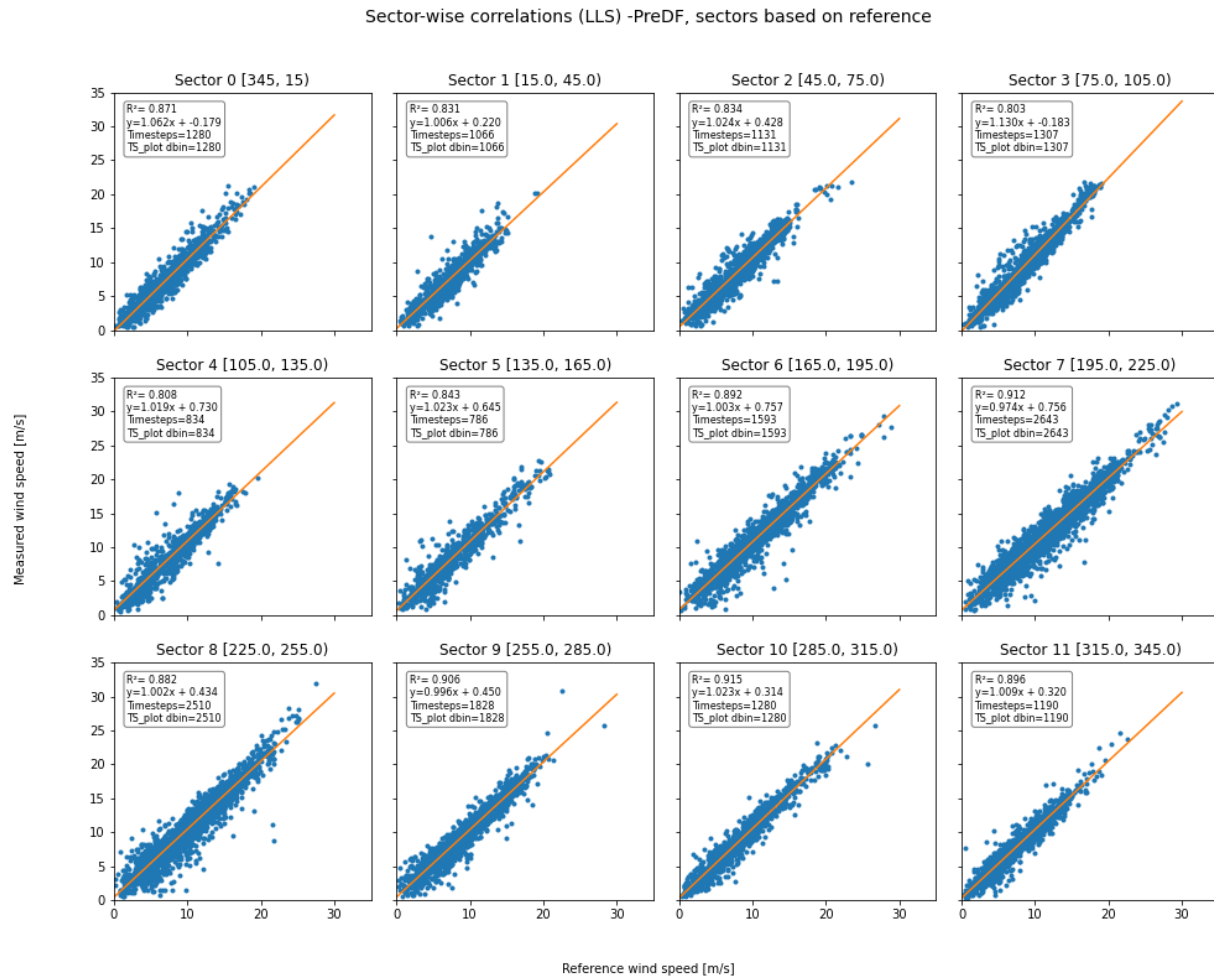


## Annex B Sectorwise exemplary results of the concurrent period

Figure B-1. PreDF - Sectorwise correlations 1-day gap, iteration 12972

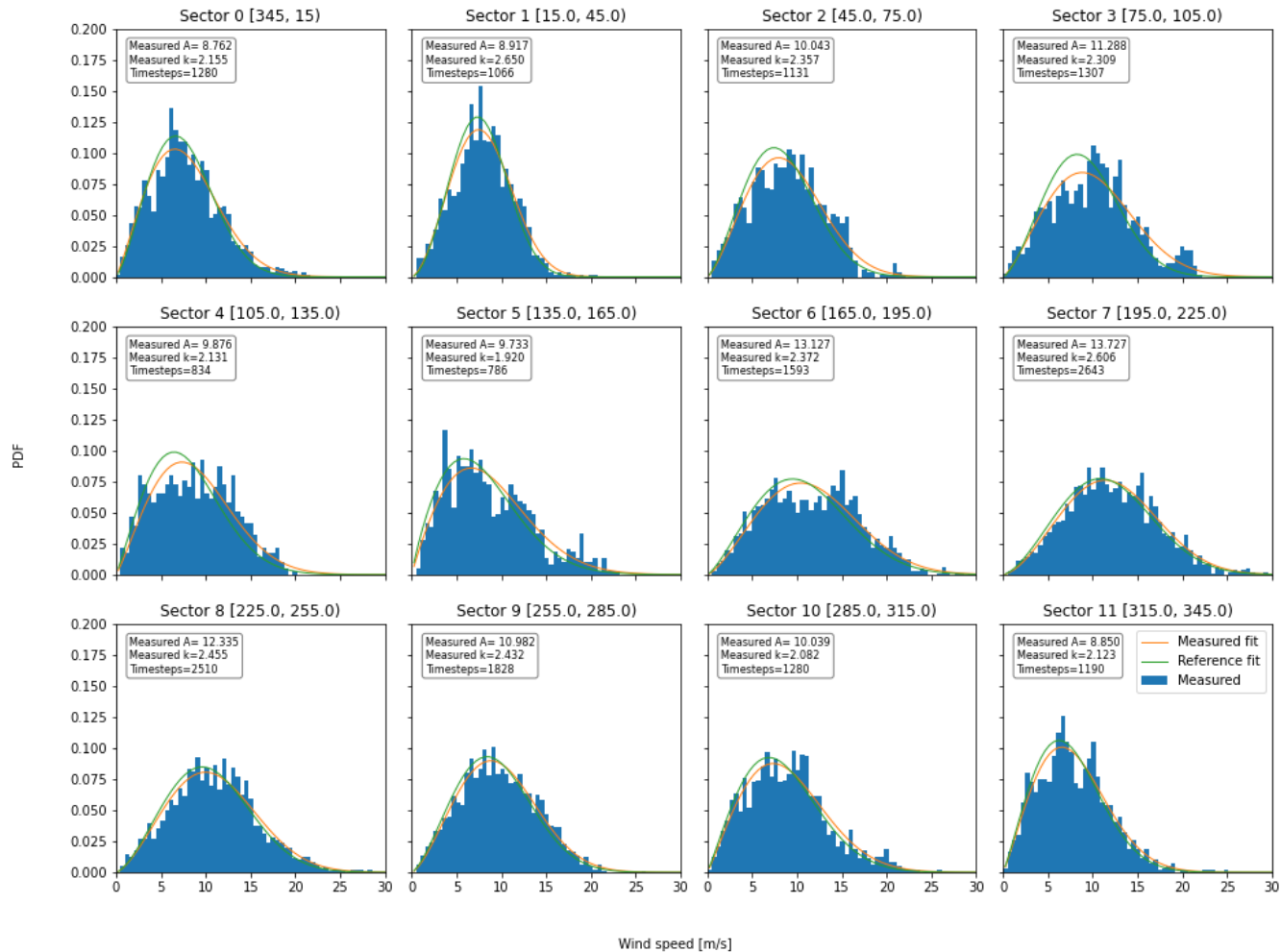


Source: Author's own illustration

Sectorwise exemplary results of the concurrent period

**Figure B-2. PreDF - Sectorwise Weibull fits with measured histogram 