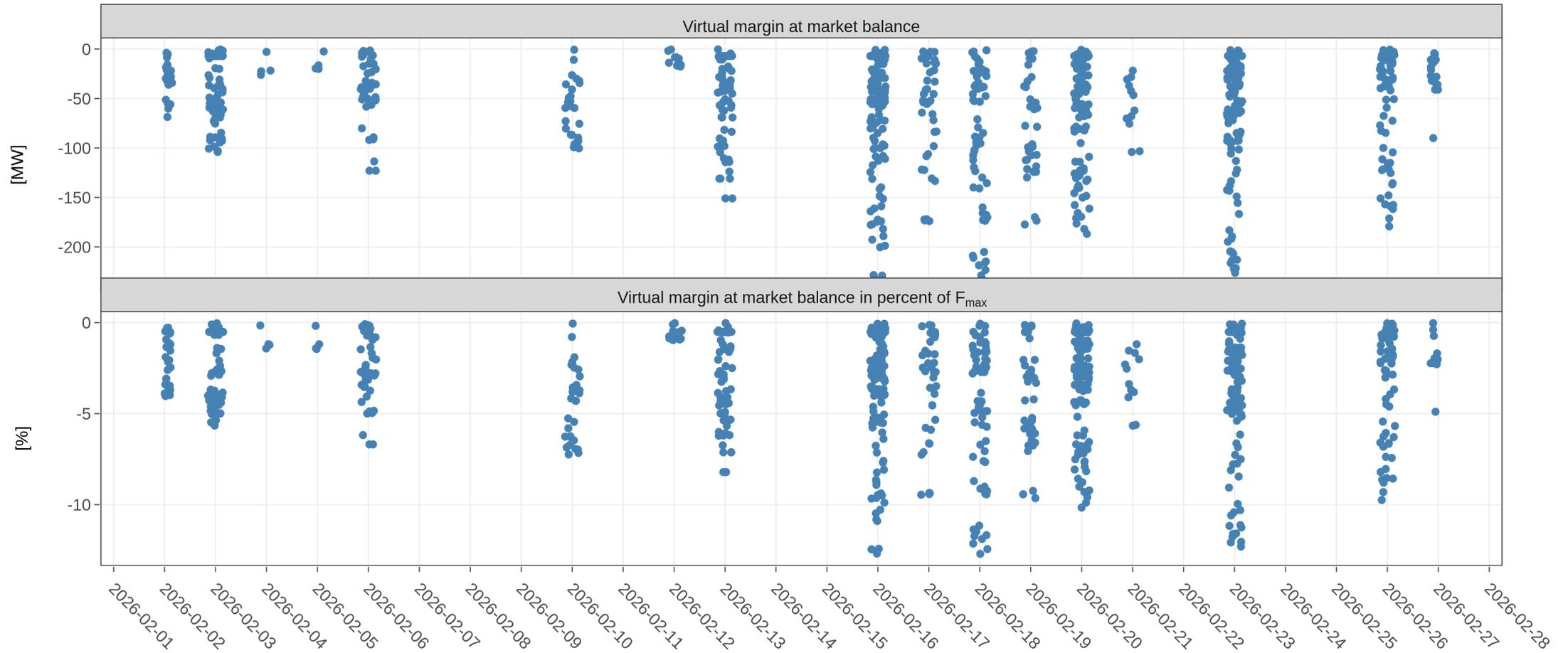
KPI 6b: Virtual margins at market balance PL