1-day gap, iteration 12972**

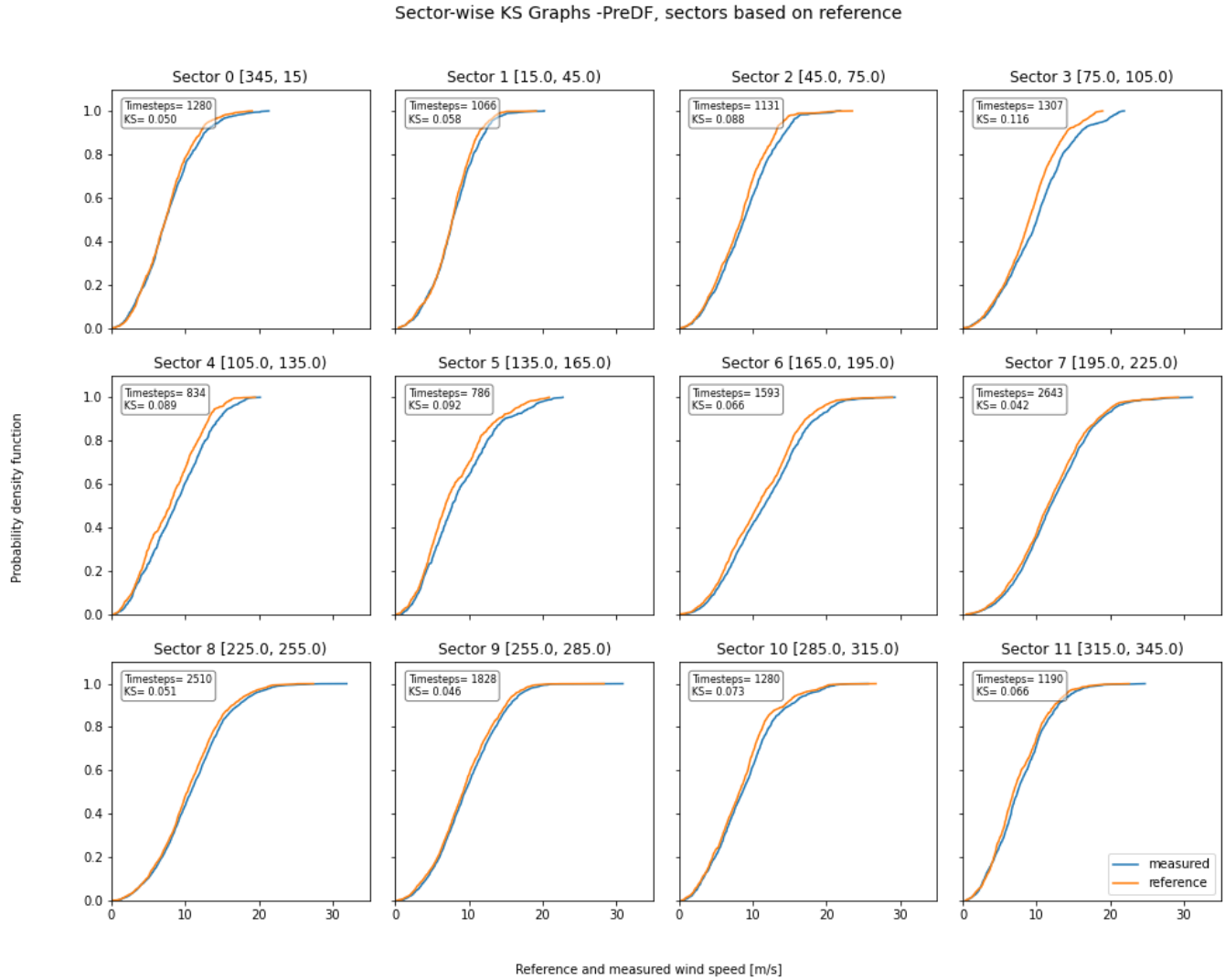
Weibull fits using maximum-likelihood method, sectors based on reference



Source: Author's own illustration

Sectorwise exemplary results of the concurrent period

Figure B-3. PreDF - Sectorwise KS-statistic 1-day gap, iteration 12972



Source: Author's own illustration

**Table B-1. i\_g:12972 test\_wgap length: 17448 results**

test dataset with gap:

	mast_WD	mast_WS	ref_WD	ref_WS
count	17448.0000	17448.0000	17448.0000	17448.0000
mean	192.9292	9.8818	193.5266	9.3390
std	95.3353	4.7495	96.3102	4.5027
min	0.0000	0.3870	0.0000	0.0700
25%	115.0750	6.3727	111.8000	5.9900
50%	207.8000	9.5110	211.9000	9.0100
75%	261.2000	12.9550	262.9000	12.2300
max	359.9000	31.8980	359.9000	29.2400

ST\_bins:

	mast_WD	mast_WS	ref_WD	ref_WS	WD_bin
DateTime					
2012-07-01 02:00:00	227.9	13.010	229.3	12.26	[225.0, 255.0)
2012-07-01 03:00:00	228.7	12.468	232.8	12.62	[225.0, 255.0)
2012-07-01 04:00:00	231.3	12.025	236.0	12.68	[225.0, 255.0)
2012-07-01 05:00:00	239.3	12.157	239.6	12.37	[225.0, 255.0)
2012-07-01 06:00:00	239.7	11.785	240.0	11.65	[225.0, 255.0)
...	...	...	...	...	...
2014-06-30 20:00:00	335.4	6.107	337.1	4.43	[315.0, 345.0)
2014-06-30 21:00:00	334.1	5.370	334.2	3.97	[315.0, 345.0)
2014-06-30 22:00:00	328.7	4.923	332.4	4.12	[315.0, 345.0)
2014-06-30 23:00:00	329.1	4.247	327.6	3.77	[315.0, 345.0)
2014-07-01 00:00:00	316.4	3.923	319.7	3.69	[315.0, 345.0)

[17448 rows x 5 columns]

-----Omni directional metrics-----

PreDF between measured and reference

MBE Weibull Scale: 0.654 m/s

MBE Weibull Shape: -0.020

R<sup>2</sup> MWD of the linear relation: 0.982

-----

SelfDF between predicted and measured

MBE Weibull Scale: -0.004 m/s

MBE Weibull Shape: 0.139

-----

Sectorwise exemplary results of the concurrent period

ValDF between predicted and measured

MBE MWS: 0.354 m/s

Iteration number:12972

-----  
Sector: 0

	mast_WD	mast_WS	ref_WD	ref_WS
count	1280.0000	1280.0000	1280.0000	1280.0000
mean	213.9797	7.7610	176.9530	7.4780
std	163.9263	3.7908	172.3165	3.3967
min	0.0000	0.4370	0.0000	0.2000
25%	10.8750	5.1253	7.3750	4.9500
50%	339.7000	7.3565	14.6000	7.3600
75%	351.1000	9.9932	351.4000	9.5425
max	359.9000	21.3380	359.9000	19.0800

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.28300156 m/s

PreMAE= 0.904 m/s

PreRMSE= 1.219 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.905

KS= 0.050-

Timesteps: 1280 -

WDdeviation: -3.691 °

PreMBE WPD= 85.5 W/m<sup>2</sup>

PreMAE WPD= 137.8 W/m<sup>2</sup>

PreRMSE WPD= 303.5 W/m<sup>2</sup>

Measured Weibull scale = 8.762 m/s

Measured Weibull shape = 2.155 -

Intercept: -0.179 m/s

Slope: 1.062 -

-----  
SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= -0.00000000 m/s

MAE= 0.886 m/s

RMSE= 1.167 m/s

Sectorwise exemplary results of the concurrent period

R<sup>2</sup> MWS of prediction: 0.871 -

KS= 0.032 -

MBE WPD= -26.7 W/m<sup>2</sup>

MAE WPD= 127.5 W/m<sup>2</sup>

RMSE WPD= 258.3 W/m<sup>2</sup>

-----  
Sector: 1

	mast_WD	mast_WS	ref_WD	ref_WS
count	1066.0000	1066.0000	1066.0000	1066.0000
mean	40.9323	7.9385	29.9021	7.6734
std	61.2576	3.2121	8.5794	2.9666
min	0.3000	0.5650	15.0000	0.4300
25%	19.0000	5.8195	22.8000	5.7825
50%	29.5000	7.7690	29.8500	7.7800
75%	38.3750	10.0758	37.4000	9.6700
max	359.4000	20.2120	44.9000	19.1100