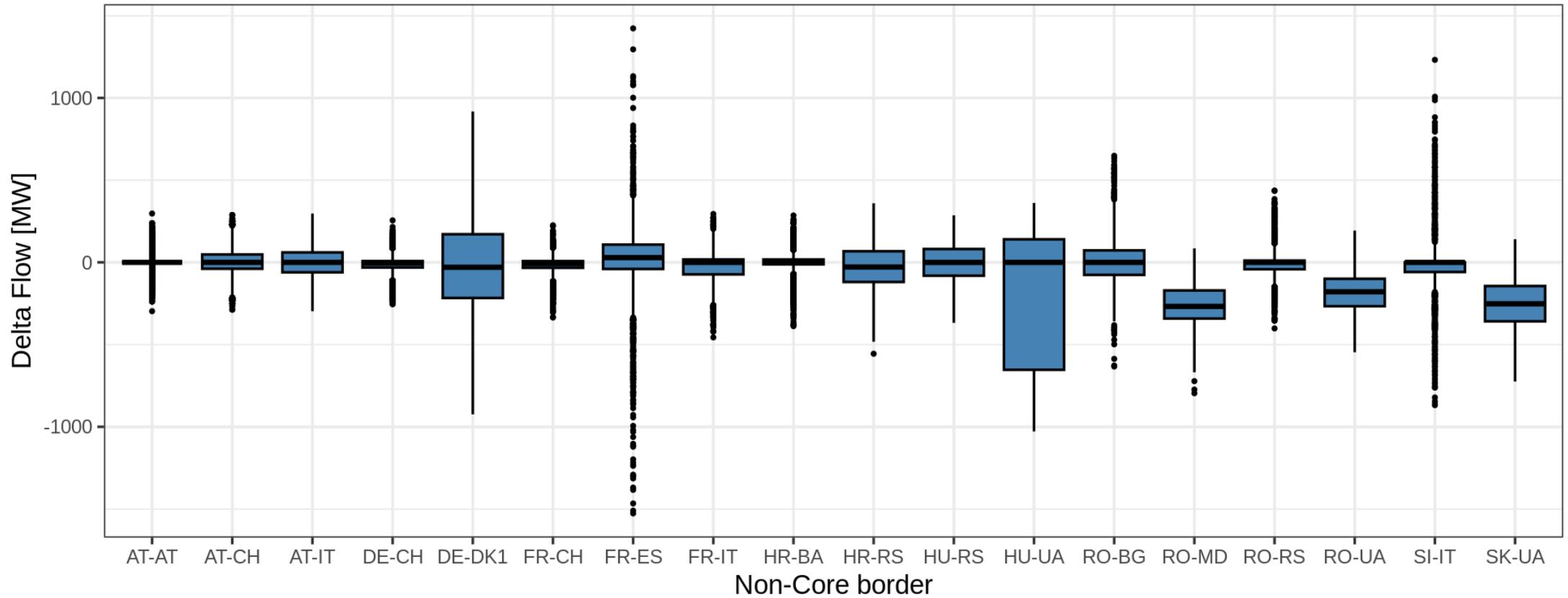
KPI 6b: Virtual margins at market balance RO



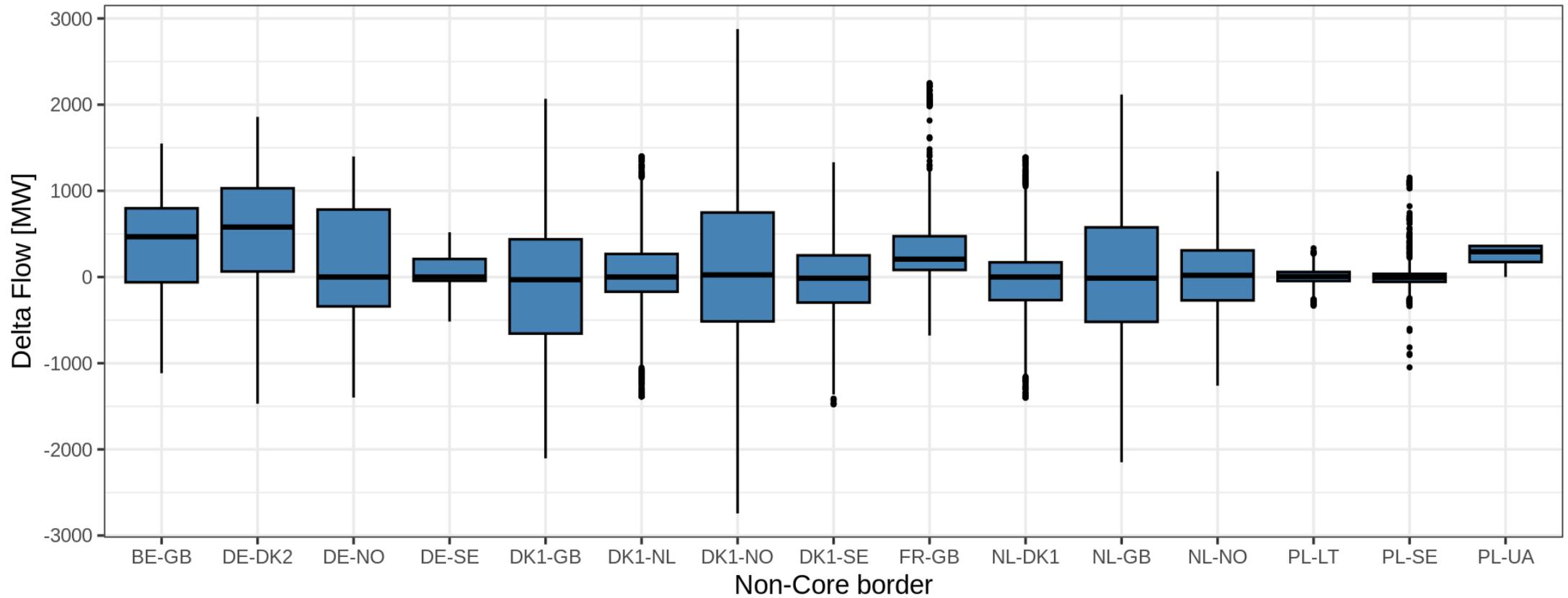
KPI 6b: Virtual margins at market balance SK