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.26515009 m/s

PreMAE= 0.883 m/s

PreRMSE= 1.218 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.863

KS= 0.058-

Timesteps: 1066 -

WDdeviation: -2.989 °

PreMBE WPD= 60.0 W/m<sup>2</sup>

PreMAE WPD= 122.0 W/m<sup>2</sup>

PreRMSE WPD= 239.1 W/m<sup>2</sup>

Measured Weibull scale = 8.917 m/s

Measured Weibull shape = 2.650 -

Intercept: 0.220 m/s

Slope: 1.006 -

-----  
SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= 0.00000000 m/s

Sectorwise exemplary results of the concurrent period

MAE= 0.868 m/s

RMSE= 1.188 m/s

R<sup>2</sup> MWS of prediction: 0.831 -

KS= 0.044 -

MBE WPD= -24.7 W/m<sup>2</sup>

MAE WPD= 119.5 W/m<sup>2</sup>

RMSE WPD= 227.3 W/m<sup>2</sup>

-----  
Sector: 2

	mast_WD	mast_WS	ref_WD	ref_WS
count	1131.0000	1131.0000	1131.0000	1131.0000
mean	59.2517	8.9082	60.2953	8.2808
std	26.2270	4.0225	8.6608	3.6951
min	0.6000	0.5570	45.0000	0.3000
25%	47.9000	5.8560	53.1000	5.4300
50%	56.0000	8.8370	60.2000	8.4800
75%	65.8000	11.6485	67.7000	10.7550
max	354.3000	21.8930	74.9000	23.5000

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.62742263 m/s

PreMAE= 1.143 m/s

PreRMSE= 1.504 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.885

KS= 0.088-

Timesteps: 1131 -

WDdeviation: -3.532 °

PreMBE WPD= 143.3 W/m<sup>2</sup>

PreMAE WPD= 200.6 W/m<sup>2</sup>

PreRMSE WPD= 331.9 W/m<sup>2</sup>

Measured Weibull scale = 10.043 m/s

Measured Weibull shape = 2.357 -

Intercept: 0.428 m/s

Slope: 1.024 -

-----  
SelfDF\_KPI\_0, using self predictions

Sectorwise exemplary results of the concurrent period

Wind speed related KPI

MBE= -0.00000000 m/s

MAE= 1.034 m/s

RMSE= 1.364 m/s

R<sup>2</sup> MWS of prediction: 0.834 -

KS= 0.041 -

MBE WPD= -31.3 W/m<sup>2</sup>

MAE WPD= 172.5 W/m<sup>2</sup>

RMSE WPD= 282.2 W/m<sup>2</sup>

-----  
Sector: 3

	mast_WD	mast_WS	ref_WD	ref_WS
count	1307.0000	1307.0000	1307.0000	1307.0000
mean	87.7621	10.0184	89.0869	9.0312
std	22.0545	4.5845	8.1768	3.8866
min	4.4000	0.4480	75.0000	0.0700
25%	77.8500	6.6310	82.5000	6.2650
50%	86.4000	10.0480	88.6000	8.9900
75%	94.6000	12.9560	95.5000	11.5150
max	328.1000	21.8850	104.9000	18.9600

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.98716832 m/s

PreMAE= 1.335 m/s

PreRMSE= 1.723 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.917

KS= 0.116-

Timesteps: 1307 -

WDdeviation: -3.271 °

PreMBE WPD= 309.9 W/m<sup>2</sup>

PreMAE WPD= 338.1 W/m<sup>2</sup>

PreRMSE WPD= 601.1 W/m<sup>2</sup>

Measured Weibull scale = 11.288 m/s

Measured Weibull shape = 2.309 -

Intercept: -0.183 m/s

Slope: 1.130 -



Sectorwise exemplary results of the concurrent period

-----  
SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= -0.00000000 m/s

MAE= 1.007 m/s

RMSE= 1.320 m/s

R<sup>2</sup> MWS of prediction: 0.803 -

KS= 0.029 -

MBE WPD= -39.4 W/m<sup>2</sup>

MAE WPD= 211.8 W/m<sup>2</sup>

RMSE WPD= 337.0 W/m<sup>2</sup>

-----  
Sector: 4

	mast_WD	mast_WS	ref_WD	ref_WS
count	834.0000	834.0000	834.0000	834.0000
mean	119.6859	8.7521	119.5468	7.8763
std	25.2394	4.3253	8.7288	3.9810
min	36.0000	0.5100	105.0000	0.3400
25%	107.2000	5.2828	111.8000	4.4925
50%	118.5000	8.6455	119.3500	7.9250
75%	129.3750	11.9790	127.0000	10.8875
max	349.8000	20.1670	134.9000	19.4900

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.87578537 m/s

PreMAE= 1.302 m/s

PreRMSE= 1.743 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.879

KS= 0.089-

Timesteps: 834 -

WDdeviation: -2.351 °

PreMBE WPD= 184.6 W/m<sup>2</sup>

PreMAE WPD= 221.2 W/m<sup>2</sup>

PreRMSE WPD= 387.4 W/m<sup>2</sup>

Measured Weibull scale = 9.876 m/s

Measured Weibull shape = 2.131 -

Sectorwise exemplary results of the concurrent period

Intercept: 0.730 m/s

Slope: 1.019 -

-----  
SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= -0.00000000 m/s

MAE= 1.061 m/s

RMSE= 1.505 m/s

R<sup>2</sup> MWS of prediction: 0.808 -

KS= 0.048 -

MBE WPD= -38.3 W/m<sup>2</sup>

MAE WPD= 171.2 W/m<sup>2</sup>

RMSE WPD= 303.7 W/m<sup>2</sup>

-----  
Sector: 5

	mast_WD	mast_WS	ref_WD	ref_WS
count	786.0000	786.0000	786.0000	786.0000
mean	150.3947	8.6111	150.7258	7.7868
std	25.9104	4.7302	8.8255	4.3780
min	14.8000	0.7850	135.0000	0.2400
25%	138.4500	4.9770	142.6000	4.4675
50%	152.1500	7.7245	151.6000	6.7850
75%	162.7000	11.7775	158.4000	10.7625
max	343.6000	22.7470	164.9000	20.8900

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.82433333 m/s

PreMAE= 1.324 m/s

PreRMSE= 1.732 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.897

KS= 0.092-

Timesteps: 786 -

WDdeviation: -2.191 °

PreMBE WPD= 188.9 W/m<sup>2</sup>

PreMAE WPD= 239.9 W/m<sup>2</sup>

PreRMSE WPD= 461.4 W/m<sup>2</sup>

Sectorwise exemplary results of the concurrent period

Measured Weibull scale = 9.733 m/s

Measured Weibull shape = 1.920 -

Intercept: 0.645 m/s

Slope: 1.023 -

-----  
SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= -0.00000000 m/s

MAE= 1.128 m/s

RMSE= 1.520 m/s

R<sup>2</sup> MWS of prediction: 0.843 -

KS= 0.057 -

MBE WPD= -41.8 W/m<sup>2</sup>

MAE WPD= 195.8 W/m<sup>2</sup>

RMSE WPD= 366.9 W/m<sup>2</sup>

-----  
Sector: 6

	mast_WD	mast_WS	ref_WD	ref_WS
count	1593.0000	1593.0000	1593.0000	1593.0000
mean	179.7465	11.6308	181.4064	10.8392
std	17.1153	5.2502	8.5956	5.0304
min	8.6000	0.6530	165.0000	0.0900
25%	172.8000	7.4080	174.4000	6.7500
50%	181.1000	11.5670	182.0000	10.6800
75%	188.2000	15.3680	189.0000	14.6600
max	337.6000	29.2850	194.9000	28.9300