KPI 7: Non-Core exchanges AC delta flow



KPI 7: Non-Core exchanges DC delta flow



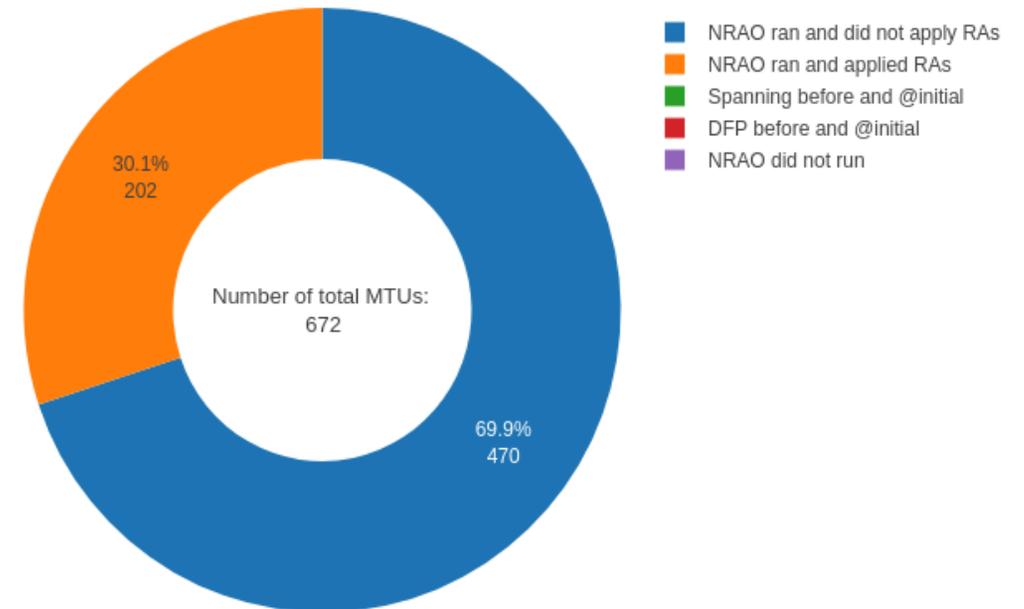
KPI 8: NRAO – Applied Remedial Action



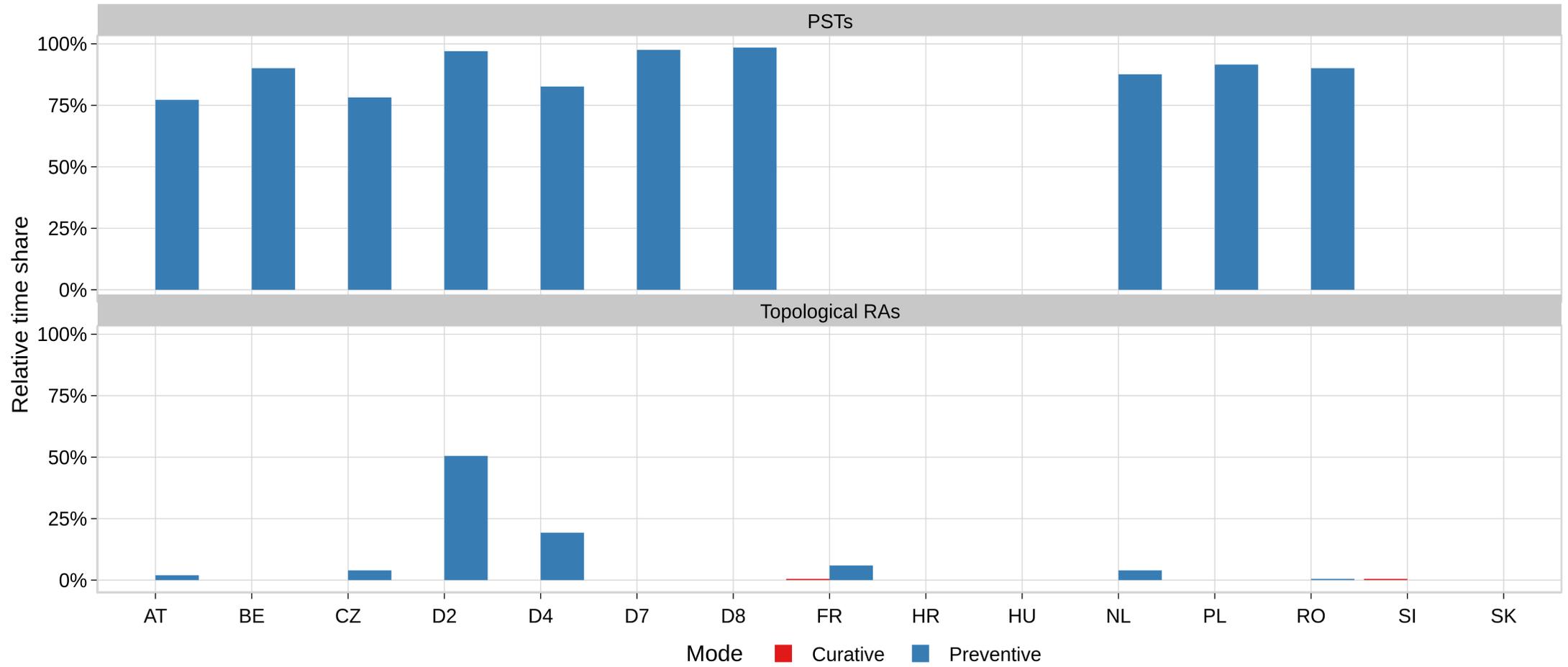
In the following plots, the relative time share relates to the hours labeled 'NRAO Ran and Applied RAs'.