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.79164972 m/s

PreMAE= 1.278 m/s

PreRMSE= 1.651 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.924

KS= 0.066-

Timesteps: 1593 -

WDdeviation: -1.469 °

PreMBE WPD= 270.3 W/m<sup>2</sup>

Sectorwise exemplary results of the concurrent period

PreMAE WPD= 365.8 W/m<sup>2</sup>

PreRMSE WPD= 602.1 W/m<sup>2</sup>

Measured Weibull scale = 13.127 m/s

Measured Weibull shape = 2.372 -

Intercept: 0.757 m/s

Slope: 1.003 -

-----  
SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= -0.00000000 m/s

MAE= 1.053 m/s

RMSE= 1.448 m/s

R<sup>2</sup> MWS of prediction: 0.892 -

KS= 0.023 -

MBE WPD= -47.0 W/m<sup>2</sup>

MAE WPD= 290.1 W/m<sup>2</sup>

RMSE WPD= 496.0 W/m<sup>2</sup>

-----  
Sector: 7

	mast_WD	mast_WS	ref_WD	ref_WS
count	2643.0000	2643.0000	2643.0000	2643.0000
mean	205.8411	12.2014	210.9022	11.7492
std	16.8783	5.0156	8.4926	4.9465
min	41.0000	0.7150	195.0000	0.4700
25%	197.6000	8.6150	203.7000	8.2150
50%	206.6000	11.8850	211.6000	11.5000
75%	214.6000	15.5335	218.2000	15.1200
max	331.3000	31.1100	224.9000	29.2400

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.45219031 m/s

PreMAE= 1.120 m/s

PreRMSE= 1.469 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.923

KS= 0.042-

Timesteps: 2643 -

Sectorwise exemplary results of the concurrent period

WDdeviation: -4.430 °

PreMBE WPD= 157.7 W/m<sup>2</sup>

PreMAE WPD= 341.3 W/m<sup>2</sup>

PreRMSE WPD= 556.3 W/m<sup>2</sup>

Measured Weibull scale = 13.727 m/s

Measured Weibull shape = 2.606 -

Intercept: 0.756 m/s

Slope: 0.974 -

-----  
SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= 0.00000000 m/s

MAE= 1.040 m/s

RMSE= 1.391 m/s

R<sup>2</sup> MWS of prediction: 0.912 -

KS= 0.020 -

MBE WPD= -48.2 W/m<sup>2</sup>

MAE WPD= 323.2 W/m<sup>2</sup>

RMSE WPD= 532.8 W/m<sup>2</sup>

-----  
Sector: 8

	mast_WD	mast_WS	ref_WD	ref_WS
count	2510.0000	2510.0000	2510.0000	2510.0000
mean	234.2535	10.9522	239.4571	10.5023
std	21.2110	4.7418	8.7894	4.4987
min	16.0000	0.5930	225.0000	0.1000
25%	225.6000	7.6535	231.6000	7.3600
50%	235.2000	10.7675	239.3000	10.2900
75%	245.4000	13.9482	247.1000	13.3675
max	350.7000	31.8980	254.9000	27.4000

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.44989960 m/s

PreMAE= 1.152 m/s

PreRMSE= 1.545 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.903

Sectorwise exemplary results of the concurrent period

KS= 0.051-

Timesteps: 2510 -

WDdeviation: -3.653 °

PreMBE WPD= 163.6 W/m<sup>2</sup>

PreMAE WPD= 294.8 W/m<sup>2</sup>

PreRMSE WPD= 545.7 W/m<sup>2</sup>

Measured Weibull scale = 12.335 m/s

Measured Weibull shape = 2.455 -

Intercept: 0.434 m/s

Slope: 1.002 -

-----  
SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= 0.00000000 m/s

MAE= 1.057 m/s

RMSE= 1.478 m/s

R<sup>2</sup> MWS of prediction: 0.882 -

KS= 0.025 -

MBE WPD= -50.8 W/m<sup>2</sup>

MAE WPD= 267.8 W/m<sup>2</sup>

RMSE WPD= 498.6 W/m<sup>2</sup>

-----  
Sector: 9

	mast_WD	mast_WS	ref_WD	ref_WS
count	1828.000	1828.0000	1828.0000	1828.0000
mean	262.338	9.7427	268.7688	9.3332
std	24.041	4.2767	8.6366	4.1235
min	23.300	0.5420	255.0000	0.2200
25%	255.575	6.6005	261.3000	6.3900
50%	263.800	9.4625	268.1000	9.2000
75%	272.925	12.7353	276.2000	12.2225
max	358.400	30.8680	284.9000	28.3200