Total MTUs: 672 hours

Category	Hours (%)
NRAO ran and did not apply RAs	470 hours (69.9%)
NRAO ran and applied RAs	202 hours (30.1%)
Spanning before and @initial	0 hours (0%)
DFP before and @initial	0 hours (0%)
NRAO did not run	0 hours (0%)

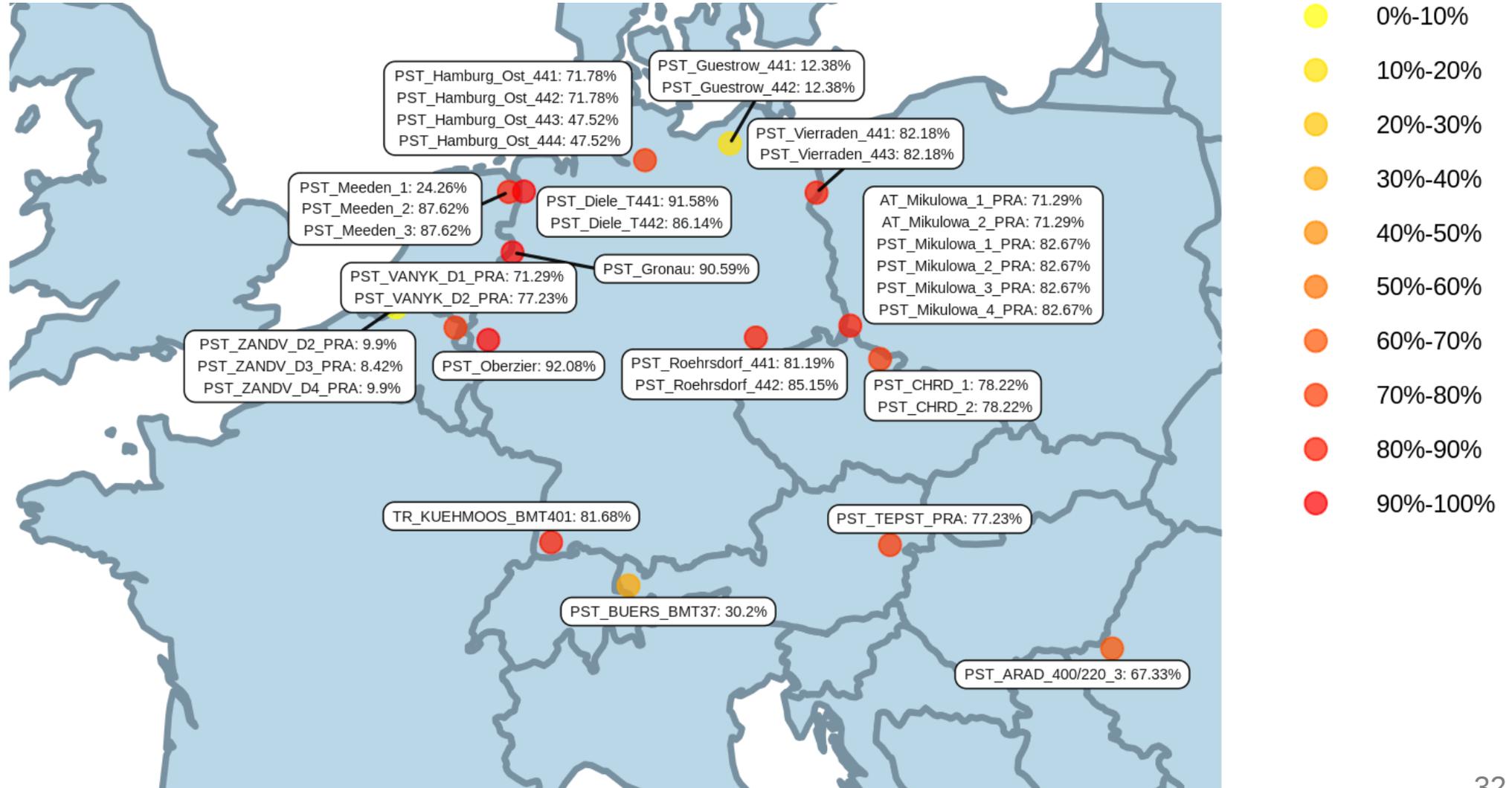


KPI 8: Relative Time Share of Applied RAs, by TSO, Type and Mode



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