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.40957549 m/s

PreMAE= 0.966 m/s

Sectorwise exemplary results of the concurrent period

PreRMSE= 1.265 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.922

KS= 0.046-

Timesteps: 1828 -

WDdeviation: -3.183 °

PreMBE WPD= 109.3 W/m<sup>2</sup>

PreMAE WPD= 197.5 W/m<sup>2</sup>

PreRMSE WPD= 424.0 W/m<sup>2</sup>

Measured Weibull scale = 10.982 m/s

Measured Weibull shape = 2.432 -

Intercept: 0.450 m/s

Slope: 0.996 -

-----  
SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= 0.00000000 m/s

MAE= 0.896 m/s

RMSE= 1.197 m/s

R<sup>2</sup> MWS of prediction: 0.906 -

KS= 0.022 -

MBE WPD= -31.0 W/m<sup>2</sup>

MAE WPD= 182.2 W/m<sup>2</sup>

RMSE WPD= 400.3 W/m<sup>2</sup>

-----  
Sector: 10

	mast_WD	mast_WS	ref_WD	ref_WS
count	1280.0000	1280.0000	1280.0000	1280.0000
mean	292.4796	8.8901	299.1581	8.3815
std	23.9609	4.4891	8.5376	4.2482
min	1.5000	0.4620	285.0000	0.3500
25%	285.4000	5.6245	291.9000	5.3700
50%	294.3000	8.5935	298.7000	8.1800
75%	303.3250	11.4488	306.2000	10.7100
max	359.2000	25.6430	314.9000	26.6900

Sectorwise exemplary results of the concurrent period

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.50855547 m/s

PreMAE= 0.949 m/s

PreRMSE= 1.235 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.938

KS= 0.073-

Timesteps: 1280 -

WDdeviation: -4.024 °

PreMBE WPD= 121.6 W/m<sup>2</sup>

PreMAE WPD= 183.6 W/m<sup>2</sup>

PreRMSE WPD= 359.8 W/m<sup>2</sup>

Measured Weibull scale = 10.039 m/s

Measured Weibull shape = 2.082 -

Intercept: 0.314 m/s

Slope: 1.023 -

-----  
SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= -0.00000000 m/s

MAE= 0.847 m/s

RMSE= 1.121 m/s

R<sup>2</sup> MWS of prediction: 0.915 -

KS= 0.031 -

MBE WPD= -19.4 W/m<sup>2</sup>

MAE WPD= 158.6 W/m<sup>2</sup>

RMSE WPD= 336.2 W/m<sup>2</sup>

-----  
Sector: 11

	mast_WD	mast_WS	ref_WD	ref_WS
count	1190.0000	1190.0000	1190.0000	1190.0000
mean	316.5339	7.8390	330.9325	7.4515
std	51.5942	3.8824	8.9043	3.6839
min	0.1000	0.3870	315.0000	0.3800
25%	315.9000	4.9535	323.1000	4.5800
50%	327.1500	7.4245	332.4000	6.8550



Sectorwise exemplary results of the concurrent period

75%	336.2000	10.2772	338.6000	9.9900
max	359.9000	24.7050	344.9000	22.5400

-----  
PreDF\_KPI\_0, comparing measurements with reference

Wind speed related KPI

PreMBE= 0.38756050 m/s

PreMAE= 0.893 m/s

PreRMSE= 1.185 m/s

R<sup>2</sup> MWS of correlation between reference and measured: 0.917

KS= 0.066-

Timesteps: 1190 -

WDdeviation: -3.028 °

PreMBE WPD= 75.5 W/m<sup>2</sup>

PreMAE WPD= 128.4 W/m<sup>2</sup>

PreRMSE WPD= 261.5 W/m<sup>2</sup>

Measured Weibull scale = 8.850 m/s

Measured Weibull shape = 2.123 -

Intercept: 0.320 m/s

Slope: 1.009 -

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SelfDF\_KPI\_0, using self predictions

Wind speed related KPI

MBE= -0.00000000 m/s

MAE= 0.833 m/s

RMSE= 1.120 m/s

R<sup>2</sup> MWS of prediction: 0.896 -

KS= 0.039 -

MBE WPD= -20.4 W/m<sup>2</sup>

MAE WPD= 118.1 W/m<sup>2</sup>

RMSE WPD= 234.9 W/m<sup>2</sup>