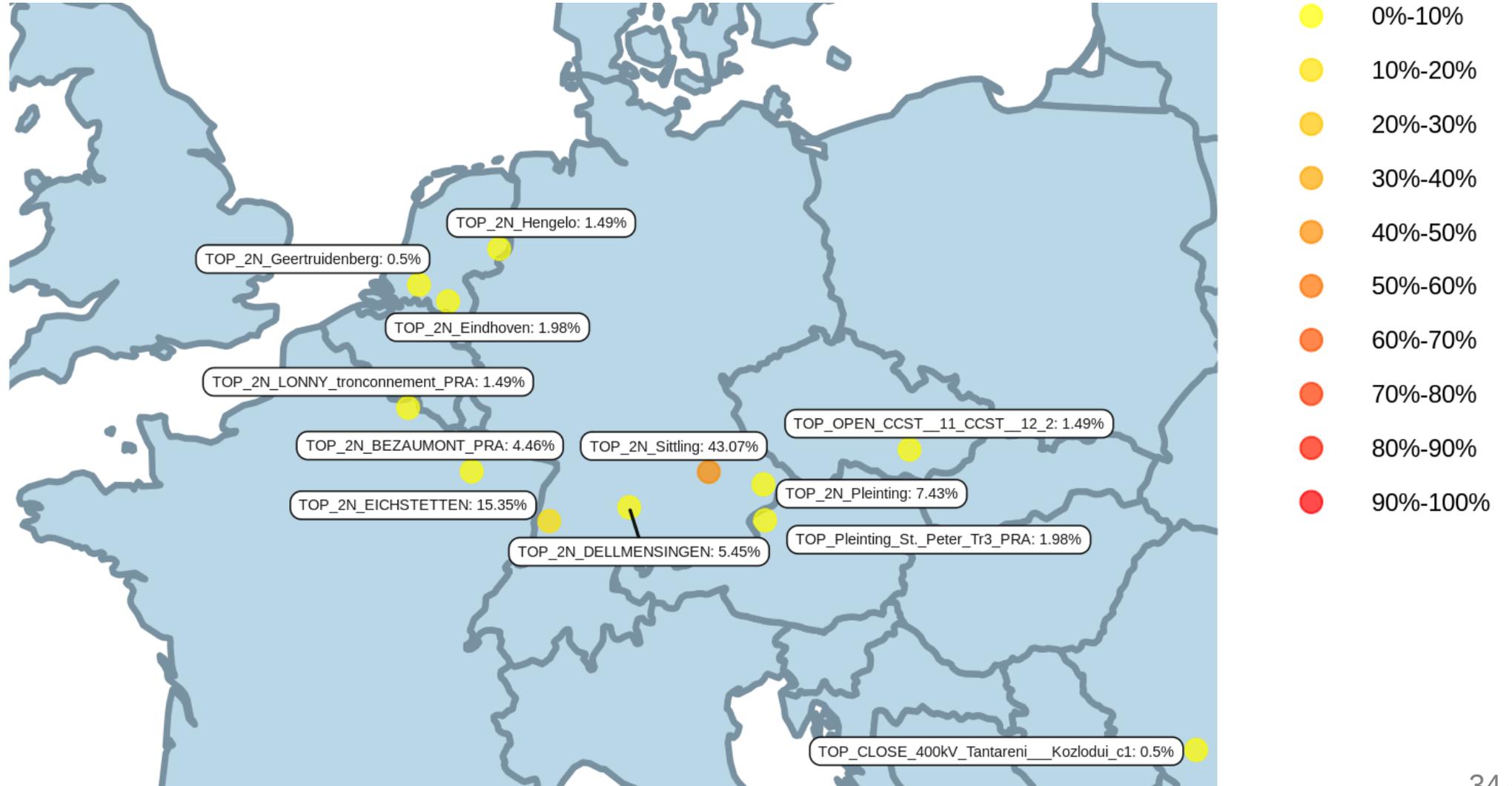


Relative Time Share of Applied PSTs in Curative Mode



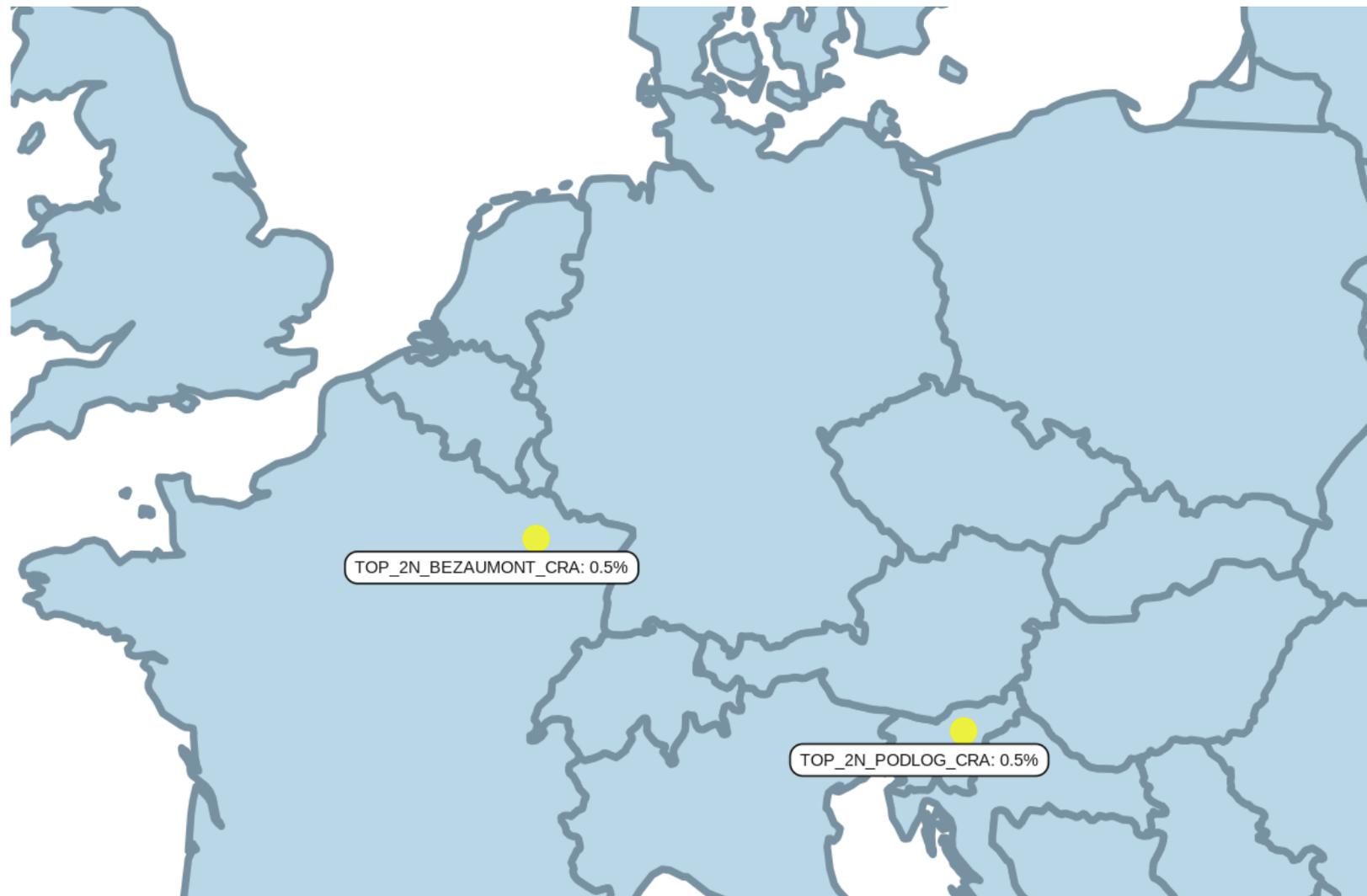
KPI 8: Relative Time Share of Applied RAs, by TSO, Type and Mode

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

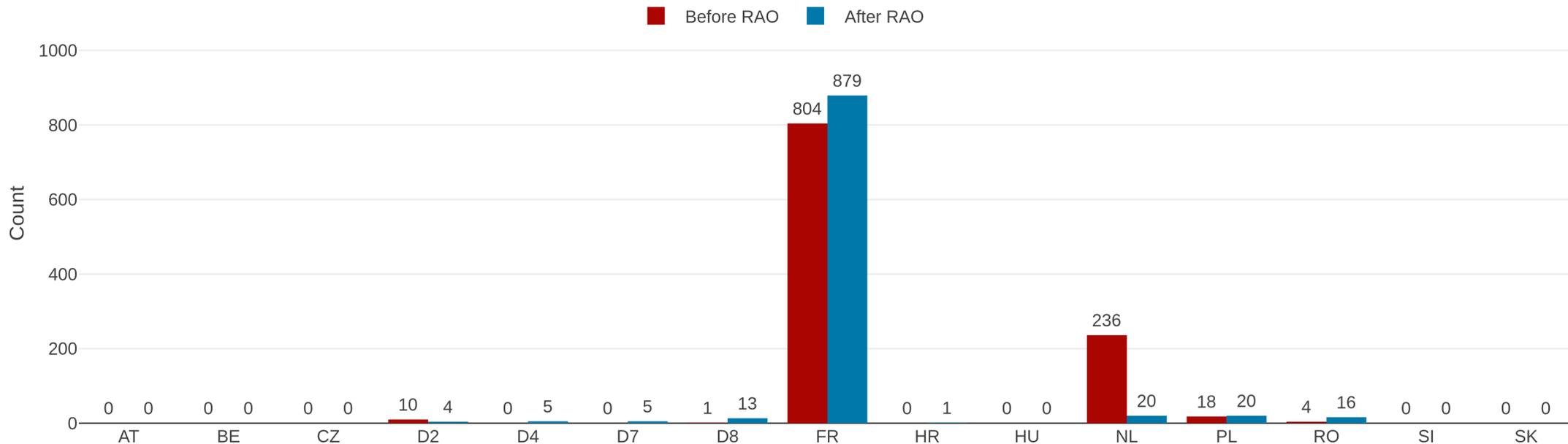


KPI 9: Most limiting CNEC per TSO (NRAO)



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

Distribution of Limiting CNECs per TSO



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

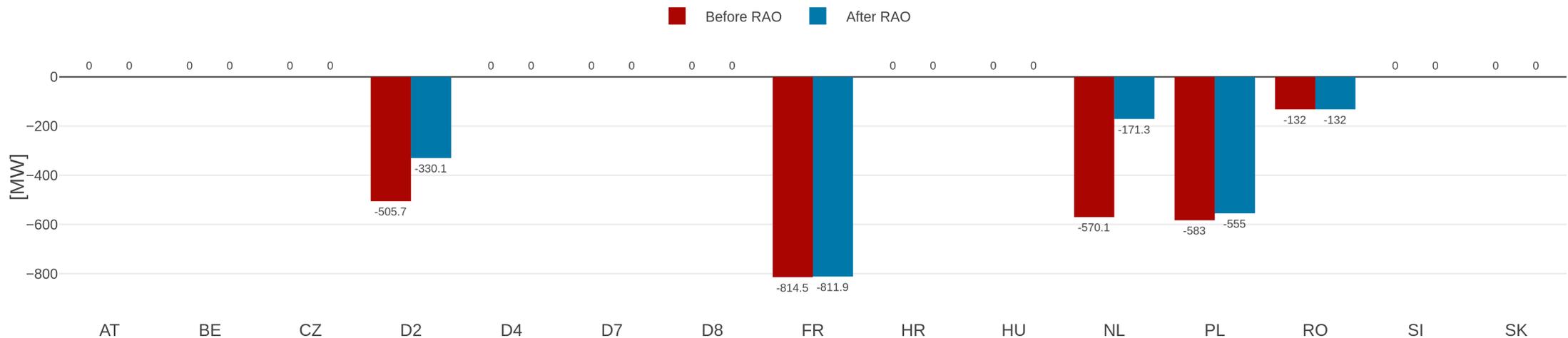


The graph shows average values of relative RAM before and after NRAO, per TSO on the most limiting CNECs from NRAO perspective. Selected CNECs before RAO are the same as after RAO, and average computed for MTUs when was used further in the process.

- 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

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

RelRAM comparison before/after RAO



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]	672	1338	93.09%	67.39%	117.17%	0.3323	1.3196
[CZ-SK] Nosovice - Varin [DIR] [CZ]	672	1692	85.75%	62.77%	120.42%	0.3323	1.3196
[SK-UA] V.Kapusany - Mukachevo (WPS) [DIR] [SK]	672	672	54.89%	33.16%	77.26%	0.2258	0.7798
[SI-HU] 400 kV Cirkovce - Hevitz [DIR] [SI]	672	1343	104.77%	85.66%	122.99%	0.181	0.9417
[D8-D8] Roehrsdorf - Roehrsdorf PST442 [DIR]	672	672	63.80%	40.93%	102.85%	0.3292	1.3045
[HR-SI] 220kV Pehlin - Divaca [DIR] [HR]	672	672	56.99%	29.41%	91.18%	0.1955	0.4552
[SI-HU] 400 kV Cirkovce - Hevitz [OPP] [SI]	672	1347	75.58%	58.97%	94.32%	0.181	0.9417
[AT-AT] Sarasdorf - Zurndorf 439A [OPP]	672	672	78.36%	47.21%	102.07%	0.3166	1.2868
[HR-SI] 220kV Pehlin - Divaca [OPP] [HR]	669	1335	110.77%	72.19%	150.27%	0.1955	0.4552
[SI-HU] Cirkovce - Heviz [OPP] [HU]	668	668	75.56%	58.87%	93.80%	0.227	1.1767
[RO-RS] Portile de Fier - Djerdap [OPP] [RO]	666	749	44.29%	20.28%	105.19%	0.3712	0.5403
[AT-CZ] Duernrohr 1 - Slavetice 437 [OPP] [AT]	663	663	71.76%	50.93%	91.63%	0.2825	1.1468
[AT-SI] Kainachtal - Maribor 473 [DIR] [AT]	660	661	82.73%	53.68%	111.13%	0.4116	1.283
[NL-NL] MEE DRT2 [DIR] [NL]	660	660	43.69%	19.96%	137.07%	0.3208	0.7748
[CZ-PL] Wielopole - Nosovice [OPP] [PL]	659	1223	118.35%	73.23%	145.38%	0.3114	1.1274
[CZ-PL] Wielopole - Nosovice [DIR] [PL]	659	1389	70.09%	38.17%	81.82%	0.315	1.1532
[SK-HU] Levice - God [DIR] [HU]	652	652	51.61%	33.48%	67.68%	0.2484	0.8508
[RO-RO] Resita - Timisoara c1 [DIR]	652	696	25.31%	20.59%	46.52%	0.1046	0.1709
[CZ-SK] Nosovice - Varin [OPP] [SK]	649	649	93.28%	76.05%	110.32%	0.3161	1.2039
[CZ-D2] Hradec - Etzenricht [DIR] [CZ]	642	642	71.15%	63.06%	80.95%	0.1562	0.697

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]	473	473	1189.87	20.26%	19.98%	25.59%	0.1416
[RO-RO] Resita - Timisoara c1 [DIR]	249	249	1905.78	25.28%	20.59%	42.78%	0.1041
[NL-NL] MEE DRT2 [DIR] [NL]	213	213	333.5	32.41%	19.96%	78.99%	0.3188
[D8-PL] Mikulowa PST1 [DIR] [PL]	190	190	805.18	51.87%	22.35%	70.76%	0.2836
[FR-FR] Creys - Saint-Vulbas 1 [OPP]	158	158	930.1	20.05%	19.98%	23.82%	0.1418
[D2-D2] Altheim - Sittling 219 [OPP]	100	100	803.41	68.92%	42.52%	96.84%	0.0771
[D8-D8] Roehrsdorf - Roehrsdorf PST442 [DIR]	96	96	318.2	60.50%	45.77%	70.68%	0.3292
[SK-HU] Levice - God [DIR] [HU]	81	81	996.84	40.82%	33.48%	55.41%	0.2452
[D8-D8] Vierraden - Vierraden PST441 [DIR]	68	68	414.84	54.67%	41.20%	69.91%	0.2999
[D2-D2] Altheim - Sittling 220 [OPP]	56	56	974.15	67.82%	45.21%	85.68%	0.0743
[NL-NL] Krimpen a/d IJssel-Geertruidenberg 380 W [DIR]	46	46	96.78	68.55%	38.63%	122.18%	0.5661
[BE-FR] Achene - Lonny 380.19 [OPP] [BE]	27	29	266.49	75.20%	63.58%	94.86%	0.3269
[NL-BE] PST Zandvliet 2 [DIR] [BE]	26	26	130.16	67.03%	25.22%	95.04%	0.4639
[AT-D2] St. Peter 2 - Pleinting 258 [OPP] [AT]	24	24	205.17	88.76%	58.10%	121.15%	0.1275
[SK-SK] V.Dur - Levice 1 [DIR]	16	16	245.41	33.48%	31.97%	34.86%	0.2125
[NL-BE] Maasbracht - Van Eyck 380 White/28 [DIR] [BE]	14	14	20.64	93.65%	83.18%	112.84%	0.3584
[RO-HU] Arad - Sandorfalva [OPP] [HU]	13	13	1723.15	0.00%	0.00%	0.00%	0.0894
[CZ-SK] Nosovice - Varin [DIR] [CZ]	12	13	35.39	77.01%	67.53%	83.55%	0.3092
[RO-MD] Isaccea - Vulcanesti [DIR]	11	11	276.39	20.58%	20.42%	20.71%	0.1523
[SK-UA] V.Kapusany - Mukachevo (WPS) [DIR] [SK]	10	10	121.03	47.87%	41.18%	56.56%	0.2008

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	758
AC < 0 MW	350
AC = 0 MW	386
AC > 0 MW	22

	PL AC Import [MW]	PL AC Export [MW]
Avg.	-2730.55	3444.18
Min.	-9680.00	0.00
Max.	0.00	12697.00

